U.S. Department of Energy
Environment, Safety, and Health

Tiger Team Assessment of the
Argonne Illinois Site

October 19, 1990

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This document contains findings and concerns identified during the Tiger Team Assessment of the Department of Energy’s (DOE’s) Argonne Illinois Site (AIS) in Argonne, Illinois. The Site includes the Argonne National Laboratory-East (ANL-E) and the New Brunswick Laboratory (NBL). The assessment also included a review of the Site A and Plot M Site, which is not a part of AIS. This assessment was directed by the Department’s Office of Environment, Safety and Health (ES&H) and was conducted from September 17, 1990, to October 19, 1990.

The AIS Tiger Team Assessment is comprehensive in scope. It covers the environmental, safety and health (including Occupational Safety and Health Act compliance), and management areas and determines the site’s compliance with applicable Federal (including DOE), state, and local regulations and requirements.

The AIS Tiger Team Assessment is one component of a larger, comprehensive DOE Tiger Team Assessment program to eventually encompass over 100 of the Department’s operating facilities. This assessment is part of a ten-point initiative announced on June 27, 1989, by the Secretary of Energy, Admiral James D. Watkins, USN (Ret.), to conduct independent oversight compliance and management assessments of the ES&H programs at DOE facilities. The objective of the assessment program is to provide the Secretary with information on the current ES&H compliance status of DOE facilities, root causes for noncompliance, adequacy of DOE and site contractor ES&H management programs, response actions to address the identified problem areas, and DOE-wide ES&H compliance trends and root causes.

Activities of the Tiger Team Assessment resulted in identification of findings or concerns and noteworthy practices. Deficiencies reported by the Environmental and Management Subteams are identified as findings, while those cited by the Safety and Health Subteam are identified as concerns. For purposes of this report, findings and concerns are equivalent. "Findings of fact" indicated in the Safety and Health portion of the report precede each concern and are factual items that support those concerns identified. In this regard, "findings of fact" in the Safety and Health portion of the report are similar to discussion portions of the Environmental and Management portions of the report. Findings and concerns are identified in the body of the text by an abbreviation and a number which relates to the subject area and the finding/concern number in that area. Both the table of contents and list of acronyms and abbreviations define these meanings.

October 1990
Washington, D.C.
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(Note: Appendix E is attached in microfiche)

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(Note: Appendix F is either attached in microfiche or available through the Argonne Illinois Site OSHA Team Leader.)
## GLOSSARY OF ACRONYMS AND ABBREVIATIONS

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<tr>
<td>AAO(*)</td>
<td>Argonne Area Office, U.S. Department of Energy</td>
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<tr>
<td>ACL</td>
<td>Acceptance Criteria List</td>
</tr>
<tr>
<td>AChL</td>
<td>Analytical Chemistry Laboratory</td>
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<tr>
<td>ADM</td>
<td>action description memorandum</td>
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<tr>
<td>AEC(*)</td>
<td>Atomic Energy Commission</td>
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<tr>
<td>AES</td>
<td>area emergency supervisors</td>
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<tr>
<td>AGHCF</td>
<td>Alpha-Gamma Hot Cell Facility</td>
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<tr>
<td>AIS(*)</td>
<td>Argonne Illinois Site</td>
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<tr>
<td>ALARA</td>
<td>as low as reasonably achievable</td>
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<tr>
<td>ALD</td>
<td>Associate Laboratory Director</td>
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<tr>
<td>AMLM</td>
<td>Assistant Manager for Laboratory Management</td>
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<tr>
<td>AM-PRO</td>
<td>AM-PRO Protective Agency, Inc.</td>
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<tr>
<td>AMOS</td>
<td>Automated Materials Ordering Center</td>
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<tr>
<td>ANL(*)</td>
<td>Argonne National Laboratory (East and West)</td>
</tr>
<tr>
<td>ANL-E(*)</td>
<td>Argonne National Laboratory-East</td>
</tr>
<tr>
<td>ANL-W(*)</td>
<td>Argonne National Laboratory-West</td>
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<tr>
<td>ANSI(*)</td>
<td>American National Standards Institute</td>
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<tr>
<td>APS</td>
<td>Advanced Photon Source</td>
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<tr>
<td>A^2R^2</td>
<td>Argonne Advanced Research Reactor</td>
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<tr>
<td>ASME(*)</td>
<td>American Society of Mechanical Engineers</td>
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<tr>
<td>AST</td>
<td>above ground storage tank</td>
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<tr>
<td>ATLAS</td>
<td>Argonne Tandem Linear Accelerator System</td>
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<td>AX</td>
<td>auxiliary systems</td>
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<tr>
<td>BFP</td>
<td>backflow prevention devices</td>
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<tr>
<td>BMPF(*)</td>
<td>Best Management Practice Finding</td>
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<tr>
<td>BOD$_5$</td>
<td>Biochemical Oxygen Demand Five-Day</td>
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<tr>
<td>Btu</td>
<td>British thermal unit</td>
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<tr>
<td>CAAC</td>
<td>Clean Air Act Code</td>
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<td>CAM</td>
<td>constant air monitor</td>
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<tr>
<td>CARES</td>
<td>calibration recall system</td>
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<tr>
<td>CEMP</td>
<td>Comprehensive Emergency Management Plan</td>
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<tr>
<td>CEQ</td>
<td>Council on Environmental Quality</td>
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<tr>
<td>CERCLA</td>
<td>Comprehensive Environmental Response, Compensation, and Liability Act</td>
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<tr>
<td>CF(*)</td>
<td>Compliance Finding</td>
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<tr>
<td>CFR(*)</td>
<td>Code of Federal Regulations</td>
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<td>CH(*)</td>
<td>U. S. Department of Energy, Chicago Operations Office</td>
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<td>CHCS</td>
<td>Criticality Hazards Control Statement</td>
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<tr>
<td>CL</td>
<td>control laboratory</td>
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<tr>
<td>CO</td>
<td>Contracting Officer</td>
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<td>COO</td>
<td>Chief Operations Officer</td>
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(*) Indicates acronyms or abbreviations not spelled out after the first usage in the body of the report.
GLOSSARY OF ACRONYMS AND ABBREVIATIONS (Continued)

COTR Contracting Officer’s Technical Representative
CP-2, CP-3 Chicago Pile 2, Chicago Pile 3
CPR cardiopulmonary resuscitation
CS Nuclear Criticality Safety
CWA Clean Water Act
CX categorical exclusions

D&D decontamination and decommissioning
DC direct current
DD Division Director
DOE(*) U.S. Department of Energy
DOE/OR U.S. Department of Energy, Oak Ridge Operations Office
DORS Design Operating Review System
DOT(*) U.S. Department of Transportation

EA Environmental Assessment
EAL emergency action level
EAP Employee Assistance Program
EBR II Experimental Breeder Reactor II
EBWR Experimental Boiling Water Reactor
ECFs environmental compliance forms
ECO Environmental Compliance Officer
ECR Environmental Compliance Representative
EIS Environmental Impact Statement
EH Assistant Secretary for Environment, Safety and Health, U.S. Department of Energy

EM Environmental Management
EMCL Environmental Monitoring Chemical Laboratory
EmPIP Emergency Plan Implementing Procedure
EOC Emergency Operations Center
EP emergency preparedness
EPA(*) U.S. Environmental Protection Agency
EPIPI Environmental Protection Implementation Plan
EPP Environmental Protection Program
ER Office Energy Research, U.S. Department of Energy
ES&H(*) Environment, Safety, and Health
ESHD(*) Environment, Safety, and Health Department, Support Services Division, ANL-E
ES&H/QA(*) Environment, Safety, Health, and Quality Assurance
ESSAP Environmental Survey and Site Assessment Program

FMEC Factory Mutual Engineering Company
FP fire protection
FPE Facilities Planning Engineering

(*) Indicates acronyms or abbreviations not spelled out after the first usage in the body of the report.
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<td>FPED</td>
<td>Facilities Planning and Engineering Department</td>
</tr>
<tr>
<td>FR</td>
<td>site/facility safety review</td>
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<tr>
<td>FTE</td>
<td>full-time equivalent</td>
</tr>
<tr>
<td>FUSRAP</td>
<td>Formally Utilized Site Remedial Action Program</td>
</tr>
<tr>
<td>FY</td>
<td>Fiscal Year</td>
</tr>
<tr>
<td>gpd</td>
<td>gallons per day</td>
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<tr>
<td>gpm</td>
<td>gallons per minute</td>
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<tr>
<td>GM</td>
<td>Geiger-Muller</td>
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<tr>
<td>GW</td>
<td>Groundwater</td>
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<tr>
<td>HAZMAT</td>
<td>Hazardous Materials</td>
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<td>HEPA</td>
<td>high efficiency particulate air</td>
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<td>HRS</td>
<td>Hazard Ranking System</td>
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<td>HSWA</td>
<td>Hazardous Solid Waste Amendments</td>
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<tr>
<td>HVEM</td>
<td>high voltage electron microscope</td>
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<tr>
<td>IAC</td>
<td>Illinois Administrative Code</td>
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<tr>
<td>IDNS</td>
<td>Illinois Department of Nuclear Safety</td>
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<td>IEPA(*)</td>
<td>Illinois Environmental Protection Agency</td>
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<tr>
<td>IFS</td>
<td>Integrated Fast Reactor</td>
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<tr>
<td>IH</td>
<td>industrial hygiene</td>
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<td>IHCL</td>
<td>Industrial Hygiene Chemistry Laboratory</td>
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<tr>
<td>INPO(*)</td>
<td>Institute of Nuclear Power Operations</td>
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<td>IPNS</td>
<td>Intense Pulsed Neutron Source</td>
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<td>IWS</td>
<td>Inactive Waste Sites</td>
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<tr>
<td>JANUS</td>
<td>JANUS Research Reactor</td>
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<tr>
<td>LDR</td>
<td>land disposal restrictions</td>
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<tr>
<td>LEPC</td>
<td>local emergency planning committee</td>
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<td>LLW</td>
<td>low level wastes</td>
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<tr>
<td>LSO</td>
<td>Laser Safety Officer</td>
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<tr>
<td>M&amp;O</td>
<td>Management and Operations</td>
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<td>MA</td>
<td>Maintenance</td>
</tr>
<tr>
<td>MED</td>
<td>Manhattan Engineer District</td>
</tr>
<tr>
<td>mg/l</td>
<td>milligrams per liter</td>
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<tr>
<td>MOU</td>
<td>Memorandum of Understanding</td>
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<tr>
<td>MS</td>
<td>Medical Services</td>
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<td>MSDS</td>
<td>Material Safety Data Sheets</td>
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<td>MTF</td>
<td>memorandum-to-file</td>
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<td>NBL(*)</td>
<td>New Brunswick Laboratory</td>
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<td>NCP</td>
<td>National Contingency Plan</td>
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(*) Indicates acronyms or abbreviations not spelled out after the first usage in the body of the report.
GLOSSARY OF ABBREVIATIONS AND ACRONYMS (Continued)

NDE  Nondestructive Evaluation
NEPA  National Environmental Policy Act
NESHAP  National Emission Standards for Hazardous Air Pollutants
NFPA(*)  National Fire Protection Association
NFSC  Nuclear Facilities Safety Committee
NGS  Neutron Generating System
NPDES  National Pollutant Discharge Elimination System
NPL  National Priorities List
NQA-1(*)  Nuclear Quality Assurance (ANSI/ASME NAQ-1, Quality Assurance Program Requirements for Nuclear Facilities)
NRC  National Response Center
NRDC  Natural Resources Defense Council
OA  organization and administration
OHS  Occupational Health and Safety
OJT  on-the-job-training
ONS  Office of Nuclear Safety
OP  operations
QQA  Office of Quality Assurance
OR  Occurrence Reporting
ORR  operational readiness review
OSHA(*)  Occupational Safety and Health Administration/Act
OSR  Operational Safety Requirement

PA  preliminary assessment
PCB  polychlorinated biphenyl
pCi/L  picocuries per liter
PEE  Project Environmental Evaluation
PFS  Plant Facilities and Services Division
PP  personnel protection
ppb  parts per billion
ppm  parts per million
PT  packing and transportation

QA(*)  quality assurance
QAC  Quality Assurance Coordinator
QAR  Quality Assurance Representative
QC  quality control
QES  Quality Assurance, Environment, and Safety Office
QV  quality verification

RAD  Radiation
RCRA  Resource Conservation and Recovery Act
RH  remote handled
RI  Remedial Investigation
RQ  reportable quantity

(*) Indicates acronyms or abbreviations not spelled out after the first usage in the body of the report.
GLOSSARY OF ABBREVIATIONS AND ACRONYMS (Continued)

RP  radiological protection
RSO  Responsible Supervisory Official
RSRC  Reactor Safety Review Committee
RTTD  Repository Technology and Transportation Division
SAR  Safety Analysis Report
SARA  Superfund Amendments and Reauthorization Act
SDWA  Safe Drinking Water Act
SEC  Safety and Environment Committee
SEN(*)  Secretary of Energy Notice
SEP  sample collection and preservation
SERC  State Emergency Response Commission
SES  Safety, Environment, and Safeguards
SHPO  State Historical Preservation Officer
SI  site inspection
SOP  standard operational procedure
SPCC  spill prevention, control, and countermeasure
SS  security/safety interface
SSD  Support Services Division
SW  surface water
SWMU  Solid Waste Management Unit
TC  training and certification
TCM  toxic and chemical materials
TDS  total dissolved solids
TEGD  Technical Enforcement Guidance Document
TRU  transuranic
TS  technical support
TSA  Technical Safety Appraisal
TSC  Transportation Safety Board
TSC  Technical Support Center
TSCA  Toxic Substances Control Act
TSR  Technical Safety Review
TSS  total suspended solids
TTA  Tiger Team Assessment
UC  University of Chicago
UOR  Unusual Occurrence Report
USGS  U. S. Geological Survey
UST  underground storage tank
VAMP  Victoreen area radiation monitor
WAC  waste acceptance criteria
WHPPM  Waste Handling Procedures Manual
WIPP  Waste Isolation Pilot Plan

(*) Indicates acronyms or abbreviations not spelled out after the first usage in the body of the report.
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>WM</td>
<td>Waste Management</td>
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<tr>
<td>WMCL</td>
<td>Waste Management Control Laboratory</td>
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<tr>
<td>WMO</td>
<td>Waste Management Office</td>
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<td>WS</td>
<td>Worker Safety and Health (OSHA) Compliance</td>
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EXECUTIVE SUMMARY

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EXECUTIVE SUMMARY

This report documents the results of the Department of Energy's (DOE) Tiger Team Assessment of the Argonne Illinois Site (AIS) (including the DOE Chicago Operations Office, DOE Argonne Area Office, Argonne National Laboratory-East, and New Brunswick Laboratory) and Site A and Plot M, Argonne, Illinois, conducted from September 17 through October 19, 1990. The Tiger Team Assessment was conducted by a team comprised of professionals from DOE, contractors, and consultants. The purpose of the assessment was to provide the Secretary of Energy with the status of Environment, Safety, and Health (ES&H) Programs at AIS.

Argonne National Laboratory-East (ANL-E) is the principal tenant at AIS. ANL-E is a multiprogram laboratory operated by the University of Chicago for DOE. The mission of ANL-E is to perform basic and applied research that supports the development of energy-related technologies. Management of Laboratory operations is assigned to the Argonne Area Office (AAO) under the Chicago Operations Office (CH). The Headquarters Offices with principal programmatic responsibilities for ANL-E are Energy Research, Nuclear Energy, Defense Programs, and Environmental Restoration and Waste Management.

Some operations at AIS were curtailed while the Tiger Team was onsite. Operations at the Argonne Tandem Linac Accelerator System (ATLAS) were curtailed and are being investigated because it was being operated without adequate shielding; hoisting and lifting operations, were curtailed by the Argonne Area Office; construction operations involving unsafe trench procedures were stopped and corrected; maintenance/service operations where safety harnesses were not being used as required, were curtailed by the site.

There are a significant number of ES&H findings and concerns identified in the report that require prompt management attention. A significant change in culture is required before ANL-E can attain consistent and verifiable compliance with statutes, regulations and DOE Orders. ES&H activities are informal, fragmented, and inconsistently implemented. Communication is seriously lacking, both vertically and horizontally. Management expectations are not known or commondated adequately, support is not consistent, and oversight is not effective.

ANL-E conducted a formal self-assessment prior to the arrival of the Tiger Team. While this represents a first step by ANL-E towards assessing its status relative to the Secretary's ES&H initiatives, the self-assessment is deficient in that it did not identify many issues identified by the Tiger Team nor did it address critical management issues and root causes.
Summary of Key Findings and Probable Root Causes

Environmental

The Environmental Subteam identified findings of potential noncompliance with Federal and state regulations and DOE Orders, and nonattainment of acceptable best management practices. However, none of these deficiencies present an immediate risk to public health or the environment.

Environmental findings, associated root causes, and observations of ANL-E operations illustrate a widespread lack of recognition and acceptance of the concepts of environmental protection and the importance of compliance with environmental regulations. The key areas of concern encompass inadequacies in the following programs: waste management; quality assurance; inactive waste sites identification, characterization, and management; and liquid discharges control.

In characterizing potential root causes, the Environmental Subteam constructed a three-tier system to define the relationship between the findings and root causes. The programmatic nature of many of the findings is such that the findings themselves are often root causes of other more specific findings. The single underlying root cause of the environmental findings is the failure to implement DOE’s environmental policy.

Safety and Health

Strengths were noted in experimental activities, packaging and transportation, nuclear criticality safety, and the general technical competence of the staff.

Safety and health concerns have generally suffered from lack of upper management support. Responsibilities and authority for safety are not clearly defined; maintenance of systems was deficient; the quality assurance program is deficient in planning, program execution, availability of trained personnel, quality control inspections, calibration, and generally suffers from systemic failure. Noncompliance with Federal and local regulations, and DOE Orders was widespread.

In the safety discipline area of worker safety and health [Occupational Safety and Health Act (OSHA)] compliance, a total of 581 noncompliance issues were identified. Of these, 92 percent (a total of 534) were considered "serious" and 8 percent (a total of 47) were considered "other than serious." Of particular note, is that two Category I and six of the eight Category II concerns noted during the assessment were in this area. The two Category I concerns involved imminent danger to personnel for failure to follow Federal safety regulations.

Principal concerns were the direct result of the lack of upper management, specifically in the following areas: developing and communicating clear lines of authority and responsibility for safety and health; developing a cohesive program to assure ES&H requirements are met; and developing and implementing
an effective self-assessment and followup program. There is an assumption throughout the Laboratory that "good science promotes acceptable safety," and that "additional safety gets in the way of research." As a result, deficiencies were widespread in the conduct of operations, comprehensive internal appraisal implementation, and OSHA compliance. The most significant deficiency was the lack of an effective and coordinated sitewide ES&H program.

Without an effective program that unifies the ES&H effort on a sitewide basis with clear authority and responsibilities defined, safety and health will be relegated to "second-class" status. This is unacceptable in light of the Secretary of Energy's ten-point initiatives. Improvement can be attained, if: (1) there is full acceptance of safety as an equal partner with the ANL-E research mission, (2) there is a sitewide approach to safety policy, (3) comprehensive procedures are developed, (4) training is considered an integral part of the program and conducted, and (5) a proactive approach to compliance with Federal regulations and DOE Orders is taken.

Management and Organization

ANL-E and CH are organizations that did not take steps to improve their ES&H-related performance until 1988/89. Current programs, organizations, and management practices are not sufficiently established to ensure full compliance with DOE requirements.

There are 51 management findings. Key findings indicated a need to improve top management leadership, communications and management awareness, line management support for ES&H/QA programs, policies and procedures, training, quality assurance (QA), and conduct of operations. There was a substantial lack of surveillance and oversight by ANL-E and CH. Problem identification, reporting, resolution, tracking, trending, and root cause analysis systems were not adequately developed to provide management the tools by which to monitor ES&H/QA implementation and status.

The Management Subteam identified five root causes for the findings and concerns identified in the assessment. ANL-E and DOE program management has not exhibited the leadership necessary to change a Laboratory culture that is resistant to meeting DOE ES&H objectives. CH and ANL-E policy and procedures are inadequate. Line managers have not met their responsibility for implementing ES&H requirements, and there is little accountability. There is a lack of guidance provided to emphasize the high priority on ES&H/QA in budget formulation and execution. Both CH and ANL-E management do not adequately monitor the implementation and status of ES&H/QA programs. A contributor to inadequate ES&H/QA performance is the lack of DOE headquarters Program Managers' emphasis on ES&H/QA objectives.
1.0 INTRODUCTION

On June 27, 1989, Secretary of Energy, Admiral James D. Watkins, USN (Ret.), announced a 10-point initiative to strengthen environment, safety and health (ES&H) programs and waste management operations in the Department of Energy (DOE). One of the initiatives involved conducting independent Tiger Team Assessments at DOE operating facilities. The Office of Special Projects in the Office of the Assistant Secretary for Environment, Safety and Health (EH) has the responsibility to conduct Tiger Team Assessments for the Secretary of Energy. This report presents the assessment of the Argonne Illinois Site (AIS) in Argonne, Illinois. AIS is the seventeenth DOE site to be reviewed by a Tiger Team.

Located on the AIS is Argonne National Laboratory - East (ANL-E), a multiprogram laboratory operated by the University of Chicago (UC) for DOE. The mission of ANL-E is performance of basic and applied research that supports the development of energy-related technologies. Management of ANL-E operations is assigned to the DOE Argonne Area Office (AAO) under the DOE Chicago Operations Office (CH). Major DOE program offices with programmatic responsibilities for ANL-E are Energy Research, Nuclear Energy, Defense Programs, and Environmental Restoration and Waste Management.

Also located on the AIS is New Brunswick Laboratory (NBL). Its mission is to serve as the Federal government’s nuclear materials measurements and standards laboratory and to provide technical expertise to support the government’s statutory responsibility for safeguarding nuclear materials. Administratively, NBL reports to CH, while programmatically, it is responsible to the Office of Safeguards and Security in Defense Programs.

Site A and Plot M were also included in the review and are inactive, decommissioned locations that were used by UC’s Metallurgical Laboratory as part of the World War II Manhattan Engineer District Project. Both areas are located in the Palos Park Forest Preserve (southwest of Chicago). Site A and Plot M are part of the DOE Formerly Utilized Site Remedial Action Program (FUSRAP).

1.1 PURPOSE

The purpose of the AIS Tiger Team Assessment is to provide the Secretary of Energy with concise information on

- current ES&H compliance status at the site and the vulnerabilities associated with that compliance status;
- root causes for noncompliance;
- adequacy of DOE and ANL-E ES&H management programs; and
- adequacy of response actions needed to address identified problem areas.

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This information will assist DOE in determining patterns and trends in ES&H compliance and probable root causes, as well as provide guidance for management to take needed corrective actions.

1.2 SCOPE

The scope of the AIS Tiger Team Assessment is comprehensive and includes an evaluation of applicable site management systems, facilities, and operations in the context of ES&H. The ES&H areas reviewed included, but were not limited to,

- compliance with applicable Federal, state, and local regulations, requirements, permits, agreements, and enforcement actions;
- compliance with DOE Order requirements for ES&H activities;
- compliance with the Occupational Safety and Health Administration/Act (OSHA) regulations and standards;
- adequacy of DOE and site ES&H management programs, including policy and procedures, internal oversight, planning and budgeting, organization, resources, training, and quality assurance;
- conformance with applicable "best" or "accepted industry practices;"
- identification of root causes; and
- identification of noteworthy practices.

1.3 APPROACH

The Tiger Team Assessment at AIS was conducted in accordance with the Tiger Team Guidance Manual (February 1990), the "Performance Objectives and Criteria for Technical Safety Appraisals at DOE Facilities and Sites" (June 1990), and generally accepted audit techniques. The assessment was conducted by a team of specialists from various DOE offices and support contractors. The team was managed by a senior DOE official and three experienced subteam leaders, one for each of the three disciplines of Environment, Safety and Health, and Management. Team members, with their areas of responsibility and work-related experience, are identified in Appendix A.

Each subteam focused on major facilities, operations, and systems to conduct a comprehensive evaluation that was representative of the overall status of the AIS ES&H programs. The Environmental Subteam performed an assessment of all applicable elements of the ANL-E and NBL environmental programs, as well as Site-A and Plot M. Environmental issues related to management were referred to the Management Subteam for followup. An evaluation of the adequacy of the AIS occupational safety/industrial safety program was conducted by the Safety and Health Subteam. This Subteam conducted a comprehensive, multidisciplined
Technical Safety Appraisal following protocols for these appraisals. Technical Safety Appraisals are operationally focused evaluations. As such, they appraise how safely a facility or site is being operated and the condition of equipment. To ensure consistency, the causal factors identified by all the subteams and during the management evaluation of the safety and health program are considered by the Management Subteam in the identification of probable root causes.

A systematic approach was implemented to perform the probable root cause analyses. This approach began with the analysis and evaluation of detailed background information and assessment data by the individual subteams to develop their findings and concerns. These individual findings were integrated by the subteams through identification of probable causal factors. The last step in the process was a collective determination of a set of probable root causes for the findings and concerns identified.

The Tiger Team Assessment process includes four distinct phases: planning, onsite assessment, reporting, and followup.

1.3.1 Pre-Assessment Planning

Planning for the assessment included the issuance of an introduction and information request memorandum, a pre-assessment site visit, an initial review of the requested documentation provided to the Tiger Team by CH, ANL-E, and NBL, and development of an assessment agenda.

The pre-assessment site visit by the Tiger Team Leader, the Environmental, Safety and Health, and Management Subteam Leaders, and representatives from the EH Office of Special Projects and Energy Research Program Office was conducted on August 16 and 17, 1990. The CH Acting Manager, the AAO Manager, ANL-E management, and NBL management provided overviews of site operations and the ES&H programs. The Tiger Team Leader and subteam leaders discussed the Tiger Team Assessment program and necessary support requirements for the onsite assessment. Federal, state, and local regulators were invited; and representatives of state and local agencies participated in the pre-assessment activity. Discussions were also held with union and collective bargaining unit representatives.

The assessment approach and agenda were provided to DOE, ANL-E, and NBL staff prior to initiation of the assessment so that counterparts for each technical area to be reviewed could be identified.

1.3.2 Onsite Activities

Onsite activities for the Assessment took place from September 17 through October 19, 1990. These activities included field observations; document reviews; observation of routine operations, emergency exercises, and the physical condition of the site and facilities; reviews of previous audits and assessments; and interviews with DOE, contractor, and subcontractor site
personnel, as well as personnel from Federal, state, and local regulatory agencies.

Using these sources of information, the Tiger Team developed issues that are reported as either findings (Environmental and Management), concerns (Safety and Health), or noteworthy practices. Section 1.3.3 discusses this development process in more detail.

The Tiger Team process was conducted in an open manner with the site, to enhance communication and to ensure the accuracy of information and issues. During the process, all three subteams conducted daily debriefing sessions which were open to site personnel. The daily debriefing sessions were well-attended, and site personnel actively participated in the sessions. In addition, the Tiger Team Leader held weekly meetings with senior managers from CH, AAO, NBL, and ANL-E to provide a summary overview of the team’s progress and to discuss major issues identified by the subteams. Prior to the closeout briefing, each subteam provided copies of draft findings and concerns to site personnel and conducted factual accuracy reviews.

The findings and concerns identified by the Safety and Health Subteam were verbally presented to representatives from DOE Headquarters, CH, AAO, ANL-E, UC, and NBL at a closeout briefing on October 12, 1990. The overall Tiger Team closeout briefing was conducted on October 19, 1990, for representatives from the organizations listed above and the Federal, state, and local regulatory agencies.

1.3.3 Reporting

Section 2.0 is an overall summary of the key Tiger Team Assessment findings, concerns, noteworthy practices, and probable root causes identified by the discipline subteams. Sections 3.0 through 5.0 contain the Environmental, Safety and Health, and Management findings and concerns, respectively. Section 6.0 addresses special safety concerns that were identified during the review, including those related to OSHA compliance. Section 7.0 addresses results of the Environmental Subteam’s evaluation of Site A and Plot M.

For the Environmental and Management Subteams, identified issues are categorized as either a "compliance finding (CF)," "best management practice finding (BMPF)," or "noteworthy practice." Compliance findings are conditions that, in the judgment of the Assessment Team, may not satisfy applicable ES&H regulations, DOE Orders (including internal DOE memoranda, where referenced), internal ES&H site operating standards, enforcement actions, agreements with regulatory agencies, or permit conditions. Best management practice findings are derived from regulatory agency guidance, draft DOE Orders, accepted industry practices, and professional judgment. Each finding is prefaced by a statement of an applicable performance objective. Performance objectives for compliance findings are derived from promulgated regulations and final DOE Orders, consent orders, agreements, and permit conditions. The performance objectives for best management practice findings are derived from regulatory agency guidance, accepted industry practices, and professional judgment. The
findings for the Environmental and Management Subteams are not necessarily arranged in order of relative significance.

The Safety and Health Subteam employed a reporting format that maintains consistency and integrity with the Technical Safety Appraisal process. Each identified issue was developed into a "concern," which is supported by findings of fact, and has the characteristics of being explicit (stating the problem), measurable (auditable), and justifiable. A concern addresses a situation that, in the judgment of the Subteam, meets one or more of the following criteria: (1) reflects less than full compliance with a DOE safety and health requirement or mandatory safety standard; (2) threatens to compromise safe operations; or (3) if properly addressed, would substantially enhance the excellence of that particular situation even though that part of the operation was judged to have a currently acceptable margin of safety. Because of this last category addressing the excellence of the operation, more concerns are reported than would result from a strictly compliance-oriented assessment. Each concern is categorized by its seriousness, potential hazard consideration, and compliance consideration. Findings of fact and concerns are prefaced by a statement of the performance objective in each discipline area.

The objective of the OSHA portion of the review of AIS facilities was to measure workplace safety and health against OSHA regulations. OSHA's General Industry Standards (29 CFR 1910) and Construction Industry Standards (29 CFR 1926) were used as criteria. A full report of the OSHA assessment is in Appendix F.

The Management Subteam evaluated the effectiveness of ES&H Program management processes to identify findings and further insights into probable root causes for ES&H findings and concerns developed by the other subteams. The Management Subteam's findings were derived from analysis of key management areas that impact on ES&H activities, and considered DOE policy and Orders, generally accepted management principles, and industry standards. The Management Subteam categorized findings as either "Compliance Findings" or "Best Management Practice Findings." Each finding is supported by a summary and discussion which identifies further detail as to the background, factual basis, and, where appropriate, management implications of the finding.

In addition to identifying findings and concerns, the subteams looked for exceptional practices in accomplishing performance objectives or meeting ES&H objectives. Any noted exceptional practices, which may have general application at other DOE facilities, are identified as "Noteworthy Practices," and are documented for the purpose of information transfer.

The assessment reflects a fixed point in time. Improvements in the ES&H areas that were planned, but were not completed at the time of this assessment, are identified in the report to provide a complete and accurate picture of the site's conditions from the onset of the assessment.

This Draft Tiger Team Report was transmitted to the Acting Manager, CH; AIS management personnel, DOE Headquarters program senior officials, and Federal, state and local regulators for technical and factual accuracy review following
the closeout meeting. Upon receipt of comments, the Tiger Team will be responsible for preparation and issuance of the final report, incorporating review comments, suggested changes, and modifications, as appropriate.

1.3.4 Followup

CH and ANL-E will prepare a draft action plan that addresses the findings and concerns identified by the Tiger Team Assessment. The draft action plan will be submitted by the Acting Manager, CH, to the appropriate Secretarial Program Office for submission to EH-1 for review and concurrence. The Secretary will approve the final action plan and direct its implementation.

1.4 SITE DESCRIPTION

AIS occupies a 1,700 acre site in DuPage County, Illinois, approximately 22 miles southwest of downtown Chicago, Illinois (See Figure 1.1). The site has facilities for ANL-E and NBL. AIS is surrounded by the Waterfall Glen Forest Preserve, a 2,040 acre public recreational area. Most of this land was formerly ANL-E property but was deeded to the DuPage County Forest Preserve District in 1973 for use as a public recreational area, nature preserve, and demonstration forest. Clustering of facilities at AIS has resulted in substantial open space between major facilities. Naturally wooded plots have been preserved and considerable portions of the site have been reforested. Approximately 55 acres is retained as parkland on the site for staff recreational activities. The site plan and major program support locations at AIS are shown on Figure 1.2.

Site A and Plot M are located in the Palos Park Forest Preserve, approximately two miles southeast of AIS. Both areas were decommissioned in 1956. Site A is a 19-acre area that contained experimental laboratory and nuclear reactor facilities, and Plot M is a 150 ft by 140 ft area used for the burial of radioactive waste. Operations at Site A ceased in 1954, and burial operations at Plot M were discontinued in 1949, after both sites had been active since 1943 as part of UC’s Metallurgical Laboratory, which was part of the World War II Manhattan Engineer District Project.

1.5 OVERVIEW OF MAJOR SITE OPERATIONS

ANL-E is a large multi-program laboratory operated by UC under contract for DOE. Major components of ANL-E’s traditional mission include: (1) development and operation of national research facilities for use in research on basic and technology-related problems; (2) basic experimental and theoretical research on fundamental problems in the physical, life, and environmental sciences to support development of energy technologies; (3) technology-directed research in advanced fission reactors and other technologies for energy applications; and (4) technical evaluation support to DOE and other Federal agencies on nationally important projects and technology options.

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Figure 1.1 Location of Argonne Illinois Site
Figure 1.2 Argonne Illinois Site - Major Areas
NBL, which functions as a plutonium and uranium measurement and analytical chemistry laboratory in support of its nuclear materials measurements and standards mission, is located on the site.

Major facilities at ANL-E include the light-water-cooled and moderated biological research reactor (JANUS), the Argonne Tandem Linac Accelerator System (ATLAS), a 22-MeV pulsed electron LINAC, a 60-inch cyclotron, other Van de Graaf and dynamitron accelerators, the Intense Pulsed Neutron Source (IPNS), cobalt-60 irradiation sources, chemical and metallurgical plutonium laboratories, and several hot cells and laboratories designed for work with multicurie quantities of actinide elements and irradiated reactor fuel materials.

Major programs include: energy technology research in fission reactor technology, fossil energy, superconductivity, and fusion energy; nuclear energy research focusing on liquid metal reactors, light water reactors, and nuclear waste management (including design of the Integral Fast Reactor, fast reactor physics and safety, reactor component development, and reactor core design); basic research in human health, human effects, environmental, and general life sciences; and energy research in magnetic fusion development and technology, high energy physics, medium energy, heavy ion nuclear physics, and materials. ANL-E also conducts programs and projects in support of the DOE Offices of Conservation and Renewable Energy, Fossil Energy, and Defense Programs. Work for others than DOE includes research involving the Reduced Enrichment/Research Test Reactor and the Strategic Defense Initiative.
KEY FINDINGS, ROOT CAUSES and
NOTEWORTHY PRACTICES
2.0  KEY FINDINGS, ROOT CAUSES, AND NOTEWORTHY PRACTICES

2.1  ENVIRONMENTAL

2.1.1  Key Findings

The Environmental Subteam has identified four key findings, each of which is comprised of several of the findings in Section 3.5. Although the component findings may not by themselves appear to be significant, taken together they represent those issues of greatest concern. The key findings are as follows:

- Programs for the management of waste are not adequate to ensure that wastes are handled in accordance with DOE Orders and environmental regulations.
- Quality assurance at ANL-E is not adequate to assure the effectiveness of environmental programs.
- There is an inadequate program to identify, characterize, and manage inactive waste sites.
- Inadequate programs to control liquid discharges have led to NPDES permit exceedances and unpermitted discharges.

A more detailed discussion of key findings is presented in Section 3.4.

2.1.2  Root Causes

The task of characterizing the environmental root causes is complemented by the nature of the assessment approach taken by the Environmental Subteam and the findings. The approach taken and the resultant findings are programmatic; that is, the assessment focuses on the structure and effectiveness of programs rather than isolated incidents of nonconformance with regulations, Orders, and best management practices. This results in findings which may themselves be among the causal factors of other less global findings.

In order to better define their relationship to the findings, the Environmental Subteam has chosen to represent the potential causal factors and root causes as a set of interrelated tiers. This should also help in the development of corrective actions. The potential environmental root causes are shown schematically in Figure 2.1. At the tier closest to the environmental findings (Tier 1) are five root causes: (1) allocation of resources, (2) procedures, (3) training, (4) communications, and (5) performance indicators.
• Allocation of Resources

There cannot be effective environmental protection without sufficient resources to conduct the necessary activities. In this context, resources include sufficient levels of staffing throughout the organization with the skills and experience necessary to accomplish their tasks, adequate facilities, and management able to identify and prioritize those activities needed to achieve environmental goals. This does not necessarily mean that resources within the organization are inadequate, but rather that they may not be used in the most effective manner. The Environmental Subteam has observed that at ANL-E, insufficient resources are being devoted to environmental activities, both within support organizations and the research divisions. Sufficient resources are necessary to prepare the procedures and programs needed for environmental protection, and to provide the training and oversight necessary for their implementation.

• Procedures

ANL-E has a general lack of formal procedures to control environmental protection activities. Rather than relying on a system of formally controlled, well-documented procedures and guidance documents, ANL-E has relied upon an informal system based on such elements as verbal instructions, memoranda, "word of mouth," and the assumption that the individuals know their jobs. This has many weaknesses that become apparent and often lead to environmental protection difficulties as a consequence of staff turnover and ever-evolving environmental regulations. Formal procedures and guidance, and a system for their control are effective in clearly establishing the requirements to which personnel must conform. Procedures also help form the basis for developing training programs and establishing meaningful performance indicators.

• Training

Environment-related training at ANL-E is too informal to ensure that personnel understand their roles and responsibilities in protecting the environment. ANL-E has a staff of highly skilled individuals who are extremely knowledgeable about many aspects of their responsibilities and in many research areas are developing state-of-the-art technologies. This has fostered the wide-spread impression that formal training programs are unnecessary because the experienced personnel appear to know their jobs and new employees can learn all they need to know from their colleagues. Unfortunately, such informal on-the-job training does not have the type of control that is necessary to ensure a consistent level of training or understanding of environmental requirements. There are formal training courses in some environmental areas, offered by individual organizational Divisions, but these are often not sufficiently well-controlled or documented to ensure that all personnel who require this training receive it. In addition, there is no sitewide program to identify all environmental training needs. On the basis of interviews, the Environmental Subteam concluded that ANL-E personnel
Figure 2.1 Environmental Root Causes
generally had only a limited knowledge of the relationship between their job responsibilities and environmental protection.

- **Communication**

Effective implementation of environmental programs requires that there be a free flow of information between managers at all levels and ANL-E personnel. Two-way communication is essential for all personnel to understand the importance of environmental protection and its relationship to ANL-E’s programmatic goals, and for management to remain cognizant of the effectiveness of the implementation of DOE’s environmental policy. Communication of the importance of environmental issues is deficient at ANL-E and is one of the factors leading to many of the findings.

- **Performance Indicators**

A system to control environmental protection activities requires that management oversight groups have adequate knowledge of the extent to which these activities are being effectively accomplished. This, in turn, requires that a comprehensive set of performance indicators be developed. These would provide the information necessary to evaluate the adequacy of procedures and training, and the effectiveness of environmental protection programs. In addition, such information aids in the identification of problem areas and development of corrective actions. In general, ANL-E is lacking not only a system to make effective use of performance indicators, but also does not have a sufficiently well-developed environmental quality assurance program to produce the type of information that is needed to nurture such a system. Where formal inspections or appraisals are in use, the findings are not sufficiently well documented, tracked, trended, or used in a way that allows early identification of problem areas and development of comprehensive corrective actions.

While the first tier causal factors relate directly to most of the findings, the question that must be asked is why these problems exist. The Environmental Subteam has concluded that the second tier probable root cause is that ANL-E has not developed formal, comprehensive plans and programs that define and control key elements of environmental protection. Environmental protection is complex, requiring the integration of many regulations and DOE Order requirements, and coordination of the activities of all the organizational units within ANL-E. This can be accomplished only through planning, development, and implementation of detailed, well-considered, structured programs that address the environment-related responsibilities of all ANL-E operations. The relationship between all corollary plans, programs, procedures, and operations, must be clearly established and well defined. The basic precepts and technical details must be communicated to the appropriate personnel through procedures, training, and other means; and a system for tracking performance must be in place to keep management apprised of the effectiveness of programs and conformance to environmental requirements at...
ANL-E. These concepts have not been incorporated into the ANL-E management system and ANL-E does not have the formality necessary to ensure that DOE Orders and environmental regulations are implemented.

As with Tier 1, there is an underlying cause for Tier 2; this is the failure of ANL-E to implement DOE's environmental policies. Three key elements for effective environmental policy implementation are: (1) authorities, responsibilities, and accountabilities must be clearly designated throughout the organization; (2) management must be knowledgeable of and experienced with the types of strategies necessary to implement the positive control required for environmental protection; and (3) the organization must possess and allocate at all levels, the appropriate technical expertise to develop compliance programs.

At ANL-E, the authority and responsibility for environmental protection is delegated to the Division Managers. However, they are not held accountable to anyone within ANL-E for their Divisions' environmental performance. Further, environmental authorities and responsibilities are not defined within the Divisions, or between research Divisions and environmental management Departments such as Waste Management, or Environment, Safety and Health. In addition, ANL-E does not have sitewide environmental performance standards to which all personnel are held accountable. Without strongly defined authorities, responsibilities, and accountabilities, implementation of DOE's environmental policies is unlikely to occur.

Implementation of environmental policies requires an understanding of various organizational strategies for designing and coordinating wide ranging environmental programs that will impact all organizational elements and staff members of ANL-E. The management and organization of environmental protection requires the development of implementation strategies that will provide control and oversight such that environmental issues are considered in the conduct of all activities, whether within environmental management departments or research departments. The Environmental Subteam has not seen evidence that ANL-E has the knowledge or experience with the type of all-encompassing organizational systems needed to implement environmental policies.

The third element needed for policy implementation is the allocation, at all levels of the organization, of applicable technical expertise in environmental areas. While it is clearly not necessary that all managers be experts in environmental protection, a certain level of technical understanding is necessary for all of them, if they are to recognize the significance of potential ANL-E impacts on the environment, and the need for action. Further, it is essential that ANL-E has, at the appropriate organizational levels, and within the appropriate divisions, the expertise to develop and implement environmental plans, programs, and procedures, as well as to provide the necessary oversight. The Environmental Subteam has observed that many managers do not have a sufficient understanding of environmental principles to allow them to recognize what must be done to achieve environmental excellence. Further, it is not apparent that ANL-E has the environmental professionals necessary to design and direct effective environmental activities.

2-5
Implicit in each probable root cause at each level is attitude. Environmental protection will happen only when everyone wants it to happen and makes a concerted effort to make it happen. At ANL-E, the Environmental Subteam found that there was no widespread recognition or acceptance of the concepts of environmental protection and the importance of compliance with environmental regulations. A common attitude in organizations such as ANL-E is that research efforts are the most important activities and that ES&H activities are nonessential support or, at best, someone else’s job. Even within the ranks of the ES&H personnel, a not uncommon attitude was that current practices are "good enough" or that commitment to the letter of the regulations and DOE orders is adequate; and that their spirit did not matter. If ANL-E is to achieve environmental excellence, everyone must recognize and accept the importance of this task.

Beyond the third tier of the environmental root causes lie those identified by the Management Subteam. The environmental third tier root cause, and indeed the root causes of all three tiers, follow from those identified as the management probable root causes.
2.2 SAFETY AND HEALTH

2.2.1 Key Concerns

The Health and Safety Subteam identified concerns in all of the safety disciplines examined during the appraisal. The most important concerns, based on hazard severity and compliance considerations, were related to Organization and Administration, Operations, Worker Safety and Health (OSHA) Compliance, Training and Certification, Facility Safety Review, Personnel Protection, and Fire Protection.

The key concerns in these areas indicate:

- ANL-E management has not clearly defined ES&H organizational functions and safety responsibilities for the site.
- Operations at many ANL-E facilities are not being conducted in a manner that achieves safe and reliable operations, as required by DOE Orders (e.g., ATLAS and Plutonium Laboratories [Bldgs. 200 and 212]).
- There is widespread noncompliance with OSHA requirements at ANL-E. Both of the Category I concerns and six of the eight Category II concerns found during the assessment involved noncompliance with OSHA requirements.
- ANL-E top management has not established a mechanism to ensure that the training and qualification requirements of DOE Orders, and Federal, state, and local regulations are met or enforced.
- ANL-E has not implemented a comprehensive internal appraisal system that provides for review of ES&H functions, as required by DOE 5482.1B.
- ANL-E management permitted its organizational divisions to independently adopt policies and procedures which could limit the Chief Operations Officer’s (COO) involvement in the health and safety program. This situation makes it difficult for the COO to verify, with any real degree of assurance, that health and safety requirements are being met.
- The Environment, Safety and Health Department has not fulfilled its responsibility for keeping the ANL-E Health and Safety Manual updated in accordance with current requirements, and ANL-E organizational divisions have not achieved compliance with many health and safety standards.
- Plans and specifications for site and facility projects and safety-related documents were not all reviewed by the Environment, Safety, and Health Department for conformance with fire protection standards, as required by DOE 5480.4 and DOE 5480.7.
Two Category I concerns were found involving situations where a clear and present danger existed for workers involved. Eight Category II concerns were also discovered involving significant risks or substantial noncompliance with DOE Orders (but not involving situations where a clear and present danger existed to workers or the public). These concerns are summarized below.

- Both Category I concerns were in the Worker Safety and Health (OSHA) Compliance safety discipline area.

The first involved a trenching operation. An employee was observed working in an unshored 8-foot trench with loose and sloughing sides. There was no ladder for quick egress, and there was a backhoe working in the trench.

The second Category I concern involved window washers at Bldg. 201 (a three story building). They were observed working near the edge of the building without wearing safety harnesses.

- Six of the eight Category II concerns were also in the Worker Safety and Health (OSHA) Compliance safety discipline area.

Two 480-volt disconnects were located in an area where operation of the disconnects would require standing in water.

Locking devices were installed on closed breakers, preventing manual operation in an emergency.

Eighty-four of 92 machines observed throughout the site were modified to bypass safety disconnects.

Egress paths from buildings in several areas sitewide did not have emergency lighting or exit signs, and were blocked.

Cranes, hoists, and rigging equipment used throughout the site were not maintained and tested in accordance with OSHA requirements.

A propane gas cylinder was leaking in an area which was not designated as a non-smoking area.

- Operations:

Activities at the Argonne Tandem Linear Accelerator System (ATLAS) were not conducted in a manner to achieve safe and reliable operations, as specified in ANSI N43.1 and as required by DOE 5480.4. See also Section 6.0 of this Report.
2.2.2 Emergency Preparedness:

The ANL-E Comprehensive Emergency Management Plan and emergency response organization do not meet the requirements established in DOE 5500.2A, DOE 5500.3, and Draft DOE 5500.3A. Although ANL-E has made progress in this area, greater effort is required to achieve full compliance with DOE Orders.

2.2.2 Root Causes

One root cause and three second tier root causes have been identified for the deficiencies in ANL-E safety and health performance:

Root Cause

ANL-E management maintains a research-oriented philosophy in which researchers and their management are extended maximum latitude for creative freedom. However, they are not being held accountable for their overall responsibilities and actions, and there is not sufficient independent oversight of ES&H activities to keep management fully informed.

Second Tier Root Causes

- There is too much autonomy given to Associate Laboratory Directors and organizational divisions, relative to incorporating safety and safety reviews into their operations.
- There is a lack of understanding and involvement by top management in assuring safety is truly integrated into site operations.
- The roles, responsibilities, and authorities of the distinct organizational units reporting to the Associate Laboratory Directors and the Chief Operations Officer are unclear.

2.2.3 Noteworthy Practices

One noteworthy practice was identified in the discipline of Medical Services. In the conduct of comprehensive evaluations, the process is computerized to a large extent. Blood counts and chemicals, audiometry data, urine tests, blood pressure, height and weight, chest x-ray, pulmonary functions, and EKG results are entered. Soon, visual acuity will be included. At the time a patient visits for a physical examination, a computer printout is available on the patient's chart, which provides the physician with a concise display of all of the data indicated for the past ten visits.
2.3 MANAGEMENT

2.3.1 Key Findings

A total of 51 findings were identified by the Management Subteam; 31 directed to ANL-E, 19 directed to CH, and one directed to the Office of Energy Research. Of this total, 19 have been identified as KEY. These key findings address the more significant management issues and practices that are adversely impacting the site's ability to achieve excellence in ES&H/QA performance:

ANL-E Management Actions
Oversight by the Office of Energy Research

Attainment of improvements in Environment, Safety, and Health/Quality Assurance (ES&H/QA) programs and performance is critically dependent on strong leadership and support from site and Program Office Managers. Site managers and supervisors do not provide constant and visible reinforcement to employees in order to attain a change in workforce attitudes.

ANL-E Implementation of DOE Directives
ANL-E Policy and Guidance for ES&H/QA
ANL-E Line Management Support of ES&H/QA Training

The ANL-E management philosophy establishes minimum Laboratory-wide requirements and provides maximum flexibility to operating Divisions in the development of procedures. This concept does not provide assurance that DOE ES&H/QA requirements will be adequately reflected in operating procedures.

Conduct of Independent Oversight Activities
ANL-E Trending, Root Cause, and Lessons Learned Programs (Two Findings)
ANL-E Self-Assessment Program
ANL-E QA Program

The ANL-E Self-Assessment identified 56 percent of the findings and concerns identified by the Tiger Team. ANL-E management is not sufficiently cognizant of the actual status of ES&H/QA performance. Internal programs should be established to provide top management with accurate information. Likewise, CH needs to increase the effectiveness of its programs that assess ANL-E ES&H/QA performance.
ES&H/QA Collateral Duties
Roles and Responsibilities (ANL-E)
Line Manager’s Responsibility (CH)
Tracking ES&H Commitments (Two findings)

This review determined that line managers are not adequately executing their line responsibilities for ES&H/QA performance. Management expectations regarding ES&H/QA responsibilities must be clarified and organizational, personnel, and performance evaluation systems need to be appropriately used for reinforcement.

 Guidance for Budget Formulation (Two findings - CH & ANL-E)
Validation of Budgets (Two findings - CH & ANL-E)

Plans for achieving improvements in ES&H/QA performance are not prepared at CH and ANL-E, and budgets are not based on an analysis of ES&H/QA needs. Budget and execution assumptions and priorities are not adequate to achieve excellence in ES&H/QA performance.

2.3.2 Root Causes

ANL-E top management and DOE program management do not exhibit adequate leadership in ES&H/QA performance.

The ANL Board of Governors issued a policy statement over a year ago making ES&H/QA the highest priority in Laboratory operations. It took over a year for Laboratory top management to issue a revision to its Policy Manual to reflect this significant policy change. The Laboratory Director has only sent three memos to employees in the last three years which place emphasis on ES&H/QA matters. The "State of the Laboratory" statements by the Director for 1989 and 1990 do not address and reinforce the high priority to be placed on ES&H/QA matters for operations nor emphasize the need for a changed culture to meet these requirements. The Laboratory Director and the Associate Laboratory Directors spend the vast majority of their time working on programmatic aspects for Laboratory operations, with relatively little time devoted to ES&H/QA matters. Lack of active and visible involvement in ES&H/QA matters sends mixed signals from top management, resulting in many ANL-E employees who do not believe that ES&H/QA has the highest priority in Laboratory activities. Consequently, the ES&H/QA performance at ANL-E is inadequate.

DOE program management has not provided adequate emphasis on the highest priority to be given to ES&H/QA requirements in conducting programs. Without a clear demonstration by DOE program management on their commitment to ES&H/QA excellence, this goal will not be achieved.
ROOT CAUSE

CH and ANL-E Policy and Procedures for ES&H/QA are inadequate.

CH has no assurance that they have determined the applicability of all DOE Orders, Notices, etc., and transmitted appropriate direction to ANL-E. CH does not maintain a listing of DOE Orders transmitted to ANL-E for implementation. The applicability of DOE Orders must be defined and transmitted by the DOE Contracting Office before they are binding on ANL-E.

There is inadequate assurance that DOE Orders and other directives are reflected in ANL-E policies and procedures; in addition, many deficiencies were found in ANL-E policies and procedures. Because policy implementation is the responsibility of the autonomous ANL-E divisions, there is no management control system to prevent nonstandard implementation and assure that appropriate requirements are reflected in division procedures. In addition, there is no discipline to assure that procedures are followed.

ROOT CAUSE

CH and ANL-E Management are not adequately performing oversight responsibilities of their ES&H/QA programs.

ANL-E management has not demonstrated the same degree of inquisitiveness regarding ES&H/QA performance as they have regarding technical and scientific performance. The Laboratory Director has established accountability for ES&H/QA performance at the Division level but has not established a system to provide feedback about the effectiveness of the ES&H/QA program. Combined with the overall latitude allowed line organizations, this has led to numerous findings of non-compliance in most areas of the ES&H/QA program.

The internal oversight program is not effective at ANL-E and CH due in large part to a lack of self-evaluation and feedback mechanisms which would allow management to be aware of the status of ES&H programs. Good people will do a good job but there must be an ongoing independent validation of performance with feedback to ensure that the intent of management is carried out. This has not occurred with the internal oversight process for ES&H/QA activities.

Organizational elements have been established to implement the ES&H/QA support and oversight program and line management has been made accountable for ES&H/QA at both ANL-E and CH. However, ANL-E and CH management have not monitored performance adequately to determine the systems that are not working, identify why not, and implement corrective actions. The reliance on the lower levels of the organization to work things out has led to numerous organizational interface problems and frequent lack of resources required to meet DOE ES&H/QA requirements.
**ROOT CAUSE**

Line managers have not adequately exercised their responsibility for implementing ES&H/QA requirements nor have they been held accountable for not doing so.

The Laboratory Director made it clear that line managers were responsible for implementing ES&H/QA and were to be held accountable. However, the large number of non-compliance findings found during this assessment demonstrate that ES&H/QA implementation has not taken place.

Commonly observed line management attitudes that compliance with ES&H requirements is optional, that they have the latitude to interpret whether requirements are "reasonable," or that compliance is unimportant, indicate that line managers have not accepted their ES&H/QA responsibility, whether or not they understand it. The lack of use of ES&H/QA professional resources which are available further demonstrates that line managers have not accepted their responsibility to implement requirements.

There are no systems in place to hold line managers accountable. Performance plans do not include ES&H/QA responsibilities, performance appraisals do not adequately reflect ES&H/QA performance, ES&H/QA goals are not set, and self-assessments have not occurred. Tracking, trend analyses and other measurement tools did not exist.

**ROOT CAUSE:**

There is inadequate prioritization, guidance, and independent validation of resource requirements for ES&H/QA.

There is a general lack of guidance provided to emphasize the high priority to be placed on ES&H/QA in budget formulation and program execution. Neither CH nor ANL-E perform an adequate, independent validation of estimates to assure the adequacy of ES&H/QA needs and priorities. There is no Laboratory-wide oversight of ES&H/QA program execution. These factors, coupled with the broad latitudes permitted the ANL-E Divisions to plan and perform programs without adequate independent validation, results in little confidence that ES&H/QA needs and priorities are appropriately planned and executed.
2.3.3 Noteworthy Practice

Board of Governor's Safety and Environment Committee

Noteworthy Practice: The University of Chicago's Board of Governors for Argonne National Laboratory established a standing Safety and Environmental Committee (SEC) in April 1989. Since its establishment, the SEC has demonstrated that it has the potential for contributing significantly to the achievement of ES&H/QA enhancements at ANL-E.

The establishment of the SEC is noteworthy in that it represents a proactive measure by a non-profit organization to exercise its responsibility for stewardship over the Laboratory, to set overall ES&H/QA policy consistent with DOE policy, to establish an implementation plan for that policy, and to monitor the state of ES&H/QA performance at ANL. SEC membership includes highly regarded former executives from Commonwealth Edison, Consolidated Edison, Dow Chemical, and a former Secretary of Environment for the State of Florida.

The SEC's activities have included review of Laboratory organization for the Board, onsite evaluations of ES&H/QA performance, assessments of specific ES&H/QA issues, and review and evaluation of the ANL-E self-assessment. The SEC issued its first report to the Board of Governors in the spring of 1990, noting many of the issues contained in the ANL-E self-assessment. The SEC has caused and encouraged the Laboratory to make the few improvements in its ES&H/QA programs noted to date.

The Committee has demonstrated a detailed understanding of Laboratory ES&H/QA issues and has stated its intention to continue to provide oversight of ANL activities to assure satisfactory resolution of current and future ES&H/QA findings and program concerns.
3.0 ENVIRONMENTAL ASSESSMENT

3.1 PURPOSE

This section presents the findings made by the Environmental Subteam during the Tiger Team Assessment of the Argonne National Laboratory-East (ANL-E) in Chicago, Illinois. The assessment was conducted from September 17 through October 19, 1990. ANL-E is a Department of Energy (DOE) multipurpose energy research laboratory. The DOE New Brunswick Laboratory, a Government-owned/Government-operated facility, is located within the boundaries of the ANL-E site and was included in the assessment. The results of the environmental portion of the Tiger Team Assessment will provide the Secretary of Energy with information on current environmental regulatory compliance status and associated vulnerabilities of each facility, root causes for noncompliance, adequacy of DOE and site contractor environmental management programs, and response actions to address the identified problem areas; and will aid in tracking DOE-wide environmental compliance trends.

3.2 SCOPE

The scope of the ANL-E environmental assessment was comprehensive, covering all environmental media and applicable Federal, state, and local regulations and requirements, DOE Orders, and best management practices. The environmental disciplines addressed in this assessment include air, surface water, groundwater/soil, waste management, toxic and chemical materials, radiation, quality assurance, inactive waste sites, requirements of the National Environmental Policy Act (NEPA), and environmental management.

3.3 APPROACH

The Environmental Subteam Assessment of the ANL-E was conducted in accordance with the Tiger Team Guidance Manual (February 1990) and followed accepted audit techniques. The assessment was conducted by a team managed by a Team Leader and Assistant Team Leader from the DOE Office of Environmental Audit and technical specialists from other DOE offices and support contractors. The names, responsibilities, affiliation, and biographical sketches of the team members are provided in Appendix A.

The Environmental Assessment of ANL-E included three phases: planning, onsite activities, and reporting. The Environmental Assessment Plan, which outlines the key issues to be addressed, general approach, and specific onsite activities, is provided in Appendix B. The Environmental Subteam Tentative Agenda, included as part of the Assessment Plan, details the planned daily activities of the team. The finalized daily agenda is included as Appendix C. Appendices D and E reflect the Contact/Interviews and Site Documents, respectively, that the Environmental Subteam used in developing its assessment and findings.

A pre-assessment site visit was conducted on August 15 and 17, 1990, to explain the purpose and assessment methodology to ANL-E and DOE Chicago Operation Office (CH) and Argonne Area Office (AAO) personnel. Meetings were held with state and local environmental regulators and collective bargaining unit officials to explain the process.

The onsite activities for the environmental assessment took place from September 18 through October 19, 1990. Onsite activities included: document review;
observation of site operation; interviews with DOE and site-contractor staff, and personnel from Federal and state regulatory agencies; review of previous surveys, audits, and self-assessments; Environmental Subteam daily debriefs; and the development of the findings presented in this section of the report.

The Environmental Subteam identified findings in two categories: Compliance Findings (CF) and Best Management Practice (BMP) Findings. Compliance findings are conditions that, in the judgment of the assessment team, may not satisfy environmental regulation, applicable DOE Orders (including internal DOE memoranda, where referenced), consent orders, agreements with regulatory agencies, or permit condition. BMP findings are conditions, where in the judgment of the assessment team, best management practices could and should be employed. The BMP findings were based on regulatory guidance, accepted industry procedures and practices, and professional judgment of the team members.

In addition to these two types of findings, the Subteam could have identified noteworthy practices, which in their judgment, have general application to DOE facilities and should be documented for the purpose of information transfer.

3.4 ENVIRONMENTAL ASSESSMENT SUMMARY

The Environmental Subteam identified 84 findings in its assessment of ANL-E. None of the findings reflect situations that present an immediate threat to public health or the environment. Seventy-five (75) findings reflect problems that do not meet the requirements of the Federal, state, or local regulation, or DOE Orders. Nine (9) findings represent conditions in which best management practices are not employed. The Environmental Subteam was unable to identify any noteworthy practices. The titles of the environmental findings are presented in Table 3.1 by media or discipline, as appropriate.

As part of the Environmental Subteam assessment, other reports on environmental compliance or environmental problems at ANL-E were reviewed. These reports included the AIS Self-Assessment Report, dated September 1990; the ANL-E Environmental Compliance Task Force Report, dated September 1990; and the ANL-E Environmental Survey Preliminary Report, dated November 1988. The Subteam reviewed the AIS Self-Assessment Report to evaluate the effectiveness of the site's self-assessment in relation to the Tiger Team environmental assessment findings. Table 3.2 presents the results of this evaluation. Findings were categorized as being fully, generally, partially, or not addressed. There were several environmental findings identified that were not addressed the AIS Self-Assessment Report, but ANL-E personnel were clearly aware of most of the problems and in some cases were pursuing the resolution. Out of the 84 findings identified by the Environmental Subteam, 43 findings (51%) were addressed in the AIS Self-Assessment Report. Only 17 of these 43 addressed findings were fully addressed and the remainder were only generally or partially addressed.

ANL-E has corrected some of the deficiencies identified in the November 1988 Environmental Survey Report. Some of the examples are: all transformers have been tested for PCB and appropriately marked; 25 underground storage tanks that were identified to have the potential to release hydrocarbons into the soil or groundwater were removed in 1989; state of the art equipment was installed to
### TABLE 3.1
ENVIRONMENTAL FINDINGS

**AIR FINDINGS**

<table>
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<tr>
<th>Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>A/CF-1</td>
<td>NESHAP for Radionuclides from DOE Facilities</td>
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<td>A/CF-2</td>
<td>Airborne Effluent Control Systems</td>
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<td>A/CF-3</td>
<td>Ambient Air Quality Surveillance Network</td>
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<td>A/CF-4</td>
<td>Asbestos Removal/Demolition Program</td>
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<td>A/CF-5</td>
<td>Operating Permits for Sources of Air Pollutants</td>
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<td>A/CF-6</td>
<td>Alkali Metal Reaction Booth in Building 308</td>
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<td>A/CF-7</td>
<td>Air Permit Requirements for Sulfur Dioxide and Opacity at the Central Boiler House</td>
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<tr>
<td>A/CF-8</td>
<td>&quot;Methanol&quot; Storage Tank</td>
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<td>A/CF-9</td>
<td>Central Shops Vapor Degreaser</td>
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**SURFACE WATER FINDINGS**

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<tr>
<td>SW/CF-1</td>
<td>NPDES Permit Requirement to Provide Chloride Removal System</td>
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<td>SW/CF-2</td>
<td>NPDES Permit Requirements for 001B and 001 Monitoring Points</td>
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<td>SW/CF-3</td>
<td>NPDES Permit Requirements for Effluents from Outfalls 003, 004</td>
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<td>SW/CF-4</td>
<td>NPDES Permit Requirements for Effluents from Outfall 006</td>
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<td>SW/CF-5</td>
<td>NPDES Permit Requirements for Effluents from Outfall 010</td>
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<td>SW/CF-6</td>
<td>Batch Liquid Effluent Control</td>
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<td>SW/CF-7</td>
<td>Radiological Analysis of Retention Tank Samples</td>
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<tr>
<td>SW/CF-8</td>
<td>Surface Waster Releases from Southern Part of Site</td>
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<td>SW/CF-9</td>
<td>Infiltration into the Wastewater Collection Systems</td>
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<td>SW/CF-10</td>
<td>Releases to Storm Drains</td>
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<td>SW/CF-11</td>
<td>CP-5 Reactor Yard Runoff</td>
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<td>SW/CF-12</td>
<td>Stormwater Discharge at the Shooting Range</td>
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<td>SW/CF-13</td>
<td>Backflow Prevention Program</td>
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<td>SW/CF-14</td>
<td>Freund Pond Sediments</td>
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<td>SW/CF-15</td>
<td>800 Area Landfill Runoff</td>
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<td>SW/BMP-1</td>
<td>Lime Sludge Pond</td>
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<td>SW/BMP-2</td>
<td>Repair and Replacement Turnaround Times</td>
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<td>SW/BMP-3</td>
<td>Domestic Water Storage Tanks</td>
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**GROUNDWATER/SOIL FINDINGS**

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<td>GW/CF-1</td>
<td>Groundwater Monitoring at the 800 Area Landfill</td>
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<td>GW/BMP-1</td>
<td>Groundwater Monitoring Plans and Procedures</td>
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<td>GW/BMP-2</td>
<td>Sitewide Hydrogeological Assessment and Monitoring Well Network</td>
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<td>GW/BMP-3</td>
<td>Closure of Wells and Boreholes</td>
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**WASTE MANAGEMENT FINDINGS**

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<tr>
<td>WM/CF-1</td>
<td>Development and Submission of RCRA Part B Permit Application</td>
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<td>WM/CF-2</td>
<td>Waste Management Program</td>
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<td>WM/CF-3</td>
<td>Waste Inventory and Tracking</td>
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<td>WM/CF-4</td>
<td>Hazardous Waste Characterization</td>
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<td>WM/CF-5</td>
<td>Radioactive Waste Acceptance Criteria</td>
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<td>WM/CF-6</td>
<td>Management of Wastes in Accumulation Areas</td>
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<td>WM/CF-7</td>
<td>Training of Hazardous Waste Generators and Handlers</td>
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<td>WM/CF-8</td>
<td>RCRA Treatment, Storage, and Disposal Units</td>
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<td>WM/CF-9</td>
<td>Radioactive Waste Storage facilities</td>
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### TABLE 3.1 (Continued)

**ENVIRONMENTAL FINDINGS**

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<td>WM/CF-10</td>
<td>New Radioactive Waste Facilities</td>
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<td>WM/CF-11</td>
<td>Closeout Procedures for Personnel, Projects, and Equipment</td>
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<td>WM/CF-12</td>
<td>Radioactive Waste Reduction Program</td>
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<td>WM/CF-13</td>
<td>Hazardous Waste Minimization Program</td>
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<td>WM/CF-14</td>
<td>DOE Field Office Radioactive Waste Management Plans</td>
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<td>Radioactive Waste Management Plans</td>
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<td>WM/CF-16</td>
<td>Storage of Mixed Wastes Subject to Land Disposal Restrictions</td>
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<td>Release-Detection Monitoring for Underground Tanks</td>
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**TOXIC AND CHEMICAL MATERIALS**

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<td>Storage of Hazardous and Toxic Materials</td>
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<td>TCM/CF-3</td>
<td>PCB Contaminated Sludge</td>
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<td>Marking of PCB Items</td>
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<td>TCM/CF-5</td>
<td>Combustible Material Near PCB Transformers</td>
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<td>TCM/CF-6</td>
<td>Leaking PCB Contaminated Transformer</td>
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**QUALITY ASSURANCE FINDINGS**

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<td>QA/CF-1</td>
<td>Environmental Quality Assurance Oversight and Technical Support</td>
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<td>Division/Department/Project Quality Assurance Plans</td>
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<td>QA/CF-3</td>
<td>Quality Assurance practices at ANL-E Environmental Laboratories</td>
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<td>QA/CF-4</td>
<td>Quality Assurance of Waste Operation</td>
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<td>QA/CF-5</td>
<td>Procurement of Environmental Analytical Services</td>
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<td>Radioanalytical Quality Assurance Practices</td>
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**RADIATION FINDINGS**

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<td>Certification of Compliance of DOE Order 5400.5</td>
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<td>RAD/CF-5</td>
<td>Environmental Review for New Facilities, Major Modifications, or Operational Changes</td>
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<td>Onsite Radiological Environmental Surveillance Program</td>
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**INACTIVE WASTE SITES**

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TABLE 3.1 (Continued)
ENVIRONMENTAL FINDINGS

NATIONAL ENVIRONMENTAL POLICY ACT FINDINGS

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<td>Guidance and Training for NEPA Compliance</td>
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ENVIRONMENTAL MANAGEMENT FINDINGS

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TABLE 3.2 (Continued)

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<td></td>
<td>*</td>
<td>This issue has been recognized by ANL-E and a resolution is being actively pursued although it was not reflected in the self-assessment.</td>
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<th>Generally Addressed:</th>
<th>General issue was identified as problem area but few, if any, specific deficiencies were recognized.</th>
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<td>All or most of the specific deficiencies were identified.</td>
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<td>Partially Addressed:</td>
<td>The general issue was not identified as a problem area but some specific deficiencies were identified.</td>
</tr>
<tr>
<td>Not Addressed:</td>
<td>✓ = Neither the issue nor the specific deficiencies were identified in the AIS Self-Assessment Report.</td>
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</table>
monitor particulate matter (PM$_{10}$); a new meteorological tower was installed; and several quality assurance/quality control (QA/QC) related deficiencies in radiological laboratories were also corrected.

In other areas, ANL-E has made little or no progress in correcting deficiencies identified in the survey and they remain findings of this assessment. For example, (1) contamination of Sawmill Creek from coal-pile runoff is still occurring; (2) surface water and soil contamination from the 800 Area landfill leachates continues; (3) hazardous waste management training in many areas is still inadequate and training records are not kept in all cases; and, (4) there is inadequate secondary containment for PCB transformers and chemical materials stored in 55-gallon drums and aboveground tanks.

ANL-E has made efforts to initiate corrective actions for some findings which were amenable to "quick fix." For example, proper hazardous waste labels were put on drums; several new procedures were written and are now in the process of becoming controlled documents; secondary containment for several drums was provided. While any efforts to improve environmental conditions are commendable, these efforts are in some ways indicative of the ANL-E tendency to be reactive rather than proactive and to focus on symptoms rather than on causes. A continuation of this type of response to environmental problems will not lead to long-term improvement.

The Environmental Subteam has identified four key findings, each of which is comprised of several findings from Section 3.5. Although the component findings may not appear significant individually, collectively they represent those issues that are of greatest concern. The key findings are as follows:

**Inadequate Program for Managing Wastes** -- ANL-E does not have an effective sitewide waste management program. The authority and responsibility for waste management are given to the Divisions, but accountability is lacking. In addition, no clear sitewide standards exist to set the framework for establishing the Divisional waste management program. Consequently, the management of wastes at ANL-E lack key elements necessary for effectiveness, such as consistent procedures, training, QA/QC, and a system to track and inventory all wastes and potential wastes.

**Inadequate Quality Assurance (QA) Program** -- QA of environmental programs at ANL-E has received low priority. The determination of whether a QA plan is needed for a given activity is at the discretion of the Divisional managers. The absence of any firm sitewide requirements has led to inconsistencies in the development of environment-related quality assurance plans with regard to both their existence and adequacy of content. Quality assurance related to waste management activities has been especially weak, but Laboratory-wide, environmental activities are not provided with adequate oversight or documentation to assure effective control. The failure to place sufficient emphasis on quality assurance of environmental protection programs has led to a situation in which ANL-E cannot provide assurances that assessments of the impact of the Laboratory's activities on the environment are valid.

**Inadequate Program to Identify, Characterize, and Manage Inactive Waste Sites** -- ANL-E lacks a formal, sitewide program to identify, characterize, and manage inactive waste sites, solid waste management units, or releases to be addressed under CERCLA or RCRA Corrective Action authority. ANL-E has not established a management structure or strategy to integrate the requirements of CERCLA to
assure that cleanup of inactive waste sites under the environmental restoration program are in accordance with the National Contingency Plan (NCP). Identification and characterization of inactive waste sites to date has not identified or addressed many of the technical issues related to site investigations, remedial activities, and RCRA/CERCLA/NEPA integration issues that will be required in the 1990s. A formal procedure to identify, characterize, and track inactive waste sites or solid waste management units has not been established. Currently, there is no central management authority to supervise and oversee the timely implementation of the regulations.

Inadequate Program to Control Liquid Discharges -- The ANL-E program for controlling liquid releases from the site is not sufficiently developed or has received sufficient attention to meet permit conditions and thus avoid unpermitted discharges. The weaknesses in the area have resulted in frequent exceedances of NPDES discharge limits which have in turn led to AAO receiving a "notice of intent to sue" from the Natural Resources Defense Council. In addition, there are problems associated with the control of batch liquid releases, and the existence of a number of unpermitted discharges. There has been no appreciable trend toward improvement in these areas.

3.5 ENVIRONMENTAL FINDINGS

The findings are presented under chapters identified by media (e.g., Air, Surface Water), or regulation (e.g., National Environmental Policy Act). Titles chosen for the individual findings are topical, rather than descriptive. Each finding is preceded by a Performance Objective. The Performance Objectives for Compliance Findings are derived from promulgated environmental regulations and applicable DOE Orders, compliance agreements, and permit conditions. The Performance Objectives for BMP findings are derived from regulatory agency guidance, accepted industry practices, and the professional judgment of the technical specialists. The findings within each Section are not arranged in order of relative significance. Parenthetical references in Chapter 3 refer to citations in Appendices D and E.
3.5.1 Air

3.5.1.1 Overview

The air assessment at ANL-E consisted of an evaluation of current practices at the facility with regard to (1) regulations promulgated under the Clean Air Act by the Environmental Protection Agency (EPA) Rules and Regulations of the State of Illinois, and permits issued by the Illinois Environmental Protection Agency (IEPA) pursuant to those regulations; (2) DOE Orders; and (3) best management practices.

The general approach to the air assessment included the following activities: (1) An examination of major facilities and major sources, including emission control and emission sampling and monitoring programs and systems; (2) An examination of ambient air-quality surveillance and meteorological monitoring programs and systems; (3) Interviews with personnel in the ANL-E Quality Assurance, Environment, and Safety Office; the Plant Facilities and Services Division; and the Support Services Division, as well as the Argonne Area Office; and, (4) A review of site documents including air permits, correspondence with regulatory agencies, standard operating procedures, Environmental Reports for 1987, 1988, and 1989, and various other internal documents.

Air contaminant emissions at ANL-E include both radioactive and nonradioactive materials. Radionuclides released to the atmosphere during 1989 included hydrogen-3 (as a gas and as water vapor), carbon-11, nitrogen-13, oxygen-15, argon-41, krypton-85, and radon-220 (plus daughters). The sources of these emissions included the M-Wing hot-cells and caves in Building 200, the JANUS reactor in Building 202, the Cyclotron in Building 211, the Alpha-Gamma Hot Cell Facility (AGHCF) in Building 212, the inactive CP-5 reactor in Building 330, and the Intense Pulsed Neutron Source (IPNS) in Building 375. Several other fission products were also released, in millicurie or smaller amounts (A-15). The radionuclide emissions are regulated by DOE Orders and by the EPA National Emission Standards for Hazardous Air Pollutants for Radionuclides (except radon-220 and -222) from DOE facilities. Ventilation systems at ANL-E are typically equipped with high-efficiency particulate air (HEPA) filters to control emissions of particulate radionuclides. Charcoal filter beds are also provided in the AGHCF ventilation system to absorb any iodine-131 released from short-cooled fuel.

Several sources and potential sources of conventional, nonradioactive air pollutants are located at ANL-E including a steam plant with a coal-fired boiler and four gas/oil-fired boilers with associated coal, ash, and spent sorbent handling systems; gasoline and gasohol fuel dispensing facilities; alkali metal reaction booths; a vapor degreaser and grinding operations at the Central Shops; a combustion/power generation research facility (FEUL); waste management operations that involve acid neutralization, solvent bulking, and venting of hoods; several small spray-painting booths; firefighting training activities where materials are burned in the open air; and asbestos removal and disposal activities. These sources and activities are regulated by Rules and Regulations of the State of Illinois Environmental Protection Agency, and the National Emission Standard for Hazardous Air Pollutants regarding asbestos.
The air portion of the Environmental Subteam Assessment identified nine compliance findings. These findings deal with: a lack of a plan to achieve and demonstrate compliance with the December 15, 1989 NESHAP for Radionuclides from DOE Facilities (except radon), devices and techniques for control of emissions of radioactive air pollutants that may not be capable of providing the protection to the public that is required by the ALARA process, deficiencies in the ambient air surveillance program, lack of recognition of the NESHAP requirements in procedures and contractor specifications for asbestos removal and demolition projects, lack of air operating permits for sources of air pollutants, an inoperative loss-of-water-flow alarm system on an air pollution control device at an alkali metal reaction booth, sulfur dioxide and opacity exceedances at the Central Boiler House, lack of a vapor recovery system on a methanol storage tank, and, an inappropriate operating procedure for a vapor degreaser at the Central Shops.

As part of the Environmental Subteam Assessment of ANL-E, a review was made of the air findings and issues discussed in the "Argonne Illinois Site Self Assessment Report," dated September, 1990. Of the nine compliance findings identified in this current assessment, one was fully addressed in that all or most or the specific deficiencies were identified. Two of the compliance findings were partially addressed in the self-assessment, where the general issue was not identified as a problem area but some specific deficiencies were identified. Three of the compliance findings were generally addressed, but few specific deficiencies were recognized. Three of the compliance findings were not addressed in the self-assessment; however, issues related to one have been recognized by ANL-E and a resolution is being pursued even though it was not reflected in the self-assessment.
3.5.1.2 Compliance Findings

**ASSESSMENT DISCIPLINE:** Air

**ASSESSMENT FINDING NUMBER:** A/CF-1

**ASSESSMENT FINDING TITLE:** NESHAP for Radionuclides from DOE Facilities

**PERFORMANCE OBJECTIVE:**

The National Emission Standards for Hazardous Air Pollutants (NESHAP) at 40 CFR 61.05 (c) states that "Ninety days after the effective date of any standard, no owner or operator shall operate any existing source subject to that standard in violation of the standard." National Emission Standards for Emissions of Radionuclides Other Than Radon from Department of Energy Facilities (40 CFR 61, Subpart H), which were promulgated on December 15, 1989, includes a number of detailed requirements, some of which are summarized below:

1. Paragraph 61.92 establishes a maximum effective dose equivalent of 10 mrem/yr to any member of the public, which is applicable to doses from combined sources at ANL-E and NBL.

2. Paragraph 61.94(a) requires a certified, signed, and dated annual report to EPA headquarters and the EPA region by June 30 that includes monitoring results and dose calculation results for the previous calendar year (CY).

3. Paragraph 61.93(b)(4)(ii) requires that an evaluation be conducted to determine whether each potential release point is subject to the emission measurement requirements of 61.93(b), using emission rate estimates that assume no pollution control equipment.

4. Paragraph 61.93(b)(4)(i) specifies which sources require emission measurements.

5. Paragraph 61.93(b) requires that prescribed methods be used.

6. Paragraph 61.93(b)(2)(iv) requires that a quality assurance program shall be conducted.

**FINDING:**

An evaluation of each potential release point at Argonne National Laboratory-East (ANL-E) and New Brunswick Laboratory (NBL) has not been conducted and documented to determine which sources are subject to emission measurement requirements. As a consequence, a demonstration of compliance with the new effective dose equivalent standard has not been accomplished.
DISCUSSION:

No centralized responsibility or authority has been assigned to oversee a facility-wide effort to assure compliance. Current efforts are fragmented or misdirected:

1. An effort to conduct an evaluation at the New Brunswick Laboratory is being confused with a concurrent effort to develop air operating permit applications, both of which have different goals. There is also a lack of awareness concerning the requirement to conduct the evaluation as if no emission control equipment were in place (I-A-19).

2. Currently, decisions regarding which sources need to be monitored for air releases are the responsibility of the separate Divisions, without benefit of facility-wide guidance, monitoring procedures, calibration procedures, or QA/QC procedures.

3. Formal guidance from CH and AAO consists of a letter transmitting a copy of 40 CFR 61, Subpart H dated December 15, 1989 (A-24) and a letter indicating that the Clean Air Act Code (CAAC) computer code used in previous years is not acceptable for CY 90 dose assessment calculations (A-27).

The AIS Self-Assessment Report did not address this finding.
ASSESSMENT DISCIPLINE: Air

ASSESSMENT FINDING NUMBER: A/CF-2

ASSESSMENT FINDING TITLE: Airborne Effluent Control Systems

PERFORMANCE OBJECTIVE:
DOE Order 5400.5, Radiation Protection of the Public and the Environment, Chapter II, Section 2, requires contractors to implement the as-low-as-reasonably-achievable (ALARA) process for all DOE activities and facilities that result in public doses.

FINDING:
ANL-E lacks a program to implement the ALARA process; consequently, devices and techniques used to capture and control emissions of radioactive air contaminants may not be providing the required protection to the public and the environment.

DISCUSSION:
A formally defined, well-documented radiological airborne effluent control program does not exist. There are no formally defined procedures, goals, objectives, performance indicators, and organizational responsibilities to facilitate compliance with DOE Orders. Some of the deficiencies noted by the Environmental Subteam that are symptomatic of the lack of an airborne effluent control program are as follows:


2. Although three documents were found that relate to high-efficiency particulate air (HEPA) filter testing (A-11, A-13, A-14), none of these represents a current formally reviewed-and-approved standard operating procedure. AIS Self-Assessment Finding EC2.1.15 addressed the inadequate testing procedures for in-place HEPA filters, but the other aspects of this finding were not addressed.

3. One of several newly acquired portable vacuum cleaners with HEPA-filtered exhausts was put into service at Building 306 without having been tested for efficiency.
ASSESSMENT DISCIPLINE: Air

ASSESSMENT FINDING NUMBER: A/CF-3

ASSESSMENT FINDING TITLE: Ambient Air Quality Surveillance Network

PERFORMANCE OBJECTIVE:

DOE Order 5400.1, General Environmental Protection Program, requires that environmental surveillance be conducted to monitor the effects of DOE activities on the environment (Chapter IV, Paragraph 5.b). A critical element of monitoring is quality assurance and verification (Chapter IV, Paragraph 1.a).

DOE Order 5400.5, Radiation Protection of the Public and the Environment, states that it is the intent of DOE that monitoring and surveillance programs for DOE activities, facilities, and locations be of high quality (Chapter I, Paragraph 8.a).

A DOE guidance document, Radiological Effluent Monitoring and Environmental Surveillance, sets forth an objective to properly and accurately measure radionuclides in ambient environmental media and, specifically for air sampling systems, requires that the total air flow or total running time be indicated (Chapter V, Paragraph 3.c).

FINDING:

The ambient air surveillance program for airborne particulate radionuclides and tritiated water vapor is not sufficient to support the accuracy and defensibility of the data.

DISCUSSION:

Observations noted by the Environmental Subteam that are symptomatic of the insufficient program include:

1. Although air flow-rate calibrations were performed initially on the Wedding PM₀ particulate monitors at the perimeter fence, there have been no continuing calibrations to verify that constant air flow is being maintained. Also, recalibrations are not performed when motor brushes or motors are replaced.

2. No site-specific standard operating procedure has been developed for the conduct of calibrations; the initial calibrations were conducted in accordance with manufacturer's directions.

3. The operating procedure that details steps to be taken to change filters and specifies data to be recorded has not been subjected to formal review and approval.

4. Elapsed-time meters on the monitors are read and reset to zero at each filter change; however, the readings are not used in the calculation of total air volume sampled during the 7-day sampling period. The sampling start and stop dates and times are recorded and used to calculate the total sampling time and air volume.
sampled. In the event of a power failure, the actual sampling time will be shorter than the calculated time, and pollutant concentrations would be understated.

5. There is no control location for an offsite particulate air monitor in the quadrant to the west of the ANL-E site. Although the monthly wind roses in the 1989 ANL-E Site Environmental Report indicate that this is not a dominant wind direction, there are recordable instances when winds blow toward the west during the spring and summer. Population distributions given in the 1989 report indicate that a significant fraction of the population adjacent to the site lives in this area (I-R-24).

6. The "open packet" silica gel samplers used for sampling airborne tritiated water vapor are incapable of producing quantitative results. Radiological Effluent Monitoring and Environmental Surveillance, Guidance Document (draft) for DOE 5400.5, Chapter V, Section 8f states that this type of device is "considered satisfactory as a detection device only." However, the 1989 Site Environmental Report, Table 4.6 contains quantitative data derived from analysis of the gel packets at two perimeter locations and an offsite location. Quantification of tritium results from the gel packets is not possible (I-R-28).

7. The two samplers for tritiated water vapor at the ANL-E perimeter and one sampler located offsite at Woodridge do not constitute an adequate monitoring network (I-R-24).

Deficiencies noted in the DOE Environmental Survey and the AIS Self-Assessment Report that were related to perimeter radiological particulate monitoring equipment and siting have been corrected.
ASSESSMENT DISCIPLINE: Air

ASSESSMENT FINDING NUMBER: A/CF-4

ASSESSMENT FINDING TITLE: Asbestos Removal/Demolition Program

PERFORMANCE OBJECTIVE:

40 CFR 61, Subpart M, National Emission Standards for Hazardous Air Pollutants (NESHAP) establishes standards for asbestos demolition and renovation activities, which include applicability, notification requirements, procedures for emission control, waste disposal, air cleaning, reporting, and operation of asbestos waste disposal sites. IEPA Section 231.230 adopts the NESHAP standards.

FINDING:

A sitewide coordinated program for asbestos removal/demolition activities does not exist to assure that the NESHAP environmental regulations are being recognized and met.

DISCUSSION:

The following observations are symptomatic of the lack of a sitewide coordinated program.

Contractor specifications issued to asbestos removal contractors by Plant Facilities and Services/Facilities Planning and Engineering (PFS/FPE) (A-42) and a draft procedure being developed by PFS/Waste Management (WM) (A-43) for work performed by WM are based on OSHA requirements and do not recognize the existence of NESHAP requirements.

The draft PFS/WM procedure (A-42) specifies that garbage bags are to be used to contain removed waste material, while the NESHAP standards require the use of prelabeled leak-tight containers.

The draft PFS/WM procedure discusses transport of bagged asbestos to the 800 Area landfill and unloading at the asbestos disposal site; however, the NESHAP requirements of 40 CFR 61.156 regarding the asbestos disposal site are not addressed nor is reference made to any specific procedure for operation of the asbestos disposal site.

During the Tiger Team Assessment, bags of asbestos at the asbestos disposal area were found that were torn and only partially covered with soil. Another bag containing asbestos was found at the landfill, but outside the proper asbestos disposal area (I-WM-6). These deficiencies were corrected after they were pointed out.

An AIS Self-Assessment Finding (EC2.1.21) recommended that all asbestos projects should be coordinated through a central location to be sure that all requirements are met. Finding EC2.1.10 dealt with procedures and training for landfill operations.
ASSESSMENT DISCIPLINE: Air

ASSESSMENT FINDING NUMBER: A/CF-5

ASSESSMENT FINDING TITLE: Operating Permits for Sources of Air Pollutants

PERFORMANCE OBJECTIVE:

IEPA regulations, Section 201.144, require that an operating permit be obtained to operate any existing emission source or any existing air pollution control equipment, except as specifically exempted in Section 201.146.

FINDING:

Because of the lack of a program to identify and evaluate sources of air pollutants and air pollution control devices, several activities are being conducted at both ANL-E and NBL that have the potential to emit regulated pollutants to the atmosphere without the required operating permits or without having been evaluated against permitting requirements.

DISCUSSION:

Specific examples that are symptomatic of sources that are currently operating without air operating permits are as follows:

1. Sources for which operating permit applications were submitted in July 1990 to IEPA (A-44).
   - Building 306, Acid Neutralization Operations
   - Building 306, Solvent Bulking Operations
   - Area 317, Passivation Tank Operations
   - Building 306, Exhaust Vents
   - Building 306, Average Quantity of Material Stored.

2. Sources of radionuclide emissions for which operating permit applications were prepared in September and October 1990 as part of an ongoing effort include:
   - Building 200, M-Wing Cave Facility
   - JANUS Reactor Exhaust System
   - IPNS Exhaust/Ventilation System
   - Building 212, Alpha-Gamma Hot Cell Facility

3. A preliminary inquiry to IEPA is being prepared to determine the need for operating permits for the following sources:
   - Building 212, Acid Scrubber
   - Building 212, Heated Degreaser
   - Building 212, Spray Booth
   - Building 212, Lead-Lithium Experiment
   - Building 202, Large Muffle Furnace
   - Building 370, ALEX Sodium Scrubber
   - NBL Plutonium Stack Ventilation System
   - NBL Uranium Stack Ventilation System
4. The SUNOCO gasoline station at ANL-E is being operated without an air operating permit. Blank application forms for an operating permit for the gasoline station were provided by the Quality Assurance, Environment and Safety Office to Plant Facilities and Services Division on August 13, 1990, but have not been completed.

5. A rotaclone particulate emission control device was found by the Tiger Team at the Building 809 Carpenter Shop that has not been identified for evaluation.

AIS Self-Assessment Findings EC2.1.9 and EC2.1.18 address the lack of air operating permits and lack of an inventory of emission sources in a general way.
ASSESSMENT DISCIPLINE: Air

ASSESSMENT FINDING NUMBER: A/CF-6

ASSESSMENT FINDING TITLE: Alkali Metal Reaction Booth in Building 308

PERFORMANCE OBJECTIVE:

An operating permit (No. 88120046) issued by IEPA (A-28) grants permission to operate the reaction booth to oxidize waste alkali metals and the associated exhaust-air scrubber to control particulate emissions. The permit also required submittal of an annual report to IEPA by February 15, 1990.

FINDING:

A potential exists for uncontrolled emissions of alkali metal oxides to the atmosphere because the reaction booth could be operated without water flow to the exhaust-air scrubber.

DISCUSSION:

Water flow to the scrubber is necessary to wash the alkali oxides particles from the air stream being exhausted from the reaction booth. Although the exhaust-air scrubber system is equipped with a loss-of-water-flow alarm system, the alarm and light are located outside the building, which would preclude timely detection of an operating problem. Also, the alarm was found to not be in working order.

During the Tiger Team Assessment, a wiring error on the outside alarm bell was corrected and a second bell was installed inside the building (I-A-28).

Also, an annual report (A-29) required by IEPA was submitted 4 months late.

The AIS Self-Assessment Report did not address this deficiency.
PERFORMANCE OBJECTIVE:

An Operating Permit (No. 79090047) for the ANL-E Steam Plant was issued on June 8, 1988 and a renewed Operating Permit was issued on July 26, 1990 by the IEPA.

Sections 214.122 and 214.141 of the IEPA Air Regulations covering new and existing fuel combustion sources restrict emissions of sulfur dioxide while burning solid fuel to a maximum of 1.8 pounds per million Btu of actual heat input.

Section 212.123 of the IEPA Air Regulations concerning visible emissions prohibits the emission of smoke or other particulate matter with an opacity greater than 30 percent, with specified exceptions.

FINDING:

ANL-E was cited in April 1990 by both IEPA (A-7) and EPA Region V (A-8) for exceedances of the sulfur dioxide and opacity limits at the No. 5 boiler, with potential for issuance of Notices of Violation.

DISCUSSION:

Emissions of sulfur dioxide exceeded the 1.8 pounds per million Btu of actual heat input 99 times and visible emissions exceeded the 30 percent opacity limit 300 times as recorded on continuous emission monitors at the Central Steam Plant No. 5 Boiler during 1989 (A-15).

The No. 5 Boiler burns a high-sulfur (3.5 percent maximum) Illinois basin coal and emissions of sulfur dioxide in the exhaust gases are controlled by scrubbing the gases with a lime slurry. The spent lime sorbant and flyash are removed from the gases by passing the gases through a baghouse filtering system to control visible particulate emissions.

ANL-E was cited in April 1990 by both IEPA (A-7) and EPA Region V (A-8) for the reported exceedances, with requests for information relating to reasons for the exceedances and description of steps taken to prevent recurrence. The Argonne Area Office (AAO) responded to the IEPA with a letter that explained the causes for the exceedances and described proposed corrective actions and operating schedules (A-10). AAO and ANL-E personnel also met with Region V EPA to discuss these issues.

Several new operating procedures (dated May 30, 1990) were written and submitted to IEPA to cover (1) operation of the system when firing 100 percent low-sulfur (0.8 percent max) coal, (2) operation with any amount of high-sulfur coal, (3) scrubber malfunctions, and (4) baghouse malfunctions (A-5).
A new operating permit (dated July 26, 1990) based on the new operating procedures has been issued by IEPA, but no further action has been taken by IEPA regarding the reported exceedances. Compliance with the sulfur dioxide and opacity limitations cannot be demonstrated until the No.5 boiler is restarted, following a maintenance turndown that began on March 31, 1990.

AIS Self-Assessment Finding EC2.1.7 considered upgrading the unit and proposed a review of fuel alternatives to alleviate further sulfur dioxide and opacity exceedances.
ASSESSMENT DISCIPLINE: Air

ASSESSMENT FINDING NUMBER: A/CF-8

ASSESSMENT FINDING TITLE: "Methanol" Storage Tank

PERFORMANCE OBJECTIVE:

An air operating permit (No. 86020043) issued by IEPA (Expiration Date: February 7, 1996) covers operation of the "methanol" storage tank and its coaxial vapor recovery system at Building 827 (A-39).

IEPA Section 215.583 prohibits the transfer of gasoline from any delivery vessel into any stationary storage tank at a gasoline dispensing facility unless the vapors displaced from the storage tank during filling are processed by a vapor control system.

FINDING:

The "methanol" storage tank at Building 827 does not have the required vapor recovery system, and gasoline is being transferred to the tank without the required vapor control system.

DISCUSSION:

Although the operating permit indicates that the tank is equipped with a coaxial vapor recovery system, the tank has only a single fill pipe with no capability for vapor return.

The gasoline/methanol mixture is prepared by pumping a volume of gasoline (15 percent of the mix) from the adjacent gasoline tank into the fill pipe of the "methanol" tank. Gasoline vapors displaced from the "methanol" tank during this transfer are released to the atmosphere. Methanol is then added to the "methanol" tank from a delivery truck; however, because the tank fill pipe is not a coaxial system, displaced vapors cannot be returned to the truck and must be allowed to escape to the atmosphere. These vapor losses are contrary to the intent of IEPA Section 215.583.

These deficiencies were not recognized in the AIS Self-Assessment Report.
**ASSESSMENT DISCIPLINE:** Air

**ASSESSMENT FINDING NUMBER:** A/CF-9

**ASSESSMENT FINDING TITLE:** Central Shops Vapor Degreaser

**PERFORMANCE OBJECTIVE:**

An operating permit (No. 90020052) issued by IEPA (A-34) for the Central Shops Vapor Degreaser includes limitations on emissions of volatile organic material (solvent) of 15 pounds per day or 3 pounds in any 1 hour, exceedance of which would subject the degreaser to the equipment and operating requirements specified in IEPA Section 215.183.

IEPA Section 215.183(a)(1) requires that no person shall operate an open top vapor degreaser unless the cover of the degreaser is closed when workloads are not being processed through the degreaser.

**FINDING:**

Deficiencies in the standard operating procedure (A-33) for the Central Shops open top vapor degreaser may result in emissions of volatile organic materials (solvent) in excess of operating permit limitations. No record of solvent usage is available to demonstrate compliance with the emission limit of 3 pounds in any 1 hour. Without a demonstration of compliance, operation of the degreaser with an open cover when workloads are not being processed violates IEPA 215.183(a)(1).

**DISCUSSION:**

The standard operating procedure (A-33) for this degreaser requires that the cover be opened prior to start up and be left open during the specified 45-minute heat-up period, and during a 15-20 minute cooling period after shutdown, during which time the emission limitation may be exceeded.

The standard operating procedure also does not include any instruction on how to record solvent replacement data or how to calculate solvent emissions. Thus, demonstration of compliance with the emission limitations is not possible except through estimations based on gross solvent replacement records, which would give only average emission rates over operating and idle periods rather than peak emission rates.

An AIS Self-Assessment Finding (EC2.1.13) on vapor degreaser operations dealt with the appropriateness of solvent used from a worker exposure viewpoint, which is not the same issue as this finding.
3.5.2 Surface Water

3.5.2.1 Overview

The purpose of the surface water portion of the environmental assessment was to review issues related to compliance with regulations promulgated in response to the Clean Water Act (CWA) and the Safe Drinking Water Act (SDWA). The review included assessments of compliance with National Pollutant Discharge Elimination System (NPDES) requirements as defined by IEPA permit limitations; Illinois Water Pollution Control Board Rules contained in Illinois Administrative Code (IAC), Title 35, Subtitle C; DuPage County regulations defined by its Department of Environmental Concerns; national primary and secondary drinking water standards developed by the EPA; Department of Energy (DOE) Orders; and best management practices.

Existing treatment systems were reviewed for their effectiveness in providing the site with potable water, laboratory service water and cooling water, and for their ability to treat domestic and laboratory wastewaters. The effectiveness of the ANL-E surface water monitoring, sampling, and analysis program was assessed, and procedures for notification of permit noncompliance and spills were reviewed. The integrity of the laboratory and sanitary wastewater collection systems, and the ongoing effort to remediate infiltration/exfiltration from the two systems, were investigated.

NPDES compliance at six of eleven permitted outfalls has been inconsistent, and has shown no trend toward improvement. Outfall 001 is out of compliance with total dissolved solids and chlorides limitations almost all of the time. A water quality management task force has been convened to address problems with effluent quality at Outfall 001. Several other projects aimed toward improving compliance with regulations are described in the individual findings. Onsite and offsite surveillance of surface water bodies has emphasized tracking of radionuclides. As a result, little is known about transport of nonradioactive chemicals. Water and wastewater treatment plants are relatively old, and some major equipment is approaching the end of its useful life. The primary reason major problems have not occurred more often than they do is that ANL-E operators are skilled in making do with the equipment they have available. Resources have been committed for upgrades at the water treatment plant, the canal-water treatment plant, and the laboratory and sanitary wastewater treatment plants.

ANL-E relies heavily on administrative and engineering controls such as multiple retention tank systems in major buildings for handling potentially radioactive wastewater; segregated domestic, laboratory, and cooling water systems and wastewater collection systems; and providing trained building maintenance supervision under the control of the Plant Facilities and Services Division's Building Maintenance Group for the various divisions and departments operating in the major laboratory buildings. Recent improvements have been made in rehabilitating the water distribution systems, and some progress toward preventing infiltration/exfiltration of the wastewater collection systems has also occurred. Conceptual design reports have been completed, and resources are committed for continuing to improve those systems.

Eleven of the 18 Surface Water findings are related to ongoing or potential NPDES or Illinois Administrative Code, Title 35, Subtitle C requirements. Of
the 11, 10 have been previously identified in the AIS Self-Assessment Report. The sole exception involved delays in constructing and operating a permit-mandated chloride removal system for treating Outfall 001 wastewaters.

In general, ANL-E personnel were aware of most of the problems related to the findings. Only 4 of the 18 surface water findings were not addressed in the AIS Self-Assessment Report. Twelve findings were fully addressed by Self-Assessment findings, while two other findings were at least partially addressed.

Four of the compliance findings are based on performance objectives defined in Illinois Administrative Code, Title 35, Subtitle C, Section 304.141(b). This paragraph prohibits discharge of pollutants unless there are limitations for such pollutants set forth in an applicable NPDES permit. Section 304.141(b) was declared invalid in Peabody Coal Company versus the Pollution Control Board in 3 Ill. App. 3rd 5 (5th District Court, 1976), but was declared valid in U.S. Steel versus the Pollution Control Board in 52 Ill. App. 3rd 1 (2nd District Court, 1977). In this situation, the Environmental Subteam has chosen to consider such issues as compliance findings rather than best management practices, because courts have ruled either way when challenges have been made. Subteam members prefer to err on the conservative side if there is any doubt about the validity of a regulation. The ultimate goal has been the improvement of environmental quality, so all findings attempt to point toward ways of achieving that goal.
3.5.2.2 Compliance Findings

ASSESSMENT DISCIPLINE: Surface Water

ASSESSMENT FINDING NUMBER: SW/CF-1

ASSESSMENT FINDING TITLE: NPDES Permit Requirement To Provide Chloride Removal System

PERFORMANCE OBJECTIVE:

NPDES Permit No. IL0034592 (SW-30) effective July 7, 1989, mandated that ANL-E construct and place into operation a wastewater treatment system for controlling chlorides in the discharge from Outfall 001 by June 30, 1990. (Special Condition #9 at page 8 of the NPDES Permit). Noncompliance with any permit-required compliance schedule must be reported to IEPA no later than 14 days following the scheduled date.

FINDING:

ANL-E has not constructed nor placed into operation any wastewater treatment system for controlling chloride at Outfall 001. Although IEPA was notified prior to the scheduled compliance date that an additional ninety days would be needed, the revised date has also passed by without meeting construction and operation deadlines mandated by the permit.

DISCUSSION:

AAO notified IEPA in January 1990 that the required chloride removal plant would not be ready by the June 1990 deadline. At that time, a 90-day extension until September 30 was requested (SW-75).

The record indicates that IEPA never responded to that request (SW-67, SW-75). Thus, it is not obvious whether or not the June 30, 1990 deadline was ever set aside in favor of a September date. On August 9, 1990, AAO notified the IEPA that the September 30, 1990, compliance date would not be met either.

On August 8, 1990, the AAO directed ANL-E management to cease and desist this violation and take immediate action to comply (SW-67). Interim solutions were required to be submitted by ANL-E by August 14th (SW-75). At a meeting on September 6, 1990, the IEPA was notified by the AAO that the proposed chloride removal plant would not adequately address TDS limits for the 001 outfall. IEPA was informed that ANL-E had convened a Water Quality Management Task Force whose primary responsibility is to resolve the problems of permit violations at NPDES Outfall 001. The Task Force is expected to submit recommendations in October, prior to meeting with IEPA to discuss plans for achieving compliance.

AIS Self-Assessment Findings EC2.2.7 and EC2.2.3.1 (SW-29) both address the need for control of chloride and total dissolved solids from Outfall 001, but neither finding addresses the failure to meet construction and operation deadlines mandated by the NPDES permit.
NPDES Permit No. IL0034592 (SW-30) effective July 7, 1989, established 30-day average and daily maximum concentration limits for effluents from 001B and 001 monitoring points. Limits were established for BOD₅, total suspended solids (TSS), and mercury at Outfall 001B (laboratory wastewater treatment plant effluent), and for fecal coliform, total dissolved solids (TDS), sulfates, chlorides, and pH at Outfall 001, the combined wastewater treatment plants' effluent.

FINDING:
Effluent limitations are not being met at Outfall 001B for BOD₅ and TSS, nor at Outfall 001 for TDS, chlorides, and fecal coliform counts (SW-2).

Discussion:
At Outfall 001B, there have been two BOD₅ and one TSS noncompliances in 1990. At Outfall 001, in the 14 months since total dissolved solids have been assigned numerical limits, no monthly measurement has indicated compliance with the limits. Ten of 14 chloride measurements have been out of compliance, and there have been 3 occasions in 1989 when fecal coliform counts have exceeded limits stated in the permit (SW-2).

ANL-E has organized a water quality management task force (SW-66) whose primary objective is to evaluate methods for achieving compliance with permit requirements for TDS and chlorides. There has also been a commitment of resources to upgrade the laboratory and sanitary wastewater treatment plants (SW-73). Completion dates for these projects are estimated to be September 1992 for the laboratory wastewater treatment system and September 1993 for the sanitary wastewater treatment system (SW-34).

This issue was identified as a finding during the DOE Environmental Survey (SW-5) and in the AIS Self-Assessment Report (SW-29) as Findings EC2.3.1, EC2.3.3, and EC2.3.4.
ASSESSMENT DISCIPLINE: Surface Water

ASSESSMENT FINDING NUMBER: SW/CF-3

ASSESSMENT FINDING TITLE: NPDES Permit Requirements For Effluents From Outfalls 003 and 004

PERFORMANCE OBJECTIVE:

NPDES Permit No. IL0034592 (SW-30), effective July 7, 1989, established 30-day average and daily maximum concentration limits for effluents from Outfalls 003 and 004 for total suspended solids (TSS) of 15 and 30 mg/L respectively. Grab samples are required to be taken once per month at each location. Title 35 of the Illinois Administrative Code, Subtitle C, Section 304.141(a) mandates that, "No person to whom an NPDES Permit has been issued may discharge any contaminant in his effluent in excess of the standards and limitations for that contaminant which are set forth in his permit." (SW-65).

FINDING:

Effluents from Outfalls 003 and 004 have repeatedly exceeded the 30-day average limitation for TSS, and on at least one occasion since January 1989, have exceeded the daily maximum limitation at Outfall 004. The single monthly grab sample must achieve compliance with both the 30-day average limitation of 15 mg/L and the daily maximum limitation of 30 mg/L.

DISCUSSION:

Non-compliances reported in the ANL-E Discharge Monitoring Reports (SW-2) ranged from 16 mg/L up to 40 mg/L of TSS in effluents from Outfalls 003 and 004, and occurred in all seasons except winter.

Outfall 003 carries the flows from the series of small tributaries of Sawmill Creek that enter upper and lower Freund Pond. Outfall 004, in turn, drains the area adjacent to the Biological and Medical Research Laboratories housed in Building 202. In addition to stormwater runoff, these streams contain cooling water and inadvertent releases of wastewater to floor drains from several ANL-E buildings, including those used for biological and medical research, chemical technology, engineering and technology transfer, material science and components, and physics laboratories.

Heavy rains can cause resuspension of Freund Pond sediments and scouring of the ditches carrying cooling water and stormwater through both outfalls. This increase in suspended matter results in non-compliance with the TSS limitations at both outfalls. The AIS Self-Assessment Report (SW-29) raised the issue of Freund Pond sediments causing non-compliances at Outfall 003 in Finding EC2.3.7, and describes an action plan for correction by removing pond sediments. Such action could improve compliance at Outfall 003, but no finding or corrective action was developed for Outfall 004.
ASSESSMENT DISCIPLINE: Surface Water
ASSESSMENT FINDING NUMBER: SW/CF-4
ASSESSMENT FINDING TITLE: NPDES Permit Requirements for Effluents from Outfall 006

PERFORMANCE OBJECTIVE:

NPDES Permit No. IL0034592 (SW-30), effective July 7, 1989, established 30-day average and daily maximum concentration limits for effluents from Outfall 006 for total suspended solids (TSS), and also required that effluent pH "shall be in the range 6.0 to 9.0." There are also specific maximum temperature requirements depending on season of the year, and a requirement that the maximum temperature rise not exceed 5°C (9°F) (SW-30). Grab samples are required to be taken once per month.

FINDING:

Effluent limitations for TSS have been repeatedly exceeded at Outfall 006, and the effluent pH has been out of the required pH range by more than one standard unit on at least one occasion since January 1989. Although preliminary design of corrective action is underway, current planning indicates that completion of a solution to this problem will not occur before the last quarter of 1993 (SW-6). In the meantime, continued NPDES permit exceedances can be expected to occur.

DISCUSSION:

Outfall 006 drains the canal-water treatment plant's sludge settling basins via vertical overflow pipes in each basin. During peak flow periods, the small ponds do not provide sufficient retention time to ensure adequate settling of water treatment plant sludges. Also, floating solids on the surface of the ponds are carried directly out of the overflow pipes, thus appearing as TSS in the outfall flow. With respect to pH, unreacted alkaline treatment chemicals are carried out with the sludge and continue to dissolve in the basins, thus raising the effluent pH, typically to 8.1-8.4. On occasion (e.g., January 1990), effluent pH measurements have been as high as 10.2, exceeding the permit limit by 1.2 standard units (SW-2).

TSS exceedances were observed in October 1989, and January and June of 1990. The October 1989 concentration of 21 mg/L complied with the daily maximum limit of 30 mg/L, but exceeded the 30-day average limit of 15 mg/L by 40 percent. The January 1990 concentration of 79 mg/L exceeded both limitations by factors of 2.6 and 5.3 respectively. In June 1990, two samples were taken for TSS analysis. The first sample contained 313 mg/L, while the follow-up sample contained 8 mg/L TSS. The June monitoring report listed the 313 mg/L as a maximum day, exceeding that limit by tenfold. In turn, the calculated 30-day average value (based on the average of 313 and 8 mg/L) also exceeded its limit by more than tenfold (SW-2).

A two-stage program for improving the rate of compliance at this outfall has begun. The first step involves rerouting the pond overflows to the sanitary wastewater collection system and treatment at the sewage treatment plant. This conversion is expected early in 1991. The second stage would provide for
rehabilitation of the entire canal-water treatment plant, including improved sludge handling and disposal facilities. Completion of construction is projected for September 1993 (SW-34).

This issue was included in the AIS Self-Assessment Report (SW-29) as Finding EC2.3.6.
ASSESSMENT DISCIPLINE: Surface Water

ASSESSMENT FINDING NUMBER: SW/CF-5

ASSESSMENT FINDING TITLE: NPDES Permit Requirements For Effluents From Outfall 010

PERFORMANCE OBJECTIVE:

NPDES Permit No. IL0034592 (SW-30), effective July 7, 1989, established 30-day average and daily maximum concentration limits for effluents from Outfall 010 for total suspended solids (TSS), six metals, oil and grease, and pH. Grab samples are required to be taken once per month in any month when coal pile runoff is overflowing through Outfall 010.

FINDING:

Effluent limitations are not being met at Outfall 010 (emergency coal pile runoff) for regulated parameters including pH, total suspended solids (TSS), iron, manganese, and zinc.

DISCUSSION:

Normal volumes of coal pile runoff are collected and currently treated at the ANL-E sanitary wastewater treatment plant. However, during periods of heavy rainfall, the normal coal pile runoff collection system may fill to overflowing, so IEPA has described the "emergency coal pile runoff" as Outfall 010.

Although Outfall 010 overflows very rarely (e.g. once in the past 24 months), when it does, it cannot comply with all the permit limitations. Moreover, since the sample frequency is one sample per month when discharging, the single sample must meet both the daily maximum and 30-day average concentration limits (SW-30, page 8, Special Condition #6). In some cases, the actual effluent concentrations are below the daily maximum limit, but exceed the 30-day average limit. For example, the discharge monitoring report for July 1990 (SW-2) indicated five permit exceedances, as follows:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>30-Day Average</th>
<th>Daily Max.</th>
<th>Actual Concentration mg/L (except pH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>6.0 to 9.0</td>
<td>--</td>
<td>2.7</td>
</tr>
<tr>
<td>TSS</td>
<td>15.0</td>
<td>30.0</td>
<td>22.0</td>
</tr>
<tr>
<td>Iron</td>
<td>2.0</td>
<td>4.0</td>
<td>202.2</td>
</tr>
<tr>
<td>Zinc</td>
<td>1.0</td>
<td>2.0</td>
<td>1.75</td>
</tr>
<tr>
<td>Manganese</td>
<td>1.0</td>
<td>2.0</td>
<td>1.24</td>
</tr>
</tbody>
</table>

Outfall 010 pH was measured at more than 3 standard units outside the acceptable range. TSS complied with the daily maximum limit but exceeded the 30-day average limit by 47 percent. Iron greatly exceeded limits by 50 and
100 times. Zinc and manganese both achieved the daily maximum limit, but exceeded the 30-day average limits by 75 and 24 percent respectively. Total flow was estimated as 30,000 gallons. This flow indicates that more than 50 pounds of iron was released to Sawmill Creek through Outfall 010.

This issue was identified as a finding during the DOE Environmental Survey (SW-5), and in the AIS Self-Assessment Report (SW-29) as Finding EC2.3.5.
ASSESSMENT DISCIPLINE: Surface Water

ASSESSMENT FINDING NUMBER: SW/CF-6

ASSESSMENT FINDING TITLE: Batch Liquid Effluent Control

PERFORMANCE OBJECTIVE:

DOE Order 5400.1, General Environmental Protection Program, Chapter IV, Paragraph 5a, states that effluent monitoring shall be conducted at DOE sites to satisfy the following program objectives: (1) verify compliance with applicable Federal, state, and local effluent regulations and DOE Orders; (2) determine compliance with commitments made in Environmental Impact Statements, Environmental Assessments, or other official documents; (3) evaluate the effectiveness of effluent treatment and control; (4) detect, characterize, and report unplanned releases; and, (5) auditable records shall be established in accordance with the requirements of DOE 5700.6B, Quality Assurance.

DOE Order 5480.19, Conduct of Operations Requirements for DOE Facilities, Attachment I, Chapter I, Part A states that effective implementation and control of operating activities are primarily achieved by establishing written standards of operations, periodically monitoring and assessing performance, and holding personnel accountable for their performance.

FINDING:

The approval process for the release of liquid effluents from building retention tanks and laboratory wastewater treatment tanks is not being performed in conformance with the orders (I-R-215).

DISCUSSION:

The following deficiencies, demonstrating a lack of positive control, were observed by the Environmental Subteam with regard to batch liquid releases:

1. The sampling procedure for retention tanks is not a controlled procedure subject to formal, documented review and approval.

2. There is no documented basis for the radiological effluent release limits.

3. There is (are) no individual(s) identified with the responsibility or authority to authorize a tank release.

4. There are no formal data reviews or approval of analysis results prior to releasing a tank.

5. Approvals for the release of retention and wastewater tanks are entirely verbal, usually by telephone. Written permission is not required.

This finding was not addressed in the AIS Self-Assessment Report.
DOE Order 5400.1, General Environmental Protection Program, Chapter IV, Section 5, requires that effluent monitoring be conducted at DOE sites. Liquid effluent programs are to be designed to satisfy the following program objectives among others: (1) verify compliance with applicable Federal, state, and local effluent regulations and DOE Orders; (2) detect, characterize, and report unplanned releases; (3) effluent monitoring shall comply with applicable regulations and shall be conducted to provide representative measurements of the quantities and concentrations of pollutants in liquid discharges; (4) auditable records shall be established in accordance with requirements of DOE Order 5700.6B, Quality Assurance.

FINDING:

The program governing the radiological analyses of building retention tank and wastewater treatment tank samples by the Waste Management Control Laboratory (WMCL) is not adequate to provide data of verifiable accuracy and precision (1-R-215).

DISCUSSION:

The Environmental Subteam noted the following deficiencies that are symptomatic of inadequate programs in the WMCL.

1. The WMCL Quality Assurance Plan does not address the methods and procedures for quality control of radiological analyses.

2. There are no documented bases for the types of radionuclide analyses that are required to be performed on retention tank samples.

3. There are no formal data reviews.

4. There are no documented radiological quality control (QC) procedures for the WMCL. A draft procedure was prepared after the Environmental Subteam identified this deficiency.

5. The only QC check for the counting instruments is counting a weekly check standard on each detector. The acceptance criteria do not have a statistical basis, and there are no specified actions to be taken for out-of-control conditions.

6. The WMCL does not perform routine efficiency calibrations on the detectors, and there is no documentation in the WMCL to support the initial calibration.

7. The WMCL performs no QC analyses such as spikes or duplicates.
8. The WMCL does not participate in either intra- or inter-laboratory cross-check programs.

9. The WMCL procedures used for the radiological analysis of liquids from building retention tanks and waste water treatment tanks are not adequate to ensure precise and accurate data. Specific deficiencies that were observed are:

- Excessive application of heat during sample evaporation causes appreciable splatter, resulting in a non-reproducible loss of sample. It is estimated by the Environmental Subteam, based on observation, that as much as one-half the sample volume may be lost in this manner.

- Sample volumes are too small and counting times too short to achieve a detection limit that is consistent with tank discharge limits.

A draft procedure designed to adequately address this deficiency was prepared after this issue was identified by the Environmental Subteam.

This finding was not addressed in the AIS Self-Assessment Report.
Illinois Administrative Code, Title 35, Subtitle C, Section 304.141(b) states that no person may discharge any pollutant unless a limitation for that pollutant has been set forth in an applicable NPDES permit. Pollutants include any that are subject to any Federal or state water quality standard, guideline, or other limitation promulgated pursuant to the Clean Water Act (SW-65).

FINDING:

Surface water and stormwater runoff released from the 317/319 Area and other sites along the current southern boundary of ANL-E have transported pollutants and possibly radionuclides offsite. None of these drainage pathways are included in any currently permitted NPDES outfall flow.

DISCUSSION:

Studies conducted in 1986 (SW-59) and 1989 (SW-42) indicated the presence of radionuclides (nonvolatile beta emitters, tritium, strontium-90, and cesium-137) and volatile organics (carbon tetrachloride and chloroform) in sewers and offsite runoff from the 317/319 Area. The AIS Self-Assessment Report (SW-29) also describes releases of volatile organics, including ketones and benzenes in soils, surface water, and wells. IEPA has been notified of the discovery of this offsite contamination. One source, a pipe draining the 317 Area vault, has been capped to prevent future releases, but the surrounding soil may be contaminated. Other discrete point sources were observed near the southwest corner of the 317 Area, and again near the boundary between Areas 317 and 319. The two primary drainage patterns leading offsite show considerable soil erosion, indicating that resuspension of contaminated soils could lead to release of radioactivity from the area.

Rules regulating stormwater runoff have been proposed by EPA, and are expected to be promulgated in 1991. These rules will require ANL-E to characterize runoffs and submit applications covering releases which are not currently considered NPDES outfalls.

Resources have been committed to conducting characterization studies of the 317 and 319 Areas along the southern boundary of the site and the ENE Area, and eventually remediation efforts will be undertaken (SW-73).

This issue was identified as a finding during the DOE Environmental Survey (SW-5), and is the subject of AIS Self-Assessment Findings EC2.3.9, 2.3.10, 2.3.11, 2.3.12, 2.3.13 and 2.3.15 (SW-29).
ASSESSMENT DISCIPLINE: Surface Water

ASSESSMENT FINDING NUMBER: SW/CF-9

ASSESSMENT FINDING TITLE: Infiltration into the Wastewater Collection Systems

PERFORMANCE OBJECTIVE:

Illinois Water Pollution Control rules stated in Illinois Administrative Code, Title 35, Subtitle C, Section 306.303 specifically prohibits excess infiltration into sewers (SW-65). EPA guidelines for municipal sewer systems have defined a "normal" infiltration rate to be no more than 1500 gallons per day (gpd) per inch-mile (SW-63).

FINDING:

Infiltration rates into sanitary sewers at ANL-E are more than five times the normal rate for municipal sewers (SW-64 and SW-65). Rates for the laboratory wastewater collection systems are 1.6 times the normal rate (SW-65). During storm events, excessive inflow overloads the wastewater treatment plants (sanitary and laboratory), and contributes to NPDES permit non-compliance problems.

DISCUSSION:

The sanitary wastewater collection system was found to have an infiltration rate of 5.4 gallons per minute (gpm)/inch-diameter/mile of pipe during wet weather in 1978, and 5.8 gpm/inch-diameter/mile in 1985 (SW-65). These rates are equivalent to 7,776 gpd/inch-mile and 8,352 gpd/inch-mile respectively. The laboratory wastewater collection system was reported to be infiltrated at the rate of 1.7 gpm/inch-diameter/mile for 1985, equivalent to 2,448 gpd/inch-mile, or 1.6 times the normal flow (SW-65).

ANL-E has produced a conceptual design report addressing this issue. A contract has been awarded to design and construct sewer lines rehabilitation, with a projected construction completion date of November 30, 1992.

The AIS Self-Assessment Report (SW-29) has included this issue as Finding EC2.3.21. The DOE Environmental Survey Report (SW-5) also called attention to potential leaks in sanitary and laboratory wastewater sewer systems as Finding Number 7 in Section 3.3.4.3.
SW/CF-9
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ASSESSMENT DISCIPLINE: Surface Water

ASSESSMENT FINDING NUMBER: SW/CF-10

ASSESSMENT FINDING TITLE: Releases to Storm Drains

PERFORMANCE OBJECTIVE:

Illinois Administrative Code, Title 35, Subtitle C, Section 304.141(b) states that no person may discharge any pollutant unless limitation for that pollutant has been set forth in an applicable NPDES permit. Pollutants include any that are subject to any Federal or state water quality standard, guideline, or other limitation promulgated pursuant to the Clean Water Act (SW-65).

FINDING:

The unpermitted release of the contents of floor drains and other runoffs directly to the storm sewer system from a number of ANL-E buildings occurs routinely, along with the permitted discharge of cooling tower blowdowns and once-through cooling waters.

DISCUSSION:

All storm drains except those along the southern boundary of the site discharge through NPDES outfalls, but can carry out pollutants which are not listed characteristics in applicable permits for the outfall. Permitted pollutants and regulated wastewater characteristics include TSS, oils and greases, temperature, and pH. IEPA has also been notified of the cooling water treatment chemicals contained in cooling tower blowdowns and once-through cooling waters.

Contrary to the permitted, deliberate releases of cooling water, any spills and/or accidental releases of hazardous chemicals to the floor drains would be violations of permit requirements. A large number of floor drains are located in equipment areas, storerooms, workshops, and laboratories throughout the site. Releases from such sources could contaminate not only the water quality at the outfall, but also the soils and sediments in the open ditches that make up part of the stormwater collection system. Storm drains also receive potential chemical pollutants in runoffs from sources such as the reactive metals burning operations outside of Building 370. The permit provides no allowances for release of such chemical pollutants from stormwater outfalls.

The AIS Self-Assessment Report (SW-29) includes discussion of this issue as Finding EC2.3.22, and the DOE Environmental Survey includes a finding relating to the floor drains in B815 (SW-5).
ASSESSMENT DISCIPLINE: Surface Water

ASSESSMENT FINDING NUMBER: SW/CF-11

ASSESSMENT FINDING TITLE: CP-5 Reactor Yard Area Run-Off

PERFORMANCE OBJECTIVE:

Illinois Water Pollution Control rules stated in Illinois Administrative Code, Title 35, Subtitle C, Section 302.207 establishes water quality standards on gross beta, which may result from natural or accelerator-produced radioactive materials, and radium-226.

Section 304.124 of Subtitle C places a limit on lead concentrations in any effluent, and Section 302.208 establishes a general use water quality standard for lead in the receiving stream.

DOE Order 5400.1, General Environmental Protection Program, Chapter IV, Paragraph 5a.2, states in part, that effluent monitoring shall be conducted to provide representative measurements of the quantities and concentrations of pollutants in liquid discharges.

DOE Order 5400.5, Radiation Protection for the Public and the Environment, Paragraph 6b, states that it is DOE's objective to protect the environment from radioactive contaminants to the extent practical. Chapter 1, Paragraph 5a, requires that additional controls on the release of liquid wastes be adopted to reduce the potential for radiological contamination of resources such as land, groundwater, surface water, and ecosystems.

FINDING:

ANL-E does not provide adequate monitoring of the runoffs from the CP-5 reactor yard to ensure that requirements of Illinois Administrative Code, Title 35 and applicable DOE Orders are being met.

DISCUSSION:

The equipment yard directly south and east of Building 330 (CP-5 reactor) has served as a storage area for radioactive equipment and lead shielding. While the reactor was active, the yard activities included handling of objects contaminated with heavy water and tritium, and operation of cooling towers. The main heat exchanger is known to have leaked at some time in 1964 or 1965, radioactively contaminating the cooling water and cooling tower. The transite in the tower still contains measurable radioactivity. Runoff patterns in the CP-5 reactor yard area allow rainwater to flow off the yard onto a paved driveway and then into a stormwater drainage system. The stormwater eventually discharges through Outfall 003. It is not routinely analyzed for pollutant parameters until after it enters Sawmill Creek and has been subjected to dilution, rather than sampling at the point of entry to Sawmill Creek to confirm that requirements of IAC and DOE Order 5400.1 are being met. Moreover, the flow immediately adjacent to the area during or immediately after a rainfall event has never been sampled to determine the amount of radionuclides or other hazardous chemicals (e.g., lead from the shielding bricks) present. Such sampling would be essential to define the quantities of hazardous pollutants (e.g. lead) in effluents from this area to satisfy
requirements of DOE Order 5400.1, and to protect the environment from radioactive contaminants to the extent practical, as mandated by DOE Order 5400.5. Thus, it is not possible to state with certainty that surface water runoff or Outfall 003 are meeting the compliance limitations stated in Subtitle C, or are in need of additional controls as required by DOE Order 5400.5.

The AIS Self-Assessment Report (SW-29) includes a discussion of this issue as Finding EC2.3.23.
ASSESSMENT DISCIPLINE: Surface Water
ASSESSMENT FINDING NUMBER: SW/CF-12
ASSESSMENT FINDING TITLE: Stormwater Discharge at the Shooting Range

PERFORMANCE OBJECTIVE:

Illinois Water Pollution Control Rules, Title 35, Illinois Administrative Code, Subtitle C, Chapter 1, Section 304.141 (b) prohibit the discharge of any pollutant subject to any applicable Federal or state water quality standard unless a limitation for such a pollutant has been set forth in an applicable NPDES Permit. The limit for lead in effluent (Section 304.124) is 0.2 mg/L, subject to averaging rules contained in Section 304.104(a). This limit applies to effluent discharged to waters of the State (Section 301.275), including groundwater (Section 301.440). There is some uncertainty regarding the strict applicability of this requirement to groundwater at Federal facilities.

Wastes subject to regulation under RCRA are identified according to the provisions of 40 CFR 261 and corresponding state regulations under Title 35 IAC 721.

FINDING:

Lead on the ground at the shooting range east of the 319 Area may be carried by surface runoff into the storm drain system that discharges onto land south of the range through a pipe beneath the protective berm.

DISCUSSION:

Lead was observed in abundance in the protective berm at the south end of the range. This berm shows evidence of erosion and is near the storm drain. The potential for transport of lead from other areas within the shooting range where lead was also observed is indicated by stormwater drainage patterns. No sampling of water or sediment in the drain has been conducted to determine whether or not lead is present.

Evidence that lead from direct contact or from vapor deposition on soil can affect the waters of the State is available from preliminary characterization studies at the former shooting range (Building 832) (GW-43), where groundwater was found to have a lead concentration of 0.6 mg/L. Because of the geology in the vicinity of the shooting range, it is probable that the groundwater will discharge to the river south of the site.

The accumulation of spent bullets in soil may constitute improper disposal of hazardous waste if this lead fails the Toxicity Characteristic Leaching Procedure (limit is 5 mg/L in extract) (40 CFR 261.24).

Findings EC2.2.6 and EC2.3.14 in the AIS Self-Assessment Report addressed these problems and pointed out that migration of lead into surrounding soils, vegetation, and wildlife could possibly harm the ecology of the area (SW-29).
SW/CF-12
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ASSESSMENT DISCIPLINE: Surface Water
ASSESSMENT FINDING NUMBER: SW/CF-13
ASSESSMENT FINDING TITLE: Backflow Prevention Program

PERFORMANCE OBJECTIVE:

DOE Order 6430.1A, General Design Criteria, Section 0266-2 requires that the "quality of domestic water within distribution systems be protected from degradation by installation of backflow prevention assemblies to preclude backflow of contaminants or pollutants into the system" (SW-70). The IEPA's Division of Public Water Supplies also has established requirements for backflow prevention assemblies in response to Title III of the Illinois Environmental Protection Act. Regulations promulgated in 29 CFR 1910.141(b)(2/ii) also require that water suppliers have a pre-installation review system in place, or else prevent contamination of potable water through use of backflow prevention devices.

FINDING:

The backflow prevention/cross-connection control programs at ANL-E have been engineered and maintained in such a way that they can be circumvented by site personnel in their individual work areas. Maintenance and tracking of backflow preventers is inconsistent and disorganized.

DISCUSSION:

A number of goose-neck sink taps were equipped with long hoses that often lay in coils at the bottom of the sink or in drains leading to sink traps. Sudden changes in water pressure could cause backsiphonage of contaminated water from the sinks or drains into the potable water system. This practice is widespread, but was specifically noted in Buildings 200, 203, 205 and 212 (I-SW-52).

Although a program is in place to inspect and repair, if necessary, the 22 active backflow prevention devices (BFP), one in Building 814 was observed to be leaking badly, and had no tag indicating when it was last inspected. Plant Facilities and Services tracks the list of backflow preventers and includes them on their preventive maintenance schedules. Currently there are 22 active BFPs serving 17 buildings. Another 7 BFPs are no longer in service, but may still remain in place, or in the inventory. For example, a BFP in Building 222 was identified as out of service in August 1988, removed in September 1988, but still appears on the September 1990 print-out of backflow preventers.

This finding is related to a similar concern expressed by the Safety and Health Subteam during their investigation of compliance with occupational health standards. Safety and Health Concern WS.3-1 (See Section 4.5.16.2 of this Report) expresses the same concern that systems for separating potable and non-potable water were being defeated by individuals in their work areas.

This finding was not addressed in the AIS Self-Assessment Report.
ASSessment Discipline: Surface Water
Assessment Finding Number: SW/CF-14
Assessment Finding Title: Freund Pond Sediments
Performance Objective:
Illinois Administrative Code, Title 35, Subtitle C, Section 304.141(b) states that no person may discharge any pollutant subject to applicable Federal or state water quality standards unless limitations for such a pollutant have been set forth in an applicable NPDES permit (SW-65). The NPDES permit for Outfall 003, which drains the Freund Pond basin, contains limitations for pH, total suspended solids (TSS), and temperature only (SW-30).

Finding:
Releases of chromium, copper, iron, and mercury (SW-24) are carried out of Freund Pond through Outfall 003. These pollutants are contained in pond sediments that may be resuspended by flowing water.

Discussion:
The principal corrosion inhibitor for cooling water systems from the early 1950's until 1979 was zinc chromate. Much of the cooling system blowdown and once-through cooling water was diverted to Freund Pond, where some of the zinc chromates precipitated and were deposited in the sediments. Even though no chromium-based inhibitors have been used since 1979, sediments still contain 10 to 25 times as much chromium as background samples, and 2 to 3 times as much zinc (SW-32). Characterization efforts indicated that the more highly concentrated sediments lie toward the deeper portions near the bottom of the pond. Copper, iron, and mercury may also be part of the sediment load, but are also likely to be present as corrosion of laboratory plumbing and accidental releases of mercury to laboratory drains and sink traps. A plan has been developed and resources committed for removal of all pond sediments, with completion scheduled for September 1991.

The AIS Self-Assessment Report (SW-29) has identified the problem of Freund Pond sediments in Findings EC2.2.17 and EC2.3.7.
ASSESSMENT DISCIPLINE: Surface Water

ASSESSMENT FINDING NUMBER: SW/CF-15

ASSESSMENT FINDING TITLE: 800 Landfill Area Runoff

PERFORMANCE OBJECTIVE:

Illinois Administrative Code, Title 35, Subtitle G, Section 807.313 prohibits anyone from operating a sanitary landfill so as to allow the discharge of any contaminants or cause water pollution. Section 807.314(e) requires landfill operators to provide adequate measures to monitor and control leachate.

FINDING:

ANL-E has been cited by DuPage County's Department of Environmental Concerns for causing or allowing the operation of a sanitary landfill (800 Area) in a manner that could cause water pollution, and for failure to provide adequate measures to monitor and control leachates (SW-71). During a site inspection on April 24, 1990, leachates were observed seeping out of the site's east slope, causing the inspector to issue a notice of apparent violations.

DISCUSSION:

ANL-E personnel backfilled the seeps and compacted the area with clay soil. Daily surveillance inspections were also conducted to ensure no further eruption. However, only limited additional measures to monitor and control leachate movement are in place currently. Resources have been committed to conduct an extensive site characterization of the 800 Area landfill. An FY 1991 project has been budgeted to provide permanent leachate collection and control, and additional monitoring and surveillance systems will be built by December 1993.

This problem has been included in the AIS Self-Assessment Report as Finding EC2.3.8 (SW-29).
3.5.2.3 Best Management Practice Findings

ASSESSMENT DISCIPLINE: Surface Water

ASSESSMENT FINDING NUMBER: SW/BMP-1

ASSESSMENT FINDING TITLE: Lime Sludge Pond

PERFORMANCE OBJECTIVE:

Water and wet sludge impounded in a surface water lagoon can present a threat to the surrounding environment either from overflow, from failure of the earthen dikes surrounding the lagoon, or from contamination of the groundwater beneath the lagoon, so such structures should be dewatered and the sludge removed at the earliest practical time.

FINDING:

ANL-E has a large unlined lagoon containing approximately 100,000 yd$^3$ of lime sludge from the water treatment plant (Building 129). The lagoon is separated from Sawmill Creek by an earthen dike. Failure of this dike could cause the release of alkaline wastewater and large quantities of suspended matter to the creek, adversely affecting creek biota downstream. Also, the absence of a liner threatens the groundwater below the lagoon.

DISCUSSION:

The lime sludge pond is no longer used for disposal of wastes, and water levels have been steadily dropping. As a result, the potential for accidental overflows has been greatly reduced. ANL-E monitors water levels in the pond weekly. The threats of dike failure and possible releases to the groundwater below the pond persist. A contract has been awarded to begin removing sludge from the pond. The work is projected to require 7 years to completely dewater the pond and recover the sludge for agricultural uses. The IEPA has issued the necessary permits for land application of the sludge (SW-11). The first 8,000 yd$^3$ is scheduled for removal in 1990.

The issue was included among the findings during the DOE Environmental Survey (SW-5), and appeared also as Finding EC2.3.16 in the AIS Self-Assessment Report (SW-29).
SW/BMP-1
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ASSESSMENT DISCIPLINE: Surface Water
ASSESSMENT FINDING NUMBER: SW/BMP-2
ASSESSMENT FINDING TITLE: Repair and Replacement Turnaround Times

PERFORMANCE OBJECTIVE:
Critical instruments and equipment necessary for proper operation of wastewater control systems must be maintained in good working order to function as efficiently as possible. If necessary, a priority work order system should be developed to ensure that all repairs or replacements can be completed as quickly as possible.

FINDING:
Unacceptably long turn around times, in many cases months, persist for essential repairs to necessary components of critical wastewater control equipment.

DISCUSSION:
This problem was apparent at the hazardous waste management facility, laboratory wastewater treatment plant, and wastewater monitoring points, but may also be widespread at other locations.

At the waste management building (Building 306), the evaporator/concentrator has been running for months without a chilled water sensor to signal that water is moving through the condenser. A high-level control has been on order for 3 months with no action. A new vacuum pump for the concentrator has been installed but not plumbed to the vacuum system because the new fixture has 2-inch lines, while the old system has 1-1/4-inch lines. All three pieces of equipment would increase the reliability of the evaporator and allow the operator more flexibility in his work.

The laboratory wastewater treatment system has been running for long periods of time without its equalization basin, and with one or more settling tanks out of service. The basin was finally restored to service on October 1, 1990. Equipment for automatic sampling has malfunctioned, partly due to vandalism at Outfall 001, and will not be replaced. Outfall 003 formerly had automatic sampling and flow measuring equipment, but it is also in a state of disrepair. The current NPDES permit no longer requires continuous monitoring at these sites, so no permit violations are involved. However, such equipment would provide ANL-E staff with useful measurements for their wastewater control programs.

This finding was not addressed in the AIS Self-Assessment Report.
ASSessment Discipline: Surface Water

Assessment Finding Number: SW/BMP-3

Assessment Finding Title: Domestic Water Storage Tanks

Performance Objective:

Owners/operators of potable water supplies should take all measures necessary to protect water supplies from possible contamination, including airborne pollutants.

Finding:

The two open-top aeration tanks for potable water at the ANL-E water treatment plant (Building 129) could become contaminated from particulates or gases emanating from the Central Boiler House, Building 108.

Discussion:

Sulfur dioxide and suspended particulates from the combustion of coal could be deposited in the aeration tanks, especially since the stack is only 300-350 feet from the two tanks. Although the water undergoes further treatment after leaving the tanks, good practice would minimize the possibility of contamination at any point in the treatment sequence. The AIS Self-Assessment Report (SW-29) has included this issue as Finding EC2.3.37.
3.5.3 **Groundwater/Soil**

3.5.3.1 **Overview**

The groundwater/soil portion of the Environmental Subteam Assessment at Argonne National Laboratory-East (ANL-E) involved an evaluation of the groundwater monitoring program and current groundwater and soil-related characterization activities. The Assessment included tours of active and inactive waste disposal sites, observation of well sampling, review of site documents, and interviews with ANL-E, Argonne Area Office (AAO), Chicago Operations Office (CH), and regulatory personnel. Compliance with groundwater requirements was evaluated on the basis of DOE Orders and Federal and Illinois regulations.

**Soil Monitoring**

The ANL-E soil monitoring program is limited to radiological analyses of annual samples taken at 20 locations. Ten of these are described in the annual site environmental reports (e.g., GW-1) as perimeter locations, but some of these are beyond the present ANL-E site boundary on property that formerly belonged to ANL-E but is now part of Waterfall Glen Forest Preserve.

In addition to the soil monitoring program, soil sampling is performed for site characterization projects and to verify compliance with Illinois Soil Cleanup Objectives where removal of underground storage tanks has taken place. Analytical parameters depend on the contaminants expected.

Soil probes have been used at the 800 Area Landfill and the 317/319 Area to collect samples of soil gas (and shallow groundwater). These studies were performed to locate former French drains used for disposal of waste oil and chemicals.

**Groundwater Monitoring**

Groundwater monitoring at ANL-E is conducted by the Environment, Safety and Health Department (ESHDD) of the Support Services Division. Two separate laboratories, the Industrial Hygiene Chemical Laboratory (IHCL) and the Environmental Monitoring Chemical Laboratory (EMCL), within ESHDD perform groundwater sampling and analysis. Nonradiological parameters are analyzed by IHCL, while radiological analyses are done by EMCL. Monitoring is conducted at wells at two waste management areas (the 800 Area Landfill and the 317/319 Area) and the CP-5 reactor yard, and on potable water wells.

The geology of the ANL-E area consists of about 30m (100 feet) of glacial till overlying dolomite bedrock of Niagaran and Alexandrian dolomite of Silurian age (GW-1). The dolomite bedrock is an important drinking water aquifer, used by both ANL-E and the surrounding area. The glacial till overlying the dolomite aquifer consists of a silty clay matrix intermixed with sand, gravel, pebbles, and rock fragments. The till contains sand lenses and layers of variable thickness and extent. These sand bodies can have localized effects on groundwater flow paths and flow rates.

Groundwater contamination is known to exist at the 800 Area Landfill. Maximum levels of metals are 150 mg/L for iron, 6 mg/L for manganese, and 0.086 mg/L for arsenic. Ketones (acetone at 66 μg/L and 2-butanone at 16 μg/L) have been
confirmed in a monitoring well in the dolomite aquifer. Although the disposal of radioactive material is prohibited in the sanitary landfill, tritium at low concentrations (up to 1100 pCi/L) has been detected in shallow wells in the glacial till. Preliminary soil probe studies indicate that organic contaminants are found in areas beyond the suspected location of the French drain.

Groundwater is known to be contaminated with tritium (up to 16,000 pCi/L) at the CP-5 reactor yard, and with lead (0.6 mg/L) at the old shooting range. Soil is also contaminated with these analytes.

The 317/319 Area has both radionuclides and organic compounds in groundwater. Soil probe results indicated the presence of more than 30 different organic compounds in the 317 Area. Acetone (265 µg/L) and 2-butanone (529 µg/L) were found in shallow groundwater collected by the soil probe study at an offsite outfall south of ANL-E. The nature and extent of contamination in the 317/319 Area and associated offsite areas are under active investigation.

Current groundwater and soil-related work at ANL-E includes preliminary characterization of several sites to be listed as Solid Waste Management Units (SWMUs) in a revision of the ANL-E Resource Conservation Recovery Act (RCRA) Part B permit application required by the IEPA. All available information pertaining to any release of hazardous wastes or hazardous constituents from SWMUs must be included in this application so that the IEPA may determine if further investigation is necessary. A plan for a baseline hydrogeological study (groundwater assessment) at the 800 Area Landfill is also being prepared for submission to IEPA under the state regulatory program for sanitary landfills.

The groundwater/soil assessment identified one compliance finding and three best management practice findings. They include the absence of a state-approved groundwater monitoring plan for the 800 Area Landfill, the lack of knowledge concerning proper closure of wells and boreholes, the need for a sitewide hydrogeological assessment and monitoring well network, and the absence of a comprehensive program of groundwater monitoring plans and procedures. The AIS Self-Assessment Report addressed the need for the hydrogeological assessment and well network.

The 800 Area Landfill groundwater monitoring plan and the lack of knowledge on well and borehole closure are issues which have been recognized by ANL-E. Resolution of these two issues is being actively pursued although they were not reflected in the AIS Self-Assessment Report.
3.5.3.2 Compliance Findings

ASSESSMENT DISCIPLINE: Groundwater/Soils

ASSESSMENT FINDING NUMBER: GW/CF-1

ASSESSMENT FINDING TITLE: Groundwater Monitoring at the 800 Area Landfill

PERFORMANCE OBJECTIVE:

The Illinois Environmental Protection Agency (IEPA) has required the submittal of a groundwater monitoring plan and a groundwater assessment study for the 800 Area Landfill. This landfill is regulated by the IEPA, Division of Land Pollution control, as a Sanitary Landfill under Title 35 Illinois Administrative Code, Subtitle G, Section 807. In a supplemental permit application denial dated October 16, 1989, the IEPA stated that the current groundwater monitoring program for the landfill was inadequate and required the submittal of a new groundwater monitoring plan. The IEPA has also required ANL-E to conduct a groundwater assessment study that would provide an adequate scientific basis for evaluation and approval of a groundwater monitoring plan. In order for a groundwater monitoring plan to be approved, the proposed monitoring system must meet all requirements stated in the IEPA Final Draft "Groundwater Monitoring Network for Non-Hazardous Solid Waste Disposal Facilities," dated April 1990.

FINDING:

The 800 Area Landfill does not have a Groundwater Monitoring Plan approved by the IEPA, nor has a groundwater assessment study been conducted that would provide an adequate scientific basis for IEPA evaluation and approval of a plan. The existing monitoring well network at the landfill is not based on an IEPA-approved plan.

DISCUSSION:

This situation arose because the 800 Area Landfill was already in existence at the time that it was originally permitted by the IEPA; consequently, a Development Permit application was never submitted. Preparation of a Development Permit application requires an extensive study of the geology and hydrology of the proposed site of the landfill (Sections 807.316[5], [6], and [7]). Although hydrogeological information was submitted with the original operating permit application, this information was not sufficiently detailed to satisfy current requirements.

ANL-E has prepared a Statement of Work (dated September 13, 1990) (GW-38) for preparation of a project plan for a hydrogeological baseline study (groundwater assessment). The Groundwater Assessment Study Plan to be completed under this effort is scheduled to be submitted to IEPA by December 1, 1990 (GW-16). IEPA will have 90 days after submittal to review and approve the plan. Implementation of the plan would then occur during the spring or summer of 1991. The results of this study would become the basis for IEPA evaluation and approval of a permit application for a permanent monitoring well network.
Although other issues concerning the 800 Area Landfill, such as RCRA/CERCLA characterization and remediation and leachate management problems, were addressed in the AIS Self-Assessment Report, these groundwater related Section 807 permit requirements were not specifically addressed.
3.5.3.3 Best Management Practice Findings

ASSESSMENT DISCIPLINE: Groundwater/Soils

ASSESSMENT FINDING NUMBER: GW/BMP-1

ASSESSMENT FINDING TITLE: Groundwater Monitoring Plans and Procedures

PERFORMANCE OBJECTIVE:

DOE Order 5400.1, General Environmental Protection Program, Chapter IV, Section 1.b and 9, requires that a groundwater protection program capable of determining and documenting the effects of DOE activities on groundwater quality be in existence by November 1991. This program must be documented by a Groundwater Protection Management Program Plan (required by May 1990) and a Groundwater Monitoring Plan (required by November 1991). The elements of the groundwater monitoring program shall be specified (sampling plan, sampling, analysis, and data management), as shall the rationale or purpose for selecting these elements.

FINDING AND DISCUSSION:

The plans and procedures covering groundwater monitoring and related activities at ANL-E are incomplete. A formal, comprehensive, well-coordinated program capable of meeting the requirements of DOE Order 5400.1 is not yet in place.

- The Groundwater Protection Management Program Plan required by May 9, 1990 was still in draft form at the time of the Tiger Team Assessment. This draft document was not transmitted to the AAO until September 5, 1990 (GW-27).

- No formal sampling and analysis plan exists for the existing Groundwater Protection Program that consists of routine analysis of the potable water well system and of groundwater monitoring at two sites, the 800 Area Landfill and the 317/319 Area.

- Existing elements of the groundwater monitoring program are found in various plans and procedures, but no single site-wide document yet exists that lists or coordinates these elements or describes how the program is implemented in the ANL-E organizational structure. Well locations, sampling procedures and sample preservation are covered in detail in Standard Operating Procedure IHCL-001 (GW-11). Similar, but less detailed, information for radiological sampling is presented in the Environmental Monitoring Chemical Laboratory Manual section on Sample Collection and Preservation (SCP) (GW-30) and specifically in SCP-002 on the sampling of subsurface water (GW-31). Quality assurance plans that discuss sample handling exist for both the Industrial Hygiene Chemical Laboratory (GW-15) and the Environmental Monitoring Chemical Laboratory (GW-28). The individual programs conducted for potable water wells, the 800 Area Landfill and 317/319 Area, are summarized in the draft Groundwater Protection Management Program Plan (GW-27) and the annual Site Environmental Reports.
(e.g., GW-1). These summaries include information on sampling frequency and analytical parameters. The lack of a single document incorporating all of these elements increases the potential for problems.

Information is missing from existing procedures. For example, the method for disposal of purge water in IHCL-001 (GW-11) does not address the fact that contaminated groundwater cannot be disposed of onto the land surface without consideration of its level of contamination. A revision of this procedure (IHCL-001-01, GW-29), which is currently in draft form, will correct this omission. The disposal of purge water is not addressed at all in the corresponding procedures for the Environmental Monitoring Chemical Laboratory (GW-30 and GW-31).

This finding was not addressed in the AIS Self-Assessment Report.
ASSESSMENT DISCIPLINE: Groundwater/Soils

ASSESSMENT FINDING NUMBER: GW/BMP-2

ASSESSMENT FINDING TITLE: Sitewide Hydrogeological Assessment and Monitoring Well Network

PERFORMANCE OBJECTIVE:

DOE Order 5400.1, General Environmental Protection Program, Chapter IV, Sections 1.b and 9, requires that, by November 1991, groundwater that is or could be affected by DOE activities shall be monitored to determine and document the effects of operations on groundwater quality.

FINDING:

ANL-E has no sitewide groundwater monitoring well network and therefore cannot adequately monitor the effects of operations on groundwater quality; moreover, a sitewide hydrogeological assessment that would support such a network has not yet been performed.

DISCUSSION:

A sitewide system of monitoring wells is needed at ANL-E, particularly at the site boundary, to satisfy the order objectives. Such a system would permit comparison of the quality of the groundwater entering the site with that leaving the site, and would thus increase the probability of detecting and evaluating offsite releases of hazardous or radioactive constituents.

The only measurements that approximate sitewide monitoring are those made on the potable water wells, which draw water from the bedrock (dolomite) aquifer that underlies glacial till throughout the site. The pumping of these water-supply wells draws water from beneath much of the areal extent of the site, and therefore routine analysis of this well water provides information on the overall quality of groundwater that reaches this aquifer. This system also collects and dilutes any contaminants that reach those portions of the aquifer that are under the influence of these pumping wells. Consequently, the routine analysis of potable well water monitors only for those contaminants that have already reached the drinking water aquifer in concentrations sufficiently high to be detectable after dilution. In addition, contaminants migrating vertically through the glacial till overlying the aquifer, or those moving horizontally in sand lenses or layers within the till, would not be detected in a timely manner analyzing well water samples. Moreover, the area of influence (cone of depression) created by pumping the water-supply wells does not extend to the east, west or south boundary of the site, so contaminant migration from waste management areas near the site boundary would not be detected by monitoring of water-supply wells.

Most of the ANL-E site boundary has no monitoring wells. Wells exist only in widely separated areas. Two waste management areas located near the site boundary, the 800 Area Landfill and the 317/319 Area, do have groundwater monitoring networks, and plans are underway to conduct further hydrogeological studies and to install additional wells at these areas. Isolated shallow wells are in place in other locations, such as the CP-5 reactor yard and the underground storage tank removal site at Building 827. Wells into the
dolomite aquifer that are used for non-potable water supplies exist but have rarely or never been sampled for water quality. Some of these are near the site boundary and are potentially suitable as part of a monitoring network. Subsurface studies and temporary wells at the Advanced Photon Source site have provided information on the existence of layers of increased permeability in the till that could affect groundwater flow paths and rates. Aside from these specific areas, little is known about groundwater conditions, particularly in the glacial till.

A well-coordinated program of hydrogeological assessment and well installations is needed to meet the requirements of DOE Order 5400.1. The AIS Self-Assessment Report recognized the need for a sitewide hydrogeological assessment and monitoring program in Finding EC2.4.17.
ASSESSMENT DISCIPLINE: Groundwater/Soils

ASSESSMENT FINDING NUMBER: GW/BMP-3

ASSESSMENT FINDING TITLE: Closure of Wells and Boreholes

PERFORMANCE OBJECTIVE:

The Illinois Water Well Construction Code, Title 77 Illinois Administrative Code, Chapter I, Subchapter r, Section 920.120 requires that the owner of a potable water well, boring, or monitoring well shall assure that such a well is sealed within 30 days after it is abandoned and no longer used for the purpose for which it was intended. The provisions and procedures of Section 920.120 and additional rules of the Dupage County Health Department apply to wells into the drinking water aquifer.

The IEPA has issued recommended procedures for plugging and abandonment of monitoring wells (Attachment to GW-16). These procedures are applicable to wells and boreholes in the glacial till above the drinking water (dolomite) aquifer.

The RCRA Ground-Water Monitoring Technical Enforcement Guidance Document (1986) states that boreholes in which permanent wells are not constructed should be sealed with material at least an order of magnitude less permeable than the surrounding soil/sediment/rock in order to reduce the number of potential contaminant pathways.

FINDING:

The current status of numerous wells and boreholes at ANL-E is unknown: consequently, there is a potential that wells and boreholes exist that have not undergone closure in accordance with applicable recommendations and regulations.

DISCUSSION:

At the onset of the Tiger Team Assessment, little information was available on the status of wells and boreholes. As a consequence of Tiger Team concerns, considerable data were compiled by ANL-E during the Assessment to document the fact that many wells into the dolomite aquifer have been sealed in conformance with state and county regulations (GW-25, 26, 41, 42). However, the status of the following wells and boreholes is still unknown:

- Sixteen soil borings drilled in 1948, probably by the U.S. Geological Survey, in the area that is now the Advanced Photon Source (APS) site (GW-9, GW-25, GW-26). Depths and locations of these holes are known and boring logs are available. These holes may have been sealed, and it may be difficult to locate them in the field.

- Sixteen soil and rock borings drilled in 1965/66 for the Argonne Advanced Research Reactor (AAR) (GW-9, GW-25, GW-26). Again, depths and locations of these holes are known and boring logs are available. Some were apparently drilled into bedrock since they are described as rock borings.
Seven bedrock (dolomite) wells described in a 1963 U.S. Geological Survey Water-Supply Paper (GW-10). Two of these (Wells 35 and 38) are on ANL-E property and five (Wells 8, 18, 19, 26, and 29) are now on Waterfall Glen Forest Preserve Property.

Wells 1N and 2S at Building 212, listed as inactive in GW-25 and GW-26.

This finding was not addressed in the AIS Self-Assessment Report.
3.5.4 Waste Management

3.5.4.1 Overview

The waste management assessment involved the evaluation of waste generation and management activities at ANL-E for conformance with applicable state and Federal regulations, and DOE Orders. The activities conducted during the assessment included: (1) inspection of waste generating operations and waste management facilities; (2) interviews with waste generators, personnel responsible for Divisional environmental compliance, and personnel from Waste Management Operations; and, (3) a review of relevant waste management documentation, including training records, waste requisitions and manifests, permits and permit applications, procedures, plans, self-assessments, and external assessments.

Major statutes and regulations against which conformance was evaluated include the Resource Conservation and Recovery Act (RCRA) and the Hazardous Waste Amendments (HSWA), EPA Hazardous Waste Regulations and Guidance, National Emission Standards for Hazardous Air Pollutants (NESHAP), Illinois Hazardous Waste Management Regulations, Illinois Solid and Special Waste Management Regulations, and DOE Orders 5400.1, General Environmental Protection Program; 5400.2A, Environmental Compliance Issue Coordination; 5400.3, Hazardous and Radioactive Mixed Waste Programs; 5480.19, Conduct of Operations Requirements for DOE Facilities; and, 5820.2A, Radioactive Waste Management.

Since ANL-E is made up of approximately 22 Divisions, it was not possible to visit all of the divisions in the time available to the Environmental Subteam. Instead, a representative sample of seven Divisions was selected on the basis of waste management documentation and input from the site. The Divisions visited were Chemistry, Chemical Technology, Material Sciences, Material Component Technology, Plant Facilities and Services, Biological and Medical Research, and Engineering Physics. New Brunswick Laboratory was also assessed. Given the consistency of the findings that resulted from the assessment of these seven Divisions, the Environmental Subteam believes the same problems are likely to exist in all of the divisions at ANL-E.

Hazardous wastes generated at ANL-E are managed by onsite accumulation and storage, followed by shipment to an offsite RCRA disposal facility. Corrosive wastes are sometimes neutralized onsite. The major hazardous waste streams generated are organic solvents (halogenated and nonhalogenated), corrosive solutions, and a wide variety of listed and characteristic wastes and surplus laboratory chemicals.

Mixed wastes generated at ANL-E are managed, for the most part, by onsite storage, and when appropriate, neutralization, although the site is able to ship its remote-handled transuranic (TRU) mixed waste to Idaho National Engineering Laboratory for interim storage. The major mixed waste streams generated are radiologically-contaminated lead shielding from decommissioning and decontamination (D&D) operations, corrosive solutions of uranium and plutonium (low-level and TRU), and toluene-based scintillation cocktails. The site is making an effort to reduce the generation of mixed waste scintillation cocktails by substituting other solvents for toluene. The corrosive component of solutions of uranium and plutonium is treated onsite by neutralization.
Radioactive wastes generated at ANL-E are managed through onsite accumulation and storage. The major radioactive waste streams generated are remote-handled TRU from the Alpha-Gamma Hot-Cell facility; contact-handled TRU from several facilities; and low-level waste, including contaminated trash and D&D debris. In addition, there are also process streams (i.e., distillation bottoms) from the Building 306 evaporators.

The site manages its nonhazardous solid and special wastes (e.g., pollution control wastes) through disposal in an onsite solid waste landfill. A section of the landfill is also used to dispose of asbestos-containing wastes. The materials disposed of in the landfill include asbestos-containing materials, equalization pond sludge, boiler fly ash and spent sorbant, packaging materials, coal dust, and office and cafeteria waste.

Compliance findings at ANL-E were related to nonconformance with regulatory standards and DOE Orders pertaining to the waste inventory system; radioactive waste management plans; radioactive waste reduction program; DOE field office radioactive waste management program; new radioactive waste facilities; ANL-E waste management program; radioactive waste acceptance criteria; radioactive waste storage areas; solid waste landfill; underground storage tanks; waste characterization; treatment, storage, and disposal units; closeout procedures for personnel, projects, and equipment; timely development of the RCRA Part B permit application; management of wastes in accumulation areas; waste minimization; training of waste generators and handlers; and the storage of land disposal restricted mixed wastes.

IEPA has notified ANL-E that its RCRA Part B permit application is due by January 1, 1991. Therefore, the finding about the timely development of the RCRA Part B permit application is of particular concern, since IEPA stated that unless the Part B permit application is submitted on time, IEPA will begin the process of terminating the site's interim status (WM-73 and WM-74). If the site were to lose interim status, waste management costs would increase dramatically.

As part of the Environmental Subteam Assessment, a review was made of the AIS Self-Assessment Report findings. Of the 18 compliance findings identified in this assessment, only 1, radioactive waste storage facilities, was fully addressed in the self-assessment, 7 were not addressed in any way, and only parts of the remaining 10 were partially or generally addressed. In general, the self-assessment focused on identifying specific deficiencies, and failed to associate these with the larger programmatic deficiencies, of which they are symptoms.
3.5.4.2 Compliance Findings

ASSESSMENT DISCIPLINE: Waste Management

ASSESSMENT FINDING NUMBER: WM/CF-1

ASSESSMENT FINDING TITLE: Development and Submission of RCRA Part B Permit Application

PERFORMANCE OBJECTIVE:

35 IAC 703.157, Resource Conservation and Recovery Act (RCRA), specifies that the owner or operator of an existing hazardous waste management facility must furnish the full information required by the Part B permit application on time.

DOE Order 5480.19, Conduct of Operations Requirements for DOE Facilities, states that operating goals should be used as a management tool; that meeting goals should require a definite set of actions or an action plan; that progress toward completing the action plan should be monitored periodically, and if results show a significant variance from the desired progress in achieving goals, management should review the action plan to ensure that it is adequate and is being executed.

DOE Order 5400.2A, Environmental Compliance Issue Coordination, establishes requirements for coordination of significant environmental compliance issues, such as RCRA permits and permit applications, to ensure timely development and consistent application of Departmental environmental policy and guidance.

FINDING:

ANL-E’s progress on conducting activities related to its RCRA Part B permit application has not been sufficient to ensure its timely development.

DISCUSSION:

ANL-E received official notification on October 23, 1989 from the IEPA that the RCRA Part B permit application for ANL-E was to be submitted by January 1, 1991. The AAO notified ANL-E on December 7, 1989, that the draft application was to be submitted to AAO and CH for review by October 1, 1990.

On the basis of document reviews and interviews of ANL-E personnel, the Environmental Subteam has concluded that development of the application has been so slow that it will be difficult to complete it on schedule with all the required elements being adequately addressed (I-WM-48 and I-WM-49).

Upon being notified that a draft of the application was due on October 1, 1990 and that the application itself was due on January 1, 1991, ANL-E failed to establish any documented goals or an action plan containing a schedule of activities necessary to meet the deadlines (WM-51).

Aside from attempting to procure a contractor to develop the application, ANL-E performed no documented internal preparatory work between the date of official notification and the date on which the contractor began work (August 3-83).
20, 1990) (WM-51). In the absence of goals and an action plan containing a schedule of activities, ANL-E could not ensure that adequate progress was being made. The belated starting date of August 20, 1990 made it necessary for ANL-E to request an extension from October 1, 1990 to November 5, 1990, which will significantly shorten the time available for AAO and CH to review the application (I-WM-39).

Upon commencing work, the contractor established a schedule for completing the draft application on November 5, 1990. However, the ability of the contractor to meet the November 5, 1990, deadline depends on the timely receipt of information about the site from ANL-E. The contractor has reported problems scheduling meetings with site personnel and procuring a complete and accurate list of the waste management units to be permitted, closed, or categorized as Solid Waste Management Units (I-WM-49 and WM-66). The development of a complete and accurate list of the waste management units takes time, and could have been developed by ANL-E before the contractor began work.

This finding was not fully addressed in the AIS Self-Assessment Report.
ASSESSMENT DISCIPLINE: Waste Management

ASSESSMENT FINDING NUMBER: WM/CF-2

ASSESSMENT FINDING TITLE: Waste Management Program

PERFORMANCE OBJECTIVE:

DOE Order 5480.19, Conduct of Operations Requirements for DOE Facilities, Attachment I, states that facilities are expected to meet the intent of the guidelines presented in this Order and that these guidelines could be used to assess the effectiveness and adequacy of policies and actions in the areas addressed. Chapter I states that effective implementation and control of operating activities is achieved by establishing written standards and closely monitoring performance in operations. Chapter I, Paragraph C states that procedures or other definitive documentation should specify policies that are to be applied for operations and that these documents should also provide for the types of controls necessary to implement the policies. Responsibilities for implementing these policies should be clearly defined. Goals should be used and should be auditable, measurable, realistic, and challenging. An audit of performance relative to operating goals should be provided to facility management and DOE. Inspections, audits, reviews, investigations, and self-assessments are a needed part of an operating program. Workers and their supervisors should be held accountable for their operating performance.

DOE Order 5400.3, Hazardous and Radioactive Mixed Waste Programs, Section 6 states that it is the policy of DOE to implement a hazardous and radioactive mixed waste program complying with applicable laws and regulations. It is also the policy of DOE to manage operations to the greatest extent practicable in a manner that provides for the safe handling, transportation, treatment, storage, or disposal of hazardous and mixed waste generated by those operations.

DOE Order 5820.2A, Radioactive Waste Management, requires that the generation, treatment, and storage of radioactive wastes, and the other pollutants or hazardous substances they contain, shall be accomplished in a manner that minimizes the generation of such wastes, and complies with all applicable Federal, state, and local environmental, safety, and health laws and regulations and DOE requirements.

FINDING:

The ANL-E waste management program does not ensure the effective implementation of DOE policy for hazardous, mixed, and radioactive waste.

DISCUSSION:

ANL-E waste management practices including policies, delegated responsibilities, and written standards are not being implemented in accordance with the conduct of operation requirements of DOE Orders. The following specific deficiencies were observed in waste management practices at ANL-E:

1. The ANL-E waste management policy is defined in the Waste Handling Procedures Manual (WHP), which states that the WHP is part of the
Laboratory's Policy Manual (R-12); however, the WHP is not included in the July 1990 revision of the Reference Manuals Section of the Policy Manual.

2. It has been over 4 years since the WHP was issued and it is out of date. Several major DOE Orders with waste requirements have been implemented since the WHP was issued and they have not been incorporated into the WHP. The WHP was not issued as a controlled copy and there are no documented requirements for its preparation, periodic review, approval, and modification.

3. The WHP does not establish specific procedures for the generators for segregation, characterization, minimization, or volume reduction of wastes. In addition, there are no performance standards defined, and audits of generator performance are not conducted routinely.

4. The WHP identifies Divisional Waste Management Representatives and assigns waste responsibilities to them; however, the Environmental Subteam saw no evidence that such representatives have been designated. The Environmental Subteam was informed that this responsibility has been assigned to the Environmental Compliance Representative since the WHP was issued (See Finding EM/CF-2).

5. The WHP states that the Director of the Plant Facilities and Services Division has the responsibility to establish and maintain a program to direct, evaluate, and enforce all waste handling and disposal requirements. The Waste Management Manager is responsible for directing the waste management program and coordinating its administrative and reporting requirements. The WHP does not have established procedures, performance standards, or performance measurements for program implementation.

6. There is no formal interface between the Waste Management Department and the Health Physics Section of the Environment, Safety, and Health Department. The Health Physics Section is responsible for the radiological aspects of handling waste, providing guidance, verifying compliance through observation, instructing generators to request timely removal of waste, and submitting completed waste disposal requisitions. Neither the Health and Safety Manual nor any other documents define mechanisms and controls for implementing these responsibilities, and these documents do not provide assurance of compliance with the waste management program. In addition, the assigned responsibilities do not adequately address waste program needs in the areas of waste minimization, volume reduction, segregation, characterization, and compliance with unrestricted release criteria.

7. Implementation of the Waste Management Program is not governed by a quality assurance plan that describes associated quality assurance objectives or how conformance to the objectives is to be assured (I-R-5, I-R-72). Quality assurance objectives are not described in terms of measurable characteristics and independent verification of the extent to which they are being met is not being performed for the waste management program.
8. Responsibility has not been assigned for the development and implementation of a formal independent overview function for the waste management program, including the WHP. However, an internal waste management appraisal has been scheduled for FY 1992 (R-107).

This finding was not fully addressed in the AIS Self-Assessment Report.
ASSESSMENT DISCIPLINE: Waste Management

ASSESSMENT FINDING NUMBER: WM/CF-3

ASSESSMENT FINDING TITLE: Waste Inventory and Tracking

PERFORMANCE OBJECTIVE:

35 IAC 725.173 and 40 CFR 265.73, Resource Conservation and Recovery Act (RCRA), requires that the owner or operator must keep a written operating record at the facility, and that this record include a description and the quantity of each hazardous waste received; the method(s) or date(s) of its treatment, storage, or disposal; and, the location of each hazardous waste within the facility and quantity at each location.

DOE Order 5820.2A, Radioactive Waste Management, Chapter III, Paragraph 3.f requires that records be maintained for all low-level wastes (LLW) that enters and leaves the storage facility. Paragraph 3.m requires development of a recordkeeping system that provides a historical record of waste generated, treated, stored, shipped, and/or disposed of at the waste facilities.

FINDING:

ANL-E does not have a program in place to inventory and track wastes such that accurate knowledge of the quantities, types, and locations of these wastes is available. This has led to an inventory that fails to include many wastes and cannot be used to locate or quantify wastes onsite.

DISCUSSION:

The current ANL-E waste inventory (i.e., written operating record) does not allow personnel to identify the storage location, date of storage, and quantity of waste in each storage location. The waste inventory at ANL-E is maintained by Plant Facilities and Services-Waste Management Operations (PFS-WM) and utilizes the chemical waste requisition forms (WM-17). However, there are no requirements or mechanisms in place at ANL-E for recording the locations of wastes. While notes about location are occasionally made on or attached to the requisition forms, the forms are not designed to record such information and it is not required by any ANL-E procedures. A spot check by the Environmental Team of the waste requisitions with such notes revealed that much of the information about storage location is incorrect. The informal notes are supplemented by the personal knowledge of the WM personnel, however this cannot be considered reliable and does not allow effective tracking.

There are no requirements or procedures at ANL-E to ensure that all wastes or potential wastes are recorded in the waste inventory. Consequently, there are hazardous and radioactive wastes that have no written record, or any other way to demonstrate that they have been properly classified, treated, stored, shipped, and/or disposed of at the waste facilities. The Environmental Team observed the following wastes which are not recorded in the formal ANL-E waste inventory system. The existence of these materials is symptomatic of the lack of a coordinated, comprehensive inventory and tracking program:

- One hundred and thirty (130) drums of mixed waste (scintillation vials) in Building 329;
- Two hundred (200) containers (approximately 500 gallons) of potentially mixed waste (radioactive animal body parts preserved in formalin) in Building 202;
- An undetermined number of lead-lined solid radioactive waste storage pots at CP-5 and Buildings 306 and 374A;
- One drum of radioactive (potentially mixed) waste in Building 306, and a drum and two bins of radioactive (potentially mixed) waste in the 317 Area deep vault No. 5; and,
- One hundred (100) 5-gallon pails of uncharacterized, and potentially mixed, waste in Building 40. The pails contain soil samples from various sites undergoing radiological decontamination.

Without accurate knowledge of the wastes in storage and their locations, ANL-E is unable to exercise the positive controls necessary to provide assurances that wastes are being stored and handled in accordance with the applicable regulations.

ANL-E is now in the process of inventorying these wastes, but there is no system in place to ensure that all such materials will be included. ANL-E is also developing a computerized system to track wastes.

This finding was not fully addressed in the AIS Self-Assessment Report.
ASSESSMENT DISCIPLINE: Waste Management

ASSESSMENT FINDING NUMBER: WM/CF-4

ASSESSMENT FINDING TITLE: Hazardous Waste Characterization

PERFORMANCE OBJECTIVE:

35 IAC 722.111 and 40 CFR 262.11, Resource Conservation and Recovery Act (RCRA), require that a solid waste generator must determine if the waste is listed as a hazardous waste, and if not listed, if it exhibits a characteristic of hazardous waste. If the waste is determined to be hazardous, the generator shall refer to the land disposal restrictions, and the standards for permitted or interim status facilities to determine if any exclusions or restrictions apply to the waste.

35 IAC 725.113 and 40 CFR 265.13, RCRA, require the owner or operator to obtain a detailed chemical and physical analysis of a waste before any hazardous waste is treated, stored, or disposed. At a minimum, this analysis must contain all the information that must be known to comply with the land disposal restrictions. The owner or operator must develop a written waste analysis plan that includes procedures for ensuring an adequate waste analysis; the parameters to be analyzed and the rationale for their selection; and test methods.

35 IAC 728.132 and 40 CFR 268.32, RCRA, require the generator of a liquid or nonliquid hazardous waste containing halogenated organic compounds to test the waste or use knowledge of the waste to determine whether the concentration levels in the waste equal or exceed the land disposal treatment standards.

FINDING:

ANL-E does not have a program in place to ensure that accurate and reliable information is used to characterize the chemical and physical composition of wastes. As a result, ANL-E is unable to ensure compliance with applicable treatment, storage, and disposal requirements.

DISCUSSION:

Most wastes at ANL-E are characterized using information provided by the generators on the chemical waste requisition forms (WM-17, I-WM-58, and I-WM-59). However, there are no assurances that the generators are providing accurate information on the waste requisitions as demonstrated below:

1. There are no sitewide procedures or formal guidance for the generators that clearly defines the type of information to be recorded while accumulating wastes.

2. Generators cannot always demonstrate that accurate knowledge of the wastes is used in completing the waste requisition forms. There are no procedures requiring generators to maintain a current log of the wastes added to a container. Consequently, such logs are not always maintained and generators must then rely on their memory when filling out the chemical waste requisition forms. Since containers may require days or even months to fill, this
practice may be described as a crude approximation rather than characterization.

3. The Waste Management Department does not conduct quality assurance oversight of the generators’ waste characterization activities. Audits of the generators are not conducted, nor are random samples of wastes analyzed as quality control verification of the generator’s data.

4. Errors identified on Chemical Waste Requisitions are not tracked and trended to facilitate corrective actions. In addition, corrective actions are not documented or tracked.

5. During the assessment, the Environmental Subteam toured selected waste generators’ facilities. As an example of deficiencies that are symptomatic of the problems associated with the lack of a coordinated waste characterization program, areas were observed in Buildings 108, 145, 200, 202, and 205 (I-WM-4, I-WM-8, I-WM-26, I-WM-42, and I-WM-56) where waste container labels and accumulation logs were absent, clearly inaccurate, and too general (e.g. wastes labeled as "organic solvents"). In Building 202, a waste container clearly containing at least 2 liters was noted in the log as containing 200 ml.

The Waste Management Department does have a Waste Analysis Plan for characterizing unknown wastes, but it is not being implemented in a manner that ensures accurate characterization of all wastes.

The Environmental Subteam identified a number of specific deficiencies that are symptomatic of the problems associated with the weak implementation of the Waste Analysis Plan:

1. The Waste Analysis Plan for small quantities of unknown waste will not provide ANL-E with sufficient information to satisfy the requirements of 35 IAC 728.132, since the plan does not call for small quantities of unknown wastes to be analyzed for halogenated compounds.

2. The Waste Analysis Plan does not satisfy the RCRA general analysis (35 IAC 725.113) in that it does not provide rationale for the parameters to be analyzed.

3. The Waste Analysis Plan has not been implemented to characterize potential hazardous wastes being stored in Buildings 40, 306, and the 317 Area storage vaults (I-WM-33 and I-WM-34).

This finding was partially addressed in the AIS Self-Assessment Report.
ASSESSMENT DISCIPLINE: Waste Management

ASSESSMENT FINDING NUMBER: WM/CF-5

ASSESSMENT FINDING TITLE: Radioactive Waste Acceptance Criteria

PERFORMANCE OBJECTIVE:

DOE Order 5820.2A, Radioactive Waste Management, Chapter II, Paragraph 3.a requires that waste with concentration of transuranic (TRU) material greater than 100 nCi/g shall be considered as TRU waste. It also states that the data package shall include information on the kinds and quantities of hazardous components contained. Paragraph 3.b requires that the waste be assayed or otherwise evaluated to determine the kinds and quantities of transuranic nuclides present.

DOE Order 5820.2A, Chapter II, Paragraph 3.c requires the preparation of a certification plan that meets the waste acceptance criterion of WIPP-DOE-69. It states that each certification plan shall define the controls and other measures to ensure that each element of the certification plan is performed adequately as described. Approved certification and associated quality assurance plans shall be implemented using specific, written operational procedures. Paragraph 3.j states that transuranic waste operations shall be conducted in accordance with the quality assurance requirement of 5700.6B, Quality Assurance.

The WIPP waste acceptance criteria (WIPP-WAC) requires the following: assay information (plutonium 239 equivalent, alpha activity, and Pu-239 activity); radionuclide isotope and quantity; organic material content; and the identity and quantity of hazardous waste characteristics.

Chapter III, Paragraph 3.d requires that low-level waste (LLW) be characterized such that the actual physical and chemical characteristics and major radionuclide content are and known and recorded. The concentration may be determined by direct methods or by indirect methods if there is reasonable assurance that the indirect methods can be correlated with actual measurements. Paragraph 3.e requires that generators of LLW shall implement a LLW certification program to provide assurance of compliance with the WAC. The WAC shall address quantities/concentration of specific radioisotopes, chemical and structural stability, and quantity of free liquids. Paragraph 3.g requires that generators shall provide annual forecasts of waste to be shipped. Paragraph 3.i requires that in no case shall the liquid exceed 1 percent of the volume. Paragraph 3.1 requires that LLW operations shall be conducted in accordance with quality assurance requirements of 5700.6B.

FINDING:

Low-level wastes (LLW) and transuranic (TRU) wastes are not managed in accordance with the requirements of DOE Orders regarding compliance with waste acceptance criteria.
DISCUSSION:

The ANL-E radioactive waste management and quality assurance programs are not sufficient to demonstrate and assure compliance with all applicable waste acceptance criteria as required by DOE Order 5820.2A. The following specific deficiencies are indicative of the overall programmatic inadequacy.

1. ANL-E does not have an LLW certification program (R-19).

2. ANL-E did not prepare the LLW annual forecast of waste to be shipped for Fiscal Year 1991.

3. LLW characterization and nuclide concentrations are based exclusively on the knowledge of the generator. Without formal requirements, this does not meet the order requirement for determination by direct or indirect methods.

4. The Quality Assurance Plan (R-20) does not define quality assurance activities for compliance with LLW WAC such as audits, surveilances, and quality control. The following specific deficiencies were noted:
   - There is no QA/QC of generator responsibilities for characterizing the waste and preparing the documentation.
   - There is no independent verification of generator characterization by spot check sampling, nor adequate facilities to take representative samples and analyze them.
   - There is no QA/QC to verify free-standing-liquid requirements. No facilities or methods to perform such determinations such as by using real-time radiography.

5. The TRU remote handled and contact handled certification plans (R-80, R-81) and the Waste Management Quality Assurance Plan do not provide positive control of certification of wastes for shipment to WIPP. Radionuclide concentrations are not accurately quantified, there is a lack of procedures, and quality assurance is inadequate. The following deficiencies were noted (R-25):
   - Contact handled TRU wastes are assayed using a segmented gamma scanner that is not capable of measuring threshold quantities (100 nCi/g) and only quantifies Pu-239 and U-235, and no other transuranic isotopes.
   - The contact handled TRU Certification Plan does not specify any requirements or methods for quantifying the presence of non-transuranic isotopes, except for solid waste derived from decontamination and decommissioning processes. The remote handled TRU Certification Plan does not specify any requirements or methods for quantifying of non-transuranic isotopes. Except for an annual QES audit, the Quality Assurance Plan does not require quality assurance activities such as audits, surveillance, or quality control, for waste certification.
Except for an annual QES audit, the QAP does not specify any QA activities such as audits, surveillances, or quality control checks for generator or Waste Management Department activities related to contact-handled TRU and remote-handled TRU certification. Among the activities in question are segregation, characterization, immobilization, inspections, document preparation and review, and packaging.

Quality Control deficiencies were found in the maintenance of the TRU Certification Plans. The remote handled plan has not been formally reviewed or revised in over 2 years, the cover sheet approval signatures are two revisions out of date, and there is no index of revisions for page 16. The contact handled plan has not been reviewed or revised for over 3 years, the cover sheet approval signatures are not dated, the cover sheet has not been re-issued through five revisions, and the revision number of page D2 is blank, even though its date is consistent with revision 3.

This finding was partially addressed in the AIS Self-Assessment Report.
ASSessment Discipline: Waste Management

Assessment Finding Number: WM/CF-6

Assessment Finding Title: Management of Wastes in Accumulation Areas

Performance Objective:

35 IAC 722 Subpart C and 40 CFR 262 Subpart C, Resource Conservation and Recovery Act (RCRA), specify the requirements for generators that accumulate less than 55 gallons of hazardous waste near the point of generation. Such generators may accumulate wastes for more than 90 days without a permit so long as the containers are in good condition; the waste is compatible with the container; the container is always closed unless waste is being added or removed; and the container is marked with the words "Hazardous Waste" or other words that identify the contents of the container.

Finding:

ANL-E does not have a sitewide program in place to ensure that waste accumulation areas are being managed in accordance with the applicable RCRA requirements.

Discussion:

At ANL-E, nearly every laboratory that generates hazardous waste has one or more waste accumulation containers. Five gallon poly carboys and one gallon glass jugs are the most frequently used accumulation containers. Even though the volume of waste at each accumulation area is small, their management is of concern because of the large number of laboratories at ANL-E.

The Environmental Subteam identified the following specific deficiencies that are symptomatic of the lack of a sitewide program to manage accumulation areas:


2. Waste accumulation containers were found open in Buildings 108 and 200 (I-WM-3, I-WM-8, I-WM-14).

This finding was partially addressed in the AIS Self-Assessment Report.
ASSESSMENT DISCIPLINE: Waste Management

ASSESSMENT FINDING NUMBER: WM/CF-7

ASSESSMENT FINDING TITLE: Training of Hazardous Waste Generators and Handlers

PERFORMANCE OBJECTIVE:

35 IAC 725.116 and 40 CFR 264.16, Resource Conservation and Recovery Act (RCRA), describes the waste management training requirements for personnel of hazardous waste treatment, storage, and disposal facilities. Specifically, personnel must successfully complete a program of classroom or on-the-job training that is designed to teach them how to perform their duties in compliance with the applicable RCRA requirements. The program must be directed by a person trained in the relevant waste management procedures and facility personnel must complete the program within 6 months of being hired.

35 IAC 722.134 and 40 CFR 262.34 exempt generators that accumulate less than 55 gallons of hazardous waste (or 1 quart of acutely hazardous waste) from the training requirements of 35 IAC 725.116 and 40 CFR 265.16 if certain conditions are satisfied. If these conditions are not met however, the exemption is no longer applicable and the training becomes mandatory.

DOE Order 5820.2A, Radioactive Waste Management, requires that radioactive and mixed waste treatment facilities shall be supported by adequate documentation of personnel training and qualification procedures.

DOE Order 5480.19, Conduct of Operations Requirements for DOE Facilities, requires on-the-job training programs to identify specific items the trainee must accomplish, that completion of the qualification program should be formally documented, and that both classroom and on-the-job training requirements and tests should be documented.

The ANL-E Waste Handling Procedures (September 18, 1986) state that it is the responsibility of the Waste Management Operations Manager to ensure that waste generators receive training in the proper handling of radioactive and hazardous wastes.

FINDING:

Training for generators of hazardous waste is not being performed under a sitewide comprehensive organized program that ensures identification of personnel requiring training, annual retraining, and effective recordkeeping in accordance with RCRA requirements and DOE Orders. Training that does occur is uncoordinated and not sufficiently documented that it can be evaluated.

DISCUSSION:

The responsibility for the proper training of waste generators has been delegated to the Waste Management Department Manager, but he has not been delegated the authority to ensure that such training actually occurs (WM-20). At ANL-E, it is both the general perception and reality that Divisions are responsible for waste generator training. Some Divisions do provide new-hires with orientations that touches briefly on waste management, but most Divisions
rely on waste generators to learn waste management practices from their colleagues and immediate supervisors. The Waste Management Department relies on an informal system of apprenticeship to teach its personnel the relevant requirements and procedures.

Many waste generators at ANL-E are not in compliance with the RCRA requirements applicable to the accumulation of less than 55 gallons of hazardous waste, and are therefore, subject to the RCRA personnel training requirements (See Finding WM/CF-6).

Specific observations that are symptomatic of this uncoordinated approach to training include:

1. There is no ANL-E requirement that waste generators receive formal, documented training, either initial or annual retraining, that enables them to perform their duties in compliance with the applicable RCRA requirements (I-WM-1, I-WM-3, I-WM-14, I-WM-22, I-WM-26, I-WM-27, I-WM-30, and I-WM-51).

2. Within the ANL-E Divisions, supervisory personnel who have not themselves been trained in the relevant waste management procedures are often responsible for teaching the waste management procedures to their staff (I-WM-14, I-WM-26, I-WM-27, I-WM-30, and I-WM-51).

3. Some Divisions (e.g., Chemical Technology, Material Sciences, and Material Components Technology) at ANL-E do not maintain complete records of waste management training received by personnel, have no program or procedures to ensure that new personnel receive waste management training within 6 months of beginning work, and are unable to provide documentation of the training requirements and tests (I-WM-26, I-WM-27, I-WM-30, I-WM-51).

• The Waste Management Department does have a documented program to ensure that its personnel receive a wide variety of training on how to safely handle and work with hazardous materials (e.g., the 29 CFR 1910.120 Training Required by OSHA). However, Waste Management does not have a formal or documented program to provide its personnel with the appropriate training in ANL-E specific waste management procedures or job-specific training to allow them to perform their duties in compliance with the applicable RCRA requirements (I-WM-30 and I-WM-31).

This finding was generally addressed in the AIS Self-Assessment Report.
ASSESSMENT DISCIPLINE: Waste Management

ASSESSMENT FINDING NUMBER: WM/CF-8

ASSESSMENT FINDING TITLE: RCRA Treatment, Storage, and Disposal Units

PERFORMANCE OBJECTIVE:

35 IAC 722 and 40 CFR 262, Resource Conservation and Recovery Act (RCRA), specify the generator requirements for labeling, accumulation time, and need to obtain a RCRA permit.

35 IAC 725 and 40 CFR 265, RCRA, describes the requirements applicable to RCRA interim status facilities for security, inspections, record keeping, management of containers, tank systems, and chemical, physical, and biological treatment units.

FINDING:

ANL-E does not have a comprehensive program in place to ensure that waste management units are accurately identified in its RCRA Part A permit application and that they meet the applicable standards for RCRA interim status facilities.

DISCUSSION:

The following deficiencies identified by the Environmental Subteam are symptomatic of the lack of a coordinated program, although the site is taking action to correct these deficiencies:

1. Potential mixed waste is being stored in a location not identified in ANL-E’s current RCRA interim status permit. About 200 containers (approximately 500 gallons) filled with radioactively-contaminated animal body parts preserved in formalin were stored in the fan loft of Building 202 for more than 90 days. This material was moved to Room Q-145 in Building 202, which is also not identified in the RCRA Part A permit application. The materials in these containers were determined to be waste about 5 years ago. In addition, the current storage area does not meet the applicable RCRA interim status standards:
   - None of the containers are labeled as hazardous waste.
   - The location and a description of the waste is not recorded in ANL-E’s waste inventory system (i.e., written operating record).
   - The waste containers are not inspected weekly for leaks and other deterioration.

According to ANL-E, recent discussions with IEPA indicate that this material is not RCRA waste.
2. Reactive waste is being improperly treated and disposed of at Building 370. Batches of up to one liter of sodium-potassium (NaK) metal are put into a sand-filled tray which is placed outside of Building 370 to react with the humidity in the atmosphere. When personnel conclude that all of the NaK has reacted, the residues are dumped on the ground and flushed with water. The deficiencies of this practice include:

- The sand-tray treatment unit is not identified in the ANL-E's current RCRA interim status permit.
- There are no precautions to ensure that the reacting NaK does not generate extreme heat, uncontrolled toxic mists, fumes, dusts or gases; damage the structural integrity of the device containing the waste; or threaten human health or the environment as required by 35 IAC 725.117 and 40 CFR 265.17.
- The sand-tray treatment unit does not comply with many of the applicable RCRA interim status standards for Chemical, Physical and Biological Treatment (35 IAC 725 Subpart Q and 40 CFR 265 Subpart Q). Standards such as the precautions mentioned above; waste analysis and trial tests; and the special requirements for reactive waste.

3. The passivation tank (which was built in 1962) in the 317 Area used to treat reactive wastes (e.g., alkali metals) does not meet the RCRA interim status standards for containment and detection of releases, inspections, or tank integrity.

- Cracks in the tank wall with stains below them suggest that the tank could be leaking.
- There are no inspection records available for the passivation tank.
- Security at the 317 Area is not sufficient to minimize the unauthorized entry of persons or wildlife. On one occasion, the gate to the 317 Area was observed to be locked with a chain, the chain was so slack that there was a two foot wide opening, although on subsequent visits the gate was properly closed.

4. There are no inspection procedures, or supervisory review and approval of inspections. Also, the inspection logs that are maintained by Plant Facilities and Services-Waste Management do not include the name of the inspector; the inspectors initials are present but unreadable (I-WM-30).

This finding was partially addressed in the AIS Self-Assessment Report.
ASSESSMENT DISCIPLINE: Waste Management

ASSESSMENT FINDING NUMBER: WM/CF-9

ASSESSMENT FINDING TITLE: Radioactive Waste Storage Facilities

PERFORMANCE OBJECTIVE:

It is the Policy of DOE Order 5820.2A, Radioactive Waste Management, that radioactive and mixed wastes shall be managed in a manner that assures protection of the environment. Chapter II, Paragraph 2 states that transuranic waste shall be managed to protect the environment. Paragraph 3.e states that transuranic waste shall be stored in a manner unlikely to alter its certification status. Transuranic waste storage facilities shall be designed, constructed, maintained, and operated to minimize the release of radioactive or hazardous constituents. Chapter III, Paragraph 2 states that low-level waste operations shall be managed to ensure that no legacy requiring remedial action remains after operations have been terminated.

DOE Order 5400.5, Radiation Protection for the Public and the Environment, states that it is DOE's objective to protect the environment from radiation contamination to the maximum extent practical.

FINDING:

The Area 317 storage vaults and "map tube" storage do not meet the requirement of DOE Orders for protecting the environment and maintaining the integrity of WIPP certified waste.

DISCUSSION:

The Area 317 radioactive waste storage facilities are of questionable integrity and have been subject to infiltration and suspected exfiltration of groundwater. Although efforts have been made to control the potential for environmental releases from these facilities, they are of marginal quality and clearly do not meet the performance standards set forth in DOE Orders. The following deficiencies have been identified (I-R-60, I-R-61, I-R-62):

1. Sumps and manholes connected to the interior drainage system and the exterior footing drains for the vaults show tritium levels up to 26,000 pCi/L, strontium-90 up to 165 pCi/L, and cesium-137 up to 306 pCi/L (1989 data). The vaults were never designed to be water-tight, since the interior drainage system was intended to collect water entering the vaults through roof leaks or cracks in the concrete walls (R-87). The system formerly drained to an offsite outfall. Sediment was removed from the outfall in 1987 after it was identified to be contaminated with greater than background quantities of radioactive material.

2. In late 1984, 4 to 5 feet of water was found in the high-activity vault. This flooding by rainwater was the result of leaks in the vault roof (R-86).

3. The "map tubes" have been found to contain standing water due to groundwater infiltration. Although the "map tubes" are not
currently in use, they have not been listed as surplus nor identified as candidates for decontamination and decommissioning (See Finding RAD/CF-1).

4. Cracks have been found in the concrete walls of some of the storage vaults, and there are no vault liners to provide a water-tight enclosure.

5. The vaults are not continuously monitored for water infiltration, and there is no routine and periodic inspection of the vaults for water infiltration or integrity.

6. The past and possible future flooding of these vaults containing WIPP-certified material fails to meet the DOE Order requirement that transuranic waste shall be stored in a manner unlikely to alter its certification status.

This finding was fully addressed in the AIS Self-Assessment Report.
ASSESSMENT DISCIPLINE: Waste Management

ASSESSMENT FINDING NUMBER: WM/CF-10

ASSESSMENT FINDING TITLE: New Radioactive Waste Facilities

PERFORMANCE OBJECTIVE:

DOE Order 5400.1, General Environmental Protection Program, Chapter IV, Paragraph 3, requires that an environmental study shall be conducted prior to start up of a new site, facility, or process which has the potential for significant adverse environmental impact. The pre-operational study should begin not less than 1 year, and preferably 2 years, before start-up to evaluate seasonal changes. The pre-operational study shall be consistent with NEPA compliance requirements.

DOE Order 5400.5, Radiation Protection for the Public and the Environment, requires that the ALARA process be implemented for facility design.

DOE Order 5820.2A, Radioactive Waste Management, Chapter III, Paragraph 3.a, requires that low-level waste (LLW) be managed to assure that external exposure to the waste and concentrations of radioactive material which may be released do not exceed 25 mrem/yr to any member of the public. Paragraph 3.c requires that designs incorporate waste minimization and that volume reduction be implemented.

DOE Order 5820.2A, Chapter III, Paragraph 3.f(3) requires that development of large-scale waste treatment facilities shall be supported by appropriate National Environmental Policy Act documentation in addition to the following: an analysis of waste streams, treatment options, and a rationale for selection; a construction design report; and a safety analysis report. Paragraph 3.h(3), requires that the development and operation of a waste storage facility shall be supported by the following documentation: an analysis which identifies the need for the storage facility; a construction design report; a safety analysis report; and operational procedures and plans. Chapter V, Paragraph 3.a requires planning for decommissioning for new facilities.

DOE Order 6430.1A, General Design Criteria, provides specific guidance for incorporating radiological controls, effluent control and monitoring, decontamination and decommissioning, and ALARA. This order also specifies additional design requirements for special DOE facilities, which includes liquid and solid radioactive waste facilities.

FINDING:

ANL-E is performing the design analysis and developing the conceptual design basis for planned new and modified radioactive and mixed waste facilities in a manner that does not meet the requirements of DOE Orders.

DISCUSSION:

ANL-E has identified the need to completely refurbish the existing Building 306 waste facility, construct a new mixed waste storage building, construct a new transuranic waste storage facility, and construct a new hazardous waste
building (R-47). The design analysis and conceptual design basis performed to date do not meet the requirements of the DOE Orders (I-R-33). The following specific deficiencies have been identified:

1. Pre-operational environmental studies have not been designed or initiated for the proposed sites of these facilities (I-R-1). The need for NEPA actions has been identified (R-103, R-104) but the required actions have not been initiated.

2. The need for safety analysis reviews has been identified (R-105, R-106). However, no resources have been allocated to develop them, no schedules have been developed, and work on the building has been initiated. The conceptual design does not address or identify critical safety features and equipment.

3. The design of the Building 306 refurbishment was based on a qualitative review and analysis of site needs instead of a quantitative analysis of waste streams, required throughputs, best available technology, cost benefit, and compliance with waste acceptance criteria. As a result the design does not meet the requirements of DOE Orders. The following specific deficiencies were identified:
   - There is no documented rationale for analysis of waste streams, or selection of the treatment options that were used to develop the design. The design is not based on a rigorous assessment of compliance with WIPP Waste acceptance criteria and LLW-site waste acceptance criteria. The significant increase in waste from planned decontamination and decontamination activities was not factored into the design.
   - The conceptual design does not quantitatively consider the needs for volume reduction, decontamination, and waste minimization. The capacity, performance specifications, and relation to site needs was not considered.
   - Space allocations are not based on specific identified equipment, analyzed throughput and residence times, or any type of quantitative analysis.
   - Quantitative waste radioactive characteristics such as isotopic concentrations, and radiation levels were not considered for each process and room. No analysis of dose rates internal and external to the building were performed. Shielding needs were not addressed.
   - The conceptual design did not analyze the need for effluent monitoring and control devices for each facility function and does not include design features for decontamination and decommissioning.

4. The conceptual design of the new mixed waste storage and transuranic waste storage facilities does not meet the required design criteria and does not adequately consider occupational and
environmental radiation exposure. The following specific deficiencies were identified:

- There is no evaluation of the shielding needs associated with each facility or indication of whether shielding will impact the design.

- There is no assessment of dose impact from moving waste in and out of these facilities or design features to address this concern. This is a critical feature of the remote handled-TRU storage process. The design proposes a bare air transfer of containers that may read up to 30 R/hr.

- There is no defined basis for the choice of 2 years of storage capacity for TRU wastes and no consideration for potential expansion.

This finding was not fully addressed in the AIS Self-Assessment Report.
ASSESSMENT DISCIPLINE: Waste Management

ASSESSMENT FINDING NUMBER: WM/CF-11

ASSESSMENT FINDING TITLE: Closeout Procedures for Personnel, Projects, and Equipment

PERFORMANCE OBJECTIVE:

35 IAC 728.150 prohibits the storage of hazardous wastes restricted from land disposal, and 35 IAC 703.121 requires that persons storing hazardous wastes longer than 90 days must have a RCRA permit. In order to comply with these requirements, it is necessary that equipment, materials, and wastes associated with departing personnel and terminated projects be promptly, identified, inventoried, decontaminated, treated, and disposed. This will minimize the potential for storage or disposal of waste in a manner that does not conform to the RCRA requirements.

DOE Order 5820.2A, Radioactive Waste Management, requires that radioactive wastes be managed by methods appropriate to protect the public health and safety and the environment.

FINDING:

ANL-E does not have a formal closeout procedure to ensure that hazardous wastes, materials, and contaminated equipment are properly handled after projects are terminated or individuals leave the laboratory.

DISCUSSION:

The research performed at ANL-E consists of a large number of independent projects staffed with a combination of permanent and temporary personnel. It is often the case that when a person leaves ANL-E or a project is terminated, the equipment, materials, and wastes associated with the project are left behind at ANL-E. In some cases these materials may remain essentially abandoned-in-place for years. Consequently, the likelihood of use by others is small. There are similar problems with equipment like solid radioactive waste pots which have been made unusable by mechanical deterioration or contamination. In addition, there are no procedures or guidance on when an unused material is classified as a waste. This can lead to situations where materials are stored for extended periods on the speculation that they may someday be used in an experiment. Since there are no programs or procedures for tracking these materials and bringing them into the ANL-E waste management system, there is no way to ensure that they are handled, stored, and disposed of properly. Examples observed by the Environmental Subteam that are symptomatic of the lack of a formal closeout procedure include:

- Radioactive wastes (i.e., activated iron, tritiated water, $^{22}$Na and $^{137}$Cs sources, and $^{232}$Th) still being stored in a Building 205 laboratory, even though the generator of the wastes left ANL-E more than 3 years ago (I-WM-29).

- An undetermined number of lead-lined solid radioactive waste storage pots at CP-5 and Buildings 306 and 374A. Some of the pots
are in poor condition, and some are being overgrown by grass in the yard on the south side of CP-5 (I-WM-34).

- Redwater waste from TNT operations that ANL-E brought onsite for a treatability study that never began. ANL-E has not been able to find a contractor that will accept the waste (I-WM-26).

- Approximately 500 gallons of mixed waste in Building 202. The mixed waste consists of radioactive animal body parts preserved in formaldehyde which were generated by a scientist who left ANL-E approximately 5 years ago.

This finding was generally addressed in the AIS Self-Assessment Report.
ASSESSMENT DISCIPLINE: Waste Management

ASSESSMENT FINDING NUMBER: WM/CF-12

ASSESSMENT FINDING TITLE: Radioactive Waste Reduction Program

PERFORMANCE OBJECTIVE:

DOE Order 5820.2A, Radioactive Waste Management, Chapter II, Paragraph 3.b, requires that technical and administrative controls shall be directed to reducing the gross volume of transuranic (TRU) waste generated and/or the amount of radioactivity requiring disposal.

DOE Order 5820.2A, Chapter III, Paragraph 3.c, requires that technical and administrative controls shall be directed to reducing the gross volume of low-level waste (LLW) generated and/or the amount of radioactivity requiring disposal. All generators are required to establish auditable programs (goals, incentives, procedures, and reports) to assure that the amount of LLW generated or shipped for disposal is minimized. Paragraph 3.g requires that LLW be treated by appropriate methods to ensure that the Order’s performance objectives are met.

DOE Order 5400.1, General Environmental Protection Program, requires a Waste Minimization Plan by May 9, 1990. The Implementation Guidance for this Order states that this plan should focus on the waste minimization component of waste reduction. Source reduction is a first priority and recycling is a second priority. It further states that the treatment, storage, and disposal of LLW plays a role in the management and reduction of wastes after they are generated, and that these activities are required by DOE Order 5820.2A and are to be addressed in the implementation plan for that order.

The Implementation Guidance for DOE Order 5820.2A requires that facilities designate one individual to function as the site Waste Reduction Coordinator who reports to the DOE field office Waste Reduction Program Manager. The Program Manager is to prepare a summary of waste reduction activities as an appendix to the site Waste Management Plan. This appendix provides the status of waste reduction activities, program performance, and waste minimization goals and objectives. The appendix is to include the following: program administration, program description, and program performance.

FINDING:

Activities and programs at ANL-E for the volume reduction of radioactive wastes are not formal, well-documented, or sufficiently comprehensive to control LLW and TRU waste.

DISCUSSION:

ANL-E has recognized the need for a formal volume reduction program (R-6) and has identified that a number of new or improved facilities will be necessary in order to implement such a program (I-R-5, I-R-28). The following specific deficiencies were identified in the area of volume reduction at ANL-E:
1. There is no formal volume reduction program that establishes the technical and administrative controls for directing and implementing volume reduction.

2. The current efforts do not constitute an auditable program that assures the amount of LLW and TRU waste is minimized because ANL-E has not established incentives, procedures, or reporting requirements relating to volume reduction.

3. In general, existing facilities and equipment are outdated and insufficient to implement an aggressive volume reduction program. The ability of ANL-E to implement treatment, segregation, decontamination, size reduction, shredding, super-compaction, and other volume reduction techniques is severely hampered by the lack of adequate facilities. ANL-E performs some volume reduction activities such as: (1) preparing to perform a test of TRUEX, a process developed to minimize the volume of a mixed TRU waste stream; (2) operates a liquid evaporation unit; and, (3) performs some baling of LLW.

4. There is no documentation that indicates the degree to which process modification, process optimization, materials substitution, and decontamination have been considered to achieve volume reduction.

5. The responsibility for implementing a volume reduction program has not been formally delegated either at ANL-E or the DOE area office. A summary of waste reduction activities was not submitted as an appendix to the site Waste Management Plan.

6. The authority and responsibility to set volume reduction goals and standards, enforce their implementation on a Laboratory-wide basis, and perform oversight of program implementation has not been formally delegated or documented. Existing quality assurance plans are not adequate to provide assurance that volume reduction is being adequately implemented and the organization responsible for performing this quality assurance function has not been clearly defined.

This finding was partially addressed in the AIS Self-Assessment Report.
ASSESSMENT DISCIPLINE: Waste Management

ASSESSMENT FINDING NUMBER: WM/CF-13

ASSESSMENT FINDING TITLE: Hazardous Waste Minimization Program

PERFORMANCE OBJECTIVE:

DOE Order 5400.1, General Environmental Protection Program, requires that a waste minimization plan and program be in place by May 9, 1990.

DOE Order 5400.3, Hazardous and Radioactive Mixed Waste Programs, Paragraph 7.d.5 states that heads of field organizations shall implement a waste minimization program for hazardous and radioactive mixed wastes, as is described in DOE Order 5400.1.

DOE Order 5820.2A, Radioactive Waste Management, requires DOE facilities to establish auditable programs (i.e., goals, incentives, procedures, and reports) to assure that the amount of low-level radioactive mixed waste generated is minimized.

Implementation Guidance for DOE Order 5400.1 states that the combination of DOE Order 5820.2A and RCRA make waste minimization activities mandatory for DOE's radioactive, mixed, and hazardous waste programs. Some of the elements discussed in the Guidance include the designation of a site Waste Reduction Coordinator; maintaining the appropriate level of documentation and accountability for waste minimization; and sufficient documentation to satisfy all requirements of the field office Waste Operation Quality Assurance Program. The basic elements of an effective waste minimization program which are to be discussed in the Waste Minimization Plan are:

- Top Management Support
- Employee Training and Awareness
- Explicit Program Scope, Objectives and Numerical Goals
- Periodic Waste Minimization Assessments/Audits
- Accurate Cost Accounting
- Accurate Waste Accounting
- Technology Transfer
- Program Evaluation

FINDING:

ANL-E does not have in place a coordinated, effective waste minimization program. In addition, the Waste Minimization Plan, on which much of the program must be based, does not adequately address all of the basic elements that are detailed in the Implementation Guidance for DOE Order 5400.1.

DISCUSSION:

The Environmental Subteam observed the following deficiencies in the Waste Minimization Plan (WM-17) and its implementation:

- The Plan does not have top management support (i.e., has not been approved by the ANL Director); address the evaluation of training programs and job assignments; clearly assign responsibility,
authority, or accountability for the elements of the Plan; or adequately describe the approach that will be used to evaluate the program.

- A Waste Reduction Coordinator has not been designated (I-R-27 and I-R-57). Also, individuals at the Divisional level have not been formally assigned responsibility or accountability for waste minimization efforts.

- There is no guidance available to generators on how to document their waste minimization efforts, or sitewide program for collecting the information needed to document the waste minimization program’s efforts and results. As a result, generators have failed to document their waste minimization efforts, and there is no information available on such efforts or how effective they may have been (I-WM-17, I-WM-18, I-WM-26, and I-WM-27).

- Sitewide employee training pertaining to waste minimization has not been performed (I-WM-26 and I-WM-27).

- No sitewide evaluation of employee job assignments to determine whether employees have the necessary tools, equipment, and training to effect waste minimization goals has been performed (I-WM-26 and I-WM-27).

- No sitewide review or audit of processes and facilities to identify opportunities to minimize or eliminate waste generation has been performed (I-WM-26 and I-WM-27), although there have been independent efforts within some of the divisions such as the TRUEX process being implemented by Chemical Technology, Waste Management, and New Brunswick Laboratory.

This finding was generally addressed in the AIS Self-Assessment Report.
ASSESSMENT DISCIPLINE: Waste Management

ASSESSMENT FINDING NUMBER: WM/CF-14

ASSESSMENT FINDING TITLE: DOE Field Office Radioactive Waste Management Program

PERFORMANCE OBJECTIVE:

DOE Order 5820.2A, Radioactive Waste Management, Paragraph 8.j, states that the Heads of Field Organizations are responsible for all activities that affect the treatment, storage, or disposal of radioactive waste in facilities under their jurisdiction. In addition, they are responsible for assuring that the day-to-day waste management operations at their sites are conducted in compliance with the requirements of this Order and comply with all Federal, state, and local statutes. Specific responsibilities include the following:

1. Preparing supplements to this Order that identify specific detailed requirements for waste management practices and procedures conducted at their sites.

2. Defining and assuring that required quality assurance activities are established and implemented for all activities under their purview, pursuant to the requirements of 5700.6B, Quality Assurance.

DOE Order 5820.2A, Chapter III, Paragraph 3.b(2), states that each field organization shall prepare and maintain an overall waste management systems performance assessment supporting the combination of waste management practices used in generation reduction, segregation, treatment, packaging, storage, and disposal.

FINDING:

The DOE field office radioactive waste management program for ANL-E is not fully developed, or formally documented and does not implement all of the requirements of DOE Order 5820.2A.

DISCUSSION:

The following deficiencies have been identified in the DOE field office radioactive waste management program (I-R-57):

1. The radioactive waste management program is not described in procedures or any other formal document.

2. The field office has not prepared and issued supplements to DOE Order 5820.2A that identify specific detailed requirements for radioactive waste management practices and procedures conducted at ANL-E.

3. The field office has not ensured that quality assurance plans have been established by ANL-E for all activities under the purview of the DOE field office radioactive waste management program (See Findings QA/CF-4, WM/CF-2, WM/CF-5).
4. An overall radioactive waste management systems performance assessment has not been prepared and maintained by the field office for ANL-E.

This finding was not fully addressed in the AIS Self-Assessment Report.
ASSESSMENT DISCIPLINE: Waste Management

ASSESSMENT FINDING NUMBER: WM/CF-15

ASSESSMENT FINDING TITLE: Radioactive Waste Management Plans

PERFORMANCE OBJECTIVE:

DOE Order 5820.2A, Radioactive Waste Management, Paragraph 10 requires that a waste management implementation plan describing schedules, costs, and quality assurance activities for compliance with the requirements of this Order for radioactive waste. Thereafter, the status of compliance with the requirements of this Order is to be reported in the annual update of the Waste Management Plan.

DOE Order 5820.2A, Radioactive Waste Management, Chapter VI, provides guidance on the development of a waste management plan. The primary purpose of the Waste Management Plan is to compile and consolidate an annual report on how waste management operations are being conducted, what facilities are being used to manage wastes, what forces are acting to change current waste management systems, and what plans are in store for the coming fiscal year.

Implementation Guidance For DOE Order 5820.2A provides guidance for the format and content of Waste Management Implementation Plans, identifies the sections that should be contained, and indicates what information each section should contain.

FINDING:

As of the time of the Tiger Team appraisal the 1990 annual update of the Waste Management Plan, due by December 31, 1989, had not been prepared and submitted as required by DOE Order 5820.2A and the previously submitted Waste Management Implementation Plan did not contain all information required by DOE Order 5820.2A (I-R-57).

DISCUSSION:

The following specific deficiencies were identified in the AIS Waste Management Implementation Plan (R-6):

1. Section 2.2 does not provide a detailed definition of approval authorities between the DOE field organizations and contractors.

2. Section 2.3 does not show the relationship between documents listed in Appendix A that guide and support the waste management program at the site.

3. Section 3.2.1 is to identify needs for transuranic waste operations to achieve and maintain compliance in the following areas: waste classification, transuranic waste generation and treatment, transuranic waste certification, transuranic waste packaging, temporary storage at generating sites, transportation/shipping to the Waste Isolation Pilot Plant, interim storage, and quality assurance. Not all of these areas
are addressed, and where they are discussed there is little detail.

4. Section 3.2.2 is to summarize waste management interactions with state and Federal regulatory agencies. The plan states that there are none. This is not correct since the site must comply with Department of Transportation and state requirements for the shipment of transuranic waste.

5. Section 3.2.3 is to describe proposed corrections for identified waste management deficiencies; however, the plan states that there are no current plans. This contradicts the budget and schedule contained in Section 3.2.4 for implementation of the needs identified in Section 3.2.1.

6. Section 3.3.1 is to identify needs for low-level waste operations to achieve and maintain compliance in the following areas: performance assessment, waste generation, waste characterization, waste acceptance criteria, waste treatment, shipment, long term storage, environmental monitoring, quality assurance, and records and reports. Not all of these areas are addressed and where they are discussed there is little detail.

7. Section 3.3.3 should describe proposed corrections; however, the plan states that there are no current plans. This contradicts the budget and schedule contained in Section 3.3.4 for implementation of the needs identified in Section 3.3.1.

8. Section 3.5 does not contain the required description of needs, regulatory interactions, current plans, and cost and schedule for decontamination and decommissioning. Instead the plan provides no information.

9. The Implementation Summary Table is to, at minimum, address all noncompliance and partial compliance issues. This Table does not contain all required information such as interim storage of certified transuranic, waste and waste facility environmental monitoring.

10. Appendix A does not contain all of the required waste management documentation such as safety analysis reports, audits of certification activities, waste forecasts, National Environmental Policy Act documents, and decontamination and decommissioning project plans.

This finding was not fully addressed in the AIS Self-Assessment Report.
ASSESSMENT DISCIPLINE: Waste Management

ASSESSMENT FINDING NUMBER: WM/CF-16

ASSESSMENT FINDING TITLE: Storage of Mixed Wastes Subject to Land Disposal Restrictions

PERFORMANCE OBJECTIVE:

35 IAC 728.150 and 40 CFR 268.50, Resource Conservation and Recovery Act (RCRA), prohibit the storage of land disposal restricted (LDR) hazardous wastes unless storage is solely for the purpose of recovery, treatment, or disposal. Storage for any other purpose after the land disposal restriction becomes effective is prohibited. For the first year after the restricted waste is put into storage, the regulatory agency bears the burden of proof in an enforcement action and must demonstrate that the storage was not for the purpose stated above. After 1 year the facility bears the burden of proof and must demonstrate to the regulator that the waste is being stored for the purpose stated above.

DOE Order 5400.3, Hazardous and Radioactive Mixed Waste Programs, requires DOE to manage mixed radioactive and hazardous wastes according to the requirements of Subtitle C of RCRA. Mixed wastes containing solvents, dioxins, and California-list wastes are subject to land disposal restrictions associated with these wastes in unauthorized states (no RCRA primacy) and authorized states that have mixed waste authority. Illinois is authorized for RCRA and has mixed waste authority; therefore, the hazardous waste component of mixed waste is regulated at ANL-E by IEPA.

FINDING:

LDR wastes containing radioactive constituents (mixed wastes) are being stored at ANL-E because there is currently inadequate or no treatment capacity for mixed wastes, rather than for the reasons permitted by RCRA.

DISCUSSION:

Storage of mixed waste subject to LDR is a DOE-wide problem. Treatment capacity that can attain standards established by LDR for ANL-E and for other DOE facilities does not currently exist.

LDR mixed wastes (e.g., scintillation cocktails with toluene) that ANL-E is unable to dispose of continue to be generated (I-WM-14 and I-WM-16). ANL-E has not implemented a program to minimize the generation of LDR mixed wastes (See Finding WM/CF-13). The Environmental Subteam identified the following LDR mixed wastes being stored at ANL-E:

- Approximately 160 drums of scintillation vials containing TRU and low-level mixed waste in Building 329.
- Approximately 5 pails of mixed waste (sodium and NaK metal) in Building 301 (I-R-63 and I-R-64).
- An undetermined number of lead-lined solid radioactive waste pots at CP-5 and Buildings 306 and 374A.
This finding was generally addressed in the AIS Self-Assessment Report.
ASSESSMENT DISCIPLINE: Waste Management

ASSESSMENT FINDING NUMBER: WM/CF-17

ASSESSMENT FINDING TITLE: Release-Detection Monitoring for Underground Storage Tanks

PERFORMANCE OBJECTIVE:

IEPA Leaking Underground Storage Tanks Regulations, Title 35, Subtitle G, Subchapter d, Section 731.141, requires owners and operators of petroleum underground storage tank (UST) systems to provide release detection for tanks and piping using one or a combination of methods listed in Section 731.143. Section 731.140 provides a release detection compliance schedule based on the UST installation date.

Section 731.143 states that if product inventory control method is employed as the release-detection method, the product dispensing must be metered and recorded within an accuracy of 6 cubic inches for every 5 gallons of product withdrawn. Owners and operators are required to obtain an independent certification of meter accuracy.

FINDING:

UST Number 21 is not meeting the requirements of meter accuracy certification.

DISCUSSION:

There are 18 active USTs that are regulated by IEPA at ANL-E. Five of these were installed prior to 1965 and must comply with the release detection requirements. The Laboratory has selected manual tank gauging with annual tightness testing for USTs with less than 2,000 gallon capacity, and inventory control with annual tightness testing for USTs with more than 2,000 gallon capacity, as the release-detection methods. USTs with less than 2,000 gallon capacity are UST number 9, 11, 14, and 15 and USTs over 2,000 gallon capacity is number 21.

UST number 21 is equipped with a product-dispensing meters. However, the required certifications that the meter accuracy is within 6 cubic inches for every 5 gallons dispensed is not available. ANL-E personnel indicated that, to the best of their knowledge, the meter was never tested for accuracy (I-WM-42, I-WM-44, I-WM-45). Additionally, annual tightness tests are required on these tanks, with initial testing to be completed by December 22, 1989. Initial tests were not conducted on these five tanks; however, all five tanks were tested in 1990 and certified tight. Manual tank gauging and inventory control measurements were also required to be initiated by December 1989, on all five tanks, but were not started until April-May of 1990.

This finding was not addressed in the AIS Self-Assessment Report.
ASSESSMENT DISCIPLINE: Waste Management
ASSESSMENT FINDING NUMBER: WM/CF-18
ASSESSMENT FINDING TITLE: Sanitary Landfill

PERFORMANCE OBJECTIVE:
ANL-E's IEPA Landfill Permit No. 1981-29-OP and/or 35 IAC 807 requires that litter is to be collected daily; portable fencing is to be utilized during the filling operations to surround the active fill area and prevent loose paper from blowing prior to the application of cover; the working face of the landfill is to be covered, compacted, and graded; and, that fencing, gates, or other measure be used to control access to the site.

40 CFR 61.156, NESHAP, requires that there be no visible emissions from an asbestos site. Asbestos-containing wastes are to be covered with at least 6-inches of compacted nonasbestos-containing material, or the perimeter of the disposal site must be fenced and appropriate signs displayed around the section of the landfill receiving asbestos.

FINDING:
The ANL-E landfill is not being operated in accordance with the IEPA solid waste regulations pertaining to litter control, methods of operation, access to the site, or the NESHAP asbestos disposal requirements.

DISCUSSION:
The following deficiencies were noted by the Environmental Team:

- Portable fencing is only used during the winter to control litter at the landfill, and even then does not surround the fill site (I-WM-6 and I-WM-60).
- Litter at the landfill is not collected daily (I-WM-6).
- Access to the landfill is not adequately controlled. The entire east side of the landfill lacks fencing, and tracks indicate that vehicles sometimes enter the landfill through a field adjacent to the northeast gate (I-WM-6).
- The working face of the landfill cannot be covered, compacted; and graded because of management practices that have resulted in unstable physical conditions at the landfill (I-WM-6).
- Within the asbestos section of the landfill, which is not fenced, two bags of asbestos were seen to be uncovered and ripped open. In addition, an uncovered bag of asbestos was found in what is supposed to be the nonasbestos portion of the landfill, which is also not fenced (I-WM-6).

This finding was generally addressed in the AIS Self-Assessment Report.
3.5.5 Toxic and Chemical Materials

3.5.5.1 Overview

The objective of the toxic and chemical materials part of the environmental team assessment at Argonne National Laboratory-East (ANL-E) was to evaluate the status of the laboratory with regard to regulations promulgated under the Toxic Substances Control Act (TSCA), recommended guidance under the Federal Insecticide, Fungicide, and Rodenticide Act, Hazardous Material Transportation Act, applicable DOE Orders, and best management practices (BMP). These regulations and orders establish the requirements for the use, handling, storage and disposal of toxic and hazardous materials. Emphasis was on the management and control of PCBs, chlorofluorocarbons, pesticides, petroleum and petroleum products, and bulk chemicals. Asbestos management was included with the air part of the assessment with reference to the NESHAP regulations.

Since 1987, ANL-E has had a program to remove and dispose of all PCB fluids and equipment from the site (I-TCM-1). The majority of PCBs were contained in the many transformers, capacitors, and switches located throughout the site. All indoor PCB and PCB-contaminated transformers were removed and disposed of, and 14 outdoor units were removed or retrofilled prior to 1989. All pole mounted transformers and circuit breakers were sampled and analyzed during 1989 for classification as PCB or PCB-contaminated units. Two units were found to be PCB units and 38 were PCB-contaminated. The goal for Calendar Year 1990 has been to remove and dispose of or retrofill the remainder of the large outdoor units and pole mounted transformers containing more than 500 ppm PCBs (I-TCM-24). In addition, some of the PCB-contaminated units will also be replaced or retrofilled this year (I-TCM-10). This program has been progressing well and the original goals should be accomplished. The removal and disposal work is being done by two licensed contractors in compliance with the TSCA regulation. The major PCB issues observed during the assessment are the sludge and sand contaminated with PCBs that have not been containerized and stored properly until they can be disposed of (See Finding TCM/CF-5), and the leaking transformer at facility 543 that has not been repaired and cleaned up within the time limits required by the regulations (See Finding TCM/CF-6). Other issues include the inadequate and incomplete marking of PCB and PCB-contaminated equipment (See Finding TCM/CF-4), as well as the combustible materials present near the transformers (See Finding TCM/CF-3). ANL-E is working on correcting these deficiencies.

Several pesticides are used at ANL-E. These are general-use herbicides and are applied mainly at the fence line (I-TCM-20). The herbicides are applied by an offsite licensed contractor using state certified applicators. There are no pesticides or equipment stored onsite (I-TCM-19). The contractor brings the solutions and necessary equipment for application to the site and removes unused herbicides and equipment after application. Disposal of unused herbicides and empty containers are also the contractor's responsibility. A similar procedure is used for insecticide application inside buildings (I-TCM-21).

Most of the diesel oil, gasoline, and methanol fuels are stored in underground storage tanks. These are discussed in the waste management section of this report. Fuel oil used in emergency generators is stored in many day tanks throughout ANL-E. These tanks are generally located inside buildings near the generators. Other petroleum products such as lubricating oils, hydraulic
fluids, Stoddard solvent, mineral spirits, and cutting oils are stored at the supply facility in the East area, as well as in many buildings near the point of use. Most of these tanks and drums do not have secondary containment and there are open drains nearby that lead to surface waters (See Finding TCM/CF-1).

Many chemicals used in bulk quantities are stored in large aboveground storage tanks (ASTs) or drums (75, 55, or 30 gallons) located at or near the point of use. Three large ASTs containing sulfuric acid and boiler water-treatment chemicals are located in the parking area of Building 108. Two of these tanks have neither secondary containment nor vehicle protection (See Finding TCM/CF-2). The third tank has an inadequate secondary containment dike but it does offer vehicle protection. There are also many drum storage areas throughout ANL-E. These are generally in the basement of the permanent buildings and are without secondary containment (See Finding TCM/CF-2). In many cases, there are open drains in the same rooms that lead to surface water or treatment plants.

ANL-E Purchasing is using the Automated Materials Ordering System (AMOS), which is designed to order chemicals in minimum quantities (e.g., gram quantities where feasible). At present AMOS covers about 25 percent of the chemicals purchased. ANL-E is proposing to expand this to an ordering system to cover more than 90 percent of chemicals procurement through the Integrated Material Management System (I-TMC-8). This program should greatly decrease the inventory of chemicals and their associated hazards, and also minimize hazardous waste generation.

The AIS Self-Assessment Report identified about 30 percent of the TCM findings. Two findings were partially addressed and four findings were not addressed.
3.5.5.2 Compliance Findings

ASSESSMENT DISCIPLINE: Toxic and Chemical Materials

ASSESSMENT FINDING NUMBER: TCM/CF-1

ASSESSMENT FINDING TITLE: Storage of Petroleum or Petroleum Products

PERFORMANCE OBJECTIVE:

40 CFR 112.7 stipulates that aboveground storage of petroleum or petroleum products should have adequate secondary containment or diversionary structures or equipment to prevent the release of these materials to surface water.

40 CFR 112.2 defines "spill event" as a discharge of oil into or upon the navigable waters of the United States in harmful quantities as defined at 40 CFR Part 110.

40 CFR Part 110 defines harmful quantities as quantities that may be harmful to the public health or welfare of the United States which include discharges of oil that violate applicable water quality standards or cause a film or sheen upon or discoloration of the surface of the water.

FINDING:

Programs are not in place at ANL-E to ensure that above ground storage tanks and drums used for the storage of petroleum products have sufficient containment to prevent a release of these substances to the environment.

DISCUSSION:

Several of the aboveground storage tanks (ASTs) and many drums at ANL-E containing diesel fuel or other petroleum products do not have secondary containment that would prevent a release of these substances to surface water, soil or groundwater. Some examples of ASTs and drum storage areas with deficiencies that demonstrate the lack of a control program include the following:

1. A 100-gallon fuel oil tank is mounted on the ceiling in a basement room of Building 350 without secondary containment and there is a floor drain within a few feet that goes to a storm sewer. In addition, this area of the basement contains a 55-gallon drum of waste oil and five 5-gallon cans of various oils without secondary containment. Another part of the basement in this building contains a 55-gallon drum of used oil and a 55-gallon drum of Mobil DTE-26 (lubricating oil) without secondary containment near a floor drain that leads to the sanitary treatment plant. In a third room of the basement, there is a 30-gallon drum of vacuum pump oil without secondary containment near a floor drain that leads to the wastewater retention tanks.

2. A 200-gallon diesel fuel tank is located near Building 331A and does not have secondary containment. The tank appears to be
partly full. A spill would contaminate the soil below this tank and runoff could carry the contaminant to surface waters.

3. More than 70 transformers of various sizes are stored in the East Area Transformer Storage Pad that was the concrete base of a former building and is without secondary containment. The concrete has many cracks and there are many oil stains adjacent to transformers. Some of the oil stains appear to be of recent origin. None of the transformers are PCB or PCB-contaminated units and most of them have been drained of oil. This problem was identified in the AIS Self-Assessment Report.

4. Eight 55-gallon drums of used oil are stored on the soil without secondary containment or pallets at the 800 Area Used Oil Storage Yard. One of the drums was badly rusted. This storage may have been temporary since workers were repairing the pad area. However, the pad does not have secondary containment. Runoff from this area could carry spills to surface water. This problem was identified in the AIS Self-Assessment Report.

5. Five 55-gallon drums are on dispensing racks in a basement area of Building 202. These drums contain lubricating oil, turbine oil, general purpose oil, and mineral spirits. Although there are drip pans underneath the spigots, there is no other containment and there is a floor drain nearby. There are also 55-gallon drums of waste oil and Duro Oil 32 on the cement floor adjacent to those on the dispensing racks without secondary containment.

6. There are at least seven 55-gallon drums containing a variety of oils (lubricating oils, motor oils, etc) in Building 6, which is part of Central Stores. These are on wooden pallets without secondary containment. This warehouse is an older building undergoing some renovation. There are floor drains in this large room and several oil stains were observed on the floor. The drain leads to the sanitary sewer system. This problem was identified in the AIS Self-Assessment Report.

7. There are six 55-gallon drums in Building 28 containing cutting oil, Stoddard Solvent, Aliphatic Spirits and "old oil." These are in storage as part of Central Stores and are placed on wooden pallets without secondary containment. Although the drains are plugged, there are many cracks in the floor of this old building. ANL-E personnel stated that there are plans to remove these drums within 90 days.

8. A 55-gallon drum containing Mineral Spirits was located on the concrete driveway of Building 330 without secondary containment. A leak or spill could carry this material to the storm sewer. This drum was no longer at this location on a follow-up visit.

9. A 250-gallon storage tank containing fuel oil is stored in Building 368. This tank does not have secondary containment and there was a drain that leads to a storm water sewer.
10. Four 55-gallon drums containing various oils are stored in Building 377. These drums do not have secondary containment and there is a floor drain about 6-8 feet away that leads to a storm water sewer.

11. Approximately fifteen 55-gallon drums containing acetone, various oils, and degreasers are stored in a hazardous storage cabinet behind Building 363-A (Central Shops). This large cabinet did not have a sign to alert personnel that flammable materials are stored inside. A fire in this cabinet would release oils and chemicals that could be washed into a storm drain.

12. Two transformers near Building 350, with approximately 550 gallons of oil in each, have no secondary containment. One of the transformers shows evidence of past leaks under the valve. There is a storm sewer a few feet downhill from these transformers.

This finding was not addressed in the AIS Self-Assessment Report.
ASSESSMENT DISCIPLINE: Toxic and Chemical Materials

ASSESSMENT FINDING NUMBER: TCM/CF-2

ASSESSMENT FINDING TITLE: Storage of Hazardous and Toxic Materials

PERFORMANCE OBJECTIVE:

40 CFR 129, Toxic Pollutant Effluent Standards; 40 CFR 122, National Pollutant Discharge Elimination System; 40 CFR 125, Criteria and Standards for the National Pollutant Discharge Elimination System; 40 CFR 131, Water Quality Standards, IAC Title 35, Environmental Protection, Subtitle C-Water Pollution (Section 304.141 NPDES Effluent Standards), and DOE Order 5400.1, General Environmental Protection Program, limit the degradation of surface water quality. In order to comply with the intent of these requirements, it is necessary to take steps for the positive control of chemicals that would prevent any leaks or spills from reaching a pathway to a surface water source. Such controls might include the use of secondary containment or the storage of materials in a protected area remote from floor drains or surface drainages.

FINDING:

ANL-E does not have a program in place to ensure that aboveground storage tanks (ASTs) and drums containing toxic and/or hazardous substances are being stored in a manner that would prevent or minimize the potential for release of these substances to the environment.

DISCUSSION:

Some large ASTs and many drums are used for storage of chemicals at or near the point of use. Deficiencies in the management and control of these facilities could result in releases leading to contamination of surface water, air, soil, and groundwater. Deficiencies observed by the Environmental Subteam that are symptomatic of a lack of a control program include the following:

1. Three ASTs containing hazardous chemicals are located in the parking area of Building 108 (Boiler House). These 1500-gallon tanks contain concentrated sulfuric acid and two Nalco water treatment chemicals. The acid tank has a 3-foot high gravel dike; however, this dike would not contain the acid in the event of a major spill. An acid resistant concrete dike lined with a synthetic liner is necessary for such protection. However, the present dike does offer protection against vehicular damage. The tanks containing a Nalco Corrosion Inhibitor and a Nalco Boiler Feedwater Treatment Chemical do not have any spill containment system or protective barriers. A tank leak or a vehicular accident involving these tanks would result in a spill which would enter the storm drain system and contaminate Sawmill Creek. This problem was identified in the AIS Self-Assessment Report.

2. Two 100 pound drums of Freon 11 are located in the basement of building 350 without secondary containment. There is a floor drain nearby that enters the sanitary treatment plant system.
3. A 55-gallon drum containing ethylene glycol monobutyl ether was observed on a dispensing rack located on the storm water drainage pad of Building 206. The drum does not have a drip pan or secondary containment and the concrete pad has cracks. There is a storm drain about 8 feet away. Secondary containment was provided for this drum during the third week of the assessment.

4. Two 55-gallon drums of antifreeze in Building 6 are stored on wooden pallets without secondary containment. There are open floor drains in this building that enter the sanitary sewer system. This problem was identified in the AIS Self-Assessment Report.

5. More than thirty 55-gallon drums and two 250-gallon mobile tanks containing antifreeze in the basement of Building 200 are without any secondary containment. Although there are no drains in the basement, the floors do have cracks/breaks that could allow spills to leach out of the building and reach groundwater or surface water.

6. One 55-gallon drum and two 30-gallon drums of various microbiocides are stored in Building 377 without secondary containment. There is a drain in this room that leads to the storm water sewer.

7. Eighteen 9 lb. bottles of 93 percent sulfuric acid and 500 kg of sodium hydroxide are stored in Building 364 without secondary containment. These are incompatible chemicals and are stored in close proximity to each other. There is a drain that leads to the stormwater sewer nearby. A similar storage of these chemicals was also observed in Building 371D. These chemicals were separated after the site was made aware of the problems.

This finding was generally addressed in the AIS Self-Assessment Report.
ASSESSMENT DISCIPLINE: Toxic and Chemical Materials

ASSESSMENT FINDING NUMBER: TCM/CF-3

ASSESSMENT FINDING TITLE: PCB Contaminated Sludge

PERFORMANCE OBJECTIVE:

40 CFR 761.65 specifies requirements for the storage for disposal of PCBs at concentrations of 50 ppm or greater and PCB items with PCB concentrations of 50 ppm or greater. This section of the Toxic Substance Control Act (TSCA) presents the requirements to be met by the storage facility, defines PCB items that qualify for temporary storage in an area that does not comply with requirements of a permanent storage facility, and limits temporary storage to 30 days. A permanent PCB waste storage facility must meet specific criteria which include: adequate roof and walls to prevent rainwater from reaching the stored wastes; impervious floor which has continuous curbing at least 6 inches high; and no drain lines or other openings that would permit liquids to flow from the storage area. TSCA also requires that stored PCB waste be disposed of within 1 year from the date when it was first placed into storage.

Subpart G (Section 761.125) PCB spill cleanup policy generally requires that cleanup be completed within 48 hours. Subpart J, Records and Reports (Section 761.180), requires that PCB waste information be included in the annual report.

FINDING:

PCB-contaminated sludge and sand at the ANL-E wastewater treatment system drying bed are not being managed in a manner consistent with TSCA storage, disposal, cleanup and reporting requirements.

DISCUSSION:

PCB contaminated sludge and sand are present in one of the drying beds at the ANL-E wastewater treatment system. Analysis of a sample of the sludge collected during the summer of 1989 was found to contain 69 ppm PCBs, and the sand beneath the sludge was reported to contain up to 366 ppm PCBs. Low levels of cobalt 60 and cesium 137 were also detected in the sludge. This results in the sludge being considered radioactive waste. ANL-E has requested a determination of this from DOE. The PCB-contaminated sludge and sand have remained at the wastewater treatment system drying bed, although the sludge has been mixed and piled at one end of the bed.

Since the drying bed has been out of service during the past year, it may be regulated under storage requirements. An ANL-E memo from A.C. Smith to J.R. Thout dated July 11, 1990 (TCM-15) supports the contention that this sludge should be regulated under the storage requirements of 40 CFR 761.65. Item 4 of this memo paraphrases EPA’s position:

"Contacted USEPA TSCA PCB Compliance Section. The contaminated sludge is regulated under the requirements of 40 CFR Part 761 for PCB contaminated waste. Since the sludge is PCB contaminated, it is subject to the storage requirements of 761.65. The contaminated material should be removed from its present location..."
and containerized the same as other toxic waste. Requirements under Part 761 of 40 CFR are that the waste be manifested and shipped offsite for disposal within a one-year period. The waste must also be documented in the annual PCB report."

As a PCB waste in storage, it has not been disposed of within 1 year after being placed in storage. Additionally, although the drying bed has been cordoned off and posted, it fails to meet the requirements for a PCB storage facility. ANL-E is working with the EPA on this matter and EPA has inspected the present site condition.

Furthermore, 40 CFR 761.125 (b)(1)(iii) requires that all soil within a spill area must be excavated and removed within 48 hours after the responsible part was notified or became aware of the spill.

This finding was identified in the AIS Self-Assessment Report as a soil, sediments, and biota problem. The Self-Assessment did not address the TSCA regulations.
PERFORMANCE OBJECTIVE:

40 CFR 761.40, Toxic Substance Control Act, requires the following items to be marked with the PCB label:

- All vehicles that are used to transport more than 45 kg of PCBs in the liquid phase, or one or more transformers with a PCB concentration greater than 50 ppm;
- PCB large high-voltage capacitors.

PCB-contaminated transformers are not required to be marked, however, it is good practice to do so. The labels should be consistent to avoid confusion and potential mishandling during a fire or a spill.

FINDING:

Practices at ANL-E for labeling PCB items are not consistent with the requirements of 40 CFR 761.40.

DISCUSSION:

Specific deficiencies related to marking of PCB and PCB-contaminated items observed by the Tiger Team include: 1) a lack of markings on the vehicles used to transport PCB fluids and items around the site; 2) labels on PCB capacitors in building 361 lacking the contact’s name and telephone number; and, 3) labels of inconsistent color on PCB-contaminated transformers.

The various background colors of PCB-contaminated labels are yellow, orange, or blue. This can confuse the emergency response team during a fire or spill. Also, the transformers with PCB concentrations less than 50 ppm or without PCBs are marked with a blue label which is similar in appearance to some of the PCB-contaminated labels. This increases the possibility of mishandling transformers by mistaking a PCB-contaminated transformer with a non-PCB transformer, potentially resulting in a release of PCB-containing fluids into the environment.

This finding was not addressed in the AIS Self-Assessment Report.
ASSESSMENT DISCIPLINE: Toxic and Chemical Materials

ASSESSMENT FINDING NUMBER: TCM/CF-5

ASSESSMENT FINDING TITLE: Combustible Material Near PCB Transformers

PERFORMANCE OBJECTIVE:

40 CFR 761.30 (a)(1) (viii), Toxic Substance Control Act mandates combustible materials must not be stored within a PCB transformer enclosure; within 5 meters of a transformer enclosure; or, if unenclosed, within 5 meters of a PCB transformer.

FINDING:

Various combustible materials were observed within PCB transformer enclosures and/or within 5 meters of transformer enclosures.

DISCUSSION:

The following combustible materials were noted inside, or within 5 meters, of the transformer enclosures: (The location and transformer identification are shown in parentheses.)

- 15 in. x 15 in. piece of wood (PCB transformer D, B-205)
- Paper, band-aid, and tape (PCB transformer, US32, B-238)
- Paper, cigarette butts, and plastic sheet (PCB transformer, US56, B-362)
- Plastic cup and paper (PCB transformer, B-391)
- Pieces of tarred roofing-paper and a rag (PCB transformer, B-583)
- Pieces of rubber hose (PCB-contaminated transformer, B-311)
- Pieces of tarred roofing-paper (PCB-contaminated transformer 4B, B-212)
- Paper and candy wrapper (PCB-contaminated transformer, T-13, B-368)
- Paper and pieces of tarred roofing-paper (PCB-contaminated transformer, T-20)

Combustible materials near PCB or PCB-contaminated transformers increases the potential for a fire, which could result in the release of PCBs and dioxins into the environment.

This finding was not addressed in the AIS Self-Assessment Report.
ASSESSMENT DISCIPLINE: Toxic and Chemical Materials

ASSESSMENT FINDING NUMBER: TCM/CF-6

ASSESSMENT FINDING TITLE: Leaking PCB-Contaminated Transformer

PERFORMANCE OBJECTIVE:
Section 761.125(b)(1)(iii), Toxic Substance Control Act, states that cleanup of low concentration and low volume spills must be completed within 48 hours after the responsible party becomes aware of the spill.

FINDING:
Cleanup of a spill from a leaking PCB-contaminated transformer was not completed within 48 hours after the responsible party became aware of it.

DISCUSSION:
The PCB-contaminated transformer (330 ppm) at building 543 was observed to be leaking at the time of the Environmental Subteam inspection on September 18, 1990. The leak was from the top of the transformer. There was liquid on the transformer surface and large stains on the concrete pad and stones at the edge of the concrete pad. There is no secondary containment for this large transformer which contains 5600 gallons of fluid. Based on a discussion held on September 28, 1990, (I-TCM-23 and 24) the leak had not been stopped and final cleanup had not been completed, although cleanup procedures had been started within 24 hours and repairs to the transformer were in progress.

This finding was not addressed in the AIS Self-Assessment Report.
3.5.6    Quality Assurance

3.5.6.1    Overview

The objective of the quality assurance (QA) portion of the Environmental Subteam Assessment at Argonne National Laboratory-East (ANL-E) was to assess the status of the environmental monitoring program in accordance with applicable Federal and state regulations, DOE Orders, QA standards such as ANSI/ASME NQA-1, and EPA guidance manuals. QA activities were specifically evaluated in accordance with Radiological Effluent Monitoring and Environmental Surveillance, Regulatory Guide for DOE Order 5400.5 (draft document) and DOE Order 5700.6B, Quality Assurance, as well as accepted industry practices and standards of performance. The assessment was accomplished through interviews with key employees; inspection of pertinent ANL-E facilities; observation of surface water and groundwater sampling; and review of documents, procedures, and QA/quality control (QC) records.

The assessment of ANL-E quality assurance practices was coordinated with other Environmental Subteam specialists to ensure that all potential quality assurance problems, related to environmental programs, were identified. It was the consensus of the Environmental Subteam that, in general, the sitewide application of quality assurance was inadequate to demonstrate that ANL-E environmental protection programs are being implemented in accordance with applicable environmental requirements and DOE Orders.

ANL-E does not have an effective laboratory-wide mechanism for ensuring the implementation of environmental protection program quality assurance at all organizational levels. There is a Quality Assurance Manual for ANL-E, and an Office of Quality Assurance (OQA), under the Director of Quality Assurance, Environment and Safety. Although the manual defines ANL-E QA, the implementation procedures and mechanisms do not ensure effective environmental program quality assurance within the various divisions.

As a result, the adequacy of QA for environmental program implementation varies dramatically between different divisions. Most of the existing QA plans, at least in part, do not satisfy the requirements of DOE Order 5700.6B.

The environmental monitoring program is conducted largely by ANL-E personnel. There are two laboratories within the Environment, Safety and Health Department that are responsible for sampling and analysis of environmental samples. These are the Industrial Hygiene Chemical Laboratory (IHCL) and the Environmental Monitoring Chemical Laboratory (EMCL). In addition, there are a number of smaller laboratories that are used to analyze effluent and waste samples (Buildings 306, 350, 362 and Building 331, T-331, Trailer 1). However, several offsite analytical laboratories are also utilized for analyses of special samples or analyses that are not available onsite.

The IHCL is responsible for the collection of samples of surface water, effluent water, and groundwater, as well as their analysis for chemical parameters. The IHCL has an appropriate quality assurance plan (QAP) and an operating manual that includes a sampling and analysis plan, as well as analytical procedures. Samples for NPDES and groundwater are analyzed in accordance with EPA approved procedures. The required inorganic analyses and the volatile organic analyses are performed by IHCL analysts. The semivolatile organic, polychlorinated biphenyls, and pesticide analyses are
contracted to the Analytical Chemistry Laboratory (AChL), which is part of the ANL-E Chemical Technology Department. The AChL also has an adequate QA plan and procedures manual. Both laboratories participate in the EPA Discharge Monitoring Report Quality Assurance Program. However, the QA samples from this program are not submitted to analysts as routine samples (See Finding QA/CF-1).

The EMCL, which is a part of the ES&H Department, conducts radiological environmental sampling and radiological analyses. EMCL has an adequate QAP and a manual of procedures. This laboratory participates in the DOE Environmental Measurements Laboratory Quality Assurance Program and analyzes a semi-annual sample containing various combinations of radionuclides. The laboratory was deficient in not using bound log books for data documentation (See Finding QA/CF-1).

The Building 306 Control Laboratory (CL) is part of the Plant Facilities and Services Division’s Waste Management Department. The CL provides various services including the analysis of drinking water samples, waste water retention tank samples, and laboratory waste tank samples for compliance with Federal and state regulations. The CL has a QAP that was revised in July 1990 and a manual of analytical procedures. The QAP is deficient with regard to instrument quality control and in that the same person is listed as the QA Coordinator and the CL supervisor (See Finding QA/CF-1). This presents a conflict of interest. Also, the retention tank samples are not secured and do not have a chain-of-custody procedure.

The CL also has contracts with several offsite analytical laboratories for analyses which are beyond CL’s capabilities. For example, contractors are used for bioassays required by NPDES, asbestos analysis, TCLP analysis of wastes, and others. The CL is deficient in not having a controlled procedure for the procurement of analytical services that provides guidelines for selection of an appropriate contractor, and including audit requirements (See Finding QA/CF-2). The CL has started to prepare an audit procedure.

QA within the smaller laboratories generally had at least some deficiencies. However, QA at Building 362 and Building 331, T-331, Trailer 1 laboratories was not conducted under a formal QA plan and there were no operating procedures.

The AIS Self-Assessment Report identified about 40 percent of the QA findings. Three findings were generally addressed and three were not addressed.
3.5.6.2 Compliance Findings

ASSESSMENT DISCIPLINE: Quality Assurance

ASSESSMENT FINDING NUMBER: QA/CF-I

ASSESSMENT FINDING TITLE: Environmental Quality Assurance Oversight and Technical Support

PERFORMANCE OBJECTIVE:

DOE Order 5700.6B, Quality Assurance, requires that an independent coordination and overview function be established to develop and coordinate quality assurance policies and overall guidelines. The Order defines quality assurance overview as an organized set of activities performed as independent functions. Its purpose is to assure that all aspects of quality-related activities for all levels of management are adequately addressed. Such activities include periodic and timely reviews of program/project documents, actions, and plans.

DOE Order 5700.6B defines a quality assurance plan as a document that references the quality assurance elements and describes how conformance with such requirements is to be assured. Section 9 states that effective quality assurance programs shall include, as a minimum, implementation of procedures and work instructions, and independent verification of quality attainment and quality assurance effectiveness. It also requires the following: (1) development of quality assurance plans and actions required to implement the stated policy for each program, project, or activity, as appropriate; (2) that quality assurance activities shall be implemented using written procedures and instructions; (3) that program quality objectives should be defined in terms of measurable characteristics, and independent measurements should provide a means for determining the extent to which they are met; (4) that confirmation of quality attainment and quality assurance effectiveness may be accomplished by various means such as program reviews, surveillance of activities or results of technical significance; and, (5) that internal quality assurance audits shall be performed as a primary activity by an organization that implements quality assurance criteria or requirements.

The ANL-E Quality Assurance Policy delineates the methods by which its objectives are to be met. The Chief Operations Officer (COO) is responsible for the development and implementation of ANL-E’s quality assurance program. The QES director is responsible for assisting the Laboratory Director and the COO in providing continuity, completeness, and appropriate standardization for the ANL-E quality assurance program including policy, planning, reporting, and auditing. The independent internal appraisal and audit program is administered by the QES director using technical expertise from the Office of Quality Assurance. The Office of Quality Assurance (OQA) provides support service for quality program development and technical expertise to help line managers meet their quality assurance responsibilities.

FINDING:

The Quality Assurance, Environmental and Safety Office (QES), does not implement its Laboratory quality assurance oversight function in a manner that
fully complies with the stated performance objective and the ANL-E Quality Assurance Policy (R-48).

DISCUSSION:

The following specific deficiencies were observed in QES responsibilities for quality assurance oversight and technical support (I-R-25, I-R-71, I-R-72, I-R-73, I-R-74, I-R-75):

1. The QES frequency for audits of environmental quality assurance plans fails to meet the DOE Order requirement for periodic and timely reviews as part of the oversight function. The oversight activity of QES is largely implemented through a program of periodic independent audits. The purpose of these audits is to evaluate the implementation of all existing ANL-E quality assurance plans (QAPs). However, existing staff is only sufficient to audit one-third of the QAPs annually and the need for 20 additional QAPs have been identified, which will further exacerbate this situation. It is likely that the need for even more QAPs will be identified as the quality assurance program continues to develop.

2. The conduct of operations of the OQA is not fully defined or documented in procedures. Some progress has been made in this area and several procedures have been developed for critical activities; however, documentation remains incomplete.

3. Except for periodic audits, the oversight function does not include well-defined quality assurance objectives and independent performance measurements. Lacking such performance indicators it is not possible for OQA to perform an independent assessment of quality attainment and quality assurance effectiveness by both the quality assurance representatives (QARs) and the Divisions.

4. There is no formal documented program for the initial training, certification, and continuing training of QARs by the OQA. This deficiency has been identified in the self-assessment. However, OQA does conduct an initial one-on-one orientation session (approximately 1.5 hours) with each newly appointed QAR (R-108).

5. The ANL-E Quality Assurance Manual (R-56) is primarily a guidance document which provides information to Divisions on how to prepare their own quality assurance plan. It also briefly describes the quality assurance organization, and planning and implementation. The manual does not describe how conformance with its requirements is assured, and how the overview function is implemented, nor does it provide specific procedures and recommended practices.

6. The ANL-E Quality Assurance Manual does not establish standards or requirements for Division Quality Assurance conduct of operations. The Policy Statement requires the Divisions to have plans that provide detailed requirements and procedures for implementation of their quality assurance program. The manual does not describe the types or frequencies of quality assurance activities that must be
implemented by the Divisions to demonstrate quality attainment such as audits, surveillances, quality control checks, etc.

7. The ANL-E Quality Assurance Manual does not provide any specific guidance on how to implement environmental, safety, and health quality assurance as required by DOE Orders and the ANL-E Health and Safety Manual. This quality assurance function is not implemented throughout ANL-E.

8. The ANL-E Quality Assurance Manual requires that Division quality assurance plans and revisions be sent to OQA for review. This review is not sufficient because many of these plans lack critical elements such as methods for QA attainment, procedures, conduct of operations, and ES&H quality assurance, among others.

9. The ANL-E Quality Assurance Manual does not establish specific conditions and requirements (frequency and documentation) for its own review, maintenance, and modification. It does establish some general requirements. The quality assurance and specific details of the control copy issue and control system is not defined. Requirements for review and approval of the document are not specified. Requirements for periodic review and modification are not established and some of the sections are over 2 years old. Each section may be individually updated and the approval documentation for each section is not included in the manual.

10. The QES cannot provide an independent oversight of the Divisions reporting to the COO, because of the assigned quality assurance responsibilities of the COO and the Director of QES, and the fact that the QES reports to the COO.
ASSESSMENT DISCIPLINE: Quality Assurance

ASSESSMENT FINDING NUMBER: QA/CF-2

ASSESSMENT FINDING TITLE: Division/Department/Project Quality Assurance Plans

PERFORMANCE OBJECTIVE:

DOE Order 5700.6B, Quality Assurance, defines a quality assurance plan as a document that references the quality assurance elements and describes how conformance with such requirements is to be assured. Section 9 states that effective quality assurance programs shall include, as a minimum, implementation of procedures and work instructions, and independent verification of quality attainment and quality assurance effectiveness. It also states the following: (1) that quality assurance plans and actions are required to implement the stated policy for each program, project or activity as appropriate; (2) that quality assurance activities shall be implemented using written procedures and instructions; (3) that program quality objectives should be defined in terms of measurable characteristics, and independent measurements should provide a means for determining the extent to which they are met; (4) that confirmation of quality attainment and quality assurance effectiveness is required and may be accomplished by various means such as, program reviews, surveillance of activities or results of technical significance; and, (5) that internal quality assurance audits shall be performed as a primary activity by any organization that implements quality assurance criteria or requirements.

NQA-1, Chapter II states that persons responsible for assuring that an appropriate quality assurance program has been established, and verifying that activities affecting quality have been effectively performed, shall have direct access to responsible management at a level where appropriate action can be effected. They shall report to a management level such that required authority and organizational freedom are provided, including sufficient independence from cost and schedule considerations.

The ANL-E Quality Assurance Policy states that Division directors and department heads have primary responsibility for assuring that established quality standards and requirements are met. They are to establish documented and auditable quality assurance programs and staff them with qualified personnel, and a position(s) reporting directly to the Division director to deal with quality assurance matters. These programs are required to provide detailed requirements and procedures for their implementation.

FINDING:

Quality Assurance activities and plans within the various ANL-E Divisions are not uniformly applied across the Laboratory and do not always comply with high standards or the requirements of DOE Orders (R-48).

DISCUSSION:

The Environmental Subteam has identified the following deficiencies in
Division Quality Assurance activities (I-R-71, I-R-72, I-R-73, I-R-74, I-R-75):

1. The operations within all Divisions and Departments at ANL-E are not covered by quality assurance plans where required. There may be some that do not require plans, but most will require quality assurance plans to effectively implement Environmental, Safety, and Health (ES&H) requirements.

2. The quality assurance plans are not complete in many Divisions in that they do not provide detailed requirements and procedures for plan implementation.

3. The conduct of operations of the quality assurance function in many Divisions is not fully defined, sufficiently formalized, or well documented. This includes such activities as plan development and maintenance, specified QA/QC activities and frequencies, QA/QC methods, documentation requirements, record keeping, acceptance criteria, and quality control checks.

4. Many quality assurance plans do not provide formal and well-documented independent verification of quality attainment, and verification of quality assurance effectiveness.

5. Many quality assurance plans do not define program quality objectives in terms of measurable characteristics or use independent measurements as a means for determining the extent to which they are met.

6. Internal quality assurance audits are not performed as part of the plan by many of the Divisions. Audits are a primary activity of any organization that implements quality assurance criteria or requirements.

7. Not all quality assurance plans establish conditions and requirements for their own review, maintenance, and modification. The control copy issue and control system is not defined. Requirements for review and approval of the documents are not specified including requirements for periodic review and modification.

8. Not all Divisions have staffed with qualified personnel, a position or positions reporting to the Division director to deal with quality assurance within the Division. Many of the Quality Assurance Representatives (QARs) in the Divisions are not quality assurance professionals and have no formal training or expertise in quality assurance.

9. Based on the deficiencies identified in this finding, it may be concluded that not all Divisions have allocated sufficient resources to implement their quality assurance requirements as delegated by the ANL-E Quality Assurance Policy. In many cases the QARs only perform their duties on a part time basis and have other line and staff responsibilities. In extreme cases these individuals may have several different staff responsibilities and
also be line managers. Very few QARs are dedicated full time to their quality assurance activities or have support staff to assist them in the performance of their jobs.

10. There is no Laboratory-wide basis to independently measure the adequacy of this Division process and ensure the allocation of appropriate resources. The various operating Divisions make their own determination of quality assurance requirements and provide resources accordingly. The Quality Assurance, Environment, and Safety Office (QES) is delegated the oversight responsibility; however, this is not adequately implemented (See Finding QA/CF-1). In addition, neither QES nor any other organization has been delegated any authority to ensure the appropriate allocation of resources within a Division.

11. The organizational assignments of the QARs often fail to meet the performance objective for independent verification of quality attainment and quality assurance effectiveness. In one case, the QAR is a line manager for the organization for which he is the designated QAR; in another case the QAR is a section head in the department for which he is the designated QAR; and in many other cases the QARs have line responsibilities within the organization for which they are the designated QAR. In addition, there are no standards or guidance on appointment of QARs to enable achievement of the required organizational independence, and the QES oversight function has failed to identify and correct this deficiency.

12. Not all of the Divisional quality assurance plans address the requirements of the Health and Safety Manual and ES&H quality assurance, as applicable, or the implementation of the requirements. In addition, the QES oversight function has failed to identify and correct this deficiency.
ASSESSMENT DISCIPLINE: Quality Assurance

ASSESSMENT FINDING NUMBER: QA/CF-3

ASSESSMENT FINDING TITLE: Quality Assurance Practices at ANL-E Environmental Laboratories

PERFORMANCE OBJECTIVE:
All major environmental regulations (40 CFR 112, 40 CFR 136 etc., as well as DOE 5400.1, General Environmental Protection Program and DOE 5700.6B, Quality Assurance (QA), contain requirements and guidance for environmental monitoring which includes quality assurance. Quality assurance/quality control (QA/QC) procedures and practices resulting in scientifically valid and defensible data should be implemented consistent with regulations and DOE Orders.

FINDING:
The QA/QC programs in some of the ANL-E analytical laboratories are not sufficient to document the validity and defensibility of the analytical data generated.

DISCUSSION:
Deficiencies symptomatic of the incomplete QA/QC programs observed by the Tiger Team in the various environmental laboratories include the following:

1. The most recent Quality Assurance Plan (QA-11) of the Plant Facility and Services-Waste Management Operations (PFS-WM) Control Laboratory contains an organization plan which shows that the supervisor of the Control Laboratory and the QA coordinator are the same person. The QA coordinator should have the organizational independence from cost and schedule considerations to make unbiased reports regarding quality assurance problems to upper management and conduct independent reviews and approve corrective actions. The present system provides the potential for conflicts-of-interest between the quality assurance requirements and the laboratory's production needs. Waste Management has plans to hire another person as the Control Laboratory supervisor. This would correct this problem.

2. Sampling of wastewater retention tanks is conducted by maintenance personnel assigned to each of the various buildings containing these tanks. After collection of the samples, they are placed into a nearby rack where they are later picked up by PFS-WM personnel, and delivered to the WM Control Laboratory (I-QA-16 & 17). Thus, the samples are left unsecured for some time and are transferred without documentation (i.e., lack of chain-of-custody). Waste Management started to place locked containers at each retention tank location for securing the samples after this concern was identified by the Environmental Subteam.

3. QA/QC samples submitted to analysts in the AChL are not double-blind (I-QA-14). Thus, the analyst is aware that they are QA/QC samples and may treat these samples more carefully than others.
4. The pH buffer and conductivity standard at the wastewater treatment plant were in use after their "expiration dates" shown on the label.

5. Two pH buffers on a bench top near a pH meter in one of the IHCL labs, had expiration dates of April 1990 and earlier. These buffers were discarded the same day this was brought to the laboratory managers attention by the Environmental Subteam.

6. Purchased computer software used at the IHCL is not always formally validated prior to use and there is no procedure in place to conduct validation (I-QA-4).

7. The sample log book in use at the Environmental Monitoring Chemical Laboratory was not of the recommended bound type (I-QA-6). The EMCL has started to use bound and numbered log books since the Environmental Subteam called this to their attention.

8. Quarterly internal reviews of the Control Laboratory by the quality assurance representative are not being conducted as specified in the QAP (I-QA-10). This problem was identified in the May audit by the PFS Division QAR (QA-12).

These QA/QC deficiencies were not identified in the AIS Self-Assessment Report.
ASSESSMENT DISCIPLINE: Quality Assurance

ASSESSMENT FINDING NUMBER: QA/CF-4

ASSESSMENT FINDING TITLE: Quality Assurance of Waste Operations

PERFORMANCE OBJECTIVE:

DOE Order 5820.2A, Radioactive Waste Management, Chapter II, Paragraph 3.c requires that each certification plan shall describe controls and other measures to ensure that each element of the certification plan is performed adequately as described. Approved certification and associated quality assurance plans shall be implemented by the generating sites using specific, written operational procedures. Paragraph 3.j requires that transuranic waste operations be conducted in accordance with the quality assurance requirements of DOE Order 5700.6B, Quality Assurance.

DOE Order 5820.2A, Chapter III, Paragraph 3.f requires that the operation of waste treatment facilities shall be supported by adequate documentation including operation and maintenance procedures. Paragraph 3.1 requires that LLW operational and disposal practices be conducted in accordance with the quality assurance requirements of DOE Order 5700.6B, Quality Assurance.

DOE Order 5700.6B defines a quality assurance plan as a document that references the quality assurance elements and describes how conformance with such requirements is to be assured. Section 9 states that effective quality assurance programs shall include, as a minimum, implementation of procedures and work instructions, and independent verification of quality attainment and quality assurance effectiveness. It also requires the following: (1) quality assurance plans and actions required to implement the stated policy for each program, project or activity as appropriate; (2) quality assurance activities shall be implemented using written procedures and instructions; (3) program quality objectives should be defined in terms of measurable characteristics and independent measurements should provide a means for determining the extent to which they are met; (4) confirmation of quality attainment and quality assurance effectiveness may be accomplished by various means such as, program reviews, surveillance of activities or results of technical significance; and, (5) internal quality assurance audits shall be performed as a primary activity by any organization that implements quality assurance criteria or requirements.

FINDING:

Quality Assurance of operations within the ANL-E Waste Management Department is not conducted in a manner that meets the requirements of DOE Orders 5700.6B and 5820.2A.

DISCUSSION:

There are several documents which describe or implement quality assurance requirements for operations within the Waste Management Department as follows: Quality Assurance Plan (QAP) for ANL-E Waste Management Operations (R-20), Waste Management Operational Procedures; and the Procedures for Hazardous
Waste Generation, Accumulation, and On and Offsite Transport (I-R-6, I-R-71, I-R-72).

1. The QAP specifies some documentation requirements for the review, revision, and approval of controlling documents; however, it does not specify the minimum frequency of review and update of these documents. There is no formal system for issuing and maintaining these documents as controlled copies or quality assurance requirements to assure that they are maintained as such. The Waste Management Department issued a document control procedure (R-100) on October 11, 1990 but it has not been implemented and does not include QA of the document control system.

2. Not all QAP activities are implemented using written procedures and instructions. Some activities are covered in the Waste Management Operation Procedures but all of these procedures are out of date with issue dates ranging from August 1985 to May 1987. There are no other quality assurance procedures and the majority of quality assurance activities are not covered by procedures.

3. Waste Management activities and operations are not fully addressed by procedures and work instructions. A significant effort is underway to correct this deficiency; however, it is far from complete and the site still uses the out-of-date Waste Management Operation Procedures.

4. The QAP does not provide for adequate independent verification of quality attainment and quality assurance effectiveness. Program quality objectives are not defined in terms of measurable characteristics, nor are independent measurements made to determine the extent to which they are met. There are no quality assurance performance indicators.

5. The QAP only requires an internal audit to be performed by the Quality Assurance, Environment, and Safety Division. It states that the Waste Management Quality Assurance Representative performs internal assessments at least annually; however, there are no procedures describing the process, its scope, or its documentation. This annual requirement is not met, and a single audit of undefined scope does not meet the requirement of the DOE order that audits are a primary activity of a quality assurance organization.

6. The QAP does not specify or require quality assurance activities such as formally documented surveillances and quality control. The waste requisition review process, waste pick-up inspections, and waste receipt inspections are not formalized in procedures. They cannot be considered as quality control checks because of this lack of formality and because the results are not tracked, trended, or used in any meaningful way to measure or improve quality attainment.

7. The QAP does not require quality assurance oversight of other organizations or individuals that have waste responsibilities. Some examples are as follows: New Brunswick Laboratory, Materials
and Components Technology Division's responsibilities for remote handled TRU, and the waste characterization and documentation performed by waste generators. ANL-E has committed to performing a one time audit of NBL, in its response to a recent Waste Isolation Pilot Plant audit (R-99).

This finding was not addressed in the AIS Self-Assessment Report.
ASSESSMENT DISCIPLINE: Quality Assurance
ASSESSMENT FINDING NUMBER: QA/CF-5
ASSESSMENT FINDING TITLE: Procurement of Environmental Analytical Services

PERFORMANCE OBJECTIVE:

DOE Order 5700.6B, Quality Assurance, establishes DOE policy on quality assurance. Section 9d of this order states "Quality assurance activities shall be implemented by DOE organizations and contractors using written procedures and instructions appropriate to the activities to be performed."

FINDING:

The Waste Management Operations Control Laboratory does not have a formal procurement policy or written procedure to assure that analytical services obtained from offsite contractors are governed by QA/QC programs consistent with DOE Orders and regulatory requirements.

DISCUSSION:

It is the stated policy at ANL-E to contract services through certified laboratories for the analysis of environmental samples. However, there is no written procedure that implements this policy. The Control Laboratory has contracts with at least six offsite contractors to analyze drinking water, sludge samples, fibers for asbestos, evaporator water, and effluent samples. Not all of the quality assurance plans (QAP) of the current contractors were available to the Control Laboratory prior to awarding the contract (I-QA-10) and consequently could not be reviewed. Also, the Control Laboratory has not conducted audits on any of these laboratories.

Section 7.0 of the Control Laboratory’s QAP (QA-11) briefly discusses the control of purchased items and services. However, there is no mention of procurement of analytical services. There is no standard operating procedure to ensure that the analytical data received from offsite contractors is consistent in quality as well as scientifically valid and defensible. An effective procedure would outline the QA/QC practices and documentation required of the contractors, and would specify the requirement for and frequency of audits. A draft audit procedure was submitted for review by the assessment team at the factual accuracy review (QA-17). However, an SOP and an addition to Section 7.0 of the QAP are still required.

This finding was generally addressed in the AIS Self-Assessment Report.
ASSESSMENT DISCIPLINE: Quality Assurance

ASSESSMENT FINDING NUMBER: QA/CF-6

ASSESSMENT FINDING TITLE: Radioanalytical Quality Assurance Practices

PERFORMANCE OBJECTIVE:

DOE Order 5400.1, General Environmental Protection Program, Chapter IV, Paragraph 10, requires that a quality assurance program consistent with DOE Order 5700.6B, Quality Assurance, be established that covers each element of environmental monitoring and surveillance programs. It requires that quality assurance programs include, but not be limited to, the following: organizational responsibility, program design, procedures, field quality control, laboratory quality control, human factors recordkeeping, chain-of-custody procedures, audits, performance reporting, and independent data verification.

DOE Order 5820.2A, Radioactive Waste Management, Chapter III, Paragraph 3.f requires that the operation of waste treatment facilities shall be supported by adequate documentation including operation and maintenance procedures. Paragraph 3.1 requires that low-level waste (LLW) operational and disposal practices be conducted in accordance with the quality assurance requirements of DOE Order 5700.6B.

FINDING:

The quality assurance programs for radiological analyses of environmental and waste samples are not sufficient to support the validity of the monitoring data (I-R-202, I-R-216, I-R-220).

DISCUSSION:

The following deficiencies that are symptomatic of the weaknesses in the quality assurance program were observed by the Environmental Subteam in at least one of the laboratories in Buildings 200 (ES&H), 350 (NBL), and 362 (Health Physics):

1. The Building 362 laboratory has no formal procedures for the following:
   - Sample receipt
   - Operation and calibration of sample counting equipment
   - Review, approval, and reporting of results

2. Procedures for waste analyses lack a formal periodic review process (observed in lab in Building 350).

3. There is no procedure for calculating lower limits of detection (observed in lab in Building 362).

4. There are no documented means of detecting or evaluating anomalous data (observed in labs in Buildings 200 and 362).
5. There is no documented commitment to a minimum QC sample load by sample and analysis type nor a formal definition of what QC samples are required by sample and analysis type (observed in labs in Buildings 200 and 362).

6. The laboratory does not participate in either an intra- or inter-laboratory cross check program (observed in lab in Building 362).

7. There is no documentation of training for laboratory personnel (observed in lab in Building 362).

This finding was not addressed in the AIS Self-Assessment Report.
3.5.7 Radiation

3.5.7.1 Overview

Environmental radiation protection programs at ANL-E were assessed to determine compliance with the documents listed in the Tiger Team Manual, applicable Federal and State regulations, and DOE Orders. The programs were also reviewed against the Radiological Effluent Monitoring and Environmental Surveillance Regulatory Guide for DOE Order 5400.5 (draft document) and against commonly accepted best industry practices and standards of performance. The assessment included interviews with ANL-E employees, inspection of selected ANL-E facilities and locations, and review of documents, procedures, and records associated with environmental radiation protection programs. The Environmental Subteam found no activity that poses immediate and unacceptable radiation safety risk to the public.

As a part of the environmental radiation protection assessment, reviews were coordinated with other Environmental Subteam Specialists to ensure that all potential radiation protection problem areas were identified and evaluated. Coordination with other specialists included the following: Air and Surface Water Specialists, to evaluate effluent monitoring and release control programs; Groundwater Specialist, to evaluate sources of potential groundwater contamination from historical and present releases of radioactive liquids and existing soil contamination; Quality Assurance Specialist, to assess environmental program oversight and control; Inactive Waste Site Specialist, to review Site A and Plot M; and Waste Management Specialist, to assess the adequacy of radioactive waste management, storage, and disposal. Many environmental radiation protection findings are included in the report sections of other specialists.

Environmental radiation programs were categorized into six areas for the purpose of this assessment: environmental surveillance, effluent monitoring, radioactive waste management, radiological analysis, decontamination and decommissioning (D&D), and radiological design criteria.

The radiological environmental surveillance program at ANL-E consists of several perimeter and offsite monitoring locations that measure air particulate, direct radiation, tritium in water vapor, and various other offsite media. The program and associated documents have deficiencies, including the dose assessment methodology and the method for measuring tritium in air. In addition, the program includes only limited onsite monitoring. The most significant weakness of the program was its lack of formal methods and equipment to perform offsite environmental monitorings, and plume tracking as an emergency preparedness function.

Radiological effluent monitoring programs and controls were reviewed for both airborne and liquid radioactive contaminated effluents. The site has identified and effectively monitors its major air effluent release points but has not yet developed a program to evaluate all potential release points. The liquid effluent monitoring and control program is not well developed or defined in several key areas such as: effluent monitoring of release points and run-off, and better analysis and control of batch releases.

Radioactive waste generation, storage, treatment, disposal, volume reduction, and compliance with waste acceptance criteria were evaluated. In general,
these areas require improvement in conduct of operations and waste facilities, and the site has identified many of these deficiencies. These findings are detailed in the Section 3.5.4, Waste Management.

Quality assurance practices were evaluated in the various ANL-E radiochemistry laboratories that are used to analyze environmental surveillance, effluent, or waste samples. Formal quality assurance plans are in place for some laboratories but not for others. In general, quality assurance practices are incompletely developed.

An evaluation of D&D activities was performed for new, operational, and surplus facilities at ANL-E. Plans are being made and are in progress for D&D of major surplus facilities onsite. These plans are being effectively implemented but would benefit from better quality assurance. There is no formal program to implement DOE D&D requirements for new and operational activities.

The Environment, Safety and Health Department implements a formal system to review and concur in the design of new facilities. This system does not include minor facility and operational changes, or safety analysis reviews. As a result, it does not provide sufficient assurance that all necessary activities will be effectively reviewed. Safety Analysis Reviews have been performed for all nuclear and high-hazard facilities; however, this is not true for other types of facilities that also require safety analyses.

The AIS Self-Assessment Report partially addressed one of the findings in this section and did not address any of the other findings.
3.5.7.2 Compliance Findings

ASSESSMENT DISCIPLINE: Radiation

ASSESSMENT FINDING NUMBER: RAD/CF-1

ASSESSMENT FINDING TITLE: Decontamination and Decommissioning Program

PERFORMANCE OBJECTIVE:

DOE Order 5820.2A, Radioactive Waste Management, Chapter V, Paragraph 3 requires that DOE organizations shall develop and document their programs to provide for the surveillance, maintenance, and decommissioning of contaminated facilities. Each field organization shall prepare and maintain a completed list of contaminated facilities both operational and excess. A record of jurisdictional program responsibility and operational records shall be maintained for all contaminated facilities. Planning for facility decommissioning shall be initiated during the design phase for new facilities and prior to termination of operations for existing operational facilities.

Paragraph 3.b defines post-operational activities and requires that adequate surveillance and maintenance be performed for surplus facilities. Paragraph 3.d defines the required decontamination and decommissioning project activities including characterization, environmental review process, engineering, decommissioning operations, and post-decommissioning activities. Paragraph 3.b requires quality assurance for decontamination and decommissioning (D&D) activities consistent with the requirements of DOE Order 5700.6B, Quality Assurance.

FINDING:

The D&D program for ANL-E facilities does not comply with all of the requirements of DOE Order 5820.2A.

DISCUSSION:

Although both the DOE field office and ANL-E have some elements of a D&D program in place, many elements are still lacking regarding implementation D&D requirements for new, currently used, and surplus facilities. The existing effort is far from a formal organized program, especially for new and operational facilities (I-R-33, I-R-34, I-R-35, I-R-36). The following deficiencies have been identified in the D&D program:

1. The DOE field organization has not prepared and maintained a complete list of contaminated facilities, both operational and excess. It also does not maintain a formal record system for tracking jurisdictional program responsibility for all contaminated facilities (I-R-57).

2. The DOE field office does not have a formal record system for maintaining operational records of contaminated facilities (e.g., design drawings and modifications and characterization data of contamination) (I-R-57).
3. There is no formal system for ensuring that the required level of planning for facility decommissioning is initiated during the design phase for new facilities, and then incorporated into the construction.

4. ANL-E does not have a formal system or a designated organization responsible for D&D planning for operational facilities prior to termination of operation.

5. No ANL-E organization has been delegated oversight responsibility for D&D efforts of surplus facilities to assure that they are conducted in compliance with the DOE Orders. The Facility Planning and Engineering (FPE) Division is responsible for the large scale D&D efforts, but smaller D&D jobs may be done within the various divisions without FPE cognizance.

6. Quality assurance oversight and Quality Assurance Plans for D&D of surplus facilities is not sufficient to ensure compliance with the DOE Orders. FPE D&D activities are covered by a QA plan; however, D&D conducted within a division may not have a QA plan, such as D&D of the radiochemistry laboratory and counting room in the Building 316/315/314 complex. In addition, the existing QA plans are not adequate (I-R-30). The following specific deficiencies were identified:
   - There are no specified quality assurance activities relating to waste characterization or the application of the residual radioactive material and property release criteria of DOE Order 5400.5, Radiation Protection for the Public and the Environment.
   - There are no specified quality assurance activities relating to operation of the gamma spectroscopy equipment in T-331, trailer 1, used for waste characterization.
   - The plan does not describe how conformance with the requirements of DOE Order 5820.2A is assured.
   - Quality assurance activities specified by the plan are not implemented by procedures.

7. Some ANL-E facilities are clearly candidates for D&D but they have not been identified in the Environmental Restoration and Management five-year plan. Some examples are the hot cells in Building 306, the ZPR in Cell 4 of Building 316, the ZPR 6 in Cell 5 of Building 316, and the "map tube" storage in Area 317. In addition, surveillance and maintenance of these facilities is not addressed in the five-year plan.

8. Some D&D candidate facilities are poorly characterized such as the map tube and vault storage area of CP-5, the hot cells in Building 306, and the 317 Area "map tubes." There is an ongoing characterization program for CP-5.
9. There are no records of the activities performed in the Building 306 hot cells or of the residual radioactive material content and radiological conditions resulting from these activities. No individual or organization could be identified that was responsible for creating the current conditions of these cells, although the Waste Management Department is currently responsible for them. It is not known whether or not these cells have been placed in a safe shut-down condition.

This finding was not addressed in the AIS Self-Assessment Report.
ASSESSMENT DISCIPLINE: Radiation

ASSESSMENT FINDING NUMBER: RAD/CF-2

ASSESSMENT FINDING TITLE: Environmental Monitoring of Radioactive Waste Facilities

PERFORMANCE OBJECTIVE:

DOE Order 5820.2A, Radioactive Waste Management, Chapter III, Paragraph 3.k requires that each operational or non-operational low-level waste treatment, storage, and disposal facility shall be monitored by an environmental monitoring program. The environmental monitoring program shall be designed to measure operational effluent releases, and migration of nuclides. Based on the characteristics of the facility, the environmental monitoring program may include, but not necessarily be limited to, monitoring surface soil, air, surface water, and in the subsurface, soil and water, both in the saturated and the unsaturated zones. The monitoring program shall be capable of detecting changing trends in performance sufficiently in advance to allow application of any corrective action prior to exceeding performance objectives. The monitoring program shall be able to ascertain whether or not effluents from each treatment or storage facility meet the requirements of applicable EH orders.

FINDING:

The ANL-E environmental monitoring program does not meet the requirements for environmental monitoring of radioactive waste storage and treatment facilities as required by DOE Order 5820.2A.

DISCUSSION:

ANL-E has a radioactive waste treatment facility in Building 306, radioactive waste storage vaults, "map tubes", and a baling facility in the 317 area, radioactive waste storage in Buildings 374 and 329, and miscellaneous storage areas in other buildings (I-R-61, I-R-62). Plans are under way to implement a transuranic waste treatment process called TRUEX, and to refurbish and construct new radioactive waste treatment and storage facilities. Radiological environmental monitoring at all of the existing facilities is not sufficient to meet the requirements of the performance objective and there is no mechanism in place to implement appropriate monitoring for the new facilities. The following specific deficiencies were noted:

1. The design and basis of the current environmental surveillance program does not include monitoring for radioactive waste treatment and storage facilities.

2. There is no formal mechanism to review radioactive waste facilities for the purpose of determining the need for environmental monitoring. There is no provision to include radioactive waste facilities in the design basis of the monitoring program.

3. Airborne effluent releases are not monitored or evaluated at any facilities.
4. Routine monitoring of surface soil, and subsurface soil and water, both in the saturated and unsaturated zones, is not conducted for any facility. Some special studies have been performed in the 317 vault area and a single monitoring well exists, but this does not meet the requirements of DOE Order 5820.2A for routine monitoring (I-R-60).

This finding was not addressed in the AIS Self-Assessment Report.
ASSESSMENT DISCIPLINE: Radiation

ASSESSMENT FINDING NUMBER: RAD/CF-3

ASSESSMENT FINDING TITLE: Environmental Protection Implementation Plan

PERFORMANCE OBJECTIVE:

DOE Order 5400.1, General Environmental Protection Program, Chapter III, Section 2 requires that each field organization prepare and submit a plan implementing the requirements of this Order no later than November 9, 1989. The purpose of the Plan is to provide management direction, including assignment of responsibilities and authorities, to ensure that facilities are operated in a manner that will protect, maintain and, where necessary, restore environmental quality, minimize potential threats to the environment and the public health, and comply with environmental regulations and DOE policies. Specifically, the implementation plan shall include the following:

a. Provide environmental protection goals and objectives for the organization, and identify strategies and timetables for attaining them. Organization and staffing, including assignment of responsibilities for environmental activities, policies, facility operating procedures, and budgeting, are to be described.

b. Provide an overall framework for the design and implementation of an environmental protection program.

c. Assign responsibilities for complying with requirements under all Federal, state and local environmental laws and/or regulations.

Environmental Protection Implementation Plan (EPIP) Guidance For DOE Order 5400.1 provides guidance for the format and content of EPIPs, identifies the sections that should be contained, and indicates what information each section should contain.

FINDING:

The ANL-E EPIP does not contain all required information or sufficiently detailed information to satisfy the requirements of DOE Order 5400.1 and was not completed in a timely manner.

DISCUSSION:

The ANL-E EPIP has not yet been approved by the Program Senior Official (ER), although it has been reviewed and recommended for approval by DOE Environmental Restoration and Waste Management (EM-32) (R-98). Specific deficiencies identified in the ANL-E EPIP, (R-7) include the following:

1. Organization and staffing, including assignment of responsibilities for environmental activities, policies, facility operating procedures, and budgeting, are not described in detail.
2. No overall framework is defined for the design and implementation of the environmental protection program, especially regarding schedules and budgets.

3. Section 1.2 does not contain a summary of all major ongoing environmental monitoring programs. It briefly summarizes environmental surveillance activities but does not describe effluent monitoring activities and does not recognize the requirements of DOE Order 5400.5, Radiation Protection for the Public and the Environment, and the draft guidance of Radiological Effluent Monitoring and Environmental Surveillance Regulatory Guide for DOE Order 5400.5.

4. The 13 responsibilities of Paragraph 9.f of DOE Order 5400.1 are delineated in Section 1 and a general description of how they will be implemented is provided. However, the delegated unit responsible for each section is not always identified, the integration of these responsibilities with other ongoing activities of the designated unit is not summarized, and the approval process for their implementation is not clearly delineated.

5. Schedules and budgetary resources were not provided for preparation of the Groundwater Protection Management Program, Waste Minimization Program, and Pollution Prevention Awareness Program, except to the extent that it states that they will be completed on time using operating funds.

6. Section 5.1 does not discuss the Environmental Monitoring Plan review and approval process, how existing plans will be expanded, nor how monitoring and surveillance initiatives will be integrated into a coordinated program. In addition, it does not provide a schedule for plan development and identification of budgetary resources.

7. Section 5.2 states that the Environmental Protection Section of the ESH Department conducts the effluent monitoring for ANL-E. This is not true for airborne effluents or retention tank releases, which are the responsibility of the Health Physics Section and Waste Management Department respectively. Effluent Monitoring is not discussed in detail.

8. Section 6.1 does not describe the quality assurance program for effluent monitoring and does not describe how the program will be expanded to incorporate the 11 elements of DOE Order 5400.1. In addition, it does not describe the organizational unit responsible for preparing and implementing quality assurance initiatives.

This finding was not addressed in the AIS Self-Assessment Report.
ASSESSMENT DISCIPLINE: Radiation
ASSESSMENT FINDING NUMBER: RAD/CF-4
ASSESSMENT FINDING TITLE: Certification of Compliance with DOE Order 5400.5

PERFORMANCE OBJECTIVE:

DOE Order 5400.5, Radiation Protection for the Public and the Environment, requires the following: (1) a certification for those areas covered by the Order for which Site/Operations Offices are not yet in compliance; and/or, (2) a request for exemption for areas not yet in compliance that includes a Plan for achieving compliance. The compliance plan accompanying the request for exemption shall include schedules of activities which will lead to compliance with the requirements of this Order.

FINDING:

The compliance certification prepared and submitted by ANL-E does not support the conclusion of compliance, and there is insufficient supporting documentation to verify that an adequate certification evaluation was performed. The ANL-E certification process did not meet the requirements of DOE Order 5400.5.

DISCUSSION:

The certification letter (R-71) is a little over one page long with two attached tables, and concludes that ANL-E is in compliance with all requirements of the Order. The information in the letter does not demonstrate that each requirement of the Order was reviewed and an adequate determination of compliance was made, and no additional supporting documentation is available. The letter was reviewed and accepted by AAO and CH as meeting the requirement of the Order but it has not been approved by EH. A brief review of the Order's requirements indicates that ANL-E does not comply with or did not adequately demonstrate compliance with the following areas among others:

1. Chapter II, Paragraph 1.b requires compliance with 40 CFR Part 61, Subpart H. However, ANL-E may not currently comply with these requirements (See Finding A/CF-1).

2. Chapter II, Paragraph 2 requires the development and implementation of a program which implements the ALARA process for all DOE activities that cause public doses. ANL-E has no formal ALARA program that addresses dose to the public and the environment.

3. Chapter II, Paragraph 3.a(2) requires the application of the ALARA process to all liquid releases even though Best Available Treatment technology may not be required. The Environmental Subteam observed no evidence that ANL-E has done this.

4. Chapter II, Paragraph 3.a(5) requires the dose to native aquatic organisms to be less than 1 rad per day. The Environmental

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Subteam observed no documentation which indicated that compliance with this limit was verified.

5. Chapter II, Paragraph 6.b requires that information on demography, land use, food supplies, and exposure pathways used in the dose calculations shall be appropriate to evaluate actual and potential doses. Such information shall be updated as necessary to document significant changes that could affect dose calculations. ANL-E does not meet this requirement (See Finding RAD/CF-11).

6. Chapter IV provides guidance on the cleanup of residual radioactive material, management of the resulting wastes and residues, and release of property. It also requires that plans and protocols be developed for implementation of this guidance. There is no documentation which demonstrates that this guidance was verified to be implemented for general operations, and for decontamination and decommissioning activities.

This finding was not addressed in the AIS Self-Assessment Report.
ASSESSMENT DISCIPLINE: Radiation

ASSESSMENT FINDING NUMBER: RAD/CF-5

ASSESSMENT FINDING TITLE: Environmental Review for New Facilities, Major Modifications, or Operational Changes

PERFORMANCE OBJECTIVE:

DOE Order 5400.1, General Environmental Protection Program, Chapter IV, Paragraph 3, requires that an environmental study shall be conducted prior to start up of a new site, facility, or process which has the potential for significant adverse environmental impact. The pre-operational study should begin not less than 1 year, and preferably 2 years, before start-up to evaluate seasonal changes. The pre-operational study shall be consistent with NEPA compliance requirements.

DOE Order 5400.5, Radiation Protection for the Public and the Environment, Chapter II, Section 2, requires that the ALARA process be implemented for facility design. Paragraph 3.a(6), requires that new facilities shall be designed and constructed to meet the discharge requirements shown in Paragraph II.3.a.

DOE Order 5820.2A, Radioactive Waste Management, Chapter III, Paragraph 3.c(4), requires that each DOE low-level waste generator preparing a design for a new process or process change shall incorporate principles into the design that will minimize the generation of low-level wastes.

DOE Order 5820.2A, Chapter V, Paragraph 3.a(3), states that planning for facility decommissioning shall be initiated during the design phase for new facilities. Paragraph 3.b, requires that facilities in which radioactive or other hazardous materials are utilized shall be designed to simplify decontamination and decommissioning and/or increase the potential for reuse. Features and procedures that simplify and facilitate decommissioning shall be identified during the planning and design phase based on a proposed decommissioning method or conversion to other use.

DOE Order 6430.1A, General Design Criteria, provides specific guidance for incorporating radiological controls; effluent control and monitoring; decontamination and decommissioning; and as low as reasonably achievable (ALARA) principles into facility designs. These criteria apply to new facilities and existing facilities that are modified or have additions. Special DOE facilities have additional design criteria that do not relate to the major building systems or design specialties; this information appears in Division 13, Special Facilities.

FINDING:

ANL-E does not have an effective mechanism to ensure that all new facilities, major modifications, and operational changes are reviewed for their impact on existing ANL-E environmental compliance programs and to ensure that the requirements of the DOE Orders have been implemented in the design.
DISCUSSION:

The Environment, Safety and Health (ES&H) Department of the Support Services Division is responsible for performing facility and operational reviews. ES&H utilizes two different methods to accomplish these reviews. The Design Operating Review System (DORS) is used to accomplish reviews by interfacing with the Facilities Planning and Engineering (FPE) Department of the Plant Facility Services Division. This system, which involves early notification of ES&H; formal ES&H reviews; and sign-offs for Title I and Title II design documents, is described in a procedure, and has some documentation. The second method utilized to track and review work projects is based on ES&H notification by Accounting when funds for a project have been authorized. This method is less formal than DORS, and ES&H is not required to review and sign-off (I-R-33, I-R-39, I-R-54).

The following deficiencies were observed in the DORS and work tracking system (R-66):

1. The DORS system is only utilized when FPE is performing the work. Engineering and design work done outside of FPE is not required to be reviewed and approved under DORS.

2. Although DORS provides an early notification to ES&H when a project is first initiated, this may not be sufficient time to implement a pre-operational survey. In addition, ES&H does not have a defined mechanism to recognize the need for such a survey and ensure that one is implemented (See Finding WM/CF-10).

3. The DORS procedure is out of date and not adequately maintained as a controlled document. The DORS procedure does not provide detailed guidance on the applicable standards to be used in the review process for ensuring that the performance objectives are met.

4. The work tracking system is not adequate to ensure that ES&H reviews are performed as necessary. This system is not described in a procedure or any other formal document. The work name or description provided by Accounting, along with their notification of funding, may not contain enough information for ES&H to recognize its potential environmental impact. Operational changes that may have potential environmental impact but not require specific funding authorization cannot be identified by this system.

5. ES&H is not authorized to perform review and approval of activities identified by the work tracking system except by invitation of the implementing organization.

6. Reviews performed by the various disciplines within ES&H are not documented in a manner which demonstrates that compliance with all applicable requirements was verified. There is no formal definition or documentation of the required scope of the review. In addition, there is no documentation that indicates if the review covered all DOE Order requirements; or any other applicable requirements.
requirements. The DORS procedure provides no guidance on the required scope of the review.

7. There is no quality assurance or quality control to ensure that these reviews are implemented as required and performed in an adequate manner.

This finding was not addressed in the AIS Self-Assessment Report.
ASSESSMENT DISCIPLINE: Radiation

ASSESSMENT FINDING NUMBER: RAD/CF-6

ASSESSMENT FINDING TITLE: Safety Analysis Reviews

PERFORMANCE OBJECTIVE:

DOE Order 5481.1B, Environmental Protection, Safety, and Health Protection Information Reporting Requirements, Chapter I, Paragraph 3.a requires that a safety analysis shall be initiated at the earliest phases of the facility life cycle and describe the design features and conduct of operation that demonstrate conformance with design or performance assumptions. Paragraph 3.b requires that the review shall include a documented evaluation of the adequacy of the preventive or mitigative design features and the administrative controls provided to limit the risk. The review shall be sufficiently documented to allow independent evaluation of its adequacy.

Paragraph 3.c states that authorizations shall limit an operation to those characteristics described and analyzed in the safety analysis. Paragraph 3.d requires that all pertinent details of the analysis, the review, and the authorization shall be traceable from initial identification of the hazard to its elimination, or the application of controls to reduce the risk. Paragraph 4 requires that ongoing DOE operations that can be reasonably expected to have the potential for major onsite and offsite impacts shall be identified and evaluated.

Chapter II, Paragraph 2.b states that this Order is applicable to those operations that involve hazards that are not routinely encountered and accepted in the course of every day living by the vast majority of the general public. Paragraph 4 requires that review and authorization levels be established for significant modifications, and that proposed physical or administrative changes be reviewed in order to determine if they are significant modifications.

DOE Order 5820.2A, Radioactive Waste Management, Chapter III, Section 3 requires that safety analysis reports be prepared for the development of large-scale waste treatment facilities and for the development and operation of waste storage facilities.

FINDING:

The ANL-E safety evaluation program is not sufficiently formalized to ensure that safety reviews are prepared, reviewed, authorized, and maintained for all applicable new and existing facilities, as required by the DOE Orders.

DISCUSSION:

ANL-E currently implements a safety evaluation program through its Office of Nuclear Safety (ONS), and the Nuclear Facilities Safety Committee (NFSC). These organizations are only involved with moderate- and high-hazards facilities, nuclear reactors, and nuclear facilities. Safety evaluation reports appear to be adequate for these designated facilities and involve the contribution, review, and approval of the Environment, Safety and Health (ES&H) Department. However, the responsibility, authority, and mechanism of
this ES&H involvement is not formally defined or documented. In addition, neither the ONS, the NFSC, nor any other program addresses facilities outside of these categories that require safety evaluations in accordance with DOE Orders (I-R-40). The following specific deficiencies have been identified:

1. The existing program does not have sufficient scope to ensure that safety reviews are performed for all required facilities. There is no formal mechanism that initiates the safety evaluation process for all new facilities. The responsibility to ensure that required safety evaluations are performed has not been formally assigned to any organizational unit.

2. The responsibility and authority of ES&H for preparation of safety evaluations is not formalized or documented. Although they are involved in preparation of major safety analyses, the scope of their involvement appears to be on an ad hoc basis rather than in accordance with established policy, guidelines, and procedures (I-R-39).

3. The responsibility and authority of ES&H for review and sign-off of safety evaluations is not formalized or documented. It appears that ES&H has an oversight role for safety evaluations to ensure that they adequately address environmental regulations; however, this role is neither defined nor implemented in a formal manner. There are no procedures or other documents that describe how this function is to be carried out (I-R-54).

4. The existing radioactive waste treatment and storage facilities do not have safety evaluations. They most likely are required under the "backfit rule" of DOE Order 5481.1, and the Waste Management Department has also reached this conclusion (R-105). However, there does not appear to have been any review or considered decision to apply the "backfit rule" to any other existing facilities at ANL-E.

5. New radioactive waste facilities are being planned and the design process is in progress. However, safety analyses for these facilities have not been initiated in accordance with the requirements of the performance objectives.

6. Existing quality assurance plans at ANL-E are not sufficient to assure that the requirements of DOE Order 5481.1B are implemented on a Laboratory-wide basis.

This finding was not addressed in the AIS Self-Assessment Report.
ASSESSMENT DISCIPLINE: Radiation

ASSESSMENT FINDING NUMBER: RAD/CF-7

ASSESSMENT FINDING TITLE: Onsite Radiological Environmental Surveillance Program

PERFORMANCE OBJECTIVE:

DOE 5400.1, General Environmental Protection Program, Chapter IV, Paragraph 5.b, states that environmental surveillance shall be conducted to monitor the effects, if any, of DOE activities on onsite and offsite environmental and natural resources. Environmental surveillance shall be designed to satisfy one or more of the following objectives: verify compliance with environmental laws and regulations; verify compliance with commitments made in DOE documents; characterize and define trends in the condition of environmental media; establish baseline of environmental quality; assess pollution abatement programs; and identify and quantify new or existing environmental quality problems.

FINDING:

The ANL-E does not have a coordinated program that satisfies all of the onsite surveillance requirements of DOE Order 5400.1, General Environmental Protection Program, regarding monitoring of the effects of DOE activities on onsite environmental and natural resources.

DISCUSSION:

The Environmental Subteam observed the following deficiencies regarding onsite surveillance that are indicative of a lack of a coordinated program:

1. Onsite environmental surveillance needs are not formally or effectively coordinated between the various Divisions and Departments that would require the use of such data, such as the Waste Management Department, Health Physics Department, and Environment, Safety, and Health.

2. Site specific operations and conditions are not routinely evaluated to determine potential onsite and offsite environmental problems as a basis for establishing onsite environmental surveillance needs (I-R-201).

3. Onsite soil and vegetation sampling is limited to a few of the so-called "perimeter" samples that may be collected within the ANL-E boundary; the majority of the "perimeter" samples are collected at offsite locations well within the Waterfall Glen Forest Preserve.

4. There has been no formal evaluation to determine whether there is a need to sample stream aquatic life.

5. There has been no documented evaluation to determine whether there is a need to sample wildlife within the ANL-E boundaries.
6. There has been no documented evaluation of the need for routine onsite surveillance for the following locations: potentially contaminated soils, known contaminated areas, or storm drain systems (I-R-202, I-R-203, I-R-206, I-R-207).

7. Responsibility for onsite environmental surveillance is not specifically assigned to anyone (I-R-201).

8. The onsite groundwater monitoring program is deficient (See Finding GW/BMP-2).

This finding was not addressed in the AIS Self-Assessment Report.
ASSESSMENT DISCIPLINE: Radiation

ASSESSMENT FINDING NUMBER: RAD/CF-8

ASSESSMENT FINDING TITLE: Radiological Sampling and Monitoring of Liquid Effluents

PERFORMANCE OBJECTIVE:

DOE Order 5400.1, General Environmental Protection Program, Chapter IV, Paragraph 5a.2, states in part that effluent monitoring shall be conducted to provide representative measurements of the quantities and concentrations of pollutants in liquid discharges.

DOE Order 5400.5, Radiation Protection for the Public and the Environment, Paragraph 6b, states that in addition to providing protection to members of the public, it is DOE’s objective to protect the environment from radioactive contamination to the extent practical. Chapter I, Paragraph 5a, requires that additional controls on the release of liquid waste be adopted to reduce the potential for radiological contamination of natural resources such as land, groundwater, surface water, and ecosystems.

FINDING:

The environmental sampling and monitoring program is not conducted in accordance with DOE Orders (I-R-210).

DISCUSSION:

The Environmental Subteam observed the following deficiencies that are symptomatic of the weaknesses in the liquid effluent monitoring program:

1. Storm drains and surface runoffs are not monitored. Inspection of the site revealed several areas where storm and surface runoffs have been heavy. The forest outside the perimeter fence adjacent to the radioactive waste storage areas has two deeply eroded gullies created from storm runoff through the steep terrain.

2. Except for outfall points 001A and 001B, radiological analyses are not performed on samples taken from onsite NPDES outfalls. These unmonitored outfalls represent most of the onsite surface drainage to Sawmill Creek.

3. The environmental liquid radiological sample taken offshore below NPDES Outfall 001 is not providing representative measurements of site liquid radiological discharges. This is better defined as an environmental surveillance sample and not an effluent sample since the site effluent has been diluted in the stream flow prior to sampling. A daily grab sample in Sawmill Creek is collected for this outfall; a proportional sampler is more representative for sampling where water flow may vary greatly. A grab sample can provide representative samples if capability exists for measuring stream flow and the data are used to correct grab sample results for changing flow. ANL-E has a dam and weir to measure flow but the results are not used to correct sample data.
4. ANL-E has not conducted a documented evaluation to ensure that all significant liquid effluents are being monitored. This finding was partially addressed in the AIS Self-Assessment Report.
ASSESSMENT DISCIPLINE: Radiation

ASSESSMENT FINDING NUMBER: RAD/CF-9

ASSESSMENT FINDING TITLE: Contamination Control Program

PERFORMANCE OBJECTIVE:

DOE Order 5400.5, Radiation Protection for the Public and the Environment, states that it is DOE's objective to operate its facilities and conduct its activities to control radioactive contamination. It is also DOE's objective to protect the environment from radioactive contamination to the extent practical.

DOE Order 5480.11, Radiation Protection for Occupational Workers (draft), Paragraph 7.g requires that workers shall be monitored as appropriate. It also states that contamination control and monitoring shall be used immediately prior to or after exits from radiological areas. Paragraph 7.1 requires that an appropriate entry control program shall be established for radiological areas, including step-off pads and protective clothing for contaminated areas. Paragraph 7.m requires that records shall be kept to document the appropriateness, quality, and accuracy of monitoring methods, techniques, and procedures.

DOE 5700.6B, Quality Assurance, sets forth actions for establishing, implementing, and maintaining actions to assure quality achievement in DOE programs.

FINDING:

ANL-E does not have a formally defined and well-documented Laboratory-wide contamination control program. The contamination control practices for hand and foot monitor calibration, and for contamination boundary demarcations are not adequate to meet the requirements of DOE Orders. Some deficiencies were also identified in the contamination control program at NBL.

DISCUSSION

The Laboratory-wide policy on contamination control is not documented in the ANL-E Policy Manual or the Health and Safety Manual, and there is no formally defined Laboratory-wide contamination control program. Contamination control is a Division line responsibility and is implemented in accordance with their own methods, although they all use the same type of monitoring equipment. A revision of the Health and Safety Manual is in progress and the Environmental Subteam has been informed that the ANL-E contamination control program will be defined in this document. The following specific deficiencies were identified regarding contamination control practices at ANL-E. Where these deficiencies also apply to the New Brunswick Laboratory (NBL), it is explicitly stated.

1. It is possible to leave the Waste Management Control Laboratory in Building 306 and enter directly into the lunchroom without using a hand and foot monitor. This laboratory is used for the analysis of potentially radioactive retention tank samples.
2. ANL-E does not have a Laboratory-wide procedure that requires or describes the methods for periodic calibration, periodic maintenance, and associated documentation, for hand and foot contamination monitoring equipment at either ANL-E or NBL. ANL-E has documented requirements for source checks and acceptance criteria (R-28) but they are not uniformly adhered to. NBL has some documented requirements for source checks but a formal acceptance criteria is not established.

3. The Environmental Subteam did not observe that any hand and foot monitoring equipment at either ANL-E or NBL were marked with calibration stickers. The gas proportional type of monitor is calibrated before being placed in the field but this is not defined or required in procedures and there is no specified periodic recalibration. Other observed types of stationary hand and foot monitors are not calibrated.

4. There are no formally established minimum sensitivity requirements at NBL for hand and foot monitoring devices or any other documentation which demonstrates that they are sensitive to the alpha and beta surface activity guides specified in DOE Order 5480.11. ANL-E has an appropriate document (R-27). NBL states specific limits in its safety analysis report but they are not related to the limits of the Order.

5. There is no specific restriction on the maximum background of hand and foot monitors at NBL and ANL-E, above the ability to monitor at the established limits. At ANL-E backgrounds of 2,000 to 3,000 counts per minute are common and backgrounds as high as 6,000 counts per minute were observed by the Environmental Subteam.

6. ANL-E has no formal criteria or standards that establish requirements for setting up hand and foot monitoring locations and where to set them up.

7. There are no formal or posted limits established for determining when someone is contaminated (i.e., counts above background) with alpha or beta radiation. It is also not demonstrated that the limits in use are sensitive enough to provide detection at the sensitivity limits required in the orders.

8. There is no ANL-E formal document that describes the actions to be take when an individual is contaminated; however, workers are trained in the correct response.

9. Some hand and foot monitoring locations at ANL-E have use directions posted but most do not. In one location, the directions were inconsistent with the monitoring equipment. There is no standard for performing hand and foot monitoring at ANL-E.

10. There is no established guidance or requirement for establishing demarcation zones in the hand and foot monitoring areas at ANL-E. In many instances, there is no indication of where the potentially contaminated area ends and where the clean area begins. At best, a piece of marking tape is placed on the floor as the boundary
marker. The Environmental Subteam observed many instances where personnel surveyed their feet only to place them back down in the same spot. As a result, it is not clear where you are frisking from and to.

11. "Step off" pads are not used at either ANL-E or NBL; however, the DOE Orders only require them for "contaminated areas." NBL and ANL-E may not have contaminated areas as defined in DOE Order 5480.11 so "step off" pads may not be required. However, the need for "step off" pads has not been formally evaluated.

12. The large-area proportional counters in use for hand and foot monitoring at ANL-E are used in a manner that has several deficiencies. These deficiencies may impair their ability to effectively monitor for contamination. The high voltage setting is not effectively controlled and in one location the Environmental Subteam observed a monitor that appeared to be sensitive to sunlight. The site stated that this was likely due to an extremely elevated high voltage setting. The Environmental Subteam also noted that many of these devices were sensitive to pressure such that if an individual placed too much pressure on the detector with a hand or foot, the reading would increase due to an increase in the detector efficiency. In practice, the Environmental Subteam observed that users would not wait for the background reading to re-stabilize, after lessening the pressure, before completing their monitoring.

This finding was not addressed in the AIS Self-Assessment Report.
ASSESSMENT DISCIPLINE: Radiation

ASSESSMENT FINDING NUMBER: RAD/CF-10

ASSESSMENT FINDING TITLE: Assessment of Impact to the Public and the Environment in Emergency Situations

PERFORMANCE OBJECTIVE:

Draft DOE Order 5500.3A, Emergency Planning and Preparedness for Operational Emergencies, I., 2.d(2), requires development and maintenance of plans, procedures, and documents integral to the emergency planning programs described in Chapter 111. Chapter 1, 2.e, specifies "Consequence Assessment" as 1 of the 14 elements of planning and preparedness.

DOE Order 5500.3A, III., f., requires that provisions be made for offsite field monitoring of hazardous materials including personnel, monitoring and sampling equipment, communications equipment, and transportation of the monitoring teams. It also requires provisions to incorporate field monitoring information into the offsite consequence assessment.

Chapter III, Section k. of this DOE Order requires provisions for analysis of environmental samples and requires that the results be provided to personnel responsible for emergency response decisions and actions. It also requires that adequate equipment and supplies be available and that they be properly stored, labeled, and operable. The type, quantity, and location of equipment shall be identified, including whether or not it is dedicated to emergency response. Provisions shall be in place to inspect, inventory, calibrate, and perform operational checks of this equipment and supplies, and provisions are to be made for repair and replenishment as needed.

FINDING AND DISCUSSION:

The ANL-E Emergency Management Plan (EMP) does not contain adequate provisions for assessment of the impact of an emergency on the environment and the public.

1. The Emergency Planning Zone section of the EMP states that the site boundary is considered to be an adequate emergency planning area for any onsite radiological incident. As a result, the Emergency Monitoring Plan does not address any of the necessary elements for assessment of the impact of an offsite radiological release, such as:

   • Training
   • Procedures
   • Required equipment
   • Communications
   • Dose Assessments
   • Personnel Monitoring
   • Safety

However, the Hazards Assessment section of the EMP identifies several radiological hazards with potential for offsite impact
event though it does not provide a mechanism to assess the consequences of a release. The Hazards Assessment section is in direct contradiction to the statement in the Emergency Planning Zone section (I-R-224).

2. ANL-E personnel stated that the site would conduct emergency offsite monitoring only if so requested to do so by state officials (I-R-225).

This finding was not addressed in the AIS Self-Assessment Report.
ASSESSMENT DISCIPLINE: Radiation

ASSESSMENT FINDING NUMBER: RAD/CF-11

ASSESSMENT FINDING TITLE: Calculation of Dose to Members of the Public

PERFORMANCE OBJECTIVE:

DOE Order 5400.1, General Environmental Protection Program, Section II, Attachment II-I, Paragraph 8.c, states that the Annual Environmental Report should contain an assessment of the potential radiation exposure to the public that could have resulted from site operations during the calendar year. The assessment should be as accurate and realistic as possible. The model and calculation methodology used in the dose assessment should be included or referenced.

DOE Order 5400.5, Radiation Protection for the Public and the Environment, Section II, Paragraph 6.b states, that information on dispersion in the environment, demography, land use, food supplies, and exposure pathways used in the dose calculations shall be appropriate to evaluate actual and potential doses in the environs of DOE facilities. It further states that doses calculated should be as accurate and realistic as possible.

DOE Order 5700.6B, Quality Assurance, Paragraph 6h, requires that a Quality Assurance Plan be applied to computer software, components, and their operation commensurate with (1) the scope, complexity, duration, and importance to satisfactory performance; (2) the potential impact on environment, safety and health; and, (3) requirements for reliability and continuity of operation.

FINDING:

The calculation of dose to members of the public, does not meet all the requirements of the DOE Orders.

DISCUSSION:

The Environmental Subteam observed the following deficiencies related to the dose calculations:

1. There is no formal documentation that demonstrates that the copy of the AIRDOS computer code used at ANL-E for dose assessments is generating valid data. ANL-E personnel stated that the code was apparently checked upon receipt but the results were never formally documented (I-R-201, I-R-205).

2. Population dose projections are not as realistic as possible because dose projections for the population between 8 km and 80 km are based on 1980 census data rather than more recent information. Recent population adjustments, based on data supplied by the Northeastern Illinois Planning Commission, for the area out to 8 km indicate significant changes in the population density and population distribution around ANL-E (I-R-201).
3. Although major sources of radionuclide emissions were included in the ANL-E Annual Environmental Report, there is no documented evidence that all sources were evaluated.

4. Liquid pathways for population doses and recreation doses (especially direct radiation to visitors in the Waterfall Glen Recreation Area) were not included in the dose assessment (I-R-201).

5. Some of the dose rate data discussed in the annual reports are difficult to interpret. For instance, in the 1989 annual report (A-15), dose rates discussed in the text do not match the data in summary tables (I-R-201).

This finding was not addressed in the AIS Self-Assessment Report.
3.5.8 Inactive Waste Sites

3.5.8.1 Overview

The Inactive Waste Sites portion of the Environmental Subteam Assessment at ANL-E evaluated the compliance status of ANL-E with regard to the statutory provisions of the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) and the Superfund Amendments and Reauthorization Act (SARA), the National Contingency Plan (NCP), the Resource Conservation and Recovery Act (RCRA) as amended by the Hazardous Solid Waste Amendments (HSWA), RCRA regulations, state regulations, and applicable DOE Orders. The goals of the assessment were to determine whether the current activities performed under the Site's environmental restoration program fulfill the requirements of CERCLA and RCRA, determine the adequacy of the methods used to quantify spills and spill reporting procedures, determine whether federally-owned property associated with ANL-E has been transferred, and if so, the adequacy of the procedures used to ensure acceptability for release/transfer. The scope of the review included interviews with DOE, ANL-E, and regulatory personnel; visits to identified inactive waste sites; and extensive review of records, documents, plans, sampling results, correspondence files, and internal standard operating procedures. The inactive waste sites investigation also included an evaluation of Emergency Planning and Community Right-to-Know activities conducted at ANL-E under SARA Title III and Illinois laws.

In the absence of inclusion or proposed inclusion on the National Priorities List (NPL) or any Interagency Agreements, Compliance Agreements, Consent Orders, or Compliance Decrees with Federal, state or local authorities, the inactive waste site environmental restoration program, at the time of the Environmental Subteam's visit, remains largely in the planning stages and early assessment process. As part of its Environmental Restoration Program, ANL-E has prepared a site-specific 5-year plan that provides a broad framework of some of the major activities that will be required to identify, characterize, and remediate inactive waste sites over the next 5 years. This plan specifies the tentative scope of and budget and schedule for undertaking expanded site characterizations and groundwater characterization programs.

One of the initial activities in the ongoing assessment process of inactive waste sites at ANL-E was the 1986 Installation Assessment Report (the DOE equivalent of a Preliminary Assessment), which addressed eight inactive waste sites at ANL-E (IWS-7). In 1988, ANL-E formally submitted Preliminary Assessments (PAs) for the original eight sites and four additional sites to EPA Region V. In March 1990, EPA Region V requested the preparation and submittal of six Site Inspections (SIs). ANL-E is currently in the process of preparing the SIs for submittal.

Additional, potential inactive waste sites have been identified since the PA submittal as the site strives to prepare a RCRA HSWA permit application (Part B permit application) by January 1, 1991. This permit will set up any corrective action required for Solid Waste Management Units (SWMUs), both active and inactive, identified at ANL-E. In addition to the 12 SWMUs identified in the PAs, approximately 40 more areas of concern have since been identified. PAs for these newly identified sites will have to be prepared and submitted to EPA Region V. Several inactive waste sites have undergone or are now undergoing characterizations to collect the data necessary to submit the
HSWA permit application and PA/SIs. These sites include the 800-Area Landfill, 317-Area, and 319-Area.

ANL-E personnel in the Support Services Division and Plant Facilities and Services Division are responsible for activities related to inactive waste site identification/characterization and the upcoming HSWA permit application. They are also responsible for ensuring that these activities are conducted in accordance with the state and Federal regulations and DOE Orders. DOE Order 5400.4, CERCLA Requirements, now requires sites to conform to the NCP, regardless of whether they are on the NPL, and also requires integration of CERCLA, RCRA (if appropriate), and NEPA requirements. Compliance with DOE Order 5400.4 necessitates major planning efforts. Site characterization work performed to date has been technically sound. However, no central management or formal program to manage inactive waste sites is in place at ANL-E. The lack of an adequate program to manage inactive waste sites was identified in the AIS Self-Assessment Report.

Site activities with regard to SARA Title III consist of spill reporting under SARA Section 304 and community right-to-know reporting under SARA Title III, Section 311 and 312. The initial SARA Title III, Section 311 report was filed in 1987, as required. The annual Tier II inventory reports, under SARA Section 312, were submitted prior to March each year as required. The operations at the Laboratory exempt ANL-E from the requirements for SARA Title III, Section 313 chemical release reporting because ANL-E is not a manufacturing facility as identified in SIC codes 20 to 39.

The system currently in place at ANL-E for spill reporting is inadequate to ensure compliance with Federal regulations and DOE Orders. A set of spill reporting procedures that clearly outlines the methodology for determining if a spill is reportable and the steps required to report a spill are not in place at ANL-E. Other aspects of emergency planning and response are coordinated with the pertinent local and state agencies. The Local Emergency Planning Committee (LEPC) is kept informed of ANL-E programs by ANL-E personnel who are members of the LEPC.

The two compliance findings and one best management practice finding noted by the Environmental Subteam in this portion of the report relate to the lack of an adequate program to manage inactive waste sites, the ANL-E spill reporting procedures, and the lack of a verified chemical inventory reporting system. The only finding addressed in the AIS Self-Assessment Report was the finding relative to management of inactive waste sites. The inactive waste site findings identified by the 1988 DOE-HQ Environmental Survey of the ANL-E site dealt with previously unknown inactive waste sites or suspected waste sites and releases. After reviewing the documentation associated with the solid waste management units developed by the site, it was determined that the inactive waste sites distinguished by the Survey had been incorporated into the list of inactive sites to be addressed in the ANL-E RCRA Corrective Action Program.

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3.5.8.2 Compliance Findings

ASSESSMENT DISCIPLINE: Inactive Waste Sites

ASSESSMENT FINDING NUMBER: IWS/CF-1

ASSESSMENT FINDING TITLE: Management of Inactive Waste Sites

PERFORMANCE OBJECTIVE:

DOE Order 5400.4, Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Requirements, states that it is the policy of DOE to respond to releases of hazardous substances in accordance with the provisions of CERCLA, as amended, as well as those of the National Contingency Plan (NCP) and Executive Order 12580. DOE responses shall include both removal and/or remedial action, as appropriate, to reduce adverse impacts on public health and the environment regardless of whether the facility is listed on the National Priorities List (NPL). The Order also states that corrective actions carried out under other authorities such as Sections 3004(u) or 3008(h) of the Resource Conservation and Recovery Act (RCRA) or State laws, must satisfy CERCLA requirements for response actions to a release of a hazardous substance (i.e., must not be inconsistent with the NCP). The NCP (40 CFR 300, as finalized on March 8, 1990 in FR 8666) requires that DOE perform Preliminary Assessments (PAs) for all release sites to set priorities for site inspections (SIs) and gather existing data to facilitate later evaluation of the release pursuant to the Hazard Ranking System (HRS), if warranted.

FINDING:

ANL-E does not have an adequate program to identify, characterize, and manage inactive waste sites in accordance with DOE Order 5400.4, CERCLA, and RCRA.

DISCUSSION:

ANL-E has not established a formal coordinated program to identify, characterize and track inactive waste sites, solid waste management units, or releases to be addressed under RCRA corrective action or CERCLA authority. There is currently no management structure or strategy to integrate the requirements of CERCLA to assure cleanup of inactive waste sites in accordance with the National Contingency Plan (NCP). ANL-E efforts for the identification and characterization of inactive waste sites has not recognized or addressed many of the technical issues related to site investigations, remedial activities, and NEPA/RCRA/CERCLA integration issues that will be required in the 1990s.

The Environmental Subteam has specific concerns that are symptomatic of the lack of a coordinated program:

1. There is no central management organization for inactive waste site identification, characterization and tracking, and very limited information is available on the sites identified to date. Clear lines of authority and responsibilities for personnel responsible for inactive waste site identification, characterization and management are not defined. To date, there
have not been adequate manpower resources to conduct complete inactive waste site identification and characterization work. There is also a lack of programmatic supervision to oversee the implementation of the regulations and NEPA/RCRA/CERCLA integration. This is evident in several pieces of site correspondence that indicate that ANL-E personnel are under the erroneous impression that current inactive waste site characterization work fulfills the requirements of a Remedial Investigation (RI) under CERCLA (IWS-14, IWS-15).

2. ANL-E does not have a mechanism in place to assure timely submittal of Preliminary Assessments (PAs) or the six Site Inspections (SIs) requested to date by EPA Region V. In March 1990, ANL-E received notification from EPA Region V that Site Inspections (SIs) must be conducted for six sites for which PAs were submitted in April 1988 (IWS-41). ANL-E has not established a timeframe for completion of the SIs or for completion of additional PAs for sites identified since the original PA submittal. Although the EPA did not establish a formal due date for SI submittal, an internal October 1, 1990 deadline for SI submittal to AAO was recently missed by ANL-E. The NCP requires that PAs be prepared in a timely manner.

3. There is no coordinated effort or formal plan to locate and characterize inactive waste sites. Consequently, inactive waste sites may not yet be identified, some known sites are inadequately described, and known inactive waste sites have not been included on the ANL-E inactive waste site list.

4. Past site data and waste disposal practices have not been thoroughly investigated to determine the existence of all potential unknown inactive waste sites, including potential sites on property transferred from DOE to the DuPage County Forest Preserve District. A previously unknown dump site on land now owned by the Forest Preserve District was identified by the Environmental Subteam through an interview of a long-term employee (I-IWS-38).

5. ANL-E has not conducted a comprehensive sitewide historical search to gain information on known sites and identify other potential sites. ANL-E does not include known sites on the inactive sites list unless information is readily available to adequately describe them. Information to add sites to the list may be available through a review of historical documents. This is particularly true for unused facilities that may be release sources, such as the Argonaut Reactor in Building 24.

6. At the time of the Tiger Team Assessment, ANL-E was gathering information on a list of approximately 50 solid waste management units (SWMUs) for submittal with the RCRA Part B permit due by January 1991. There is no separate list of inactive waste sites to be remediated under CERCLA authority and the NCP. Such candidate CERCLA sites would include sites that do not involve RCRA hazardous substances, but concern radioactive releases only, such as the CP-5 building. Seven sites now located in the
Waterfall Glen Forest Preserve, on property which formerly belonged to DOE, are incorrectly included in the list of SWMUs to be submitted with the Part B Application. Such sites are not owned by DOE and would not be likely to require attention by DOE/ANL-E except under a CERCLA action as a potentially responsible party.

This finding was identified in the AIS Self-Assessment Report (EC2.8.38) as Inadequate Assessment of Inactive Sites.
PERFORMANCE OBJECTIVE:

Section 103(a) of CERCLA requires facilities to immediately report releases (except federally permitted releases) of hazardous substances to the environment in excess of a reportable quantity (RQ) to the National Response Center (NRC).

Section 304 of SARA requires that facilities must immediately notify the local emergency planning committees (LEPCs) and state emergency response commissions (SERCs) if there is an offsite release into the environment of a hazardous substance that exceeds the RQ.

DOE Order 5500.2A, Emergency Notification, Reporting, and Response Levels, requires that "Field Elements shall notify the Headquarters Emergency Operations Center and the National Response Center . . . as defined in 40 CFR 302, Designation, Reportable Quantities, and Notification".

FINDING:

The ANL-E procedure for the reporting of spills is not adequate to ensure compliance with the reporting requirements of Federal regulations and DOE Orders.

DISCUSSION:

Formal procedures that integrate the requirements of the federal regulations and DOE Orders to provide clear spill-reporting guidance to site personnel are not in place at ANL-E. The only practice in place to report spills is for the first responder (Argonne Fire Department), following notification through 911, to contact the Environmental Compliance Officer who then will make a determination of the appropriate reporting requirements (I-IWS-12).

Procedures are not in place to assure initial identification of occurrences, notification of the Environmental Compliance Officer or designated alternate, and eventual reporting to the appropriate authorities within the time periods required for compliance.

A specific example of the difficulties encountered with the ANL-E spill reporting process is found in the 800 Area September 21, 1989 Hazardous Waste Release Accident Revised Report dated May 7, 1990 (IWS-42). No clear lines of command or authority were established to manage the incident and the spill was subsequently not reported to the National Response Center or the Headquarters Emergency Operations Center. Lack of procedures contributed to the break down of reporting requirements when the Environmental Compliance Officer contacted the State Emergency Response Commission, which incorrectly stated that no further notification (i.e., NRC notification) was necessary. ANL-E personnel assigned to implement the CERCLA spill reporting requirements have not been trained with regard to their responsibilities or the requirements of CERCLA and SARA Title III. This was evident during this incident because the official Spill Prevention, Control and Countermeasure Plan (SPCC Plan)
intended for events like this one, was never put into effect. Had this plan been implemented, the designation of a coordinator and internal notification procedures contained within the plan could have greatly improved the response to the incident.

This finding was not addressed in the AIS Self-Assessment Report.
3.5.8.3 Best Management Practice Findings

**ASSESSMENT DISCIPLINE:** Inactive Waste Sites

**ASSESSMENT FINDING NUMBER:** IWS/BMP-1

**ASSESSMENT FINDING TITLE:** SARA Title III Chemical Inventory Tracking and Verification

**PERFORMANCE OBJECTIVE:**

The Emergency Planning and Community Right-to-Know Act (SARA Title III) requires a facility covered by OSHA's Hazard Communication Standard to submit MSDSs or a list of MSDSs to the State Emergency Response Commission, Local Emergency Planning Committee, and local fire department. In addition, Tier I or Tier II annual inventory reports must be submitted to State and local authorities (by March 1 each year) on specified hazardous chemicals if they have at least 10,000 pounds of the substance in inventory according to SARA Title III Section 312. Implementing regulations for SARA Title III Sections 311 and 312 are found in 40 CFR 370.

Best management practice dictates that a chemical tracking system that incorporates hazardous chemical inventories and SARA Title III reporting requirements is useful when large numbers of chemicals are being reported from a large number of departments.

**FINDING:**

ANL-E has no system in place for hazardous chemical inventory tracking in relation to purchasing and MSDS management, or a system of checks and audits to verify inventory accuracy.

**DISCUSSION:**

ANL-E has prepared a list of hazardous chemicals and Tier II forms for 1988 and 1989. These were sent by the AAO to the State Emergency Response Commission, the Local Emergency Planning Committee, and the Argonne Fire Department as required by the regulation. ANL-E prepares Tier II forms for a total of 8 chemicals stored on-site in excess of 10,000 pounds that primarily involve water treatment chemicals such as chlorine and sulfuric acid.

The hazardous chemical inventory compiled each year for SARA Title III reporting is updated manually by circulating the previous year's inventory via memorandum from the Compliance Officer to each person responsible for chemical management. The chemical managers are asked to verify the summary and make any changes for the next reporting period. The chemical inventories submitted are not reviewed for accuracy. This manual system, as well as unverified reporting, could allow for inaccurate annual inventory reporting (Tier II forms). Also, no training for the chemical managers in how to prepare the inventory input to the Compliance Officer is evident. The chemical inventories submitted are reviewed for accuracy. The only guidance received by the persons responding to the annual inventory request is contained in the memorandum itself.

This finding was not addressed in the AIS Self-Assessment Report.

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3.5.9 National Environmental Policy Act

3.5.9.1 Overview

The purpose of the National Environmental Policy Act (NEPA) portion of the Argonne National Laboratory-East (ANL-E) Tiger Team Environmental Assessment was to: 1) evaluate compliance with the NEPA, Council on Environmental Quality (CEQ) regulations, and DOE NEPA Guidelines, Orders, and Memoranda; 2) identify any inappropriate or inadequate NEPA procedures and documentation; and, 3) evaluate NEPA management structure and NEPA review processes at the ANL-E site including the New Brunswick Laboratory (NBL), and at the Department of Energy (DOE) Operations Office (CH) and Argonne Area Office (AAO). Table 3.5.10-1 lists the applicable regulations and/or requirements used to evaluate NEPA compliance.

The NEPA Tiger Team assessment focused on NEPA activities at ANL-E following issuance, in 1988, of ANL-E guidance; emphasis was given to problems that are continuing or may return. Because guidance and directives from Department of Energy Headquarters (DOE-HQ) are still evolving, the review focused on actual current practice rather than the content of the 1988 guidance. The assessment included a site tour, reviews of documents and procedures, and interviews with staff responsible for NEPA compliance at the site (i.e., NEPA staff in CH, AAO, NBL, and ANL-E). The 1982 sitewide environmental assessment (EA) was reviewed for general NEPA adequacy, and for its adequacy as a reference document from which to tier future NEPA documents. The 1990 Advanced Photon Source EA (DOE/EA-0389) was reviewed for compliance with NEPA. Categorical exclusions, memoranda-to-file (MTFs), action description memoranda (ADMs), and environmental evaluation forms (EEFs) were evaluated for consistency with DOE NEPA requirements. Responsibility for the NEPA program at ANL-E is with the Chief Operations Officer (Associate Director level) in the Quality Assurance, Environment, and Safety Office.

Before 1988, NEPA procedures, planning, and documentation at ANL-E were inadequate and inconsistent with DOE-HQ guidance. Few records of formal NEPA compliance from before 1988 could be located, although a variety of informal communications
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<th>Citation</th>
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<td>Regulations for Implementing the Procedural Requirements of NEPA</td>
<td>Council on Environmental Quality (CEQ)</td>
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<td>10 CFR 1021</td>
<td>Compliance with the National Environmental Policy Act</td>
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<td>52 FR 47662-47670 (December 15, 1987)</td>
<td>DOE Compliance with the National Environmental Policy Act (NEPA); Amendments to the DOE NEPA Guidelines</td>
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<td>DOE Order 5400.1C (April 9, 1985)</td>
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<td>General Environmental Protection Program</td>
<td>DOE</td>
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<td>DOE Order 5400.4 (October 6, 1989)</td>
<td>Comprehensive Environmental Response, Compensation, and Liability Act Requirements (CERCLA RI/FS and NEPA)</td>
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concerning the impacts of projects were found. Thus, prior to 1988 only a few EAs, MTFs, and categorical exclusions exist for the site.

Since 1988 the NEPA compliance program at ANL-E has undergone major changes, as illustrated by the following examples:

- The first formal ANL-E NEPA guidance was written in 1988 (N-210);
- CH issued CH 5440.1C (April 4, 1990), a revision of its 1983 order;
- AAO Standard Operating Procedure (SOP-2, Implementation and Compliance of the National Environmental Policy Act,) (N-183) was issued (September 17, 1990).

In addition, CH has issued a variety of guidance memoranda concerning NEPA. However, none of these orders, procedures, and guidance memorandums can be considered fully integrated into site NEPA planning and compliance. Other recent and ongoing changes with implications for NEPA compliance include the following:

- CH's annual Environmental Protection Appraisal of ANL-E for 1988 (N-184) identified several NEPA deficiencies some of which were anticipated in earlier appraisals by CH (N-220). As a result, the site hired an Environmental Compliance Officer with part-time (estimated 10 percent) NEPA responsibilities;
- Under CH 5440.1C.6.b (N-170), CH assigned major technical oversight responsibilities for NEPA to the Area Office Manager and the Area Office Environmental Compliance Officer whose duties included this role (1-N-31);
- CH has appointed a full-time NEPA Compliance Officer, reporting to the Director; Environment, Safety, and Health Division;
- Several environmental committees have been, and to various degrees remain, active (e.g., Environmental Advisory Council (1987), Board of Governors' Safety and Environment Council (1988), Environmental Compliance Task Force (1989), Environment, Safety, and Health Advisory Council (1990), and the site TTA Self-Assessment Committee).

As a result of the recent closer scrutiny of NEPA compliance, many past deficiencies in compliance have been recognized; for example, the NEPA TTA group agrees in broad outline with the findings of the site TTA Self-Assessment Committee. Nonetheless, problems with NEPA compliance persist. For example, the status of recent formal records (primarily since 1988) was frequently difficult to determine. Of 167 EEs and related documents, only 19 could be clearly categorized as finalized NEPA determinations signed by the appropriate official(s). The remaining 148 were inappropriately signed or delayed in the system (See Findings). In addition, the site has had virtually no public involvement and little other agency involvement regarding NEPA, a circumstance probably resulting partly from the absence of an EIS-level NEPA document for the site. Also, the 1988 ANL-E guidance
requires revision to be consistent with CH 5440.IC and SEN-15-90, and may require additional revision when DOE 5440.ID is finalized.

CH is about to implement a computerized tracking system which will form a basis for improved recordkeeping (I-N-16). Similarly, ANL-E recently began development of a computerized "Expert System" which includes as a major emphasis NEPA compliance for both construction/maintenance and research projects. This system, which is nearing implementation, could be a positive contribution to NEPA compliance at the site as well as a possible model for use at other sites. ANL-E has not yet committed to providing stable and continuing funding to implement, calibrate, and maintain this system (I-N-32).

The ANL-E Tiger Team NEPA Assessment has resulted in three compliance findings related to: (1) inadequate/inappropriate NEPA determinations; (2) failure to incorporate NEPA early in the planning process; and, (3) inadequate guidance/training implementing NEPA. In addition, there was one best management practice finding related to inadequacies of the sitewide EA.
3.5.9.2 Compliance Findings

**ASSESSMENT FINDING:** NEPA

**ASSESSMENT FINDING NUMBER:** NEPA/CF-1

**ASSESSMENT FINDING TITLE:** NEPA Determinations

**PERFORMANCE OBJECTIVE:**

The Department of Energy (DOE) National Environmental Policy Act (NEPA) Guidelines (52 FR 47662) and DOE Order 5440.1C, National Environmental Policy Act, require that a Responsible Supervisory Official (RSO) make appropriate and adequate NEPA determinations for all DOE activities.

Prior to Secretary of Energy Notice (SEN) 15-90 (February 5, 1990), a DOE Chicago Operations Office (CH) RSO could determine whether an Argonne National Laboratory-East (ANL-E) proposed action either: (a) fell within the typical classes of actions requiring one of the three levels of NEPA review provided for in 52 FR 47662, Section D i.e., a categorical exclusion, environmental assessment (EA), or environmental impact statement (EIS)]; or (b) although not categorically excluded, had effects which were "clearly insignificant." If all potential impacts were clearly insignificant, a Memorandum-to-File (MTF) could be written. However, if a proposed action required analysis of questions related to DOE control and jurisdiction or any environmental data gathering or analysis to reach a conclusion, then the proposed action failed the test of "clearly insignificant" and an action description memorandum (ADM) would be required. The ADM should be submitted through channels to DOE Headquarters for a determination of the appropriate NEPA documentation (i.e., EA, EIS, or supplemental EIS)(N-213). (NEPA determinations were first initiated by ANL-E on a Project Environmental Evaluation Form (PEE); subsequently, CH 5440.1C, (effective February 1990), required instead that the CH Environmental Evaluation Notification Form (CH 560) be completed by a project manager.

SEN-15-90 eliminates the use of the MTF by October 1, 1990 and requires Secretarial Officer approval, rather than CH RSO, of any MTF issued between February 5, and October 1, 1990.

**FINDING:**

Some recent NEPA determinations for the site were inappropriate or inadequate.

**DISCUSSION:**

Review of NEPA determination documents revealed inappropriate NEPA determinations or insufficient information to permit an independent appraisal of the correct determination for a document. The review covered 167 ANL-E environmental evaluations (PEEs or CH 560) and associated documents, all but one of which were dated from late 1988 to 1990 (N-001 through N-167). Before 1988, there was almost no formal NEPA documentation conducted at the site (I-N-22), although environmental concerns were considered informally for at least some projects.
INAPPROPRIATE NEPA DETERMINATIONS

Incorrect determinations of the appropriate level of NEPA documentation were made for the following projects:

- **MEMORANDA-TO-FILE**
  - A²R² Fill Project, 1989 (N-146).
  - Experimental Boiling Water Reactor (EBWR) Decontamination and Decommissioning, 1986 (N-166).

- **CATEGORICAL EXCLUSIONS (1989)**
  - Laboratory Wastewater Treatment Plant Improvements (N-131).
  - Laboratory and Sanitary Sewer Collection System Rehabilitation (N-132).
  - Sanitary Wastewater Treatment Plant Improvements (N-133).
  - Water Line Replacement (N-135).

The noted MTFs required too much supporting analysis to be "clearly insignificant" on their face, and should have been short EAs; the categorical exclusions were not designated for a particular category or did not clearly fit into an exclusion existing at the time. CH notified AAO that MTFs should be prepared for the categorical exclusions (N-219), but no records were found showing that such MTFs were prepared.

An interview with the ANL-E Environmental Compliance Officer (ECO) (I-N-2) and the review of available NEPA documents and files indicated that from September 1988 to approximately July 1989, the ANL-E ECO made NEPA determinations for 91 of 167 proposed actions (N-066 to N-128, N-136 to N-145, N-147 to N-163, and N-165), although the ECO did not have authority to do so: authority for such determinations rests with DOE. For the majority of these actions (89 out of 91), there was no evidence in the file to indicate the transmittal of the PEE and any supporting documentation to AAO, DOE-CH, or DOE-HQ. It should be noted, however, that timely transmittal of the required environmental evaluations (either PEE or CH-560) and any associated documentation has been made to the AAO since approximately July 1989.

All of the above examples were also noted in the AIS Self-Assessment Report (N-169), and were flagged by the ANL-E ECO as inappropriate exclusions (i.e., the process should not have proceeded without addressing ECO concerns).

INADEQUATE NEPA DETERMINATIONS

Deficiencies in the completion of the PEEs were observed as described below.

- Eighty-one of 167 PEEs reviewed provide only a title of the project. They do not provide a sufficient description of the proposed action to make possible an independent evaluation of the NEPA level determined. Adequate descriptions are available, however, for almost all of the proposed actions after January 1990.
Eighty-three out of 167 PEEs make a recommendation for a NEPA determination, indicating that the proposed action warrants a categorical exclusion, but do not specify which categorical exclusion applies.

Twenty-eight out of 167 PEEs mention the disposal of asbestos without quantifying the amount of asbestos (i.e., the statement is consistently phrased: "Asbestos to be removed by approved EPA methods and disposed at ANL-E landfill.")

PEEs and CH 560s prepared in FY 90 have improved in quality as project managers have learned more about what is required.
ASSESSMENT FINDING: NEPA
ASSESSMENT FINDING NUMBER: NEPA/CF-2
ASSESSMENT FINDING TITLE: Early Incorporation of NEPA into Decision Making

PERFORMANCE OBJECTIVE:
CEQ Regulations (40 CFR 1501.2), DOE Order 4700.1, and SEN-15-90 require that appropriate NEPA reviews be performed early in the project planning process to ensure that environmental factors are considered in decision-making.

FINDING:
Failure to perform NEPA reviews early in the project planning process has occurred with a number of recent (1987 to present) projects. Projects at ANL-E have been initiated without formal NEPA determinations; in some cases formal NEPA determinations were made after project initiation.

DISCUSSION:
This finding is based on review of the FY 1992 Circular A-106 Environmental Project Plan (N-186), interviews with site Environmental Compliance Officer (I-N-2, I-N-20, I-N-28, I-N-29), and the review of available NEPA documents and files.

Projects which were initiated without first completing NEPA documentation include:

- Stack Monitors Project (initiated October 1987) involves upgraded stack monitoring for radioactivity for compliance with NESHAPs and DOE Orders.
- The Fallow Deer Study Project (N-042), initiated in Summer 1990, before completion of a NEPA determination (NEPA not completed at the time of the Tiger Team Visit, I-N-33).
- Freund Pond Characterization Project (in progress at time of the Tiger Team visit) involves analysis of the sediment of the pond for hazardous waste characteristics.
- 317/319/Landfill Characterization Study (N-063), initiated 10/87 (then halted for NEPA, I-N-33), MTF dated November 30, 1989;
- Meteorological Tower Construction Project (N-164) constructed 11/88 before NEPA documentation 03/89 (N-211, I-N-33);

ANL-E recognized in its Self-Assessment that projects are sometimes started prior to completion of NEPA review.
ASSESSMENT DISCIPLINE: NEPA

ASSESSMENT FINDING NUMBER: NEPA/CF-3

ASSESSMENT FINDING TITLE: Guidance and Training for NEPA Compliance

PERFORMANCE OBJECTIVE:

Council on Environmental Quality (CEQ) Regulations (40 CFR 1500 et seq), the Department of Energy guidelines implementing NEPA (52 FR 47662), and SEN-15-90, require agencies to implement NEPA correctly. For example, CEQ (40 CFR 1507.2) states than an agency "shall be capable (in terms of personnel and other resources) of complying [with NEPA]."

FINDING:

Guidance and training at the site are not sufficient to ensure proper implementation of NEPA. Areas in which guidance and training are inadequate include the following:

- Timely and accurate completion of the Environmental Evaluation Notification Form, CH-560 (N-212), by ANL-E site project personnel is seriously hampered by absence of training and guidance. Under CH 5440.1C, National Environmental Policy Act, (N-170), site project managers are responsible for completing CH-560 to initiate the CH NEPA determination procedure. In interviews, ANL-E site managers for both construction/maintenance and research projects, who have been assigned responsibility for preparing CH-560, expressed the need for detailed and explicit guidance in completing this environmental evaluation. Interviewees appeared willing to cooperate in NEPA compliance, but were concerned over their lack of knowledge of and/or the absence of clarity in items on CH-560 (I-N-6 to I-N-11). Comments about the form were transmitted informally to CH by the ANL-E Environmental Compliance Officer (N-172) (I-N-20). The need for such guidance also has been noted by an AAO memorandum of June 25, 1990 to CH (N-209). As a result of these concerns, CH was requested in June 1990 to provide written guidance on the use of CH-560 (I-N-20). However, at the time of the Tiger Team visit, no site or DOE office or official associated with NEPA has provided the needed information. As a result, project managers are uncertain and concerned about filling out CH-560, and sometimes make mistakes in doing so. Such errors are either discovered in AAO, resulting in delays and backlogs, or, if unfound, may lead to incorrect NEPA determinations (See Finding NEPA/CF-1).

- There is a general need for broader guidance and training of division Environmental Compliance Representatives (ECRs) concerning NEPA, particularly given the past inattentiveness to formal NEPA documentation at the site (See Finding NEPA/CF-1). Although ECRs are expected to assist project managers with NEPA compliance, interviews revealed that only limited NEPA guidance or training has been provided them. CH presented a seminar to division ECRs following the publication of SEN-15-90, and a 1989
workshop (N-221), and several guidance memoranda (N-173, N-174, N-175, N-214) have been presented to CH/ANL-E principal staff. The CH workshop in July 1989 was attended by eight ANL-E employees, and appears to have been effective in providing information on basic NEPA responsibilities; however, there has been no wider or regular dissemination of information on NEPA for personnel involved in site activities.

Orientation for newly-hired or newly-assigned project managers and other with NEPA responsibilities does not include information they would need to understand and comply with NEPA.

**DISCUSSION:**

Interviews reveal that lack of such training and guidance have contributed to excessive delays in NEPA determinations, as summarized in the following statistics for forms submitted between July 1989 and July 1990 (including the period during which the form was changed):

- Twenty Project Environmental Evaluations (N-040 to N-042, N-044 to N-061, N-063) submitted by ANL-E between July 1989 and March 1990 have no record of having been finalized.
- Fourteen CH-560 evaluations submitted by ANL-E from June 11 to July 9, 1990 have not yet been finalized.

Such delays increase the risk that projects will be implemented without formal NEPA determination or with inadequate consideration of environmental concerns, as has happened previously (See Finding NEPA/CF-2).

Staff involved in NEPA compliance are enthusiastic about a planned computerized "Expert System" designed to assist in NEPA and other compliance activities. The system is designed with the flexibility to incorporate data from a sitewide document (See Finding NEPA/BMP-1), and has potential to improve the accuracy and consistency of environmental evaluations for many projects. In effect, such a system could provide guidance for site project managers to make environmental evaluations (I-N-32). However, there is no clear funding commitment from laboratory or DOE management for continued development, implementation, and maintenance of the system; considerable development and calibration remains to be completed; and use of the system will not remove the need for guidance and for judgment in completing CH-560 and for making NEPA determinations.

ANL-E recognized in its Self-Assessment that personnel are operating without necessary training.
3.5.9.3  Best Management Practice Findings

**ASSESSMENT DISCIPLINE:**  NEPA

**ASSESSMENT FINDING NUMBER:**  NEPA/BMP-1

**ASSESSMENT FINDING TITLE:**  Sitewide NEPA Documentation

**PERFORMANCE OBJECTIVE:**

Council on Environmental Quality (CEQ) Regulations (40 CFR 1500 et seq.) and the Department of Energy guidelines implementing NEPA (52 FR 47662) require DOE to (1) address the significance of cumulative impacts (40 CFR 1508.7) resulting from individually minor but collectively significant actions taking place over a period of time; (2) "encourage and facilitate public involvement" [40 CFR 1500.2(d)] and to "make diligent efforts to involve the public in preparing and implementing their NEPA procedures 1506.6(a)];" and (3) "integrate the requirements of NEPA with other planning and environmental review procedures [40 CFR 1500.2(c)]." Such integration should document the consideration of a number of laws, regulations, and technical areas [e.g., the Fish and Wildlife Coordination Act, Endangered Species Act, Executive Order 11988 (Floodplain Management), Executive Order 11990 (Protection of Wetlands), and National Historic Preservation Act] and must satisfy certain minimum procedural and technical requirements. In addition, DOE-HQ guidance (N-216) requires that radiological and nonradiological impacts to workers be assessed in NEPA documentation for both normal operations and potential accidents.

**FINDING:**

ANL-E lacks an adequate sitewide NEPA document which could be used to assess the cumulative impacts of past, present, and reasonably foreseeable future actions. The 1982 Argonne National Laboratory "sitewide" Environmental Assessment (DOE/EA-0181) did not address cumulative impacts, did not involve the public in the NEPA process, has a number of procedural and technical inadequacies when evaluated against current standards for environmental assessments, and does not fully address all current and planned activities.

**DISCUSSION:**

The 1982 EA generally describes the impacts related to individual actions or projects, but the significance of cumulative impacts resulting from several of these individual projects is not evaluated. For example, the cumulative impacts resulting from the facility's waste stream and effluent discharges, waste disposal, worker health risks, and accident analyses (dose exposures) have not been adequately evaluated. Of concern are the potential cumulative impacts resulting from actions determined to be categorically excluded. Categorical exclusions (CXs) are categories of actions which do not individually or cumulatively have a significant effect on the human environment [40 CFR 1508.4]. ANL-E continues to make CX determinations for new projects without an adequate basis for analyzing cumulative impacts as required by CEQ Regulations. This increases the risk that proposed actions which individually may appear minor, might be categorically excluded from further NEPA review when, in fact, there may be significant cumulative impacts. An adequate sitewide NEPA document would help prevent such inappropriate NEPA determinations by providing a basis for analyzing the
incremental impacts of proposed actions in relation to other past, present, and reasonably foreseeable future actions.

The EA was originally prepared in 1979 as an EIS and subsequently condensed; however, there was no public involvement in the process (I-N-30). Interviews indicate that there has been no subsequent public involvement in the NEPA process at ANL-E that would remedy this deficiency. The only opportunity for public involvement in the NEPA process at ANL-E was the public notice of the Finding of No Significant Impact for the Advanced Photon Source in 1990 (DOE/EA-0389).

The procedural and technical inadequacies include the following:

- Although the EA devotes a major portion of the impacts section to the analysis of the offsite impacts resulting from radioactive accident scenarios, radiological and nonradiological impacts on ANL-E workers are not identified.

- Delineation of floodplains and wetlands, resource impacts related to site operations, development of wetlands or floodplain mitigation plans, and consultation with Fish and Wildlife Service to evaluate potential impacts from proposed modifications to site aquatic resources, are not adequately treated.

- Determination of the presence of threatened and endangered species on the ANL-E site, documentation of consultation with the Federal and local agencies, and evaluation of potential impacts and mitigation, are not adequately treated.

- Development of a sitewide cultural resources management and mitigation plan, significance of resources (National Historic Registry status), estimation of operational impacts, and documentation of State Historical Preservation Officer (SHPO) consultation and involvement are not adequately treated.

- Quantification and consideration of impacts related to noise are not adequately treated.

- Evaluation of the impacts related to the transportation and storage of nonradioactive, hazardous materials, and radioactive materials that are shipped in and out of ANL-E, are not adequately treated.

Current and planned site activities which were not evaluated in the 1982 sitewide EA include:

- Many remediation projects in the environmental restoration and waste management 5-year plan (N-188). Impacts of waste characterization and remediation activities for RCRA or CERCLA sites are not considered in the 1982 EA; the ability to consider the collective impacts of RCRA corrective actions and to accomplish NEPA/CERCLA integration under DOE Order 5400.4, Comprehensive Environmental Response, Compensation, and Liability Act Requirements, (d) and (e) is thereby limited;
current and future alternatives for nonhazardous waste disposal (e.g., the 800 Area Landfill);

- wastewater treatment plant upgrades; and

- current operations of Building 201.

The current 5-year plan for environmental restoration and waste management at ANL-E (N-188) contains a line item (FY 91 and 92) for preparation of a "Sitewide EIS." Funding planned for such a document would cover only waste characterization and remediation activities in this program. Not covered under this proposed "Sitewide EIS" would be all other site activities not related to the restoration program.

The laboratory recognized in its AIS Self-Assessment Report (September 1990) that certain ongoing and future activities at ANL-E are not collectively covered in a sitewide NEPA document (EC2.9.3). Laboratory and DOE-CH staff acknowledge the technical insufficiency of the document and have not tiered other NEPA documents from this EA. Instead, separate NEPA analyses must be performed for each action. This results in an inefficient use of resources to consider cumulative impacts adequately, and therefore increases the risk of inappropriate NEPA determinations.
3.5.10 Environmental Management and Oversight

3.5.10.1 Overview

During the assessment, it became apparent that several issues identified by the Environmental Subteam specialists related to the Laboratory as a whole and not any specific discipline. These issues involve environmental policies, the development of programs to implement these policies, and the effectiveness of line management in fulfilling their responsibilities. Because of the broad scope of these issues, it was concluded that it would be appropriate to address them in a separate section, commensurate with their importance and Laboratory-wide applicability.

The assessment included interviews with ANL-E employees, and the review of documents, procedures, and records associated with environmental programs. The team found no activity that poses an immediate and unacceptable risk to the environment or public. The findings in this section are the integrated results of the efforts of all Environmental Subteam members and were coordinated closely with the Management Subteam to avoid duplication of effort and redundancy in this report.

The ANL-E environmental protection policy delegates responsibility and authority to the Line Divisions for policy implementation. Authority and responsibility for the support and oversight functions are delegated to the Chief Operations Officer and his operating divisions.

Although the policy defines the environmental responsibilities, the findings in this section indicate that neither the line nor the oversight functions are being effectively implemented. In addition, the policy does not provide an effective method of accountability for implementing responsibilities, nor associated mechanisms to ensure compliance with the policy requirements.

The AIS Self-Assessment report generally addressed one of these findings and did not address the other four.
3.5.10.1 Compliance Findings

ASSESSMENT DISCIPLINE: Environmental Management

ASSESSMENT FINDING NUMBER: EM/CF-1

ASSESSMENT FINDING TITLE: Environmental Protection Policy Implementation

PERFORMANCE OBJECTIVE:

DOE Order 5400.1, General Environmental Protection Program, Paragraph 9.f(1) requires that contractors execute environmental protection compliance programs and policies, and provide for oversight, confirmation, and independent verification of those programs.

DOE Order 5480.19, Conduct of Operations Requirements for DOE Facilities, Chapter I, Section A states that effective implementation and control of operating activities is primarily achieved by establishing written standards in operations, periodically monitoring and assessing performance, and holding personnel accountable for their performance. Section B states that a high level of performance is accomplished by establishing operating standards, communicating these standards to the working level, and by providing sufficient resources to the Operations Department.

The ANL Environmental Protection Policy states that Chief Operations Officer (COO) acts for the Laboratory Director in all matters on environmental policy and oversight. He is responsible for developing and implementing the environmental program and is assisted by the Quality Assurance Environment and Safety (QES) Director in this effort. The line management of the Divisions and Departments are responsible for complying with all components of the environmental protection program and taking necessary measures that allow their facilities and activities to comply with environmental protection requirements.

FINDING:

The Environmental Protection Program (EPP) at ANL-E is not formalized, detailed, or implemented in a manner sufficient to meet the requirements of the DOE Orders and the ANL Environmental Protection Policy.

DISCUSSION:

The ANL-E EPP (I-R-49), is in the early stages of development and implementation. As a result, the formal conduct of operations for implementation of this program has not been completely developed or implemented. The following specific deficiencies have been identified (I-R-16, I-R-25):

1. The EPP is not defined in any formal documents other than the ANL Environmental Protection Policy, which states that the program is to be set forth in all ANL-E policy and procedures manuals and handbooks, as well as other directives and memoranda. The only two documents specifically referenced in the policy are the Environment, Safety, and Health Manual and the Comprehensive

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Emergency Management Plan, and the former document is only in draft form (See Finding EM/CF-3). The Environmental Subteam observed no other manuals, handbooks, or procedures at either the Laboratory or Division/Department level that describe the EPP or its implementation.

2. Conduct of operations for the EPP within the support and the Line Divisions is not formally defined nor implemented through the use of written procedures, as required by DOE Orders.

3. The Line Divisions are required to ensure that all buildings, facilities, and facility related activities comply with established environmental protection requirements; however, the only mechanism in place to accomplish this is the Environmental Compliance Representative program. That program is not adequately defined or implemented to meet this purpose (See Finding EM/CF-2).

4. The Environmental, Safety and Health Department is assigned several EPP responsibilities in the ANL Environmental Protection Policy; however, the frequency, mechanism, scope, and requirements for implementing these responsibilities are not formally defined or documented.

5. The COO and QES Director are responsible for conducting oversight of EPP implementation using the five mechanisms defined in the ANL Environmental Policy. These mechanisms, described below, do not effectively implement the oversight function.

   - The QES Office depends on the information generated by the other four mechanisms to keep the COO informed of environmental program implementation.

   - Environmental Compliance Office - This mechanism is not sufficiently developed or formally implemented (See Finding EM/CF-2).

   - Environmental Protection Committees provide advice and are available to provide oversight; however, they have not initiated any quantifiable measurement of EPP compliance, at the operating level, on a Laboratory-wide basis.

   - Surveillance - The Environmental Safety and Health Department is responsible for providing environmental protection surveillance; however, the mechanism, scope and requirements for performing and documenting these activities is not formally defined or documented (See Finding EM/CF-3).

   - Periodic Appraisals and Audits - The Office of Quality Assurance performs the periodic audits; however, they do not specifically address EPP implementation and the audit frequency is not sufficient (See Finding QA/CF-1). An independent internal appraisal of ESH compliance is conducted and administered by the QES Director using technical expertise furnished by the Safety, Environment and
Safeguards Department at ANL-W. The frequency, mechanism, scope, and requirements for performing and documenting this appraisal is not formally defined or documented.

This finding was not addressed in the AIS Self-Assessment Report.
ASSESSMENT DISCIPLINE: Environmental Management

ASSESSMENT FINDING NUMBER: EM/CF-2

ASSESSMENT FINDING TITLE: ANL-E Environmental Compliance Office

PERFORMANCE OBJECTIVE:

DOE Order 5400.1, General Environmental Protection Program, Paragraph 9.f(1) requires that contractors execute environmental protection compliance programs and policies, and provide for oversight, confirmation, and independent verification of those programs.

DOE Order 5480.14, Comprehensive Environmental Response, Compensation, and Liability Act Program, Chapter I, Section A states that effective implementation and control of operating activities is primarily achieved by establishing written standards in operations, periodically monitoring and assessing performance, and holding personnel accountable for their performance. Section B states that a high level of performance is accomplished by establishing operating standards, communicating these standards to the working level, and by providing sufficient resources to the Operations Department.

The ANL Environmental Protection Policy requires that the Environmental Compliance Officer oversee the development, implementation and control of all activities related to compliance. In addition, he shall provide necessary assistance to the environmental compliance representatives (ECRs) of the line organizations. It also requires that the Quality Assurance, Environment and Safety (QES) Director shall be in a position to keep the Laboratory Director and Chief Operations Officer informed on all environmental matters and assure that the environmental program is adequately maintained and implemented and that DOE Orders are implemented. The QES Director is also required to provide continuity, completeness, and standardization of environmental compliance and reporting at ANL-E. In addition, he is responsible for determining the degree to which environmental policies are effectively implemented on a Laboratory-wide basis.

FINDING:

The ANL-E Environmental Compliance Office (ECO) is not being operated in a manner that effectively implements its responsibilities as defined in the ANL Environmental Protection Policy regarding oversight activities related to environmental compliance. This policy was developed to implement the requirements of DOE Orders.

DISCUSSION:

The operation of the Environmental Compliance Office is not defined or documented in procedures or other formal documents, except for the ANL Environmental Protection Policy. The following specific deficiencies were identified by the Environmental Subteam (I-R-16, I-R-25):

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1. Conduct of operations within the ECO is not formally defined nor being implemented through the use of written standards and procedures as required by DOE Orders.

2. There is no formal procedure that requires the ECO to be notified of all new construction, building modifications, new projects, new operations, or changes in operational activities that may have environmental compliance requirements or affect existing environmental compliance permits or regulatory commitments. However, ECO is generally aware of major activities at ANL-E.

3. The role of QES and ECO in review, preparation and development of environmental compliance documents that affect the Laboratory as a whole is not defined. In some cases, they have been actively involved (air permits, NESHAP Subpart H compliance, and the RCRA application). In other cases, there is no apparent involvement (preparation of the Environmental Protection Implementation Plan, development of the Environmental Monitoring Program, and certification of compliance with DOE Order 5400.5).

4. The ECO has not developed well-defined environmental compliance objectives applicable to all Divisions. Lacking such objectives, the ECO cannot readily perform independent oversight of Divisional compliance with DOE Orders and the ANL Environmental Protection Policy.

5. The ECR program serves a key role in keeping the ECO informed of environmental protection matters within the Divisions, and provides the ECO with a mechanism for the oversight of the development, implementation, and control of compliance activities. However, this program is not formally defined or implemented. The following specific deficiencies were identified in the ECR program (I-R-16, I-R-23):

   - The ECRs are mentioned in the Environmental Protection Policy; however, their duties, responsibilities, and organizational position are not described in this document or any other document. There is no formal conduct of operations or procedures defined for the ECRs.

   - The ECR objectives are not clearly defined. Consequently, the ECO cannot conduct independent performance measurements of ECR activities.

   - The method of selecting ECRs and their qualification requirements are not described in any formal document.

   - The relationship of the ECRs to the ECO is not formally defined. The communications pathways and associated documentation are not defined.

   - The responsibility for training ECRs is not delegated in the Environmental Policy Statement. There is no formal program for the initial training, certification, and continuing training of ECRs.
6. The ECO cannot and does not fulfill its delegated responsibilities because of the current state of the ECR program, the informal conduct of operations in the ECO, and the fact that the ECO consists of only two professionals.

This finding was not addressed in the AIS Self-Assessment Report.
ASSESSMENT DISCIPLINE: Environmental Management

ASSESSMENT FINDING NUMBER: EM/CF-3

ASSESSMENT FINDING TITLE: Environment, Safety and Health Department Environmental Compliance Activities

PERFORMANCE OBJECTIVE:

DOE Order 5400.1, General Environmental Protection Program, Paragraph 9.f(1) requires that contractors execute environmental protection compliance programs and policies, and provide for oversight, confirmation, and independent verification of those programs.

DOE Order 5480.19, Conduct of Operations Requirements for DOE Facilities, Chapter I, Section A states that effective implementation and control of operating activities is primarily achieved by establishing written standards in operations, periodically monitoring and assessing performance, and holding personnel accountable for their performance. Section B states that a high level of performance is accomplished by establishing operating standards, communicating these standards to the working level, and by providing sufficient resources to the Operations Department.

The ANL Environmental Protection Policy states that the Environment, Safety and Health Department (ES&H) is responsible for performing the following functions related to the ANL Environmental Protection Program: (1) provide advice, technical expertise, and direct assistance to the line organizations to help them meet their environmental compliance responsibilities; (2) develop and carry out programs to maintain and improve the effectiveness of the Laboratory’s environmental protection effort; (3) provide independent environmental surveillance as a part the Laboratory’s oversight function; (4) develop and conduct environmental monitoring and characterization programs; (5) assist line management in implementing and maintaining appropriate aspects of the program; (6) develop, distribute, and maintain the ES&H Manual; and, (7) provide specific policies and procedures, and recommended practices for implementation of this policy.

FINDING:

The ES&H Department does not operate in a manner that meets the requirements of DOE Orders or that implements the requirements of ANL Environmental Protection Policy (EPP), because conduct of operations for its environmental responsibilities is not defined.

DISCUSSION:

The ES&H Department has just begun the process of developing and implementing programs to meet their EPP responsibilities (R-49). The following specific deficiencies have been identified in current ES&H operations related to the EPP (I-R-9, I-R-25, I-R-38, I-R-39):

1. Conduct of operations in the ES&H Department regarding implementation of EPP responsibilities is not formally defined nor
being implemented through the use of written standards and procedures, as required by DOE Orders.

2. The technical support and direct assistance functions of ES&H to the line management and division operations conflict with their responsibility for independent oversight of the same Divisions. This dual role and the relatively low organizational reporting level of ES&H limits its effectiveness as an oversight organization.

3. ES&H has responsibility to develop and conduct environmental monitoring and characterization programs; however, it has not been delegated any authority to ensure compliance with programs that may affect multiple Divisions. Responsibility for compliance with such programs has been delegated to line management.

4. ES&H has no authority to develop environmental compliance standards and requirements and to enforce compliance with them, unless it is specified in the Health and Safety Manual. The current version of the Health and Safety Manual does not even have a section related to environmental compliance. A revision to this document is in progress and will be called the "Environment, Safety and Health" when it is issued.

5. The ES&H Department cannot effectively perform its oversight and surveillance function because the Health and Safety Manual (R-43) does not establish well defined environmental compliance objectives. Without clear objectives, ES&H cannot readily conduct independent performance measurements of divisional compliance with the requirements of the Health and Safety Manual.

6. The review and oversight function of ES&H is not sufficient to evaluate the adequacy of allocated resources within each Division. Line managers are assigned the responsibility of complying with environmental compliance requirements, and for allocating the resources they feel are necessary to fulfill these requirements. There is no formal mechanism to ensure the allocation of appropriate resources based on independent evaluations or formal criteria. This is further complicated by the fact that Health Physics and Technical Support section personnel are funded by the direct allocation method. As a result, the Divisions have a direct influence on the allocation of staff that provides a part of both the ES&H technical support and oversight functions.

7. ES&H is responsible for the development, distribution, and maintenance of the Health and Safety Manual. This responsibility is not being effectively implemented:

- The manual does not establish the conditions and requirements for its review, maintenance, and modification.
- The documented control system is not defined nor covered by any quality control checks.
- Requirements for review and approval of the document and subsequent modifications are not specified.

- Requirements for periodic review and update of the manual sections are not established. The manual has not been reissued since 1984, some sections are as old as 1973, and the most recent section was issued in 1987. There is no documentation that reviews have been conducted to evaluate the need for other sections.

- Each section may be updated individually but there is no approval documentation in the manual for the individual sections.

- The manual contains a Health and Safety Policy Statement that is 3 years out of date.

This finding was generally addressed in the AIS Self-Assessment Report.
SECRETARY OF ENERGY NOTICE, SEN-11-89, setting the new DOE course, established management reform as a key initiative, stating that it would "include measures to effect both program reform and badly-needed cultural change. The new culture will emphasize an open door philosophy and demand professional excellence in both government and contractor performance, a culture wherein constructive criticism from any source, external as well as internal, is encouraged and rewarded." One specific initiative related to this is the strengthening of independent internal oversight, "particularly in the areas of environment, safety, health, and security."

SEN-20-90, Interaction with Internal and External Oversight Organizations, states that, "Our activities are being and will continue to be reviewed on an ongoing basis by a variety of oversight or assessment organizations, including: . . . EH Tiger Teams, . . . ."

"I expect all Departmental elements not only to cooperate fully and openly with these organizations, but to be responsive to their findings, questions, and recommendations in a positive manner giving each careful consideration. . . . In addition, you need to make a good faith effort to be forthcoming about environmental, safety and health concerns, and not wait for oversight groups to 'ask the right question.'"

"We will have 'arrived' at my objective in this area when all departmental elements welcome with open arms any authorized outside visitors."

FINDING:

ANL-E and CH have not been consistently cooperating fully and openly with the Environmental Tiger Team nor responding in a positive manner to findings, questions, and recommendations.

DISCUSSION:

During the conduct of the Tiger Team Assessment, the Environmental Subteam has often encountered a negative attitude toward the assessment with individuals not being open and forthcoming about environmental concerns. This has been seen in instances where team members were provided with misleading information, told documents existed when in fact they did not, or told during interviews that documents did not exist, when they did. There were also instances where team members asked repeatedly for information but were not provided it until the Environmental Subteam Leader requested it during the nightly debrief, and other occasions where pertinent documents were not provided because they were not specifically requested by name. The general impression of the Subteam has been that information from some individuals was unlikely to be volunteered and that the success of the assessment was critically dependent upon "asking the right question." It should be pointed out that the majority of individuals interviewed were cooperative.
Specific instances that exemplify this lack of full and open cooperation include:

1. Several individuals were interviewed about the activities and contents that led to the contamination of cells in Building 306 and who was responsible. The interviewees stated that there was little information available on this subject (I-R-27, I-R-28, I-R-36). The question was also raised at the daily debriefs more than once. After it was made the subject of a finding, the same individuals stated during the Factual Accuracy Review that it is the responsibility of the Waste Management Department and was not known what activities had contaminated the cells nor specifically what the contents are, although the contents are generally known.

2. During a daily debrief, when a Team member stated that groundwater well sampling at Site A and Plot M was not being conducted according to accepted protocols for purging, an ANL-E representative stated that the procedure in use had been approved by EPA and said he could document that approval. However, he subsequently could not provide approval documentation and then stated that the documentation was related to well recharge measurements that demonstrated the validity of the sampling approach. This latter documentation was also not provided.

3. Repeated requests were made for a copy of the draft RCRA Part B Permit Application. Site personnel stated on multiple occasions that it would be provided. When concern over the delay was expressed during the daily debriefing, it was admitted that nothing yet existed for review.

4. Site personnel did not indicate that a contractor was preparing the Part B Permit Application for ANL-E until specifically asked if that were the case during a daily team debriefing.

5. When a copy was requested of all correspondence documenting or related to the preparation of the Part B Permit Application, the only information provided was a one-page, handwritten listing of dates at which some activities occurred; documentation to support this was not provided (WM-51).

6. The Radiation Specialist was told during an interview that there was no documentation related to NESHAP compliance; after this was discussed during that day's debrief, the same individual stated that a letter had been submitted to DOE on this subject.

7. One team member requesting procedures for environmental monitoring and analysis was informed by an ANL-E environmental professional that there were none (I-R-1); two days later, another team member verified that such documents did exist and received copies, with some difficulty, from the same individual.

8. The Environmental Subteam was not informed by CH, AAO, or ANL-E that a DOE Inspector General investigation of environmental compliance at ANL-E had occurred during January through June 1990, and that the IG report was received September 18, 1990. This
occurred despite the fact that the Tiger Team information request includes "historic audit/appraisal reports for the last three years" and "regulatory/enforcement-related environmental information developed since 1986." The Subteam received this information through DOE Headquarters, and after making inquiries about the report received another copy from the AAO Manager.

9. Subteam members were told during an interview that "there is a proportional sampler" at the Sawmill Creek sampling location. When one of the members stated his intention to visit the sampler location, he was told that the site collects grab samples there. It was later learned that the proportional sampler had been inoperative for over 3 years (I-R-201).

10. A tour of Building 306 Evaporation/Concentrator operations by the Surface Water Specialist had to be rescheduled because the most knowledgeable operator had been made unavailable. The Specialist was told that there was an "emergency" requiring the operator's attention elsewhere. It was later established that the operator had been made unavailable to the Team so that he would be available to work on a "special project" with the Waste Operations Manager (I-SW-38).

11. Much of the time allotted to the discussion of findings during Factual Accuracy Review was spent challenging the designation of findings as "compliance finding," until the Environmental Subteam Leader stated that because of time constraints this could no longer be a subject of discussion at FAR's. All such comments were subsequently required to be submitted in writing. During one FAR, an ANL-E representative explained the emphasis on this issue was because it was felt that corrective action was required for compliance findings but optional for best-management-practice findings. This indicates an emphasis on the letter of the regulations rather than the spirit.
3.5.10.3 Best Management Practice Findings

ASSESSMENT DISCIPLINE: Environmental Management

ASSESSMENT FINDING NUMBER: EM/BMP-1

ASSESSMENT FINDING TITLE: Management of Environmental Restoration Program

PERFORMANCE OBJECTIVE:

A single, cohesive organization for management of an environmental restoration program is necessary to ensure efficient planning, organization, coordination, budgeting, management, review, and control of these activities. DOE Order 4700.1, Project Management System, contains Management Plan preparation guidance that is relevant to many of the environmental restoration activities.

DOE Order 5400.4, Comprehensive Environmental Response, Compensation, and Liability Act Requirements, Paragraph 7a, states that remedial activities must conform to CERCLA requirements. EPA guidance documents for conducting CERCLA RI/FSs, as well as those for RCRA corrective actions, also contain management plan guidance.

DOE Order 5480.19, Conduct of Operations Requirements for DOE Facilities, states that heads of field elements shall ensure that adequate contractor plans, procedures, and programs are in place and assess the effectiveness of their implementation at sites under their jurisdiction, consistent with the provisions of the Order.

FINDING:

There is no central management organization for Environmental Restoration activities at ANL-E; no single individual has the responsibility or authority to coordinate the responsibilities and interrelationships of the various groups with essential roles in these activities.

DISCUSSION:

Responsibility for implementation of environmental restoration activities lies, for the most part, with two ANL-E Divisions, the Support Services Division (SSD) and Plant Facilities and Services (PFS). Oversight and quality assurance responsibilities lie in another group, Quality Assurance, Environment, and Safety Office. The responsibility for the performance of technical site characterizations and analysis is presently assigned to SSD, which performs the work through its various departments, groups, and laboratories, with assistance from subcontractors. The responsibility for performance of environmental engineering and remediation activities is presently assigned to PFS, which also performs the work with the assistance of subcontractors. This management arrangement creates functional problems as demonstrated by the following examples:

- The relationships among these entities are rarely cooperative, informal communications are ignored until presented in written form, and delays are often attributed to some other group or individual. This situation is illustrated in the internal
communications between SSD and PFS concerning the Freund Pond characterization and remediation project (GW-32, 33, 34, 35 and 36).

- Monitoring Well installation may occur with insufficient oversight on location and construction. The development of a sitewide monitoring system may be delayed if distinctions between temporary and permanent wells are not understood, well construction requirements for various purposes are not coordinated, and newly available hydrogeological information is not incorporated into a central data management system. For example, monitoring wells installed at part of an underground storage tank (UST) removal action were never sampled because personnel in charge of nonradiological sampling were unaware of their existence. Sampling was not necessary for conformance with UST requirements, but information on the availability of these wells and their subsurface lithology was pertinent to an understanding of the localized hydrogeological regime. A determination to pursue water level and water-quality measurements on these wells needed to be made at a level beyond the UST program.

- The inability to keep up with regulations is made worse by an organizational structure in which the most knowledgeable people are distributed among groups that compete with each other for funding and authority. This situation was identified on Page 2 of the Executive Summary of the AIS Self-Assessment Report.
### TEAM COMPOSITION AND AREAS OF RESPONSIBILITY

#### ENVIRONMENTAL TEAM

<table>
<thead>
<tr>
<th>Areas of Responsibility</th>
<th>Name and Organization</th>
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<tbody>
<tr>
<td>Team Leader</td>
<td>Donna Bergman</td>
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<td>Office of Environmental Audit</td>
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<td>Department of Energy</td>
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<td>Assistant Team Leader</td>
<td>Narendra Mathur</td>
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<td>Office of Environmental Audit</td>
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<td>Department of Energy</td>
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<td>Technical Coordinator</td>
<td>David Yesso</td>
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<td>Waste Management</td>
<td>Michael Sutton</td>
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<td>ICF, Incorporated</td>
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<td>Surface Water</td>
<td>Joseph Boros</td>
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<td>NUS Corporation</td>
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<tr>
<td>Air/Assistant Technical Coordinator</td>
<td>Tom Eckle</td>
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<td>Groundwater/Soil</td>
<td>Mary Robison</td>
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<td>Toxic &amp; Chemical Materials/Quality Assurance</td>
<td>Charles Caruso</td>
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<td>Radiation/Quality Assurance</td>
<td>Steven Masciulli</td>
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<td>Radiation</td>
<td>Tom Cox</td>
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<td>Inactive Waste Sites</td>
<td>John McCann</td>
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<td>CEC, Inc.</td>
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<td>Special Assistant</td>
<td>Ched Bradley</td>
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<td>Administrative Assistant</td>
<td>Lisa Drinkhall</td>
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<td>National Environmental Policy Act</td>
<td>Eric Cohen</td>
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<td>Department of Energy</td>
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### Areas of Responsibility

<table>
<thead>
<tr>
<th>Name</th>
<th>Organization</th>
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<tbody>
<tr>
<td>Cynthia G. Heckman</td>
<td>Oak Ridge National Laboratory</td>
</tr>
<tr>
<td>Warren Webb</td>
<td>Oak Ridge National Laboratory</td>
</tr>
<tr>
<td>Wayne Tolbert</td>
<td>Science Applications International Corporation</td>
</tr>
<tr>
<td>Richard Barringer</td>
<td>JAYCOR</td>
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<tr>
<td>Greg Haugan</td>
<td>META, Inc.</td>
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<tr>
<td>Richard Lynch</td>
<td>META, Inc.</td>
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<tr>
<td>Darryl Coleman</td>
<td>META, Inc.</td>
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<tr>
<td>Nancy Arnold</td>
<td>Advanced Sciences, Inc.</td>
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SAFETY & HEALTH ASSESSMENT

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4.0 SAFETY AND HEALTH ASSESSMENT

4.1 PURPOSE

The purpose of the Safety and Health Subteam appraisal was to assess the effectiveness of representative safety and health programs at ANL-E and NBL through the evaluation of activities at selected facilities and in selected safety disciplines.

4.2 SCOPE

The safety and health portion of the Tiger Team Assessment was a Technical Safety Appraisal (TSA) conducted in accordance with established procedures. The following ANL-E and NBL safety and health program elements were reviewed as a part of this TSA: Organization and Administration, Operations, Maintenance, Training and Certification, Nuclear Criticality Safety, Auxiliary Systems, Technical Support, Security/Safety Interface, Site/Facility Safety Review, Emergency Preparedness, Radiological Protection, Personnel Protection/Industrial Hygiene, Experimental Activities, Fire Protection, Packaging and Transportation, Quality Verification, Worker Safety, and Medical Services.

4.3 APPROACH

The Safety and Health Subteam evaluation was conducted from September 17 to October 19, 1990. The evaluation was conducted by a team assembled by the Office of the Assistant Secretary for Environment, Safety and Health (EH), Office of Safety Appraisals (OSA). Team members consisted of DOE staff, employees of DOE contractors, and outside consultants. The Subteam was led by a Team Leader from the OSA. Biographical sketches of each team member and their areas of responsibilities are provided in Appendix A-3.

TSAs are operationally focused. As such, in terms of safety, health, and quality verification, the site and selected facilities are appraised relative to operations and the condition of equipment and facilities. This approach is based upon the assumption that the facility and its equipment have been appropriately designed, constructed, and tested, and that safety reviews or the Safety Analysis Reports (SARs) adequately evaluate the risks presented by the operation of the facility. The evaluation thus addresses whether current operations are being conducted within the operational safety procedures established for specific facilities and activities.

The Subteam activities were guided by the performance objectives and supporting criteria contained in the "Performance Objectives and Criteria for Technical Safety Appraisals at Department of Energy Facilities and Sites," June 1990. The findings identified by the Subteam were obtained in three ways: (1) observing routine operations and the physical condition of the site and facilities; (2) interviewing management, staff, operators, and craft personnel; and (3) reviewing policy statements, records, procedures, and other
relevant documents. A concern addresses a situation that in the judgment of
the Subteam: (1) reflected less than full compliance with a DOE safety and
health requirement or mandatory safety standard, (2) threatened to compromise
safe operation, or (3) if properly addressed would substantially enhance the
excellence of that particular situation even though that part of the operation
was judged to have a currently acceptable margin of safety. Because of this
last category for addressing the excellence of the operation, more concerns
are reported than would result from a strictly compliance-oriented appraisal.

As a result of the individual findings-of-fact, 157 concerns are identified in
this section of the report. The findings-of-fact that support each concern
are listed immediately preceding the concern. One hundred forty-seven of the
concerns were judged to be Category III, eight were judged to be Category II,
and two were judged to be Category I. The category rating, potential hazard,
and level of noncompliance for each concern were determined by using criteria
contained in Section 4.7.

Drawing upon the extensive experience of its members, the Subteam made an
effort to identify some of the responsible factors in each statement of
care. However, the Subteam recognizes that this effort is at best
imperfect, due to the Subteam’s relative unfamiliarity with the details of the
contractors’ overall operations. Therefore, the findings-of-fact, and even
the statements of concern, should be considered as symptomatic of some set of
deep root causes which should be sought out and corrected so that there will
be reasonable assurance that improvements in the safety of operations will be
sustained.

This is the first sitewide TSA to be performed at AIS.

4.4 SAFETY AND HEALTH ASSESSMENT SUMMARY

ARGONNE NATIONAL LABORATORY-EAST

Safety is considered a line responsibility at ANL-E, and safety responsibility
and authority flow from the Laboratory Director and Management Council down
through Division Heads to the working level. However, disconnects in the
lines-of-communication provide major contributions to deficiencies in the
safety performance of the Laboratory. Direction and guidance issued from the
Laboratory Director level, designed to give maximum latitude and
responsibility to the organizational Divisions, are general in content and
broad in scope. For the most part, the intermediate management levels below
the Laboratory Director have passed the direction and guidance on without
further amplification or specificity. Because Laboratory-wide policies and
controls have not been designed to ensure a uniform and consistent safety
program, safety direction with appropriate specification is not provided to
the line organizations and the safety lines-of-communication are effectively
severed. This is further exacerbated by the absence of any followup or
feedback mechanism to ensure effectiveness/implementation of the original
instructions. Since each Division is autonomous in its safety responsibility,
many aspects of the safety program are fragmented, unfocused, inconsistent,
and not in compliance, and there is failure to establish proper priorities.
The safety reviews of experiments are performed at separate facilities or Divisions, and the Divisions have some form of safety review organizations. The experimental safety review organizations perform well and, generally, have a reasonable amount of documentation, although this varies from Division to Division. However, the overall safety of both the facilities and experimental activities would be enhanced if conscientious review were applied uniformly and were applied both to facility operations, as well as experimental activities.

The independent safety reviews conducted for moderate hazard nuclear facilities and reactors were in accordance with applicable DOE Orders. However, deficiencies were noted with respect to nonnuclear moderate hazard and nonnuclear/nuclear low hazard facilities. DOE 5482.1B had not been implemented at ANL-E. The lack of a consistent management system to assure flowdown of safety policy to the Division level (and below) has resulted in an inconsistent involvement in safety within the various Divisions.

Setting measurable safety goals and the establishment of an active program to achieve these goals is nonexistent. The Laboratory has not formulated its as low as reasonably achievable (ALARA) goal for radiation exposures for 1990 because all of the Divisions have not turned in their ALARA goals.

Some important management, operational, and safety documents are not being properly controlled. There is no system to assure that revision pages are actually inserted into the documents, some have pages that are not dated, some organization charts are not signed and dated, some documents are out-of-date regarding content, and others have old pages (some dating back to 1973).

While on the threshold of a modern safety culture in a few areas, there remains a deep-seated and pervasive attitude at ANL-E that safety gets in the way of research, that a rigorous approach to safety is incompatible with the research-oriented mission of the Laboratory, that safety compliance should be minimal, and that good science equates to satisfactory safety performance. This culture hinders the need for improvement and suppresses the urgency for necessary corrective measures. A change in attitude will take diligence at all levels, but it must occur expeditiously.

Technological excellence exists in the research arena, but is not equaled in the safety program. There is need for improvement in knowledge of Occupational Safety and Health Administration (OSHA) requirements and sitewide staff appreciation of the relationship between housekeeping and fire hazards. The two Category I concerns and six of the eight Category II concerns were in the area of OSHA compliance.

When procedures exist, they are not always followed with consistency or rigor, and deviations frequently occur without full documentation and evaluation. The one Category II concern in operations at the Argonne Tandem Linear Accelerator System (ATLAS) can be attributed to this cause.

Although ANL-E has made great strides of Emergency Preparedness, a Category II concern was in this area to emphasize the importance of the much needed work that is still required to assure full and expedited compliance with DOE Orders.
The Environmental, Safety and Health Department (ESHD) has a potential conflict of interest by being assigned both a technical safety support role and an independent safety surveillance role. Because of the ESHD reporting level and its perception by the program Divisions as being a support organization, ESHD cannot effectively carry out an independent safety surveillance function.

One root cause and three second tier root causes have been identified for the deficiencies in ANL-E safety and health performance:

Root Cause

ANL-E management persists in a research-oriented philosophy in which researchers are extended maximum latitude for creative freedom and are not being held accountable for their ES&H responsibilities and actions. This philosophy is emphasized by management's lack of ES&H oversight.

Second Tier Root Causes

- There is too much autonomy given to Associate Laboratory Directors and organizational Divisions, relative to incorporating safety and safety reviews into their operations.
- There is a lack of understanding and involvement by top management in assuring safety is truly integrated into site operations.
- The roles, responsibilities, and authorities of the distinct organizational units reporting to the Associate Laboratory Directors and the Chief Operations Officer are unclear.

The dedicated and highly competent staff at ANL-E is capable of substantially improving overall safety performance. This improvement can be realized by full acceptance of safety as an equal partner with the research mission, a sitewide approach to safety policy (which has not been successful at ANL-E), procedures, and training, and a proactive approach toward compliance with Federal regulations and DOE Orders. Improvement can be demonstrated through better workplace practices and documentation.

NEW BRUNSWICK LABORATORY

NBL is a DOE-operated facility that receives its programmatic direction from the Office of Safeguards and Security, Headquarters, DOE. It is a small Laboratory of about 45 people. The turnover rate is small.
NBL functions much like a large family, with little protocol regarding position levels. Each person seems to know his job, his authorities and responsibilities, and how to get the job done. The Laboratory Director goes into the workplace on a daily basis, and management and staff are on a first name basis.

Formality of operation is somewhat loose. There is no system in place to assure that recipients of controlled documents keep them up-to-date. The Laboratory Director had a set of goals and objectives as part of a "Conduct of Operations" document dated December 1989. Some of these goals and objectives were measurable, and others were long-range intangible objectives. However, lower level management and staff were not aware of any goals or objectives, and there was no active program in place to achieve the goals.

NBL sometimes appears like the "poor stepchild" with regard to its interaction with CH from whom it receives administrative support. Communication is not always received in a timely manner. Directives are sometimes late or received at the last minute; some announcements are received after the event has happened; and needed technical support is not always available.

A total of seven Category III concerns were found at NBL; two in the area of Organization and Administration, and one each in the areas of Nuclear Criticality Safety, Operations, Site/Facility Safety Review, Radiation Protection, and Fire Protection. The OSHA compliance-type inspections that were conducted by the Subteam did not include NBL.
4.5 SAFETY AND HEALTH FINDINGS AND CONCERNS

4.5.1 Organization and Administration

4.5.1.1 Overview

The Organization and Administration part of the appraisal was performed by interviewing management and staff of ANL-E, NBL, AAO, and CH; by reviewing documents and manuals; by attending briefings and meetings; and by performing walkthroughs of selected facilities and buildings. All performance objectives in this area were addressed.

Argonne National Laboratory-East

ANL-E is a typical research and development laboratory in that much authority and responsibility is formally or informally delegated from the Laboratory Director and the Management Council to the Division level. Safety is emphasized as a line responsibility, and the Divisions are required to have some inhouse safety capability. Interviews revealed that, when the Divisions think they have the needed safety capability to perform a specific job, they do not need to involve the Laboratory-wide safety organizations. The Divisions have a great deal of autonomy in carrying out specific functions, including safety. There is little guidance that sets minimum standards that all Divisions must follow. Therefore, some safety requirements are implemented in varying degrees across the Laboratory.

Some examples of variances across the Laboratory include: the frequency of safety meetings varies from regular to nonexistent, and there is no ANL-E policy or requirement; charters for safety committees vary from nonexistent to good, but few have all of the elements of a good charter; and in the annual performance assessment, safety does not receive equal emphasis to program performance, nor is the emphasis on safety consistent from Division to Division.

Setting measurable safety goals and the establishment of an active program to achieve these goals is nonexistent. The Laboratory has not formulated its ALARA goal for radiation exposures for 1990 because all of the divisions have not turned in their ALARA goals.

The Laboratory has a formal problem resolution program called "In Touch"; however, the program is not well publicized nor understood by ANL-E management and staff.

The Laboratory has had elements of a Drug and Alcohol Abuse program for several years; however, a complete program, as defined by the current policy, is less than 2 years old. Few management personnel and staff have been trained in this new program, and the Employee Assistance part of this program is not clearly understood.
Some important management, operational, and safety documents are not being properly controlled. There is no system to assure that revision pages are actually inserted into the document, some have pages that are not dated, some organization charts are not signed and dated, some documents are out-of-date regarding content, and others have old pages (some dating back to 1973).

The Environment, Safety, and Health Department (ESHD) has a potential conflict of interest by being assigned both the technical safety support and the independent safety surveillance roles. Because of the ESHD reporting level and the fact that it is perceived by the Program Divisions as a support organization, ESHD is not effectively carrying out its independent safety surveillance function.

New Brunswick Laboratory

NBL is a DOE-operated facility that receives program direction from the Office of Safeguards and Security, (DP-34). It is a small laboratory of about 45 people. The turnover rate is small. However, filling vacancies is not always easy because of the government pay scale.

NBL functions much like a large family, with little protocol regarding position levels. Each person seems to know his job, his authorities and responsibilities, and how to get the job done. The Laboratory Director goes into the workplace on a daily basis, and management and staff are on a first name basis.

Formality of operation is somewhat loose. There is no system in place to assure that recipients of controlled documents keep them up-to-date.

The Laboratory Director had a set of goals and objectives as part of a "Conduct of Operations" document dated December 1989. Some of these goals and objectives were measurable, and others were long-range intangible objectives. However, lower level management and staff were not aware of any goals or objectives, and there was no active program in place to achieve the goals.

NBL sometimes appears like the "poor stepchild" with regard to its interaction with CH from whom it receives administrative support. Communication is not always received in a timely manner. Directives are sometimes late or received at the last minute; some announcements are received after the event has happened; and needed technical support is not always available.
4.5.1.2 Findings and Concerns

OA.1 SITE/FACILITY ORGANIZATION

PERFORMANCE OBJECTIVE: Management should organize and manage the site/facility’s work, programs, and resources so that safety and health are an integral part of the personnel duties and requirements are consistently implemented.

Findings of Fact:
- There was no ANL-E-wide specific policy or requirement regarding the holding of regularly scheduled safety meetings. However, the ANL-E Health and Safety Manual signed by the Laboratory Director recommended: "Safety meetings should be held at regular intervals to review safety problems associated with the work of the organization."

- One Associate Laboratory Director (ALD) did not know whether or not the divisions under his purview were holding safety meetings.

- One Division Director stated that the union contract requires that regular safety meetings be held.

- A few Divisions were holding formal safety meetings.

- In response to questions as to whether they were holding safety meetings, Division Directors provided the following information:
  - No safety meetings were being held,
  - Safety meetings were held two or three times per year,
  - Safety meetings were only held for technicians, or
  - Safety was included in semiannual division meetings.

- This concern was not addressed in the ANL-E self-assessment.

CONCERN: At Argonne National Laboratory-East, safety meetings are not regularly scheduled and held to promote safety in the workplace.

Findings of Fact:
This Management Plan also stated: "The AAO Manager reports to the DOE-CH Manager through the AMLM [Assistant Manager for Laboratory Management]." The Management Plan continues with the mission and function of the AMLM; but safety is not mentioned; neither is safety mentioned as a responsibility of the AMLM in CH 1100.b. However, the "Mission and Functions Statement" of the AAO as outlined in Appendix 4 of the Management Plan states that the AAO: "Provides management directions in operation, environment, safety, health and security functions."

The AAO was designated "... as the primary interface with ANL, and provides general oversight of the Laboratory's activities." The "Management Plan for the Argonne Area Office," also stated that "While AAO recognizes the independent CH management support role of the matrix divisions, audit findings and recommendations and other significant issues ... should be brought to the attention of the Area Manager."

The "Management Plan for the Argonne Area Office" further stated that "Notwithstanding the above, the functional office must recognize the responsibility of the Contracting Officer to evaluate the advice provided in light of many other considerations ...."

Documentation is not clear regarding which health and safety responsibilities and authorities of the CH Manager are retained and which are delegated to the AAO Manager.

The documentation is not clear regarding the extent of the delegation of safety responsibility and authority to the AAO Manager and the chain of flow for this delegation.

Part of this concern was addressed by the AAO self-assessment, and corrective action started.

CONCERN: The succession of authority and responsibility for health and safety matters is not clearly defined, documented, and implemented from the Chicago Operations Office through the Argonne Area Office to the Argonne National Laboratory-East. (Also see Concerns SS.3-1 and EA.2-1.)

Findings of Fact:
- The ANL-E Policy Manual, Health and Safety Chapter, September 1990, is confusing in that it:
  - Assigned direct responsibility for safety to the ALDs and the Chief Operations Officer (COO).
  - Stated that "Division Directors and Department Heads have primary responsibility for the safety of facility operations ... and taking the necessary measures to ensure that all ...
facility-related activities comply with established safety requirements."

- Stated that "Specialized support for such generic safety functions as radiological protection, industrial hygiene, industrial safety and fire protection are provided to line organizations by core technical groups reporting to the Chief Operations Officer."

- ANL-E-wide guidance for "... established safety requirements" was minimal; i.e., (1) hoisting and rigging safety requirements, and (2) level of review required for experiments.

- The ANL-E Health and Safety Manual provided that ESHD "... shall participate in the safety review of experiments or tests when requested ...." (underlining added) In addition, ESHD is assigned to assist the Divisions and Departments in fulfilling their safety responsibilities by performing various functions listed in the ANL-E "Health and Safety Manual."

- ANL-E management did not provide guidance regarding when line management must obtain safety assistance from the COO. (Also see Concerns PP.1-1 and PP.2-1.)

- This concern was not addressed by the ANL-E self-assessment.

CONCERN: Argonne National Laboratory-East management has not clearly defined organizational functions and safety responsibilities. (Also see Concerns PP.1-1, PP.2-1, PP.2-2, PP.4-2, and SS.3-1; and Section FP.1.)

Findings of Fact:

- ESH resources were insufficient to ensure effective implementation and control of radiological protection activities. (Also see Section RP.1.)

- There was a shortage of ANL-E quality assurance (QA) resources which appear unable to meet the heavy workload and the requirements of DOE 5700.6B.

- In the maintenance area, plant facilities and equipment have deteriorated due to resource allocations, lack of realistic inspections, and the reluctance of first line supervisors to express dissatisfaction. (Also see Section MA.1.)

- ANL-E management had not reviewed the existing resources and budget to ensure adequate emergency management support as required by DOE 5500.1A, DOE 5500.3, and Draft DOE 5500.3A. (Also see Section EP.1.)
• Resources had not been allocated to accomplish the necessary elements of a fire protection program as required by DOE 5480.7. (Also see Section FP.1.)

• Parts of this concern were addressed in the ANL-E self-assessment, but no action plan has been developed.

CONCERN: Argonne National Laboratory-East management has not provided the needed resources to implement safety programs required by the Department of Energy.

CONCERN: There was no assurance that similar hazards in different divisions/departments at Argonne National Laboratory-East receive the same level of review nor whether reviews accurately define all of the potential hazards. (Also see Concerns EA.2-3, PP.2-1, and PP.2-2.)

Findings of Fact:

• The ANL-E Policy Manual constitutes the top tier safety document at the Laboratory.

• Safety responsibilities and authorities were either formally or informally delegated from the Laboratory Director and Management Council to the Division level.

• Divisions were provided maximum latitude in both safety and program to accomplish their mission; i.e., research and development.

• There were few ANL-E-wide requirements or guidance for implementation of required DOE safety programs.

• The involvement of the COO in providing safety support services was usually on an as-needed basis by the Divisions.

• Safety surveillance was located at such a low level that it was ineffective. (Also see Concerns PP.2-1 and OA.5-2.)

• The authorities and responsibilities of the Divisions' Safety Coordinators and safety committees and their interface with the COO safety surveillance and oversight function had not been clearly defined and documented. (Also see Concern PP.2-2.)

• The level of review of safety-related items was designated by the program Divisions and not by an independent safety organization.

• The findings noted were more evident in the nonnuclear areas than in the nuclear areas.

• This concern was not addressed in the ANL-E self-assessment.
OA.2 ADMINISTRATION

PERFORMANCE OBJECTIVE: Administrative programs and controls should be in place to ensure policies concerning health and safety are administered throughout the facility.

Findings of Fact:

- ANL-E has a program called "In Touch" that can be used to resolve employee questions, suggestions, or problems; however, the program is not well understood nor promoted by the Laboratory.

- The management at the Alpha/Gamma Hot Cell Facility produced a memorandum, "Implementation of a Problem/Resolution System for the IPS," dated October 16, 1989, describing a divisional problem resolution program. However, the staff interviewed was not totally familiar with this system.

- Most ALDs and Division Directors (DDs) interviewed indicated that the Laboratory did not have a formal system to help employees resolve safety problems and issues.

- Most ALDs and DDs stated that employees could get resolution to safety problems and issues either through the management open-door policy or through contact with the safety staff.

- Even those who acknowledged using the "In Touch" program, only recalled its existence after the appraisers specifically mentioned the program.

- This concern was not addressed in the ANL-E self-assessment.

CONCERN: The Argonne National Laboratory-East "In Touch" program is not well publicized or understood as a formal means of resolving safety problems and issues.

Findings of Fact:

- The ANL-E Health and Safety Manual approved by the Laboratory Directory stated: "Each Division or Department at the Laboratory shall provide an internal safety organization for conducting safety reviews of experiments, inspecting work areas,...and developing divisional safety policies for recommendations to the Division Directors or Department Heads." It further stated that: "To assist the division directors or department heads in the discharge of their safety responsibilities, it is recommended that divisional or departmental safety committees be established."

- All safety committees did not have charters as recommended by the Laboratory Director.
Where charters existed they were not consistent nor did they include all elements of a charter as recommended in the ANL-E Health and Safety Manual.

This concern was not addressed in the ANL-E self-assessment.

CONCERN: Each Argonne National Laboratory-East safety committee does not have a charter that includes all of the elements recommended in the Argonne National Laboratory-East Health and Safety Manual.
OA.3 MANAGEMENT OBJECTIVES

PERFORMANCE OBJECTIVE: Site/facility management objectives should ensure commitment to safe operation, including enforcement of approved work practices and procedures.

Findings of Fact:

- Several managers stated that setting safety goals would have no meaning since ANL-E safety statistics were sufficiently low.

- The DOE publication "Safety Performance" for January - March 1990, listing the injury and illness ranking of Research Contractors, ranked ANL 15 out of 31 contractors. The statistics for 1985-1989 indicated that ANL has remained in this "average" position for at least 5 years.

- The Laboratory usually sets an ALARA goal for radiation exposures each year based upon the collective goals of each division within ANL-E. However, since all divisions had not turned in their 1990 goals, the Laboratory did not have an ALARA goal for radiation exposures for Fiscal Year (FY) 1990.

- Most of the management personnel interviewed stated that they did not have any specific measurable safety goals. However, some managers stated that they did have some long-range intangible safety objectives.

- Working level staff were not aware of any specific safety goals or long-range safety objectives other than to perform their work safely.

- This concern was identified by the ANL-E self-assessment, but no action plan had been developed.

CONCERN: Argonne National Laboratory-East does not consistently set definitive and measurable safety goals that are updated and published annually. (Also see Section RP.11.)

Findings of Fact:

- The NBL safety goals were contained in a "Conduct of Operation" document dated December 1989. Some of these goals were measurable, but most were intangible with no means of determining success.

- Of the management and staff interviewed, only the Laboratory Director was aware of any specific goals that the Laboratory was trying to attain.

- NBL had not performed a self-assessment.
CONCERN: There is no active program to attain measurable or intangible safety goals at the New Brunswick Laboratory.

(OA.3-2) (H2/C2)
OA.4 CORPORATE SUPPORT

PERFORMANCE OBJECTIVE: Corporate interest and support for safe operation should be evident.

Findings of Fact:

- NBL reported administratively to CH; but programmatically, NBL received direction from the Office of Safeguards and Security, HQDOE.

- Communication from CH to NBL was not always received in a timely manner. Specifically, a recent facsimile request was received from CH on a Friday evening at quitting time that required an immediate action. There was no telephone contact to provide a heads-up alert to the request.

- NBL reported that some CH correspondence listed persons to call for additional information, and that several times the listed persons had no knowledge of additional information.

- Many times, information from CH was a simple pass-through with no screening for applicability to NBL.

- The CH ES&H organization only provided oversight of NBL; (i.e., no support services).

- CH had not performed a self-assessment.

CONCERN: The Chicago Operations Office does not provide timely communication and support to the New Brunswick Laboratory.

(H2/C2)
OA.5 MANAGEMENT ASSESSMENT

PERFORMANCE OBJECTIVE: Management and supervisory personnel should monitor and assess facility activities to improve performance in all aspects of the operation.

Findings of Fact:
- Within ANL-E, the organizational reporting level of ESHD did not lend itself to ESHD performing its assigned task.
  - ESHD was four levels removed from the Laboratory Director.
  - ESHD reported to the Director of the Support Services Division (SSD), which implies that its only function was support.
  - The ESHD Manager did not have peer access to Division Directors nor ready access to the Laboratory Management Council.
- The September 1990 revision of the Health and Safety Chapter of the ANL-E Policy Manual assigned the Chief Operations Officer (COO) responsibility for development and implementation of the ANL-E safety oversight program. It also stated that the COO was assisted in this responsibility by the Director of the Quality Assurance, Environmental, and Safety Office (QES). However, the ANL-E Policy Manual further stated that ESH was charged with the responsibility for providing independent safety surveillance as an extension of the Laboratory's oversight function. Since health physics technician support was an item direct-costed to the Program Divisions, routine radiation monitoring and air sampling were often neglected by the Division.
- The ANL-E Policy Manual assigned ESHD the technical support functions (paragraph III.B.4.) as well as the independent safety surveillance oversight functions (paragraph III.B.4.).
- Examples of independent safety surveillance oversight included:
  - ESHD was responsible for the development and conduct of the occupational health and safety program (ANL-E Policy Manual, paragraph III.C.).
  - ESHD was required to review all plans and specifications for new construction or facility modifications ... for compliance with applicable safety codes and standards as well as the ANL-E Health and Safety Manual, (Chapter I-9, paragraph 2.4.).
- ESHD was responsible for reviewing and approving a contractor's safety program prior to the start of work. (Health and Safety Manual, Chapter 1-7, paragraph 2.2).

- ESHD, in some cases, was to carry out independent investigations of accidents, injuries, and unusual occurrences when it was deemed advisable by the Director of ESHD. (Health and Safety Manual, Chapter 1-4, paragraph 2.5.1).

- Examples of technical support included:
  - ESHD provided the technical expertise and personnel to help the line manager meet their responsibilities in such areas as radiological protection, industrial hygiene, industrial safety, fire protection, and emergency preparedness. (ANL-E Policy Manual, paragraph III.C.)
  - ESHD was required to participate in the safety review of experiments or tests when requested. (Health and Safety Manual, Chapter 1-9, paragraph 2.4.)

- Some management personnel perceived that ESHD was a technical support organization only. (See memorandum, M. J. Steindler to R. Herriford, "Self Assessment Document and Other Problems," dated September 18, 1990.)

- Parts of these concerns were identified in the ANL-E self-assessment, but no action plan had been developed.

CONCERN: The Argonne National Laboratory-East Environment, Safety and Health Department has a potential conflict of interest by being assigned both a technical safety support role as well as independent safety surveillance oversight functions. (OA.5-1) (H2/C2)

CONCERN: The Argonne National Laboratory-East Environment, Safety and Health Department is at too low of a reporting level, and is perceived strictly as a provider of technical support upon demand, to effectively carry out its independent safety surveillance oversight functions. (OA.5-2) (H2/C2)

Findings of Fact:
- DOE 5000.3A and DOE 5484.1 established the reporting requirements for safety incidents.
- ANL-E Quality Guide 16.2 described the purpose and responsibilities of Occurrence Reporting (OR) for the site.
- Not all operating divisions clearly understood the sitewide organization structure for coordinating OR requirements.

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Specific guidance for implementation of Quality Guide 16.2 was not provided.

- Potentially significant safety-related deficiencies were not always reported to management on a timely basis in accordance with DOE 5000.3A and DOE 5484.1.

- An incident involving elevated film badge readings at the ATLAS Facility ion source was not elevated to management attention outside of the Physics Division through the OR system.

- Over the last 5 years, three microswitches in the ATLAS Facility interlock system have been found to be defective in addition to any found during the 6-month interval tests. These were replaced as part of routine maintenance. However, the failures were not brought to management’s attention via an unusual occurrence or other reporting system.

- ANL-E Self-assessment Findings SH3.5.29 and SH3.5.30 identified problems with the OR system at JANUS and the Intense Pulsed Neutron Source. The planned action recommended that Laboratory management assure that ORs be handled by one organization designated by management, in order to give consistency to implementation.

- This concern was not addressed in the ANL-E self-assessment.

CONCERN: Occurrence reporting is not implemented sitewide Argonne National Laboratory-East in accordance with DOE 5000.3A and DOE 5484.1.
OA.6 PERSONNEL PLANNING AND QUALIFICATION

PERFORMANCE OBJECTIVE: Personnel programs should ensure that appropriate job qualification requirements or position descriptions are established for all positions that affect safe and reliable operation.

Findings of Fact:

- A review of individual job descriptions indicated that the line-safety concept was not always apparent.

- In many performance evaluations, safety responsibilities were included as a part of other responsibilities; therefore, the weighing factor as it pertains to safety was unknown.

- Review of the ANL-E annual Merit Review Performance Assessment System revealed that less emphasis was being placed on safety than on performance.

- The Physics Division did not use the standard ANL-E "Merit Review Performance Assessment" system. The Physics Division system was based upon the employee’s position description; however, there were no preset elements against which the employees knew they would be assessed. It was not clear how safety enters into the Physics Division system, if at all.

- The annual "Merit Review Performance Assessment" did not reflect the ANL-E Health and Safety Policy that safety was to be given the highest priority.

- Part of this concern was addressed in the ANL-E self-assessment, but no action had been taken.

CONCERN: Safety does not receive equal emphasis to program performance in the annual "Merit Review Performance Assessment," and does not reflect the Argonne National Laboratory-East Health and Safety Policy.
OA.7 DOCUMENT CONTROL

PERFORMANCE OBJECTIVE: Document control systems should provide correct, readily accessible information to support site/facility operations.

Findings of Fact:
- The location or ownership of controlled documents was recorded, and revision sheets were sent to the recorded owner to keep the document up-to-date; however, there was no followup system to ensure that the revision sheets were actually inserted into the controlled document.
- Some controlled documents did not have all pages dated to assure that the document was up-to-date. (For example, the ANL Nuclear Safety Procedures Manual in the Tiger Team Library only had the pages for revisions 4, 5, and 6 dated, while the rest of the pages were undated.)
- Not all organization charts were dated and signed; however, the Chief Operations Officer stated that ANL-E was in the process of requiring that this be done.
- All pages of the ANL-E Policy Manual were dated; however, pages were dated from 1973 through 1990. Even though some policies may remain unchanged for years, old dates cast doubt on the thoroughness of revisions.
- Parts of this concern were reflected in several concerns in the ANL-E self-assessment; however, no action plan had been implemented.

CONCERN: Some important Argonne National Laboratory-East management and safety related documents are not consistently controlled and updated. (Also see Concerns PP.2-3 and WS.4-4.)

Findings of Fact:
- At NBL, important safety-related documents were assigned to a specific person or location and updated with revision pages.
- Holders of the controlled document were required to sign a form stating that they had received the revision pages; however, there was no followup to assure that the revised pages were actually inserted into the controlled document.
- NBL had not performed a self-assessment of this topic.

CONCERN: At New Brunswick Laboratory, there is no assurance that controlled documents are kept up-to-date.

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OA.8 FITNESS FOR DUTY

PERFORMANCE OBJECTIVE: A Fitness For Duty Program should be capable of identifying persons who are unfit for their assigned duties as a result of drug or alcohol use, or other physical or psychological conditions, and should provide procedures to remove them from such duty and from access to vital areas of the site or facility pending rehabilitation or remedial actions.

Findings of Fact:


- The ANL-E Policy Manual stated: "Prospective employees will be tested for drugs and alcohol," while the Personnel Policy and Procedures Manual stated: "Applicants for sensitive safety or security positions will be tested for drugs and alcohol." In addition, a memorandum dated September 25, 1990, stated: "Pre-employment physical examinations which include drug and alcohol testing are mandatory for: a. All union positions, b. Any sensitive positions and positions required by job specifications ....", and that "Pre-employment drug and alcohol testing will normally be scheduled for all regular hires prior to an offer of employment being made."

- Substance abuse training was included in the managers and supervisors training program. About 260 managers and supervisors had received this training. In addition, ANL-E management stated that most upper level management had received on-the-job training in substance abuse as a result of helping to formulate the Substance Abuse Program and Policy.

- Twelve 45-minute employee information meetings on substance abuse were held on September 11 through 13, 1990.

- The substance abuse program included an Employee Assistance Program (EAP). The ANL-E "Policy Manual" stated: "While participation in the EAP is confidential, the program can neither absolve nor protect the employee from the consequences of continued substandard work performance or rule infractions." The "Personnel Policy and Procedures Manual" stated: "Employees who voluntarily request counseling or referral for assistance for substance abuse will not be terminated for that reason," and "Where substance abuse presents either a threat to the health, safety or welfare of the employee, or employees, the public and/or Laboratory or public/private property or to the security interest of the Laboratory, it may result in the employee being disqualified for employment in the classification held. Under these circumstances, the employee may be placed on leave, reassigned to other duties, or terminated, depending on the circumstances."
- Of the management and staff interviewed, none had an understanding of the program. Only two stated they had training or indoctrination in substance abuse; both stated their training or information session had been two to three years ago (prior to the current program).

- None of those personnel interviewed knew whether their job would be in jeopardy as a result of seeking help from the EAP.

- This concern was not covered in the ANL-E self-assessment.

CONCERN: The Argonne National Laboratory-East Substance Abuse Program, including the Employee Assistance Program, is not well understood and few management and staff have received any formal training or information to explain the program.
4.5.2 Quality Verification

4.5.2.1 Overview

The Quality Verification appraisal was directed toward reviews and interviews at all designated moderate hazard facilities because there are no high hazard facilities at the Laboratory. It also included selected samples of low hazard facilities and reviews of the quality related staff and Support Services Division (SSD). Facilities visited and reviewed included the Chemistry Division, Hot Cell Cave Facility; the Materials Science Division, High-Voltage Electron Microscope (HVEM); the Intense Pulsed Neutron Source (IPNS) Facility; the Biological and Medical Division, JANUS Research Reactor (JANUS); the Materials and Components Technology Division, Alpha Gamma Hot Cell Facility; the Electronics Division, Calibration Facility; the Physics Division, ATLAS; and the DOE-operated NBL. The appraisal also included interviews with DOE and ANL-E quality assurance (QA) personnel and a review of the QA administered Calibration Recall System. In SSD, the appraisal addressed quality related activities in the Procurement, Inspection and Receiving Departments, and in the Central Shops. These latter included warehouses, shop areas, test and inspection areas, storerooms, and office areas. Reviews of projects in the early development stages, such as the Advanced Photon Source (APS) and the High Energy Physics Division Superconducting Super Collider detector project, were also included. In each area the status of preparation and implementation of QA plans and activities, to obtain a measure of the effectiveness of quality verification sitewide, was examined including all seven performance objectives.

The findings are disturbing because it is uncharacteristic of the Laboratory's national reputation for excellence. It is more disturbing because the ANL-E self-assessment failed to detect about half of the identified concerns. It is most disturbing that there is evidence that management had been notified in the past of some of the concerns not included in the laboratory self-assessment but had apparently elected not to give priority to their resolution.

In addition to QA plans that were identified as delinquent and some that were needed but not started, the Tiger Team identified other needed plans the self-assessment did not mention. A significant number of approved plans were not implemented in part or in whole. QA personnel training has been identified as an issue, but the self-assessment did not identify shortages of QA personnel and quality control (QC) professionals as a problem. Problems with calibration are routinely detected in Laboratory audits, but the self-assessment failed to recognize that calibration facilities fall far short of comparable industry standards. In fact, calibration programs, with the possible exception of the Electronics Division, are so fragmented and unorganized that they are ineffectual.

The most serious quality verification problem is that QC inspections are almost 100 percent optional. This has resulted in some examples of ridiculous inspection plans; receipt inspections in the hands of requisitioners who could lack skills, facilities, and motivation to perform needed inspections; and no system in place that provides assurance or independent verification that
required inspections are indeed performed. Further, the laboratory professional inspection staff is at a minimum capability level so that a skilled capability can be eliminated with the loss of one or two key persons.

The shortage of QA resources and the lack of a sitewide manual applies to DOE organizations at the site as well, and the Tiger Team observed that the NBL QA Plan is not yet fully implemented.

The Quality Assurance Representative (QAR)/Quality Assurance Coordinator (QAC) system used for quality verification at the site suffers not only from shortfalls in training but also from the fact that these positions are collateral duties, so little time is allocated for this activity. The QARs are conscientious and liberal in allocating their efforts to QA activities. However, they are replaced from time-to-time, usually just as they are acclimated to their duties. There is a question as to their true independence from cost and schedule concerns. Management and QARs have received the quality message and support it, but a program that is understood at the lower tiers is needed.

Other concerns are noted in this report, but this summary is directed toward those of greatest significance. To resolve these issues will require management creativity. For a system that does not work, a patch and repair effort is no help. The Safety and Health Subteam's assessment is that the laboratory approach to research is directed to achieving excellence, but the approach to quality is merely to strive for some poorly understood compliance. The priority should be to provide the same skills and vigor needed for excellence in research to the quality verification program. There is a need to identify some measures as to whether or not success is being achieved. A continued effort toward improvement is needed to ensure this achievement of excellence.
4.5.2.2 Findings and Concerns

QV.1 QUALITY PROGRAMS

PERFORMANCE OBJECTIVE: Administrative programs and controls should be in place to ensure policies concerning quality are administered for each facility throughout the site.

Findings of Fact:

- ANL-E tracked and reported 16 of 90 QA plans, identified as being required, had not been issued or approved.
- The revised QA plan for procurement had not been approved by DOE. (See Section QV.2.)
- The time required to prepare, review, approve, and issue plans and procedures was found excessive. Some plans have been incomplete since 1987.
- There was no QA plan for packaging and transportation or for medical services and the need for plans had not been identified by ANL-E.
- The approved JANUS QA Plan was out-of-date. Revisions had been made based on ANL-E audit findings, but the issue was being delayed awaiting the Tiger Team Assessment findings.
- The sitewide QA manual lacked seven planned QA guides which had not been issued.
- The following approved and issued QA plans had not been fully implemented:
  - Materials Science Division
  - Intense Pulsed Neutron Source
  - Advanced Photon Source
  - Physics Division
- The ANL-E self-assessment had identified seven concerns related to the lack of QA plans or the prescription of requirements for QA and is implementing action plans for these.

CONCERN: Argonne National Laboratory-East lacks documented and approved quality assurance plans required by DOE 5700.6B and ANSI/ASME NQA-1, Section 2.

Findings of Fact:

- Neither CH nor AAO had institutional QA plans.
- CH had issued a QA guidance document, the QA Manager had prepared a plan, but its release had not been authorized.
NBL had a QA plan, but it had recently been revised. The revision had not been issued, and the plan had not been fully implemented.

Most DOE major projects had approved QA plans.

The lack of a CH QA Manual had been documented in a June 1990 DOE audit report.

CONCERN: The Chicago Operations Office and the Argonne Area Office do not have a documented, approved quality assurance plan as required by DOE 5700.6B.

Findings of Fact:

- ANL-E had not previously identified the need for, and lacked prescribed, QA plans addressing the following areas:
  - Contractor Waste Management Operations
  - Medical Department
  - Sanitary Wastewater Effluent Monitoring
  - Radionuclide Monitor Data
  - Site Meteorology System and Data
  - Radionuclide Effluent Monitors
  - Organizations cited in Concern QV.1-1

- All of the preceding organizations and activities had been cited in the ANL-E self-assessment.

CONCERN: Quality assurance programs at Argonne National Laboratory-East fail to address all safety and personnel protection related functions as required by DOE 5700.6B.

Findings of Fact:

- The implementation of QA activities was dependent on Quality Assurance Representatives (QAR) and Quality Assurance Coordinators (QAC) in the line organizations. They were frequently not independent of cost, schedule, or programmatic concerns.

- Quality Assurance, Environment, and Safety Office (QES) personnel assigned oversight of line organizations frequently provide guidance to the line programs, which gives an appearance of conflict of interest.

- QAR and QAC assignments were a collateral duty. Most were planned as 10 percent of full-time equivalency, although this was an average figure.

- Two full-time QARs were identified, all others had other assignments.

CONCERN: Argonne National Laboratory-East Quality Assurance Representatives, Quality Assurance Coordinators and Quality
CONCERN: Findings of Fact:

(H2/C1) Engineers lack the independence necessary to comply with the requirements of DOE 5700.6B and ANSI/ASME NQA-1, Section 1. (Also see Concern OA.5-1.)

- The QA Manager's position in QES had been vacant since February 1990.
- The QA Section of QES had a vacant position for a Quality Engineer for about one year. A new hire was to start in November 1990.
- Required audits and surveillances were infrequently performed or not performed at all.
- There were no quality control engineers in QES or the Inspection Department and statistical trending of findings was not performed.
- The 4 active Quality Engineers were required to provide overview services to more than 90 organizations, facilities, and projects.
- The shortage of QA resources was not identified as a concern in the ANL-E self-assessment, but it was cited as a causal factor and no action plan had been prepared.

CONCERN: See Concern OA.1-4.

Findings of Fact:

- Many QAR and QAC personnel did not have the necessary training to function effectively in their assigned QA duties as required in Section 1.2 of the ANL-E Quality Assurance Manual.
- QES had implemented a QAR Training Program, but it will require a major effort to achieve the desired level of effectiveness.
- The ANL-E self-assessment had identified the lack of QAR training as a concern. Further training was planned for completion during FY91 but had not been implemented.

CONCERN: Argonne National Laboratory-East quality assurance personnel did not have adequate training as required by DOE 5700.6B and ASME NQA-1, Section 2.

Findings of Fact:

- QARs did not have formal surveillance plans and activities. Some research and development organizations made effective use of formal peer review processes, and some Department Managers reviewed all documents and records; however, the foregoing were exceptions to the sitewide situation.
Software for the ATLAS interlock system was not subjected to validation and verification in accordance with NQA-1 and related standards and other accepted QA practices.

Independent verification of the appropriate achievement of quality was not part of most approved QA plans.

There was an insufficient number of QES audit personnel to review the more than 90 programs on a frequent basis. They scheduled about 20 reviews per year but usually accomplished fewer.

Line organizations depended on QES internal audits and on DOE audits and program reviews for monitoring of their QA activities and for advice as to required improvements.

The lack of surveillance was indicated in the ANL-E self-assessment but not the insufficiency of internal audits.

CONCERN: (QV.1-6) (H2/C1) Independent verification and oversight of quality assurance activities are not implemented by line or staff organizations at Argonne National Laboratory-East, as required by DOE 5700.6B and ANSI/ASME NQA-1, Sections 2 and 18.

Findings of Fact:

- The ANL-E Quality Assurance Manual, as revised October 2, 1989, was basically a document defining minimum requirements to be implemented sitewide. It lacked information as to how QA activities should be accomplished to meet requirements. A plan or policy description as to how this QA Manual was to be implemented and administered did not exist, although one was in preparation and scheduled for completion by June 1991.

- The QA Manual had provisions for 28 guidance documents to assist organizations in preparing and implementing plans. The following were missing or not released:
  - 2.3 Software QA Plans
  - 3.1 Design and R&D Analysis
  - 3.2 Design Review
  - 3.3 Peer Review
  - 8.1 Material Identification and Control
  - 10.2 Construction Inspection
  - 11.2 Software Testing and Validation

- The missing guidelines covered subjects in which some deficiencies are noted elsewhere in this report.

- The ANL-E self-assessment was concerned that "auditors expect more thorough prescriptions of the institutional QA program" and the site was writing a program plan to correct the deficiency. It did not note that the deficiency was not in
prescribing requirements but in an inability to communicate standards or models of compliance to those who must implement the requirements.

CONCERN: The Argonne National Laboratory-East Quality Assurance Manual is incomplete and lacks guidance needed to assure quality achievement in all operations onsite, as required by DOE 5700.6B.

Findings of Fact:
- QARs, Quality Engineers and the QES Director all write quarterly assessment reports that were transmitted to higher levels of management. Reviews of selected samples revealed they were little more than status or activity reports. They did not provide an accurate assessment of the effectiveness of the QA program at ANL-E.
- A program to evaluate the effectiveness of QA at ANL-E had not been implemented.
- A memorandum to the QES Director from the QES quality staff on August 9, 1990, recommended specific improvements for QA program effectiveness.
- The ANL-E self-assessment did not recognize this deficiency. CH had accomplished a self-assessment in a contractor audit report commissioned by CH in June 1990 that applied equally to ANL-E.

CONCERN: Argonne National Laboratory-East has failed to accomplish the responsibility to periodically evaluate the effectiveness of their Quality Assurance Program as required by DOE 5700.6B and ANSI/ASME NQA-1, Section 2.

Findings of Fact:
- CH QA staffing, in the ES&H organization, consisted of:
  - one QA Manager
  - two Quality Engineers
  - one Trainee
  - one Vacancy
   Also, there was one institutional QAC in the line organization.
- One person in AAO had QA as a collateral duty and had total line management and overview responsibility for QA matters at ANL-E.
- These QA resources were responsible for support of ANL-E and ANL-W activities, four area offices, and for simultaneous responsiveness to DOE Headquarters staff and programmatic needs, as indicated in the effectiveness evaluation of June 1990.
Other findings in the June 1990 CH audit related to noncompliance with the intent of DOE 5700.6B, ineffective independent oversight, and the lack of a QA Manual. These shortcomings were attributed to lack of resources.

CONCERN: Chicago Operations Office management has not implemented quality assurance programs and guidance for their area offices and contractors as required by DOE 5700.6B.
QV.2 PROCUREMENT AND SUPPLIER CONTROL

PERFORMANCE OBJECTIVE: Provisions should be established for the control of purchased material, equipment, and services; for selection and control of suppliers; and for assessing the adequacy of procurement activities.

Findings of Fact:

- There was no sitewide program to assure and verify that procurement of spare replacement parts were subject to QA program controls, to codes and standards, and to technical requirements. This responsibility was delegated to requisitioners and Quality Assurance Representatives who frequently lacked the training to comply with ANL-E QA Manual guidance.

- The Procurement Department manual does not have a QA chapter (Chapter 86). It was revised and submitted to DOE for approval in August 1987 and returned (unapproved) in August 1988. It was revised by January 1989, but the responsible individual retired before resubmitting it. It was recently rediscovered and resubmitted as a result of this appraisal.

- It was ANL-E practice that checks of procurement documentation were the responsibility of the requisitioner.

- Since few inspections were performed (see Sections QV.3 and QV.6), good vendor performance histories were not available. Rejected items were tracked appropriately, but there were no verifications that adequate inspections were performed regularly.

- Vendor audits were performed by the Quality Assurance, Environment, and Safety Office, when requested. There were no requirements to mandate vendor audits for each area where they should be performed.

- The ANL-E self-assessment had recognized procurement quality as a problem attributable to training and resource needs.

CONCERN: Provisions for the control of purchased material, equipment, and services and for selection and control of suppliers is not fully implemented by Argonne National Laboratory-East as required by DOE 5700.6B.

Findings of Fact:

- There were no Quality Control Engineers assigned to track and assess the adequacy of Procurement's receiving activities.

- Documentation accuracy is tracked by the Receiving Department who maintain histories, but the histories do not include parametric or dimensional performance statistics.
• One Quality Engineer, assigned to Procurement (among other areas) had submitted a proposal for an improved program, but it had not been approved.

• Procurement control concerns were part of the ANL-E self-assessment.

CONCERN: Argonne National Laboratory-East procurement activities are neither thoroughly assessed nor independently verified as required by ANSI/ASME NQA-1, Sections 4 and 7.
QV.3 RECEIVING AND PRE-INSTALLATION INSPECTIONS

PERFORMANCE OBJECTIVE: Provisions should be established for the inspection of purchased material, equipment, and services in accordance with documented procedures by trained personnel.

Findings of Fact:
- Only stainless steels were routinely inspected at the receiving area by the Inspections Department. When materials were inspected by the Inspections Department by special request, it was done properly and was verifiable.

- The Receiving Department only verified purchase order information against vendor shipping documents on a routine basis; however, since the inception of the Automatic Material Order System wherein vendors have been standardized, this was only done on a sample basis.

- Inspection of all other received materials depended on the requisitioner and was not systematically and independently verified.

- Inspection of Central Shops parts and assemblies often depended on the requisitioner and was not independently verified.

- Most inspections performed at ANL-E were done by requisitioners, not the Inspections Department, and no system exists to verify they were accomplished.

- There was evidence that the deficiencies in inspections had been raised to management. It was also a concern in the self-assessment; however, action plans had not been completed.

CONCERN: Receiving and pre-installation inspections are not independently verified at Argonne National Laboratory-East as required by DOE 5700.6B and ANSI/ASME NQA-1. (Also see Concern QV.6-2.)
QV.4 CALIBRATION PROGRAM

PERFORMANCE OBJECTIVE: Provisions should be made to ensure that tools, gages, instruments, and other measuring and testing devices are properly identified, controlled, calibrated, and adjusted at specified intervals.

Findings of Fact:

- Calibration programs were the responsibility of individual organizations at ANL-E and depended on experimenters and Quality Assurance Representatives for effective implementation.

- The High Energy Physics Division had recently assigned Calibration Officers to be responsible for all Division mechanical and electrical calibrations.

- There was no standardization of calibration requirements at ANL-E. Some calibration program discrepancies were observed where QA programs were not fully implemented.

- The Quality Assurance, Environment, and Safety Office administered a Calibration Recall System (CARES) as a service to custodians. CARES provided information on due dates and partial calibration histories; however, the system lacked parametric data (as found and as left conditions) and was an optional program.

- Fluid systems gauges were not calibrated onsite. They failed to assure correct and accurate flow and pressure. (See Section MA.5.)

- Examples of program deficiencies included inadequate status marking, incomplete records, and lack of verification that calibration schedules were maintained.

- The accuracy of measurements for radiation protection instruments was not assured by calibrations. (See Concern RP.8-1.)

- Calibration program deficiencies were consistently found by both DOE and ANL-E QA audits, but it was not a concern in the ANL-E QA self-assessment.

CONCERN: The Argonne National Laboratory-East calibration program does not meet the requirements of ANSI/ASME NQA-1, Section 12.

Findings of Fact:

- There was no sitewide mechanical gauge laboratory or comparable equivalent at ANL-E, although outside vendors are used in some cases.

- Electronics Division maintains an electronics instrument calibration facility that was acceptable and effectively
controlled, but there was no evidence that electronics instruments requiring calibration were sent to the facility for service.

- Traceable standards and secondary standards were found to be used in various areas sitewide; however, some of the areas in which they were used lacked effective environmental and cleanliness controls usually found in comparable industry metrology programs.

- There was no evidence that either DOE or ANL-E recognized marginal calibration facilities as a problem.

CONCERN: Argonne National Laboratory-East facilities (shops) used for calibrating measuring and test equipment do not meet industrial good practice standards.
QV.5 IDENTIFICATION AND CONTROL OF HARDWARE/MATERIALS

PERFORMANCE OBJECTIVE: Provisions should be established to identify and control the use or disposition of hardware, materials, parts, and components as well as to ensure that incorrect/defective items are not used.

Findings of Fact:

- There was no sitewide program to identify safety-related parts and components. The responsibility to control, segregate, and properly identify stored safety-related parts and components was delegated to facility managers.

- Some facilities, such as JANUS, had documented and effective safety-related parts and components storage programs.

- A number of facilities had no QA program or incompletely implemented QA programs where requirements were not fully understood. Compliance with the requirement for identification and control of safety-related materials was not verifiable in these instances.

- The Laboratory had not recognized this area as a concern in their self-assessment.

CONCERN: At Argonne National Laboratory-East, identification and control of safety-related hardware and materials is not in compliance with the requirements of ANSI/ASME NQA-1, Section 8.
QV.6 INSPECTIONS

PERFORMANCE OBJECTIVE: Prerequisites should be provided in written inspection procedures with provisions for documenting and evaluating inspection results.

Findings of Fact:

- Of all commodities stocked in the Receiving Department Storeroom, only stainless steels were inspected on a regular basis by the Inspections Department.

- The Inspections Department Manager had instituted a program to inspect small tools on a sample basis because of recent complaints about their quality.

- Requisitioners of material from storerooms or from the Automatic Material Order System were restricted to an approved list. Requisitioners were required to provide inspections of this material as needed; however, no systems existed to verify that those requisitioners had the skills, facilities, or equipment to perform inspections.

- No system was established to verify that required inspections were accomplished. This was a Quality Assurance Representative (QAR) responsibility, but it was not systematically traceable.

- For special procurements or Central Shops service requests, the requisitioner was required to specify if inspection was required and to provide an Acceptance Criteria List (ACL) which was an inspection plan. The responsible QAR was required to review and approve these requests. In most cases, the requisitioner would provide inspections instead of using the professional Dimensional and Non-Destructive Examination (NDE) Inspectors. A system did not exist to verify that all needed inspections were actually accomplished.

- A review of selected samples of ACLs (inspection plans) indicated that some plans called for inspection of one unit only, regardless of lot size, or of critical dimensions only, instead of inspecting for all drawing requirements. This was a cost avoidance measure by the requisitioners and was not in accordance with accepted industry practice.

- The number of Inspections Department personnel had declined from 16 people 5-years ago to 7 at present. These included one Department Manager, two Supervisor/Engineers (Dimensional & NDE), and two well-qualified inspectors in each area. This was a minimal staff since any losses would effectively eliminate the inspection capability.

- There were no quality control (QC) engineers assigned to the Inspections Department or any other Department.
Inspections Supervisors and Department Manager provided QC engineering services, as time permitted; however, no sitewide QC engineering planning or trending activities were implemented.

- The Inspections Department Manager and Supervisors were also assigned collateral safety, environmental, and QAR duties which was a further limitation on the Department's resources.

- Certain programmatic documentation, such as that used for calibration and training, was not developed, although some implementing procedures were in use.

- Management of the Laboratory had been advised of these problems by the Inspections Department, but the concerns were not cited in the ANL-E self-assessment report. There was no evidence that these deficiencies were a concern of Laboratory management.

**CONCERN:** Quality inspection programs at Argonne National Laboratory-East are not implemented as required by DOE-5700.6B and ANSI/ASME NQA-1.

**CONCERN:** At Argonne National Laboratory-East, there are no provisions for independent verification that all required inspections are being performed in accordance with DOE 5700.6B and ANSI/ASME NQA-1.
4.5.3 Operations

4.5.3.1 Overview

The eight performance objectives in the Operations functional area were addressed in this appraisal. The appraisal was conducted by reviewing facility documentation for all of the major and several minor facilities located at the AIS, including NBL. Field inspections and interviews with operations staff were also conducted. Two major failures in the safe conduct of operations were found during the field phase of the appraisal: plutonium-containing gloveboxes in Bldg. 200 (Chemistry) were found to be operated at positive pressures relative to the Laboratory, and an uncontrolled exposure to a high radiation field was observed in progress at the ATLAS Facility in Bldg. 203 (Physics). The uncontrolled exposure was determined to be a Category II concern and laboratory management suspended operations at ATLAS pending further review. Further investigations were initiated.

The safety of operations at facilities at ANL-E can be characterized as highly variable. Some facilities are operated safely with good attention by management and staff to conduct of operations, while other facilities are operated with limited management control and oversight. Facilities that have benefitted from a vigorous review process enjoy safe and reliable operation. Such facilities include Intense Pulsed Neutron Source and JANUS. Programs and facilities without these vigorous proactive processes often have "hit and miss" safety programs.

The operations conducted at the ANL-E reactor facilities or nonreactor nuclear facilities have benefitted from a good conduct of operations program. Despite the emphasis on review of these facilities during this appraisal, no significant deficiencies that would impact safety were observed.

The recent ANL-E self-assessment, along with the "do-it-now" program of preparation, has resulted in the preparation of numerous documents such as operations manuals. However, the lack of the programs and procedures which provide requirements and guidance for the content, preparation, and maintenance of these recently generated documents results in a system which has no method for ensuring continued use and development.

Operations at NBL benefit from NBL's mission oriented role, isolated facilities, and the small number of operations staff. NBL also has a highly skilled staff with low turnover which also contributes to a safe operation in most instances. However, a small staff, and limited resources, can create noncompliance with mandatory standards, resulting in a degradation of safe operations. NBL could benefit from a closer relationship with the ANL-E ES&H staff. For example, liaison and adopting procedures (where appropriate) and other developments from the ANL-E professional safety staff could improve the overall health and safety program at NBL from an operations perspective.
4.5.3.2 Findings and Concerns

OP.1 ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE: Operations organization and administration should ensure effective implementation and control of operations activities.

Findings of Fact:

- NBL did not have a Laboratory workplace criteria which would establish the appropriate workplace (hood or glovebox) depending on the hazard of the operation.

- The Chemistry Division laboratory policy for the Bldg. 200 plutonium laboratories requiring the use of hoods rather than benchtop was 100,000 dpm, rather than a risk-based value.

- The Chemistry Division laboratory policy for the Bldg. 200 plutonium laboratories requiring the use of gloveboxes rather than hoods was based on whether or not the plutonium was in powder form rather than a risk-based value.

- Activities in the Biology Laboratories in Bldg. 202 use phosphorous-32 in hoods regardless of the quantity involved.

- See Concerns OP.2-2 and OP.2-3.

- The issue of risk-based decisions for containment enclosure was addressed in the recent ANL-E self-assessment. An action plan has been developed to address this concern and is satisfactory.

CONCERN: Argonne National Laboratory-East does not have laboratory workplace criteria which would establish the appropriate workplace (e.g., hood or glovebox) depending on the hazard of the operation.

CONCERN: The New Brunswick Laboratory does not have laboratory workplace criteria which would establish the appropriate workplace (e.g., hood or glovebox) depending on the hazard of the operation.
PERFORMANCE OBJECTIVE: Operational activities should be conducted in a manner that achieves safe and reliable operation.

Findings

- At the ATLAS Facility, an employee, considered by ANL-E to be a trained radiation worker, was observed working on the ion source in a high radiation area (5 rem per hour at contact, 150 mrem per hour general body fields). This high radiation area was created by the removal of the lead shielding from around the ion source about 18 months ago. No one was aware of the high radiation fields. The radiation area was not posted.

- Lead shielding was placed on the ATLAS ion source two years ago in the course of an exposure investigation following elevated dosimetry badge readings observed in the routine dosimetry program.

- The radiation area monitor at the ATLAS ion source would not have alarmed, if it had been operable, because personnel had altered the alarm setpoint from the normal setting.

- Radiation area monitors were used at the ATLAS in lieu of a more extensive measurements (routine survey) program.

- The ATLAS Facility Accelerator had an interlock system comprised of a single sensor (microswitch). This system was not dual and operation was dependent on the operation of a single circuit. This system was not fail-safe.

- The operator of the ATLAS was not required to be present at the console at all times when the machine was operating.

- Doors to machine areas were unlocked. Operations staff were not aware that exterior doors into accelerator areas were left unlocked. The door to the Linear Accelerator area was not capable of being locked.

- See Concerns RP.3-3 and FR.1-3.

- Some of the specific deficiencies noted above were not generally recognized in the self-assessment conducted earlier this year. However, the interlock system was recognized to be single sensor, and the self-assessment, though noting different issues, asserted: "Most deficiencies relate either directly or indirectly to a potential for an accident and subsequent exposure..." The action plan that was developed is not satisfactory.
CONCERN: Argonne National Laboratory-East operation activities at the Argonne Tandem Linear Accelerator System were not conducted in a manner to achieve safe and reliable operation as specified in ANSI N43.1 and as required by DOE 5480.4.

Findings of Fact:

- Gloveboxes used for plutonium in the M Wing of Bldg. 200 were observed to be at positive pressures relative to the laboratory rather than 0.3-inch (water) negative as required by DOE 6430.1A.

- Gloveboxes used for plutonium in the M Wing of Bldg. 200 were observed operating at unknown pressure differentials with the gauge indicating off-scale (water) negative pressure relative to the laboratory.

- Gloveboxes used for plutonium had foot switches for adjusting the internal pressure.

- Gloveboxes were operated to provide 125 linear feet per minute air flow in front of their high-efficiency particulate air filtered inlet, rather than being set to a specific pressure differential. The staff responsible for setting up the gloveboxes confused the requirements for hoods with those for gloveboxes.

- Hoods were placed within 10 feet of air inlets and were subject to air turbulence. Hoods were operated with low face velocities insufficient to prevent air currents from disrupting uniform air entrance.

- Laboratories were designed with narrow aisles and with hoods located in the normal traffic route used to enter the area or adjacent laboratories.

- The gloveboxes in the plutonium laboratories in Bldg. 212 where metallographic operations (grinding, etc.) are conducted were designed with a low flow inert gas system.

- The gloveboxes in Bldg. 212 cannot maintain 125 linear feet per minute air flow when a loss of a glove or other credible breach of confinement occurs. These gloveboxes do meet their original design intent.

- See Sections RP.6 and PP.3.

- Improper operation of confinement devices at ANL-E was not recognized during the ANL-E self-assessment.

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CONCERN: Activities in the plutonium laboratories in Argonne National Laboratory-East Buildings 200 and 212 were not conducted in a manner to achieve safe and reliable operation as required by DOE 6430.1A Section 1161-4.

CONCERN: Argonne National Laboratory-East lacks an effective sitewide policy and program for design, installation, maintenance, and surveillance of confinement devices.
PERFORMANCE OBJECTIVE: Operations personnel should know the status of the systems and equipment under their control, should know the effect of non-operational systems and equipment in continued operations. They should ensure that systems and equipment are controlled in a manner that supports safe and reliable operation.

Findings of Fact:

- Off-shift maintenance personnel respond to computerized alarms. These alarms are both maintenance (water leak, etc.) as well as scientific (loss of cooling water to an experiment, etc.). Most scientific alarms require the off-shift personnel to call the scientist. Some scientific alarms require action on the part of off-shift personnel.

- Maintenance alarms are prioritized and the priority is displayed so that the staff can respond appropriately.

- Scientific alarms are prioritized but the priority is not displayed and must be looked up in a manual.

- Scientific alarms require responses that may include emergency actions to be taken.

- There is no policy for alarms placed on the maintenance computer system.

- Off-shift maintenance personnel are not respirator-qualified, nor are they provided with other emergency response training.

- See Concern TC.4-3 and Section EP.7.

- This issue was not addressed in the ANL-E self-assessment.

CONCERN: Argonne National Laboratory-East maintenance personnel responding to alarms can be exposed to hazardous situations.
OP.5 OPERATIONS STATIONS AND EQUIPMENT

PERFORMANCE OBJECTIVE: Operation stations and facility equipment should effectively support facility operation.

Findings of Fact:

- At the time of the walkthrough of ATLAS, the operations staff was unable to produce a complete wiring diagram showing the current configuration of the ATLAS interlock system or a logic table.

- New interlock additions at the ATLAS facility and software modifications were installed and tested on the operating computer and data acquisition system without review and authorization of management and without triggering an updated biannual interlock test when the system was restored to operability.

- Observations revealed that the current interlock system at ATLAS had unauthorized changes left in place following prototype testing.

- There had been no independent review of the current ATLAS interlock system hardware installation or software.

- Components in the ATLAS beam transport system (bending magnets and quadrupoles) were not interlocked to prevent sending beam into unplanned areas. This potential source of radiation did not receive consideration and review by staff.

- At ATLAS, large components with inherent shielding such as spectrometer arms could be moved by personnel who were not part of the normal operating staff without triggering a resurvey and reposting of the radiation fields. The devices could obstruct the radiation monitoring systems.

- The Safety Analysis Report (SAR) for ATLAS failed to consider the catastrophic failure of the helium manifold, despite the presence of energy sources such as a large overhead crane.

The SAR for ATLAS consisted of a primary document and at least three addendum. It was not clear from the documentation what requirements remained valid or have been superseded in the addendum.

- See Concerns QV.1-1 and QV.1-7.

- The ANL-E self-assessment did not fully address the issues of adequacy of the interlock logic design and implementation.
CONCERN: The design, installation, and testing of interlocks at the Argonne National Laboratory-East Argonne Tandem Linear Accelerator System Facility are not in compliance with ANSI N43.1, as required by DOE 5480.4.
PERFORMANCE OBJECTIVE: Operator knowledge and performance should support safe and reliable operation of the equipment and systems for which they are responsible.

Findings of Fact:
- The Subteam member who observed an uncontrolled exposure to high radiation field at the ATLAS Facility ion source believed that his prompting was necessary to get an appropriate response in a timely manner.
- Senior staff associated with the ATLAS Facility contradicted themselves regarding limitations on allowable beam intensity and energy changes given in the SAR.
- ATLAS Facility staff regarded the radiation potential of the machine as insignificant.
- The ATLAS operations staff incorrectly debriefed the Safety and Health Subteam member, who observed the uncontrolled exposure, concerning the radiation interlocks at the machine.
- See Concern OA.1-3.
- The ANL-E self-assessment did not find deficiencies in the training and knowledge of staff associated with the ATLAS Facility.

CONCERN: Responsible staff lack fundamental knowledge and training regarding operating parameters, safety systems, testing, and acceptance criteria for the safe operation of the Argonne National Laboratory-East Argonne Tandem Linear Accelerator System as required by ANSI N43.1.

Findings of Fact:
- Chemists in Bldg. 200 routinely modified the glovebox internal pressures for comfort in violation of internal procedures and DOE 6430.1A, Section 1161-4.
- In July 1990, a chemist in Bldg. 200 refused to wear a respirator for several entries into a potential airborne area despite the recommendations of the Health Physics Technician responsible for the area. The refusal to wear required safety equipment had not been reported to DOE. The chemist had received conflicting guidance from another health physics employee.
- See Concern PP.3-2.
- This issue was not addressed in the ANL-E self-assessment.
CONCERN: Some of the Argonne National Laboratory-East Building 200 staff do not properly operate safety equipment in the performance of their jobs.
4.5.4 Maintenance

4.5.4.1 Overview

All eight performance objectives were reviewed during the appraisal of the Maintenance functional area. The assessment of the Maintenance functional area emphasized plant facilities and support systems that are under the cognizance of the Plant Facilities and Services Division (PFS) at ANL-E. Physical inspections of support systems such as service steam, chilled water, compressed air, and emergency power were conducted in the major ANL-E buildings. These buildings included the Boiler House, Central Shops, Vehicle Maintenance, and the buildings providing support to major accelerators and laboratory facilities (Bldgs. 145, 200, 202, 203, 211, 212, 223, 306, 314, 315, 316, 350, 360, and 362). Maintenance of user equipment and facilities was addressed only for a few representative facilities, since there are too many such user facilities to assess each one effectively. The inspections of buildings and facilities were conducted with either the responsible Maintenance Supervisor, Building Manager, or a user representative present.

PFS manages the Maintenance Program under the guidance provided in their Maintenance Administration Manual. This guidance is considered to be adequate, but some of its requirements have not been implemented effectively. In particular, plant facilities and systems are largely being maintained in a reactive mode. Current manpower is not adequate to provide the needed level of corrective or preventive maintenance for plant support systems in the various ANL-E buildings. Fewer deficiencies were noted in the NBL Facility.

The ANL-E self-assessment did not specifically cover maintenance, although related issues such as the lack of a radiation work permit procedure were noted. Nevertheless, the Safety and Health Subteam was provided a copy of a consultant’s report, that covered many of the same concerns identified during this appraisal. The report title is "Maintenance Management Plan Development, Plant Facilities and Services Department," September 10, 1990. Although this report lacks specific justification in some areas recommended for improvement, its general thrust is clearly in the right direction. The administrative recommendations are broad and will require significant enhancements in the ANL-E maintenance program to implement. The report does not address specific policy and technical recommendations surrounding this management plan that will be needed for successful implementation.

ANL-E policies in the maintenance area have gradually resulted in less maintenance over the past 10 years, leading to the need for more comprehensive facility refurbishment programs than might otherwise be required. Simple preventive maintenance and preservation work has been neglected so that the remaining manpower can keep Laboratory users in operation. This user-priority system suggests the over emphasis on production found at other DOE nuclear facilities and cannot be expected to change without a change in fundamental Laboratory policies.

On the technical side, there is now a significant deficiency in control of hardware operability, especially noticeable to outside auditors in the area of
valves and piping systems. The Subteam found that little confidence can be placed in the operability of system components that are not used routinely. The situation at ANL-E in this regard is more severe than encountered elsewhere in DOE facilities. Immediate action is required to regain control of the fluid support systems in ANL-E buildings.

For example, when the Subteam requested a demonstration of the operability of the six manually operated overflow line valves for the six Laboratory drain retention tanks in one wing of Bldg. 212, five of them could not be operated by the assigned Laboratory operator because they were stuck. Moreover, the design of these diaphragm valves and this unpressurized system is such that valve operation should be very simple and require little effort. Annual operational cycling of manually operated valves is not done at ANL-E. External preservation and lubrication of these valves were also essentially nonexistent, so they eventually froze in place.

These overflow valves are apparently left open all the time so that overflow between tanks is possible. If a tank overflow capability is needed to serve the intended function of controlling contaminated water, the tank would have to overflow into the immediate adjacent tank (regardless of its contents) or tanks and also could not be isolated from the other tanks. In contrast, the six frequently used drain admission valves (same design as the overflow valves) were operated very easily by the assigned system operator. The only other valve for which demonstration of its operability was requested was a manual chilled water valve in another building. The assigned building maintenance operator was unable to move the hand wheel to the valve.

Thus, six of 13 valves tested would not operate due to lack of preventive maintenance.

Although the external appearance (lack of lubrication) of these inoperable valves would suggest to an experienced inspector that the valves would be difficult to operate, the Subteam was surprised that the men who tried to operate these relatively small valves could not move them at all. At ANL-E, there are many other valves that are much larger (thus, should be more difficult to operate) and that are actually corroded or the stems painted over. Many packing glands and studs were also observed to be painted and inoperable.

Lagging (insulation) of pipes and valves is also a problem, especially for steam systems such as the steam supply to steam-driven emergency generators. Operability of the steam admission valves has been in question for an extended period. Lagging problems with these valves are a potential contributor to the operability problem due to the thermal gradient effects across the close tolerances in the valves if they are not lagged. Except for such localized problems, however, the steam system lagging was generally above average for a DOE facility.

The severity of the valve maintenance problem at ANL-E is even more significant because of the importance of maintaining the firemain valves, discussed in the fire protection section of the report. For example, it is not adequate to simply verify the position of valves. They must also be
periodically operated (full stroke) and kept clean so that they can be operated when needed.

Chilled water and similar cooling water systems in most buildings inspected were not adequately insulated or protected by paint from the effects of condensation. In some areas of piping, the integrity of the pipe wall was questionable, due to severe deposits of red rust;, but building maintenance personnel appeared to be indifferent. Some carbon steel pipes were lagged to prevent condensation (and corrosion), but the pipe was not properly prepared (painted) before the application of the lagging, so that the pipe was still corroding under the insulation where the insulation was loose. Lack of preservation leads to increased reliance on wholesale replacement of such systems.

An actual operational problem involving maintenance occurred in Bldg. 200 during the assessment. The explanation of the event was that the ventilation exhaust motor failed and the associated damper did not close, so the backup exhaust fan was not able to pull enough air through laboratory hoods. This indicates a need for better damper preventive maintenance and may indicate the need for better ventilation fan-motor preventive maintenance.

The JANUS Preventive Maintenance Program was reviewed. Some procedural documentation improvements were identified, but these were already being accomplished by JANUS supervision.

At NBL, the only significant and unique maintenance problem noted was that the service steam cutout valve to the building had been reassembled by a contractor using undersized bolts to (apparently) replace the ones the contractor lost while working on the valve.

The ANL-E In-House Energy Management Plan was also reviewed as part of the assessment of the Maintenance functional area. The Subteam considers this program to be commendable and a good example of how to reduce costs without making arbitrary budget cuts. The energy conservation program is comprehensive, creative, and aggressive; and continued support should be provided for the program.
4.5.4.2 Findings and Concerns

MA.1 ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE: Maintenance organization and administration should ensure effective implementation and control of maintenance activities.

Findings of Fact:

- Inspections of mechanical equipment in several buildings indicated lack of systematic inspection and maintenance.

- The service steam line to Bldg. 350 was reassembled with undersized bolts by a contractor, but this obvious deficiency was not detected by ANL-E or NBL personnel.

- At the time of this assessment, the Vehicle Maintenance Shop was undermanned due to cutbacks and long-term illness. Each mechanic was responsible for about 100 vehicles (about twice the optimal workload), and the supervisor stated that he was starting to get behind on vehicle inspections, including EPA emission inspections.

- First line supervisors said that their manpower had steadily decreased over the past 10 years to the point that inspection, supervision, and proactive activities were not adequate. They were reluctant to complain since management was not receptive on manpower issues. (See Concern OA.1-4.)

- This concern was not addressed by the ANL-E self-assessment.

CONCERN: Argonne National Laboratory-East plant facilities and equipment are deteriorated due to lack of resource allocations, lack of realistic inspections, and the reluctance of first line supervisors to seek assistance from management to correct the situation.
MA.5 CORRECTIVE MAINTENANCE

PERFORMANCE OBJECTIVE: The material condition of components and equipment should be maintained to support safe and effective operation of all facilities on the site.

Findings of Fact:

- Mechanical systems and equipment in plant facilities areas were generally functional for normal operations but not for infrequent or emergency operations. This was caused by lack of proactive inspections and testing, particularly noticeable in the area of valves.

- Good lubrication practices were not evident except in the Central Shops areas. Fittings used to lubricate valve stem bushings were often painted-over.

- Paint was often found on threaded parts, indicating painters were not well trained or supervised.

- Calibration of gauges was not evident for fluid systems anywhere at ANL-E, so it was difficult to confirm proper operation. (See Section QV.4.)

- Equipment, structures, and systems maintained by the Plant Facilities and Services Division were not properly preserved or, in some cases, insulated to avoid condensation and corrosion.

- The building inspection program was conducted on an annual basis, but obvious deficiencies were not identified.

- Corrective maintenance was not addressed by the ANL-E self-assessment.

CONCERN: The Argonne National Laboratory-East inspection and corrective maintenance program is not effective in assuring the design operability of facility support systems.
MA.6 PREVENTIVE MAINTENANCE

PERFORMANCE OBJECTIVE: Preventive maintenance should contribute to optimum performance and reliability of systems and equipment important to operations.

Findings of Fact:

- Retention tank overflow valves (five out of six valves) tested for one wing of Bldg. 212 could not be operated by the operating personnel responsible for the tanks. All five valves were stuck in the open position. Thus, if contaminated water got into a tank, it could not be isolated from the other tanks, and the automatic overflow feature of the system would not be controllable.

- The six fill valves for these retention tanks were operable, but a chilled water system valve in Bldg. 223 could not be operated. Thus, out of a total of 13 valves whose operation was requested to be demonstrated, six did not work.

- The valves in most buildings at ANL-E were not on any systematic preventive maintenance schedule, so others may be stuck. Maintenance personnel said that the problem with doing routine maintenance has been lack of manpower.

- Packing glands, stems, and threaded members of valves were often not preserved, not preserved properly, or had paint on them, degrading operability and functional life.

- Lagging (insulation) on valves and piping was deteriorated in many buildings.

- Rust was present on pipes, valves, and other components in many buildings, leading to the need for early replacement.

- Preventive maintenance was not addressed by the ANL-E self-assessment.

CONCERN: Preventive maintenance for Argonne National Laboratory-East plant facilities fluid systems is not adequate since valve maintenance and system preservation are not included.
4.5.5 Training and Certification

4.5.5.1 Overview

This appraisal addressed all of the Training and Certification performance objectives. The appraisal was conducted through a combination of interviews with personnel with training responsibilities and students who had completed training programs; observation of the conduct of classroom training and an emergency preparedness exercise; and review of training program policies and procedures, training materials, examinations, and training records. Training observed included: radiation safety, lockout/tagout, confined space entry, supervisor safety orientation, hazard communication, and an emergency preparedness exercise. Interviews and document reviews were conducted related to the above training programs as well as the following: Intense Pulsed Neutron Source (IPNS) operator training, equipment operator (e.g., cranes, forklifts) certification, AAO training, NBL fissile material handler and criticality safety training, JANUS reactor operator training, hazardous waste generator and handler training, steam plant operator qualification, and Health Physics Technician training.

Until the last year, ANL-E top-level management had given little attention to formal training and qualification programs required by DOE Orders or Federal, State, or local regulations related to safety or environmental protection. There were some exceptions, such as operator training programs for nuclear facilities and reactors, where most of the operator training requirements of DOE 5480.5 and DOE 5480.6 were met. For these programs, management had established a nuclear safety organization which provided specific standards and strong oversight. In contrast, there had been little accountability required of supervisors and line managers in implementing their responsibilities for training workers in other mandated safety areas, including: radiation safety, hazard communication, hazardous waste, and occupational safety. Laboratory-wide standards had not been established for how training was to be developed and presented, or what records were to be maintained. Few records existed of what training was provided. Resources for developing and conducting safety and environmental compliance training for ANL-E personnel were almost nonexistent. The ES&H Department (ESHD) had no dedicated training staff and, other than new employee orientation, no safety training courses. The Human Resources Division had a full-time training and education professional, but none of the courses offered by Human Resources related directly to compliance with safety training requirements.

In April 1989, ESHD was authorized an additional position with responsibilities in both training and QA for the Department. The individual hired to fill that position continues to have both responsibilities but now has a full-time instructional designer and two safety training instructors, one on a temporary basis. There is also an authorized industrial hygiene trainer position which is unfilled. Two additional training positions are requested for Fiscal Year 1991 for this group, one for industrial safety and emergency preparedness, and the other for environmental protection.
This organization (the Training Section) has developed a matrix, cross-referencing mandatory safety and environmental training requirements to functional areas or positions at ANL-E. While this matrix is an important first step in moving ANL-E toward compliance with these requirements, it has not been adopted by all divisions to identify their training requirements, and it has not been endorsed as a requirement by any top-level ANL-E policies. The Training Section established radiation safety training as a first priority and has a target of December 1991 for completing all the radiation safety training requirements of DOE 5480.11. Other than radiation safety training, the Training Section has no regular schedule for the conduct of training but rather responds to training requests from Divisions. In some cases the Training Section arranges for vendors to provide training for Divisions, such as the most recent hazardous materials handling training conducted at ANL-E.

The Training Section of ESHD has been effective in the training presented to date and has identified, in a draft ESHD Training Management Manual, a systematic approach to training that is appropriate to the need. However, ANL-E is a long way from being in compliance with mandatory safety and environmental training requirements, and it will take more than the best efforts of the Training Section to achieve this compliance. First of all, not all ANL-E research divisions view "compliance with mandatory safety and environmental training requirements" as synonymous with "I really have to do it." They have heard ANL-E top-level management say the words that ES&H is the first priority, but they have not yet seen the actions that convert those words into action. There are not yet any ANL-E policies which establish either specific requirements or standards for training programs, and there is no mechanism identified for enforcing these requirements. ES&H training requirements have been consistently dealt with reactively, rather than proactively.

In summary, ANL-E has identified the specific deficiencies in training and qualification programs that need to be corrected in order to be in compliance with DOE ES&H requirements. However, ANL-E does not have plans in place for a system that will address these deficiencies in an integrated way, nor is there evidence that the attitudinal changes needed to affect these changes are being addressed by top-level management.
4.5.5.2 Findings and Concerns

TC.1 TRAINING AND CERTIFICATION

PERFORMANCE OBJECTIVE: The training organization and administration should ensure effective implementation and control of training activities.

Findings of Fact:

- While ANL-E management stated that ES&H is the first priority, this message had not been translated into top-level management actions to achieve compliance with mandated ES&H training requirements. ANL-E management had not promulgated any goals or policies with respect to ES&H training.

- The Training Section of the Environment, Safety and Health Department (ESHD) had, with the assistance of a contractor, developed a draft ESHD Training Management Plan which was issued in September 1990. While this plan included details of a performance-based training program, without top-level policies this plan can have a very limited effect on improving ANL-E training. This is the case because issues such as standards for the conduct of all ANL-E training, enforcement of training and qualification requirements, identification of Laboratory-wide duties and responsibilities, and recordkeeping are not within the control of this organization.

- Observation of the conduct of classroom training indicated inconsistent use of lesson plans and examinations. Some training had both, while for other training there were neither lesson plans nor examinations.

- The Training Section of ESHD developed a training matrix which relates 99 different mandatory ES&H training requirements to 39 different functional areas (e.g., security, visitors, radiation workers, contractors). On August 7, 1990, this matrix was distributed as Tiger Team Task Force Bulletin #8. The stated purpose of this matrix was "to help the divisions in identifying their ES&H training needs." While it was not clear from the bulletin, discussions with cognizant personnel indicated that it was intended that Divisions respond to the Training Section with an indication of which of their personnel were in each of the 39 functional areas. Such information would provide the first opportunity for the Training Section to know the size of their target audience and would also provide the first mechanism for determining whether Divisions have provided for the training needs of their personnel. At the time of this assessment, some but not all Divisions had provided this information. There was no due date established for Division responses; it was indicated that ESHD did not have the authority to mandate these training requirements. Thus, the memorandum was a request rather than a demand.
Interviews with personnel responsible for providing ES&H training indicated continuing difficulties in convincing some ANL-E personnel that they should participate in training required by DOE Orders or Federal, State, or local regulations. This did not apply to all parts of the Laboratory; some organizations had been committed to providing mandated ES&H training to their personnel, while others had done little in this area. This inconsistency in implementation was evidence of a lack of direction and priority with respect to training by top-level management.

The ANL-E self-assessment of September 1990 acknowledged the lack of policies and procedures for ANL-E training programs and established a schedule for developing an ESHD Training Management Manual by September 1990 and Laboratory-wide training policy by December 1990. However, a review of these efforts, and discussions with cognizant personnel, indicated that these efforts were too narrowly focused and did not yet have management "buy-in." The draft Training Management Manual, dated September 1990, only addressed training developed and conducted by ESHD; it did not establish standards for job-related training conducted by other organizations and also did not address methods to be used to enforce training and qualification programs. This effort was out of sequence. It is necessary to first establish top-level policies before procedures and plans can be put in place to implement these policies.

CONCERN: There are no top-level Argonne National Laboratory-East training goals and policies and no associated implementing procedures or standards.

Findings of Fact:

- There were some areas where mandated training and qualification requirements had been met by ANL-E, but these were the exception rather than the rule. An example where requirements were met was with respect to JANUS reactor operator training.

- As is detailed in other concerns in this section, ANL-E was not in compliance with most ES&H training and qualification requirements. These areas included: radiation safety (DOE 5480.11), hazard communication (29 CFR 1910.1200), hazardous waste operations (40 CFR 243.201/2), lockout/tagout (29 CFR 1910.147), and Health Physics Technicians (DOE 5480.11).

- ANL-E had no oversight mechanisms in place to provide feedback to management on the extent to which the above mandated requirements were being achieved.

- While the ANL-E self-assessment of September 1990 identified individual deficiencies in training programs, the lack of an
effective oversight mechanism was not an identified weakness, nor did corrective actions describe what was planned to be done to ensure compliance with mandated training requirements.

**CONCERN:** Argonne National Laboratory-East top management has not established a mechanism to ensure that training and qualification requirements of DOE Orders and Federal, State, and local regulations are enforced.

(H1/C1)

**Findings of Fact:**

- Contrary to the requirements of DOE 1324.2, DOE 5480.5, DOE 5480.11, and DOE 5483.1A, neither the ANL-E Health and Safety Manual, nor any other ANL-E policy or procedure required documentation of training or specified what training records were to be maintained.

- The Human Resources Division had developed a training records data base that was being used by some ANL-E organizations, including the Training Section of ESHD. However, not all ANL-E organizations were using this data base, and there were no ANL-E directives indicating that this data base or some equivalent capability should be used.

- Some ANL-E organizations had not maintained any training records for their personnel. Others had recently begun to maintain some records but were unsure about what information they needed to maintain to meet requirements and how long they needed to retain the information.

- The ANL-E self-assessment of September 1990 acknowledged that documentation of training at ANL-E had been inadequate. The planned actions included documenting training from February 1, 1990 on, using the Human Resource Division data base, and revising the Health and Safety Manual to include the use of this data base. Including this requirement in the Health and Safety Manual will not totally correct the deficiency because there is considerable training which is outside of the scope of the Manual, which has an effect on safety and the environment, and which needs to be documented. Examples include training for maintenance personnel, steam plant operators, water treatment plant operators, accelerator operators, reactor operators, and hazardous waste generators.

**CONCERN:** Training records have generally not been maintained at Argonne National Laboratory-East as required by DOE 1324.2, DOE 5480.5, DOE 5480.11, and DOE 5483.1A.

(H3/C1)

**Findings of Fact:**

- The Secretary of Energy emphasized the need for increased oversight of contractor ES&H activities by DOE personnel. AAO responded to this emphasis by establishing an Operational Surety Branch and using announced and unannounced inspections of ANL-E facilities.
The AAO Management Plan, Appendix #4, defined primary and secondary responsibilities of AAO personnel. However, neither this plan nor any other AAO documents identified formal training requirements for AAO personnel. Interviews indicated that AAO Branch Chiefs reviewed the education, training, and experience of their personnel when they were hired and communicated verbally to them what additional training they should receive. However, the need for additional training was not documented. It was also indicated that there was an unwritten policy that each person should have at least one training opportunity per year.

There were no established requirements for AAO personnel who conduct inspections or appraisals of ANL-E facilities to ensure qualification with respect to inspection methods, technical knowledge of the function being evaluated, or familiarity with the facility or associated safety considerations. It was indicated that only those personnel who met the above qualifications were generally assigned to inspections and appraisals.

There were no methods established to document that AAO or CH personnel, who perform surveillances, inspections or appraisals, have the training and qualifications required by DOE Orders or Federal, State, or local regulations and that would allow unescorted access to ANL-E facilities. Examples of applicable requirements include: radiation safety, hazard communication, criticality safety, emergency management, industrial hygiene, and industrial safety. There were no formal agreements established between the AAO and ANL-E or CH and ANL-E on the participation of AAO or CH personnel in ANL-E training programs.

A draft "Quality Assurance Plan for the Chicago Operations Office ES&H Appraisal Program" was developed in 1987. This draft Plan was being used by CH for conducting ES&H appraisals of ANL-E. CH was revising this draft Plan to provide additional formality for appraisals. This draft Plan requires trainees to accompany an experienced appraiser on a minimum of two appraisals before being considered a qualified appraiser.

Three AAO employees indicated that they had ES&H responsibilities but had not received sufficient training.

The AAO self-assessment of September 1990 acknowledged a lack of formality in AAO activities and minimal use of tracking systems. This self-assessment also indicated that there were initiatives to increase training for AAO personnel. Examples of these initiatives included risk assessment training provided to an environmental engineer in August 1990, and environmental regulation training for line managers scheduled for October 1990. There was no CH self-assessment.
CONCERN: Chicago Operations Office training and qualification programs do not adequately document that Chicago Operations Office personnel can safely and effectively carry out their oversight responsibilities.

CONCERN: Argonne Area Office training and qualification programs do not adequately document that Argonne Area Office personnel can safely and effectively carry out their oversight responsibilities.
PERFORMANCE OBJECTIVE: The nuclear facility operator and supervisor training and certification programs should be based on DOE 5480.5, as applicable, and should develop and improve the knowledge and skills necessary to perform assigned job functions.

Findings of Fact:

- The Intense Pulsed Neutron Source had two different categories of operating personnel, one was accelerator operators, and the other was Neutron Generating System (NGS) operators (who manipulate and control NGS target systems). The training and qualification programs for these positions were described in two separate procedures; both of which were most recently revised in August 1988. These procedures described a formal program for qualification and requalification of both operating positions. However, neither of these programs provided any specific information about on-the-job training (OJT) activities (tasks) for which proficiency was to be demonstrated as part of the initial qualification process, as required by DOE 5480.5, Section 10.

- The operations staff of the IPNS had been quite stable, and as a result the need for formal initial training programs was minimal. However, during 1990 one new accelerator operator was qualified. This individual indicated that the direction he was provided on what he should study was provided verbally by the accelerator operator to whose shift he was assigned. His principal training document was the IPNS Final Safety Analysis Report. The bulk of the knowledge he acquired was through interactions with the qualified accelerator operator on his shift.

- This concern was not addressed in the ANL-E self-assessment.

CONCERN: The operator training program for the Argonne National Laboratory-East Intense Pulsed Neutron Source does not include a formal method for controlling or documenting on-the-job training as required by DOE 5480.5.
TC.4 GENERAL EMPLOYEE/PERSONNEL PROTECTION TRAINING

PERFORMANCE OBJECTIVE: General employee and personnel protection training programs should ensure that site/facility personnel, subcontractors and visitors have an understanding of their responsibilities and expected safe work practices, and have the knowledge and practical abilities necessary to effectively implement personnel protection practices associated with their work.

Findings of Fact:

- The Training Section of the ES&H Department (ESHD) developed and presented a 1.5-hour program for general radiation safety training. Attendance records indicate that, as of August 22, 1990, 521 of the estimated 1200 ANL-E personnel, who were required by DOE 5480.11 to receive this training, had completed the program. The Training Section also developed an 8-hour training program to partially meet the DOE 5480.11 training requirements for radiation workers. As of September 18, 1990, approximately 1250 of the estimated 3300 radiation workers at ANL-E had completed this program. The remainder of the radiation worker training program was planned for development during the next few months. ANL-E made a commitment in its DOE 5480.11 implementation plan to complete all required radiation safety training by December 31, 1991.

- The ANL-E self-assessment of September 1990 identified these deficiencies as well as outlining a schedule.

CONCERN: Argonne National Laboratory-East radiation safety training does not meet the requirements of DOE 5480.11.

Findings of Fact:

- The ESHD training staff provided hazard communication training to the Plant Facilities and Services Division (PFS) custodial staff and had included general hazard communication information with the 8-hour radiation safety training being provided. However, not all ANL-E personnel had been provided the general training required by the Hazard Communication Standard (29 CFR 1910.1200) and DOE 5483.1A. Such training was required by the Standard to be completed by May 1987.

- A principal component of the Hazard Communication Standard was training of all personnel on recognizing the hazards of chemicals in the workplace, as well as the measures employees can take to protect themselves from these hazards. A poll was conducted of a class of 50 students in an ANL-E supervisors training course on September 19, 1990. None of the 50 indicated that they had received the training that is required by the Standard, on the specific hazards in their workplaces.
• The ANL-E self assessment of September 1990 identified this deficiency and indicated that the general training was to be completed by December 1990. However, not addressed was training on the specific hazards to which individual workers are exposed.

CONCERN: See Concern PP.5-1.

Findings of Fact:

• For some visitors, such as summer student programs coordinated by the Human Resources Division, there were mechanisms in place to ensure that these people received the same training that was provided to ANL-E employees. However, many other visitors and users were dealt with directly by line organizations without any involvement by ESHD or the Human Resources Division. The training and orientation provided to these individuals was at the discretion of the sponsoring organization; there were no ANL-E policies or procedures that required any training for these people, contrary to the requirements of DOE 5480.11 (radiation safety), DOE 5480.5 (criticality safety), Draft DOE 5500.3A (emergency preparedness), and DOE 5483.1A (hoisting and rigging, lockout/tagout). In some cases, users had access to facilities after hours when there were few, if any, ANL-E personnel available to assist them in interpreting alarms or evaluating hazards.

• ESHD had provided general radiation safety training to security inspectors. However, there were no written agreements between the AM-PRO Protective Agency, Inc. (AM-PRO) (the ANL-site security contractor) and ANL-E concerning the safety training and qualification of security inspectors. Security inspectors' responsibilities necessitated their unescorted entry into ANL-E facilities after hours. However, there was generally no written documentation of safety training provided to security inspectors related to facility safety hazards and procedures.

• The ANL-E self-assessment of September 1990 indicated that training requirements for visitors, temporary employees, contract personnel and transient workers had not been established. The actions identified were to include such requirements in the ESHD Training Management Plan by September 1990. A draft of this plan had been developed, however, it did not address this issue. It is the view of the Safety and Health Subteam that this plan is not the appropriate document to address these requirements, but rather these requirements need to be in top-level ANL policies that clearly apply to all ANL-E programs and activities.
CONCERN: Argonne National Laboratory-East does not have a program to ensure that all personnel, including visitors, security inspectors, users, and subcontractor personnel, are provided with training concerning the safety hazards to which they are exposed.

Findings of Fact:

- ANL-E had no documented policies or procedures concerning controlling personnel access to facilities with special hazards. This was contrary to several DOE Orders and other regulations which require safety training associated with special hazards; among them are DOE 5480.5, criticality safety; DOE 5480.11, radiation safety; and 29 CFR 1910.1200 (DOE 5483.1A), hazard communication.

- Tiger Team members were provided a site orientation and were permitted free access around the AIS. However, this orientation did not include any training with respect to onsite alarms and associated responses (e.g., evacuation, criticality, high radiation).

- During the Tiger Team orientation briefings, it was indicated that as many as 1500 "casuals" (visitors, users, temporary employees, or subcontractors) may be onsite at ANL-E at any one time.

- Most ANL-E facilities with special hazards had no formal programs to acquaint personnel with these hazards prior to allowing unescorted access to the facility. An example of a facility that had established such a mechanism is the Intense Pulsed Neutron Source (IPNS). The "IPNS Worker Qualification Procedure" was revised on September 14, 1990 to provide such a formal mechanism. The procedure provided both an overall facility qualification form and qualification on particular instruments (e.g., crane/hoist operation, neutron beam gate operation). Although this program has the necessary elements to be effective, it was not fully implemented at the time of this assessment.

- See Section WS.4.

- The ANL-E self-assessment of September 1990 identified a variety of safety training deficiencies, but none that specifically addressed training with respect to facility-specific hazards and associated safety precautions.
CONCERN: Argonne National Laboratory-East does not have a program to ensure that personnel who have unescorted access to facilities with special hazards are trained to recognize these facility-specific hazards and understand associated safety precautions.

Findings of Fact:

- ANL-E had not revised the Health and Safety Manual to be in conformance with the OSHA Standard 29 CFR 1910.147, Control of Hazardous Energy (Lockout/Tagout), which became effective in January 1990. This standard required documented training of both authorized and affected personnel; authorized personnel being those authorized to place locks and tags on equipment and affected personnel being those could come into contact with these locks and tags. While ESHD had provided training to some ANL-E personnel, not all authorized and affected personnel had received training, and the training received had not been based on a program that meets all the requirements of the standard.

- The ANL-E self-assessment of September 1990 included a concern with respect to inadequacies in the ANL-E lockout/tagout program (SH3.3.11) but did not make specific mention of the OSHA Standard, and the actions identified did not include any training activities.

CONCERN: See Concerns PP.2-3 and WS.4-4.

Findings of Fact:

- The training required by the ANL-E Health and Safety Manual, Chapter I-6, Section 5.2, dated September 15, 1978, had not always been provided, and infrequently documented when it was provided. This Chapter required that "when a relatively high degree of hazard may be present, such as in the use of significant quantities of highly reactive-including flammable-materials, high pressure gases or liquids, high temperature equipment or components, high voltage, toxic materials, or specialized and/or expensive equipment, or when working under unusual circumstances, specialized training shall be provided." It had often been assumed by supervisors that individuals were qualified for these high hazard activities based on their years at ANL-E or their experience with other organizations.

- The training matrix developed by the Training Section of ESHD provided a potential means to identify the personnel and job positions which had a need for this specialized safety training, as well as a means to track the qualification and requalification of individuals. However, that matrix had not been completed by all Divisions, and no mechanisms had been established for using it for that purpose.
- The ANL-E self-assessment of September 1990 identified this concern. However, the actions to correct this problem were very general, and no schedule was identified.

CONCERN: Not all Argonne National Laboratory-East personnel receive the specialized safety training required by the Health and Safety Manual before performing high hazard activities.

Findings of Fact:
- While the "Health and Safety Manual," Chapter I-11, of December 22, 1983, requires equipment operator certification, discussions with certified operators of hoists and cranes indicated that they were unaware of many of the operation and maintenance requirements of OSHA Standards (29 CFR 1910.179 through 188) for the operation and maintenance of cranes, hoists, and slings. These are mandatory DOE requirements based on DOE 5483.1A. A review of the certification records for equipment operators indicated that the records were not maintained in an auditable fashion, and that their qualification status was not available at work locations.

- The ANL-E self-assessment of September 1990 indicated that numerous personnel had been operating equipment without certification. A date of June 1991 has been established for completing all operator certifications.

CONCERN: Personnel who operate Argonne National Laboratory-East hoisting and rigging equipment have not been adequately trained and certified to operate and maintain this equipment in accordance with 29 CFR 1910.179 through 188.
TC.9 RADILOGICAL PROTECTION PERSONNEL

PERFORMANCE OBJECTIVE: The radiological protection personnel training and qualification program should develop and improve the knowledge and skills necessary to perform assigned job functions.

Findings of Fact:

- ANL-E had procedures in place for health physics technician initial training (Procedure HPP-105), and requalification training (Procedure HPP-106), both dated September 11, 1987. However, these procedures did not include all the requirements of DOE 5480.11 with respect to both initial and continuing training programs on radiation safety fundamentals and the procedures specific to the facility where the technician is assigned. In particular, HPP-105 did not indicate what radiation safety fundamentals training is to be included, did not address any facility-specific training, and did not require examinations for either initial and requalification training programs.

- ANL-E was not complying with all the requirements in either HPP-105 or HPP-106. Trainees (Technician III) were being qualified through participation in the requalification program rather than meeting the requirements of HPP-105, and requalification teams defined in HPP-106 were not being used. There was no training coordinator as defined in these procedures, rather the Manager, Health Physics was developing and conducting all radiation safety fundamentals training for health physics technicians.

- As of September 1, 1990, 11 of 25 ANL-E Health Physics Technicians were trainees (Technician III), primarily due to recent retirements of experienced technicians.

- The ANL-E self-assessment of September 1990 identified this concern. The schedule associated with this item indicated that both health physics technician training and a revision to HPP-105 were to be completed by September 1, 1990. Neither of these actions had been taken. Discussions with the Manager, Health Physics indicated that he had proposed a special 80-hour training program for Health Physics Technicians for Fiscal Year 1991. This program began on October 8, 1990, for eight technicians. It is planned that all technicians will complete this program by December 1990. The program does not address all the requirements of DOE 5480.11, particularly those related to facility-specific procedures.

CONCERN: The Argonne National Laboratory-East training and qualification programs for health physics technicians do not meet the requirements of DOE 5480.11.
4.5.6 Auxi ar.y Systems

4.5.6.1 Overview

Seven of the nine performance objectives were covered in this appraisal. Coolant Cleanup Systems were not considered applicable, and Storage and Handling of Fissile Material are addressed under Nuclear Criticality Safety to the extent needed for this assessment.

Physical inspections of support systems such as service steam, chilled water, compressed air, and emergency power were conducted in the major ANL-E buildings. These buildings included the Boiler House, Central Shops, Vehicle Maintenance, and the buildings providing support to major accelerators and laboratory facilities (Buildings 145, 200, 202, 203, 211, 212, 223, 306, 314, 315, 316, 350, 360, and 362).

Overall, for the major facilities assessed at ANL-E, the Auxiliary Systems functional area was well managed. One significant weak area found was the inadequate control and storage of contaminated equipment. The effluent holdup and treatment systems, although in need of routine maintenance and urgent corrective maintenance of system valves, were found to be basically capable of controlling laboratory wastewater. There is some concern, however, that the sources of high wastewater flows are not well understood or assessed at ANL-E. Additional concerns were raised by the Environmental Subteam.

Solid wastes are generally also well controlled with the exception of radioactively contaminated equipment that is stored (or not decommissioned) rather than disposed of at the conclusion of a project. Each laboratory area is independently managing contaminated equipment, storing it, and trying to meet health physics control requirements without sufficient policy guidance, without appropriate storage space, and without adequate health physics coverage or decontamination.

For example, the Safety and Health Subteam found a contaminated glovebox containing contaminated equipment stored in the ventilation loft of one of the ANL-E buildings. The doors to the ventilation loft had been posted with radiation area signs, and most of the contaminated equipment in the room was labeled. The glovebox was not labeled, and the tape used to cover the glove ports was dry and brittle. The glovebox had been in storage for about three years.

The health physics representative stated that they routinely monitored such storage areas in the past but stopped about two years ago due to lack of manpower. This aspect of the radiation control program is covered in the ANL-E self-assessment. The lack of an inventory, lack of adequate designated storage space, and lack of a clear policy on decommissioning and disposal of this equipment as solid waste are not addressed in the self-assessment.

The building ventilation systems hardware appeared to be adequate with the exception of possible failures in preventive maintenance for dampers; operational concerns about positive pressures in some gloveboxes; and filter
testing issues raised in the reports for maintenance, operations, and environmental issues.

JANUS was reviewed for adequacy of auxiliary systems and instrumentation needed to ensure safety. No safety issues were identified.
4.5.6.2 Findings and Concerns

AX.3 SOLID WASTES

PERFORMANCE OBJECTIVE: Solid hazardous wastes (including radioactive wastes) should be controlled to minimize the volume generated, and handled in a manner that provides safe storage and transportation.

Findings of Fact:

- A contaminated glovebox was found in storage without proper radiation labels in a radiological control area in Bldg. 212. Health physics personnel were called to survey and label the glovebox. According to ANL-E personnel, the glovebox was in storage for about three years. The tape used to seal the gloveports was so old and brittle that the glovebox had to be checked for external contamination. (The original radiation tag was found on the floor the next day.)

- Health Physics Department personnel and/or Building Managers did not maintain lists of contaminated equipment kept in long-term storage areas.

- Facilities appropriate for long-term storage of contaminated equipment considered to be potentially useful in the future had not been provided, and routine surveys of alternative storage areas (such as fan rooms/lofts) were no longer conducted by health physics personnel.

- Health physics personnel stated that they no longer had the manpower to survey/monitor such storage areas.

- This is not fully addressed by the ANL-E self-assessment.

CONCERN: At Argonne National Laboratory-East, contaminated equipment placed in long-term storage for potential future use is not systematically assessed for disposal, inventoried, periodically surveyed, or stored in suitable facilities.
4.5.7 Emergency Preparedness

4.5.7.1 Overview

The appraisal addressed all seven Performance Objectives in the Emergency Preparedness functional area for ANL-E. In addition, an additional area that was addressed in this appraisal was the Emergency Public Information Program. The emergency preparedness program established by NBL was included in this appraisal on a limited basis, in that much of its emergency support and response functions are provided by ANL-E.

The appraisal was accomplished through interviews with managers, specialists, supervisors, the ANL-E Emergency Management Officer, and some members of the ANL-E Emergency Response Organization. These interviews were utilized to ascertain how emergency response activities and the emergency preparedness programs were conducted, managed, and controlled. The team reviewed and examined records, emergency plans, implementing procedures, training programs, and supporting documentation against the DOE Orders (5500 series and 5480 series), American National Standards Institute (ANSI) Standards, and good industry practices.

The ANL-E Emergency Preparedness Program has the capability to respond, detect, and report credible data to make assessments and to provide some protection to onsite employees. During this appraisal, it was observed that there is little or no concern regarding the possibility of having any emergency situation that would affect a person residing offsite in the area surrounding ANL-E. ANL-E has developed their "Comprehensive Emergency Management Plan" (CEMP) but this document is not in sufficient detail and has not been developed using all the guidance provided in DOE Orders. CH has an emergency plan that was issued in October 1988, with no known revisions. NBL has developed an emergency plan that has sufficient emergency instructions for their operations. However, both the ANL-E CEMP and the CH Emergency Plan do not contain all the information, instruction, data, reporting, and notifications required by DOE Orders.

The ANL-E Emergency Plan Implementing Procedures (EmPIPs) do not provide sufficient instructions or assign responsibilities as required by DOE 5500.1A, DOE 5500.3 and Draft DOE 5500.3A. The existing 12 EmPIPs cannot be used to develop emergency planning lesson plans due to the lack of emergency information, instructions, and responsibilities contained in these procedures.

Emergency preparedness training is reportedly conducted on an annual basis. However, review of the documents used for training, revealed these documents were more in the nature of speaking outlines, rather than true lesson plans. Training records are not documented, as required by DOE 1324.2. The five training modules and the written examinations provide only 8.5 hours (total) of classroom instruction. These training modules only addressed Crisis Managers, Area Emergency Supervisors, Incident Commander, Emergency Facilities Activation and Support Staff Functions. There are no training modules for emergency response teams, specialized support personnel, emergency maintenance/repair teams, medical personnel, and field monitoring/sampling.
teams. The hospitals that have entered into letters of agreements with ANL-E are reportedly trained by the local commercial nuclear power plants, but ANL-E does not have any records or evidence of this training or of its applicability to DOE requirements.

The followup action and resolution of previously cited emergency preparedness deficiencies has not received proper attention and quick resolution.

The ANL-E self-assessment did not identify all of the deficiencies in the ANL-E Emergency Preparedness Program and did not address the more serious concerns that are listed in this appraisal. However, "Technical Safety Review," Appendix B, Section III.F, Emergency Preparedness, (in Volume 3) did address the findings and concerns that are reflected in this appraisal report.

The unannounced emergency preparedness exercise, conducted for the Safety and Health Subteam, was compromised by unknown personnel as to the time, date, and some scenario details. Therefore, it should be considered a preannounced exercise. The initial reaction to the exercise was considered good. On-scene incident command was established and good control of the immediate response was exercised by the Fire Department. The exercise was designed to test the emergency response organization using both the Fire Department Dispatcher and Security Force Dispatcher. The Fire Department had alerted an extra dispatcher to assist the regular dispatcher in his mission. The Security Force Dispatcher was overwhelmed with numerous duties and functions but handled the situation well. See Section EP.4 for more details on the exercise.

The Emergency Management Officer has only been employed at ANL-E for nine months. Prior to the arrival of the Emergency Management Officer, numerous emergency preparedness problems had been detected through appraisals conducted by Headquarters DOE, CH, and AAO. Some constructive effort has been made to resolve the outstanding deficiencies, but there is considerably more effort needed to bring this program up to acceptable DOE standards.

One of the primary problems detected during this emergency preparedness appraisal was the lack of understanding and/or the refusal by ANL-E to accept their responsibilities as defined in the DOE Orders. In addition, ANL-E does not consider credible an event that would release radioactive or toxic materials offsite. The basic rule for emergency preparedness is: prepare EmPIPs for all credible emergency situations; prepare and conduct a well-developed training program; and employ an effective emergency response organization that can recognize, classify, and take appropriate action to mitigate the emergency and effect a speedy recovery.
The most serious items of concern are the needs for: improving the Emergency Preparedness Training Program for all members of the ANL-E Emergency Response Organization, specialized support staff, and field teams; developing a job task analysis to define all the responsibilities and functions of each member of the ANL-E Emergency Response Organization to include support teams; using the job task analysis to develop revisions to the CEMP and EmPIPs and to refine the assigned organization responsibilities; expediting resolution of all required improvements; conducting emergency exercises to ensure ANL-E has the ability to respond, mitigate, and effect appropriate recovery operations; and conducting an indepth review of DOE Orders to determine what responsibilities apply to emergency preparedness and ensure compliance. If the DOE Orders have provisions or assigned responsibilities that are not applicable to ANL-E, waivers of these items should be requested.
4.5.7.2 Findings and Concerns

EP.1 ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE: Emergency preparedness organization and administration should ensure effective planning for, and implementation and control of, site/facility emergency response.

Findings

- Not all possible credible emergencies were covered in sufficient detail in the emergency plans, training programs, and implementing procedures as required in DOE 5500.3.

Fact:

- The ANL-E Emergency Preparedness Program did not meet the criteria established in DOE 5500.1A and DOE 5500.3 for planning purposes.
- ANL-E had not developed job task analysis for each member of the emergency response organization, support staff, and specialized teams and had not identified their responsibilities as outlined in DOE 5500.3A.
- The ANL-E Comprehensive Emergency Management Plan did not address all ANL-E emergency management organizations, support staff, and emergency response teams in sufficient detail.
- This concern was addressed in the ANL-E self-assessment. An action plan had not been developed to address this concern.

CONCERN: See Concern EP.2-1

Findings of

Fact:

- ANL-E had not developed an inhouse, totally independent, emergency preparedness appraisal capability for evaluation of ANL-E readiness capabilities, training programs, onsite and offsite emergency response programs, etc. as required by DOE 5500.3 and Draft DOE 5500.3A.
- The Quality Assurance, Environment and Safety Office (QES) is not an independent QA organization due to its involvement with emergency preparedness functions.
- This concern was addressed in the ANL-E self-assessment. An action plan had not been developed to address this concern.
CONCERN: Argonne National Laboratory-East has not developed an independent, inhouse emergency preparedness appraisal capability as required by DOE 5500.3 and Draft DOE 5500.3A.

Findings of Fact:
- CH initiated an annual emergency preparedness appraisal of ANL-E in early 1990. The appraisal had not been completed. 
- This concern was not addressed in the ANL-E self-assessment. An action plan had not been developed to address this concern.

CONCERN: Chicago Operations Office has not performed the required annual appraisal of Argonne National Laboratory-East emergency preparedness as required by DOE 5500.3.

Findings of Fact:
- Emergency preparedness deficiencies cited in appraisals, exercise critiques, etc. were not incorporated into an action plan and were not tracked to resolution.
- This concern was addressed in the ANL-E self-assessment. An action plan had not been developed to address this concern.

CONCERN: Argonne National Laboratory-East did not have an effective system in place to track and resolve cited emergency preparedness deficiencies as required by DOE 5500.3.

Findings of Fact:
- ANL-E management had not provided sufficient allocation of resources to accomplish ANL-E emergency preparedness and response tasks for both routine and emergency response.
- This concern was addressed in ANL-E self-assessment. An action plan had not been developed to address this concern.

CONCERN: See Concern OA.1-4.
PERFORMANCE OBJECTIVE: The emergency plan, the emergency plan implementing procedures, and their supporting documentation should provide for effective response to operational emergencies.

Findings of Fact:

- CH had not reviewed or approved the Comprehensive Emergency Management Plan (CEMP), approved of proposed ANL-E Emergency Planning Zone, or Ingestion Pathway Zone as required in DOE 5500.1A.

CONCERN: Chicago Operations Office had not reviewed or approved the Argonne National Laboratory-East Comprehensive Emergency Management Plan.

Findings of Fact:

- The CEMP did not address onsite specific safety analysis of potential abnormal conditions in sufficient detail. The CEMP unusual initiating events, multiple failures, or man made emergencies were not fully addressed.

- There is a lack of evidence to support the conservative nature of the emergency action levels (EALs), which do not include conditions for a General Emergency.

- Responsibilities were not addressed in the CEMP for members of the emergency response organization; i.e., specialized teams, field response teams and support staff.

- Standard definitions, as outlined in DOE 5500.1A and other related DOE Orders, were not used to identify emergency titles, facilities, and operations.

- There is no formal documentation to indicate that any formal review of the entire CEMP had been coordinated with AAO; CH; and other Federal, State, and local emergency management agencies.

- Documentation of annual reviews of other ANL-E Emergency Response Plans and Area Emergency Supervisor Plans had not been made a matter of record.

- This concern was addressed in the ANL-E self-assessment. An action plan had not been developed to address this concern.

- See Sections EP.1 and OA.5.

CONCERN: The Argonne National Laboratory-East Comprehensive Emergency Management Plan and emergency response organization does not meet the requirements established in DOE 5500.2A, DOE 5500.3 and Draft DOE 5500.3A. (Also see Concerns SS.2-1, and OA.5-3.)
Findings of Fact:

- Emergency Plan Implementing Procedures had not been developed to support the provisions of the CEMP.
- Responsibilities, instructions, and guidance outlined in the ANL-E EmPIPs were not in sufficient detail and did not provide emergency response personnel with sufficient emergency instructions.
- Supporting plans and procedures had not been developed to provide written instructions for activation and deployment of all emergency response teams.
- EmPIP had not been prepared to provide detailed instructions for immediate actions, interim actions, and followup actions for each member of the ANL-E emergency management staff, support staff, and response teams.
- Procedures had been developed, but did not provide sufficient guidance, on notifications and reporting, emergency classification, and EALs; search and rescue operations; and sitewide evacuation, assembly and accountability.
- The emergency preparedness job task analysis studies, which could serve an administrative tool in the revision of the EmPIPs, had not been performed.
- All EmPIPs did not have a cover sheet attached with space provided for signatures and dates for the developer/drafter, reviewer, and Manager, ES&H Department (ESH&D) as approval authority. The EmPIPs had not been reviewed on an annual basis by the Safety Review Committee for accuracy.
- Emergency administrative procedures had not been developed to provide instructions on conducting surveillances, testing, training program development, and emergency action item tracking.
- Checklists had not been developed to support all EmPIPs and to ensure all appropriate emergency actions are taken by members of the emergency response organization.
- Some procedures used in support of emergencies were contained in manuals/procedures books used for normal operations instead of the EmPIPs Manual.
- This concern was addressed in the ANL-E self-assessment. An action plan had not been developed to address this concern.

CONCERN: The Argonne National Laboratory-East Emergency Plan Implementing Procedures do not meet the requirements contained in DOE 5500.1A, DOE 5500.2A, DOE 5500.3 and Draft DOE 5500.3A.
EP.3 EMERGENCY RESPONSE TRAINING

PERFORMANCE OBJECTIVE: Emergency response training should develop and maintain the knowledge and skills for emergency personnel to respond to and control an emergency effectively.

Findings of Fact:
- ANL-E had not developed a written Emergency Preparedness Training Program description as outlined in DOE 5500.3 and Draft DOE 5500.3A.
- Training records had not been maintained for each member of the emergency response organization in accordance with the requirements of the Emergency Preparedness Training Program and DOE 1324.2.
- All emergency preparedness lesson plans had not been developed and signed by the Emergency Management Officer; reviewed by the Manager, ESHD; and approved by the Manager, Training Department.
- An ANL-E Emergency Preparedness Training Program that was below minimum standards had been developed for the emergency management organization and key emergency response managers but had not addressed training for all emergency response and specialized teams and orientations for AAO and CH.
- This concern was addressed in the ANL-E self-assessment. An action plan had not been developed to address this concern.

CONCERN: Argonne National Laboratory-East did not use the guidance provided in DOE 5500.3, Draft DOE 5500.3A, and good industry practices to develop the emergency response training program.
EP.4 EMERGENCY PREPAREDNESS DRILLS AND EXERCISES

PERFORMANCE OBJECTIVE: Emergency preparedness programs should include provisions for simulated emergency drills and exercises to develop and maintain the knowledge and skills for emergency personnel to respond to and control an emergency effectively.

NOTE: The drills and exercises referred to in this section are related to tests of and training on the emergency preparedness program. In many cases, these drills and exercises are best initiated using an operational situation. If accomplished that way, an additional benefit is gained by exercising the operations personnel and the interface between operations and emergency preparedness. Therefore, the maximum benefit, an operational drill or exercise can be used to lead into the emergency preparedness event, providing a drill or exercise to each program.

Findings of Fact:

- An exercise scenario development committee had been organized, but the membership did not include representatives from the Fire Department, security, public affairs, maintenance, safety, medical services quality assurance, offsite agencies (where required), and the ANL-E facility that is involved in the scenario as required in DOE 5500.1A and DOE 5500.3.

- Exercise controllers and evaluators had not been given annual training.

- ANL-E had not developed an emergency preparedness administrative procedure to address scenario development, format, training requirements for controllers and evaluators, development of exercise objectives, and post-exercise activities (i.e., critiques consisting of both verbal and written reports).

- This concern was addressed in the ANL-E self-assessment. An action plan had not been developed to address this concern.

CONCERN: Argonne National Laboratory-East procedures for scenario development and training and selection of controllers/evaluators is not in conformance with DOE 5500.3 and Draft DOE 5500.3A.

Findings of Fact:

- Quarterly communication drills were not held; however, a test of emergency communications was held on a quarterly basis and appropriate test records are maintained.

- Emergency drills were not being held to simulate all possible emergency situations that could affect onsite organizations and offsite agencies.

- Documentation that was reviewed indicated that ANL-E did not take timely and effective action to resolve cited improvements.

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and deficiencies following exercises, drills, and appraisals.

- This concern was addressed in the ANL-E self-assessment. An action plan had not been developed to address this concern.

**CONCERN:** Argonne National Laboratory-East did not have an action plan developed to resolve past cited deficiencies from appraisals or exercises.

**Findings of Fact:**

- ANL-E did not schedule and conduct emergency exercises which involve both onsite and offsite emergency response organizations to test the interactions of the entire emergency response organization for both onsite organizations and offsite emergency management agencies.

- A program had been established for planning, scheduling, preparation, and post-exercise critique of emergency response exercises but was found not to be in compliance with DOE 5500.3 and Draft DOE 5500.3A.

- Mini-drills had not been conducted to ensure that specialized teams and emergency response teams (i.e., field monitoring and sampling teams, emergency maintenance, environmental teams, emergency public information staff, and dose assessment, etc.) receive experience and to perfect procedures and communications.

- This concern was addressed in the ANL-E self-assessment. An action plan had not been developed to address this concern.

**CONCERN:** Argonne National Laboratory-East did not develop a drill and exercise program as outlined in DOE 5500.2A, DOE 5500.3, and Draft DOE 5500.3A.

**Findings of Fact:**

- All of the findings listed below are exercise deficiencies identified by members of the Safety and Health Subteam during the emergency preparedness exercise. These exercise deficiencies were not part of the ANL-E verbal and written critique and positively points out a weakness in the evaluators and controllers used by ANL-E.

  - The Crisis Manager declared a site emergency without consulting the Emergency Plan Implementing Procedures or Emergency Action Levels.

  - The ANL-E Emergency Operations Center (EOC) staff did not followup on the injured personnel's condition, obtain their names, and simulate the notification of the relatives.
- At the start of the exercise, only the primary members of the emergency response organization and support staff responded to the ANL-E EOC.

- There was a 20-plus minute delay before the evacuation of surrounding buildings at the simulated incident location.

- When industrial hygiene personnel arrived at the exercise location, they had to train a fireman on how to use the Dreagar Chemical Kit.

- Arriving ambulance and paramedics did not know the simulated emergency conditions and what types of chemicals were involved.

- The Fire Department had two dispatchers on duty at the start of the emergency exercise; the normal manning for this position is one person.

- The senior Technical Support Center (TSC) Officer did most of the communicating with the ANL-E EOC but did not use his communicator effectively.

- All radio communications in the TSC were open channels. The radios did not have headsets available which would have reduce background noise levels.

- No EmPIPs were utilized in the TSC by the staff.

- No access rosters had been prepared to control access to the emergency response facilities.

- The terminology "this is a drill" was not used at the beginning and termination of exercise or during radio communications from the exercise location, from security, and other response groups.

- The Security Dispatcher was overwhelmed with additional exercise-related duties such as authorizing entrance into buildings. The Security Dispatcher attempted to log all information on scratch paper, not log books.

- The Security Operations Center staff did not use any procedures during the exercise.

- AAO emergency response staff were not notified of the exercise.

- CH did not notify the Headquarters DOE EOC that CH and ANL-E EOCs were activated and operational.
- CH did not begin messages and terminate message with "this is a drill."

- ANL-E upgraded the emergency to a Site Emergency without discussion with the ANL-E EOC and the CH EOC. There was a delay by CH in reporting this upgrade of emergency classification to the DOE Headquarters EOC.

- The ANL-E EOC made a protective action recommendation directly to the State without coordination with CH on sheltering.

- CH had not updated and revised their emergency plan since 1988.

- CH and AAO had not developed EmPIPs or checklists for emergency response operations.

- Fireman at the simulated incident location moved a simulated electrical line that was draped over a truck and laid it on wet grass which was considered a possible safety problem.

- The simulated accident vehicle involved in the exercise had its engine left on for a long time before it was turned off.

- The fireman did not search the involved building for additional injured personnel.

- After the evacuation was completed, one AM-PRO Security Officer entered Bldgs. 4 and 6 to verify no one was left inside.

- It took over 65 minutes for the personnel at the exercise location to turn off the electrical power to Bldg. 26.

- Security did not properly secure the simulated incident location during the exercise.

- When the Environmental Team arrived at the exercise location, they did not know what chemicals were involved, and did not use any procedures or checklists.

- A construction worker using a backhoe at the simulated incident location was not removed or his operation shut down.

- No official headcount for accountability was observed being taken after arrival of evacuated personnel at the assembly area.

- At the actual emergency at Bldg. 200, it was observed that security responders did not establish crowd control or
cordon off the area immediately around the Incident Command Post.

CONCERN: Argonne National Laboratory-East did not comply with DOE 5500.1A, DOE 5500.2A, DOE 5500.3, Draft DOE 5500.3A, DOE 5500.4, and good industry practices.
EP.5 EMERGENCY FACILITIES, EQUIPMENT, AND RESOURCES

PERFORMANCE OBJECTIVE: Emergency facilities, equipment, and resources should adequately support site/facility emergency operations.

Findings of Fact:

- Adequate working space had not been provided in the ANL-E Technical Support Center and the Emergency Operations Center.
- A computer system had not been developed which could disseminate emergency data, chronological listing of events, offsite notifications, and emergency status to all emergency facilities.
- The Technical Support Center and ANL-E Emergency Operations Center were not equipped with as-built drawings for all facilities; vendor manuals; listing of stored hazardous materials; radiological and nonradiological hazardous/toxic materials; and procedures for health physics, chemistry, and maintenance.
- A facility inventory or surveillance procedure had not been developed to ensure that all emergency response facilities, communication systems, and resources are inventoried and tested on a periodical basis as prescribed by DOE 5500.3A, Attachment III.
- This concern was addressed in the ANL-E self-assessment. An action plan had not been developed to address this concern.

CONCERN: The Argonne National Laboratory-East Emergency Operations Center and Technical Support Center has not been established and maintained in accordance with DOE 5500.3, DOE 5500.1A, and good industry practices.

Findings of Fact:

- ANL-E has not conducted a public address audio survey to ensure complete coverage of all ANL-E property.
- This concern was not addressed in the ANL-E self-assessment. An action plan had not been developed to address this concern.

CONCERN: Argonne National Laboratory-East has not ensured that the existing public address system will provide sitewide coverage for providing emergency instructions as required by DOE 5500.2A.
PERFORMANCE OBJECTIVE: Emergency assessment and notification procedures should enable the emergency response organization to correctly classify emergencies, assess the consequences, notify emergency response personnel, and recommend appropriate actions.

Findings of Fact:
- The ANL-E Emergency Action Levels (EALs) were conservative and were not in accordance with DOE 5500.3, DOE 5500.2A, and Draft DOE 5500.3A. These EALs did not have any general emergency criteria established.
- Classification of emergency events and definitions used to described emergency classification was not consistent with DOE 5500.2A.
- Coordination had not been achieved in the review of emergency classifications system and EALs with State or local emergency management agencies.
- Emergency Plan Implementing Procedures (EmPIPs) had not been developed that addresses the notification and reporting requirements in sufficient details as required in DOE 5500.2A and DOE 5000.3A.
- This concern was addressed in the ANL-E self-assessment. An action plan had not been developed to address this concern.

CONCERN: The emergency action levels and emergency classification definitions used in the Argonne National Laboratory-East emergency plan are not in compliance with DOE 5500.1A and have not been coordinated with State and local emergency management agencies as directed in DOE 5500.3 and Draft DOE 5500.3A.

Findings of Fact:
- Dissemination of emergency information to ANL-E site personnel was not accomplished during the emergency exercise, except during evacuation of the simulated incident scene.
- Information on the nature and magnitude of emergencies and hazards was not made available to all ANL-E organizations by use of the public address system and announcements.
- EmPIPs and checklists of actions had not been developed to address reentry and recovery operations.
- This concern was not addressed in the ANL-E self-assessment. An action plan had not been developed to address this concern.
Argonne National Laboratory-East did not review the requirements in DOE 5500.2A, DOE 5500.3, and DOE 5500.3A to address the dissemination of information on emergency instructions, protective actions, and classifications of emergencies to site personnel.
PERFORMANCE OBJECTIVE: Personnel protection procedures should control and minimize personnel exposure to any hazardous materials during abnormalities, ensure that exposures are accurately determined and recorded, and ensure proper medical support.

Findings of Fact:

- ANL-E procedures did not conform to DOE 5480.1A, Chapter XI, Section 4.9, and DOE 5480.10 for establishing (radiation and chemical) exposure limits for life saving, emergency repairs, and protection of vital equipment under emergency conditions. This procedure did not address additional requirements contained in DOE 5500.1A and did not designate who was responsible for authorization of the use of these limits.

- A decontamination Emergency Plan Implementing Procedure has not been developed which establishes emergency limits for decontamination of personnel, equipment, and facilities.

- Evacuation routes had not been clearly marked and assembly areas posted.

- A site evacuation plan or procedure had not been developed to provide for effective traffic control and egress during any emergency condition.

- This concern was addressed in the ANL-E self-assessment. An action plan had not been developed to address this concern.

CONCERN: Argonne National Laboratory-East procedures on exposure control, decontamination, and site evacuation do not comply with DOE 5500.3 and Draft DOE 5500.3A.
4.5.8 Technical Support

4.5.8.1 Overview

This appraisal of Technical Support to operations addressed five of the eight performance objectives in this functional area. Performance Objective TS.5, Environmental Impact, was addressed in detail by the Environmental Subteam and the results are included in Section 3.0 of this report. TS.6, Packaging and Transportation of Hazardous Materials, and TS.8, Criticality Safety, were appraised as separate functional areas and are described in Sections 4.5.9 and 4.5.10, respectively.

Visits were made to the Intense Pulsed Neutron Source (IPNS) and Alpha Gamma Hot Cell Facility, moderate hazard nuclear facilities; ATLAS, Advanced Photon Source (APS), and NBL, low hazard facilities; and JANUS, a category B reactor. Discussions were held with operations managers of those facilities as well as representatives of Plant Facilities and Services Division (PFS), Environment, Safety and Health (ESH), Special Projects Office (SSD), Quality Assurance, Environment, and Safety Office (QES), Engineering Physics, and the New Brunswick Laboratory (NBL). Documentation of modification project files, SARs, Operational Safety Requirements (OSRs), procedures, and other technical support documents was reviewed and evaluated.

Technical support to operations at ANL-E comes from a wide variety of organizations. Organizational charts define the lines of communication and responsibility. PFS, which provides design and construction management for modification projects, is organized to carry out this function effectively. ESH provides technical support by specialists and technicians in various safety disciplines; e.g., industrial safety, industrial hygiene, fire protection, health physics, and environmental compliance.

Line management within the various research divisions is given the primary responsibility to determine what safety-related technical support they need. Technical support for ongoing operational activities is often provided by groups within the Divisions; however, evidence suggests that a broader safety review would be desirable. Sitewide technical support to operations is not used effectively. Safety review by ESHD, in most cases, is by invitation only. Evidence confirmed that ESHD does not perform sufficient safety surveillance of sitewide operations.

SARs have been prepared for each of the operating facilities visited, as well as a Preliminary Safety Analysis Report (PSAR) for APS. Laboratory divisions have the responsibility to prepare SARs. There is no clearly designated central organization within ANL-E to provide guidance and to coordinate format, content, and quality. The recent SAR for the IPNS and the PSAR for APS are of high quality, but earlier SARs prepared for other facilities do not conform as well to the format and content required by DOE 5481.1B. This has been expressed as a concern. An ANL-E self-assessment finding pointed out that waste management facilities onsite do not have a SAR.
Attention has been given to keeping OSRs and Technical Specifications consistent with current configuration and operations. Limiting conditions for operations and surveillance requirements are generally specified. Records reviewed verified that surveillance requirements are being met. In most cases, operations managers maintain a status record to ensure that tests and checks are completed as required.

Procedures are generally prepared and approved within each operating group. Those that involve safety generally receive some sort of safety review. But it was not always possible to verify that any safety review independent of operations was required. Safety-related steps are seldom highlighted in operating procedures. It was verified that operating procedures receive annual review and revision as necessary. Most technical support procedures are not current and are undergoing revision; e.g., the "Health and Safety Manual" for ESH and the policy and procedures manuals for the Facilities Planning and Engineering Department (FPED). The "Health and Safety Manual" for NBL is available in draft only.

Facility modifications performed by PFS follow sound engineering practices with incorporation of appropriate safety features. Design and construction plans are reviewed and approved by ESHD. Documented completion reviews are conducted for closeout of each project. Formal closeout requires as-built drawings, but they are not always completed, particularly if funds run out. Also many different groups within other Laboratory Divisions carry out modifications and prepare drawings, with no coordination with PFS and ESH. This practice provides no assurance of adequate safety review and no assurance of sitewide configuration control. This is a major concern of the Safety and Health Subteam.

Laboratory divisions are generally responsible for operational readiness review (ORR) prior to startup after any modification that involves safety. There is little documented evidence to verify how this has been accomplished in the past. However, the ORR for the startup of the IPNS enriched uranium booster target (October 1988) was comprehensive and well documented. This could serve well as a model for ANL-E.

Performance monitoring and testing of operations equipment are usually done by personnel within the respective divisions and in the Maintenance Department. For systems important to operations, trending of performance data to improve reliability and safety and to check for age-related degradation has sometimes been done. More often, however, trending of performance data is performed only when there seems to be a problem, or components are simply replaced when they fail. Also, evidence suggests that safety-related deficiencies are not always reported on a timely basis in accordance with DOE 5000.3A.

Most of the technical support activities for JANUS are carried out by operators and technician within the division. Power and reactivity calibrations are routinely monitored. Deficiencies noted in the ANL-E self-assessment are being addressed. Operations and maintenance procedures are being revised to cover off-normal conditions and to provide more formal content and quality.
4.5.8.2 Findings and Concerns

TS.2 PROCEDURES AND DOCUMENTS

PERFORMANCE OBJECTIVE: Technical support procedures and documents should provide appropriate direction, allow for adequate record generation and maintenance for important activities, and should be properly and effectively used to support safe operation of all facilities on the site.

Findings

- There was no clearly designated sitewide guidance and technical support for the preparation of SARs to control format and content, especially for nonnuclear facilities.
- The SAR recently updated for IPNS (August 1988) and the Preliminary Safety Analysis Report prepared for APS (January 1990) conformed well to the format and content required by DOE 5481.1B.
- A number of facilities (JANUS, ATLAS, and the Alpha Gamma Hot Cell Facility) had SARs that did not meet current standards and requirements. A new SAR for ATLAS was being prepared to address all modifications for the entire facility. A SAR revision was also underway for the Alpha Gamma Hot Cell Facility. Additional safety analyses were being carried out for an addendum to the JANUS SAR.
- The SAR for ATLAS was distributed among the original report and revisions in 1985 and 1989. It was not clear from the documentation which requirements remained valid and which had been superseded.
- The description of ATLAS Beam 4 along with the interlock specification was not addressed in the SAR.
- The ATLAS SAR did not consider the catastrophic failure of the helium manifold despite the presence of energy sources such as a large overhead crane.
- ANL-E self-assessment Finding SH 3.5.63 expressed the concern that the Alpha Gamma Hot Cell Facility SAR should be updated and that analyses be performed to assure that all safety questions have been covered. A schedule for completion proposed June 1, 1991. Self-assessment Finding SH 3.9.15 stated that Waste Management Facilities do not have a SAR. The proposed schedule called for a draft SAR by June 1991 and an approved SAR by September 1991.
CONCERN: Not all facilities at Argonne National Laboratory-East that require it have a current Safety Analysis Report that conforms to the format and content required by DOE 5481.1B.
TS.3 FACILITY MODIFICATIONS

PERFORMANCE OBJECTIVE: Technical support services required by each facility on the site to execute modifications should be carried out in accordance with sound engineering principles that should assure proper design, review, control, implementation, and documentation in a timely manner.

Findings of Fact:

- The ANL-E Health and Safety Manual required that ESHD review all plans and specifications for new construction or facility modifications managed by PFS. Review of recent PFS project files verified ESHD reviewed design specifications. However, fire protection reviews of plans, specifications, and projects was not routinely performed. (Also see Concern FP.1-I.)

- Personnel within other Laboratory Divisions carried out facility modifications independent of PFS, a practice which often bypassed appropriate design safety review.

- Modifications in a number of buildings did not always receive adequate independent safety review.
  - In Bldg. 366, the tops of offices were modified to serve as storage facilities.
  - Numerous modifications were made to electrical systems. In Bldg. 363, a machine was moved leaving exposed wires. In Bldg. 203, shop machines were inadvertently rewired to bypass the safety systems.

- See also Concern WS.4-5.

- This concern was expressed as a finding within ANL-E self-assessment finding SH-OP.3.3, but the recommended action focused only on the need for as-built drawing configuration control.

CONCERN: Facility modifications at Argonne National Laboratory-East are made without appropriate design and safety review.

Findings of Fact:

- PFS had the responsibility to maintain as-built drawings on the configuration of nonprogrammatic facilities and support systems.

- Modification drawings had been prepared by not only PFS but also Engineering Physics and staff within divisions, with no centralized control of as-built drawings.

- At times, PFS had to prepare current configuration "as-found" drawings prior to beginning a modification project.
- PFS procedures required completed as-built drawings to formally closeout a project, but limitation of project resources sometimes caused as-built drawings not to be prepared to meet the closeout requirement.

- See also concerns WS.4-5 and FP.1-1.

- ANL-E had identified this concern in self-assessment Finding SH.OP.3.3 PFS. An action plan and schedule were proposed. Efforts were not yet underway to update existing drawings although a request for funding was proposed to update existing drawings by April 1994. Steps had been taken to help ensure that as-built drawings be prepared to closeout future modification projects.

CONCERN: Argonne National Laboratory-East does not ensure configuration control of facility modifications with as-built drawings.

(TS.3-2) (H2/C2)
4.5.9 Packaging and Transportation

4.5.9.1 Overview

Argonne National Laboratory-East

Eleven of the 12 performance objectives in the Packaging and Transportation (PT) functional area were addressed in this appraisal. PT.7, Intra-Building Movements, was not appraised since there was no activity being performed that was directly applicable. Information for the appraisal was obtained by (1) reviewing policies, procedures, QA plans where available, records of receipts and shipments of hazardous material; (2) interviewing PT personnel from Waste Management Operations, Materials, Health Physics, Special Materials, Environmental Compliance Representatives, Site Services/Drivers and Riggers, Safety Coordinators, QA Coordinators, Director of the Safety Analysis Report for the Packaging Review Program for DOE Headquarters; (3) visiting Bldgs. 4, 5, 306, 325, 329, 374, 317, 815, 827, 316, 212, 200, and their associated areas; (4) observing the categorizing and packaging of hazardous materials and waste by a contractor, Laidlaw Environmental Services, Inc. (GSX), at Bldg. 325 and by waste management personnel at Bldg. 306. Hazardous materials are packaged, loaded and transported by GSX. Since the contract was initiated about July 1, 1990, 1800 drums have left ANL-E.

Based on observations of various PT activities it is concluded that PT operations are being performed safely. This is a credit to the experienced people involved, but it should be recognized that since PT activities are performed in at least five different organizations that the potential for serious incidents or noncompliances exist. This deficiency in PT organization was also indicated in the ANL-E self-assessment.

Nevertheless, several serious additional deficiencies in training, procedures, QA, safety oversight, and onsite requirements were identified during this appraisal. It is therefore, extremely important that the Transportation Safety Board (TSB) appointed and chartered on September 12, 1990, develop an official charter and address the deficiencies noted above and in the ANL-E self-assessment. The TSB reports to the Chief Operations Officer (COO) and this requires top management support. The TSB needs top management support so that the Transportation Officer, who also chairs the TSB, can carry out his PT responsibilities and assure (1) that compliance with all applicable DOE Orders and Federal regulations is achieved, and (2) that PT activities are performed in a safe and consistent manner.

In summary, there are serious concerns in training, procedures, QA, safety oversight, and PT organization. There was some evidence of good training, and the good things being done in PT are a credit to the experienced people not the system. Unusual Occurrence Reports are being accomplished as required in a timely manner.

The ANL self-assessments for PT were done well and the action plans and schedules for correction of the deficiencies should assure safe PT operations.
in accordance with the rules and regulations. These deserve top management support in implementation.

**New Brunswick Laboratory**

The eleven performance objectives used for appraisal of ANL-E were also used for appraisal of NBL. Bldg. 350 was visited and interviews were held with the Operations Support Division Director and the Department of Transportation (DOT) Certifying Officer. Policies, procedures, and experienced personnel are in place to carry out a safe and effective PT activity. Although a QA plan was in the process of being formally issued, NBL uses a QA data sheet with responsible individuals signing off on PT actions. Prior to shipment, this data sheet is signed by NBL management. Some shipments exempt from the regulations are shipped from NBL; the remainder are shipped through ANL-E. The PT operation is a well-staffed and operated organization.

Appraisal of the ANL-E and NBL PT activities are performed by the CH ES&H Division. The last appraisal was conducted in mid-1989. This activity was done well.

The individual responsible for the AAO PT oversight recently assumed the position of Operational Safety Engineering/Training/QA Specialist. Plans at this time have not been finalized but they are expected to continue with the CH representative providing direction and guidance in the PT activity and also conducting appraisals.
4.5.9.2 Findings and Concerns

PT.1 ADMINISTRATION AND ORGANIZATION

PERFORMANCE OBJECTIVE: Management should develop and implement a system of policies and directives that will provide for effective implementation of DOE Orders, particularly DOE 5480.3, 1540.1, 1540.2, Federal and State regulations, and good industrial practices in operations involving packaging and transportation of hazardous materials.

Findings of Fact:

- The ANL-E Transportation and Shipping Policy was issued in June 1990.

- There was no procedures manual for packaging and transportation (PT) activities. (Also see Concern PT.6-1.)

- There was no central organization responsible for PT activities. PT activities were carried out in five different organizations.

- The Transportation Officer in one of the five organizations had overall responsibility for PT activities but he was unable to carry them out.

- A control system did not exist to ensure that all persons involved in PT activities had ready access to current procedures.

- Formation of a Transportation Safety Board was approved by the Chief Operations Officer on September 12, 1990. A draft charter was also provided.

- There was no independent safety oversight.

- This concern was addressed in the ANL-E self-assessment. An action plan and schedule had been developed to correct the concern and it was considered adequate to correct the concern.

CONCERN: There is a lack of management control over the packaging and transportation activities at Argonne National Laboratory-East as required by DOE 5480.3.
PT.2 TRAINING

PERFORMANCE OBJECTIVE: Personnel should be trained, qualified, and certified in handling hazardous materials as required by DOE 5480.3 and 49 CFR.

Findings of
Fact:

• There was no formal documented training program for packaging and transportation (PT) employees involved in hazardous materials packaging and transportation.

• Some employees in PT had received no training, although a 3-day DOT Hazardous Materials Training course for onsite transportation personnel had been conducted by Westinghouse Hanford Company in December 1989.

• Training deficiencies in the five organizations involved in PT activities were addressed in the ANL-E self-assessment dated September 1990. An action plan and schedule had been developed to correct the concern and it was considered adequate to correct the concern.

CONCERN: Argonne National Laboratory-East packaging and transportation (PT.2-1) employees have not received comprehensive training to perform their duties as required by DOE 5480.3 and 49 CFR.

CONCERN: There is no formal training program for packaging and transportation employees at Argonne National Laboratory-East as required by DOE 5480.3 and 49 CFR.
PT.3 QUALITY ASSURANCE

PERFORMANCE OBJECTIVE: A system of checks and balances should exist that ensures the quality assurance (QA) requirements of the applicable DOE Orders, especially DOE 5700.6B, and ANSI NQA-1-1989 are met.

Findings of Fact:

- There was no Packaging and Transportation (PT) QA Plan.
- Two of five organizations had QA plans but they were out of date or not consistent with DOE 5700.6B and were not controlled documents. The remaining three organizations had no QA plans for their PT activities.
- There were no QA audits although one organization had one scheduled for November 1990.
- This concern was addressed in the ANL-E self-assessment. An action plan and schedule had been developed to correct the concern and was adequate to correct the concern.

CONCERN: At Argonne National Laboratory-East quality assurance plans have not been developed for all packaging and transportation activities consistent with DOE 5700.6B. (Also see Concern QV.1-1.)
PERFORMANCE OBJECTIVE: Sitewide operations involving packaging and transportation of hazardous materials should be conducted in a safe, consistent, and accountable manner, following approved procedures, in conformance with applicable standards and accepted practices.

Findings of Fact:

- Not all packaging and transportation operating procedures were documented, controlled, and current.
- Procedures used were not always available or coordinated with other groups.
- This concern was addressed in the ANL-E self-assessment. An action plan and schedule had been developed to correct the concern and was considered adequate to correct the concern.

CONCERN: The Argonne National Laboratory-East operating procedures for packaging and transportation of hazardous materials are incomplete.
PT.8  ONSITE TRANSFERS

PERFORMANCE OBJECTIVE: Onsite transfers of hazardous materials should be conducted in a safe, consistent, and accountable manner, following approved procedures, in conformance with applicable standards and accepted safety practices.

Findings of Fact:
- There was no policy for onsite packaging and transportation.
- There was no onsite transportation manual.
- Standards and procedures for onsite transportation of hazardous materials have not been established.
- DOE is in the process of issuing onsite requirements.
- This concern was addressed in the ANL-E self-assessment. An action plan and schedule had been developed to correct the concern and were adequate to correct the concern.

CONCERN: Argonne National Laboratory-East is not in compliance with proposed Department of Energy policy for onsite transportation.

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PERFORMANCE OBJECTIVE: Periodic PT safety appraisals of contractors by the Field Office, and independent internal PT safety audits by each contractor are required by DOE 5480.3 are conducted in accordance with DOE 5482.1B.

Findings of Fact:

- There were no independent internal safety audits of the packaging and transportation activity.
- There were some walkthrough safety inspections by line management personnel.
- Safety appraisals had been conducted by CH.
- Followup on findings from previous inspections and appraisals was not timely.
- This concern was addressed in the ANL-E self-assessment. An action plan and schedule had been developed to correct the concern and were adequate to correct the concern.

CONCERN: There are no independent internal safety audits of packaging and transportation activities at the Argonne National Laboratory-East as required by DOE 5480.3.
4.5.10  **Nuclear Criticality Safety**

4.5.10.1  **Overview**

The five performance objectives in the Nuclear Criticality Safety functional area were appraised by evaluating compliance with relevant codes, standards, DOE Orders, and nuclear industry practice. The appraisal covered facilities operated by ANL-E and NBL. Members of the Nuclear Facility Safety Committee, the Office of Nuclear Safety, Division Management, Criticality Safety Representatives, and operators were interviewed.

Emphasis in the review effort was given to those facilities that have a combination of the largest fissile material inventories and the greatest current level of fissile material handling activities. The specific facilities that were reviewed in detail are the Alpha Gamma Hot Cell facility; the Vault (Bldg. 315); and the NBL Uranium Laboratory, Plutonium Laboratory, and Vault. Reviews were also conducted of other facilities with significant inventories. ANL-E facilities with quantities of fissile material that are well below that necessary for nuclear criticality were not reviewed because these have no potential for criticality with current inventories.

The top level document for ANL criticality control, the Nuclear Criticality Safety Chapter of the Nuclear Safety Procedures Manual, was reviewed in depth. This document establishes requirements for: a Criticality Hazards Control Statement (CHCS) for each Division possessing more than specified quantities of fissile material; a General Plan for Nuclear Criticality Safety for each Division requiring a CHCS; a specific approval process for both the CHCS and General Plans, and a periodic updating process for CHCS; the appointment of a Divisional Criticality Safety Representative; and the training, qualification, and requalification of Fissile Material Handlers and their supervisors. At present there are 9 general plans and 15 CHCSs in active status plus 4 CHCSs in inactive status. NBL uses a single General Plan, a single CHCS, and a Criticality Safety Representative and an Alternate to control its criticality safety activities. The CHCSs of the Alpha Gamma Hot Cell and NBL were reviewed in detail, and the laboratory and storage areas of both were inspected for consistency with their CHCS requirements. Particular attention was paid to the content and posting of procedures, container labeling, criticality limit postings, and current inventories. Criticality representatives and operators were interviewed and Fissile Material Handler training and training records were reviewed. In addition, the Bldg. 315 Vault, the Intense Pulsed Neutron Source (IPNS), and Chemical Technology facilities were inspected. The central control station of the sitewide criticality alarm system (Bldg. 222) was inspected and key staff members responsible for the design, operation, and maintenance of the system were interviewed.

The nuclear criticality safety programs of ANL and NBL are documented and well defined. In both cases, they include a criticality safety review function that is independent of operations, and which reviews all criticality safety documents and procedures and performs operational conformance reviews and audits. At ANL-E, criticality safety is the direct responsibility of each
Division or Department director, with a Divisional Criticality Safety Representative reporting to the director and having the delegated operational responsibility for criticality control. The independent review function is provided by the Nuclear Facility Safety Committee, reporting directly to the Laboratory Director. This committee, after due deliberation, makes recommendations for the Laboratory Director’s approval of the Nuclear Safety Procedures Manual, the CHCSs, and the changes and updates thereto. The Committee is supported administratively and technically by the Office of Nuclear Safety, which reports to the Assistant Laboratory Director, ANL-W, and then to the COO. Individual committee members, several of whom normally report to the Divisions, do not participate in Committee activities concerning their own Division, in order to assure independence. Ultimately, the Laboratory Director must assure the continued independence of the committee from any possibility of influence based on operational interests.

At NBL, criticality safety is the responsibility of the Director with his appointed Criticality Safety Representative having operational responsibility. The usage of the CHCS and other aspects of the NBL program are very similar to the ANL-E program. The independent review function is performed by the ANL Nuclear Facility Safety Committee under a Memorandum of Understanding between DOE, NBL, and ANL.

The geographic separation of the ANL-E facilities from the technical, administrative, and documentation resources of the Office of Nuclear Safety in Idaho does not appear to have contributed to any criticality safety problems. However, this geographic separation has, and will continue to require a special effort from key staff members in both locations to maintain communications and a full awareness of the many current operating situations at ANL-E facilities.

The criticality control programs of both ANL-E and NBL are well conceived. These programs are being executed in a safe and conscientious manner by competent and trained staff members that uniformly exhibit a high awareness of the extreme importance of criticality safety. The principal method of criticality control is the administrative control of fissile material quantities to less than one-half of the minimum critical mass for the form of the material within a control area. Because of its simplicity, mass control is probably the most reliable method of criticality control by administrative means. In addition, the double-contingency principle is being conservatively interpreted as requiring continued subcriticality after two unrelated and improbable adverse conditions or events have occurred. Because of the usage of safe-mass-limit administrative controls, the conservative application of the double-contingency principle and the caliber and attitude of the operating and independent review staff members, the likelihood of an inadvertent criticality at ANL-E is judged to be very low. Although these are favorable factors, the continued use of any kind of administrative controls will continue to challenge the ANL and NBL staff members to maintain criticality safety margins.
4.5.10.2 Findings and Concerns

CS.1 ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE: All operations with fissionable material should be conducted to provide effective nuclear criticality control during all activities.

Findings of Fact:
- The individual records and documents significant to criticality control at NBL were complete and current.
- There was no top-level document (or documents) at NBL which unequivocally identified all of the necessary types of criticality records and documents and the corresponding responsibility for distribution, control, and currency of each type. Such a document(s) is required by DOE 5480.5.8(j).

CONCERN: The criticality records control system at the New Brunswick Laboratory is not in compliance with the requirements of DOE 5480.5.
CS.4 OPERATING PROCEDURES AND CRITICALITY SAFETY LIMITS

PERFORMANCE OBJECTIVE: The approved written operating procedures should address criticality safety limits in providing effective guidance for all aspects of facility activities.

Findings

- Chapter 1, Nuclear Criticality Safety, of the ANL Nuclear Safety Procedures Manual required that the divisional Criticality Safety Representatives report instances of non-compliance to the Divisional Director, but did not require Fissile Material Handlers to make such reports.

- The categorization of off-normal events or conditions is required by DOE 5000.3A.7. Neither the ANL-E Manual nor the Divisional Criticality Hazard Control Statements address such categorization for criticality-related occurrences.

- The identification and reporting of reportable occurrences is required by DOE 5000.3A.8e. The ANL Manual did not include a requirement that Fissile Material Handlers and their supervisors report criticality-related occurrences, nor did it include a requirement that they receive training in the identification and reporting of such occurrences.

- The Argonne Illinois Self-Assessment Report identified (SH3.5.95 in Volume 2) a similar concern. The current absence of a categorization requirement was not identified, but the absence of a specific training requirement was noted. Separately, DOE requested (Taboas to Schriesheim, September 25, 1990) that ANL-E develop specific criteria for categorizing reportable occurrences at designated facilities. The Director of the Office of Nuclear Safety stated that the revision of the ANL-E Manual that is currently in progress would bring that Manual into compliance with occurrence reporting requirements. Therefore, the criticality safety assurance process was responding in a prompt and responsible manner to this self-assessment finding.

CONCERN: Approved written operating procedures concerning criticality control at Argonne National Laboratory do not address all of the requirements of DOE 5000.3A.
4.5.11 Security Safety Interface

4.5.11.1 Overview

The four Performance Objectives for the Security Safety Interface technical area were addressed during the course of this appraisal. This appraisal was conducted by reviewing pertinent DOE Orders and documents supplied by CH, AAO, ANL-E, NBL, and AM-PRO Protective Agency, Inc. (AM-PRO). The scope of this appraisal extended to NBL as well as ANL-E and AM-PRO. Interviews were conducted with engineering, safety, safeguards, and security personnel within CH, AAO, ANL-E, NBL, and AM-PRO. Tours of Buildings 302, 316, the outdoor firing range, and the Tactical Operations Center were conducted to verify conditions and practices in the workplace.

Overall, there were several deficiencies noted in the manner in which the safety, safeguards, and security functions interface. This situation has been exacerbated by the recent establishment of a new site contractor protective force which is managed by AAO rather than ANL-E, as was formerly the case. The lack of clearly defined roles and responsibilities for security, safety, and safeguard among ANL-E, AM-PRO, and DOE was found by the S&H Subteam to be an issue requiring immediate management attention by AAO.

Security/safeguards improvements and modifications are handled by the Facilities Planning and Engineering Department (FPED) in accordance with the ANL-E document, JOSTD-101-G-TO01, "Quality Assurance Practices for Facility Projects," October 8, 1989, which provides for the review and approval of such modifications by the ESH Department (ESHD). Mechanisms are in place to resolve comments from various reviewers for these projects. However, some modifications initiated by the Safeguards and Security Department did not require FPED involvement and, thus, did not receive any review by ESHD.

There is an overall lack of documentation describing the interrelationships among the site safeguards, security, and safety functions. Plans and procedures are either nonexistent or need updating. Access control during emergencies for needed safety personnel is being provided by security. However, during the course of an emergency response exercise in June 1990, it was noted that some confusion existed on the part of the AM-PRO personnel as to which responding vehicles should be allowed access to the incident scene (see critique: ANL-E "Emergency Response Exercise Assessment," June 28, 1990, page 23). This confusion was remedied by providing special identification to the responding units as evidenced during a subsequent exercise in July 1990 (see critique: ANL-E "Emergency Response Exercise Assessment," July 19, 1990, page 30).

AM-PRO is the ANL-E site protective force contractor and is a prime DOE contractor (to AAO). AM-PRO replaced the ANL-E protective force on June 1, 1990. A Memorandum of Understanding has been generated describing, in very general terms, the various responsibilities that ANL-E, DOE, and AM-PRO now have in this new arrangement. Detailed documents specifically describing the roles, responsibilities, and interfaces among the three organizations have not been prepared, and the lack of detail in existing documents has contributed to...
confusion among the site safeguards, security, and safety personnel. This deficiency should receive immediate AAO management attention for resolution.

Safety analyses and evaluations have been performed for the firing range. A recent series of safety tests on the firing range baffles resulted in restricting range activities to only 38 caliber weapons. A Firearms Safety Committee, chaired by ANL-E with representatives from DOE and AM-PRO, has been established by management to review, evaluate, and audit the programs, activities, procedures, and requests for exemptions in the area of firearms safety. An approved SAR for the outdoor firing range exists but no longer reflects its actual condition. The firing range is in a seriously deteriorated condition. Target baffles have degraded due to loss of filler, erosion of soil has occurred around the range floor, normal lavatory and toilet facilities are inoperable due to drainage problems with the septic system, and weeds have overgrown the top and sides of the range berm. Immediate AM-PRO and ANL-E management attention must be given to the range to bring it into a safe condition consistent with the existing SAR.


Training for AM-PRO personnel is being implemented according to the Draft DOE "Basic Training Program for Security Inspectors," September 1990, which appears to cover the elements stipulated in DOE 5480.16, Chapter I, paragraph 2.c. An AM-PRO training program is to be in place by November 1990.

AM-PRO "Small Arms Range Standard Operating Procedure," September 6, 1990, sets forth the operating procedures for the outdoor range at ANL-E. This procedure incorporates the requirements for range operations as defined in DOE 5480.16, Chapter I, paragraph 4. In addition, provisions have been made by AM-PRO for airborne lead concentration testing at the range and administering annual hearing tests and semiannual blood tests for lead to appropriate personnel.

A firearms safety program review of AM-PRO was conducted by AAO during the period July 17 to 19, 1990, using DOE 5480.16 as a guide. A total of 20 findings were identified, two of which were cited as requiring immediate attention. AAO is tracking the AM-PRO responses to these findings. Although it appears progress is being made, close monitoring by AAO will be required to assure that AM-PRO, as a new protective force contractor, meets all the requirements of DOE 5480.16 on a continuing basis.

The security/safety interface at the NBL was examined. ANL-E and AM-PRO in combination provide protective force and emergency response support to NBL. There were no new findings or concerns identified specifically regarding NBL.
4.5.11.2 Findings and Concerns

SS.1 SAFETY OF IMPROVEMENTS

PERFORMANCE OBJECTIVE: Security/safeguards improvements and modifications should not create or increase hazards that would impede the safe, reliable operation or shutdown of any facility on the site in normal, abnormal, or emergency situations.

Findings of Fact:

- Designs related to security/safeguards improvements were being managed by the Facilities Planning and Engineering Department (FPED) in accordance with JOSTD-101-G-T001, "Quality Assurance Practices for Facility Projects," October 6, 1989. JOSTD-101-G-T001 provides for the review and approval of design documents by the ES&H Department (ESHD).

- Some modifications having safety implications, such as locating and installing security alarms or making key and lock changes, were being made by ANL-E Safeguards and Security Department (SEC) without going through the FPED system of review and approval.

- Similarly, those same modifications initiated by SEC were not reviewed by ESHD.

- This concern was partially addressed in ANL/TTTF-90/1, AIS Self-Assessment Report, Volume 2, September 1990. The concern stated below addresses yet another area, security/safeguards, where ESHD reviews of modifications were not conducted. There was no action plan nor schedule identified in ANL/TTTF-90/1.

CONCERN: Some security/safeguards modifications having potential safety implications are not reviewed for safety by the Argonne National Laboratory-East Chief Operations Officer's organization.
SS.2 EMERGENCY ACCESS AND EGRESS

PERFORMANCE OBJECTIVE: Authorized facility and safety support personnel should not be denied access in an emergency. Egress during emergencies should be conducted according to approved preplanning.

Findings of Fact:

- The ANL-E Health and Safety Manual, May 6, 1983, currently in use, incorrectly referenced the ANL-E "Emergency Handbook" as opposed to the "Comprehensive Emergency Management Plan" (CEMP), Revision 1, April 1990, which was in use for the site.

- The CEMP did not reflect AM-PRO as the current protective force contractor at the AIS site. Furthermore, the CEMP lacked specific procedures directed at the safety and security functions and how they related to overall emergency preparedness planning for the site. For example, there was no specifically documented procedure in the CEMP that required the ESHD review of emergency exercise scenarios.

- The "Safeguard and Security Plan," March 1989, did not reflect AM-PRO as the onsite protective force contractor. A revised Plan was to have been completed by the end of November 1990. However, plans did not call for incorporating procedures on how the safeguards, security, and safety functions would interface with one another.

- Specific standard operating procedures, including those directed at the safety of personnel and operations and the reporting of safety incidents, had not been prepared by AM-PRO. For example, procedures for the reporting of safety incidents as required by DOE Orders had not been prepared, although the DOE contract with AM-PRO requires such reporting.

- See Section EP.2.

- The lack of procedures related to specific security/safety interfaces were identified in several places in both ANL/TTTF-90/1, AIS Self-Assessment Report, Volume 2, September 1990, and the AM-PRO "Firearms Safety Program Review," July 17-19, 1990, conducted by AAO. No schedules or actions plans were identified in the ANL/TTTF-90/1 document. However, action plan status reports which reflect appropriate and timely responses were being tracked by AAO in response to the AM-PRO "Firearms Safety Program Review" to assure corrective actions will be taken.

CONCERN: There is a lack of formally documented plans and procedures describing the interrelationships among safeguards, security, and safety, including emergency preparedness, activities at the Argonne Illinois Site.
PERFORMANCE OBJECTIVE: Safety authorities and responsibilities for all types of security/safeguards emergencies should be well defined and understood by all involved parties.

Findings of Fact:

- AAO has contract authority for the AM-PRO protective force which had replaced the ANL-E protective force earlier in the year.

- The document, "Memorandum of Understanding (MOU) Between Argonne National Laboratory, the Department of Energy, and AM-PRO Protective Agency, Inc. Regarding the Contract Protective Force for the Argonne Illinois Site," was prepared to define the responsibilities and interfaces among the three parties. This document, however, did not address all important responsibilities and interfaces. For example, the responsibility for the operation of the site firing range, its operational safety, and maintenance were not included in any provisions of this MOU. Although there was evidence that a more detailed MOU would be generated, no target date for such a document had been established by the parties to the MOU.

- The Manager, ANL-E ESHD was neither actively involved in the development of the existing MOU nor aware that he would have any involvement in the future should any revisions be made.

- Interviews with ANL-E, CH, and AM-PRO personnel revealed there was confusion over who had responsibility for the firing range SAR.

- Discussions with several ANL-E and AAO safety, security, and safeguards management personnel confirmed that the various roles, responsibilities, and interfaces among AAO, ANL-E, and AM-PRO were not clear and not well understood.

- There were no concerns found in the ANL/TTTF-90/1, "Argonne-Illinois Site Self-Assessment Report," Volume 2, September 1990, that addressed the concern stated below.

CONCERN: The Argonne Area Office has not assured that the roles, responsibilities, and interfaces among the site safety, safeguards, and security functions are clearly defined and well understood. (See Concerns OA.1-2 and OA.1-3.)
4.5.12 Experimental Activities

4.5.12.1 Overview

Since this is the first TSA at ANL-E to include experimental activities. Because experimental activities represent the largest concentration of people and because of their diversity in size and scope, experimental activities have large potential for safety impacts and were appraised in some depth.

Experimental activities were reviewed for the following organizational entities of ANL-E: (1) the Associate Laboratory Director (ALD) for Physical Research including the Divisions of Chemistry, Physics, and the Intense Pulsed Neutron Source (IPNS); (2) the Associate Laboratory Director for the Advanced Photon Source (APS); (3) the Associate Laboratory Director for Energy, Environmental and Biological Research including the Division of Biological and Medical Research; (4) the Associate Laboratory Director for Engineering Research including the Integrated Fast Reactor (IFR) activities and the Divisions of Engineering Physics, Chemical Technology, and Reactor Analysis and Safety. Additionally, the interfaces of the ANL-E Program and Division Directors with the Chief Operations Officer and the services provided by his staff were examined.

Finally, the functions and responsibilities of CH and AAO were assessed from the perspective of safety and health overview of experimental activities at ANL-E.

All of the performance objectives for the Experimental Activities functional area were examined for the above organizational entities. This included EA.1, Interface with Experimenters; Experiment Categories (review/approval of proposed experiments by an independent Safety Review Committee); Experiment Proposals; and Operation of Experiments.

The Acting Manager of CH, AAO Management, the Director of ANL-E and the ALDs mentioned above were interviewed, as were the Division and Department Directors. Safety Officers and Committee Chairmen were interviewed also and, in some cases, discussions were held with other Divisional support personnel or individual experimenters.

In general, the safety reviews of experiments are performed at the facility or Divisional level within ANL-E. The Divisions have some form of safety review organizations and each has a charter, although the charters are, in some cases, called other things. The experiment safety review organizations perform very well and, generally, have a reasonable amount of documentation, although this varies from Division to Division. However, the overall safety of both the facilities and experimental activities would be enhanced if the degree of conscientious review were applied uniformly and were applied both to facility operations as well as experimental activities.

CH and AAO have not developed their roles with respect to each other and existing documentation does not reflect their current operations. As a result, the lines of authority and responsibility for many aspects of the
safety of experimental activities are either blurred or do not exist. Implementation procedures for DOE Orders, e.g., DOE 5482.1B or 5000.3A, transmitting guidance and direction from AAO to ANL-E had been issued shortly before the assessment.

The Management Council at ANL-E had implemented policies and procedures for safety oversight and safety review of nonreactor experimental activities on a basis which can vary from program to program, even those under the direction of a single ALD.

From a practical viewpoint, the major problem is that there is no formal written policy or guidance from the Laboratory Director or Management Council levels to provide a framework for the determination of minimum levels of safety review required for the vast amount of work within the Divisions. There is no guidance which implements DOE 5480.5 with regard to the amount of documentation required for any safety analysis. There is minimum formal guidance on approvals required. The use of radiation safety and health physics personnel, and the level at which an independent safety review is obtained, is at the option of the Division director in which the experiment is performed.

Laboratory-wide policy, processes, and procedures for minimum levels of safety reviews and for minimum levels of documentation can be issued with the collaboration and assistance of the various Divisions, without disturbing the many excellent Divisional safety programs that are in place. Further, such guidance can provide the necessary incentive to upgrade the few marginal programs that currently exist.
4.5.12.2 Findings and Concerns

EA.2 EXPERIMENT CATEGORIES

PERFORMANCE OBJECTIVE: All proposed experiments should be approved by an independent Safety Review Committee before they are performed.

Findings of Fact

- The ANL-E Health and Safety Manual required only that "...occupational health and safety (OHS) shall participate in the safety review of experiments or tests when requested..."

NOTE: The Health and Safety Manual is in the process of being updated. The name of OHS has been changed to ES&H Department (ESHD) since the existing version of the Health and Safety Manual was issued, but the safety review is still performed by ESHD, when requested.

- At ANL-E, procedures and guidelines for determining the extent of review needed for experiments had not been developed and distributed Laboratory-wide.

- ANL-E Management considered that "...accountability and responsibility [for safety and health] is in divisions/ALDs...and if the capability exists, there is no reason why the divisions cannot do their own [safety and health]."

- Formal flowdown requirements, viz, implementing procedures from ALDs to Division levels did not exist to assure consistent approach to involvement of nondivisional personnel (e.g., ESHD) in experiment review.

- The charters and mission statements of CH make no mention of safety. Explicit responsibility for safety had not been delegated as a line function.

- Formal flowdown implementing procedures from CH to AAO, implementing DOE 5480.5, DOE 5482.1B, DOE 5484.1B and DOE 5000.3A, do not exist.

- Guidance to ANL-E from AAO, in the form of implementing procedures, is of such recent vintage that it has not yet begun to have an effect.

- See Concerns OA.1-2, OA.1-5 and OP.2-2.

- Concern EA.2-3 was found in the ANL-E self-assessment.
CONCERN: (EA.2-1) (H2/C2) Documented delegation of responsibilities from the Chicago Operations Office to the Argonne Area Office for safety review and safety oversight of experimental activities does not exist.

CONCERN: (EA.2-2) (H2/C2) The requirements for safety review and safety oversight of experimental activities have not been effectively codified by the Argonne Area Office and transmitted to Argonne National Laboratory-East.

CONCERN: (EA.2-3) (H2/C2) Procedures, programs or guidance to assure systematic assessment of experiment safety do not exist at the director level within the Argonne National Laboratory-East.
4.5.13 Site/Facility Safety Review

4.5.13.1 Overview

The six Performance Objectives for the Site/Facility Safety Review functional area were addressed during the course of this appraisal. This appraisal was conducted by reviewing pertinent DOE Orders and documents supplied by CH, AAO, ANL-E, and NBL. ANL/TTTF-90/1, "Argonne-Illinois Site Self-Assessment Report," Volume 2, September 1990, was reviewed. Interviews were conducted with CH, AAO, ANL-E, and NBL management personnel responsible for safety reviews. Tours of the Biological and Medical Research Division, Chemistry Division, Intense Pulsed Neutron Source (IPNS), and JANUS facilities, as well as NBL, were made to gain insight into the operations and how independent safety reviews were applied in the various operations across AIS.

The independent safety reviews conducted for moderate hazard nuclear facilities and reactors were in accordance with applicable DOE Orders. However, deficiencies were noted with respect to nonnuclear moderate hazard and nonnuclear/nuclear low hazard facilities. DOE 5482.1B had not been implemented at ANL-E. The lack of a consistent management system to assure flowdown of safety policy to the Division level (and below) has resulted in an inconsistent involvement of safety within the various divisions.

The independent safety review programs for the moderate hazard nuclear facilities and reactors were conducted in accordance with the "Nuclear Safety Procedures Manual," March 31, 1990, and followed the requirements of DOE 5480.5 and 5480.6. The independent safety review system for these facilities was implemented through the Quality Assurance, Environment, and Safety Office (QES), the Office of Nuclear Safety (ONS), the Nuclear Facilities Safety Committee (NFSC), and the Reactor Safety Review Committee (RSRC). Safety review documentation for the two moderate hazard facilities (IPNS and the Alpha-Gamma Hot Cell) and JANUS was reviewed and was in accordance with DOE 5480.5 and 5480.6. That documentation included annual facility appraisal reports, minutes of the NFSC and RSRC meetings, and minutes of meetings of the NFSC and RSRC Chairmen with the Director, ANL-E. This appraisal indicated the need to provide a quorum declaration statement and assignment of specific action items in the documented meetings of the two committees. It was observed that the annual facility appraisal reports, although specifically covering the review elements of DOE 5480.5 and 5480.6, could be enhanced by including all review documentation, such as meeting minutes, so that all review activities pertinent to a facility could be captured in a single document.

The safety review system for other facilities (nonnuclear moderate hazard and nonnuclear/nuclear low hazard) was deficient in that an internal appraisal system to provide an independent and objective review of ES&H activities, as required by DOE 5482.1B, is not expected to be in place until early 1991. This is further exacerbated by the lack of involvement of safety in operational activities which is left to the discretion of each operating Division. Furthermore, the absence of any flowdown requirements, such as formal implementing procedures, to Divisions has resulted in an inconsistent
involvement of safety in operational reviews and in the operations themselves. This has contributed to many safety violations cited in the Safety and Health Subteam report in the areas of worker safety, packaging and transportation, auxiliary systems, and operations.

Triennial reviews for the moderate hazard nuclear facilities and JANUS were performed and documented. However, a triennial review system to review the ES&H appraisal program had not been implemented, as required by DOE 5482.1B. It was noted that previously, triennial reviews of the internal audit system for ES&H activities had been documented, for example, "Triennial Review of Internal Audit System for the ANL Environmental Protection, Safety, and Health Protection Program," September 1986. However, such reviews lacked sufficient depth and detail to indicate to management the effectiveness of the ES&H audit program at that time. ANL-E has submitted to AAO for approval the ANL-E "Environment, Safety and Health Independent Internal Appraisal Program," June 7, 1990. This program document, upon approval, is intended to implement an internal ES&H appraisal program. However, Section 8.0, Independent Triennial Management Appraisal of Program, states that the "Laboratory QES Director, in conjunction with ESHD at ANL-E and Safety, Environment, and Safeguards (SES) at ANL-W, will conduct an independent triennial management appraisal of the ES&H Independent Internal Appraisal Program at ANL." The Laboratory QES Director has the responsibility for implementing the ES&H appraisal system as specified in Section 3.0, Responsibilities, and as such would have an organizational conflict of interest when conducting the triennial review of that appraisal program.

NBL is considered to be a low hazard facility (letter, Donald L. Bray to Robert W. Barber, Subject: Status of Safety Analysis Reports (SARS) for all Nuclear Facilities, June 30, 1986). Furthermore, NBL, because of nuclear criticality considerations must comply with DOE 5480.5 and provide an independent internal safety review system. The implementing procedures for such a system, however, are not in place at NBL. Discussions with NBL personnel indicated that these procedures would be in place by December 31, 1990.

A formal program to evaluate operating experiences and improve safety of operations was not in place. However, the Director, QES has been designated as the Occurrence Reporting Coordinator. As such, Unusual Occurrence Reports (UORs) (DOE 5000.3) and Occurrence Reports (ORs)(DOE 5000.3A) were reviewed and categorized by type to provide management with information on types and trends of incidents to be used to improve operations. However, evidence was found that not all incidents were elevated to management through the UOR system. For example, an incident approximately 2 years ago, involving an employee with elevated film badge readings at the ATLAS Facility was not reported as a UOR. Nuclear Regulatory Commission reports and other external publications on general safety and safety incidents were distributed to ESHD staff. Technical support staff in the various ES&H disciplines were in place. However, their availability did not appear sufficient to perform and provide necessary ES&H technical support for the AIS.
4.5.13.2 Findings and Concerns

FR.1 SAFETY REVIEW COMMITTEE

PERFORMANCE OBJECTIVE: A Safety Review Committee should be available to review safety questions and the safety impacts of experiments. This committee is part of the "Contractor Independent Review and Appraisal System" specified in DOE 5480.5, or DOE 5480.6, and/or DOE 5482.1B., Section 9.d.

Findings of Fact:

- A recent revision (September 1990) of the Health and Safety Policy contained in the ANL-E Health and Safety Manual, established the policy for an independent ES&H appraisal program to be administered by the Director, QES.

- A draft of the ANL-E "Environment, Safety and Health Independent Internal Appraisal Program," June 7, 1990, had been forwarded to AAO from the Director, Quality Assurance, Environment, and Safety Office (QES) for approval. This document defined the proposed ANL ES&H internal appraisal program in general terms, but had not been approved by AAO at the time of this assessment.

- The preparation of procedures and actual implementation of a comprehensive internal appraisal system for ANL-E, in accordance with DOE 5482.1B, had not been accomplished.

- This concern had not been addressed in the ANL/TTTF-90/1, "Argonne-Illinois Site Self-Assessment Report", Volume 2, September 1990.

CONCERN: Argonne National Laboratory-East has not implemented a comprehensive internal appraisal system that provides for the review of environment, safety and health functions as required by DOE 5482.1B.

Findings of Fact:

- CH determined that NBL was a low hazard facility that must meet the requirements of DOE 5480.5 which stipulates that a contractor establish and maintain an independent internal safety review system.

- The Director, NBL, assigned the responsibility for establishing and implementing an independent safety review system to the Senior Technical Assistant.

- Implementing procedures had not been prepared by the Office of the Senior Technical Assistant that would establish and maintain such a review system. It was planned, however, to have such procedures prepared and approved by December 31, 1990.

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There was no NBL self-assessment available; thus, this concern had not been previously addressed.

CONCERN: The New Brunswick Laboratory has not developed implementing procedures for an internal safety review system as required by DOE 5480.5.

Findings of Fact:

- The ANL-E Health and Safety Policy contained in the Health and Safety Manual, designated line management responsible for assuring the safety of ANL-E activities.

- Although such a policy provided the top level direction for safety of operations, no apparent formal flowdown of operating safety review requirements or standards to divisions was apparent. Rather, Divisions developed their own safety manuals which led to inconsistent approaches to involving safety in the review of operations across the site.

- Gloveboxes used for handling plutonium in the M Wing of Bldg. 200 were found to be operated at unknown pressure differentials. Other gloveboxes in that same area were observed to be at positive pressure relative to the laboratory. (See Concern OP.2-2.)

- Several serious safety events were observed at the ATLAS Facility indicating a lack of safety involvement in review of operations. For example, approximately 18 months ago, a lead shield was removed from an ion source which resulted in an unnecessary radiation exposure to an employee. At that time the radiation area was not properly posted. Furthermore, the facility SAR permits experimenters to modify beam parameters such as energy and current. The safety of major modifications to the facility, such as Beam 4, have not been formally reviewed and approved by safety. In the wake of the aforementioned radiation incident and prior to completion of an investigation, the chairman of the Radiation Safety Committee requested an exemption to restart the machine.

- Numerous noncompliances with OSHA Standards 29 CFR 1910, General Industry, and 29 CFR 1926, Construction, were cited, some of which resulted in two Category I Concerns and eight Category II Concerns.

- There were no independent safety audits of the packaging and transportation activities on site. (See Concern PT.11-1.)

- Radioactively contaminated equipment was observed to be placed in long-term storage without routine periodic monitoring. (See Concern AX.3-1.)

- This overall concern, as stated, had not been addressed in the 4-120
CONCERN: Argonne National Laboratory-East has not implemented a laboratory-wide policy that provides for an acceptable level of safety involvement in the review of operations across the site.
PERFORMANCE OBJECTIVE: Items that require review by the Safety Review Committee should be well defined and understood by facility management.

Findings of Fact: 
- The overall quality and depth of the ANL-E self-assessment was considered to be good, as evidenced by the numerous deficiencies documented in that report that were not documented in the Safety and Health Subteam report.
- Because of the thorough nature of the ANL-E self-assessment, there were a large number of deficiencies identified. However, there is concern that these deficiencies will receive lower priority when the Tiger team Assessment concerns and findings are formally transmitted to ANL-E.

CONCERN: The numerous deficiencies cited in the Argonne National Laboratory-East self-assessment may not be given sufficient priority once the Tiger Team Assessment concerns and findings are formally transmitted to Argonne National Laboratory-East.
PERFORMANCE OBJECTIVE: A triennial appraisal of the safety review system should be performed by contractor management.

Findings of Fact:

- Triennial reviews of the ANL internal safety review system, as applied to nuclear facilities and reactors, were being performed. However, similar reviews of the nonnuclear moderate hazard and nonnuclear/nuclear low hazard facilities lacked sufficient detail and depth.

- DOE 5482.1B requirements for an internal appraisal system of ES&H functions and a triennial review thereof had not been implemented at ANL-E at the time of this assessment. Thus, triennial reviews of the ES&H independent appraisal system also had not been performed. (See Concern FR.1-1.)

- The internal appraisal program was administered by the Director, Quality Assurance, Environment, and Safety Office (QES) as provided in the most recent revision of the Health and Safety Policy contained in the ANL-E Health and Safety Manual. The draft ANL-E "Environment, Safety and Health Independent Internal Appraisal Program," June 7, 1990, also designated the Director, QES as responsible for conducting the triennial review of the ES&H internal appraisal program. As such, there was a conflict of interest in that the one responsible for reviewing the internal appraisal system, triennially, is part of the system being reviewed.

- See Concern OA.5-1.

- This concern had not been addressed in the ANL/TTTF-90/1, "Argonne-Illinois Site Self-Assessment Report," Volume 2, September 1990.

CONCERN: For other than moderate hazard nuclear facilities, Argonne National Laboratory-East has not implemented an independent triennial review system of its environment, safety, and health internal appraisal program as required by DOE 5482.1B.
4.5.14  Radiological Protection

4.5.14.1  Overview

The radiological protection activities at ANL-E were evaluated against the performance objectives and criteria described in DOE/EH-0135, "Performance Objectives and Criteria for Technical Safety Appraisals at Department of Energy Facilities and Sites," dated June 1990. All 12 of the performance objectives were addressed. Evaluations were made by interviewing ES&H Managers and Supervisors, Group Leaders, Health Physicists, facilities managers and Health Physics Technicians; visiting selected buildings and sites to observe radiation safety practices; reviewing procedures, documents and records; and reviewing the unusual occurrence records for the past two years.

The external and internal dosimetry at ANL-E is good. The external dosimetry program at ANL-E has Department of Energy Laboratory Accreditation certification through January 1992. The bioassay program is extensive and technically sound. The whole body counting facilities had the equipment and personnel expertise to measure and evaluate internal deposition of radionuclides emitting photons. Recordkeeping has recently been upgraded and complies with the requirements in DOE 5480.11.

The radiation protection activities in the work areas are mostly conducted in a reactive mode. The Health Physics Group is understaffed for the amount of work required of them. The group consists of 25 health physics technicians and 4 health physicists. Of the 25 health physics technicians, 11 are classified as Technician III, the starting grade and are considered as "in training." The Technical Support Group includes eight health physicists, four of whom also participate in the radiation safety program. The Technical Support Group had a reduction in health physicists from four to two with retirement of one staff member and reassignment of one staff member (full-time) to the design team for Advanced Photon Source (APS), yet the workload on the Group has increased. Proactive surveillance of work areas by professional Health Physicists is not being done. These factors have led to a marked reduction in the level of radiation safety at the ANL-E.

The problems of understaffing will take a long time to rectify. Health physics technicians require at least a year on the job before they start to become qualified to work without direct oversight of a qualified person.

The ANL-E self-assessment pointed out many safety deficiencies. This alerted upper management to the inherent radiation safety problems. The problems that could be addressed immediately were rectified. Corrective actions that were made included the delineation of radiological control zones, the posting of such areas, installation of hand and shoe monitors at the egress points, and the upgrade of the record keeping systems.

There are a number of radiation safety concerns still pending or discovered by this assessment. An example of a serious concern is in the Bldg. 200 Chemistry laboratories where gloveboxes are used for plutonium chemistry. The boxes are purposely pressurized by activating a foot switch. Any breach of
the containment will likely lead to a radiation exposure or contamination incident. In these same chemistry laboratories there were other gloveboxes operating outside the limits of pressure differential. Hoods also were in use that were being operated at less than the minimum air inflow required by DOE standards.

In safety of radiation producing machines, interlocks on x-ray diffraction equipment and in accelerator areas are not redundant. A single interlock chain exists in many cases. Failure of an interlock switch could lead to serious radiation exposure to workers.

These situations are indicative of the lack of proper safety surveillance by radiation protection personnel. A proactive health physics program would pick up such deficiencies. The lack of a proactive program is further evidenced by 88 radiation protection concerns established in the ANL-E self-assessment. Many of these concerns reflected serious deficiencies in the overall radiation protection program.

ANL-E is not in compliance with radiation control practices required by DOE 5480.11. The action plans developed to respond to these deficiencies is not adequate. Until recently, training of health physics technicians was not in compliance with DOE 5480.11. However, a satisfactory action plan for training has been developed and implemented. When technicians are hired at the Technician III level, almost all training is on-the-job. ANL-E has initiated a good technician training class with basic health physics theory and laboratory work along with their on-the-job training. This is particularly important and needs to continue as the older technicians are approaching retirement.

The radiation protection personnel including supervision are overworked. They have put in many hours of overtime in Fiscal Year 1990, and relief from excessive overtime does not appear likely at this time.

The qualified technicians (viz, those not in trainee status) and professionals are technically competent. All are dedicated to their work, but as presently staffed, more work exists than can be accomplished in a timely manner.
4.5.14.2 Findings and Concerns

RP.1 ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE: Site/facility organization and administration should ensure effective implementation and control of radiological protection activities on the site/facility.

Findings of Fact:

- Radiological protection at ANL-E covered a wide spectrum of research activities including accelerators, many types of radiation producing equipment, radiochemistry, radiobiology, reactor operations, fuel element processing, decommissioning of retired reactors, and radioactive waste management. Other health physics activities included external dosimetry and badging, bioassay, whole body counting, and internal dosimetry.

- Health physics coverage for all these activities was provided by a staff of 25 health physics technicians and 8 professional health physicists.

- Eleven of the 25 health physics technicians were Technician IIs (starting grade) and have been in health physics for less than 1 year.

- Twenty-four health physics technicians had worked more than 6000 hours overtime in Fiscal Year 1990.

- Radiation protection activities were conducted solely in a reactive mode, primarily limited to acting on requests for service.

- See Section AX.3 for examples of lack of proactive surveillance.

- Health physics technician staffing is inadequate to cover the work requests in a timely manner. An experimenter requested health physics coverage for change-out of a tritium target in Bldg. 316. After waiting for health physics coverage for more than an hour, and getting no help, he changed-out the target with two other co-workers using the wrong type of gloves. They received a small intake of tritium. The committed dose equivalent turned out to be insignificant (< 0.01 mSv or 1 mrem). However, this indicates that experimenters are not willing to delay work until health physics coverage is available. All the health physics technicians were on other assignments at the time.
These administrative and operational deficiencies were recognized in the self-assessment conducted earlier this year. Corrective action was being taken by ANL-E. Additional full-time equivalents had been authorized and the ES&H Department had recently hired five new technicians and one professional health physicist. One vacancy for a technician still existed.

CONCERN: See Concern OA.1-4.
PERFORMANCE OBJECTIVE: Radiation protection procedures for the control and use of radioactive materials and radiation generating devices should provide for safe operations and for clearly identified areas of potential consequences.

Findings of Fact:

- The ANL-E "Policy Manual" defined the Health and Safety Policy of the Laboratory and designated responsibilities for implementing the policy. It also provided the charter of ESH.

- In the current ANL-E Health and Safety Manual, the section on radiation protection consists mainly of basic health physics information for the benefit of line supervisors. Few procedures were included, and they are outdated. A revised manual is in draft form but has not been formally approved and distributed.


Findings of Fact:

- The Health Physics Procedures Manual provided procedures and technical information for the Health Physicists and Health Physics Technicians working in the field. It was not complete, lacking some important procedures such as a Radiation Safe Work Permit procedure, a procedure on placement of air monitor equipment, a procedure on how health physicists should respond in an emergency, and a procedure for control of radioactive material moving from one radiological control area to another. The existing procedures referenced DOE Orders, the Code of Federal Regulations, American National Standards Institute standards, and other pertinent sources of information.

- These deficiencies were recognized in the ANL-E self-assessment made earlier in the year. The ESH Health Physics group was working on the problem at the time of this appraisal with all additions and revisions to be completed by December 1, 1990.

CONCERN: The Argonne National Laboratory-East Health Physics Procedures Manual lacks a number of procedures important to safely working with radiation and radioactive materials.

Findings of Fact:

- Interlocks on analytical x-ray machines in Bldg. 212 were not dual, hardwired, and fail-safe.
- The analytical x-ray machines in Bldg. 212 did not incorporate interlocked plastic box shields.
- In the past, users of the machines had by-passed the interlocks using magnets.
- Interlock tests on the x-ray machines in Bldg. 212 were 2 months overdue, but the machines were not taken out of service.
- In the past, users of the machines had improperly assembled and operated the machines ignoring the radiation alarms.
- In the past, users of the machines had improperly assembled and operated the machines inadvertently resulting in radiation exposure to the system manager.
- The recent self-assessment did not recognize the limitations of administrative controls in preventing the unsafe use of analytical x-ray machines.

CONCERN: Analytical x-ray machines at Argonne National Laboratory-East have insufficient physical barriers and interlocks.

Findings of Fact:
- Interlocks on the Fast Neutron Generator in Bldg. 315 are not dual with independent action.
- Components in the transport line of ATLAS are not interlocked to prevent unintentional loss of the beam.
- See Sections OP.2, OP.3, and OP.4.
- The recent self-assessment established findings concerning the lack of dual, fail-safe interlocks around the ATLAS Facility.

CONCERN: Argonne National Laboratory-East has no standards for the interlock systems of small accelerators, and this results in a failure to meet the mandatory requirements of ANSI-N43.1.
PERFORMANCE OBJECTIVE: External radiation exposure controls should minimize personnel radiation exposure.

Findings of Fact:

- Proactive surveillance of work areas was not being done by health physicists. Health physicist work is limited to responding to requests for services. See Sections AX.3 and OP.2 for examples.

- There were many areas of the Laboratory such as Bldgs. 200, 203, and 212 where a health physics investigation could result in reducing the probability and severity of radiation exposure incidents.

- The ANL-E self-assessment recognized this deficiency. Six additional positions were immediately allocated for health physics technicians to cover waste management operations. Thirteen additional positions in health physics are requested for Fiscal Year 1991.

CONCERN: Argonne National Laboratory-East had no proactive approach to external radiation control.

Findings of Fact:

- ANL-E did not have a Radiation Safe Work Permit program; therefore proper control of exposure to external radiation sources could not be assured.

- This deficiency was noted in the ANL-E self-assessment report.

- Action was planned by the Health Physics Group to incorporate a Radiation Safe Work Permit in the existing Safe Work Permit structure.

CONCERN: At Argonne National Laboratory-East, work on radioactive systems can proceed without proper review by the health physics organization as required by DOE 5480.11.
PERFORMANCE OBJECTIVE: Internal radiation exposure controls should minimize internal exposures.

Findings of Fact:
- ANL-E had an extensive bioassay program for monitoring the uptake of radionuclides in workers which included routine fecal analyses.
- During Calendar Year 1989 two employees received uptakes of uranium by inhalation. These resulted in a committed effective dose equivalent of 1.5 mSv (150 mrem) and 1.8 mSv (180 mrem), respectively. Nine other internal exposures were investigated that year, but none exceeded 0.10 mSv (10 mrem).
- There are areas of ANL-E, such as Bldgs. 200 and 212, where ANL-E had no proactive surveillance by Health Physicists for possible sources of intake of radioactive materials by workers.
- See Section RP.9 for discussion of deficiencies in constant air monitors.
- The ANL-E self-assessment recognized the deficiencies in air monitoring. Eight constant air monitors are on order and the passive air sampling program will be increased.

CONCERN: Argonne National Laboratory-East had no proactive health physics approach in work areas where intake of radioactive materials is possible.

Findings of Fact:
- Hoods were observed in the analytical chemistry laboratories that were being operated with inflow velocities below the requirements in DOE 6430.1A.
- Gloveboxes used for plutonium work in Bldg. 200 had step-on switches which pressurized the glovebox when activated.
- Gloveboxes are operated with pressure differentials outside specifications in DOE 6430.1A.

CONCERN: See Concern OP.2-2.
PERFORMANCE OBJECTIVE: Personnel dosimetry and radiological protection instrumentation used to obtain measurements of radioactivity should be calibrated, used, and maintained so that the results are accurately determined.

Findings of Fact:

- The area radiation monitors at the chemistry electron linear accelerator were source checked annually but were not calibrated.
- Radiation monitors at the ATLAS accelerator were response checked annually but were not calibrated.
- An area radiation monitor at the ATLAS ion source was not functioning due to a failed fuse.
- See Concern QV.4-1.
- The recent self-assessment noted that radiation monitors not under the control of the ES&H Department were, at times, left in the field and not calibrated.

CONCERN: (RP.8-1) (H2/C1)

The Argonne National Laboratory-East program of calibration and controls for radiation monitors fails to ensure the accuracy of measurements.

Findings of Fact:

- A memo of understanding was issued which coordinates calibration of NBL radiation instruments.
- Surface contamination instruments at the NBL were subjected to an annual source check but were not calibrated in accordance with ANSI N323.
- External exposure rate instruments at the NBL were subjected to an annual source check but are not calibrated in accordance with ANSI N323. These instruments were also used for shipping certification of radioactive materials.
- See Concern QV.4-1.

CONCERN: (RP.8-2) (H3/C1)

Instrument calibrations at New Brunswick Laboratory are not performed in accordance with ANSI-N323.
PERFORMANCE OBJECTIVE: Air monitoring systems through selection, location, calibration, and maintenance should ensure reliable estimates of air activity for radiological control purposes.

Findings of Fact:

- The ANL-E air monitoring program had de-emphasized air monitoring in favor of passive air sampling. There were only a few constant air monitors (CAMS) left operating onsite.

- CAMS have been removed from service and not replaced due to user complaints of noise or reliability.

- ANL-E had improperly asserted to AAO that the air monitoring program was in compliance with DOE 5480.11. The basis for this assertion is that since the Order does not explicitly define the term "monitoring" ANL-E is free to interpret it differently than other DOE sites, thereby, allowing passive sampling to be used in lieu of monitoring with CAMS.

- Passive air samplers were not in place in all of the plutonium handling laboratories in Bldgs. 200 and 212.

- CAMS were not in place in the plutonium handling laboratories in Bldgs. 200 and 212.

- Results of the passive air sampling program were expressed in the primary measurement of disintegrations per minute, and not in units of air concentration.

- Air flow meters had been the subject of a one-time characterization of accuracy and were not routinely calibrated.

- The recent self-assessment noted the lack of documentation on the air monitoring program.

CONCERN: The Argonne National Laboratory-East air monitoring program fails to meet the requirements of DOE 5480.11.
PERFORMANCE OBJECTIVE: The radiation monitoring and contamination control program should ensure worker protection from radiation exposures.

- NBL had constant air monitors (CAMs) in each plutonium laboratory.
- Air monitoring for radioactive materials was lacking in many radiological control areas. Only one CAM was observed in operation in Bldg. 212 in the Alpha Gamma Hot Cell area.
- Passive air monitoring at "breathing zone" level is done around gloveboxes and hoods; however, there were many hoods and gloveboxes that had no such monitoring.
- Portable air sampling equipment is used during work on equipment which has the potential for air contamination.
- Eight CAMs have been ordered for placement in Bldgs. 306 and 331.
- Air monitoring deficiency was noted in the ANL self-assessment.

CONCERN: See Concern RP.9-1.

Findings of Fact:

- All radiological control areas had some type of frisker or a hand and foot monitor at the point of egress. These instruments detect alpha and beta-gamma activity. In many cases, such as in Bldg. 306, they were placed in areas where the background counts range from 2000 to 3000 counts/minute where the ability to detect alpha activity at the release limit was compromised.
- In Bldg. 306 two special hand and shoe monitors were mounted on carts and were moved to work areas with known alpha emitting material. These units were set to detect only alpha activity. The detectors have a background of a few counts a minute and, therefore, would detect alpha activity at the limit for release. There is no documented procedure for the placement and use of these alpha hand and shoe monitors.
- The ANL-E Health and Safety Manual states the ANL-E policy for location and use of the hand and foot monitors. The policy is based on a technical study. The policy was not followed.
- Deficiency on egress contamination control was recognized in the ANL-E self-assessment. Corrective action had been started with a scheduled completion date of December 20, 1990.
CONCERN: (RP.10-1) (H3/C1) At Argonne National Laboratory-East, inappropriate location of hand and foot monitors limits ability to detect alpha contaminated hands and shoes as required by DOE 5480.11.

Findings of Fact:

- ANL-E did not have a Radiation Safe Work Permit program; therefore, proper control of exposure to internal radiation sources could not be assured.

- This deficiency was noted in the ANL-E self-assessment report.

- Action was planned by Health Physics to incorporate a Radiation Safe Work Permit in the existing Safe Work Permit structure.

CONCERN: See Concern RP.4-2.
PERFORMANCE OBJECTIVE: A formally structured, auditable program should be in place with established milestones to ensure that exposures are maintained as low as reasonably achievable (ALARA).

Findings of Fact:
- No ALARA Goals were documented for 1990.
- A letter by R. E. Toohey, et al. and approved by R. A. Wynveen, R. L. Herriford and R. J. Teunis, dated May 10, 1990, defined the method by which ALARA goals were to be established for Calendar Year 1990.
- The ES&H Department (ESHD) had not received 1990 goals from two of the Divisions in the Laboratory in accordance with the letter cited above. Even after several notifications, ESHD had not received any additional goals. Consequently, the 1990 ALARA documents did not exist.
- The cumulative radiation exposure data over the past 10 years showed a decreasing trend in the Laboratory total man-rem exposures.
- Management support for ALARA in some divisions was weak or nonexistent.
- These deficiencies were not noted in the ANL-E self-assessment.

CONCERN: See Concern OA.3-1.
4.5.15  Personnel Protection

4.5.15.1  Overview

Occupational Safety and Industrial Hygiene aspects of this appraisal were addressed in unified fashion under the Personnel Protection Performance Objectives. All Personnel Protection performance objectives were appraised for ANL-E. In addition, industrial hygiene compliance issues were addressed for ANL-E under Section IH.5 of this report. Findings were developed through discussions with ES&H personnel, as well as various staff members of representative Divisions. Division discussions and site walkthroughs were conducted for various Plant Facilities and Services Division (PFS) operations, Chemistry Division, Chemical Technology Division, Biology and Medical Research Division, Environmental Research Division, Medical Department, and others. During site visits, policy, procedures, and records were reviewed, and field observations were made to evaluate overall compliance to safety and health practices.

The ANL-E Health and Safety Program is a line responsibility administered at the Division level through Division Directors, Department Heads, Division Safety Committees, Division Safety Coordinators, and managers and supervisors. The Quality Assurance, Environment, and Safety Office (QES) was responsible for acting to establish safety policies; determining the degree of implementation; and assisting the Laboratory Director in policy, planning, reporting, and auditing. ESHD was responsible for independent safety surveillance, support of QES, assisting line management in program implementation, and maintenance of the ANL-E Health and Safety Manual.

Policies and procedures did not clearly specify authority and responsibility for day-to-day assurance and verification of implementation and enforcement by line management of the safety and health program. A mechanism or system was not established to identify, track, correct, and verify correction of program deficiencies and noncompliances with policy, procedure, and regulation. The authority, responsibility, interaction, and communication mechanism between the line, QES, and ESHD had not been established to effectively resolve safety and health related matters.

Line management was not consistently effective in implementing and enforcing the health and safety program. Degree of compliance varied by division; however, in general terms, numerous sitewide noncompliances and deficiencies were found by the appraisal team in areas such as electrical safety, lockout/tagout procedures, hoisting and rigging safety, handling and storage of chemicals/gases/wastes, asbestos abatement procedures, and others.

PFS was particularly deficient in implementation and enforcement of health and safety requirements for construction. Numerous noncompliances were found in construction activities. An effective oversight, enforcement, corrective action, reporting, and documentation system was lacking for contractor activities. Purchasing did not consider past or present safety performance in its award criteria (which was by low bid). Construction coordinators responsible for safety performance were not formally trained in performing
OSHA-type inspections. They did not submit substantive safety reports on deficiencies regarding contractor activities. Findings from ESHD safety inspections of contractor activities were documented but no verification system was in place to assure PFS implementation of corrective action. Also, no effective communication system was in place to inform ESHD of ongoing contractor activities for surveillance purposes.

The ANL-E Health and Safety Manual had not been maintained current with new OSHA regulations and revisions. Many procedures did not comply with current regulations. This finding along with the inconsistency of line management in program application and enforcement contributed to nonuniformity in practice and to noncompliances throughout the site for key safety procedures such as lockout/tagout.

Training programs were provided for many health and safety related topics. However, the content of training courses could not be assured in many cases, because of the lack of course outlines or manuals. In addition, no mechanism was in place to assure that all personnel requiring training received it. The training program was in the process of being upgraded to address these and other issues.

Divisions could exercise extreme autonomy in health and safety by developing their own health and safety programs without Chief Operations Officer (COO) approval or concurrence through QES or ESHD. The quality of division safety and health manuals and corresponding programs varied. Division-approved procedures could limit COO involvement.

In summary, ANL-E management had not established an integrated, coordinated, and unified safety and health program. Policy, procedure, authority, responsibility, interfacing and implementing mechanisms, corrective action mechanisms, approval mechanisms, and verification/assurance mechanisms exhibited deficiencies, lack of definition, and/or nonuniformity in application.
4.5.15.2 Findings and Concerns

PP.1 ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE: Site and facility organization and administration should ensure effective implementation of the personnel protection program.

Findings of Fact:

The Quality Assurance, Environment, and Safety Office (QES) and ES&H Department (ESHD) were the groups reporting to the Chief Operations Officer (COO), responsible for health and safety oversight. Health and safety policy did not provide a clear statement concerning the interrelationship between these groups nor did it clearly define a day-to-day assurance and verification role. (See Section OA.1.)

- ESHD had independent safety surveillance oversight responsibility; however, no implementing mechanism for correction of surveillance findings and verification of correction was identified. QES was given responsibility to determine degree of policy implementation and to conduct appraisals and audits; however, it was not clear whether this referred to an ESHD program appraisal/audit or line enforcement program appraisal/audit, or both.

- The primary ESHD role was service-based rather than assurance, verification, or surveillance-based. This orientation was promoted by the lack of a clear policy statement establishing an ESHD assurance and verification role, as well as Division resistance in recognizing and accepting ESHD in such a role. Division resistance was demonstrated by a memorandum to ESHD discouraging proactive participation in the safety program, as well as by various Division policy statements implying Division self-sufficiency and autonomy.

- Specific goals, objectives, and agenda were not established for QES or ESHD. For instance, no analysis and resultant plan was in place which identified and prioritized items or areas of emphasis such as specific hazards to be evaluated and controlled; divisions to be targeted for support, oversight, evaluation, appraisal, or inspection; or regulations which required action for compliance. Without an agenda supported by ANL-E management, ESHD essentially defaulted to a service mode, and QES oversight was limited.

- ESHD staff referred to the Divisions as "clients" which indicated the predominant service orientation.

- ESHD and line management reports of safety noncompliances were often not acted upon by Divisions, demonstrating the lack of a
mechanism to obtain and verify corrective action. (See Section PP.3.)

- Line management did not consistently enforce personnel protection programs as evidenced by the numerous noncompliances found by the appraisal team, as well as the failure to correct noncompliance reports. (See Sections WS.3, WS.4, WS.5, PP.3, PP.4, and IH.5.)

- Personnel protection programs were appraised and results were reported in the "Argonne-Illinois Site Self-Assessment Report," September 1990. The report recognized a breakdown of line management safety responsibility, lack of ESH role definition, communication difficulties with divisions and the COO, and performance of ESHD safety reviews primarily upon division request. The cause, however, was not identified as lack of clarity in the assurance and verification system and implementing mechanisms to hold line management accountable for enforcement. Recommended actions were briefly mentioned but insufficiently detailed to assure appropriate correction.

CONCERN: The Argonne National Laboratory-East Chief Operations Officer had not established the Environment, Safety and Health Department, Quality Assurance, Environment, and Safety Office in a credible assurance and verification role relative to other Divisions. (Also see Concern OA.1-3.)
PP.2 PROCEDURES AND DOCUMENTATION

PERFORMANCE OBJECTIVE: Procedures and documentation should provide appropriate direction, record generation, and support for the personnel protection program.

Findings of Fact

- Health and Safety Policy did not provide a clear understanding of the role, responsibility, and authority of the Quality Assurance, Environment, and Safety Office (QES) relative to the ES&H Department (ESHD), both of which reported to the Chief Operations Officer (COO). (See Sections PP.1 and OA.1.)

- The role of ESHD relative to the divisions was further defined in the ANL-E Health and Safety Manual, as follows:

  - Chapter I-8, Division Safety Committees, ESHD assistance to the line was specified as was independent hazard surveys; however, no ESHD verification/assurance of safety program enforcement by the line was specified.

  - Chapter I-9, Facility, Equipment, and Experiment Safety Review Requirements, specified that ESHD "shall participate in safety review, when requested."

  - Chapter I-7, Construction Contractor Safety, allowed ESHD to perform surveys of construction sites and prepare deficiency reports to the Construction Coordinator for their corrective action. It did not specify ESH in a role to assure corrective action implementation, nor did it establish any verification mechanism.

- No supplemental implementing procedures were available to establish a mechanism or system of QES, ESH, and line interaction to identify, correct, and verify correction of deficiencies.

- The appraisal team found that noncompliances identified were often not corrected which confirmed the lack of effective interaction and followup.

- The "AIS Self-Assessment Report" did not identify the lack of a clear policy statement and implementation mechanism concerning the assurance and verification role of the COO and its responsible entities, ESH and QES.

CONCERN: See Concerns PP.1-1 and OA.1-3.
Findings of Fact:

- The Chemistry Division had prepared a detailed safety and health manual which was indicative of a strong commitment to safety; however, this manual represented a prime example of how a division could exercise autonomy in safety and health and (whether consciously or unconsciously) minimize or exclude the COO from a verification, assurance, and proactive role. This was based on the following:

  - The COO had no approval mechanism for the Chemistry Division safety and health plan.
  
  - The Laser Safety Officer (LSO), an ESHD industrial hygienist, who according to ANSI Z136.1-1986, had the ultimate authority and responsibility to monitor and enforce the control of laser hazards, was not afforded the opportunity to approve or concur with the Laser Safety Procedures of the Chemistry Division.
  
  - The "Laser Safety Procedures," as written, abrogated certain LSO responsibility as defined in ANSI Z136.1-1986, Section 1.3, such as medical surveillance and training, by placing the responsibility with the Chemistry Division Safety Officer (Safety Coordinator). Training and medical surveillance violations were noted during this appraisal. (See Section IH.5.)
  
  - A page and a half of the "Laser Safety Procedures" defined the Division Safety Officer responsibilities. LSO responsibilities were not similarly defined.
  
  - As written, the LSO was not included as a member or even advisor to the Laser Safety Committee. The Committee had no defined interface with the LSO. The procedure required the Committee to submit a report to the Division Director annually on laser safety status based on Division Safety Officer inspections but did not specify that the LSO be copied or that input be received from the LSO. In practice, the LSO was an active Committee participant despite the lack of a written role.
  
  - The "Reporting Procedure After an Accident" as defined in this manual for Bldg. 211 ("Safety Procedures") specified that accidents were to be investigated internally by the division and reported to the Bldg. 211 Safety Committee. COO involvement was not mentioned.
  
  - The Safety Procedures section of the manual rarely mentioned an ESH role. QES was not mentioned. The Safety Charter did not acknowledge COO, QES, or ESH existence.

- See Section EA.2.
The "AIS Self-Assessment Report" did not recognize the lack of COO review, approval, or concurrence of Division safety and health plans or of division ability to minimize the role of the COO.

**CONCERN:** Argonne National Laboratory-East management allowed Divisions to independently adopt policy and procedure which could limit Chief Operations Officer involvement in and assurance and verification of the health and safety program. (Also see Concerns OA.1-3 and OA.1-5.)

**Findings of Fact:**
- The role of the ANL-E Division Safety Coordinator was specified in Chapter I-8 of the Health and Safety Manual, Division Safety Committees, and included coordination of the safety program, point-of-contact for ESHD, and establishment of meeting schedules and inspection programs. The Safety Coordinator and Safety Committee, according to this procedure, were not responsible for inspections. This was specified as a supervisor responsibility.

- Health and Safety Policy did not clearly define the Division Safety Committees' roles. It gave these committees an option to be advisory or to perform oversight.

- Each ANL-E Division could develop its own safety and health policy and procedures. Some Divisions had prepared detailed manuals; whereas some Divisions had not. Some Division manuals further defined the Safety Coordinator and Safety Committees' roles, whereas others did not.

- ANL-E Safety Coordinators performed varying roles within divisions. Some participated in oversight, some did not. Variable roles led to internal confusion over who in the line had accountability for enforcement. (See Section PP.3.)

- The "AIS Self-Assessment Report" recognized the nonuniform Safety Coordinator role, but did not define concrete action to correct the deficiency.

**CONCERN:** Responsibility and authority of Division Safety Coordinators and Division Safety Committees were not clearly and uniformly defined by Argonne National Laboratory-East and Division policy and procedures. (Also see Concerns FR.1-3, OA.1-3, and OA.1-5.)

**Findings of Fact:**
- The ANL Health and Safety Manual contained general procedures for safety and industrial hygiene issues. Some procedures did not provide sufficient detail or had not been kept current to comply with regulations. Examples included:
- Lockout and Tagout procedures, Chapter I-12, did not comply with 29 CFR 1910, Subpart J. Numerous program inconsistencies and noncompliances were observed across the site by the appraisal team. (See Sections WS.4 and WS.5.)

- The Chemical Hazard Communication and Toxic Material Control procedure, Chapter III-1, did not establish criteria to meet 29 CFR 1910.1200 hazard communication requirements. (See Section PP.5.)

- The Hoisting and Rigging Equipment procedure, Chapter III-15, did not comply with 29 CFR 1910.179 and other standards. Numerous noncompliances were observed across the site by the appraisal team. (See Sections WS.4 and WS.5.)

- The Laser Safety procedure, Chapter III-7, did not incorporate all requirements of ANSI Z136.1-1986. (See Section IH.5.)

- The Confined Spaces procedures, Chapter III-9, did not comply with 29 CFR 1910.146, nor did the Safe Work Permit procedures, Chapter I-10. (See Section IH.5.)

- The Welding, Cutting, Brazing procedure, Chapter II-3, did not incorporate the April 11, 1990, revisions in 29 CFR 1910, Subpart Q.

- New standards such as 29 CFR 1910.1450, Occupational Exposures to Hazardous Chemicals in the Laboratory, as well as revised standards such as those listed above, were not effectively implemented by ANL-E Divisions, nor were revised procedures incorporated into the Health and Safety Manual.

- ESHD had responsibility for the "development, distribution, and maintenance of a Health and Safety Manual as defined by Health and Safety Policy.

- The "Argonne-Illinois Site Self-Assessment Report" recognized that the "Health and Safety Manual" required revision and it is underway; however, the recommended action was of insufficient detail to assure timely correction.

CONCERN: The Argonne National Laboratory-East Environment, Safety and Health Department had not fulfilled its responsibility for keeping the Health and Safety Manual current with regulations, and Divisions had not achieved compliance with many health and safety standards. (Also see Concern OA.7-1.)
Findings of Fact:

- Monitoring data showing higher than acceptable exposure results and quality control data showing outliers had, at times, been accepted without documenting a proper logic trail. For instance, clearance sampling for asbestos abatement performed by ESH in Bldg. 200 was above the 0.01 fibers per cubic centimeter of air (f/cc) EPA clearance guideline. Nevertheless, clearance was given without written explanation. When verbally explained by ESHD, the decision seemed defensible.

- Nonproficiencies for asbestos fiber-in-air counts (part of the National Institute for Occupational Safety and Health Proficiency Analytical Testing Program) were not explained on data sheets. Investigative and corrective action was reportedly performed, but was not documented.

- Quality criteria and standard operating procedures were being developed or were planned for approximately 25 industrial hygiene activities such as for the conduct of monitoring, surveys, investigations, tests, etc. These were for the most part, not finalized at the time of the appraisal.

- Monitoring records were maintained manually in building files which limited the ability to manage, track, and trend results.

- The "AIS Self-Assessment Report" recognized the data management difficulties and need for standard operating procedures. Deficiencies in the documentation of a logic trail in quality control or technical decisions was not identified.

CONCERN: The Argonne National Laboratory-East Environment, Safety and Health Department operating procedures, documentation, and data management systems were not structured and coordinated to assure generation of defensible and readily retrievable exposure assessment data.
PP.3 MANAGEMENT OF HEALTH AND SAFETY CONCERNS

PERFORMANCE OBJECTIVE: Chemical, physical, and/or other environmental stresses arising in the workplace should be identified, evaluated, and controlled.

FINDINGS OF FACT

- The Facilities and Planning Engineering Department (FPED) of Plant Facilities and Services Division (PFS) had no system to identify, track and correct occupational safety and health concerns for construction programs as indicated by the following:
  
  - Construction coordinators responsible for enforcing health and safety requirements prepared monthly progress reports for construction activities identifying percent completion and were held accountable for completion. The coordinators had no similar monthly requirement to report on safety matters.
  
  - Construction coordinators prepared project construction logs which at times mentioned a safety issue; however, these logs did not comprise an inspection mechanism to identify deficiencies and enforce corrective action.
  
  - Construction coordinators held no regular safety meetings among themselves or with management to discuss safety issues.
  
  - No mechanism was in place to issue contractors non-compliance reports and require their response for corrective action.
  
  - Shut down authority existed for imminent danger situations; however, Construction Coordinators were unsure of what constituted an imminent danger situation.
  
  - No requirement existed for PFS to report to procurement on contractor safety performance.

- ANL-E procurement awarded construction contracts on a low bid basis, did not consider past safety performance as an evaluation criterion, had no contract clause to penalize contractors based on safety performance, and kept no record of contractor safety performance.

- Environment, Safety and Health Department (ESHD) performed some construction safety review and inspection, which at times was conducted in the presence of Construction Coordinators. Noncompliances were reported upon and documented; however, no followup mechanism to verify correction was in place.
- ESHD was provided insufficient information to know of contractor activities such that walkthroughs could be planned and conducted.

- Quality Assurance, Environment, and Safety Office (QES) performed no regular oversight or appraisal of construction safety performance.

- Neither a formal nor effective informal system was in place for PFS management and procurement to hear and review ESHD and Construction Coordinator safety concerns and take corrective action with contractors.

- FPED Construction Coordinators felt their primary function was to get the job done correctly from a quality standpoint and as close to schedule as possible. They acknowledged safety responsibility, but clearly this was secondary.

- Construction Coordinators received no formal OSHA inspection training.

- Numerous construction safety and health noncompliances were identified at ANL-E by the appraisal team including imminent danger trenching/shoring violations, asbestos contaminant violations, gas storage violations, and others. (See Sections IH.5, WS.4, and WS.5.)

- The "AIS Self-Assessment Report" did not specifically identify construction safety as being a major deficiency.

**CONCERN:**

The Argonne National Laboratory-East Plant Facilities Services Division construction program including its procurement aspects did not apply an effective system to enforce safety requirements and correct noncompliances, and an effective assurance interface between Plant Facilities Services and the Chief Operations Officer was lacking.

**Findings of Fact:**

- ANL-E line management had not established a formal and consistent health and safety surveillance program to identify, track, correct, and closeout deficiencies and noncompliances. For instance, Central Shops listed deficiencies identified from quarterly inspections in report form which assigned a responsible party for corrective action. Many items, however, were carried over from quarter to quarter with no action taken and no interim followup. No deadlines for completion were established and management did not actively monitor progress on action item requirements. Some Division operations such as FPED and the Installations Section of FPED performed no documented walkthrough surveys.
Neither QES nor ESHD had established a programmed approach to conduct regular site walkthroughs or inspections for division activities as required by DOE 5480.10. Only a small percentage of site facilities were proactively surveyed and evaluated each year.

The Safety coordinator role was not defined by ANL-E Health and Safety Policy. ANL-E Division safety coordinator roles varied from Division to Division as follows which created nonuniformity in line enforcement practice:

- Most provided communications interface passing along information to groups and workers.
- Most had input to safety meeting agenda, if meetings were held.
- Some served on division safety committees while others did not.
- Some participated in walkthrough evaluations while others did not.
- Some received and maintained inspection reports while others did not.
- Some documented safety inspections while others did not.
- None established deadlines to close out safety related action items.

Safety coordinators had other responsibilities requiring more time than the safety role.

The "AIS Self-Assessment Report" recognized the inconsistency in the Safety Coordinator role and safety program application, acknowledged deficiencies in safety inspections by the line, and recognized the lack of walkthroughs of facilities. Recommended action was briefly stated but was not sufficient to assure correction.

**Concern:**

Argonne National Laboratory-East line management did not apply an effective system to identify, evaluate, and control safety and health hazards, nor enforce safety policy, and the Chief Operations Officer did not function in a programmed surveillance and assurance role. (Also see Concerns PP.1-1, PP.2-1, and OP.2-2.)

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Findings of Fact:

- An inspection, maintenance, and testing program for laboratory hoods was conducted by the Building Maintenance Department of FPED on an annual basis. However, hood installations and relocations were handled by the Divisions or the Installations Section of FPED. This information was not always provided to Building Maintenance for inclusion into the preventive maintenance and testing program. A hood in Bldg. 202, room A-146 had not been tested and appeared to have a low flow rate.

- Other ANL-E local exhaust ventilation systems such as dust collectors in shops, welding hoods, and paint booths were not included in a regular inspection and maintenance program.

CONCERN: See Concern OP.2-3.
PP.4 SURVEILLANCE OF HEALTH AND SAFETY CONCERNS

PERFORMANCE OBJECTIVE: Appropriate surveillance of activities should be conducted to measure safety and health performance and ensure the continued effectiveness of controls.

Findings of Fact:

- Reporting and logging of accidents, injuries, and illnesses in OSHA 200 format were not conducted by ANL-E. Accident and injury statistics were not formulated, tracked, and analyzed relative to trends or other facilities. Specific goals to reduce occurrences were not established.

- The Chemistry Division Health and Safety Manual as written, did not specify a Chief Operations Officer (COO) role to compile accident, incident, injury information, did not require COO notification, and did not acknowledge any COO role in investigations.

- The "AIS Self-Assessment Report" acknowledged the accident/injury deficiency but did not establish a mechanism or deadline for correction.

CONCERN: Accidents, injuries, and illnesses were not reported, logged, and tracked at Argonne National Laboratory-East as required by 29 CFR 1904 and DOE Order 5480.4.

Findings of Fact:

- The Facilities and Plant Engineering Department (FPED) of the Plant Facilities and Services Division (PFS) was responsible for management of larger scale construction and renovation programs and for the implementation and enforcement of health and safety requirements. Construction coordinators assigned to oversee contractor activities received no formal OSHA inspection training. Many hazards and OSHA violations were found by the appraisal team and were either not recognized or not acted upon by construction coordinators. (See Sections PP.3, WS.5, and IH.5.)

- FPED contractors were required to submit safety plans for construction activities. These plans were reviewed and approved by the ES&H Department (ESHD). However, construction coordinators were not provided with these plans by the construction managers. Their content, therefore, could not be enforced.

- An FPED project manager stated that the contractor safety plans were boilerplate and, therefore, not important to provide to the construction coordinators for enforcement purposes. Upon review, the plans contained many specific requirements for contractor safety including, in some cases, weekly inspections by contractor safety representatives. Without the plans, the
Construction Coordinators had no knowledge of contractor safety inspection or other requirements and applied no assurance role relative to plan implementation.

- Construction Coordinators did not document safety inspections or prepare reports on safety issues. ESH performed some safety inspections but had no mechanism to verify correction of noncompliances. Quality Assurance, Environment, and Safety Office (QES) performed no regular appraisals of contractor safety performance.

- The appraisal team found numerous health and safety non-compliances involving construction activities. (See Sections PP.3, WS.5, and IH.5.)

- The "AIS Self-Assessment Report" did not identify construction safety as a major deficiency.

CONCERN: See Concern PP.3-1.

Findings of Fact:

- Neither QES nor ESHD routinely conducted division walkthroughs and evaluations.

- Safety noncompliances were not tracked, trended, and closed.

- The Industrial Hygiene Section of ESHD performed an active exposure monitoring program and a number of hazards were regularly monitored and controlled. However, the lack of an effective ESHD facility walkthrough evaluation program precluded the identification of many operations and hazards which could have required monitoring and evaluation.

- Monitoring data were maintained by ESHD in written reports or raw data sheets in building files. Exposure records by worker or by job function were not compiled by either ESHD or by the Medical Department as required by DOE 5480.10.

- The "AIS Self-Assessment Report" acknowledged ESH program limitations in walkthrough surveys and exposure monitoring. Recommended action was of insufficient detail to assure correction.

CONCERN: At Argonne National Laboratory-East, coordinated and programmatic facility walkthroughs and hazard evaluations were not applied by the Environment, Safety and Health Department or by the Quality Assurance, Environment, and Safety Office on a sitewide basis as required by DOE 5480.10 and 5480.4. (See Concerns OA.1-3 and OA.1-4.)
PERFORMANCE OBJECTIVES: Site/facility personnel should be adequately informed of chemical, physical, and biological stresses that may be encountered in their work environment. Written programs are available, and are of sufficient quality to comply with all DOE-prescribed occupational safety and health standards.

Findings of Fact:

- The ANL-E Health and Safety Manual, Chapter III-1, Chemical Hazard Communication and Toxic Material Control described the requirements of a hazard communication program but did not describe how the criteria specified were to be met as required by 29 CFR 1910.1200, paragraph e.

- ANL-E had not developed an action plan or approach to come into compliance with 29 CFR 1910.1450, Occupational Exposures to Hazardous Chemicals in the Laboratory, which requires establishment of monitoring, chemical hygiene plan, information and training, labelling, and recordkeeping procedures specific to laboratory workers. January 31, 1991, is the deadline for compliance.

- Labelling deficiencies were noted by the appraisal team and included lack of flammable tags on solvent storage facilities and solvent drums, label defacing and relabelling of laboratory chemical containers, unlabelled chemicals in laboratories, and others. (See Sections WS.3, WS.4, WS.5, and IH.5.)

- Noise hazard signs were not posted in Bldg. 363, Central Shops, despite an ESHD recommendation to use hearing protection for certain operations. (See Concern WS.4-8.)

- Hazard communication training was not well documented. Training lists were maintained in ESHD files; however, assurance that all appropriate personnel had received training could not be made. (See Concerns TC.1-3, TC.4-2, and TC.4-4.)

- The "AIS Self-Assessment Report" recognized the training deficiency and appropriate action was recommended for correction. Other deficiencies were not noted.
CONCERN: The Argonne National Laboratory-East hazard communication program was not in compliance with 29 CFR 1910.1200 and DOE 5480.10, and in addition, compliance with 29 CFR 1910.1450, Exposures to Hazardous Chemicals in the Laboratory, by the January 31, 1991, deadline could not be assured.

Findings of Fact:

- Safety and health related training programs were available for many topics such as asbestos handling, laser safety, hazard communication, hearing conservation, lockout/tagout, respiratory protection, and others. However, for many courses, content could not be assured due to the lack of a training outline or manual. Also, no system was in place to assure that all appropriate workers who required training, received it.

- The "AIS Self-Assessment Report" identified many training deficiencies and was in the process of developing and implementing a computer database to record and document training activities.

CONCERN: See Concerns TC.1-3, TC.4-1, TC.4-2, and TC.4-4.
4.5.16 Worker Safety and Health (OSHA) Compliance

4.5.16.1 Overview

A comprehensive safety and health compliance appraisal (OSHA-type) covering general industry and construction standards was conducted at the ANL-E to determine compliance with existing OSHA regulations as adopted by DOE. Noncompliances and hazards were documented and discussed with management at the end of each day. Repeated noncompliances of the same standard in any given department were only noted once on the inspection report form (see Appendix F). All Performance Objectives for the Worker Safety and Health (OSHA) Compliance functional area were evaluated.

Eighteen buildings, with more than 2.8 million square feet and covering 2,546 employees were inspected for compliance with OSHA regulations. Evaluation criteria were based, in part, on OSHA General Industry and Construction Standards; 29 CFR 1910 and 29 CFR 1926, respectively.

The areas selected were primarily those where most employees work, or those in which workplace safety and health were judged to be difficult to attain because of the presence of hazardous materials or activities. Facilities satisfying one or more of these criteria were the maintenance shops, craft shops, steam supply plant, and laboratories. These buildings included a large fraction of the nonoffice workplaces and many of the hazardous workplaces. A less comprehensive sample of office buildings and other low hazard areas was also inspected.

A total of 581 noncompliance issues were identified. Of these, 534 were considered "serious" (92 percent) and 47 were classified as "other than serious" (8 percent). Table WS-1 provides a summary of the buildings inspected, the number of noncompliance issues noted and the OSHA violation classification of each. Appendix F is a tabulation, by Department, of all noncompliances with OSHA regulations and standards. Collectively the findings indicate deficiencies in the following areas:

- Trenching (hazard on 94th Street resulting in a Category I Concern);
- Electrical safety (in Building 203 resulting in a Category II Concern);
- Release of propane into a laboratory area providing the potential for explosion (resulting in Category II Concern);
- Inspection of slings, chokers, and related rigging (resulting in Category II Concern);
- Machine guarding;
• Implementation of the Hazard Communication Program;
• Window washers not wearing safety harnesses (resulting in a Category I concern).
<table>
<thead>
<tr>
<th>Location</th>
<th>Serious</th>
<th>Other-Than-Serious</th>
<th>% of Total</th>
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<td>Bldg. 200</td>
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<td>8</td>
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<td>13</td>
<td>11.2</td>
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<td>0</td>
<td>0.5</td>
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<td>Bldg. 363</td>
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<td>4.7</td>
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<td>19.0</td>
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<td>3.1</td>
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<tr>
<td>Bldg. 360</td>
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<td>3</td>
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<td>TOTAL</td>
<td>534</td>
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<td>100.0</td>
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</table>
- Methods of storage of combustible and flammable materials and compressed gases;
- Fire protection standards such as "Exit" signs, extinguishers, evacuation plans, and fire prevention plans (resulting in a Category II Concern); and
- Recordkeeping.

It was not necessary to do any air sampling for this appraisal because most of the potential air quality problems would result from accidental releases or specific projects such as asbestos removal. The procedures and implementation of the procedures for special projects were evaluated and found to comply with appropriate regulations or good practices. During this appraisal, no asbestos removal or cleanup was in process to afford confirmation of program adequacy or evaluation of performance in these areas.

At the request of this appraisal team, Industrial Hygiene Department personnel collected a bulk sample of material thought to be asbestos. These samples were analyzed and positive findings were obtained for asbestos.

In the ANL-E OSHA self-assessment, deficiencies were identified with respect to 29 CFR 1910.1200, Hazard Communication. This appraisal confirmed that there are significant problems related to training and retention of employee training data in critical areas, the availability of Material Safety Data Sheets, labeling, appropriateness of hazard warnings, and the use of the Hazardous Materials Information System.

The ANL-E self-assessment identified a concern related to management acceptance of safety findings and the need to change the Laboratory safety culture, specifically to refocus the basic attitude toward safety.

Observation of the facilities and activities reflect an underlying lack of management involvement and commitment to worker safety and health. The areas where the deficiencies occur are defined in a recent OSHA document "Safety and Health Program Management Guidelines." There are four elements that lead to an effective safety and health program as follows:

1. Management Commitment and Employee Involvement. ANL-E management does not demonstrate commitment to worker safety and health from top management down. Interviews revealed that problems of a safety and health nature are constantly brought to the attention of ANL-E management who refuses to accept the findings. Supervisors do not realize that safety and health is as much a part of doing business as research or maintenance of production. There are, of course, divisions or departments where this does not apply, but for the most part it is a universal deficiency.

2. Worksite Analysis. The Laboratory has had outside groups and ANL-E staff identify numerous hazardous conditions. Interviews with safety, supervisors, and employees revealed that, for the most part, these findings are ignored when presented to management. There is no
definitive system to assure multi-disciplined safety review of new or proposed equipment, processes, tasks, or planned construction and modification. The absence of such a system allows work to continue without input or surveillance by individuals qualified to identify and understand the safety requirements. A recent example of less than thorough preplanning arose during the emergency preparedness exercise conducted for this appraisal. Several hazardous situations arose during the execution of the drill which could have been avoided had the safety issues been recognized and addressed beforehand.

3. Hazard Prevention and Controls. There is no mechanism to determine the most effective design. Engineering is rarely consulted in design or modification of existing problems.

4. Safety and Health Training. The training provided does not adequately address the problems nor satisfy OSHA safety training requirements. Training does not appear to be transmitted to the appropriate levels to afford a safe work force.

The aforementioned problems are amplified and particularly evident with outside contractors. According to the ANL contract language, contractors are required to comply with all applicable standards and are trained in the hazards for the work being performed. No information was provided as to whether or not contracts are terminated for noncompliance and whether or not contractors are barred from competition for future contracts. General contractors who subcontract work are not held responsible for their subcontractors' actions. ANL-E oversight personnel do not demonstrate a level of authority or presence on the job to assure safe work and protection of property and personnel. Lack of enforcement of appropriate regulations was observed at most worksites during the course of this appraisal.

The noncompliance with OSHA regulations and standards reflect, in part, that the Industrial Safety and Hygiene staff has a limited number of representatives to cover the breadth and diversity of the work at the Laboratory. Further, the line authority of this group does not provide the ability to maintain safe, work places. ANL-E is not performing sufficient audits and surveillance of all the worksites. Although appraisals by outside consultants have been initiated in order to achieve a viable program, onsite safety professionals are not effectively completing evaluations of these efforts.

A separate responsibility of the safety and hygiene staff is to assure proper review and classification of injury and illness records and related documentation. Compliance with these requirements is not demonstrated by ANL-E nor communicated to Laboratory employees. The 1986 Bureau of Labor and Statistics guidelines delineate specific methods for appropriate recordkeeping. First-aid data dating back to January 1990 must be reevaluated and classified commensurate with DOE directives. These time and authority restraints on the staff are affecting the ability to comply with these requirements.
Many of the hazards identified in previous DOE appraisals and in the AIS self-assessment should have been corrected prior to this appraisal.
4.5.16.2 Finding and concerns

WS.1 MANAGEMENT OF HEALTH AND SAFETY CONCERNS

PERFORMANCE OBJECTIVE: Chemical, physical, and/or other environmental stresses arising in the work place should be identified, evaluated, and controlled.

NOTE: Noncompliances with this performance objective are documented on the OSHA Form 1B format. A compilation of these completed forms is provided in Appendix F to the Tiger Team Assessment Report.

Findings of Fact:

- There was no systematic program for identifying and evaluating health and safety concerns. (See Section PP.3.)
- Process, operating, mechanical, and administrative controls were not effective in assuring the control of occupational hazards.

CONCERN: See Concern PP.3-2.
WS.2 SURVEILLANCE OF HEALTH AND SAFETY CONCERNS

PERFORMANCE OBJECTIVE: Appropriate surveillance of activities should be conducted to measure safety and health performance and ensure the continued effectiveness of controls.

Note: Noncompliances with this performance objective are documented on the OSHA Form 1B format. A compilation of these completed forms are provided as Appendix F to the Tiger Team Assessment Report.

Findings of Fact:

- There was no evidence of a health and safety surveillance program for construction activities.
- There was no documented program of regular walkthrough surveys to assure evaluation of chemical, physical, and biological stresses to ensure maintenance of satisfactory conditions.
- See Sections PP.3 and PP.4.

CONCERN: See Concern PP.3-1.
WS.3 COMPLIANCE WITH OCCUPATIONAL HEALTH STANDARDS FOR GENERAL INDUSTRY

PERFORMANCE OBJECTIVE: Site/facility operations should comply with DOE-prescribed standards for the application and control of occupational health hazards.

NOTE: Noncompliances with this performance objective are documented on the OSHA Form 1B format. A compilation of these completed forms are provided as Appendix F to the Tiger Team Assessment Report.

Findings of Fact:
- Cross connection prevention systems for potable and nonpotable water were not upgraded to current standards to prevent individuals from defeating them in their work areas.


Findings of Fact:
- Several areas were observed in which asbestos material was in disrepair. The areas were not marked to indicate the presence of a hazard.
- High noise areas existed that were not posted with requirements for wearing hearing protection.

CONCERN: See Concerns WS.6-1 and PP.5-1.
PERFORMANCE OBJECTIVE: Workplaces should be free of uncontrolled physical hazards and be in compliance with DOE-prescribed occupational safety standards.

NOTE: Noncompliances with this performance objective are documented utilizing the OSHA Form 1B format. A compilation of these completed forms is provided as Appendix F to the Tiger Team Assessment Report.

Findings of Fact:
- Emergency lighting and exit signs were less than adequate or improper in several areas inspected.
- Means of egress were blocked in several areas inspected.
- Numerous passage doors which did not afford a means of egress were not posted "NOT AN EXIT".
- See Section FP.2.


Findings of Fact:
- Placement and installation of safety showers and eyewash stations was less than adequate. Portable eyewash bottles were provided in several areas inspected. These squeeze bottles did not provide the required volume of deluge nor were they properly changed and sanitized to prevent the growth of bacteria.

CONCERN: Argonne National Laboratory-East did not comply with 29 CFR 1910.151 (c), Medical and First Aid, regarding safety showers and eyewashes.

Findings of Fact:
- ANL-E did not provide guarding on the majority of machinery in accordance with OSHA Standards.

Findings of Fact:
- ANL-E did not have an effective lockout/tagout program or procedures. There were no uniform practices between Divisions; a minority of divisions complied while the majority did not.
- See Sections PP.2 and TC.4.

CONCERN: Argonne National Laboratory-East did not comply with 29 CFR 1910.147, Control of Hazardous Energy Source (Lockout/Tagout). (Also see Concerns PP.2-3 and OA.7-1.)

Findings of Fact:
- There were deficiencies in marking or labeling of panels and wiring.
- Engineering drawings were not kept current.
- There was a general lack of ground fault circuit interrupters in most areas.
- Electrical noncompliance issues indicated a lack of work control and review by engineering, qualified electricians, and safety personnel.
- The electrical maintenance and inspection program implementation was less than adequate.


Findings of Fact:
- Emergency escape route posting and training was less than adequate throughout the facility.
- There was no Fire Prevention Plan prepared in accordance with the elements outlined on 29 CFR 1910.38 for ANL-E buildings and work areas.
- There was no Emergency Action Plan in accordance with the elements outlined in 29 CFR 1910.38 for ANL-E buildings and work areas.

Findings of Fact:
- Flammable materials were stored in cabinets not approved for that purpose.
- No signage or provisions were made to prevent smoking in areas where flammable materials are present.
- Fire extinguishers were located where they were not clearly visible or identified.


Findings of Fact:
- Requirements for and the provision of personal protective equipment was less than adequate. Hardhats, respirators, safety glasses and faceshields, hearing protection, and gloves were used inconsistently.


Findings of Fact:
- Eighty-four out of 92 machines across the site were modified in such a way as to by-pass safety devices, resulting in potential exposure up to 480 volts.

CONCERN: Recognized safety devices to prevent electrocution during maintenance were defeated on 84 out of 92 machines at the Argonne National Laboratory-East in violation of 29 CFR 1910, Subpart S, Electrical.

Findings of Fact:
- Aisles were not kept clear nor wide enough, nor were they identified where required.
- Load ratings for stairs and floors were not posted.
- Housekeeping practices were less than adequate.
(FS.4-10)  
(F2/C1)

Findings of Fact:
- Two 480-volt disconnects were located in an area where the floor was covered with water. In order to pull the disconnect lever, the employee had to stand in the water, presenting an electrocution hazard.

CONCERN: Argonne National Laboratory-East Line management and the Safety Coordinator failed to identify and correct an imminent electrocution hazard. (Also see Concern WS.4-12.)  
(FS.4-11)  
(F1/C1)  
CAT II

Findings of Fact:
- An employee was observed working in an unshored 8-foot trench with loose and sloughing sides.
- There was no ladder for quick egress from the trench.
- The employee was in the trench while a backhoe was working inside the trench.
- Valve covers were removed with a sling hooked onto the bottom of the bucket. The hook on the bottom of the bucket had no safety latch to prevent the sling from slipping off.
- The fiber-webbed sling was deteriorated and showed no proof of inspection.
- A Plant Facilities and Services Division (PFS) Construction Coordinator was overseeing the project and did not assert his authority to correct the hazards.

(FS.4-12)  
(F1/C1)  
CAT I

Findings of Fact:
- The cranes, hoists, and rigging equipment throughout the ANL-E facility were not inspected in accordance with 29 CFR 1910.179.
- The cranes, hoists, and rigging equipment throughout the ANL-E facility were not maintained and tested as required.
- The personnel responsible for the ANL-E cranes, hoists and rigging did not receive training on the OSHA Standards as required.
• OSHA Standards were not available to persons responsible for crane and rigging activity.
• See Sections TC.4 and WS.5.


Findings of Fact:
• Circuit breakers are essentially defeated by being locked-on and therefore do not provide protection against the effects of overcurrent. Additionally the lock on devices prevent manual operation of the circuit breakers thereby requiring tools to remove them before the circuits can be deenergized. This hazard is obvious especially in regards to fires and electrocution as a result of defeating the purpose of an electrical safety device.

CONCERN: Locked closed or "on" circuit breakers were found in Argonne National Laboratory-East Buildings 360 and 362; there were approximately 25 to 30 of these breakers locked on in violation of the requirements of 29 CFR 1910.304(e), Overcurrent Protection.

Findings of Fact:
• Contractors cleaning the upper outside windows of Building 201 using a boatswains chair, did not use the proper safety equipment. They were not using the proper safety belt attached to a lifeline, as required by OSHA standards.

• Employees were walking around the outside edge of Building 201 roof without the proper full protection equipment in place or proper personal protection equipment.

Concern: Argonne National Laboratory-East contractors are not complying with Occupational Safety and Health Administration Standards for fall protection. They do not comply with 29 CFR 1910.28 (j)(4), Safety Requirements for Scaffolding, or 29 CFR 1910.132(a), Personal Protective Equipment, general requirements.
WS.5 COMPLIANCE WITH OCCUPATIONAL SAFETY AND HEALTH STANDARDS FOR CONSTRUCTION INDUSTRY.

PROGRAM OBJECTIVE: Construction activities should be free of uncontrolled physical and health hazards, and should be in compliance with DOE-prescribed occupational safety and health standards relating to construction.

NOTE: Noncompliances with this performance objective are documented utilizing the OSHA Form 1B format. A compilation of these completed forms is provided as Appendix F to the Tiger Team Assessment Report.

Findings of Fact:

- Inspections found several violations of construction standards creating serious safety hazards for ANL-E and contractor employees. As an example, an employee was observed working in a trench approximately eight feet in depth without proper shoring or sloping, thus creating an imminent danger situation for the employee.

- ANL-E requires contractors to submit a safety program prior to construction, the construction coordinators did not receive copies of submitted documents, and therefore, could not enforce the submitted program.

CONCERN: See Concern PP.3-1.

Findings of Fact:

- ANL-E field supervision indicated that it was not their responsibility to "tell the contractors what to do" in the area of safety because of possible liability.

CONCERN: Argonne National laboratory-East is not in compliance with OSHA 1926.20(a), and thus did not provide a safe place to work.

Findings of Fact:

- In Bldg. 362 construction renovation caused an electrical cord to run through the main door. It was not protected from damage and caused a tripping hazard.

- On several occasions, employees were observed working with electrical equipment not connected to Ground Fault Circuit Interrupter protection.
CONCERN: Argonne National Laboratory-East did not fully comply with OSHA 1910.305, Electrical, or OSHA 1926.400, Electrical.

Findings of Fact:
• Numerous construction power tools and machines were observed without protection guards in place.


Findings of Fact:
• In most of the construction areas several gross violations of housekeeping standards were noted.

CONCERN: Argonne National Laboratory-East does not fully comply with OSHA 1910.26 Housekeeping.

Findings of Fact:
• On several occasions, employees were observed working on the top step of step-ladders.

CONCERN: Argonne National Laboratory-East did not comply with OSHA 1926.440, Ladders and Scaffolding.

Findings of Fact:
• On several occasions oxygen/acetylene bottles were lying flat on ground and not secured as required.
• Compressed gas cylinders were transported with regulators attached.


Findings of Fact:
• A failure to close a valve after use of a propane compressed gas cylinder produced a potentially explosive atmosphere in Bldg. 200, F Wing.
• Employees were observed smoking in the immediate area.
CONCERN: Argonne National Laboratory-East Plant Facilities and Services Department oversight had no definitive mechanism to detect or correct an existing hazard. (Also see Concern PP.3-1.)

Findings of Fact:

- Cranes did not receive inspections as required.
- Cranes did not receive preventive maintenance as required.
- There were no written procedures or other means to assure that cranes and hoisting devices were operated in conformance to OSHA standards.
- Rigging was not inspected as required.
- There were no safe operating practices established for rigging as required.
- There were no provisions for assuring that rigging equipment conforms to the requirements.

CONCERN: See Concern WS.4-13.
WS.6 PERSONNEL COMMUNICATION PROGRAM

PERFORMANCE OBJECTIVE: Site/facility personnel should be adequately informed of chemical, physical, and biological stresses that can be encountered in their work environment.

Note: Noncompliances with this performance objective are documented utilizing the OSHA Form 1B format. A compilation of these completed forms is provided as Appendix F to the Tiger Team Assessment Report.

Findings

• Hazardous chemicals were not labeled or labeled incorrectly throughout the entire facility.

Fact:

• Material Safety Data Sheets were not always readily available in areas containing hazardous chemicals.

CONCERN: See Concern PP.5-1.
4.5.17 Industrial Hygiene

4.5.17.1 Overview

Most performance objectives of the industrial hygiene program were addressed as part of the overall health and safety program, as discussed in the Personnel Protection Section of this appraisal report. This Section of the report and the overview address only IH.5 for ANL-E which dealt with compliance issues. The findings for industrial hygiene were developed from discussions with Environment, Safety, and Health Department (ESHD) personnel and review of ESHD program documents and records. In addition, discussions were held during site walkthroughs with representatives from Plant Facilities and Services Division (PFS), Chemistry, Chemical Technology, Central Shops, Biology and Medical Research, and other divisions. Policy, procedures, records, and operations were reviewed during division walkthroughs.

The Industrial Hygiene Section of ESHD was comprised of a highly qualified and professional staff including four Certified Industrial Hygienists. The staff applied a systematic approach to evaluate, assess, and recommend controls for chemical, physical, and biological hazards. Effective evaluation and control of hazards were demonstrated. However, the Industrial Hygiene Section of ESHD generally responded in an assistance rather than proactive surveillance, evaluation, and verification role.

Noncompliances and deficiencies were found in a number of industrial hygiene related programs. Deficiencies included implementation and enforcement issues as well as programmatic aspects as summarized below.

Asbestos abatement and handling activities at ANL-E were found to have many deficiencies regarding compliance with regulatory standards, guidelines, and good work practices. Examples included lack of monitoring and oversight of abatement activities, defeat of negative pressure containments, use of improper respiratory protection, failure to use containment procedures, and lack of documentation. The same construction safety deficiencies noted in the Personnel Protection Section (4.5.15.2) of this report applied to asbestos abatement.

Other industrial hygiene programs in which deficiencies or noncompliances with regulations and DOE Orders were evident included the following:

- Laser Safety - Lack of Regular Laser Safety Officer reviews, worker training, and medical surveillance.
- Chemical/Compressed Gas/Waste Storage and Handling - Labeling and signage problems, gas storage noncompliances, improperly stored chemicals, etc.
- Confined Spaces - Practice and procedures did not comply with 29 CFR 1910.146.
- Respiratory Protection - Use of improper protection factors, lack of field inspection, improper use of dust masks for asbestos exposures.

The Industrial Hygiene Section of ESHD did not update the Health and Safety Manual new and revised OSHA regulations. A plan to address requirements with 29 CFR 1910.1450, Occupational Exposures to Hazardous Chemicals in the Laboratory, was not in place to assure compliance by the January 31, 1990, deadline.

Deficiencies in the industrial hygiene program could be traced to similar oversight, surveillance, enforcement, and verification concerns addressed in the Personnel Protection Section (4.5.15.2) of this appraisal report.
4.5.17.2 Findings and Concerns

IH.5 COMPLIANCE WITH OCCUPATIONAL HEALTH STANDARDS

PERFORMANCE OBJECTIVE: Site/facility operations comply with DOE-prescribed standards for the evaluation and control of occupational health standards.

Findings of Fact:

- Asbestos abatement or handling was performed at ANL-E by multiple groups including the Facility Planning and Engineering Department (FPED), PFS-FPED. Installations Section, the Building Maintenance Section, Waste Management Operations (WMO), and contractors procured through divisions. This multiplicity of functions created an exposure potential for an unnecessarily large segment of workers.

- FPED was responsible for large-scale asbestos abatement actions. Abatement contractors were selected and managed by FPED either directly or through a construction contract. FPED management and oversight of abatement contractors had numerous deficiencies including the following:
  - Abatement specifications were general and provided no detail as to the abatement plan for specific actions.
  - In many cases, the abatement contractor was responsible for the monitoring program and hired a monitoring firm. This represented a potential conflict of interest, especially in light of the limited Environment, Safety, and Health Department (ESH) and Quality Assurance, Environment, and Safety Office (QES) oversight and verification program.
  - Daily monitoring was required by the general specifications. This was not performed in some cases.
  - Monitoring records were not consistently provided to or maintained by FPED. Little or no abatement documentation was maintained by FPED to demonstrate an acceptable abatement action in compliance with regulations.
  - Monitoring records were not submitted to ESHD for review.
  - The FPED construction coordinator was responsible for overseeing abatement actions and enforcing regulatory and contract requirements. An abatement contractor turned off negative air for a Bldg. 6 asbestos containment prior to clearance monitoring, thereby, defeating containment. The Construction Coordinator either did not recognize this as a problem or did not act to prevent it. Most construction coordinators had not had formal asbestos supervisor and worker training.
- The construction coordinators did not document asbestos abatement inspections or procedures. Monitoring firms were not required to complete abatement checklists documenting proper procedure. ESHD and QES did not document proper procedures. Visual inspections required prior to final clearance sampling were not documented.

- Non-friable materials such as floor tile were removed without benefit of containment.

- Although performed less frequently, Building Maintenance conducted small scale asbestos removals such as from pipe elbows, fittings, valves, and short pipe runs. Deficiencies in this program included the following:
  - No glovebags or containments were used. Only wetting agents and encapsulants were applied.
  - No high-efficiency particulate air vacuums were used for decontamination.
  - Only single-use dust masks were used, which was in direct violation of 29 CFR 1926.58.
  - No monitoring or inspections were performed on representative removals.

- The Installations Section performed small scale asbestos removals from pipes and mechanical systems as well as floor tile and mastic removals. It also installed new tiles. No containments were used for floor tile/mastic removal.

- WMO performed significant amounts of small to large scale abatement actions. ESHD provided monitoring for some of these actions. Of the ANL-E abatement groups, WMO was the best equipped and most experienced in abatement. Time containment records were not maintained for workers engaged in asbestos abatement or other regulated area work duties to derive exposure periods and concentrations.

- Divisions could contract for abatement actions independently, creating difficulty in assuring proper control.

- ESHD provided various support and oversight for asbestos programs. Deficiencies in ESHD activities included:
  - Although reports were well prepared in many cases, the ESHD monitoring for the Bldg. 200 abatement was not well-documented. A written report was not prepared.
- ESHD did not, as a matter of routine, inspect abatement actions, review monitoring results, and assure application of good work practices.

- Abatement specifications allowed exposure in occupied areas (outside containment) to reach 0.1 fiber/cc before shutdown was required. This level was at the proposed OSHA permissible exposure limit and well above normal building background levels.

- An ANL-E facility asbestos survey had not been performed. Areas impacted by renovation/construction were often checked for asbestos prior to work, but no requirement was in place to do so.

- The Medical Department did not complete the mandatory medical questionnaires for asbestos workers as shown in 29 CFR 1926.58, nor did it render a written opinion on worker medical condition and limitations such as ability to wear a respirator.

- The "AIS Self-Assessment Report" failed to identify most of the findings stated above. An "Industrial Hygiene Program Review for ANL-East," December 1989, performed by a consulting firm also did not address the asbestos issue. An "Industrial Hygiene Appraisal Report ANL-East," May 1989, performed by CH also did not address asbestos.

CONCERN: Asbestos abatement at Argonne National Laboratory-East was not performed in compliance with 29 CFR 1926.58, and good work practices were not consistently utilized and could not be assured or documented.

Findings of Fact:

- The following deficiencies were identified in the ANL-E Laser Safety Program, some of which were noncompliances with ANSI Z136.1-1986:

  - Laser operators did not always notify the Laser Safety Officer (LSO) of laser movement, modification, or planned installation such that the LSO could enforce and control the Laser Safety Program, and execute his responsibilities as defined by ANSI Z136.1-1986.

  - New purchases of lasers were monitored by the LSO through the Automated Material Ordering System; however, orders could be placed without advance LSO notification, review, and approval.

  - The LSO reviewed laser systems, on average, only every three years. This frequency provided only limited verification
opportunity for Laser Safety Program enforcement, interlock system checks, etc.

- Laser safety training could not be assured for all users. A student present during Class 4 laser operation in Bldg. 200 had not received training. ANSI Z136.1-1986 requires training for each employee working with or around lasers above Class 2.

- Cardiopulmonary resuscitation (CPR) training was not required. ANSI Z136.1-1986 requires CPR for personnel servicing or working on lasers with exposed high voltages.

- Medical surveillance could not be assured for all personnel. A student worker in Bldg. 200 had received no eye examination despite routinely working in laser environments.

- Several open beam lasers in Bldg. 200, E-134, were placed under metal fabricated covers with hinged tops for accessing purposes. The metal had a dull mat but was still somewhat reflective.

- The "AIS Self-Assessment Report" recognized training, relocation, posting, and LSO verification deficiencies. Recommended action did not provide sufficient detail to assure correction.

CONCERN: The Argonne National Laboratory-East Laser Safety Program did not comply with ANSI Z136.1-1986. (Also see Concerns TC.4-4 and PP.3-2.)

Findings of Fact:

- Deficiencies in gas, chemical, and waste handling and storage operations included:

  - Extensive use of laboratory hoods for chemical storage, especially for hazardous waste storage which tended to accumulate,

  - Presence of defaced labels or missing labels on some laboratory stored chemicals,

  - Extensive storage of research gas cylinders in laboratory hoods without cylinder caps,

  - Storage of laboratory solvents (flammable) in cabinets or below hoods not designed for flammable storage,

  - Failure to consistently segregate broken glassware from general refuse in laboratories,
- Failure to secure compressed gas cylinders such as in Bldg. 26 used for gas storage,
- Failure to utilize "flammable" warning labels on solvent storage sheds and solvent drums (e.g. Bldg. 363),
- Failure to label laboratory carcinogens as required by DOE 5480.10,
- Oxygen and acetylene stored in a shed outside Bldg. 363, separated only by a five foot, one-quarter inch steel plate which could not assure 30-minute fire resistance as required by 29 CFR 1910 Subpart Q, Welding, Cutting, Brazing, and
- Drinks placed on benches next to solvent squeeze bottles in Bldg. 363.
- No procedure was in place to eliminate or recycle unwanted or obsolete laboratory chemicals when custody of a laboratory was transferred from one researcher to another.
- The "AIS Self-Assessment Report" identified similar deficiencies in specific areas such as Bldg. 306, but did not address the issue as a sitewide concern.

CONCERN: Hand1i ng, storage, and labelling of chemicals, compressed gases, and wastes at Argonne National Laboratory-East did not comply with DOE 5480.10, DOE 5480.4, various Occupational Safety and Health Administration regulations, and good standards of practice.

Findings of Fact: ANL-East confined space procedures (Chapter III-9 of the ANL-E Health and Safety Manual) and practices were not current with 29 CFR 1910.146, Permit Required Confined Spaces, Notice of Proposed Rulemaking, June 5, 1989. Other program deficiencies included:

- An inventory or defined guidelines to aid in identifying ANL-E areas which required entry as a confined space or entry into a low hazard permit space were not available, but were being developed.

- The Safe Work Permit System (Chapter I-10) of the ANL-E Health and Safety Manual did not conform to Permit Required Confined Spaces 29 CFR 1910.146(d), Permit System.

- Some confined space entry training had been performed; however, training program content could not be assured and QES or ESHD did not perform regular confined space entry reviews in the field to verify that good practices were applied.
The "AIS Site Self-Assessment Report" did not address confined spaces.

CONCERN: See Concerns PP.2-3, PP.3-2 and TC.4-4.

Findings
Fact:

- The ANL-E respiratory protection program was reflected in Industrial Hygiene Operating Procedure (IHOP) 006, recently approved on September 14, 1990. The following deficiencies were noted in this program or its application.
  
  - Protection factors were not current with the "Guide to Respiratory Protection," National Institute for Occupational Safety and Health, 1987, which will be the basis for OSHA's revised standard; nor with asbestos standards 29 CFR 1926.58 and 29 CFR 1910.1001.

  - ESHD did not verify through a field inspection program whether respirators were being used properly; however, a recall and inspection was performed every 6 months.

  - Building Maintenance personnel used dust masks for asbestos removal which was a violation of ESH IHOP 006 and 29 CFR 1926.58, and 29 CFR 1910.1001.

- The "AIS Self-Assessment Report" identified various deficiencies in the respiratory protection program which resulted in action to revise and improve the program. This has largely been accomplished with the above exceptions.

CONCERN: See Concerns WS.4-8, PP.4-2, and IH.5-1.
4.5.18 Fire Protection

4.5.18.1 Overview

The seven performance objectives in the Fire Protection functional area were addressed in this appraisal. In addition to the criteria contained in the performance objectives, the specific requirements/guidelines contained in DOE 5480.1B, DOE 5480.4 and DOE 5480.7 and the National Fire Protection Association (NFPA) Codes were applied in the evaluation. The appraisal covered the entire ANL-E complex, including NBL.

The appraisal concentrated on ANL-E facilities and programs and was accomplished through interviews with management and staff personnel in Support Services Division (SDD), Environment, Safety, and Health Department (ESH), the Fire Department, Plant Facilities and Services Division (PFS), the Facilities Planning and Engineering Department (FPE), and the Utilities Section; review of policy, program, procedures, and previous appraisal/evaluation documents; and site tours and inspections that included Buildings 108, 202, 203, 214, 333, and 350.

The primary organizational elements responsible for the fire protection program are the Fire Department and ESHD; specifically, the Safety and Fire Section of ESHD. The Fire Department is responsible for the fire fighting and inspection/testing of installed fire protection equipment and manning the fire alarm center, which is an integral part of the sitewide emergency response operation. Included with these duties are hazardous materials (HAZMAT) response and ambulance services. The Safety and Fire Section, specifically, the Fire Protection Engineer(s) of ESHD, is responsible for the remaining elements that constitute a good fire protection program. Only one Fire Protection Engineer was available to execute the myriad of program elements required by the standards.

Secondary, but vitally important, support is performed by the Communications, Engineering, Maintenance, and Utilities Sections of PFS. This support consists of maintenance of the fire alarm system and fire water system and engineering design documents.

Interviews with the Fire Department and review of records indicated that deficiencies exist in the fire protection program. The building fire alarm systems are considered unreliable due to their age and maintenance status and are no longer available from the manufacturer. The site fire alarm reporting system is no longer manufactured for general sale, and repair parts can no longer be obtained from the original manufacturer. Spare parts are only available from salvage/rebuild operations on other similar systems around the country.

The pre-fire plans do not meet the DOE and NFPA standards with respect to detailed information on facility layout (including special equipment) and the known hazards associated with the facility.
One of three pumper vehicles is unreliable due to its age and maintenance status. It is a 1963-vintage unit for which repair parts are not available except through rebuild of on-hand supplies. In addition, the unit failed to meet pump test requirements in 1990.

Records are in order and an auditable program is intact; however, documentation reflects that inspections and tests are not detailed nor comprehensive with respect to standards requirements. This lack of detail and comprehensiveness is indicative of job requirements and intensiveness above the capacity and capability of the existing staff.

A program or other guidance has not been developed to provide for fire protection personnel to be included in the review and approval process for safety related documents and for review of new construction or modification projects. Responsibility for Life Safety has not been assigned to a specific organizational entity. Such guidance is being developed, but is not expected to become a part of the program until the beginning of Calendar Year 1991.

Collection and analysis of water supply information is not being performed. With recent work/upgrade on the main supply lines, such analysis is critical to assurance of adequacy of water supplies within the system.

Finally, the valve inspection program is not being conducted in accordance with mandatory national standards; manual pullboxes are not installed in accordance with NFPA 101 required locations; and all buildings/occupied spaces are not protected by automatic sprinkler systems.

Loss potential analyses had not been performed of any of the facilities at ANL-E until recently. A fire protection consultant has been contracted by the laboratory to primarily perform loss analysis reports on major buildings. A few have been completed. This should be continued.

The basic and most pressing needs in the fire protection program are revision of the ANL-E Health and Safety Manual to clearly delineate the responsibilities of the Fire Protection Engineer(s), the Fire Department and those group(s) supporting the Fire Protection Program, such as PFS. Validating the adequacy of the water supply system, including the supply to building sprinkler systems; the need for additional sprinklers in buildings; the site fire alarm system, including the need for manual pullboxes at most facilities; and the life safety elements to be in compliance with NFPA 101, is urgently needed.

The ANL-E general management is aware of these and other deficiencies through indepth fire protection evaluations conducted by Factory Mutual Engineering Company (a nationally recognized fire engineering company), visits by other fire protection consultants on specific projects, and through self-assessment. Corrective actions and resolutions of the recommendations developed are being pursued within the constraints of resources. A good example is the Conceptual Design Report developed in January 1990 and entitled "Fire Safety Improvements."
Continued management emphasis on, and attention to, the overall program needs will be required to reach an "Improved Risk" level of fire protection and prevention.
4.5.18.2 Findings and Concerns

FP.1 ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE: Fire Protection organization and administration should ensure the effective implementation and control of fire protection equipment and activities.

Findings of Fact:
- The fire protection organizational structure encompassed elements of the ES&H Department (ESHD), the Fire Department, Maintenance, Utilities, Engineering and User organizations. The authorities and responsibilities of these organizations and their interrelationships had not been clearly established.

- This concern was addressed in an ANL-E self-assessment. An action plan had not been developed to address this concern.

CONCERN: See Concern OA.1-3.

Findings of Fact:
- Guidance on the review of plans and specifications for new construction or modification to existing facilities for conformance with fire protection standards had not been developed by management for all divisions having safety interface responsibilities. Final approval for all safety concerns is the responsibility of ESHD.

- Other safety related documents (SARs, procedures, etc.) are not routinely provided to ESHD for review and/or approval.

- This concern was addressed in an ANL-E self-assessment.

CONCERN: Plans and specifications for site and facility projects and safety related documents were not reviewed by the Argonne National Laboratory-East Environment, Safety and Health Department for conformance with fire protection standards as required by DOE 5480.4 and 5480.7.

Findings of Fact:
- Only one fire protection engineer is available to execute the Fire Protection Program. In addition, the position for the Section Head of the Safety and Fire Section was vacant. Insufficient resources contribute to many findings and concerns contained in this appraisal report.

- This concern was addressed in the ANL-E self-assessment. An action plan had been developed to address this concern.

CONCERN: See Concern OA.1-4.
PERFORMANCE OBJECTIVE: All facilities onsite should provide adequate life safety provisions against the effects of fire.

Findings of Fact:
- Some of the buildings onsite lack the following:
- Easily visible directional exit signs,
- Properly sized egress routes,
- Life safety analyses,
- Required number of exits, and
- Short travel distances to exits.

- This concern was addressed in an ANL-E self-assessment. An action plan had not been developed to address this concern.

CONCERN: Argonne National Laboratory-East is not in compliance with the Life Safety Code, NFPA 101. (See Concern WS.4-1.)

Findings of Fact:
- A portion of the sitewide fire alarm system was being repaired using reconditioned parts no longer listed by Underwriters Laboratory and therefore, can no longer be considered to be reliable.

- The fire alarm system is an integral part of the emergency preparedness program.

- Manual-pull fire alarm boxes to initiate local and Fire Department station alarms were not installed at exits from all buildings.

- Portions of this concern were addressed in the ANL-E self-assessment.

CONCERN: Requirements for emergency alarms, as detailed in NFPA 72D and mandated by DOE 5480.4, are not met in Argonne National Laboratory-East facilities.
PERFORMANCE OBJECTIVE: The site should not be vulnerable to being shut down for an unacceptable period as the result of a credible fire.

Findings of Fact:
- Design and the adequacy of fire suppression and detection systems could not be determined, because fire hazard analyses had not been performed for all major facilities. (Also see Section FP.5.)
- Only partial sprinkler systems had been installed in some buildings. Lacking hazard analyses, these systems did not provide confidence that unacceptable loss or periods of shutdown would not exceed the guidelines contained in DOE 5480.7.
- This concern was addressed in a ANL-E self-assessment. An action plan had not been developed to address this concern.

CONCERN: Automatic fire suppression systems are not provided throughout the Argonne National Laboratory-East facilities, as required by DOE 5480.7.
FP.5 PROPERTY PROTECTION

PERFORMANCE OBJECTIVE: A maximum credible fire, as defined in DOE 5480.7, Section 6.f, should not result in an unacceptable property loss.

Findings of Fact:
- A fire hazards analysis for most major facilities had not been performed. However, the ANL-E management was aware of many of the site fire protection deficiencies as a result of evaluations performed by Factory Mutual Engineering Company (FMEC) and recommendations developed by other fire protection consultants under contract to ANL-E. Those recommendations remain valid. For the FMEC recommendations, ANL-E had developed an action plan for correcting the deficiencies. Progress on actions not requiring significant resources was progressing satisfactorily. Many actions requiring significant resources have not been implemented.
- In addition to previously identified deficiencies the following were observed:
  - Monitoring and maintenance of all control valves related to the fire water distribution system was not being done.
  - Fire barriers within facilities to limit fire loss in accordance with the loss potential criteria defined in DOE 5480.7, Sections 6.f. and g. have not been provided.
- This concern was addressed in an ANL-E self-assessment. An action plan had not been developed to address this concern.

CONCERN: (FP.5-1) (H2/C1) Loss analyses have not been performed on many major Argonne National Laboratory-East facilities and information evaluated to determine the adequacy of the installed fire protection systems in accordance with requirements of DOE 5480.7.

Findings of Fact:
- Automatic suppression is lacking in the Plutonium section of Bldg. 350 occupied by NBL.
- The emergency generator, switchgear and batteries are located in an area in the Basement of Bldg. 350. The equipment area is not separated from the remainder of the basement area.
- A self-assessment was not made by NBL.

CONCERN: (FP.5-2) (H2/C1) The New Brunswick Laboratory is not in compliance with DOE 5480.7 or DOE 5480.4.
PERFORMANCE OBJECTIVE: The Fire Department should have the capacity to properly terminate and mitigate the effects of a fire in a safe and effective manner.

Findings of Fact:

- The need for at least one member of the Fire Department to be available to monitor/operate the Fire Department Alarm Station Console decreases the number of personnel available to respond to a fire emergency.
- The need to respond to HAZMAT and ambulance service, calls also reduces the number of personnel available for fire emergencies.
- The 1963 fire pumper failed to pass the water delivery test in 1990.
- The need to make offsite mutual aid reduces personnel availability for fire emergencies.
- If all vehicular equipment is expected to respond in the event of a fire emergency, this will further stress the responding fire fighters.
- Two Battalion chiefs are retiring soon with no immediate replacements hired.
- There was neither a structured physical fitness program for fire fighters nor a physical fitness facility to implement such a program.
- The lack of automatic sprinklers in some buildings results in the potential for a more severe fire, further stressing the limited number of responding fire fighters.
- Lack of detailed prefire plans will dilute the efforts of the fire department response members.
- A self-assessment was performed by the ANL-E Fire Department and covered some of these concerns. An action plan had not been developed to address this concern.

CONCERN: See Concern OA.1-4.
PERFORMANCE OBJECTIVE: A fire protection engineering program should be in place to effectively provide and maintain an "improved risk" level of fire protection.

Findings of Fact:
- A policy/guidance document has not been completed detailing the responsibilities of the Fire Protection Engineer(s).
- Only a limited number of fire protection audits and appraisals, required by DOE 5480.1B, were being accomplished.
- A program to follow-up on known fire protection deficiencies had not been implemented.
- This concern was addressed in the ANL-E self-assessment. An action plan had not been developed to address this concern.

CONCERN: The requirements for "Improved Risk" as mandated in DOE-5480.7, are not being met at the Argonne National Laboratory-East.
4.5.19 Medical Services

4.5.19.1 Overview

Familiarity with the processes, activities, and hazards was obtained by briefings, observations, document review, and site tours. Bldgs. 202 and 212 were toured. The medical facility and equipment were evaluated. Interviews were conducted with the Medical Director, Staff Physician, Nurse, Clinical Psychologist, and Managers of Industrial Hygiene, Safety, and Human Resources. Employees were interviewed at random. Medical records (charts) were examined. Statistical reports, logs, policy, practice, and procedure documents were reviewed. Conduct of procedures in the Medical Department was observed. The five performance objectives addressed in the Medical Services functional area were considered in the appraisal.

An appraisal had been performed by the Medical Director, Headquarters DOE in September 1987. Many recommendations resulted. Since the position for the ANL-E Medical Director has been a full-time position, almost all of the recommendations have been addressed and the program improved. All of the concerns identified in this appraisal were noted in the 1987 appraisal and were included in the self-assessment.

There is a broad scoped medical program of high quality that contains the essential elements and activities of a contemporary occupational medical department. The staff was experienced and qualified. Charts for patients and other information recorded by the medical staff were complete, accurate, and well maintained. However, for a complete medical file, the medical staff is dependent on the submission of information from organizational units within the laboratory. This information is often missing and is almost always incomplete. Extensive documentation on the occupational medicine program was present and was being revised and formalized. However, a written occupational medical plan required by DOE 5480.8 had not been completed. Comments about the medical program solicited at random were excellent. Concerns addressed documentation, staffing levels, examinations, and medical records.

Medical services are provided eight hours a day. After-hour needs are met by paramedics. Medical staff consists of 2.5 physicians, 2 nurses, 2 laboratory technicians, 1 x-ray technician, 1 clinical psychologist, and clerical and administrative support. The qualifications of the staff were well documented. Continuing education is supported and promoted. The medical facility is located in the main administration building. It is spacious and well-equipped with modern instrumentation. Computers are utilized to a great extent for appointments, record keeping, and generation of forms. Current books, journals, and other references are available.

Clinical programs provide care for emergencies and personal illness to the extent usually provided by industry. Work injuries are treated onsite or are referred to competent specialists when indicated. A broad range of comprehensive examinations are performed in voluntary and mandatory categories as well as preplacement, termination, and return to work examinations, although the clinic is not staffed to provide examinations for employees at
the required frequency. Many activities relating to wellness, health education, and wellness promotion are conducted.

Employee assistance is provided by both onsite and offsite programs. The Medical Department is involved in the alcohol and substance abuse program. Drug testing is performed on some new hires, for cause, and when required by regulation.

The Medical Director reports to the Director of Human Resources. Communication and working relationships with top management and other health and safety professions was excellent. Although regular meetings were infrequent, contacts occurred promptly when necessary.
4.5.19.2 Findings and Concerns

MS.1 ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE: Site and facility organization and administration should ensure effective implementation and control of the medical services program.

Findings of professional staff.

Fact:

- There was no schedule of site visits by members of the professional staff.
- Site visits were not documented.
- Site visits were conducted in response to problems or requests.

CONCERN: Site visits, by the Argonne National Laboratory-East Medical Department staff, were not conducted frequently and regularly as required by DOE 5480.8.
MS.2 PROCEDURES AND DOCUMENTATION

PERFORMANCE OBJECTIVE: Procedures and documentation should provide appropriate direction, record generation, and support of the medical services for the facility and site.

Findings of Fact:

- Documentation was present for most practices and procedures in the form of memoranda, copies of reference resources, equipment operating instructions, and handbooks.
- Documentation on occupational medical policies and procedures was being revised and added.
- Documentation was informal, not indexed, and not organized.
- Documentation was dispersed in multiple forms and locations and was not readily accessible for reference, review, or training.
- The QA plan for occupational medicine was incomplete and not implemented.
- The medical emergency and disaster plan was incomplete and not fully integrated with the site emergency plan.

CONCERN: A written occupational medical plan did not exist at Argonne National Laboratory-East as required by DOE 5480.8.

Findings of Fact:

- Medical records (patient charts) containing information collected by the clinic staff were complete, accurate, and legible.
- Patient charts and information were well organized.
- Employee medical files do not contain information on hazards and hazardous substances and other industrial and radiation hazard information.

CONCERN: At Argonne National Laboratory-East, medical records did not contain required information on employee exposures to hazards and hazardous substances as required by DOE 5480.8.
PERFORMANCE OBJECTIVE: Medical treatment should be available and provided by qualified, competent staff, and adequate facilities should be available.

Findings of Fact:
- Policies and procedures were not present to establish medical requirements for special term employees, visitors, and other nonregular employees onsite.
- Examinations were offered to all employees but not at the frequency required by DOE 5480.8.
- Medical services did not routinely review employee health status/medical records when job changes occurred.
- Comprehensive examinations were not performed on all terminating employees who required examinations.

CONCERN: Comprehensive, termination, and transfer examinations for all employees including special term employees, visitors and other nonregular employees are not performed at Argonne National Laboratory-East as required by DOE 5480.8.

Findings of Fact:
- The professional staff was experienced, trained, and qualified as required by DOE 5480.8.
- There were 2.5 physicians, including the Medical Director, and 2 nurses.
- The "population served" was estimated at 5,649.
- The number of regular employees was 3,239.

CONCERN: Staff levels in the Argonne National Laboratory-East Medical Department did not meet minimum guidelines based on population served as required by DOE 5480.8.
4.6 NOTEWORTHY PRACTICES

Noteworthy Practices are exceptional ways of accomplishing a Performance Objective or some aspect of it. Other DOE facilities are encouraged to adopt these practices when applicable to their operations.
PROCEDURES AND DOCUMENTATION

PERFORMANCE OBJECTIVE: Procedures and documentation should provide appropriate direction, record generation, and support of the medical services for the facility and site.

NOTEWORTHY PRACTICE: In the conduct of comprehensive evaluations, the computer is used to a great extent. Blood counts and chemistries, audiometry data, urine tests, blood pressure, height and weight, chest x-ray, pulmonary functions, and EKG results are entered. Soon visual acuity will be included. At the time of visit for a physical, a computer printout is available on the patient's chart which provides the physician with a compact and dramatic display of all of the above data for the past 10 visits. This facilitates identification of changes and trends and provides a graphic tool to use for informing and motivating patients. For example, demonstration of gradually increasing cholesterol or weight, or decrease in pulmonary function can educate and motivate life style changes. Conversely, demonstration of improvement in trends can confirm the effects of positive life style changes.
4.7 SYSTEM FOR CATEGORIZING CONCERNS

Each concern contained in this report has been characterized using the following three sets of criteria.

A. CATEGORY I: Addresses a situation for which a "clear and present" danger exists to workers or members of the public. A concern in this category is to be immediately conveyed to the managers of the facility for action. If a clear and present danger exists, the Assistant Secretary for Environment, Safety, and Health, or his/her designee, is to be informed immediately so that consideration may be given to exercising the Secretary's facility shutdown authority or directing other immediate mitigation measures.

CATEGORY II: Addresses a significant risk or substantial noncompliance with DOE Orders but does not involve a situation for which a clear and present danger exists to workers or members of a public. A concern in this category is to be conveyed to the manager of the facility no later than the appraisal closeout meeting for immediate attention. Category II concerns have a significance and urgency such that the necessary field response should not be delayed until the preparation of a final report or the routine development of an action plan. Again, consideration should be given to whether compensatory measures, mitigation, or facility shutdown are warranted under the circumstances.

CATEGORY III: Addresses significant noncompliance with DOE Orders, or the need for improvement in the margin of safety, but is not of sufficient urgency to require immediate attention.

B. Hazard Level 1: Has the potential for causing a severe occupational injury, illness, or fatality, or the loss of the facility.

Hazard Level 2: Has the potential for causing minor occupational injury or illness or major property damage, or has the potential for resulting in or contributing to, unnecessary exposure to radiation or toxic substances.

Hazard Level 3: Has little potential for threatening safety, health, or property.

C. Compliance Level 1: Does not comply with DOE Orders, prescribed policies or standards, or documented accepted practices. The latter is a professional judgment based on the acceptance and applicability of national consensus standards not prescribed by DOE requirements.
**Compliance Level 2:** Does not comply with DOE references, standards, or guidance, or with good practice (as derived from industry experience, but not based on national consensus standards).

**Compliance Level 3:** Has little or no compliance considerations. These concerns are based on professional judgment in pursuit of excellence in design or practice; i.e., these are improvements for their own sake and are not deficiency driven.
### 4.8 CATEGORIZATION AND TABULATION OF CONCERNS

#### 4.8.1 Categorization of Concerns

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*Designates a Category I Concern.  
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*Designates a Category I Concern.

**Designates a Category II Concern.
4.8.2 Tabulation of Concerns

4.5.1 Organization and Administration

CONCERN: At Argonne National Laboratory-East, safety meetings are not regularly scheduled and held to promote safety in the workplace.
(OA.1-1) (H2/C2)

CONCERN: The succession of authority and responsibility for health and safety matters is not clearly defined, documented, and implemented from the Chicago Operations Office through the Argonne Area Office to the Argonne National Laboratory-East. (Also see Concerns SS.3-1 and EA.2-1.)
(OA.1-2) (H2/C2)

CONCERN: Argonne National Laboratory-East management has not clearly defined organizational functions and safety responsibilities.
(OA.1-3) (H2/C2)
(Also see Concerns PP.1-1, PP.2-1, PP.2-2, PP.4-2, and SS.3-1; and Section FP.1.)

CONCERN: Argonne National Laboratory-East management has not provided the needed resources to implement safety programs required by the Department of Energy.
(OA.1-4) (H2/C1)

CONCERN: There was no assurance that similar hazards in different divisions/departments at Argonne National Laboratory-East receive the same level of review nor whether reviews accurately define all of the potential hazards. (Also see Concerns EA.2-3, PP.2-1, and PP.2-2.)
(OA.1-5) (H2/C2)

CONCERN: The Argonne National Laboratory-East "In Touch" program is not well publicized or understood as a formal means of resolving safety problems and issues.
(OA.2-1) (H2/C2)

CONCERN: Each Argonne National Laboratory-East safety committee does not have a charter that includes all of the elements recommended in the Argonne National Laboratory-East Health and Safety Manual.
(OA.2-2) (H3/C2)

CONCERN: Argonne National Laboratory-East does not consistently set definitive and measurable safety goals that are updated and published annually. (Also see Section RP.11.)
(OA.3-1) (H2/C2)

CONCERN: There is no active program to attain measurable or intangible goals at the New Brunswick Laboratory.
(OA.3-2) (H2/C2)

CONCERN: The Chicago Operations Office does not provide timely communication and support to the New Brunswick Laboratory.
(OA.4-1) (H2/C2)
CONCERN: The Argonne National Laboratory-East Environment, Safety and Health Department has a potential conflict of interest by being assigned both a technical safety support role as well as independent safety surveillance oversight functions.

CONCERN: The Argonne National Laboratory-East Environment, Safety and Health Department is at too low of a reporting level, and is perceived strictly as a provider of technical support upon demand, to effectively carry out its independent safety surveillance oversight functions.

CONCERN: Occurrence Reporting is not implemented sitewide Argonne National Laboratory-East in accordance with DOE 5000.3A and DOE 5484.1.

CONCERN: Safety does not receive equal emphasis to program performance in the annual "Merit Review Performance Assessment," and does not reflect the Argonne National Laboratory-East Health and Safety Policy.

CONCERN: Some important Argonne National Laboratory-East management and safety related documents are not consistently controlled and updated. (Also see Concerns PP.2-3 and WS.4-4.)

CONCERN: At the New Brunswick laboratory, there is no assurance that controlled documents are kept up-to-date.

CONCERN: The Argonne National Laboratory-East Substance Abuse Program, including the Employee Assistance Program, is not well understood and few management and staff have received any formal training or information to explain the program.

4.5.2 Quality Verification

CONCERN: The Argonne National Laboratory-East lacks documented and approved quality assurance plans required by DOE 5700.6B and ANSI/ASME NQA-1, Section 2.

CONCERN: The Chicago Operations Office and the Argonne Area Office do not have a documented, approved quality assurance plan as required by DOE 5700.6B.
CONCERN: Quality assurance programs at Argonne National Laboratory-East fail to address all safety and personnel protection related functions as required by DOE 5700.6B.

CONCERN: Argonne National Laboratory-East Quality Assurance Representatives, Quality Assurance Coordinators and Quality Engineers lack the independence necessary to comply with the requirements of DOE 5700.6B and ANSI/ASME NQA-1 Section 1. (Also see Concern OA.5-1.)

CONCERN: Argonne National Laboratory-East quality assurance personnel did not have adequate training as required by DOE 5700.6B and ASME NQA-1, Section 2.

CONCERN: Independent verification and oversight of quality assurance activities are not implemented by line or staff organizations at Argonne National Laboratory-East, as required by DOE 5700.6B and ANSI/ASME NQA-1, Sections 2 and 18.

CONCERN: The Argonne National Laboratory-East Quality Assurance Manual is incomplete and lacks guidance needed to assure quality achievement in all operations onsite, as required by DOE 5700.6B.

CONCERN: Argonne National Laboratory-East has failed to accomplish the responsibility to periodically evaluate the effectiveness of their Quality Assurance Program as required by DOE 5700.6B and ANSI/ASME NQA-1, Section 2.

CONCERN: Chicago Operations Office management has not implemented quality assurance programs and guidance for their area offices and contractors as required by DOE 5700.6B.

CONCERN: Provisions for the control of purchased material, equipment, and services and for selection and control of suppliers is not fully implemented by Argonne National Laboratory-East as required by DOE 5700.6B.

CONCERN: Argonne National Laboratory-East procurement activities are neither thoroughly assessed nor independently verified as required by ANSI/ASME-NQA-1, Sections 4 and 7.

CONCERN: Receiving and pre-installation inspections are not independently verified at Argonne National Laboratory-East as required by DOE 5700.6B and ANSI/ASME NQA-1. (Also see Concern QV.6-2.)
CONCERN: The Argonne National Laboratory-East calibration program does not meet the requirements of ANSI/ASME NQA-1, Section 12.

CONCERN: Argonne National Laboratory-East facilities (shops) used for calibrating measuring and test equipment do not meet industrial good practice standards.

CONCERN: At Argonne National Laboratory-East, identification and control of safety-related hardware and materials is not in compliance with the requirements of ANSI/ASME NQA-1, Section 8.

CONCERN: Quality inspection programs at Argonne National Laboratory-East are not implemented as required by DOE-5700.6B and ANSI/ASME NQA-1.

CONCERN: At Argonne National Laboratory-East, there are no provisions for independent verification that all required inspections are being performed in accordance with DOE 5700.6B and ANSI/ASME NQA-1.

4.5.3 Operations

CONCERN: Argonne National Laboratory-East does not have laboratory workplace criteria which would establish the appropriate workplace (e.g., hood or glovebox) depending on the hazard of the operation.

CONCERN: The New Brunswick Laboratory does not have laboratory workplace criteria which would establish the appropriate workplace (e.g., hood or glovebox) depending on the hazard of the operation.

CONCERN: Argonne National Laboratory-East operation activities at the Argonne Tandem Linear Accelerator System were not conducted in a manner to achieve safe and reliable operation as specified in ANSI N43.1 and as required by DOE 5480.4.

CONCERN: Activities in the plutonium laboratories in Argonne National Laboratory-East Buildings 200 and 212 were not conducted in a manner to achieve safe and reliable operation as required by DOE 6430.1A.1161-4.

CONCERN: Argonne National Laboratory-East lacks an effective sitewide policy and program for design, installation, maintenance, and surveillance of confinement devices.

CONCERN: Argonne National Laboratory-East maintenance personnel responding to alarms can be exposed to hazardous situations.
CONCERN: The design, installation, and testing of interlocks at the Argonne National Laboratory-East Argonne Tandem Linear Accelerator System Facility is not in compliance with ANSI N43.1, as required by DOE 5480.4.

CONCERN: Responsible staff lack fundamental knowledge and training regarding operating parameters, safety systems, testing, and acceptance criteria for the safe operation of the Argonne National Laboratory-East Argonne Tandem Linear Accelerator System as required by ANSI N43.1.

CONCERN: Some of the Argonne National Laboratory-East Building 200 staff do not properly operate safety equipment in the performance of their jobs.

4.5.4 Maintenance

CONCERN: Argonne National Laboratory-East plant facilities and equipment are deteriorated due to lack of resource allocations, lack of realistic inspections, and the reluctance of first line supervisors to seek assistance from management to correct the situation.

CONCERN: The Argonne National Laboratory-East inspection and corrective maintenance program is not effective in assuring the design operability of facility support systems.

CONCERN: Preventive maintenance for Argonne National Laboratory-East plant facilities fluid systems is not adequate since valve maintenance and system preservation are not included.

4.5.5 Training and Certification

CONCERN: There are no top-level Argonne National Laboratory-East training goals and policies and no associated implementing procedures or standards.
CONCERN: Argonne National Laboratory-East top management has not established a mechanism to ensure that training and qualification requirements of DOE Orders and Federal, State, and local regulations are enforced.

CONCERN: Training records have generally not been maintained at Argonne National Laboratory-East as required by DOE 1324.2, DOE 5480.5, DOE 5480.11, and DOE 5483.1A.

CONCERN: Chicago Operations Office training and qualification programs do not adequately document that Chicago Operations Office personnel can safely and effectively carry out their oversight responsibilities.

CONCERN: Argonne Area Office training and qualification programs do not adequately document that Argonne Area Office personnel can safely and effectively carry out their oversight responsibilities.

CONCERN: The operator training program for the Argonne National Laboratory-East Intense Pulsed Neutron Source does not include a formal method for controlling or documenting on-the-job training as required by DOE 5480.5.

CONCERN: Argonne National Laboratory-East radiation safety training does not meet the requirements of DOE 5480.11.

CONCERN: Argonne National Laboratory-East does not have a program to ensure that all personnel, including visitors, security inspectors, users, and subcontractor personnel, are provided with training concerning the safety hazards to which they are exposed.

CONCERN: Argonne National Laboratory-East does not have a program to ensure that personnel who have unescorted access to facilities with special hazards are trained to recognize these facility-specific hazards and understand associated safety precautions.

CONCERN: Not all Argonne National Laboratory-East personnel receive the specialized safety training required by the Health and Safety Manual before performing high hazard activities.

CONCERN: Personnel who operate Argonne National Laboratory-East hoisting and rigging equipment have not been adequately trained and certified to operate and maintain this equipment in accordance with 29 CFR 1910.179 through 188.
CONCERN: The Argonne National Laboratory-East training and qualification programs for Health Physics Technicians do not meet the requirements of DOE 5480.11.

4.5.6 Auxiliary Systems

CONCERN: At Argonne National Laboratory-East, contaminated equipment placed in long-term storage for potential future use is not systematically assessed for disposal, inventoried, periodically surveyed, or stored in suitable facilities.

4.5.7 Emergency Preparedness

CONCERN: Argonne National Laboratory-East has not developed an independent, inhouse emergency preparedness appraisal capability as required by DOE 5500.3 and Draft DOE 5500.3A.

CONCERN: Chicago Operations Office has not performed the required annual appraisal of Argonne National Laboratory-East emergency preparedness as required by DOE 5500.3.

CONCERN: Argonne National Laboratory-East did not have an effective system in place to track and resolve cited emergency preparedness deficiencies as required by DOE 5500.3.

CONCERN: Chicago Operations Office had not reviewed or approved the Argonne National Laboratory-East Comprehensive Emergency Management Plan.

CONCERN: The Argonne National Laboratory-East Comprehensive Emergency Management Plan and emergency response organization does not meet the requirements established in DOE 5500.2A, DOE 5500.3 and Draft DOE 5500.3A. (Also see Concerns SS.2-1, and OA.5-3.)

CONCERN: The Argonne National Laboratory-East Emergency Plan Implementing Procedures did not meet the requirements contained in DOE 5500.1A, DOE 5500.2A, DOE 5500.3 and Draft DOE 5500.3A.

CONCERN: Argonne National Laboratory-East did not use the guidance provided in DOE 5500.3, Draft DOE 5500.3A, and good industry practices to develop the emergency response training program.
CONCERN: Argonne National Laboratory-East procedures for scenario development and training and selection of controllers/evaluators is not in conformance with DOE 5500.3 and Draft DOE 5500.3A.

CONCERN: Argonne National Laboratory-East did not have an action plan developed to resolve past cited deficiencies from appraisals or exercises.

CONCERN: Argonne National Laboratory-East did not develop a drill and exercise program as outlined in DOE 5500.2, DOE 5500.3, and Draft DOE 5500.3A.

CONCERN: Argonne National Laboratory-East did not comply with DOE 5500.1A, DOE 5500.2, DOE 5500.3, Draft DOE 5500.3A, DOE 5500.4, and good industry practices.

CONCERN: The Argonne National Laboratory-East Emergency Operations Center and Technical Support Center has not been established and maintained in accordance with DOE 5500.3 and DOE 5500.1A and good industry practices.

CONCERN: Argonne National Laboratory-East has not ensured that the existing public address system will provide sitewide coverage for providing emergency instructions as required by DOE 5500.2A.EP.6

CONCERN: The emergency action levels and emergency classification definitions used in the Argonne National Laboratory-East emergency plan are not in compliance with DOE 5500.1A and have not been coordinated with the State and local emergency management agencies as directed in DOE 5500.3 and Draft DOE 5500.3A.

CONCERN: Argonne National Laboratory-East did not review the requirements in DOE 5500.2, DOE 5500.3, and DOE 5500.3A to address the dissemination of information on emergency instructions, protective actions, and classifications of emergencies to site personnel.

CONCERN: Argonne National Laboratory-East procedures on exposure control, decontamination, and site evacuation do not comply with DOE 5500.3 and Draft DOE 5500.3A.

4.5.8 Technical Support

CONCERN: Not all facilities at Argonne National Laboratory-East that require it have a current Safety Analysis Report that conforms to the format and content required by DOE 5481.1B.

CONCERN: Facility modifications at Argonne National Laboratory-East are made without appropriate design and safety review.
CONCERN: Argonne National Laboratory-East does not ensure configuration control of facility modifications with as-built drawings.
(TS.3-2) (H2/C2)

CONCERN: Argonne National Laboratory-East packaging and transportation employees have not received comprehensive training to perform their duties as required by DOE 5480.3 and 49 CFR.
(P.T.2-1) (H3/C1)

CONCERN: There is no formal training program for packaging and transportation employees at Argonne National Laboratory-East as required by DOE 5480.3 and 49 CFR.
(P.T.2-2) (H3/C1)

CONCERN: At Argonne National Laboratory-East quality assurance plans have not been developed for all packaging and transportation activities consistent with DOE 5700.6B. (Also see Concern QV.1-1.)
(P.T.3-1) (H3/C1)

CONCERN: The Argonne National Laboratory-East operating procedures for packaging and transportation of hazardous materials are incomplete.
(P.T.6-1) (H3/C2)

CONCERN: Argonne National Laboratory-East is not in compliance with proposed Department of Energy policy for onsite transportation.
(P.T.8-1) (H3/C2)

CONCERN: There are no independent internal safety audits of packaging and transportation activities at the Argonne National Laboratory-East as required by DOE 5480.3.
(P.T.11-1) (H3/C1)

4.5.9 Packaging and Transportation

Argonne National Laboratory-East does not ensure configuration control of facility modifications with as-built drawings.

There is a lack of management control over the packaging and transportation activities at Argonne National Laboratory-East as required by DOE 5480.3.

 Argonne National Laboratory-East packaging and transportation employees have not received comprehensive training to perform their duties as required by DOE 5480.3 and 49 CFR.

There is no formal training program for packaging and transportation employees at Argonne National Laboratory-East as required by DOE 5480.3 and 49 CFR.

At Argonne National Laboratory-East quality assurance plans have not been developed for all packaging and transportation activities consistent with DOE 5700.6B. (Also see Concern QV.1-1.)

The Argonne National Laboratory-East operating procedures for packaging and transportation of hazardous materials are incomplete.

Argonne National Laboratory-East is not in compliance with proposed Department of Energy policy for onsite transportation.

There are no independent internal safety audits of packaging and transportation activities at the Argonne National Laboratory-East as required by DOE 5480.3.
4.5.10 Nuclear Criticality Safety

CONCERN: The criticality records control system at the New Brunswick Laboratory is not in compliance with the requirements of DOE 5480.5.

CONCERN: Approved written operating procedures concerning criticality control at Argonne National Laboratory do not address all of the requirements of DOE 5000.3A.

4.5.11 Security Safety Interface

CONCERN: Some security/safeguards modifications having potential safety implications are not reviewed for safety by the Argonne National Laboratory-East Chief Operations Officer's organization.

CONCERN: There is a lack of formally documented plans and procedures describing the interrelationships among safeguards, security, and safety, including emergency preparedness, activities at the Argonne National Laboratory-East site.

CONCERN: The Argonne Area Office has not assured that the roles, responsibilities, and interfaces among the site safety, safeguards, and security functions are clearly defined and well understood. (See Concerns OA.1-2 and OA.1-3.)

4.5.12 Experimental Activities

CONCERN: Documented delegation of responsibilities from the Chicago Operations Office to the Argonne Area Office for safety review and safety oversight of experimental activities does not exist.

CONCERN: The requirements for safety review and safety oversight of experimental activities have not been effectively codified by the Argonne Area Office and transmitted to Argonne National Laboratory-East.

CONCERN: Procedures, programs or guidance to assure systematic assessment of experiment safety does not exist at the director level within the Argonne National Laboratory-East.

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4.5.13 Site/Facility Safety Review

CONCERN: Argonne National Laboratory-East has not implemented a comprehensive internal appraisal system that provides for the review of environment, safety, and health functions as required by DOE 5482.1B.

CONCERN: The New Brunswick Laboratory has not developed implementing procedures for an internal safety review system as required by DOE 5480.5.

CONCERN: Argonne National Laboratory-East has not implemented a laboratory-wide policy that provides for an acceptable level of safety involvement in the review of operations across the site.

CONCERN: The numerous deficiencies cited in the Argonne National Laboratory-East self-assessment will not be given sufficient priority once the Tiger Team Assessment concerns and findings are formally transmitted to Argonne National Laboratory-East.

CONCERN: For other than moderate hazard nuclear facilities, Argonne National Laboratory-East has not implemented an independent triennial review system of its environment, safety, and health internal appraisal program as required by DOE 5482.1B.

4.5.14 Radiation Protection


CONCERN: The Argonne National Laboratory-East Health Physics Procedures Manual lacks a number of procedures important to safely working with radiation and radioactive materials.

CONCERN: Analytical x-ray machines at Argonne National Laboratory-East have insufficient physical barriers and interlocks.

CONCERN: Argonne National Laboratory-East has no standards for the interlock systems of small accelerators, and this results in a failure to meet the mandatory requirements of ANSI-N43.1.
CONCERN: Argonne National Laboratory-East had no proactive approach to external radiation control.
(RP.4-1) (H2/C2)

CONCERN: At Argonne National Laboratory-East, work on radioactive systems can proceed without proper review by the health physics organization as required by DOE 5480.11.
(RP.4-2) (H2/C1)

CONCERN: Argonne National Laboratory-East had no proactive health physics approach in work areas where intake of radioactive materials is possible.
(RP.6-1) (H2/C2)

CONCERN: The Argonne National Laboratory-East program of calibration and controls for radiation monitors fails to ensure the accuracy of measurements.
(RP.8-1) (H2/C1)

CONCERN: Instrument calibrations at New Brunswick Laboratory are not performed in accordance with ANSI-N323.
(RP.8-2) (H3/C1)

CONCERN: The Argonne National Laboratory-East air monitoring program fails to meet the requirements of DOE 5480.11.
(RP.9-1) (H2/C1)

CONCERN: At Argonne National Laboratory-East, inappropriate location of hand and foot monitors limits ability to detect alpha contaminated hands and shoes as required by DOE 5480.11.
(RP.10-1) (H3/C1)

4.5.15 Personnel Protection

CONCERN: The Argonne National Laboratory-East Chief Operations Officer had not established the Environment, Safety and Health Department, Quality Assurance, Environment, and Safety Office in a credible assurance and verification role relative to other Divisions. (Also see Concern OA.1-3.)
(P.P.1-1) (H2/C2)

CONCERN: Argonne National Laboratory-East management allowed Divisions to independently adopt policy and procedure which could limit Chief Operations Officer involvement in and assurance and verification of the health and safety program. (Also see Concerns OA.1-3 and OA.1-5.)
(P.P.2-1) (H2/C1)

CONCERN: Responsibility and authority of Division Safety Coordinators and Division Safety Committees were not clearly and uniformly defined by Argonne National Laboratory-East and Division policy and procedure. (Also see Concerns FR.1-3, OA.1-3, and OA.1-5.)
(P.P.2-2) (H2/C2)
The Argonne National Laboratory-East Environment, Safety and Health Department had not fulfilled its responsibility for keeping the Health and Safety Manual current with regulations, and Divisions had not achieved compliance with many health and safety standards. (Also see Concern OA.7-1.)

The Argonne National Laboratory-East Environment, Safety and Health Department operating procedures, documentation, and data management systems were not structured and coordinated to assure generation of defensible and readily retrievable exposure assessment data.

The Argonne National Laboratory-East Plant Facilities Services Division construction program including its procurement aspects did not apply an effective system to enforce safety requirements and correct noncompliances, and an effective assurance interface between Plant Facilities Services and the Chief Operations Officer was lacking.

Argonne National Laboratory-East line management did not apply an effective system to identify, evaluate, and control safety and health hazards, nor enforce safety policy, and the Chief Operations Officer did not function in a programmed surveillance and assurance role. (Also see Concerns PP.1-1, PP.2-1, and OP.2-2.)

Accidents, injuries, and illnesses were not reported, logged, and tracked at Argonne National Laboratory-East as required by 29 CFR 1904 and DOE Order 5480.4.

At Argonne National Laboratory-East, coordinated and programmatic facility walkthroughs and hazard evaluations were not applied by the Environment, Safety and Health Department or by the Quality Assurance, Environment, and Safety Office on a sitewide basis as required by DOE 5480.10 and 5480.4. (See Concerns OA.1-3 and OA.1-4.)

The Argonne National Laboratory-East hazard communication program was not in compliance with 29 CFR 1910.1200 and DOE 5480.10, and in addition, compliance with 29 CFR 1910.1450, Exposures to Hazardous Chemicals in the Laboratory, by the January 31, 1991, deadline could not be assured.

4.5.16 Worker Safety and Health (OSHA) Compliance

Argonne National Laboratory-East did not comply with 29 CFR 1910.141 (b) (2) (ii) Sanitation - Water Supply.

Argonne National Laboratory-East did not comply with 29 CFR 1910.151 (c), Medical and First Aid, regarding safety showers and eyewashes.


Recognized safety devices to prevent electrocution during maintenance were defeated on 84 out of 92 machines at the Argonne National Laboratory-East in violation of 29 CFR 1910, Subpart S, Electrical.

Argonne National Laboratory-East Line management and the Safety Coordinator failed to identify and correct an imminent electrocution hazard. (Also see Concern WS.4-12.)


CONCERN: Locked closed or "on" circuit breakers were found in Argonne National Laboratory-East Buildings 360 and 362; there were approximately 25 to 30 of these breakers locked on in violation of the requirements of 29 CFR 1910.304(e), Over current Protection.

CONCERN: Argonne National Laboratory-East contractors are not complying with Occupational Safety and Health Administration Standards for fall protection. They do not comply with 29 CFR 1910.28 (j)(4), Safety Requirements for Scaffolding, or 29 CFR 1910.132(a), Personal Protective Equipment, general requirements.

CONCERN: Argonne National Laboratory-East is not in compliance with OSHA 1926.20(a), and thus did not provide a safe place to work.

CONCERN: Argonne National Laboratory-East did not fully comply with OSHA 1910.305, Electrical, or OSHA 1926.400, Electrical.


CONCERN: Argonne National Laboratory-East does not fully comply with OSHA 1910.26 Housekeeping.

CONCERN: Argonne National Laboratory-East did not comply with OSHA 1926.440, Ladders and Scaffolding.


CONCERN: The Argonne National Laboratory-East Plant Facilities and Services Department oversight had no definitive mechanism to detect or correct an existing hazard. (Also see Concern PP.3-1.)
4.5.17 Industrial Hygiene

CONCERN: Asbestos abatement at Argonne National Laboratory-East was not performed in compliance with 29 CFR 1926.58, and good work practices were not consistently utilized and could not be assured or documented.

CONCERN: The Argonne National Laboratory-East Laser Safety Program did not comply with ANSI Z136.1-1986. (Also see Concerns TC.4-4 and PP.3-2.)

CONCERN: Handling, storage, and labelling of chemicals, compressed gases, and wastes at Argonne National Laboratory-East did not comply with DOE 5480.10, DOE 5480.4, various Occupational Safety and Health Administration regulations, and good standards of practice.

4.5.18 Fire Protection

CONCERN: Plans and specifications for site and facility projects and safety related documents were not reviewed by the Argonne National Laboratory-East Environment, Safety and Health Department for conformance with fire protection standards as required by DOE 5480.4 and 5480.7.

CONCERN: Argonne National Laboratory-East is not in compliance with the Life Safety Code, NFPA 101. (See Concern WS.4-1.)

CONCERN: Requirements for emergency alarms, as detailed in NFPA 72D and mandated by DOE 5480.4, are not met in Argonne National Laboratory-East facilities.

CONCERN: Automatic fire suppression systems are not provided throughout the Argonne National Laboratory-East facilities as required by DOE 5480.7.

CONCERN: Loss analyses have not been performed on many major Argonne National Laboratory-East facilities and information evaluated to determine the adequacy of the installed fire protection systems in accordance with requirements of DOE 5480.7.

CONCERN: The New Brunswick Laboratory is not in compliance with DOE 5480.7 or DOE 5480.4.

CONCERN: The requirements for "Improved Risk" as mandated in DOE-5480.7, are not being met at the Argonne National Laboratory-East.
4.5.19 Medical Services

CONCERN: Site visits, by the Argonne National Laboratory-East Medical Department staff, were not conducted frequently and regularly as required by DOE 5480.8.

CONCERN: A written occupational medical plan did not exist at Argonne National Laboratory-East as required by DOE 5480.8.

CONCERN: At Argonne National Laboratory-East, medical records did not contain required information on employee exposures to hazards and hazardous substances as required by DOE 5480.8.

CONCERN: Comprehensive, termination, and transfer examinations for all employees including special term employees, visitors and other non-regular employees are not performed at Argonne National Laboratory-East as required by DOE 5480.8.

CONCERN: Staff levels in the Argonne National Laboratory-East Medical Department did not meet minimum guidelines based on population served as required by DOE 5480.8.
5.0 MANAGEMENT ASSESSMENT

5.1 PURPOSE

The Management Subteam conducted a management assessment of ES&H programs and their implementation at ANL-E. The objectives of the assessment were to: (1) evaluate the effectiveness of existing management functions and processes in terms of assuring environmental compliance, and the health and safety of workers and the general public; and (2) identify probable root causes for ES&H findings and concerns.

5.2 SCOPE

Organizations reviewed were CH (including AAO and NBL) and ANL-E (and its parent, the University of Chicago [UC]).

The scope of the assessment covered ES&H general management issues (i.e., organization, planning, controls, communication, culture, and commitment); policies and procedures; authority, responsibility, and delegations; resources (including budgeting); training (including qualifications); quality assurance; emergency preparedness; internal oversight; and appraisal and followup. DOE and ANL-E management configurations were reviewed to ascertain the existing lines of authority, responsibility, and accountability for ES&H; and the interfaces for ES&H between DOE Headquarters, CH, AAO, UC, and ANL. Emphasis was placed on the priorities given ES&H activities, communication of ES&H objectives, line authority for ES&H, ES&H quality assurance, and DOE and ANL-E oversight.

Interviews were conducted with DOE and ANL-E top, middle, and first-line management, as well as working level staff. Documents reviewed included: DOE and CH Orders, CH Management Directives, the DOE contract with UC, the ANL-E Institutional Plan, policies, procedures, manuals, mission and function statements, implementation plans, budgeting and financial reports and records, audit, appraisal, and surveillance reports, information from manual and computerized tracking systems, self-assessment reports, job descriptions, individual performance plans and appraisals, and training materials and records.

5.3 APPROACH

The Management Subteam conducted its assessment in accordance with the Tiger Team Guidance Manual, dated February 1990. The Subteam coordinated with the Environmental, and Safety and Health Subteams to share information and ideas on management issues identified during the Tiger Team Assessment, as well as identify management issues that might be common to the findings of all subteams. The causal factors identified by all subteams were considered in the evaluation of probable root causes.
The Management Subteam was aided in its evaluation by draft "Performance Objectives and Criteria for Management Appraisal of Environmental Protection, Safety, Health, and Quality Assurance (ES&H/QA)." These performance objectives and criteria were one element used to evaluate findings gathered in the course of the review.

Initially, the Subteam developed an understanding of CH, AAO, and ANL-E senior management and expectations for management of ES&H activities. This was followed by a review of supporting documentation describing the organization, roles, policies, plans, procedures, performance criteria, funding, etc. for ES&H organizational elements, operations, and programs at AIS. Next, the Subteam conducted interviews and developed an understanding of the perceptions of DOE Headquarters; CH; AAO; ANL-E; and UC personnel concerning ES&H activities at AIS; how current practices conform to senior management’s ES&H policies and goals; and the adequacy of supporting documentation.

The Subteam’s own observation were supplemented through coordination with the Environment, and Safety and Health Subteams. Preliminary data and conclusions were developed, checked, and factually validated through further document reviews and followup discussions with managers and staff at CH, AAO, and ANL-E.

5.4 MANAGEMENT ASSESSMENT SUMMARY

ANL-E and CH are organizations just entering a period of significant transition. While many of the Department’s elements started to improve their ES&H/QA status in the early 1980s, CH and ANL-E did not take any steps to improve their performance until 1988/1989. As a result of this late start, the effectiveness of their programs and demonstrated ES&H/QA performance is considerably less than the Department’s current expectations.

CH has recently taken steps to increase the effectiveness of Federal line management oversight of its assigned laboratories. Management is aware of the need for ES&H/QA enhancements, but few implementing actions have been taken. As a result, management systems are not able to support ES&H/QA objectives and related organizational issues need resolution.

ANL-E’s ES&H/QA posture prior to 1989 can be characterized best as complacent, with only marginal performance, and with an objective of doing "just enough to get by." In technical program areas, support for "excellence in science" had a higher priority than support for ES&H/QA programs and performance that were marginal and could, with application of minimal effort and resources, be brought into compliance. ANL-E management has taken limited actions during the past year to increase the support for and effectiveness of ES&H/QA programs. To date, these efforts have not produced the desired results, and a more concerted and aggressive approach must be taken by top and middle management, in order to make the myriad of changes necessary to achieve an acceptable ES&H/QA posture.
The Tiger Team considers the actions of the Safety and Environment Committee of the UC Board of Governors to be a noteworthy practice. The Committee has demonstrated a detailed understanding of ES&H/QA issues at ANL-E. They have stated their intention to follow ANL-E actions as it attempts to resolve current and future ES&H/QA program deficiencies. This followup and support is necessary, as the Laboratory begins to work more systematically toward attaining improvements in ES&H/QA performance.

Both CH and ANL-E are staffed with talented personnel who have a deep commitment to the programs being performed at AIS. All want recognition for doing a good job, but many do not understand that acceptable ES&H/QA performance is an inherent part of their job. Top management of both organizations have not demonstrated leadership in conveying to their staffs that ES&H/QA programs have the highest priority. Top management has also missed opportunities to communicate to its employees the need to change attitudes regarding ES&H/QA performance; and their specific actions and decisions have sent conflicting signals to staff regarding the "real" priority of ES&H/QA activities vis-a-vis "good science." Clarity of communications and unity of purpose are required to achieve the necessary changes in workforce attitude toward ES&H/QA and eliminate the confusion that exists. Similarly, site and middle management need to establish, communicate, support and implement realistic program plans for achieving success in the ES&H/QA program. Section 5.5 contains many findings which support the conclusion that currently this is not the case, and which indicate there is a lack of visible management support for DOE's ES&H/QA objectives and for meeting applicable requirements.

DOE Headquarters Program Managers have not demonstrated visible support for ES&H/QA programs at ANL-E in the past. These managers have the ability to significantly influence ANL-E staff acceptance of ES&H/QA through (1) longstanding peer relationships and (2) "the power of the purse." The Office of the Assistant Secretary for Energy Research (ER) needs to assure that its managers fully understand and accept the need for improvements at ANL-E, and that these managers demonstrate visible and convincing commitment to ANL-E staff by supporting those actions in programmatic and budgetary decisions. ER has recently taken actions to increase their oversight of ANL-E programs, and these efforts show promise for achieving beneficial results.

There were many findings indicating that ANL-E's line management was not accepting responsibility for ES&H/QA performance. There were many instances where management systems did not recognize ES&H/QA as an integral part of job descriptions or performance standards, and where organizational charters were silent on ES&H/QA responsibilities. Many of the findings of the Safety and Health, and Environmental Subteams can be directly attributed to the absence of line management "ownership" of an ES&H/QA issue. A majority of the Category I and II concerns found by the Safety and Health Subteam and many of the environmental compliance deficiencies resulted from situations known in advance by knowledgeable ANL-E line managers who did not take mitigating actions.

While ANL-E has a very strong "line manager" organizational concept, its premise of decentralization has worked to the detriment of ES&H/QA performance.
performance. Specifically, all subteams found that Laboratory-wide ES&H/QA policy guidance and procedures did not have the minimum specificity necessary to assure detailed understanding of the requirements and to assure adequate performance. This situation manifested itself by allowing far too much latitude and independence in the preparation of specific implementing instructions by organizational elements of ANL-E charged with implementation. In addition, many of the top level policy documents were inadequate, incorrect, or outdated. There were also instances found where policy documents were ignored.

Because ANL-E has a highly decentralized managerial structure, there is a priority need for both ANL-E and CH management to have effective self-assessment and surveillance programs to determine the actual level of ES&H/QA performance within the individual work units. Neither CH nor ANL-E have effective self-assessment programs. While CH has the framework for an acceptable appraisal/surveillance process, the program has not been fully implemented -- with inadequate staff being cited by CH as the cause. (Note that the Management Subteam did not assess the efficiency of staff utilization.) However, CH does not have an effective tracking and followup system, nor a system to keep top management informed on progress and performance for needed remedial actions.

ANL-E does not have an acceptable independent oversight, managerial reporting, or followup system to review and evaluate the effectiveness of its ES&H/QA programs and performance. There is no formalized self-assessment program. Independence is not achieved. Also, trending, tracking, and root cause analysis do not exist. Laboratory management does not exhibit the same degree of inquisitiveness toward ES&H/QA performance as it does toward basic and applied science issues. Many staff personnel believe that management support to ES&H/QA matters is secondary to "good science." The Tiger Team detected some reluctance by ANL-E staff to raise safety issues for fear of retribution. ANL-E management needs to change this image (real or perceived) and create an environment conducive to more open vertical communications.

Both CH and ANL-E have not prioritized resource allocations required for acceptable ES&H/QA performance. Within ANL-E, resources are allocated in a process which is dominated by line managers' interests. Interviews and observations made during the assessment indicated that line managers have not fully accepted the need for improved ES&H/QA performance. Laboratory management has not performed an ES&H/QA "needs assessment," and no mechanisms exist to verify that consensus funding proposals adequately meet the Department's objective of enhanced ES&H/QA performance. Multi-year plans with the objective of achieving excellence in ES&H/QA performance have not been prepared. Similarly, CH does not review the adequacy of ANL-E funding allocated to ES&H/QA activities, during either budget preparation or program execution. Resource allocations for ES&H/QA activities at both CH and ANL-E have increased during the past two years; however, the buildup is not sufficient to meet ANL-E's growing ES&H/QA needs. ER, the primary Headquarters Program Office, also has not reviewed or provided guidance concerning most ES&H/QA resource determinations for ANL-E.
5.5 MANAGEMENT FINDINGS

5.5.1 General Management

INTRODUCTION AND SUMMARY

ANL-E policy was recently revised to state that ES&H/QA has the highest priority in all Laboratory operations. Top management has stated on several occasions their support for this new policy, but their actions have not always lent weight and credibility to their words. Candor regarding ES&H/QA performance has not been encouraged or accepted, priority has not been given to the correction of known ES&H/QA deficiencies, planning for improvements in ES&H/QA performance has not taken place, funding for ES&H/QA activities has not been emphasized in budget documents, and ES&H/QA considerations have not been a visible part of management's day-to-day routine. In short, ES&H/QA at ANL-E is perceived by the Tiger Team as an "afterthought," not an integral part of basic management considerations. Managers at ANL-E need to reassess their actions to assure that they are providing continuous visible support to the Laboratory's stated policy.

The Tiger Team also found that the DOE Headquarters Program Offices have not demonstrated visible support for improvements in ANL-E's ES&H/QA performance. Their primary interest has been in the cost of remedial actions, not in assuring that adequate programs are in place to achieve Departmental objectives. Individual ANL-E researchers are responsive to their DOE programmatic customer. DOE Headquarters program managers must provide visible and convincing support to ES&H/QA performance for the ES&H program to achieve its objectives. The recent initiatives by the Office of Energy Research to increase awareness and oversight of CH and ANL-E ES&H/QA programs will have a beneficial impact.

The Tiger Team also found that ANL-E management has not demonstrated the same degree of technical inquisitiveness regarding ES&H/QA performance as it does for matters of scientific and technical interest. The ANL-E self-assessment, while a good start, did not include a causal factor or root cause analysis. Had these techniques been used, many of the management issues found by the Tiger Team would have been identified prior to the Team's arrival. The Tiger Team also found the absence of trending, root cause and lessons learned analyses for evaluation of ES&H/QA performance data. ANL-E needs to posture itself to proactively identify current and emerging ES&H/QA issues in order to achieve continual improvement in ES&H/QA performance.

The specific findings on General Management follow.
ASSESSMENT DISCIPLINE: Management Attitude, Involvement, and Commitment

ASSESSMENT FINDING NUMBER: M/BMPF-1

ASSESSMENT FINDING TITLE: ANL-E Management Actions

PERFORMANCE OBJECTIVE:

Management attitude towards performance excellence is reflected in a commitment to corporate policy, knowledge of requirements, and direct and active involvement in activities related to ES&H/QA.

FINDING:

ANL-E top management’s statements regarding ES&H/QA performance excellence are not reflected in their actions.

DISCUSSION:

Top Laboratory management has stated as a matter of policy that ES&H/QA has the highest priority in all Laboratory operations. However, top Laboratory management has not followed through by assuring their own actions reflect the policy. Consequently, ANL-E employees are getting confused signals from top management, and the policy is only on paper.

In general, top management spends the vast majority of its time on programmatic aspects of Laboratory operations, with relatively little time devoted to ES&H/QA problems, programs or issues. Interviews conducted by the Tiger Team Assessment Subteams revealed that many employees do not believe that ES&H/QA has the highest priority in Laboratory operations. Perhaps this attitude is attributable to the observed lack of visible involvement by top management.

The ANL Board of Governors issued a policy statement over a year ago making ES&H/QA the highest priority in Laboratory operations. It took over one year for Laboratory top management to issue a revision to its Policy Manual to reflect this significant change; and the Laboratory Director, in his September 20, 1990, memo distributing the revised policy, did not take this opportunity to reinforce the Policy.

The Laboratory Director conducts an extensive amount of communication with ANL-E employees to discuss information he believes employees should all be aware of, and to explain his vision for the Laboratory. However, this communication effort does not place emphasis on ES&H/QA performance. For example:

- The Laboratory Director has sent only three memos to all Laboratory employees in the last three years which put emphasis on ES&H/QA matters.
The "State of the Laboratory" addresses by the Laboratory Director in 1989 and 1990 did not address and reinforce the DOE and ANL policy that highest priority is to be placed on ES&H/QA in all Laboratory operations. Nor did he address the need for change, for a new culture emphasizing ES&H/QA, or for correcting existing ES&H/QA problems. Almost the entire address focused on programmatic concerns of the Laboratory.

The Laboratory Director holds informal breakfast meetings with ANL-E employees in small groups to enhance communication. The Subteam's review of meeting agendas revealed there is little evidence that he addresses ES&H/QA concerns. Interviews with persons who have attended these meetings revealed the Director has made it clear he expects each manager to place high priority on safety or they will be replaced.

The Laboratory Director holds Management Council meetings weekly, but they do not address ES&H/QA problems in any depth. Primarily the only ES&H/QA concerns these meetings address are reports by the Chief Operations Officer of accidents and incidents.

The Laboratory Director has the Director of the Office of Quality, Environment and Safety (QES) brief the Management Council quarterly on ES&H/QA status. These briefings summarize incidents and ongoing or upcoming activities (appraisals, tiger teams, etc.) but do not characterize the effectiveness of ES&H/QA performance at ANL-E. However, these briefings have provided sufficient information to the Management Council members for them to begin to draw their own conclusions regarding the effectiveness of ES&H/QA performance and to take necessary corrective actions. There is no evidence they have done so.

It is not apparent that Management Council members are actively involved in ES&H/QA issues, although they do have extensive daily involvement in programmatic activities. ANL-E management's failure to establish adequate formal reporting, trending, and root cause analysis programs deprive management of tools to effectively, objectively and reliably assess the adequacy of ES&H/QA performance at ANL-E. (See Findings Nos M/CF-1, and M/BMPF-25) Laboratory management does have formal reporting systems for programmatic and administrative matters, however. This apparent dichotomy sends mixed signals to ANL-E employees.

Despite the fact the DOE placed great emphasis on ES&H/QA performance for a number of years, Laboratory management did not support expansion of resources in ES&H/QA areas until Fiscal Year 1989, when there was a small increase. In Fiscal Year 1990 there was a significant expansion in ES&H/QA resources.
ASSESSMENT DISCIPLINE: Performance Measurement, Reporting, and Tracking

ASSESSMENT FINDING NUMBER: M/CF-1

ASSESSMENT FINDING TITLE: ANL-E Management Reporting System

PERFORMANCE OBJECTIVE:

Formal management systems shall be in place which ensure ES&H/QA requirements are effectively implemented throughout the organization. The systems shall provide to managers and supervisors at all levels timely, objective, and reliable indication of ES&H/QA performance, including significant achievements and deficiencies (DOE 5482.1B).

FINDING:

ANL-E does not have adequate formal reporting systems to provide information to management regarding the adequate implementation of ES&H/QA policy and compliance with ES&H/QA procedures.

DISCUSSION:

ANL-E management has not established a formal system to identify, trend, analyze root causes and report to management at all levels compliance with ES&H/QA requirements.

There is a general reliance by ANL-E management on incident reporting as the only formal means of keeping management informed of ES&H/QA issues. Interviews with key managers revealed that there is more reliance on informal, oral reports, with judgment made as to "what the boss wants to hear." Furthermore, as the Safety and Health Subteam determined, not all serious safety incidents are reported to management. (See Concern OA.5-3 in Section 4.5.11.) Also, interviews revealed there is a perception by some employees that raising ES&H/QA issues to management may result in retribution to the employee. Thus, there is no assurance that management at all levels is being informed of all significant problems.

The Laboratory Director's Management Council meetings do not address ES&H/QA problems to any depth.

Lack of formal reporting systems deprives management at all levels of the information necessary to take proactive steps to correct deficient conditions in order to prevent incidents from occurring.
ASSESSMENT DISCIPLINE: Appraisal and Followup System

ASSESSMENT FINDING NUMBER: M/BMPF-2

ASSESSMENT FINDING TITLE: Management Followup

PERFORMANCE OBJECTIVE:
A system is in place which is effective in evaluating deficiencies including unusual occurrences in order to determine the underlying or root causes and which develops corrective actions aimed at root causes.

FINDING:
ANL-E management has not taken aggressive action to identify and resolve the root cause of noncompliance with ANL-E Health and Safety Manual, DOE, and other Federal requirements.

DISCUSSION:
As the Tiger Team Assessment findings from the Safety and Health Subteam reveal, there is widespread lack of compliance with the requirements contained in the ANL-E Health and Safety Manual as well as with DOE and other Federal requirements. ANL-E management has been slow in identifying, and lethargic and ineffective in responding to this sitewide safety concern.

Interviews with the Support Services Division (SSD) Director revealed that he had a growing awareness of the site’s lack of compliance with the Health and Safety Manual requirements, but doubted if upper management was aware of this situation. His growing awareness came from the Technical Safety Review (TSR) conducted for ANL-E over a year ago, as well as the recently completed ANL-E self-assessment, both of which demonstrated significant noncompliance by ANL-E with Health and Safety Manual requirements. The Environment, Safety and Health Department (ESHD) Head also indicated a similar growing awareness from these reviews, as well as from surveillances by his staff over the years.

ANL-E management has not instituted an adequate and effective reporting system (See Finding M/CF-1), depriving management of information necessary to assess ES&H/QA performance at ANL-E. ANL management does not have a formal, Laboratory-wide system in place to consistently identify, track, trend and perform lessons learned on ES&H/QA concerns (see Findings M/BMPF-25 and M/BMPF-26). Further, ANL-E management has not established a root cause analysis system to identify major cross-cutting causation of deficiencies and, through correction of these root causes, effect a significant enhancement to the overall ES&H/QA posture at ANL-E. Consequently, tools have not been established for all levels of ANL-E management, and especially top management, so they could become aware of the deficiencies and initiate effective Laboratory-wide corrective actions.

ANL-E has not aggressively resolved many of the deficiencies noted by the Technical Safety Review, and CH and ANL-E appraisals (See Finding M/CF-20.) Lack of aggressive pursuit of corrective actions signifies to ANL-E employees
that ANL-E management does not consider ES&H/QA to have the highest priority in operations at the site.
ASSESSMENT DISCIPLINE: ANL-E Oversight

ASSESSMENT FINDING NUMBER: M/BMPF-3

ASSESSMENT FINDING TITLE: Oversight of the ANL-E Five-Year Plan

PERFORMANCE OBJECTIVE:
The organization is established in such a manner that the function, assignments, responsibilities, and reporting relationships of individuals are clearly defined, understood, and effectively implemented. All major parts of Environmental Protection, Safety, Health, and Quality Assurance (ES&H/QA) responsibilities are included, with emphasis on line management control of ES&H/QA.

FINDING:
ANL does not have an adequate organizational structure to oversee the execution of the Environmental Restoration and Waste Management Five-Year Plan (Five-Year Plan).

DISCUSSION:
There is no Laboratory-wide organization to provide oversight of Five-Year Plan program execution. There is no single organization designated to assess and report on Five-Year Plan program performance, cost, schedules, etc. for ANL-E. Project status information and reporting is decentralized to the performing divisions without Laboratory-wide oversight. Laboratory-wide coordination of Five-Year Plan preparation efforts reside with the Director, Office of Quality Assurance, Environment, and Safety. A team, under his direction and with representatives from both line and staff organizations, provides a preparation quality check and assists in Laboratory-wide prioritization. There is no evidence that program execution oversight is provided under this arrangement.
**ASSESSMENT DISCIPLINE:** DOE Oversight

**ASSESSMENT FINDING NUMBER:** M/BMPF-4

**ASSESSMENT FINDING TITLE:** Oversight of CH and ANL-E by the DOE Office of Energy Research

**PERFORMANCE OBJECTIVE:**

DOE Program Offices are actively involved in oversight of program activities at field offices (and their contractors) to ensure that they comply with ES&H requirements established by law, regulations, and DOE policy.

**FINDING:**

The DOE Program Office with primary responsibility for ANL programs and activities (Office of Energy Research) has not provided adequate environment, safety, health, and quality assurance guidance to and oversight of ANL-E in the past.

**DISCUSSION:**

The DOE Office of Energy Research (ER) has primary responsibility for landlord activities and institutional support for ANL-E. In the past, ER has not provided CH and ANL-E with guidance and direction concerning the conduct of ES&H/QA activities, nor has it conducted adequate oversight or surveillance activities to ascertain ANL-E's compliance with Departmental ES&H/QA goals and objectives.

ER review of ANL-E and CH planning and execution activities has concentrated on program-related functions. Review of ES&H/QA activities has been limited to major items of equipment or construction projects with ES&H implications. As a result, many activities required for improvements in ES&H/QA performance have not been reviewed by the Headquarters program sponsors.

ER has issued a program plan for oversight and appraisal of ES&H/QA activities of CH and ANL-E. This plan includes the definition of Headquarters Program Manager ES&H/QA responsibilities and establishes a review and appraisal program wherein ER line and staff personnel will maintain a current awareness of the plans for and status of ES&H/QA activities at CH and ANL-E. Program managers will be required to assess the adequacy of CH and ANL-E plans and initiatives to meet current and emerging ES&H/QA needs.

ER also has begun to develop a program to vertically integrate ER elements (from Headquarters through the contractors) into a comprehensive self-assessment program. This effort is in response to the Secretary's guidance on self-assessments which was issued on July 30, 1990.

In addition, ER plans to strengthen the ER/CH interface in order to increase the ability of CH and AAO line managers to meet the required ES&H/QA objectives.
5.5.2 Policies and Procedures

INTRODUCTION AND SUMMARY:

CH and ANL-E do not have a complete and disciplined framework of policies and implementing procedures, do not have adequate discipline in determining the applicability of new requirements, and have not properly implemented all the policies and procedures that exist. This lack of formality and discipline was observed throughout the CH and ANL-E organizations, and severely impacts the effectiveness of ES&H/QA programs.

There was not adequate assurance that DOE Orders and other directives were appropriately reflected in ANL-E policies and procedures. In addition, many deficiencies were found in ANL-E policies and procedures. These deficiencies result from a management philosophy that established minimal Laboratory-wide requirements and delegated the preparation of operating procedures to 18 decentralized operating Divisions without a central organization review function. This philosophy was adopted to maximize the flexibility available to the programmatic organizations in the conduct of scientific and technical endeavors. As a result of this philosophy, ES&H/QA programs were adversely impacted as follows: (1) the Laboratory-wide requirements were often not sufficient to assure an implementing program consistent with DOE requirements, (2) there were no requirements for central and independent review of Divisional procedures before implementation, and (3) the effectiveness of surveillance and oversight activities was unacceptably degraded.

Since ANL-E had no formal method to assure all appropriate requirements were reflected in Laboratory-wide procedure manuals, there was no assurance that these manuals were complete and adequate. In fact, none of the manuals reflect DOE requirements for environmental protection.

The absence of formality and discipline in ANL-E and CH ES&H/QA programs also extended to implementing specific clauses in the contract between DOE and the University of Chicago, which required that specific ES&H/QA programs and plans be developed by ANL-E, approved by the contracting officer, and implemented by ANL-E. These clauses were not fulfilled.

Neither CH nor ANL-E took a proactive approach to implementing the Department’s Conduct of Operations guidelines, and through mutual agreement, inappropriately limited the application of the Conduct of Operations guidelines to only three specific ANL-E facilities. This is indicative of the current culture at CH and ANL-E: resistance to a more disciplined and formal approach to program execution, and non-receptiveness to new ways of doing business.

ANL-E did not have an employee concern program that would encourage employees to raise ES&H/QA concerns for resolution without fear of retribution. Beyond not complying with DOE requirements, this situation is symptomatic of an organization that does not encourage its employees and management to take an
active interest in improving performance in areas of safety concern to its employees.

The specific findings on Policies and Procedures follow.
ASSESSMENT DISCIPLINE: DOE and Regulatory Requirements Control

ASSESSMENT FINDING NUMBER: M/CF-2

ASSESSMENT FINDING TITLE: CH Determination of Applicability and Distribution of DOE Directives

PERFORMANCE OBJECTIVE:
The DOE and regulatory authorities in contracts, Orders, policies, standards, codes, directives, and regulations are properly distributed, clearly defined, interpreted and implemented.

FINDING:

CH and AAO were not following CH 1321.1B, Chicago Operations Office Directives System, dated July 27, 1989, which would provide for the timely determination of applicability and distribution of DOE and CH directives to ANL-E.

DISCUSSION:

There was no local record of new/revised DOE Orders being received by CH, nor was there a record of Orders being transmitted to organizations under the purview of CH (Form CH 519 was not used).

The CH Action Division has no assurance that the determination of applicability has been made to ANL-E. There was no central record maintained.

Orders were not being sent to ANL-E in a timely manner by CH. DOE 5480.19, Conduct of Operations Requirements for DOE Facilities, of July 9, 1990, was distributed to the Field Offices on July 29, 1990. The Order was transmitted to ANL-E on October 3, 1990.

Neither CH nor AAO maintained a listing of Orders transmitted to ANL-E for implementation. This is important because not all orders are applicable to ANL-E, and Orders must be transmitted by the Contracting Officer before they are binding on ANL-E.
ASSESSMENT DISCIPLINE: DOE and Regulatory Requirements Control

ASSESSMENT FINDING NUMBER: M/BMPF-5

ASSESSMENT FINDING TITLE: ANL-E Implementation of DOE Directives

PERFORMANCE OBJECTIVE:

The DOE and regulatory authorities in contracts, Orders, policies, standards, codes, directives, and regulations are properly distributed, clearly defined, interpreted and implemented.

FINDING:

ANL-E did not have a procedure to assure the timely implementation of DOE Orders and SENs transmitted by AAO.

DISCUSSION:

ANL-E maintained a log of incoming correspondence including DOE Orders transmitted by AAO. Orders were assigned to a "responsible individual" to determine impact of applicability on ANL-E and prepare implementing documentation. However, ANL-E had no system to follow-up on the determination by the "responsible individual" with regard to applicability, and to assure appropriateness of the implementing documentation (e.g., modification of procedures).

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PERFORMANCE OBJECTIVE:

Environmental protection, safety, health, and quality assurance requirements--as defined by DOE and regulatory authorities in contracts, orders, policies, standards, codes, directives, and regulations--are properly interpreted and implemented.

FINDING:

ANL-E policy and guidance manuals do not reflect the University of Chicago's Board of Governors' or DOE's policies or requirements relating to ES&H/QA.

DISCUSSION:

The ANL-E Policy Manual's statement on environmental protection, in effect when the Tiger Team Assessment began, did not reflect the DOE or Board of Governors policy to place highest priority on worker and public safety and environmental protection. ANL-E had earlier recognized this weakness and revised the policy. An approved revision, issued on Sept 20, 1990, corrected this deficiency.

The ANL-E Health and Safety Manual is incomplete. Most DOE Orders and applicable statutes relating to environmental protection are not addressed in the Manual. A revision to this Manual is in preparation and is intended to address requirements for environmental protection. The Laboratory plans to retitle the revision, The Environment, Safety and Health Manual.

The Safety and Health Subteam has identified several concerns addressing the inadequacy of various procedures contained in the Health and Safety Manual. ANL-E has not periodically reviewed the Health and Safety Manual to assure it incorporates new or changing requirements.

The Management, Safety and Health, and Environmental Subteams identified deficiencies in the Quality Assurance Manual. The Manual does not describe how conformance with requirements is assured, and does not provide specific guidance on how to implement ES&H/QA (See Environmental Finding QA/CF-1 and Safety and Health Concern QV.1.1 in Sections 3.5 and 4.5 of this Report).
DOE placed increased emphasis on ES&H/QA over the past several years. ANL-E management has been slow to react to this increase emphasis. The latest revision to the Health and Safety Manual was only initiated about one year ago and still has not been issued.
ASSESSMENT DISCIPLINE: DOE and Regulatory Requirements Control

ASSESSMENT FINDING NUMBER: M/CF-4

ASSESSMENT FINDING TITLE: Fulfilling Contractual Requirements

PERFORMANCE OBJECTIVE:
The DOE and regulatory authorities in contracts, Orders, policies, standards, codes, directives, and regulations--are properly distributed, clearly defined, interpreted and implemented.

FINDING:
There is a lack of formality and discipline in ANL-E fulfilling its ES&H/QA contractual requirements.

DISCUSSION:
Contract No. W31-109-ENG-38, Modification No. M160, requires that ANL-E submit selected ES&H/QA related documents to DOE for approval. ANL-E has not submitted many of these documents to CH, and there is no evidence that CH has requested ANL-E to correct this deficiency.

As required by Article 68 [Environmental Protection (Special)], of the Contract, the Contractor shall continue to maintain a management program and implementation plan as approved by the Contracting Officer (CO). ANL-E has not submitted an Environmental Protection Implementation Plan as required by the contract for the AAO Contracting Officer’s approval; however, ANL-E did submit a plan as required by DOE 5400.1.

As required by Article 70 [Quality Assurance Program (Special)], of the contract, the Contractor shall establish, implement, and maintain a quality assurance program which shall be submitted for review and approval of the Contracting Officer. ANL-E has not submitted the quality assurance program to AAO. Thus, the DOE Contracting Officer has not approved ANL-E’s quality assurance program.

Under Article 21 [DEAR 970.5204-2 Safety and Health (Government-Owned or Leased) (Apr 1984) (Modified)], "the Contractor shall continue to maintain a management program and implementation plan as approved by the Contracting Officer." AAO has not received an implementation plan from ANL-E; thus, AAO has not formally approved the program nor the implementation plan.

There was no evidence that ANL-E had established, maintained, and implemented a reliability assurance program for ES&H as required by Article 69 [Reliability Assurance for Environmental, Safety and Health (Special)] of the contract.

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Recently, AAO and ANL-E have had discussions related to some of the above contractual issues; however, there is still confusion and uncertainty on what would constitute fulfillment of the contractual requirements.
ASSESSMENT DISCIPLINE: Conduct of Operations

ASSESSMENT FINDING NUMBERS: M/BMPF-6, and M/BMPF-7

ASSESSMENT FINDING TITLE: Application of Conduct of Operations

PERFORMANCE OBJECTIVE:
INPO and Conduct of Operations Guidelines are to be integrated throughout the DOE complex.

FINDING (M/BMPF-6):
CH management did not take a proactive approach to implement "Conduct of Operations."

FINDING (M/BMPF-7):
ANL-E management did not take a proactive approach to implement "Conduct of Operations."

DISCUSSION:
In November 1989, the DOE Under Secretary provided instructions by memorandum regarding the implementation of "Conduct of Operations" activities in all DOE programs. CH, in turn, requested ANL-E to "prepare directives relating to the conduct of operations for all facilities engaged in industrial, research, testing or production activities."

The ANL-E response proposed that only three facilities be considered for inclusion under the Conduct of Operations guidance (JANUS reactor, Alpha-Gamma Hot Cell and the Intense Pulsed Neutron Source). CH accepted the ANL-E response and transmitted it to DOE Headquarters.

The Under Secretary’s memorandum directed that elements of a more formal "Conduct of Operations" program be considered for all DOE programs, activities and functions; and that individual elements should be applied to specific program activities, as appropriate. The ANL-E and CH responses did not contain any rationale for limiting the program’s application to the three identified facilities. When queried by the Management Subteam, ANL-E representatives stated that the narrow interpretation was discussed and agreed upon by CH and ANL-E prior to the preparation of the ANL-E response.

In subsequent correspondence, CH informed both DOE’s Energy Research Program Office and other Defense Programs that they did not plan to "query their laboratories further" until "definitive DOE-wide guidance . . . or rulemaking has been promulgated." In July 1990, DOE 5480.19, Conduct of Operations, was issued. This Order has been received by CH but it has not been formally provided to ANL-E and made an applicable part of the contract with ANL-E.
Interviews revealed there are no plans for CH or ANL-E to implement this Order. (This Order was transmitted to ANL-E on October 3, 1990.)

The lack of a timely and proactive approach to implementation of "Conduct of Operations" is a further indication of a resistance by CH and ANL-E to a more disciplined and formal approach to ES&H program execution, and a lack of receptivity to considering new and more effective ways of doing business.
ASSESSMENT DISCIPLINE: Communications

ASSESSMENT FINDING NUMBER: M/CF-5

ASSESSMENT FINDING TITLE: ANL-E Employee Concerns Program

PERFORMANCE OBJECTIVE:

The contractor shall establish a program which encourages employees to identify ES&H-related concerns. The program shall objectively address all concerns and the employee will be free of concern for retribution. (DOE 5483.1A)

FINDING:

ANL-E has not established an overall policy or program to encourage employees to raise ES&H concerns without fear of retribution.

DISCUSSION:

The ANL-E Policy Manual has no statement that employees with health and safety concerns can raise them without fear of retribution; nor is there a statement that employees may raise concerns directly to DOE. ANL-E does mount posters from DOE identifying employee rights to raise safety concerns within ANL-E and directly to DOE.

ANL-E has a variety of programs intended to make avenues available to employees to express suggestions, questions, or concerns. These include the "In Touch Program," the complaint resolution procedures for exempt and non-exempt employees, and union grievance procedures. None of these programs are for the stated purpose of making available to employees a mechanism to raise safety concerns. However, the Chief Operations Officer has sent a memorandum to all employees soliciting ES&H concerns as a mechanism to enhance ANL-E's ES&H performance.

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5.5.3 Authority, Responsibility and Delegations

INTRODUCTION AND SUMMARY:

Both CH and ANL-E are staffed with capable people dedicated to "doing a good job." However, the nature of "the job" has changed over the past several years, and many individual employees do not yet understand (or accept) the nature of those changes.

Within CH, line and staff ES&H/QA roles are not always well-understood and ES&H/QA responsibilities are not adequately (if at all) included in employee position descriptions and performance plans.

The Laboratory Director has stated that ES&H/QA is a line responsibility and that he holds line managers accountable. However, numerous instances were found where it was evident that line managers either have not accepted that responsibility or do not understand it.

ES&H/QA responsibilities were generally not delegated/assigned to an individual staff member but rather to organizational units. Individual performance evaluations against ES&H/QA objectives were weak. Many of the findings of the Safety and Health and Environmental Subteams are attributed to a lack of line manager "ownership" of an ES&H/QA issue. For example, a majority of the Category I and II Safety and Health concerns involve situations which were known in advance to knowledgeable ANL-E managers, whom did not independently take mitigating actions. Laboratory programs and systems for assigning and assuring line responsibility for ES&H/QA implementation are not strong.

The specific findings on Authority, Responsibility, and Delegations follow.
ASSESSMENT DISCIPLINE: Delegation

ASSESSMENT FINDING NUMBER: M/BMPF-8

ASSESSMENT FINDING TITLE: Roles and Responsibilities

PERFORMANCE OBJECTIVE:

The organization is established in such a manner that the functions, assignments, responsibilities, and reporting relationships of individuals are clearly defined, understood, and effectively implemented. All major parts of environmental protection, safety, health, and quality assurance (ES&H/QA) responsibilities are included, with emphasis on line management control of ES&H/QA.

FINDING:

ANL-E has not effectively defined individual line management functions, authorities, and responsibilities regarding environmental protection, safety, health, and quality assurance.

DISCUSSION:

SEN-11-89 requires clear, documented identification of responsibilities for ES&H/QA performance of individuals. ANL-E relies on the Policy Manual, organization charts, and position descriptions to define individual functions, authorities, and responsibilities regarding ES&H/QA. Inadequacies were identified in all three areas: the Policy Manual is general and describes only generic requirements; the organization chart issuances are not done in a controlled manner; and position descriptions do not adequately reflect individual ES&H/QA responsibilities.

The ANL-E Policy Manual, where policies on ES&H/QA are defined, states that line responsibility for ES&H/QA is automatically delegated to the individual line manager for each function. This type of general delegation does not adequately identify the specific ES&H/QA responsibilities that an individual has; instead it places complete responsibility on everyone. This lack of specificity leads to confusion by individuals as to their specific responsibilities.

There is a proliferation of organization charts at ANL. There is a requirement that organization charts be incorporated into the Policy Manual. However, these charts are not distributed in a controlled manner across the organization. Supervisors can reorganize and issue new charts with the approval of their manager. While new charts eventually will be incorporated into the Policy Manual, there is a time lag before the organization charts are placed in the Policy Manual and when the actual organizational change is made. Thus, there is no assurance that any given chart is current and correct. (See Concern OA.7-1 in Section 4.5.1 of this Report.)
Position descriptions for line management are written in general terms and do not contain clear and complete identification of each line manager's ES&H/QA responsibilities. ANL-E management acknowledged that the primary purpose of position descriptions was to determine the type and value of the individual required to perform a particular job, and not to define the individual's ES&H/QA responsibilities.

Interviews with staff and line management personnel revealed that there is no clear understanding and acceptance of line and staff responsibilities and authorities. This is supported by the Safety and Health Subteam's evaluation, which identified a number of related concerns. (See Concerns OA.1-2, OA.1-3; PP.1-1; PP.2-1; PP.2-2 in Section 4.5 of this Report.)
ASSESSMENT DISCIPLINE: Delegation

ASSESSMENT FINDING NUMBER: M/BMPF-9

ASSESSMENT FINDING TITLE: Interface Responsibilities

PERFORMANCE OBJECTIVE:

The organization is established in such a manner that the functions, assignments, responsibilities, and reporting relationships of individuals are clearly defined, understood, and effectively implemented. All major parts of environmental protection, safety, health, and quality assurance (ES&H/QA) responsibilities are included, with emphasis on line management control of ES&H/QA.

FINDING:

Environmental protection, safety, health and quality assurance interface requirements and responsibilities between line organizations and staff organizations at ANL-E are not clearly defined, understood or documented.

DISCUSSION:

Interface responsibilities are not clear and documented in Laboratory-wide policy and procedure documents. Interviews with management of the ANL-E Environment, Safety, and Health Department and the Quality Assurance, Environment, and Safety Office regarding their ES&H/QA oversight responsibilities revealed they do not fully understand their responsibilities and interfaces with line organizations. Interviews and reviews of correspondence revealed that line organizations have expressed misunderstandings and concerns regarding their interface with staff support organizations. The Safety and Health Subteam identified a similar concern (See Concern OA.5-2 in Section 4.5.1 of this Report).

Several Memoranda of Understanding to supplement policy and procedure documents, have been prepared between organizations, including one between an Associate Laboratory Director and the Chief Operations Officer to better define interface responsibilities.
ASSESSMENT DISCIPLINE: Line Management Responsibility for ES&H

ASSESSMENT FINDING NUMBERS: M/CF-6

ASSESSMENT FINDING TITLE: Line Management Responsibility for Implementation of DOE ES&H Objectives

PERFORMANCE OBJECTIVE:

Primary accountability and responsibility for ES&H activities is to be fixed in DOE line management at all levels (SEN-11-89, Setting The New DOE Course, September 5, 1989).

FINDING:

Position descriptions and performance plans for AAO staff members did not adequately address or reflect each line manager's responsibility for implementation of DOE ES&H/QA objectives.

DISCUSSION:

No Fiscal Year 1990 position descriptions reviewed included line responsibility for ES&H/QA (e.g., Programs and Projects Branch Chief, Director of Safety and Nuclear Programs).

No appraisal plans reviewed provided for the rating of line management responsibility for ES&H/QA (e.g., two general engineers, a project engineer, and a Project Manager, Advanced Photon Source). At best, the plans state only that the staff are to "ensure that ES&H issues are adequately addressed."
ASSESSMENT DISCIPLINE: Management

ASSESSMENT FINDING NUMBERS: M/BMPF-10 and M/BMPF-11

ASSESSMENT FINDING TITLE: Security Contractor Integration

PERFORMANCE OBJECTIVE:
The onsite security force shall be integrated into site operations so it may perform its duties safely as well as discharge their safety-related responsibilities.

FINDING (M/BMPF-10):
CH has not adequately defined the roles and responsibilities of the parties involved in the new security force contract.

FINDING (M/BMPF-11):
ANL-E management attention has been inadequate to implement integration of the new contract security force into site operations, particularly where safety concerns are involved.

DISCUSSION:
A number of findings in Section 4.5.11 (Security Safety Interface) of the Safety and Health Subteam portion of this report reveal that roles and responsibilities among ANL-E, AAO, CH, and AM-PRO (the new contract security force) are unclear. Management attention to this matter is required.

Integration of the security force into site activities is essential for the safety of the site, because the security force is a prominent factor in a number of site safety-related activities such as emergency response and traffic control. Moreover, it is essential for the safety of security forces personnel that they not be placed unknowingly in hazardous situations or locations without proper equipment and training.

Firing range safety issues have been addressed by the Safety and Health Subteam. However, Laboratory management needs to assure that not only will the present deficiencies be corrected, but also that ANL-E responsibilities for the range will be performed to DOE standards in the future.

Training of AM-PRO personnel also needs management oversight. Training is beginning to take place but, as yet, security personnel have little training on the hazards to be expected in various facilities to which they will be expected to respond and provide security support. This demand could occur at any time.
AM-PRO personnel have received training from the onsite fire department and have received offsite HAZMAT training. However, present AM-PRO formal training plans call for only two hours facility orientation. It is in ANL-E’s best interests to assure that the level of training the Laboratory thinks is necessary for the security force be provided.

Two incidents occurred during the Tiger Team Assessment which also indicated the need for security force training. Neither incident by itself turned out to be a significant event but they both strongly illustrate the need for improvements in training and/or clearer roles. Comments received from AAO on the draft Tiger Team report further reinforce these needs, since AAO did not appreciate the significance of the events.

The first incident was a situation where a potentially hazardous object was brought to a security officer’s attention, but the security officer would not take action without the presence of a supervisor. The supervisor was observed to also be unclear as to his responsibilities. AAO’s response to the initial draft description of the event indicates that it is not clear if AM-PRO, Plant Facilities and Services, or ES&H Department had the responsibility.

The second incident did not involve a safety situation, but could have under different circumstances. This incident involved access to a room during other than normal duty hours in which security and the fire department demonstrated that they were not clear as to who could allow access under what conditions. The point is not whether there was a safety problem, but rather that the two primary emergency response organizations should be clear on their roles in all circumstances.

The Branch Chief for Administration in AAO is the Contracting Officer (CO) for the new security force contract, but a Branch Chief within the CH Safeguards and Security Division is the Contracting Officer’s Technical Representative (COTR). Placing these functions in separate organizations is cumbersome and could contribute to a lack of clear roles and responsibilities.

In one instance, the Tiger Team was told that the COTR at CH requested a firearms safety review from the CH ES&H Division, although no written request was made available. The review was performed, and the report was sent to the AAO Manager with a copy to the CO and the COTR’s Division Director. While there appears to have been informal coordination among the parties, the correspondence does not reflect that there are clear lines of authority.

The memorandum of understanding (MOU) between ANL, DOE, and AM-PRO is another concern. The MOU does not provide clear definition of roles and responsibilities between the parties. A revision that covers all aspects of roles and responsibilities is necessary to ensure efficient performance of the security contract.

The MOU specifies that the Firearms Safety Committee will continue to be led by ANL-E. AAO should confirm why this should continue to be so, if ANL-E is no longer a user of the range and another prime contractor is involved. While pursuing the question of range safety with ANL-E, CH, and AM-PRO staffs,
diverse opinions were offered as to who should be responsible for safety at the range, indicating clarification of the situation is necessary.

There has been no resolution as to which type of weapons are required for the site (i.e., whether shotguns are needed). However, if these weapons are required, qualification with them will be necessary. This could be done elsewhere, but will be more costly and time consuming. In addition, the decision will dictate the safety criteria appropriate for the range, and could lead to a revised safety analysis and/or physical corrections at the range.
ASSESSMENT DISCIPLINE: Organizational Structure

ASSESSMENT FINDING NUMBER: M/BMPF-12

ASSESSMENT FINDING TITLE: Collateral ES&H/QA Assignments

PERFORMANCE OBJECTIVE:

Management provides an adequate staff of qualified personnel to ensure effective implementation of ES&H/QA programs and affords professional development opportunities to the staff personnel.

FINDING:

Problems have been identified with ANL-E line organization use of Division ES&H/QA representatives.

DISCUSSION:

Line organizations have, at the Division level, assigned ES&H/QA responsibilities, in varying degrees, to Division staff as collateral duties. Positions performing these duties are safety coordinators or safety officers, QA representatives (QARs), environmental compliance representatives (ECRs), and area emergency supervisors (AESs).

There are a number of problems limiting the effectiveness of these positions that have been identified by other Tiger Team Subteams. They are addressed here because the use of these collateral duty assignments is prevalent and functions assigned as collateral duties are important elements in program implementation of ES&H/QA line responsibilities. These problems are:

- The adequacy of initial and ongoing training for the collateral duties has frequently been cited as a shortcoming throughout ANL-E.

- Roles and responsibilities are unclear. Even in those areas where responsibilities are defined in manuals, (e.g., QA and Emergency Management), some collateral duty representatives expressed and demonstrated that they were unclear as to what they were supposed to do.

- Several representatives cited lack of time to do both their primary and collateral assignments. Because they are appointed by and report to the Division directors, there is a natural bias built into resolution of these conflicts.

- As a further time constraint burden, some divisions have assigned more than one ES&H/QA collateral duty to the same person. In at least one case, an individual has three such
assignments in addition to his primary job. While there is nothing inherently wrong with multiple assignments, the potential conflicts are obvious and there is a need for Division directors, the Office of Quality, Environment and Safety (QES), and the Environment, Safety, and Health Division (ESHD) to collectively address the issue.

- There is another conflict of both time and duties. The representatives serve "two masters" in the sense that, while they are appointed by the line, they receive training and attend periodic meetings called by QES and ESHD. Meetings and training sessions have not always been well attended—in some cases reportedly less than half of those expected. The missed opportunity for communications affects continuity and consistency in the ES&H/QA program.
ASSESSMENT DISCIPLINE: Performance Measurement, Reporting, and Tracking

ASSESSMENT FINDING NUMBER: M/BMPF-13

ASSESSMENT FINDING TITLE: Performance Plans for CH ES&H Division Employees

PERFORMANCE OBJECTIVE:
ES&H and quality assurance performance of groups and individuals are evaluated against established goals and objectives.

FINDING:
The performance plan for most employees in the CH ES&H Division is not adequate to evaluate the incumbents' performance against their specific ES&H responsibilities.

DISCUSSION:
DOE 3430.3A requires management to ensure that performance plans, which describe key job responsibilities on which performance will be evaluated, are prepared for all employees. A standard performance plan is being used for most employees in the CH ES&H Division. However, this plan does not cover the specifics of individual jobs in enough detail to provide adequate performance evaluation criteria.
5.5.4 Resources

INTRODUCTION AND SUMMARY

All disciplines in the Tiger Team review had findings which indicate that inadequate resources have been allocated to ES&H/QA programs and activities. The Management Subteam verified that funding and staffing for ANL-E ES&H/QA functions remained unchanged during the period 1985 to 1989, a period of heightened national and Departmental attention to safety and environmental problems. As a result, significant programmatic deficiencies occurred resulting in a series of marginal and unsatisfactory reviews between 1987 and 1989. Some program growth was experienced in 1990, and current ANL-E proposals (as yet unapproved) project increases for ES&H/QA programs in 1991.

Resource trends for ES&H/QA activities at CH have improved. Manpower approved for CH ES&H/QA activities has increased by 11 positions since 1988, at a time when total CH staffing levels remained unchanged.

CH management personnel cited many instances in which inadequate staffing resources were a cause for inadequate ES&H/QA performance. While many necessary activities are not being performed, it was difficult to determine whether these shortcomings resulted from (1) inefficient practices, (2) improper allocation of available staffing resources, or indeed, (3) a CH-wide lack of staff. Some shortfalls can be accommodated by the greater use of support service contractors (in appropriate support functions). Also, the current organizational structure for meeting CH ES&H/QA responsibilities should be examined to assure that it is capable of providing the extent of management talent needed to adequately address the increasingly complex ES&H/QA programs at CH.

The annual budget is the primary vehicle for identification of ES&H/QA needs. Inadequate DOE guidance, CH’s and ANL-E’s lack of establishing a high priority on ES&H/QA needs, and the autonomous Division level budget process without independent validation, results in little assurance that ES&H/QA needs were adequately included in budget formulation and execution plans. This conclusion is supported by the large number of Tiger Team findings attributable to inadequate or ineffective use of resources.

There was no written, formal DOE guidance issued by Headquarters Program Officers to CH, or from CH to ANL-E to emphasize the high priority to be placed on ES&H/QA in budget formulation and program execution. ANL-E internal, written planning, budget formulation guidance did not contain requirements for increased emphasis on ES&H/QA.

Neither CH nor ANL-E performed an adequate, independent validation of budget estimates for ES&H/QA needs and priorities. As an example, a number of additional sites and facilities, perhaps 15 to 20, have been identified for inclusion in the updated Environmental Restoration and Waste Management Five-Year Plan.
Overhead accounts are the primary mechanism used by ANL-E to fund ES&H/QA needs for the Laboratory-wide staff offices. Estimates in these areas are subjected to review by the ANL-E Controller to ensure that proper inflation, labor, and overhead rates are used. In addition, these estimates are reviewed by the Chief Operations Officer, representatives from each Associate Laboratory Director, an Overhead Review Committee, and finally, the Management Council. There was no evidence that these reviews extended to an examination of the adequacy of ES&H/QA estimates. CH does not perform a review of ANL-E overhead accounts, but is advised after resource levels are set by the Laboratory.

A Laboratory plan and schedule for achieving needed ES&H/QA improvements did not exist, and the Laboratory Director did not identify initiatives for enhancing ES&H/QA performance. As a result, ES&H/QA funding levels were established by a "bottoms-up" process, in a system dominated by line program managers. Without top management attention, and without line management commitment to excellence in ES&H/QA performance, this process will always result in a less than adequate allocation of funds for ES&H/QA programs.
ASSESSMENT DISCIPLINE: Planning, Budgeting, and Spending

ASSESSMENT FINDING NUMBER: M/BMPF-14

ASSESSMENT FINDING TITLE: DOE Guidance for Budget Formulation

PERFORMANCE OBJECTIVE:

ES&H/QA programs are an integral part of the planning and budgeting process and receive the same consideration and priority as other operational activities.

FINDING:

DOE Headquarters and CH did not provide ANL-E adequate written guidance on funding levels, priorities, and requirements associated with ES&H/QA activities.

DISCUSSION:

There was no written, formal DOE Headquarters guidance issued to emphasize the high priority to be placed on ES&H/QA in budget formulation. DOE Headquarters programs provided instructions for only general format, schedule, and budget support information needs. In the environmental area, the required Headquarters Environmental Restoration and Waste Management Five-Year Plan (Five-Year Plan) and the companion ANL-E Site Specific Plan provide a planning framework for remediation and cleanup. In the case of the Five-Year Plan, no formal prioritization and funding levels to assist budget formulation were given by DOE Headquarters or CH to ANL-E. In the safety and health area, no guidance was provided. An exception was the Office of New Production Reactors, which outlined project guidance and provided funding targets for environment, health, and safety.

CH, through AAO, transmitted the DOE Headquarters guidance to ANL-E adding only information on internal processes, schedules, and contacts. There is no evidence that CH provided ANL-E the guidance that budgets should reflect DOE’s increased emphasis on ES&H/QA.

Interviews indicated that budget formulation discussions involving ES&H/QA did occur between Headquarters program offices, AAO, and ANL-E staff. This continuing dialogue is important, but is not a suitable substitute for formal, DOE program guidance.
PERFORMANCE OBJECTIVE:
ES&H/QA programs are an integral part of the planning and budgeting process and receive the same consideration and priority as other operational activities.

FINDING:
ANL-E's internal, written planning, budget formulation, and budget execution guidance does not contain requirements for increased emphasis on ES&H/QA requirements.

DISCUSSION:
The primary vehicle for identifying ES&H/QA resource needs is the annual budget submission with the exception of Laboratory-wide staff office functions funded by ANL-E overhead allocations. The budget is supported by a number of planning documents which include:

- In the environmental restoration and waste management area, the Environmental Restoration and Waste Management Plan (Five-Year Plan).
- ANL-E's annual Institutional Plan which provides a broad context for budget formulation and prioritization.

ANL-E's planning and budgeting activities are decentralized, placing primary responsibility at the Division level. There was no evidence that ANL-E top management provided written guidance to any level in the organization which indicated that ES&H/QA activities were to be afforded highest priority in planning and budgeting. Examples of this lack of guidance are:

- ANL-E's Laboratory-wide program budget calls issued by the ANL-E Controller, both for direct program and overhead activities (which are used to fund ES&H/QA policy oversight, appraisal and technical support), did not provide direction that highest priority should be given to meeting ES&H/QA requirements.

- The preliminary draft of the Institutional Plan, May 1990, discusses the need for additional funding for plant rehabilitation to offset the effects of normal aging, to accommodate changing technologies and scientific programs, and to meet more stringent environmental and safety standards. The document also describes
environmental activities now being conducted at ANL-E. However, there is no statement that increased attention to meeting ES&H/QA standards is the highest priority being addressed in ANL-E's institutional planning.

- In those instances where Associate Laboratory Directors issued written planning/budgeting instructions there was no indication that highest priority should be given to ES&H/QA.

- In the Divisions, where the detailed planning and budget estimates were prepared, the primary emphasis was on the preparation of program work authorization packages. There was no evidence that guidance was issued to indicate that the highest priority was to meet ES&H/QA needs.

- The special call for estimates for sitewide general plant projects did not place the highest priority on meeting ES&H/QA needs.

- Five-Year Plan budget guidelines were issued using the same broad format and schedule instructions provided by DOE Headquarters.
ASSESSMENT DISCIPLINE: Planning, Budgeting, and Spending

ASSESSMENT FINDING NUMBER: M/BMPF-16

ASSESSMENT FINDING TITLE: Validation of Budgets by CH

PERFORMANCE OBJECTIVE:

ES&H/QA programs are an integral part of the planning and budgeting process and receive the same consideration and priority as other operational activities.

FINDING:

Inadequate independent validation is performed by CH to determine if mandatory ES&H/QA requirements are provided for in program plans and budget estimates.

DISCUSSION:

CH does not perform an adequate independent validation to assure that program plans and budget estimates provide for ES&H/QA needs and priorities.

ANL-E provides the CH Manager a presentation on the budget several days prior to submission to Headquarters to prepare him for the DOE Internal Review Budget Process. ANL-E’s budget presentation did not indicate the priority or adequacy of the ES&H/QA funding levels requested. There was no evidence that CH requested a special review or highlighted ANL-E’s ES&H/QA needs nor validated or influenced ANL-E’s request before submission to DOE Headquarters.

The CH Manager provided DOE Headquarters a written review of ANL’s budget submission. In his review, the CH Manager indicated a major concern that ANL-E sites and facilities must meet mandatory ES&H standards. The CH Manager supported ANL-E’s request. However, the Manager did not indicate to Headquarters that all mandatory ES&H requirements were identified and adequately funded in the ANL-E budget submission.

CH has assigned the Environmental Restoration and Waste Management Five-Year Plan (Five-Year Plan) activities to an Assistant Manager who has established an Operations Office level team to coordinate, prepare and review Five-Year Plan activities. This team is involved in setting priorities, assuring preparation guidance is observed, and providing quality control. However, there is no evidence that CH performs an adequate independent validation of ANL-E’s submission to assure that needs, scope, schedule and costs are appropriately reflected. As an example, a number of additional sites and facilities, perhaps 15 to 20, have been identified by ANL-E for inclusion in an updated Five-Year Plan.
ASSESSMENT DISCIPLINE: Planning, Budgeting, and Spending

ASSESSMENT FINDING NUMBER: M/BMPF-17

ASSESSMENT FINDING TITLE: ANL-E Validation of Budgets

PERFORMANCE OBJECTIVE:

ES&H/QA programs are an integral part of the planning and budgeting process and receive the same consideration and priority as other operational activities.

FINDING:

ANL-E has not performed an adequate independent validation to assure that program plans and budget estimates provide adequate funding for ES&H/QA needs and priorities.

DISCUSSION:

This is no evidence that ANL-E performs an independent validation to determine the needs, scope, schedule and priority of the ES&H/QA requirements contained in budget estimates prepared by the line and functional divisions.

ANL-E has established a Laboratory-wide task force for the Environmental Restoration and Waste Management Five-Year Plan (Five-Year Plan) to consolidate estimates, assure proper formats and prioritize projects. However, there is no evidence that ANL-E performs an independent validation of the Five-Year Plan proposals. Later review by ANL-E indicates that a number of additional sites and facilities, perhaps 15 to 20, have been identified for inclusion in the update of the Five-Year Plan.

Line item construction and general plant projects are reviewed centrally by the Chief Operations Officer in consultation with ANL-E Divisions. Projects in this area are independently validated.

ANL-E budget estimates are reviewed by the Central Controller staff to ensure that proper inflation, labor and overhead rates are being used. There is no evidence that estimates are being subjected to independent validation to assure that ES&H/QA needs are adequate.

Overhead accounts are the primary mechanism used to fund ES&H/QA needs for the Laboratory-wide staff offices. Estimates in these areas are subjected to an independent review by the Chief Operations Officer, representatives of each Associate Laboratory Director, an Overhead Review Committee and finally the Management Council. There is no evidence that these reviews extend to an examination of the adequacy of ES&H estimates.
5.5.5 Training

INTRODUCTION AND SUMMARY

CH and ANL-E training programs do not adequately support line and staff responsibilities for ES&H/QA. In both organizations, there is an absence of established courses, documentation and training records, and top management sponsorship of ES&H/QA training and certification programs.

The Safety and Health, Environmental, and Management Subteams identified a number of concerns and findings regarding ES&H training at ANL-E. The overall conclusion was that, although progress was being made in some areas, the site is not yet in compliance with DOE training and qualification requirements.

Also, ANL-E has no central policy guiding the implementation of ES&H training, and management has not actively supported ES&H training implementation. The latter conclusion was illustrated by the lack of support by line managers for two ES&H training improvement initiatives. Both the effort by the ANL-E Environment, Safety, and Health Department to implement an ES&H training needs assessment and an effort by ANL-E Human Resources to implement a centralized training tracking and scheduling system have not been supported by all ANL-E Divisions.

More attention needs to be focused on training at CH. There was no systematic approach to training, including no program for analyzing jobs and tasks in order to identify performance requirements with ES&H responsibilities. Also, interviews indicated that individual development plans were not being prepared.
ASSESSMENT DISCIPLINE: Experience, Skills, Training, and Certification

ASSESSMENT FINDING NUMBER: M/BMPF-18

ASSESSMENT FINDING TITLE: CH ES&H Training Policy and Guidance

PERFORMANCE OBJECTIVE:
Management ensures that persons with the necessary experience, skills, training, and certification are provided to meet ES&H/QA goals and objectives.

FINDING:
There is no systematic approach to training and professional development in CH and AAO to prepare their personnel for ES&H/QA oversight responsibilities.

DISCUSSION:
The Safety and Health Subteam (See Concerns TC.1-4 and TC.1-5 in Section 4.5.5) found that there was no documented training or qualification for CH or AAO personnel. Some of the findings that supported this concern included:

- There was no formal method for determining training needs.
- There were no established training requirements for AAO personnel who conducted inspections or appraisals.
- There were no agreements that would allow personnel to participate in ANL-E training programs.

In summary, there was no systematic approach to job and task analysis to define ES&H/QA or other technical performance requirements. Interviews indicated also that individual development plans are not being prepared for CH and AAO personnel.

The CH and AAO staffs include a solid core of experienced and capable professionals. However, due to reorganizations and the expansion of AAO, there are a number of personnel in new job positions or new to DOE. The Tiger Team found that training was needed to improve job knowledge of these personnel, as well as to satisfy basic requirements (e.g., in hazard communications).
ASSESSMENT DISCIPLINE: Experience, Skills, Training, and Certification

ASSESSMENT FINDING NUMBER: M/BMP-19

ASSESSMENT FINDING TITLE: ANL-E Line Management Support of ES&H Training

PERFORMANCE OBJECTIVE:
Management ensures that persons with the necessary experience, skills, training, and certification are provided to meet ES&H/QA goals and objectives.

FINDING:
ANL-E does not have sitewide policy and procedures for meeting mandatory training and certification requirements; nor has ANL-E line management supported initiatives by the Support Services Division-Environmental, Safety, and Health Department and Human Resources to enhance the implementation and tracking of mandatory training and certification programs.

DISCUSSION:
The Safety and Health and the Environmental Subteams identified concerns and findings regarding training at ANL-E. A major concern was that there was no central policy guiding implementation of ES&H training. A major conclusion was that ANL-E is not in compliance with most DOE ES&H training and qualification requirements and has not provided adequate training to personnel assigned to ES&H/QA positions. In particular, ANL-E has struggled with implementing and tracking mandatory training and certification programs. Although these training problems have been well documented, some line Divisions have resisted efforts by the Support Services Division-Environmental, Safety, and Health Department (ESHD) and Human Resources (HR) to standardize and centralize mandatory training programs and recordkeeping. Several Divisions have failed to participate in the ESHD sponsored needs assessment of mandatory training. Also, there has been a lack of sitewide acceptance and use of the HR developed training management system that, if implemented, would result in a central training tracking and scheduling system.

The two major reasons the needs assessment and training management efforts failed to achieve their objectives or become accepted were the tendency of Divisions to resist centralization and standardization of functions and a lack of management support.

At ANL-E, top management support appears to be the critical element in successfully implementing a sitewide program. For example, two centrally initiated and coordinated training and personnel development programs, recently implemented at ANL-E, have met with considerable success. These are
the basic management training program and the organization review program. Both programs have strong and visible top management support. The Laboratory Director and the Associate Laboratory Directors participate as presenters, as well as trainees, in the management training program. The organization review program essentially was sponsored by the Laboratory Director.

Although there are Divisions that have supported ES&H training, it appears that for the ES&H training programs to be successful sitewide, top level management support and sponsorship to eliminate Divisional resistance is necessary.
5.5.6 Quality Assurance

The Tiger Team found that neither CH nor ANL-E had implemented QA programs that complied with DOE 5700.6B.

CH has not developed a formal QA program for implementation within CH that is consistent with DOE Orders. CH has not identified QA program requirements and prepared the necessary documentation to define QA activities, roles and responsibilities, measurable performance standards, and provide implementation guidance. However, CH had initiated an effort to develop a formal QA program prior to the Tiger Team Assessment.

The Team also found that CH had not provided adequate guidance and oversight to ANL-E. CH 5700.6C and DOE/CH-8801, CH's guidance on institutional quality, were not clear on what the programmatic basis of ANL-E QA should be and did not provide specific guidance on ES&H quality assurance. The level of guidance reflected a CH management philosophy of only providing general direction to the contractor.

At ANL-E, the Quality Assurance, Environment, and Safety Office (QES) had not provided an effective level of guidance to the line managers trying to implement QA programs. The ANL-E QA Manual did not contain specific guidance on how to address ES&H quality assurance, and adequate training was not provided to quality assurance representatives (QARs). Since decentralization of the QA function in 1985, 90 division and project organizational units have been identified as requiring a QA plan. Of the 90, 16 still do not have an approved plan.

Organizational QA Plans that were reviewed did not provide adequate requirements or guidance and were almost universally deficient in addressing ES&H quality issues. The QARs, who were key individuals for implementing line QA programs, generally were ineffective -- lacking experience and knowledge of QA, as well as being assigned the QAR function on a collateral duty basis, in most cases.

There was little internal oversight and problem reporting within Divisional QA programs, and management was not receiving adequate feedback and reports regarding program implementation and quality problems. On the other hand, management was not attempting to use QA to monitor ES&H program performance.

The ANL-E quality control (QC) inspection program also had management deficiencies. Sixty-five percent of the QC inspection budget was based on cost recovery; waivers and deviations were frequently used to resolve nonconforming items; and the results of nondestructive tests conducted by QC were often interpreted by the organization that had requested the testing.

There were four major causal factors that contributed to the problems in QA. These included:

- CH operating philosophy was to provide general direction and allow the contractor work out implementation details.
• There was a lack of understanding and appreciation of ES&H quality assurance.

• There was a feeling that existing QA, as applied to experimental design, was sufficient. Subsequently, line management did not perceive a need for additional QA for ES&H.

• There was no additional funding set aside for accomplishing decentralization of QA, and QES did not have the resources to perform their existing duties and provide adequate support to the line organizations.

The Management Subteam also assessed the prospects of CH and ANL-E for resolving their QA problems. It appears that CH has a good organizational structure for implementing a QA program, but strong management support will be required to coordinate implementation of the CH program and to effectively oversee and assure that ANL-E has an acceptable QA program. The prospects at ANL-E are not so clear. Significant changes in line organization attitudes about the value of QA are a prerequisite to establishing an effective program. So too is getting top management to support the program with more emphasis on ES&H quality assurance and selected increases in resources until Divisional and project QA programs are effective.
ASSESSMENT DISCIPLINE: Quality Assurance

ASSESSMENT FINDING NUMBER: M/CF-7

ASSESSMENT FINDING TITLE: CH Quality Assurance Program

PERFORMANCE OBJECTIVE:

Quality assurance requirements for the ESH&QA programs are documented in a formalized QA program or plan and are implemented.

FINDING:

CH has not developed a quality assurance program that meets the requirements of DOE 5700.6B and CH 5700.6C.

DISCUSSION:

The Management Subteam found that CH had not developed and implemented a QA program. The following observations support the finding:

- CH has not issued a QA manual or plan defining QA requirements and oversight activities, although there were program QA manuals and implementing procedures for special project areas such as the Repository Technology and Transportation Division (RTTD).
- Appraisal of contractor facilities are not being conducted as scheduled. Eleven appraisals were scheduled for 1990 -- two have been completed.
- In the past year, audits of only two ANL-E facilities have been conducted.
- There have been no QA audits or appraisals of CH or AAO, with the exception of management observations made by an outside consultant in June 1990.

Some of these findings and others had been reported to CH management in a June 29, 1990, letter from the consultant that conducted the management observations. Interviews with CH managers and staff personnel indicated that the need for a documented and active QA program was recognized and that a CH QA program was being developed. CH had drafted a revision to CH 5700.6C requiring CH to develop a QA requirements document and a QA Manual that defined responsibility for implementation and oversight of requirements.
While CH did not have a QA Manual and implementing procedures, the QA audits that had been conducted by CH's Environmental, Safety, and Health Division (ESHD) had been implemented effectively and were well-documented. ESHD employed implementing procedures from the RTTD QA Manual as guidelines for conducting audits of ANL-E.
ASSESSMENT DISCIPLINE: Quality Assurance

ASSESSMENT FINDING NUMBER: M/BMPF-20

ASSESSMENT FINDING TITLE: CH Quality Assurance Guidance to ANL-E

PERFORMANCE OBJECTIVE:

Quality assurance requirements for the ESH&QA programs are documented in a formalized QA program or plan and are implemented.

FINDING:

The QA guidance provided by CH to ANL-E was not consistent with DOE 5700.6B.

DISCUSSION:

The manner in which CH defined the Laboratory QA program in DOE/CH-8801 and the scope of DOE 5700.6B applicability in CH 5700.6C has contributed to ANL-E developing QA plans that do not comply with DOE 5700.6B. (See Environmental Finding QA/CF-1 in this Report.)

DOE/CH-8801 was developed jointly by CH and management and operations contractors as a concept and general guidance for facility QA. The basic concept that ANSI/ASME NQA-1 can be used effectively as the basis for establishing institution-wide QA at the Laboratory was consistent with DOE QA objectives. However, DOE/CH-8801 went on to state that CH considers NQA-1 a "quality management guide" and suggested that there may be application of the entire standard or only appropriate portions. Further, DOE/CH-8801 does not provide guidance on how to determine applicability of NQA-1 basic requirements or set forth minimum requirements for meeting DOE 5700.6B. DOE/CH-8801 did not place adequate emphasis on environment, safety and health quality assurance. The lack of guidance is reflected in ANL-E QA policy. For example, in the summary description of the ANL-E QA model, which is published in DOE/CH-8801, the criteria for identifying "important to quality" items and activities was stated: "if the risks do not substantially affect cost, schedule, compliance, reputation, or other specific consequences, detailed planning is not needed." This basis for determining application of QA planning is not consistent with DOE priorities for identifying "important to quality" in that ES&H quality assurance is not emphasized.

In turn, CH 5700.6C, which implements DOE 5700.6B, required M&O contractors to have QA programs "limited to application of the contractor's Institutional QA Plan unless a sponsor prescribes additional QA requirements." The ANL-E QA Manual is a guidance document subject to interpretation by Divisional and project personnel. The only way that CH could provide guidance and oversight regarding the basic QA program at ANL-E would have been to review, comment on, and approve the ANL-E QA Plans, which are the ANL-E QA requirements documents.
However, there was no indication that any organizational QA Plans had been reviewed by CH.
ASSESSMENT DISCIPLINE: Quality Assurance

ASSESSMENT FINDING NUMBER: M/CF-8

ASSESSMENT FINDING TITLE: ANL-E Quality Assurance Program

PERFORMANCE OBJECTIVE:
Quality assurance requirements for the ESH&QA programs are documented in a formalized QA program or plan and are implemented.

FINDING:

ANL-E quality assurance program specifications and their implementation do not comply with DOE 5700.6B and ANSI/ASME NQA-1, Section 2.

DISCUSSION:
A large number of findings and concerns regarding the effectiveness of the ANL-E QA Program were identified by the Safety and Health, the Environmental, and the Management Subteams. The major concerns are:

- ANL-E organizational QA Plans do not define QA specific requirements for environmental, safety, and health quality assurance. They also do not have specific procedures for identifying items/activities "important to safety" or consistently define management and oversight responsibilities.

- The line organization quality assurance representatives (QARs) have not been effective in supporting the development, implementation, and evaluation of organization quality assurance programs. In general, QARs do not have QA backgrounds or experience. Training and other QA professional development activities were inadequate. There is a lack of understanding and guidance on the application of basic QA requirements to specific ANL-E applied and basic research activities. The QAR responsibility frequently is assigned as a collateral duty or individuals are assigned to be the QAR for multiple projects or Divisions, thus limiting the time that can be committed to QA.
ANL-E does not have an adequate program for reporting QA or quality control deficiencies. There is no nonconformance reporting system. Periodic reports developed by QARs focus more on QA processes and program status, rather than serving as a vehicle to report problems to upper management.

These programmatic deficiencies had resulted in a number of implementation problems. Three major problems are:

- Items and activities important to quality had not been systemically identified in any of the QA programs. This requirement is the cornerstone of QA, since it establishes the basis for most line quality activities. In most cases, "important to quality" has not been defined. In one case where it had been defined, the definition and criteria for determining "important to quality" did not include environmental considerations.

- With the exception of Advanced Photon Source (APS), none of the QA programs reviewed had implementing procedures. The APS facility had begun to develop implementing procedures and had several in draft form.

- Surveillances were not conducted, and there was no indication that managers, particularly the Associate Laboratory Directors and Laboratory Director, were receiving QA problem reports.

The Management Subteam identified three causal factors that had contributed to deficiencies in the QA program at ANL-E. The first was the lack of adequate policy guidance. Secondly, there is not a good appreciation of modern QA practices at the Laboratory. Both the misdirection provided in DOE/CH-8801 and the traditional Laboratory perspective that experimental safety reviews ensure quality contribute to this situation. Third, centralized guidance and standardization is generally rejected by the Divisions. Each of these factors, both singularly and collectively, represent a major barrier to development of an acceptable QA program.
ASSESSMENT DISCIPLINE: Quality Assurance

ASSESSMENT FINDING NUMBER: M/BMPF-21

ASSESSMENT FINDING TITLE: ANL-E Office of Quality Assurance

PERFORMANCE OBJECTIVE:

Quality assurance requirements for the ESH&QA programs are documented in a formalized QA program or plan and are implemented.

FINDING:

The ANL-E Office of Quality Assurance was not effective in providing quality assurance guidance, training, and oversight.

DISCUSSION:

The Safety and Health and Environmental Subteams identified a number of findings and concerns related to the operation of the Office of Quality Assurance (OQA). These findings and concerns, along with observations and interviews conducted by the Management Subteam, led to the conclusion that improvement in the operation of OQA is required. Major observations included:

- Although decentralization of QA occurred in 1985, 16 of 90 organizational units or projects do not have approved QA plans. There was no indication that this deliberate pace for defining QA programs was a concern to management.

- OQA was responsible for issuing the ANL-E QA Manual and for approving QA Plans. There are deficiencies in these documents.

- Quality assurance representatives (QARs) have received no formal training in QA skills and techniques since initial training was conducted in 1985 and 1986. There have been one-on-one sessions for QARs conducted by OQA personnel, and the periodic QAR meetings also include training.

- The OQA manager position has been vacant since February 1990.

Both the Safety and Health and the Environmental assessments identified a lack of resources as a concern that impedes the proper functioning of OQA. The organization is not staffed to carry out its normal duties and responsibilities and to provide the support needed to get the Divisional QA programs implemented effectively.
It should be noted that OQA has made progress in establishing formality and discipline in its operation. OQA personnel have been effective in getting line organizations to respond to audit findings. Implementing procedures have been developed for audit activities. OQA personnel also established a system for tracking and trending QA audit findings. The trending system is not sophisticated, but should prove beneficial in identifying root cause quality issues as the database grows. The QARs are not participating in this trending system.
ASSESSMENT DISCIPLINE: Quality Assurance

ASSESSMENT FINDING NUMBER: M/BMPF-22

ASSESSMENT FINDING TITLE: ANL-E Quality Control - Inspection Management

PERFORMANCE OBJECTIVE:
Quality assurance requirements for the ESH&QA programs are documented in a formalized QA program or plan and are implemented.

FINDING:
The ANL-E Quality Control Inspection Unit is not operating in accordance with best management practices.

DISCUSSION:
The Quality Control (QC) Inspection Unit is a part of ANL-E's Support Services Division. Its primary function is to provide test and inspection services to other Laboratory facilities. A review of the QC-Inspection Unit revealed that there were several implementation deficiencies in the QC inspection function at ANL-E. As noted by the Safety and Health Subteam, there was a serious quality verification problem because QC inspections are, to a large degree, optional. Further, with the exception of a few projects, line organizations have not developed guidelines and criteria for inspections. One of the results is that users, on occasion, interpret nondestructive evaluation (NDE) results (e.g., radiographs and ultrasonic C-scans) rather than relying on the independent expertise of QC-Inspection.

A second management issue was that waivers and deviations frequently were employed to disposition items that do not meet procurement specifications. This practice generally is considered to be indicative of an ineffective QA program and of management acceptance of performance defects. At the time of the Tiger Team Assessment, the QC-Inspection Manager was analyzing Inspection Disposition Reports in order to determine the magnitude of the practice.

A third management issue was that approximately 65 percent of the QC-Inspection Unit budget is based on full cost recovery. Full cost recovery could discourage project managers or principal investigators from requesting inspections to save costs.
5.5.7 Emergency Preparedness

INTRODUCTION AND SUMMARY

The ANL-E emergency preparedness program was rated unsatisfactory in the CH Summary Appraisal Report for Fiscal Year 1989, and both the Management, and the Safety and Health Subteams determined that considerable problems still exist. Many concerns raised in the September 1989, Technical Safety Review of ANL-E have not been addressed. Improvements have been made in emergency preparedness since the hiring of the ANL Emergency Management Officer. However, the program has a long way to go to recover from the neglect of the preceding few years, if the program is to meet DOE's requirements for a formal, thorough emergency preparedness program.

The CH system of orders and program plans is outdated, does not have internal consistency and does not reflect the current concept for operations between the CH Emergency Operations Center (EOC) and the site EOC.
ASSESSMENT DISCIPLINE: Emergency Management

ASSESSMENT FINDING NUMBER: M/CF-9

ASSESSMENT FINDING TITLE: ANL-E, Emergency Management Planning

PERFORMANCE OBJECTIVE:

Plans are in place to deal promptly and efficiently with potential emergencies. Personnel and equipment to deal with emergencies are in a continual state of readiness.

FINDING:

The ANL-E Emergency management program needs significantly increased attention to assure it meets DOE requirements.

DISCUSSION:

The emergency management program at ANL-E was rated unsatisfactory in the CH Summary Appraisal Report of ANL-E for Fiscal Year 1989. Tiger Team reviews indicate significant shortcomings remain in the program. The program is not in compliance with the DOE 5500 series of Orders and does not include many basic elements reflecting best management practices. (See Section 4.5.7 of this report.)

Most of the 26 concerns contained in the September 1989, Technical Safety Review (TSR) for emergency preparedness remain open. Many were not considered in the emergency management section of the 1990 ANL-E self-assessment.

Staffing for emergency management at ANL-E is presently one full-time equivalent (FTE) but additional resources are necessary. Outside expertise, internal support, and additional staff can help, but the program will not meet all compliance requirements unless additional full-time staff is dedicated to emergency management.

Several findings from the February 1989, CH appraisal have not been closed by AAO. A number of extensions were granted by AAO at the request of ANL-E. In response to Finding One of the February 1989 appraisal, an independent review of the Comprehensive Emergency Management Plan was commissioned by ANL-E in February 1990. The report was received May 1990, but ANL-E staff reported no action has been taken on this report as of the date of the Tiger Team Assessment, although other actions have been taken to address Finding One of the February 1989 appraisal. There have been no other documented ANL-E independent internal reviews of the status of the program.
PERFORMANCE OBJECTIVE:

Plans are in place to deal promptly and effectively with potential emergencies. Personnel and equipment to deal with emergencies are in a continual state of readiness.

FINDING (M/CF-10):

CH emergency management Orders and program plans are not current.

FINDING (M/CF-11):

CH does not follow its own Order requirements and program plans in executing its emergency preparedness responsibilities.

DISCUSSION:

CH 5500.2, 5500.3, and 5500.4 were issued in 1982, and do not include the most recent requirements contained in the DOE 5500 series of Orders. The assignment of responsibilities and identification of implementing organizations is outdated, and does not reflect current CH modes of operation during an emergency. Draft revisions of CH 5500.1A and 5500.2A have been prepared. The drafts are also outdated and do not accurately reflect current requirements for CH Emergency Operations Center (EOC) operations.

In 1988, CH issued an Emergency Plan, and an Emergency Management Team Plan. A Public Affairs Emergency Plan is also issued (1989 latest version). These plans are inconsistent, and some do not accurately reflect the current modes of CH EOC operations as observed during the October 3, 1990, exercise held in conjunction with this assessment. Specifically, the execution of functions between the CH Personnel in the CH EOC, AAO personnel stationed in the site EOC, and ANL-E Personnel in the site EOC was not specified in CH’s Orders and plans. Examples include:

- Orders and some plans state that the CH EOC will approve press releases before issuance. The Emergency Public Information Plan states that press releases will be approved in the site EOC. In practice, they are approved by the AAO personnel at the site EOC and provided to the CH EOC for information.

- Orders/plans state that the CH EOC will be the communication link with state and local agencies. In practice this link was maintained by the site EOC (AAO and ANL-E).
Orders/plans state that the CH EOC will advise state/local agencies of protective action recommendations. In practice the site EOC (AAO and ANL-E) made a "sheltering" recommendation directly to the state.

Neither the CH Orders nor emergency plans reflect changes that resulted from the recent assignment of ANL-E site security responsibilities to a separate DOE prime contractor. The roles and responsibilities of the security contractor need to be specified in the CH policy documents and implementing plans.

DOE requires that the Headquarters (Forrestal) EOC be provided the current status of incident information and that the Headquarters EOC be fully aware of the safety implications and technical considerations of an incident. The CH emergency planning management concept delegates management of the incident to the site EOC, with CH EOC maintaining a current status of events and an awareness of significant considerations. Observation of the October 3, 1990, exercise revealed the CH EOC does not possess sufficient detailed information to adequately respond to reasonably anticipated DOE Headquarters EOC information requirements.

Implementing procedures do not exist for activities to be conducted in the CH EOC.
5.5.8 Internal Oversight

INTRODUCTION AND SUMMARY

ANL-E did not have an acceptable program for performing its internal oversight function and, as organized, this program did not have adequate independence.

ANL-E did not have a systematic, sitewide program to trend incidents, perform root cause analyses, nor identify lessons learned related to ES&H/QA deficiencies. There was not an aggressive management system to perform analyses on deficiencies nor a system to communicate "successes" from other sources.

The AIS Self-Assessment (ANL/TTTF-90/1) reported in September 1990, was a good start, but the report lacked several key elements of a thorough appraisal:

- There was no root cause analysis.
- The report was not comprehensive, because input from all sources was not included.
- There was inadequate rigor and introspection. The self-assessment identified about 56 percent of Tiger Team findings. In the Management and the Environmental areas, the self-assessment included about half of the Tiger Team findings. This level of deviation is unacceptable.
- A number of findings in the Self-Assessment Report had fourth quarter Fiscal Year 1990 completion dates. As of the date of the Tiger Team Assessment, the status of these findings were generally unknown to management.

CH had not performed a formal self-assessment nor was there any evidence that a self-assessment process was being established. AAO conducted two cursory self-assessments; neither of which met the intent of the Secretary’s guidance. CH did not adequately include an assessment of its own internal vulnerabilities, causes, or corrective actions in its Annual Assurance Letter.

The Subteam’s examination of "user" facilities determined that no environmental reviews were performed prior to experiments. While ANL-E performs safety and health reviews of such experiments, no followup is performed to determine whether the experimental programs were conducted in accordance with review/approval parameters. These followup reviews should also be performed for environmental parameters.
ASSESSMENT DISCIPLINE: Independent Oversight Activities

ASSESSMENT FINDING NUMBER: M/BMPF-23

ASSESSMENT FINDING TITLE: Independence of Oversight Activities

PERFORMANCE OBJECTIVE:

Internal oversight of ES&H/QA activities is performed at the operating level by persons not directly responsible for performance of the activities being appraised.

FINDING:

ANL-E is not performing an adequate level of independent oversight activities, nor has it established an adequate degree of independence in the conduct of oversight activities.

DISCUSSION:

ANL-E has established a multi-tiered concept for the conduct of independent internal oversight:

- The ES&H Department provides line implementation oversight of ES&H/QA procedures and guidance.
- The Office of Quality Assurance, Environment, and Safety (QES) provides line implementation oversight of ES&H/QA procedures and guidance.
- QES provides line implementation oversight of QA/QC functions.

While this concept has been defined, it has not been effectively implemented. There has not been an adequate number of reviews performed by either the ES&H Department or QES to provide ANL-E management with assurances that policies and procedures are being executed in accordance with Laboratory policies and DOE requirements. Both QES and the ES&H Department have prepared proposals to increase the number and depth of oversight reviews.

ANL-E's concept for internal oversight results in situations where the independence of the reviewing organization may not be adequate. Three instances of potential conflict were determined:

- The ES&H Department oversees ES&H performance of the Plant Facilities and Services Division. Both organizations ultimately report to the Chief Operations Officer.
- The ES&H Department oversees the "line" performance of health protection personnel and services which the ES&H Department
provides to line managers on a "support" basis. (See Concern OA.5-1 in section 4.5.1 of this report.)

- QES oversees the overall performance of the ES&H Department. Both organizations ultimately report to the Chief Operations Officer.
ASSESSMENT DISCIPLINE: Environmental Protection

ASSESSMENT FINDING NUMBER: M/CF-12

ASSESSMENT FINDING TITLE: ES&H Review of Construction and Engineering Projects

PERFORMANCE OBJECTIVE:

Environmental protection facilities and practices reflect a dedication to preservation of the environment and comply with Federal and state regulations and with DOE Orders and directives.

FINDING:

Not all planned construction projects and engineering fabrication receive adequate ES&H reviews prior to implementation.

DISCUSSION:

DOE 5400.1 requires management to ensure that all operations and planned activities and projects under their authority are reviewed to ensure compliance with applicable environmental protection laws, regulations, and directives.

The ANL-E Facilities Planning and Engineering Department QA Plan requires an ES&H review of all Title I and II design drawings. In compliance with this requirement, all project plans are submitted to the ANL-E ES&H Department for review. Although some modest review is made of all project plans, the Manager of the ES&H Department believes that only about 50 percent receive an adequate review because of a shortage of resources.

Engineering services for experimental facilities is performed by staff assigned to the Engineering Physics Division. While most of such efforts are reviewed by the sponsoring Division Safety Committee, there is no requirement for an independent ES&H/QA review by the ANL-E ES&H Department.
ASSESSMENT DISCIPLINE: Environment Protection

ASSESSMENT FINDING NUMBER: M/CF-13

ASSESSMENT FINDING TITLE: Environmental Reviews of User Experiments

PERFORMANCE OBJECTIVE:

Environmental protection facilities and practices reflect a dedication to preservation of the environment and comply with Federal and state regulations, and DOE Orders and directives.

FINDING:

ANL-E does not conduct environmental reviews of user experiments.

DISCUSSION:

DOE 5400.1 requires management to ensure that all operations and planned activities and projects under their authority are reviewed to ensure compliance with applicable environmental protection laws, regulations, and directives.

Visits were made to the High Energy Physics and Intense Pulsed Neutron Source Divisions. Interviews and document reviews in these Divisions revealed that safety reviews are done of user experiments at both facilities, but that environmental compliance reviews are not being accomplished.

AAO and the ANL-E ES&H Department each conduct surveillances of both of the above Divisions. These inspections do not include reviewing either the ES&H review procedures or the documentation of ES&H reviews conducted of user experiments.

CH conducts environmental protection functional appraisals of ANL-E on a regular basis. The appraisals also do not consider the ES&H review process of user experiments.

The ANL-E Health and Safety Manual is used by ANL-E Divisions as guidance for ES&H reviews. This Manual does not contain a section regarding environmental compliance reviews.

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ASSESSMENT DISCIPLINE: Internal Oversight

ASSESSMENT FINDING NUMBER: M/BMPF-24

ASSESSMENT FINDING TITLE: AAO Responsibility for Internal Oversight

PERFORMANCE OBJECTIVE:
Internal oversight of ES&H/QA activities is performed adequately to ensure effective performance of the contractor.

FINDING:
AAO does not have an effective oversight program of ANL-E.

DISCUSSION:
AAO has recently established (as of April 24, 1990, with a draft revision, dated September 14, 1990) an operational surety surveillance program that primarily covers OSHA-type reviews. The Draft does not include the full spectrum of ES&H/QA activities.

Staffing vacancies have made it difficult to perform required surveillances. 28 positions are in the approved AAO organization; however, AAO is only authorized a total of 25 full-time equivalents (FTEs).

AAO has recently reorganized, but the transition of personnel into the new positions designated for surveillance and line management oversight has not occurred.
ASSESSMENT DISCIPLINE: Internal Controls

ASSESSMENT FINDING NUMBER: M/CF-14

ASSESSMENT FINDING TITLE: Identification of Vulnerabilities, Causes, and Corrective Actions

PERFORMANCE OBJECTIVE:
Managers are expected to evaluate internal controls in a conscientious manner, candidly report the results, and resolve problems identified as expeditiously as circumstances permit. [SEN-9-89, Federal Manager’s Financial Integrity Act and Audit Resolution and Followup.]

FINDING:
CH did not adequately include an assessment of acknowledged internal vulnerabilities, causes or corrective actions in its Annual Assurance Letter to the Secretary.

DISCUSSION:
In their Fiscal Year 1990 Federal Manager’s Financial Integrity Act Report, CH did not adequately address weaknesses in the CH ES&H/QA program implementation as follows:

- Findings in the AAO self-assessment were not appropriately addressed.
- CH failed to perform a self-assessment, thus failing to recognize the numerous CH deficiencies noted by the Tiger Team.
- Actions needed to insure correction of deficiencies in the AAO and ANL-E self-assessments, 1987 Environmental Survey, Technical Service Review etc. were not included.

CH had not fully identified the weaknesses and deficiencies in its oversight programs. These weaknesses and deficiencies have contributed significantly to CH’s failure to adequately identify and correct the many significant ES&H/QA shortfalls at ANL-E.

The following items from ANL-E’s Self-Assessment Report (included in CH’s Vulnerability Assessment) are representative of problems where CH has not taken effective action to prevent or correct ES&H/QA deficiencies:

- ANL-E is not in compliance with some permits, and DOE Orders. As a result, the National Resources Defense Council (NRDC) has notified AAO of an intent to sue.

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• ANL-E does not have an ongoing audit program.

• QA/QC procedures for environmental sample recovery, analysis and monitor calibration are lacking. This has resulted in a low confidence in the accuracy of monitoring results.

• The groundwater monitoring program needs enhancement.

• Waste management has no working QA plan or training for individuals.

• While environmental incidents are reported in a timely manner, the ameliorative actions taken do not follow established plans.

• ANL-E has very few procedures, especially in the areas of waste management, environmental compliance, and internal audits.
ASSESSMENT DISCIPLINE: Management Followup

ASSESSMENT FINDING NUMBER: M/BMPF-25

ASSESSMENT FINDING TITLE: Trend and Root Cause Analyses

PERFORMANCE OBJECTIVE:
A system is in place which is effective in evaluating deficiencies including unusual occurrences, in order to determine the underlying or root cause and which develops corrective actions aimed at root causes.

FINDING:
ANL-E does not have a systematic, sitewide program to trend and do root cause analyses of ES&H/QA deficiencies identified by internal or external incidents, appraisals, surveillances, and audits.

DISCUSSION:
ANL-E does not use deficiencies from available reviews or assessments to identify trends by functional discipline or responsible line organization, nor is any other type of trend analysis performed, with the exception of a QA audit tracking and trending system recently initiated by the Office of Quality Assurance.

As noted by the Safety and Health Subteam (See Concern OA.3-1 in Section 4.5.1 of this report), ANL-E management has not set safety goals throughout the site. ANL-E management has also not established a system to track and trend ES&H/QA performance indicators. There are no root cause analyses done on a systematic basis. The ANL-E self-assessment did not include a root cause analysis. (Interviewees stated during the Tiger Team Assessment that it proved too difficult to reach agreement on root causes, and they ran out of time.) Without a systematic method of identifying root causes, and tracking performance indicators, the establishment and measurement of ES&H/QA performance goals cannot be attained.
ASSESSMENT DISCIPLINE: Management Followup

ASSESSMENT FINDING NUMBER: M/BMPF-26

ASSESSMENT FINDING TITLE: Lessons Learned

PERFORMANCE OBJECTIVE:
Management promotes the communication of good and bad performance experiences from within and outside the facility to potentially affected organizations.

FINDING:
ANL-E does not have a systematic, sitewide lessons learned program to assess internal and external problems or issues and possible implications to ANL-E operations.

DISCUSSION:
ANL-E does not have a formal process to review Tiger Team Assessments from other DOE sites for possible impact on ANL-E operations. ANL-E does not systematically review incidents, safety near misses, off-normal events, or other sources of information from ANL-E operations or from other DOE sites, including the Secretary’s daily report, to extract important information and lessons learned for specific application to ANL-E operations.

ANL-E informally distributes, for information, Unusual Occurrence Reports (UORs) generated by ANL-E. However, there is no controlled standard distribution for UORs, so there is no assurance that all individuals who need access to the information in a given UOR actually see it. Issues from other DOE sites have been identified through counterpart contacts on an informal basis.

Lack of formal evaluation of lessons learned is indicative of an organization whose management is not committed to continually seeking ways to improve ES&H/QA performance.
ASSESSMENT DISCIPLINE: Self-Assessments

ASSESSMENT FINDING NUMBERS: M/CF-15, M/CF-16, M/CF-17, and M/BMPF-27

ASSESSMENT FINDING TITLE: ANL-E Self-Assessment Program to Characterize ES&H Concerns

PERFORMANCE OBJECTIVE:

Line organizations shall implement a comprehensive self-assessment program to identify and characterize ES&H/QA concerns relating to their operations.

FINDING (M/CF-15):

The ANL-E self-assessment program does not meet DOE requirements.

DISCUSSION:

The AIS Self-Assessment Report in three volumes (ANL/TTTF-90/1), September 1990, prepared prior to the Tiger Team Assessment is a good start to a site self-assessment program, but the report and the process used to develop it reflect some of the problems inherent in overall ES&H/QA management of the site.

Specific major concerns are: the lack of root cause analysis, sitewide or programmatic issues are not developed from individual deficiencies, the document is not comprehensive since it does not reflect input from all sources throughout the Laboratory, it does not adequately address management issues, and action plans are preliminary and/or inadequate.

The AIS Self-Assessment Report exhibits a concerted effort to identify individual ES&H/QA deficiencies and, in most cases, the findings are consistent with those of the Safety and Health Subteam. In some areas, such as radiation protection, the AIS Self-Assessment Report identified findings not discussed by the Tiger Team (Safety and Health Subteam). These should not be ignored. The environmental and the management analyses were less comprehensive.

The AIS Self-Assessment Report also recognizes the need to institutionalize a self-assessment process consistent with the Secretary of Energy's guidance. According to ANL-E management, the ad hoc committees involved in development of the AIS Self-Assessment Report will continue to exist while the process is institutionalized.

The need for a corrective action plan was recognized and included in the AIS Self-Assessment Report. The adequacy and tracking of the action plan are addressed in findings in this section of the Management Subteam report.
Both the Environmental and Health and Safety Subteams concluded that the AIS Self-Assessment Report does not generally address the sitewide or broader programmatic implications of the individual deficiencies. A number of illustrations are provided in both Sections 3.5 and 4.5 of the Tiger Team Assessment Report. Also, only about half the findings in Section 5.5 of the Tiger Team Assessment Report are addressed in the AIS Self-Assessment Report.

The AIS Self-Assessment Report did not identify root causes. Identification and correction of root causes is essential to the self-assessment process. Root causes can be inferred from the Executive Summary and Management Section of the AIS Self-Assessment Report. However, interviews revealed that agreement could not be reached by ANL-E on root causes in time to include them in the report.

Another major concern with the AIS Self-Assessment Report is that it is not comprehensive, because input from all Divisions was not formally included. While it is understood that the Divisions, the ES&H Advisory Committee (ESHAC), and management have had an opportunity to review the Self-Assessment Report, input from all organizational elements was not reconciled. The fact that there was a completely separate set of self-assessment findings generated by the Divisions after the original Self-Assessment Report further illustrates this point.

ANL-E plans to integrate the individual action plans from the site self-assessment and the self-assessment findings generated by the Divisions, when the action plans are finalized. This will establish one integrated self-assessment action plan for tracking purposes, but will not integrate the self-assessment findings into a single document.

An auditable, traceable action plan is an essential element of a self-assessment. The action plans for the AIS Self-Assessment Report are preliminary or nonexistent. Often, where other Tiger Team reviewers found the self-assessment to coincide with a Tiger Team finding, they found the action plan inadequate.

**FINDING (M/CF-16):**

ANL-E does not have an institutionalized self-assessment program which meets the intent of the Secretary of Energy's memorandum of January 26, 1990 (Preliminary Review of Trends in Tiger Team Assessments), nor the criteria in the Secretary's memorandum of July 31, 1990 (Guidance on Environment, Safety, and Health Self-Assessment).

**DISCUSSION:**


The guidance memorandum was formally transmitted to ANL-E on August 27, 1990, by AAO, and a response was requested by October 30, 1990. The response is to
provide AAO with a description of ANL-E’s institutionalized process for AAO approval.

The response date was selected to enable ANL-E to take advantage of any findings or lessons learned from the Tiger Team Assessment. There are a large number of findings in both the AIS Self-Assessment Report and the Tiger Team Assessment related to the internal review process, and ANL-E has indicated that they are working on a number of tasks to improve that process. However, when implementation of the Secretarial guidance was discussed, there was no indication that a systematic attempt was being made to address the guidance, even though the deadline set by AAO is approaching.

**FINDING (M/CF-17):**

CH and AAO have not met the intent of the Secretarial guidance that all line organizations implement self-assessment programs.

**DISCUSSION:**

AAO had a cursory self-assessment performed in July 1990, by an outside consultant. The consultant report has been followed by an internal draft self-assessment which led to the AAO Management Plan. The Secretary, following the January 26, 1990, memorandum analyzing Tiger Team findings, directed all line organizations to implement comprehensive self-assessment programs. AAO documentation, while containing some worthwhile ideas, does not meet the intent of the Secretary’s January 26, 1990 directive or the more formal recent guidance memorandum of July 31, 1990.

CH has not done a formal self-assessment as of the date of this Tiger Team Assessment and there was no evidence that one is underway.

In the last paragraph of the July 31, 1990, guidance memorandum, the Secretary stated that, "I am hereby directing that each Secretarial Officer review and approve self-assessment programs developed by field offices and facilities for which they have line management responsibility." Thus far, DOE’s Energy Research Program Office (ER) has not requested that a self-assessment program be prepared by CH or that it be submitted for approval. Discussions with ER revealed that ER has drafted a comprehensive self-assessment plan to include ER, DOE field organizations, and ER contractors.

**FINDING (M/BMPF-27):**

ANL-E management is not monitoring the status of findings from its recent site self-assessment.

**DISCUSSION:**

A number of the findings in the AIS Self-Assessment Report have fourth quarter, Fiscal Year 1990 completion dates. The status of these findings is generally unknown to management. Even if action plans are preliminary, the near-term completion dates should be firm enough to permit tracking.
Those findings from the AIS Self-Assessment Report that are not in the Tiger Team report, as well as all findings from other internal and external reviews, such as the 1989 Technical Safety Review and the 1987 Environmental Survey, have not been incorporated into the comprehensive tracking system. Interviews revealed that the ANL-E Quality Assurance, Environment, and Safety Office is completing this tracking system and putting it into operation later in October 1990.
5.5.9  Appraisal and Followup System

INTRODUCTION AND SUMMARY

CH has an appraisal program that, if properly implemented, should provide adequate ES&H/QA oversight of ANL-E activities. The absence of proper planning currently limits its effectiveness. In contrast, CH does not have a program to appraise CH line management implementation of ES&H/QA responsibilities. This is a "missing link" in assessing the chain of line management effectiveness from the DOE Headquarters program office to the individual performer in the Laboratory.

The Tiger Team found that the appraisal program was not being effectively used by CH and ANL-E management to improve the status of ES&H/QA compliance. Effective systems or procedures were not in place to track findings, provide reports to management, and to expedite closure of recommendations. Effective systems to highlight critical ES&H/QA commitment dates did not exist.

The Tiger Team also found that CH and ANL-E were not taking prompt action to correct deficiencies identified in appraisals, surveys, reviews and environmental permits. Little action had been taken to close findings in 1987 Environmental Survey, the 1989 Technical Safety Review, or to comply with a requirement in an National Pollutant Discharge Elimination System permit.

There is no evidence that the CH ES&H Division has performed surveillance, audits or appraisals of AAO, with the exception of one QA "audit."

Considerable confusion exists within CH and AAO concerning the oversight role of the CH ES&H Division over AAO. This responsibility is not formally defined nor documented.
ASSESSMENT DISCIPLINE: Performance Measurement, Reporting, and Tracking

ASSESSMENT FINDING NUMBER: M/CF-18

ASSESSMENT FINDING TITLE: ES&H and QA Oversight of AAO

PERFORMANCE OBJECTIVE:
Management systems are in place which provide to managers and supervisors at all levels timely, objective, and reliable indication of ES&H and QA performance.

FINDING:
CH is not performing ES&H and quality assurance oversight review of Argonne Area Office implementation of line ES&H responsibilities.

DISCUSSION:
DOE 5482.1B requires that appraisals be performed of DOE and contractor activities with sufficient scope and frequency to ensure effectiveness of the ES&H activities.

There is no evidence that the CH ES&H Division has performed surveillance, audits or appraisals of AAO, with the exception of one QA "audit."

Considerable confusion exists within CH and AAO over the oversight role of the CH ES&H Division over AAO. This responsibility is not formally defined and documented.
ASSESSMENT DISCIPLINE: Performance Measurement, Reporting, and Tracking

ASSESSMENT FINDING NUMBERS: M/CF-19 and M/CF-20

ASSESSMENT FINDING TITLE: Corrective Action Followup

PERFORMANCE OBJECTIVE:
Management shall ensure that prompt action is taken to correct deficiencies identified in appraisals, audits, surveys, reviews, and permits.

FINDING (M/CF-19):
CH did not take prompt action to correct deficiencies identified in surveys, reviews, and permits.

FINDING (M/CF-20):
ANL-E did not take prompt action to correct deficiencies identified in surveys, reviews, and permits.

DISCUSSION:
The environmental survey of ANL-E conducted in June 1987, identified 64 findings of which only 14 have been closed.

The ANL-E ES&H Department conducted a Technical Safety Review (TSR) in September 1989. The TSR report lists 165 findings of which only ten have been closed.

Examples include the following:

- NPDES Permit IL0034592 issued to ANL-E on July 7, 1989, required that a waste water treatment system for controlling chlorides be constructed and operational by June 30, 1990. The system has not been installed (See Environmental Finding SW/CF-1 in Section 3.5 of this Report).

- Many deficiencies identified by surveillances of the Central Shops were carried over from quarter to quarter with no corrective action taken (See Concern PP.3-1 in Section 4.5.15 of this Report).
ASSessment Discipline: Performance Measurement, Reporting and Tracking

Assessment Finding Numbers: M/BMPF-29 and M/BMPF-30

Assessment Finding Title: Tracking ES&H Commitments and Survey, Review, and Appraisal Findings

Performance Objective:
Management systems are in place which provide to managers and supervisors at all levels timely, objective, and reliable indication of ES&H and QA performance.

Finding (M/BMPF-29):
CH does not have an effective method or procedure for tracking regulatory commitments, DOE Headquarters commitments, and appraisal, audit, surveillance, survey, and review findings.

Finding (M/BMPF-30):
ANL-E does not have an effective method or procedure for tracking regulatory commitments, DOE Headquarters commitments, and appraisal, audit, surveillance, survey, and review findings.

Discussion:
There are several tracking systems being used by CH and ANL-E. However, functional appraisal findings are being independently tracked by AAO, the CH ES&H Division, the Office of the Assistant Manager for Laboratory Management, and the ANL-E Quality Assurance, Environment, and Safety Office. Each has its own system and does not share information. A draft permit tracking system has recently (September 20, 1990) been developed by ANL-E, but CH has no system to track permits.

There is no reporting system to inform management on the status of appraisal findings, DOE Headquarters commitments, and regulatory commitments.

An effective tracking system may have enabled CH and ANL-E to avoid the following missed deadlines:

- DOE 5400.2 requires Field Offices to submit information on existing and anticipated permits for DOE facilities annually to EH-23 by October 1. CH has not submitted this report for FY 1990.
DOE 5820.2A requires an annual update of the Waste Management Plan by December 31 of each year. The update due December 31, 1989, had not been submitted as of the dates of the Tiger Team Assessment. (See Environmental Finding WM/CF-15 in Section 3.5.4 of this report.)

NPDES Permit No. IL0034592 issued to ANL-E July 7, 1989, required that a waste water treatment system for controlling chlorides be constructed and in operation by June 30, 1990. This deadline was not met. The permit states further that, if the compliance deadline is not met, ANL-E is to notify Illinois EPA within 14 days (July 14, 1990). In a letter dated January 16, 1990, AAO notified the Illinois State Division of Water Pollution Control that the June 30, 1990, date "will be difficult to achieve..." and requested approval to extend the schedule of compliance to September 30, 1990. No response was ever received from the state granting the extension. It would seem, therefore, that the extension was not granted and that the above indicated reporting deadline should have been followed. The noncompliance was not reported until August 8, 1990. (See Environmental Finding SW/CF-1 in Section 3.5 of this Report.)

Numerous survey and review findings are not being corrected in a timely manner and there is no mechanism to inform management on the status of deadlines.

A computer system to track NEPA actions and Tiger Team findings is being developed. CH and ANL-E plan to expand this system in the future to include all ES&H items. The system will be used by CH, AAO, and ANL-E.
ASSESSMENT DISCIPLINE: Performance Measurement, Reporting, and Tracking

ASSESSMENT FINDING NUMBER: M/CF-21

ASSESSMENT FINDING TITLE: Closeout of Appraisal Findings

PERFORMANCE OBJECTIVE:
Management systems are in place which provide to managers and supervisors at all levels timely, objective, and reliable indication of ES&H and QA performance.

FINDING:
CH is not following CH 5000.1a to close appraisal findings.

DISCUSSION:
DOE 5482.1B and CH 5000.1a require that action be taken to expedite closure of appraisal recommendations.

Final closure of recommendations on previous appraisals by CH does not occur until the next appraisal, which, in some cases, is more than two years. ANL-E believes, however, that closure occurs when they have reported the corrective action and have received tentative CH approval.

There is no clear understanding on the procedures and authority for closing appraisal findings between the AAO Staff and the CH ES&H Division. In general, each office believes this responsibility and authority belongs to them. This apparent confusion may be part of the reason why timely closure action is not occurring.
ASSESSMENT DISCIPLINE: Performance Measurement, Reporting, and Tracking

ASSESSMENT FINDING NUMBER: M/CF-22

ASSESSMENT FINDING TITLE: Establishment of Achievable Appraisal Schedule

PERFORMANCE OBJECTIVE:

Management systems are in place which provide to managers and supervisors at all levels timely, objective, and reliable indication of ES&H and QA performance.

FINDING:

CH has not established an achievable ES&H appraisal schedule.

DISCUSSION:

DOE 5482.1B requires that field organizations "prepare an annual schedule showing the functional and management appraisals planned for the following fiscal year." CH 5000.la states that "appraisals will not normally be scheduled more frequently than once every two years in any functional area unless a DOE or CH Order requires more frequent appraisals or Laboratory performance warrants an appraisal sooner."

CH schedules most functional appraisals annually but accomplishes only about 50 percent of those scheduled. As a result, some functional ES&H areas are not being appraised on a schedule required by the CH Order.
5.6 Noteworthy Practice

Noteworthy Practice Title: Board of Governor’s Safety and Environment Committee

Noteworthy Practice: The University of Chicago’s Board of Governors for Argonne National Laboratory established a standing Safety and Environmental Committee (SEC) in April 1989. Since its establishment, the SEC has demonstrated that it has the potential for contributing significantly to the achievement of ES&H/QA enhancements at ANL-E.

The establishment of the SEC is noteworthy in that it represents a proactive measure by a non-profit organization to exercise its responsibility for stewardship over the Laboratory, to set overall ES&H/QA policy consistent with DOE policy, to establish an implementation plan for that policy, and to monitor the state of ES&H/QA performance at ANL-E. SEC membership includes highly regarded former executives from Commonwealth Edison, Consolidated Edison, Dow Chemical, and a former Secretary of Environment for the State of Florida.

The SEC’s activities have included review of Laboratory organizations for the Board, onsite evaluations of ES&H/QA performance, assessments of specific ES&H/QA issues, and review and evaluation of the ANL-E self-assessment. The SEC issued its first report to the Board of Governors in the spring of 1990, noting many of the issues contained in the ANL-E self-assessment. The SEC has caused and encouraged the Laboratory to make the few improvements in its ES&H/QA programs noted to date.

The Committee has demonstrated a detailed understanding of Laboratory ES&H/QA issues and has stated its intention to continue to provide oversight of ANL-E activities to assure satisfactory resolution of current and future ES&H/QA findings and program concerns.
6.0 SPECIAL SAFETY ISSUES

Two specific safety issues discovered by the Safety and Health Subteam are discussed in this Section. The first concerns the Argonne Tandem Linear Accelerator System (ATLAS) facility, and the Category II concern involving that facility. The second issue deals with ANL-E's failure to enforce contractor compliance with basic safety standards. This second safety issue led to two Category I concerns.

Safety and Health Subteam findings related to operations at the ATLAS facility led to a decision by ANL-E management to curtail operations, pending an investigation of the Category II concern. The information gathered by the Subteam relating to ATLAS is discussed below.

6.1 SYNOPSIS OF EVENTS AT ATLAS

This synopsis reflects the chronology of events surrounding the onsite inspection of the ATLAS Facility on October 4, 1990. In the course of the inspection, several findings were established that lead to concerns being developed by Dr. J. J. Shonka, a member of the Safety and Health Subteam, that were documented in Section 4.5.3 of the Tiger Team Assessment Report of the Argonne National Laboratory-East.

The ANL-E operations counterpart for the assessment had arranged appointments to tour the ATLAS facility along with several other facilities on Thursday, October 4, 1990. Dr. Shonka arrived at Bldg. 203 and "checked in" with the Health Physics Office. After unrelated discussions, a facility tour group was assembled consisting of: the ATLAS Facility Manager (appointed about eight months ago and one of the principle staff associated with the electron-cyclotron resonance ion source discussed later), the ES&H Health Physicist for the facility, the ANL-E operations counterpart, and Dr. Shonka.

The ES&H Health Physicist occupies a matrixed position and discharged out one-half time to Bldg. 203 and the ATLAS. Over the past year, his principal responsibilities included development of sitewide programs in Health Physics (such as the air sampling initiative developed in response to DOE 5480.11). His responsibilities also included serving on the recently constituted ATLAS Radiation Safety Committee, organized in response to the ANL-E self-assessment. This Committee had met only once and discussed the issue of single interlocks, which has been highlighted in a AAO self-assessment.

The tour included the main control room. A walkthrough of the facility was suggested. Dr. Shonka requested a portable radiation monitor and was provided a Geiger-Müller (GM) survey meter. The tour started at the Electron-Cyclotron Resonance Ion Source. The Electron-Cyclotron Resonance is situated in a structure designed to allow the ion source to be operated at high, direct current (DC) voltage. There is an interlocked cage surrounding it to protect a worker from electrical shock when DC is applied. The tour proceeded to the side of the Electron-Cyclotron Resonance. There was an individual working on the ion source inside of the cage. No particular note was made of the worker as the high voltage appeared to be off, and he seemed to be aligning
electronics. As the tour continued, Dr. Shonka observed that the GM survey meter, was "clicking" at a high rate. The dial indicated 1.5 mrem per hour. The tour group discussed this and observed that an area radiation monitor (not the Victoreen instrument discussed later) was also indicating 1.5 mrem per hour. No particular note was made of the source of the radiation fields. The tour then proceeded to the front of the Electron-Cyclotron Resonance with discussion made concerning the next accelerator component, the Linear Accelerator used to accelerate ions from the Electron-Cyclotron Resonance into ATLAS. At this point, Dr. Shonka became concerned about the individual in the Electron-Cyclotron Resonance and prompted staff to consider the significance of the radiation level observed earlier. The staff agreed it was reasonable to assume it was due to the ECR source. Dr. Shonka then calculated verbally inverse distance squared and asserted the individual was present in radiation fields easily above 100 mrem per hour.

The ATLAS Facility Manager noted this fact, but took no action, and appeared ready to proceed with the tour. Dr. Shonka intervened, assertively asking if the observations indicated, at a minimum, the need for a survey of the area. ANL-E staff then stated that a call to Health Physics was required but did not initiate the call. Dr. Shonka then suggested that the tour should not delay them from dealing with the situation. The machine designer was present and offered to handle the situation while the tour proceeded.

Later in the tour, the group informed that field measurements had confirmed peak radiation fields of 5 rem per hour and general body fields of 150 millirem per hour. The group was also informed that the Victoreen area radiation monitor located on the ion source was out-of-calibration, inoperative, and had been returned to the ESH calibration facility.

The tour then proceeded uneventfully with a walkthrough of the current injector (ion source and Tandem Van de Graaff accelerator) to the ATLAS accelerator. The facility was observed to have radiation area postings with fields always given as 1000 mrem per hour which, according to ANL-E staff, were regulatory compliance postings and not used by staff to identify radiation levels. To assist the worker in identifying presence and magnitude of radiation, particularly over the radio frequency sections of ATLAS, a series of Victoreen area radiation monitors had been installed. ANL-E staff asserted that they were used to establish approximate fields for work activity. The tour continued to the ATLAS LINAC, where a discussion was held concerning (two) 1000 liter helium dewars. One dewar was located in a high bay area with an overhead crane. Staff asserted that catastrophic failure of a liquid nitrogen line nearby was analyzed in the Safety Analysis Report (SAR) and that helium was not a problem. [Several days later, the staff was able to assert that the (SAR) also studied helium loss, though not from a catastrophic failure, but from crane damage to the manifold.] A discussion was also held concerning a nearby steel door into the ATLAS LINAC. The door had a single microswitch and no door lock. Staff asserted that this was a design intent, in order to allow emergency ingress to the LINAC area, when time did not allow callup of main control for an orderly shutdown. The next area toured was an area of ATLAS that included a large bending magnet used to direct the beam to various beam use areas. A set of doors to the outside (adjacent to a rollup door) was not locked. This surprised ATLAS staff who believed that the door...
should be locked. (Several days later, ATLAS staff asserted that since the machine was not operating, there was no requirement to lock the door.) The tour proceeded through the experimental areas stopping near Area 4, a new beamline under construction that will use the ECR source. A door interlock switch light was observed to be on (powered).

The ATLAS staff and ES&H representative engaged in a discussion over why the new area interlock was powered, but came to no conclusion. Dr. Shonka later established (by interviews) that the interlock had been added to the existing system and new software was tested. The system was partially restored (new interlocks not removed) and returned to service. The tour then proceeded to older experimental areas where other features were described, including a demonstration of the key-operated interlock by-pass mode. The morning tour ended with a continuing discussion of operations in the main control room. The operators are not required to be present at the console during operations. The ATLAS facility allows experimenter access in areas around the beamline if the dose rate on contact is less than 200 mrem per hour. The area is roped to 5 mrem per hour with instructions to "not spend more than two minutes" inside of the rope.

At the Safety and Health Subteam meeting on October 4, 1990, a strong concern was voiced in light of the uncontrolled work in a high radiation area, that there was no system of controls apparent was capable of terminating the exposure, and also, regarding the general informal conduct of operations evident at ATLAS. An evening meeting was held to guide management discussions concerning ATLAS. Additional facts that were relayed to the Subteam prior to the meeting included:

- The radiation field had been produced by removal of lead from around the ion source.
- The Victoreen Area Radiation Monitor (VAMP) was inoperative due to a blown fuse.
- The ECR Victoreen Area Radiation Monitor set point was turned "all the way up" rendering it incapable of alarm.
- The need for the lead shielding was established by accidental irradiation of the facility manager 2 years earlier resulting in 80 mrem exposure as recorded by his dosimetry.

(Several days later, the ATLAS staff established that Physics Division, not ES&H, had purchased the VAMP. This was established after the Wynveen Committee (appointed by Physics) had questioned staff on the use of the VAMP, particularly whether the VAMP was used for protection purposes or as a process monitor. Operations staff then began to assert that the VAMP was a process monitor.)
The next morning, an overview of the machine was provided (principally) by Dr. Bollinger, the ATLAS developer. Staff emphasis was on routine operations to provide a perspective on typical radiation levels encountered. Emphasis was also placed on the difficulty of turning a beam and how any transient tended to reduce beam intensity or trip-off the beam entirely.

Afternoon staff briefings continued with a walkthrough of the interlock system. The Facility Manager lead the briefing and incorrectly asserted that an uncompiled basic program was used to operate interlocks. (This issue was corrected several days later.) He asserted that his responsibility was delegated to the technician who had the lead role for implementing interlocks. A second tour was conducted of the experimental area. Discussions were held about specific beamline components, specifically a focussing quadrapole, a bending magnet or dipole, and the large spectrometer. Each of these was discussed and shown to be capable of substantially altering the local radiation fields without triggering a survey and reporting or any other direct action by operations staff.

The Safety and Health Subteam also established other significant findings at the ATLAS accelerator which led to a Category II concern. Because of the serious nature and extent of the findings, management responsible for the facility voluntarily shutdown the ATLAS accelerator and its associated components and established a committee to further investigate the findings. Later, ANL-East management and Headquarters, DOE, established committees of similar function.

These findings, which are similar to some established by the AAO self-assessment, were extensive and documented a weak safety program, generally, with little or no review or audit. The Safety and Health Subteam findings included:

Discovery of work-in-progress on the Electron Cyclotron Resonance Ion Source in a high radiation field. The high radiation field was created by removal of lead shielding at some time over the past year. The lead shielding had been placed at the ion source in response to a similar incident nearly two years ago. The work was proceeding with no radiological controls in place. Additionally, a local radiation monitor was incapable of performing its intended function; it had a blown fuse, was not calibrated, and had its alarm set point raised to the maximum.

The use of a single interlock coupled with lack of independent review of logic and installation; testing of modifications on the existing system with no followup test to confirm that the system was restored to normal afterwards; facility doors not locked; the unreported failure of three microswitches over the last five years; and informal emergency procedures which allowed opening doors without shutting the machine down first.

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Unreviewed safety hazards such as unintentional radiation fields caused by loss of beamline transport components, and catastrophic failure of a liquid helium manifold located under a crane.

Apparent life safety code violations on minimum distance for exiting.

Absence of sprinklers or a loss study to justify the lack of a need for sprinklers for fire protection.

It is the conclusion of the team that the actions to shutdown the ATLAS facility and the designation of a committee to investigate the event by the Laboratory were appropriate.

6.2 CATEGORY I SAFETY AND HEALTH CONCERNS AT ANL-E

This section deals with the two Category I concerns discovered at ANL-E. In both cases, members of the Tiger Team found workers contracted by ANL-E to be in imminent danger. Below is a brief description of the two incidents.

In the first incident, an employee was working in an unshored eight-foot trench with loose and sloughing sides. There was no ladder for quick egress from the trench. The employee was in the trench while a backhoe was working over/inside the trench. A Plant Facilities Construction Coordinator was overseeing the project and did not assert his authority to correct the hazard.

In the second incident, two window washers were observed along the edge of Bldg. 201 not wearing proper safety harnesses. (The proper safety equipment was available.)

In the case of window washers, it was later revealed that the ANL-E had previous safety problems with this particular contractor.

It is the conclusion of the Tiger Team that ANL-E should closely examine its worker safety program for contractor employees. Safety must be emphasized to ANL-E's contractors. Further, safety education of proper practices and a rigorous inspection program are, at a minimum, required to assure that these situations do not reoccur.
7.0 SITE A and PLOT M

The purpose of the Site A and Plot M Site, or Palos Park Site (referred to as the site), portion of the Tiger Team Environmental Assessment (TTA) was to evaluate: 1) the historical management and responsibility for the site; 2) the implementation of studies to investigate the nature and extent of contamination at the site; 3) compliance with Federal, state, and local requirements for hazardous substance release response actions such as the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986; and 4) compliance with Department of Energy (DOE) Orders such as DOE Order 5400.4, CERCLA Requirements.

The general approach to the assessment included field observations of the site, and review of documents associated with the management and investigation of the site. In addition, personal and telephone interviews were conducted with personnel in the Argonne National Laboratory-East (ANL-E) Environment, Safety and Health Department, DOE Argonne Area Office (AAO), DOE Chicago Operations Office (CH), DOE-HQ Formerly Utilized Sites Remedial Action Program (FUSRAP) Office, the Oak Ridge Operations FUSRAP Office, the Oak Ridge Associated Universities (ORAU) Environmental Survey and Site Assessment Program (ESSAP) District, and the Cook County Forest Preserve. The information collected from these activities was evaluated with respect to Federal and state regulations and guidelines, in addition to the appropriate DOE Orders.

7.1 OVERVIEW

7.1.1 Site Location and Description

Site A and Plot M are located in the Palos Park Forest Preserve about 20 miles southwest of the center of Chicago and 18 miles west of Lake Michigan. Site A is a 19-acre site where scientists from the Manhattan Engineering District of the U.S. Army Corps of Engineers (MED) and ANL operated two research reactors, Chicago Pile 2 and 3 (CP-2 and CP-3) between 1943 and 1954. Other programs conducted at Site A during the 1943 to 1954 period included reactor physics studies, fission product separations, tritium recovery for lithium targets, and metabolism of radionuclides in laboratory animals. Site A also included a variety of support facilities such as a lead foundry, dormitories, a cafeteria, several gasoline storage/dispensing tanks, a landfill, and a septic drain system.

In 1947, the present site of ANL-E was obtained, and as facilities at this new location were completed, programs were transferred from Site A. As programs were relocated, empty buildings were radiologically surveyed, decontaminated, and razed. All of the reactor fuel, reactor components, and the majority of contaminated material were shipped out-of-state for re-use or disposal. Because of its physical bulk, the CP-3 biological shield was used to contain various items of contaminated hardware and piping, filled with concrete and buried on site.

Plot M is a 1-acre site located approximately 1600 ft north of Site A. It was used for shallow land burial of low-level radioactive and other potentially hazardous waste from operations at Site A and the University of Chicago. Disposal of waste at Plot M was conducted between 1944 and 1949. In early
1956, reinforced concrete side walls and a concrete cap were placed over the burial site to inhibit intrusion of water and migration of contamination.

7.1.2 Site History and Authority

The history of Site A and Plot M, collectively called the site, is well presented in numerous documents reviewed as part of the TTA (IWS-1). The major issues relating to the history and authority of the site for the purposes of this evaluation are summarized as follows:

- Between 1942 and 1956, MED and, subsequently, the Atomic Energy Commission (AEC) leased land from the Cook County Forest Preserve District for the construction and operation of nuclear research facilities. The first lease for the property included 1,025 acres and was exercised on July 31, 1942. In 1947, the old lease was terminated and a new lease signed. Only 20 acres were covered under the new 1947 lease (the current Site A and Plot M site). The remaining 1,005 acres were returned to the Forest Preserve. The AEC indicated in the agreement that the 1,005 acres "have not suffered a degree of contamination from past operations by or on behalf of the Government as to cause any hazard whatsoever to plant or animal life." For the sum of $63,000, the lessor released and forever discharged the Government from any and all manner of actions, liability, and claims.

- The second lease ran from February 1947 to June 1956. It required the U.S. Government to surrender possession of the land upon termination and that the property be returned "in as good condition as that existing at the time of entering the same." It also required the U.S. Government to "remove, destroy, or render harmless any or all installations, structures, appurtenances, material, or conditions of the ground or terrain which shall be dangerous, perilous, or hazardous or which, if permitted to remain, would interfere with the full use and enjoyment of said premises by the public as a part of the Forest Preserve District."

- During 1955 and 1956, decommissioning activities were conducted on the site, and waste materials were entombed in the areas now known as Site A and Plot M. Documentation accompanying the termination of the lease arrangement makes it clear that the parties understood that all materials from U.S. Government research efforts were not removed from the site, but that some materials remained buried at the site. For these buried materials, the AEC certified that the engineered features incorporated in the burial design were sufficient to prevent future users of the area from being exposed to radioactivity hazards.

- At the time when decommissioning of the property was being completed, a letter was signed by the Manager of Chicago Operations and the Director of the Health and Safety Division, which described the status of the site and the terminated lease. The letter stated that "the premises will be in safe condition and that those who may use the area in the future will not be exposed to radioactivity hazards." With reliance on this letter, the District stated it would assume custody and care of the premises.
and relieve the U.S. Government of any further responsibility thereafter. This agreement was set forth in a supplemental agreement to the lease. The Engineer for the Forest Preserve reported on January 14, 1957, that the earthwork and grading had been satisfactorily completed. The AEC paid the Forest Preserve $49,000 in lieu of performance of further restoration required by the lease.

- Upon completion of the above actions, AEC placed markers on the site and wrote a letter indicating it would continue to monitor the site as part of its environmental monitoring program. In the early 1970s, the AEC began a process of evaluating its formerly utilized sites under FUSRAP. In 1973, small amounts of tritium (well below acceptable drinking water standards) were found in the water from a nearby forest preserve picnic well.

- In response to the detection of tritium in well-water samples from the Palos Park Forest Preserve, AEC initiated a regular, periodic sampling and analysis effort, which continues to the present time. Funding for this monitoring effort has been provided through FUSRAP and administered by the Oak Ridge Operations Office (DOE/OR), since FUSRAP is responsible for administering DOE's environmental response activities at sites formerly utilized by MED. Although DOE/OR provided the required funding, some coordination and interaction with local, state, and Federal officials, as well as with environmental organizations and the news media, was performed by CH as a result of the proximity to the site and CH's historical connection. In addition, the DOE-HQ FUSRAP office was directing the project from a technical standpoint.

- In 1976-78, an environmental analysis and an engineering evaluation were performed for the DOE Office of Remedial Action Programs by ANL-E. The engineering evaluation report prepared from this exercise recommended that the safest action was to leave the waste in place, and increase the monitoring to ensure early detection of materials other than tritium from the site.

- In 1979, the engineering evaluation report was released by DOE, and a group of local, state, and Federal agencies reviewed and endorsed the report's findings.

- In November 1988, the DOE-HQ Preliminary Environmental Survey Report stated there was inadequate physical and institutional control of Plot M. In October 1987, in response to the Preliminary Environmental Survey Report, CH invited all cognizant local, State, and Federal agencies, including EPA Region V, to review the monitoring data and recommend any necessary action. This group, The Site A/Plot M Technical Review Committee, also includes the United States Geological Survey (USGS), the Illinois Department of Nuclear Safety (IDNS), the Cook County Forest Preserve, and the Village of Willow Springs. The Illinois Environmental Protection Agency (IEPA) was also invited, but elected not to participate. This technical review committee
endorsed the current practice of continued site monitoring as sufficient for management of the site.

In May 1990 during a routine visit, a monitoring crew from the IDNS found a hockey puck-sized piece of unirradiated natural uranium in an area adjacent to Site A that was scattered with debris. In response to this finding, the technical review committee was reconvened and approved a two-phased characterization effort which DOE initiated in June 1990. The DOE-HQ FUSRAP office assigned Oak Ridge Associated Universities as the technical contractor to perform the work. This work is being performed under formal procedures and a Quality Assurance Plan (R-94, R-95, R-96).

Sixteen pinpoint locations with exposure levels above background were found at the site during Phase One field work. A needle-sized piece of radium, containing 0.8 millicuries, was unearthed at a point with elevated readings. Another piece of radium was also found at a spot with elevated readings. Currently, 1300 soil samples from Phase One sampling are being analyzed by the Oak Ridge Associated Universities. The Technical Review Committee is scheduled to review the results of the Phase One work when a report is issued from the characterization contractor.

The second phase of the characterization effort is scheduled to begin in late October. This phase, based on the results from the first phase of work, will include walkover radiation measurements in outlying areas of the site, and further surface and subsurface sampling for radiological and non-radiological contaminants.

Currently, it has been proposed by DOE that all aspects of the site management and accountability be transferred from FUSRAP to CH under its Non-Defense Facilities and Sites program effective the beginning of Fiscal Year 1991 (IWS-52). This transfer was in progress at the time of the Tiger Team Assessment, and is expected to be official by the end of October 1990.

7.1.3 Current Site Status

The following items represent the current status of Site A and Plot M at the time of the Tiger Team Assessment:

- The U.S. Government does not own, nor has ever owned, the site property. Therefore, it is not included on the Federal Agency Hazardous Waste Compliance Docket. DOE does monitor the site under authority of the Atomic Energy Act and its prior lease agreements.

- The site is monitored regularly under the Site Surveillance and Maintenance Program conducted by ANL-E under contract to FUSRAP. Historical environmental monitoring under this program to date has not indicated a significant exposure to the general public, although radionuclides are present in surface water, sediments, and groundwater at concentrations greater than background levels. Elevated concentrations in groundwater are probably due to past
site operations, but are well below applicable regulatory limits. Currently, DOE is actively characterizing the site and surrounding area (200 acres inclusive) to gather further information about what, if any, action is necessary in response to the recent detection of contamination at the surface of the site.

- Historically, management of the site has been a DOE-HQ and FUSRAP responsibility. This has led to confusion in the "outside world" due to ANL-E and CH historical connections and proximity to the site. Current site management is in a state of transition from FUSRAP to CH.

- The Technical Review Committee (a quasi-formal group) has been reconvened to keep interested parties informed of developments at the site and allow for input in the investigation and remediation process. The only documentation for this committee process is in meeting minutes generated by CH.

- In March 1990, EPA Region V requested the submittal of a Preliminary Assessment for the site. Because DOE has the potential to be a responsible party under CERCLA for past waste disposal practices, and because DOE has conducted an extensive monitoring program at the site, CH is preparing a PA/SI on the site as a matter of comity. The PA/SI is currently in draft form and has not been submitted to EPA Region V.
7.1.4 Best Management Practice Findings

ASSESSMENT FINDING DISCIPLINE: Site A and Plot M
ASSESSMENT FINDING NUMBER: Site A and Plot M BMP-1
ASSESSMENT FINDING TITLE: Site A and Plot M Public Participation Process

PERFORMANCE OBJECTIVE:

A key element of regulatory and DOE Order-driven programs related to environmental contamination is the requirement for formal plans to elicit public participation to ensure that the best interests of the public are being served and that community concerns are understood and appropriately considered. This is clearly evident in the requirements for the CERCLA Community Relations Plan and publicly available Administrative Record, and the specific public participation requirements of the DOE Environmental Restoration and Waste Management 5-year planning process.

In light of the emphasis placed on public participation by CERCLA and the DOE 5-Year Plans, it is prudent to develop formal comprehensive public participation plans for any characterization or remediation of an area with significant environmental contamination. This is particularly valid for contaminated sites to which the general public has unrestricted access, or a location that may have the potential for future consideration as a CERCLA site.

FINDING:

DOE has not established a formal public participation plan for the Site A and Plot M site characterization work currently being funded under the Formerly Utilized Site Remedial Action Program (FUSRAP).

DISCUSSION:

Phase One of a site characterization/radiation survey, which is designed to sufficiently define the contamination status of a 200-acre portion of the Palos Park Forest Preserve encompassing Site A and Plot M, was initiated by DOE in June 1990. Phase Two of the characterization work is scheduled to begin by late October 1990. The objectives of the characterization are to identify potential locations of hazardous material contamination, identify radiological and non-radiological hazardous contaminants, and determine contaminant levels and extent. This scope of work was initiated as a result of the Illinois Department of Nuclear Safety (IDNS) discovery of a small sample of unirradiated natural uranium outside the Site A and Plot M area during a routine visit to the site in May 1990. The detail of the characterization data will be sufficient to enable DOE to assess the hazard potential to users of the Site A and Plot M portion of the Palos Park Forest Preserve, and allow prioritization of remediative or mitigative actions, if required.

Public participation for this characterization effort consists of a meeting held by DOE-HQ, DOE-CH, and Oak Ridge Associated Universities with cognizant Federal, state, and local agencies, which reviewed and concurred with the site characterization plan. This meeting was held on June 15, 1990 and included
representatives from the U.S. Environmental Protection Agency, U.S. Geological Survey, Illinois Department of Nuclear Safety, Cook County Forest Preserve, and two representatives from the village of Willow Springs. DOE intends to meet with the representatives of these groups to review Phase One site characterization data and any modifications to the plans for the second phase. This project was also addressed during the public meeting held to discuss Chicago Operations Site-Specific Plans on August 14, 1990.

A best management practice would be to establish a formal site-specific public participation plan to direct DOE's external interaction aspects of future site management involving public groups and ongoing characterization studies at Site A and Plot M. Currently, there is no plan specifying public participation activities that DOE expects to undertake with Site A and Plot M, and no formal process to assure that interested parties are made aware of results from characterization studies, remedial plans, and/or have input to the remedial process, if required.

Attempts to involve the public without a comprehensive, well-documented public participation plan are likely to result in incomplete public participation and reduced confidence in conclusions and resultant actions.
ASSESSMENT DISCIPLINE: Site A and Plot M
ASSESSMENT FINDING NUMBER: Site A and Plot M BMP-2
ASSESSMENT FINDING TITLE: Groundwater Sampling Procedure at Plot M

PERFORMANCE OBJECTIVE:

The RCRA Groundwater Monitoring Technical Enforcement Guidance Document (1986) provides the following guidance on well purging:

"The water standing in a well prior to sampling may not be representative of in situ groundwater quality. Therefore the owner/operator should remove the standing water in the well. . . so that formation water can replace the stagnant water. . . The procedure the owner/operator should use for well evacuation depends on the hydraulic yield characteristics of the well. When evacuating low-yield wells. . . the owner/operator should evacuate wells to dryness once. . . Whenever full recovery exceeds two hours, the owner/operator should extract the sample as soon as sufficient volume is available for a sample for each parameter."

A later EPA document, Handbook: Groundwater (EPA/625/6-87/016, March 1987), states "Water that has remained in the well casing for extended periods of time (i.e., more than about two hours) has had the opportunity to exchange gases with the atmosphere and to interact with the well casing material. The chemistry of water stored in the well casing is unrepresentative of that in the aquifer and it should not be collected for analysis. Purge volumes and pumping rates should be evaluated on a case by case basis." This latter document provides details on estimating well purging requirements from hydraulic conductivity measurements.

FINDING:

Monitoring wells in the glacial till at Plot M in the Palos Park Forest Preserve are not purged before sampling as recommended by EPA guidance.

DISCUSSION:

The current groundwater monitoring practice (I-GW-9), which is not documented in a formal procedure, is to collect a sample and then purge the well dry. The well is allowed to recharge until the next sampling round, two months later. The Surveillance of Site A and Plot M Report for 1989 (GW-22) states that "each borehole was emptied of water and allowed to recharge before sampling" (P. 15) but does not mention the two-month time period between purging and sampling.

Monitoring at the Palos Park Forest Preserve is not part of the ANL-E Groundwater Protection Program. However, it is conducted by the ANL-E Environmental Monitoring Chemical Laboratory under contract to the DOE Formerly Utilized Sites Remedial Action Program (FUSRAP). Wells in similar glacial till that are part of the ANL-E Groundwater Protection Program and located on ANL-E property are purged according to the recommended procedures.
in the EPA Technical Enforcement Guidance Document (1986) and apparently recharge in a matter of hours or days.

The DOE Environmental Survey of 1987 addressed the lack of well purging prior to sampling of monitoring wells at Plot M. The Survey finding was discussed in a meeting of the Site A/Plot M Technical Review Committee held on October 15, 1987. Minutes of the meeting (GW-39) indicated that purging of the wells was stated to be impractical. The reason given was that the recovery rate of some of the holes is so slow that purging and sampling would have to be done weeks or even months apart. No data were presented to support this statement, although USGS and EPA representatives agreed that slow recovery rates are a common problem in this area. The comment was also made that failure to purge may affect the results for nonradioactive parameters more than for radioactive ones.

Strontium-90 analytical data from 1984 on unpurged wells and from 1985 on the same wells after purging in April and sampling in mid-May were compiled for the EPA in 1988 as evidence of the absence of statistical difference in results regardless of purging. The results (GW-40) show that low levels (less than 1 pCi/L) are the same within analytical error. Higher values (up to 7 pCi/L) do not overlap. A more accurate comparison between non-purged and purged samples would require taking a sample of stagnant water in the well bore, purging the well, allowing the well to recover until field parameters have stabilized, and taking a sample of the formation water.

ANL-E has indicated that the rate of recharge of these monitoring wells will be remeasured, since earlier data cannot be located and are obsolete in any case (I-GW-15).
APPENDIX A

TIGER TEAM ASSESSMENT
PERSONNEL AND BIOGRAPHICAL SKETCHES
ARGONNE ILLINOIS SITE
Appendix A-1

BIOGRAPHICAL SKETCHES of
TIGER TEAM ASSESSMENT TEAM LEADER
and TEAM LEADER STAFF
ARGONNE ILLINOIS SITE
TIGER TEAM ORGANIZATION  
ARGONNE ILLINOIS SITE

**TIGER TEAM LEADER**  
Bruce Church

**DEPUTY TEAM LEADER**  
Leah Dever

**SPECIAL ASSISTANT**  
Stacy Wade

**HQ LIASONS**
- F. Koomanoff ER-10
- N. Thomasson ER-8
- L. Ford GC
- Y. Garbe EH-5

**ADMINISTRATOR**
- Mary Meadows

**COORDINATORS**
- Patricia Davidson
- Robin Longerbeam

**ENVIRONMENTAL TEAM LEADER**  
Donna Bergman

**SAFETY & HEALTH TEAM LEADER**  
Richard Lasky

**MANAGEMENT TEAM LEADER**  
Ernest Chaput

Figure A-1
NAME: Bruce W. Church

AREA OF RESP: Tiger Team Leader

ASSOCIATION: Office Environment Safety and Health, Nevada Operations Office, Department of Energy

EXPERIENCE: 29 years

- Department of Energy, Las Vegas, NV
  - Assistant Manager Environment Safety and Health (ES&H) - Responsible for ES&H/Quality Assurance (QA) oversight of contractors and user organizations at the Nevada Test Site (NTS).
  - Deputy Assistant Manager for Engineering and Safety - Responsible for Safety, Health Physics and QA programs.
  - Director, Health Physics Division - Responsible for managing all Health Physics and Environmental Programs at the NTS.
  - Chief, Radiological Branch - Responsible for managing all Health Physics programs for the weapons test program. Served as Technical Director for the Remedial actions at Nuclear Test Sites at Hattisburg, Mississippi, Gnome and Gasbuggy sites in New Mexico, Rulison and Rio Blanco sites in Colorado and for the Enewetak remedial action in the Marshall Islands.

- Pan American World Airways - Nuclear Rocket Development Station, Nevada - Responsible for managing the Radiological Assessments Laboratory. This laboratory was responsible for effluent and environmental investigations, dosimetry and whole body counting programs related to the activities of the Nuclear Rocket Development Program.

EDUCATION: M.S., Radiological Health, Colorado State University
B.S., Molecular and Radiobiology, University of Utah
A.S., Dixie Jr. College, St. George, Utah

OTHER: Author/Co-author of 20 technical publications
Consultant to IAEA, Vienna, Austria on large land area decontamination
Technical Assistance Director, Office of Science and Technology Policy - Committee for Interagency Radiation Research and Policy Coordination, 1984, 1985
U.S. Member to the British and Australian Governments' "Technical Assessment Group" concerning remedial action for the former British Nuclear Weapons Test Site at Maralinga, Australia, 1986-1990
Director Federal Radiological Management and Assessment Center (FRMAC) for the launch of the Galileo Space Craft, October 1989
Past President Environmental Radiation Section of the Health Physics Society, 1988-1990
Member of the Health Physics Society
NAME: G. Leah Dever
AREA OF RESP: Deputy Tiger Team Leader
ASSOCIATION: Office of Environmental Compliance, Headquarters, Department of Energy
EXPERIENCE: 13 Years
- Office of Environmental Compliance, DOE
  - Director, Military Applications Compliance Division with responsibility for assisting and facilitating the resolution of site specific environmental compliance issues with the Rocky Flats Office, and the Albuquerque, Nevada, Oak Ridge, and San Francisco Operations Offices. Issues deal with a variety of Federal and state environmental laws regulating hazardous and radioactive waste, cleanup and restoration, water, air and toxic chemicals, and requiring coordination with EPA, the Nuclear Regulatory Commission and state environmental protection agencies. Chairman of work group, composed of DOE and contractor personnel, that is developing strategies to resolve ten environmental compliance issues that cross-cut the DOE complex.

- The Aerospace Corporation, Washington, DC
  - Consultant to DOE and DOD on a wide variety of environmental protection issues including, compliance with the National Environmental Policy Act (NEPA); Resource Conservation and Recovery Act (RCRA); the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA); Clean Water Act; Clean Air Act; and Toxic Substances Control Act.

- Gannett Fleming Corddry and Carpenter, Inc., Harrisburg, PA
  - Consultant to EPA and State of PA on a number of projects dealing with water pollution control. Prepared NEPA documents in support of water pollution projects, and participated in groundwater sampling program in the Mammoth Cave, Kentucky area.

EDUCATION: M.S., Biology/Ecology, Pennsylvania State University
B.A., Biology, Thiel College
**NAME:** Laurie R. Garnand Ford

**AREA OF RESP:** Legal Advisor

**ASSOCIATION:** DOE Office of General Counsel, Headquarters

**EXPERIENCE:** 10 years

- DOE Environmental Attorney for Headquarters with emphasis in water pollution laws, cultural resources laws, and NEPA.
- DOE Finance Attorney for Headquarters for Great Plains Coal Gasification Project.
- DOE General Law Attorney with emphasis on information, administrative, and appropriations law.

**EDUCATION:** J.D., Law, University of Denver College of Law
B.A., Political Science, University of Denver
NAME: Mary Meadows

AREA OF RESP: Tiger Team Administrator

ASSOCIATION: U.S. Department of Energy Headquarters, Office of Safety Appraisals

EXPERIENCE: U.S. Department of Energy


- Staff Assistant, Office of Environmental Compliance and Overview.

- Staff Assistant, Office of Bio-Medical and Environmental Research, USAEC, ERDA.

- Staff Assistant, Office of the Commissioner, USAEC.

- Administrative Assistant, Office of the Assistant General Manager for Research and Development, USAEC.

- Other Related Experience

- Administrative and conference planning positions within the USAEC, ERDA, AND DOE.

EDUCATION: Numerous work-related courses and workshops at various colleges, training centers, and the American Management Association

OTHER: Member, U.S. Delegation to Disarmament Conference, Geneva, Switzerland, USAEC

Recipient of Federal Government Awards for superior performance
NAME: Dale A. Moul

AREA OF RESP: Report Technical Manager

ASSOCIATION: Battelle-Columbus Operations

EXPERIENCE: 20 years

- Battelle-Columbus Operations
  - Participated in TSAs for Paducah Gaseous Diffusion Plant, Idaho Chemical Processing Plant, High Flux Beam Reactor, and Rocky Flats Plant, and Feed Materials Production Center; and Tiger Teams for the Nevada Test Site and the Lawrence Livermore National Laboratory.
  - Associate Section Manager, Systems Safety and Security Unit: Manages personnel involved in performing safeguards, security and safety reviews of DOE weapons complex and NRC nuclear facilities. Participates in technical aspects of selected work efforts involving physical security, safety/safeguards interactions, and emergency readiness.
  - Program Manager, DOE Office of Security Evaluations support contract for inspections and evaluations of safeguards and security of DOE facilities.
  - Member, Nuclear Weapons Modernization Task Force, Safeguards and Security Subcommittee.
- NUSAC, Inc./Wackenhut Advanced Technologies Corporation
  - Manager/Director, Special Projects: Led and participated in support projects for private industry, the nuclear industry, and government involving emergency preparedness, safety/safeguards issues, emergency response training, and legal aspects of regulatory issues.
- U.S. Army - Six years of experience involving counterintelligence and physical security assignments. Led teams of inspectors and investigators that performed penetration inspections and counterintelligence/security audits of military installations.

EDUCATION: J.D., Law, University of Maryland
B.S., Social Science, Michigan State University

OTHER: Member, Virginia State Bar Association
Certified Protection Professional, American Society for Industrial Security (ASIS)
Member, Institute of Nuclear Materials Management
Member, Standing Committee on Disaster Management, ASIS
NAME: Stacy L. Wade

AREA OF RESP: Special Assistant

ASSOCIATION: Office of Information Management, Nevada Operations Office, Department of Energy

EXPERIENCE: 4 years

- Department of Energy, Las Vegas, NV
  - Computer Specialist: Coordinates the design, development and implementation of information systems. Oversees the automated data processing (ADP) technical support contractor for NV to ensure compliance with DOE orders. Assists users of NV computers with software issues when necessary.

- Nevada Power Company, Las Vegas, NV
  - Programmer Analyst: Analyze and design information systems to support the Billing process of a small utility company.

EDUCATION: B.S., Computer Information Systems, DeVry Institute of Technology, Phoenix, Arizona
Appendix A-2

BIOGRAPHICAL SKETCHES of
ENVIRONMENTAL SUBTEAM MEMBERS
ARGONNE ILLINOIS SITE
NAME: Donna A. Bergman

AREA OF RESP: Environmental Team Leader

ASSOCIATION: U.S. Department of Energy, Office of Environmental Audit

EXPERIENCE: 15 Years

- U.S. Department of Energy
  - Assistant Team Leader for the Environmental Surveys of 13 DOE facilities. Included planning activities in preparation for the onsite Survey, team management during the onsite Survey, guidance in report preparation, and sampling and analysis responsibilities.
  - Environmental Compliance Coordinator between Idaho Operations Office and DOE-HQ, and Oak Ridge Operations Office and DOE-HQ for purposes of environmental compliance and oversight in regards to applicable environmental requirements.

- Department of Commerce, Economic Development Administration
  - Senior Environmental Protection Specialist responsible for the development and implementation of environmental policy and directives. Provided guidance to regional officers for interpretation of environmental regulations as they related to economic development strategies.

- Department of the Interior, Bureau of Land Management
  - Natural Resource Specialist/Planning Coordinator responsible for providing guidance, assistance, and quality control for multiple-use planning. Served as Team Leader for the preparation of comprehensive multiple-use plans.

- Department of Agriculture, Soil Conservation Service
  - Soil Conservationist

EDUCATION: Graduate Studies in Environmental Planning, University of Virginia
B.S., Plant Resources Management, University of Maryland
NAME: Narendra N. Mathur
AREA OF RESP: Assistant Environmental Team Leader
ASSOCIATION: U.S. Department of Energy, Office of Environmental Audit
EXPERIENCE: 18 Years
  - Department of the Air Force
    - Team Leader, Environmental Compliance Assessment and Management Program (ECAMP). Conducted environmental audits for the Houston and Columbia Air National Guard (ANG) Bases. Responsibilities included validating and prioritizing survey findings and briefing site Commanders.
    - Program manager responsible for ANG Hazardous Waste Management Program. Developed ANG policies, regulations and implementation guidance.
    - Staff Engineer responsible for ANG Air Pollution Control Program.
  - Department of the Navy
    - Environmental Engineer responsible for managing Drinking Water Program for Chesapeake Division, Naval Facilities Engineering Command.
  - District of Columbia Government
    - Worked as Environmental Engineer and later as Chief, Bureau of Air and Water Quality, Department of Environmental Services.
EDUCATION: M.E., Environmental Engineering, Howard University, Washington, DC
B.E., Civil Engineering, Madhav Engineering College, Gwalior, India
NAME: Charles E. Bradley, Jr.

AREA OF RESP: Assistant Environment Team Leader

ASSOCIATION: U.S. Department of Energy

EXPERIENCE: 17 Years

- U.S. Department of Energy, Office of Environment, Safety and Health
  - Environmental Protection Specialist, specializing in waste management.

- Economic Regulatory Administration
  - Environmental Protection Specialist, specializing in electric power generation.

- Naval Facilities Engineering Command
  - Environmental Planner specializing in facility planning.

- Consultant
  - Consulting in environmental planning with private firms specializing in transportation and energy facility siting.

EDUCATION: M.R.P., Regional Planning, University of Pennsylvania, 1976
B.S., Economics, (cum laude), University of Maryland, 1973
NAME: Richard A. Barringer

AREA OF RESP: National Environmental Policy Act (NEPA)

ASSOCIATION: JAYCOR/Oak Ridge National Laboratory (ORNL)

EXPERIENCE: 5 Years

- JAYCOR/Oak Ridge National Laboratory (ORNL)
  - Participated in Tiger Team Assessments of Pinellas Plant, Savannah River Site, Lawrence Livermore National Laboratory, Brookhaven National Laboratory, Sandia National Laboratory-Livermore, and the Hanford Site for the Department of Energy (DOE).
  - Conducted environmental compliance assessments at Naval Petroleum and Oil Shale Reserves in Wyoming and Colorado for the DOE.

- LABAT-ANDERSON, Incorporated
  - Reviewed Defense Facilities Decommissioning Program and Formerly Utilized Sites Remedial Action Program RI/FS work plan documents for the DOE and assessed compliance with NEPA and Environmental Protection Agency (EPA) guidelines.
  - Prepared EPA Uncontrolled Hazardous Waste Site Ranking System environmental evaluations of Department of Defense (DoD) military installations for the EPA in support of nominations to the National Priority List and subsequent eligibility for the DoD remedial action program.
  - Prepared Environmental Impact Statements for the U.S. Forest Service and the Bureau of Land Management.

EDUCATION: USDA Graduate School, National Environmental Policy Act Course, 1989
Old Dominion University, M.S., Geological Sciences, 1987
Old Dominion University, B.S., Geological Sciences, 1982
NAME: Joseph A. Boros

AREA OF RESP: Surface Water

ASSOCIATION: NUS Corporation

EXPERIENCE: 38 Years

- NUS Corporation
  - Participated in six Tiger Team Assessments.
  - Served as Surface Water Specialist on eight DOE Environmental Surveys.
  - Worked as Site Coordinator for prioritization efforts involving three DOE sites; assisted on four other DOE sites.
  - Led field investigation crews making onsite assessments for EPA at 60 iron- and steel-making facilities; and 25 molding and casting shops.
  - Participated in the writing of EPA Development Documents in support of rule-making for regulating discharges from the iron- and steel-making and foundry industries.
  - Conducted environmental assessments for two automobile manufacturing plants and two plate glass manufacturing shops.
  - Managed an engineering research laboratory in support of FWQA investigations aimed at eliminating pollution from acid mine drainage in coal fields.
  - Supported chemical engineering projects for a variety of clients including utilities, non-ferrous metal plants, refineries and chemical manufacturers.

- LTV Steel Corporation (and its predecessor, Jones and Laughlin Steel Corporation)
  - Supervised the environmental laboratory working on projects at all mills, mines, quarries and finishing plants.
  - Performed treatability tests and recommended optional treatment systems for control of pollution from mills and mines.
  - Developed basic designs for sedimentation processes, acid mine drainage treatment plants, pickle liquor neutralization processes, oil recovery and reuse systems, and phenol solvent extraction units.
  - Established air and water monitoring programs for three major integrated steel plants.
  - Worked with State and Federal regulatory agencies through permit application and negotiation processes.

EDUCATION: B.S., Chemistry, Grove City College
          A.B., Mathematics, Duquesne University
NAME: S. Charles Caruso

AREA OF RESP: Toxic and Chemical Materials/Quality Assurance

ASSOCIATION: NUS Corporation

EXPERIENCE: 35 Years

- NUS Corporation
  - Participated in four Environmental Surveys and four Tiger Team Assessments.
  - Prepared part of audit checklists of the Clean Air Act regulations for DOE.
  - Prepares SARA Section 313 Chemical Release Inventory Reports for Chemical Plants.
  - Reviews and validates monitoring data from Superfund sites and Air Force Bases.
  - Prepares sampling and analysis plans for remedial investigations and field studies.

- Carnegie Mellon University
  - Managed an environmental research group.
  - Directed a study to control NOx emissions from industrial processes.
  - Supervised and participated in an acid rain study.
  - Supervised studies concerned with the development of biological treatment processes for industrial wastewaters.
  - Directed a survey of industrial wastewaters for priority pollutants.
  - Supervised the evaluation of processes for control of air pollutants from coke, iron and steel making plants.
  - Evaluated and developed physical/chemical processes for control of pollutants in industrial wastewaters.
  - Developed analytical methods for the determination of specific pollutants in industrial wastewaters and air emissions.
  - Planned and participated in water quality surveys of rivers and lakes.
  - Conducted studies on the source of organoleptic compounds in drinking water.
  - Served as an advisor to an industrial committee of analytical chemists and assisted in the preparation of a QA/QC manual.
  - Conducted a study to evaluate waste oils for toxic materials.

EDUCATION: Ph.D., Chemistry, University of Pittsburgh
B.A., Chemistry, Alfred University
NAME: Eric B. Cohen, P.E.
AREA OF RESP: National Environmental Policy Act (NEPA)
ASSOCIATION: U.S. Department of Energy (DOE), Office of NEPA Oversight
EXPERIENCE: 11 Years
  • DOE, Office of NEPA Oversight, Waste Management Group
    - Physical Scientist. Responsible for recommending required level of National Environmental Policy Act documents for DOE projects, reviewing environmental impact statements and environmental assessments for accuracy and adequacy, and developing NEPA compliance policies and guidance.
  • U.S. Environmental Protection Agency, Office of Municipal Pollution Control
    - Environmental Engineer. Served as national coordinator to manage the wastewater treatment innovative or alternative technology program. Conducted field performance evaluations and training exercises for regional and state personnel at facilities claiming technology failure. Initiated studies to evaluate the potential for whole-effluent toxicity removal in municipal wastewater treatment facilities.
  • U.S. Air Force, Air Force Systems Command
    - Environmental Engineer. Responsible for all aspects of Installation Restoration Program management for the Command, including budget administration and allocation, project prioritization, and multidisciplinary technical review of remedial investigation/feasibility studies at over 150 sites, and of 9 remedial action constructions to ensure compliance with all relevant regulations at 8 facilities. Provided support for base environmental audits, and guidance to base environmental coordinators.
  • Illinois Environmental Protection Agency, Chicago Area Office, Division of Water Pollution Control Operations
    - Environmental Engineer. Conducted compliance inspections at municipal, industrial and Federal wastewater treatment facilities, conducted pretreatment audits, evaluated O&M and performance of treatment hardware, and responded to citizen pollution complaints and to emergency spills of chemical or hazardous materials.

EDUCATION: M.S., Environmental Science in Civil Engineering, University of Illinois, 1979
           B.A., Chemistry and Biology, Western Maryland College, 1977
NAME: Thomas E. Cox

AREA OF RESP: Radiation

ASSOCIATION: NUS Corporation

EXPERIENCE: 23 Years

- NUS Corporation
  - Executive Chemist providing chemistry and radiochemistry consulting services to commercial nuclear power plants. Services include preparation of training texts, technical training, technical assistance for chemistry and environmental audits and general chemistry/radiochemistry support.

- Bechtel National, Inc.
  - Lead Engineer for Bechtel National, Inc., at TMI-2. Provided technical assistance in tracking fissionable materials and decontaminating TMI-2 systems.

- EG&G Idaho, Inc.

- Exxon Idaho, Inc.
  - Scientist and then project leader for the NRC Source Team Program at commercial PWR's. Assisted in 2 years of radioiodine air research at INEL. Lead scientist in developing procedures for analyzing TRU in commercial resins.

- Allied Chemical Corporation
  - Chemist in the process analysis lab at the Idaho Chemical Processing Plant. Provided chemical and radiochemical analysis for fuel processing and waste calcining operations.

- U.S. Navy
  - Qualified as a reactor operator on Naval pressurized water reactors.

EDUCATION: M.S., Radiochemistry, University of Idaho, 1979
B.S., Geology, University of Tennessee, 1970
NAME: Lisa M. Drinkhall

AREA OF RESP: Environmental Team Administrator

ASSOCIATION: NUS Corporation

EXPERIENCE: 7 Years

- NUS Corporation

Served as the Environmental Team Administrator for the DOE Tiger Team Assessments at Nevada Test Site, Lawrence Livermore National Laboratory, Paducah Gaseous Diffusion Plant, and Argonne Illinois Site. Responsibilities included:

- Coordination of the environmental portion of the Tiger Team report.
- Typing of the actual report on Wordperfect 5.0.
- Coordination of schedules, tables, etc. for the report.

Department Secretary for the Chemistry/Toxicology Department. Responsible for secretarial and administrative support for the Manager of the Department and seven professionals. List of responsibilities include:

- Tabulating laboratory analytical results for data validation
- Reviewing quality control of analytical data
- Inputing and processing data validation information for active projects on computers (Lotus 1-2-3, Foxbase)
- Lead typing responsibility for the department to include: Memoranda, letters, small reports on Xerox Memorywriter; project reports prepared on PC word processing software (Officewriter, Wordperfect 5.0, 5.1)
- Composing memos and letters for department manager and professional staff

EDUCATION: West Allegheny Senior High School, General Studies, Graduation - 1983

OTHER: DOE Special Environmental Team Training (1 day)
- Quality Education Classes (2 weeks)
NAME: Tommy F. Eckle

AREA OF RESP: Air

ASSOCIATION: NUS Corporation

EXPERIENCE: 34 Years

- NUS Corporation
  - Participated in Tiger Team Assessments at the Rocky Flats Plant, Lawrence Livermore National Laboratory, Paducah Gaseous Diffusion Plant, and Argonne Illinois Site.
  - Served as Air Specialist on six DOE Environmental Surveys (11 sites).
  - Served as Site Coordinator in the prioritization of the DOE Environmental Survey findings.

- U.S. Steel Corporation
  - Performed air-dispersion modeling to demonstrate effectiveness of emission-control alternatives.
  - Developed inventories of air-pollutant sources at integrated steel mills.
  - Developed and conducted a road-dust emission-sampling program at a major steel mill.
  - Coordinated installation of an ambient-air monitoring station for prevention of significant deterioration purposes.

EDUCATION: B.S., Chemistry, West Virginia Institute of Technology
NAME: Gregory T. Haugan, Jr.

AREA OF RESP: Environment Team Report Administration

ASSOCIATION: META, Inc.

EXPERIENCE: 8 Years

- META, Inc.
  - Information Management Specialist. Assigned to an administrative support contract aiding the Environmental Team on DOE Tiger Team audits. Efforts to date include Brookhaven National Laboratory, Sandia National Laboratory, Livermore, the Hanford Site, and Argonne Illinois Site.

- UDI Contractors, Inc.
  - Project Manager and Administrator for UDI Contractors, Inc. Supervised field operations and managed office administration for a construction management firm.

- GLH, Inc.
  - Program Analyst specializing in research, report writing, and project management software for an information resources management consulting firm.

EDUCATION: Graduate Coursework, General Administration, University College, 1987
B.A., General Studies, University of Maryland, 1984
NAME: Cynthia G. Heckman

AREA OF RESP: National Environmental Policy Act (NEPA)

ASSOCIATION: Oak Ridge National Laboratory (ORNL)/Martin Marietta Energy Systems, Inc.

EXPERIENCE: 5 Years

- Oak Ridge National Laboratory/Martin Marietta Energy Systems, Inc.
  
  - Participated in Tiger Team assessments of the Rocky Flats, FMPC/Fernald, Pantex, Kansas City, Savannah River, Lawrence Livermore, and Hanford facilities to evaluate the adequacy of existing NEPA documentation. Assisted in the development of the NEPA Compliance Audit Protocol used on Tiger Team assessments.
  
  - Technical Information Analyst maintaining and updating the Department of Energy NEPA Memoranda-to-File database and Environmental Guidance Program Reference Books on 14 major environmental statutes including the Resource Conservation and Recovery Act (RCRA); the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); and the Toxic Substances Control Act (TSCA).
  
- MAXIMA Corporation
  
  - Staff Scientist in the Environmental Technology Division providing technical support to Oak Ridge National Laboratory programs by reviewing applicable environmental laws and regulations. Reviewed spill cleanup technologies using foams and other retardants on floating hazardous chemicals for the U.S. Coast Guard.

EDUCATION: M.S., Biology, University of Kentucky, 1985
B.A., Biology, Thomas Moore College, 1980
NAME: Steven Masciulli
AREA OF RESP: Radiation
ASSOCIATION: Vertechs Inc.
EXPERIENCE: 15 Years

- Vertechs Inc., Senior Specialist, responsible for health physics, dose assessments, emergency planning, audits, appraisals, and computer applications. Served on Lawrence Livermore National Laboratory and Paducah Gaseous Diffusion Plant Tiger Teams.

- Cygna Group, Division Manager and Senior Technical Specialist, responsible for health physics, emergency planning, quality assurance and computer applications.
  - Performed numerous investigations, audits and appraisals of applied health physics and radiological environmental and effluent monitoring programs.
  - Developed and ran database and computer programs for offsite dose assessment, radiological effluent monitoring, control room habitability, and shielding analysis.
  - Supervised radiological environmental monitoring laboratory.
  - Served on Nevada Test Site Tiger Team.

- New York Power Authority
  - Senior Radiological Appraisal Specialist: responsible for developing and implementing appraisal program for health physics and radiological effluent and environmental monitoring programs.
  - Supervisory Radiological Engineer: supervised a group with responsibility for development and implementation of health physics and environmental programs.
  - Radiological Engineer.

- Consolidated Edison Company of New York Inc., Nuclear Environmental Monitoring Engineer

- General Dynamics Corporation, Electric Boat Division, Radiation Control Engineer

EDUCATION: M.S., Applied Science, New York University
B.S., Radiological Sciences, Lowell Technological Institute

OTHER: Certified Health Physicist (comprehensive and power reactor specialty)
NAME:       John P. McCann
AREA OF RESP: Inactive Waste Sites/CERCLA
ASSOCIATION: Civil & Environmental Consultants, Inc., Pittsburgh, PA
EXPERIENCE: 11 Years
- Civil & Environmental Consultants, Inc.
  - Director of CEC’s Health, Safety and Regulatory Compliance Program and Senior Project Manager. Principal responsibilities include program management in Corporate Health and Safety, Chemical Hazard Evaluation/Risk Assessment, Hazardous Waste Site Assessments, and Environmental Compliance Audits.
  - Participated as the Inactive Waste Site/CERCLA specialist for the Y-12 Plant and Savannah River Site Tiger Team Assessments. Reviewed RI/FS (RFI/CMS) Work Plans in support of the Hanford Site Tiger Team Assessment.
- ICF Technology, Inc.
  - Manager of the Environmental Health Department of ICF Corporation’s regional office in Pittsburgh involved in investigations of uncontrolled hazardous waste sites under contract to the EPA. Project Manager of a Remedial Investigation to determine the extent of groundwater and soil contamination at an abandoned tanker-truck facility in eastern Texas. Also managed a DOD Installation Restoration Program environmental assessment concerning a jet fuel spill at an Air Force Base in southern Florida.
- NUS Corporation
  - Worked on various Superfund/CERCLA related projects as Scientist and Project Manager in the Environmental Chemistry and Toxicology group of NUS Corporation. This work primarily involved preparing extent of contamination and quantitative risk assessment at numerous Superfund sites across the eastern states.
EDUCATION: M.S., (anticipated) Environmental Chemical Hazard Assessment, Graduate School of Public Health, University of Pittsburgh B.S., Environmental Health, Colorado State University
NAME: Mary S. Robison

AREA OF RESP: Groundwater

ASSOCIATION: NUS Corporation

EXPERIENCE: 30 Years

- NUS Corporation
  - Served as Groundwater Specialist on seven DOE Environmental Surveys (12 sites).
  - Participated in two DOE/Tiger Team Assessments as Groundwater/Soils Specialist and assisted with assessment checklist development.
  - Acted as assistant to site coordinator on DOE prioritization of Environmental Survey results for the Rocky Flats Plant and Oak Ridge Y-12 Plant facilities.
  - Supervised field investigation of a Superfund site contaminated with radioactive waste.
  - Performed aquifer testing at Superfund sites (Region I).
  - Planned and conducted environmental baseline sampling for an industrial client.
  - Served as client liaison and project manager for radiological environmental monitoring programs at nuclear power plants.
  - Planned hydrogeological investigation to support RCRA Part B permit application for an industrial client.
  - Identified potential groundwater contaminant sources and solid waste management units for an industrial client.

- Teledyne Isotopes
  - Managed analytical services in radiometric dating and stable isotope ratio measurements for clients in the petroleum and mining industries.

EDUCATION: Ph.D., Geochemistry, University of Pittsburgh
M.S., Biochemistry, Medical College of Georgia
B.S., Chemistry, Marian College
NAME: Michael C. Sutton

AREA OF RESP: Waste Management

ASSOCIATION: ICF Incorporated

EXPERIENCE: 8 Years

- ICF Incorporated, Waste Management and Policy
  - Participated in developing Report to Congress on Special Mineral Processing Wastes for EPA Office of Solid Waste. Evaluated the alternatives for managing and/or utilizing the twenty "special" mineral processing wastes, which have a temporary exclusion from RCRA Subtitle C requirements.
  - Provided technical review for EPA of delisting petitions to exclude a listed hazardous wastes from RCRA Subtitle C requirements.
  - Reviewed state plans for assuring sufficient hazardous waste treatment and disposal capacity for the next 20 years. States not having approved plans were unable to receive federal Superfund money after 1989.
  - Performed legislative analyses of proposed RCRA reauthorization legislation, used in preparing EPA officials for Congressional hearings.

- Environmental Science America, Waste Management
  - Provided private sector clients with advice on multidisciplinary projects such as market assessments for pollution control technologies, strategies for complying with environmental regulations, and identification of potential Superfund liabilities.

- House Committee on Energy and Commerce, U.S. Congress, Environmental Legislation
  - Committee staff member with responsibilities for drafting, evaluating, and managing legislation having to do with energy and the environment, including amendments to RCRA, TSCA, and the Nuclear Waste Policy Act of 1988.

- Westinghouse Electric, Naval Reactor Operations
  - Taught civilian engineers and naval personnel reactor chemistry control, health physics, and how to identify and respond to emergencies.

EDUCATION: M.S., Civil Engineering, Carnegie-Mellon University
B.S., Chemistry and Physics, Lewis and Clark College
NAME: Wayne W. Tolbert

AREA OF RESP: National Environmental Policy Act (NEPA)

ASSOCIATION: Science Applications International Corporation

EXPERIENCE: 13 Years

- Science Applications International Corporation (SAIC)
  - SAIC Assistant Vice-President and Senior Project Manager who has managed or contributed to over 45 Environmental Impact Statements (EISs), EIS Supplements, EAs, and NEPA Adequacy reviews.
  - Extensive experience conducting peer reviews of environmental documents including 20 EISs and EAs, 300 Action Description Memoranda, Memos-to-File (MTFs), and Categorical Exclusions.
  - Senior Technical QA Reviewer for the Defense Nuclear Agency Environmental Support for Nuclear Weapons Effects Simulation effort and QA Officer for the USAF/US Army Corps of engineers EIS Support contracts.
  - NEPA Specialist for Environmental Audit Teams for the Mound Plant, the Feed Materials Production Center, and the Nevada Test Site.
  - SAIC Division Manager Training Development Team.
  - Authored SAIC Project Management Training Course and serves on the Corporate Division Manager Training Development Team.

EDUCATION: Ph.D., Ecology, University of Tennessee, 1976
M.S., Ecology, University of Tennessee, 1972
B.S., Biology, Wake Forest University, 1970
A.A., Biology, Wingate Junior College, 1968
NAME: J. Warren Webb

AREA OF RESP: National Environmental Policy Act (NEPA)

ASSOCIATION: Oak Ridge National Laboratory
Environmental Sciences Division

EXPERIENCE: 12 Years

- Oak Ridge National Laboratory
  - Performed impact analyses of nuclear power plants, geopressure and geothermal resource development, synthetic fuels, oil shale mining and processing, uranium mining and milling, and small hydropower development.
  - Performed analysis of cumulative impacts of multiple-hydropower development in the Owens River Basin, California.
  - Performed analysis of impacts of small-scale hydropower development nationwide with and without tax and financial benefits.
  - Reviewed EISs/EAs and associated documents dealing with stabilization of uranium mill tailings.
  - Evaluated issues, data needs, and research needs related to the effects of the expected climatic warming on unmanaged ecosystems.
  - Performed basic research on insect populations and communities, concentrating on their roles in ecosystems and relationships with plants.

EDUCATION: Ph.D, Ecology, Rhodes University, South Africa, 1975
Graduate Study, Cornell University, 1969
B.A., Zoology, University of Texas, 1967
NAME: J. David Yesso

AREA OF RESP: Environmental Technical Coordinator

ASSOCIATION: NUS Corporation

EXPERIENCE: 19 Years

- NUS Corporation
  - Technical coordinator and radiation specialist for the
    Tiger Team Assessments of three sites, the DOE Special
    Assignment Environmental Team at the Rocky Flats Plant,
    and seven Environmental Surveys at DOE facilities.
  - Provided environmental consulting support to industrial
    and governmental organizations.
  - Former Director of NUS Chemistry Training Center.
  - Radiation Safety Officer for the Laboratory Services
    Group.
  - Provided consulting services in chemistry and
    radiochemistry to nuclear utilities.

- Battelle, Columbus Laboratories
  - Group Leader for radiochemistry.
  - Managed nuclear facility's radiological laboratory.
  - Project Manager for program to characterize wastes.
  - Technical consultant on program to calibrate and
    redesign utility radiation monitoring system.
  - Project Manager or technical lead on research projects
    related to various aspects of the nuclear fuel cycle.

- University of Pittsburgh, Department of Physics and
  Chemistry
  - Conducted research on the mechanisms of neutron damage
    to metals.
  - Research on interactions of heavy ions with matter.
  - Responsible for design and development of accelerator
    ion sources.

EDUCATION: Ph.D., Nuclear Chemistry, University of Pittsburgh
  B.S., Chemistry, University of Pittsburgh
Appendix A-3

BIOGRAPHICAL SKETCHES of
SAFETY & HEALTH SUBTEAM MEMBERS
ARGONNE ILLINOIS SITE
NAME: Richard H. Lasky

AREA OF RESP: Safety and Health Subteam Leader

ASSOCIATION: Office of Safety Appraisals, Headquarters, Department of Energy

EXPERIENCE: 17 years

- U.S. Department of Energy
  - Safety and Health Subteam Leader for Tiger Team Assessments and TSA Team Leader.
  - TSA Team Member: Responsible for the Fire Protection, Training and Certification, Facility Safety Review or Instrumentation and Control Systems functional areas of various appraisals.

- U.S. Nuclear Regulatory Commission
  - Electrical Engineer, Instrumentation and Control Systems
  - Equipment Qualification and Test Engineer, Environmental Qualification Inspections

- U.S. Department of the Navy, Norfolk Naval Shipyard
  - Nuclear/electrical engineer, Nuclear Engineering Department
  - Senior Engineer: Primary Plant Instrumentation, Primary Plant Controls, Nuclear Instrumentations, Steam Generator Water Level Control, Temperature Monitoring, Reactor Protection and Alarms, Radiation Monitoring, SG Chemical Cleaning (Electrical)

EDUCATION: B.S., Electrical Engineering, Norwich University

OTHER: Member, Institute of Electrical and Electronic Engineers
NAME: John W. Arendt

AREA OF RESP: Packaging and Transportation

ASSOCIATION: John W. Arendt Associates, Inc.

EXPERIENCE: 47 years

- John W. Arendt Associates, Inc.
  - Senior Engineer: Provide technical assistance in the fields of: (1) UF₆ handling, (2) packaging and transportation of hazardous waste and radioactive materials, (3) quality assurance, (4) standards and regulations, and (5) engineering and management consultation.

- JBF Associates, Inc.
  - Provide technical and management advice to the President in fields of uranium enrichment, standards and regulations, waste management, packaging and shipping, reactor activities, and quality assurance.

- Nuclear Division, Union Carbide Corporation
    - Superintendent of Planning and Budgeting in Gas Centrifuge Program.
    - Project Manager for UCC-ND Uranium Resource Evaluation, part of the National Uranium Resource Evaluation (NURE) Project.
    - Superintendent of Physical Measurements, Inspection and Nuclear Technology.
    - Superintendent of Physical Measurements, Inspection and Nuclear Technology.
    - Superintendent of Inspection, Metallurgical and Nuclear Engineering.
    - Production Supervisor for in-plant handling, measuring, storing, packaging and shipping of nuclear materials.

- Manhattan Project, University of Chicago
  - Research Assistant

EDUCATION: B.S., Chemical Engineering, Marquette University

OTHER: Registered Professional Engineer, State of Tennessee, 1974
Certified Nuclear Materials Manager
Member, Nuclear Standards Board, American National Standards Institute (ANSI)
Chairman, ANSI N14 Standards Committee, Packaging and Transportation of Radioactive Materials
Member, ANS, ASME, ASQC, ASNT, INMM, NSPE, TSPE, and ADPA
NAME: George P. Bailey

AREA OF RESP: Emergency Preparedness

ASSOCIATION: Advanced Systems Technology, Inc.

EXPERIENCE: 30 years
- Advanced Systems Technology, Inc.
  - Manager, Emergency Preparedness
- Stone & Webster Engineering Corp.
  - Senior Emergency Planning Analyst
- Public Service of Indiana
  - Senior Emergency Preparedness Licensing Engineer, Marble Hill, Nuclear Generating Station
- Louisiana Power & Light
  - Site Emergency Planning Coordinator, Waterford 3, Steam Electric Station
- Nuclear Energy Services, Inc.
  - Manager, Protective Services
- U.S. Air Force Retired
  - Onsite Controller, Nuclear Emergency Team

EDUCATION: University of Philippines
  Tunxis Community College
  Hartford State Vocational College
  NET Course, Sandia Base, New Mexico
  Disaster Preparedness Instructor Course
  CBR Warfare Instructor Course
  Nuclear Weapons Basic Course
  Nuclear Weapons Advance Recertification

OTHER: AIF - Former Member, Subcommittee on Siting, Licensing and Emergency Preparedness
AIF - Former Member, Subcommittee on Safeguards
Society of Fire Protection Engineers
NAME: Lorin C. Brinkerhoff

AREA OF RESP: Organization and Administration

ASSOCIATION: Private Consultant

EXPERIENCE: 37 years

- Private Consultant, associated with Oak Ridge Associated Universities, EG&G Idaho, Inc., and Scientech, Inc.
- Technical Safety Appraisal Team Leader, Office of Safety Appraisal, Headquarters, Department of Energy
- Acting Chief, Reactor Safety Branch, Headquarters, Department of Energy
- Senior Nuclear Safety Specialist, Headquarters, Department of Energy/Energy Research and Development Administration/Atomic Energy Commission
- Senior Nuclear Engineer, Aerojet General Corp., Nerva Program, Nuclear Rocket Development Station (NRDS), NV
- Manager, Nuclear Critical Facility, Lawrence Livermore National Laboratory, Livermore, CA
- Reactor Foreman, Phillips Petroleum Co., Idaho Test Site
- Research Specialist, General Electric Co., Hanford, WA

EDUCATION: B.S., Chemical Engineering, University of Utah

OTHER: Member, ANS-15 Standards Committee on Research Reactor Safety, 1980-1989
Member, ANSI N-16 Standards Committee on Nuclear Criticality Safety, 1978-1984
Listed in: Who's Who in the East
Who's Who in the World
NAME: Melvin E. Cassady

AREA OF RESP: Worker Safety and Health (OSHA) Compliance


EXPERIENCE: 25 years

- National BioSystems, Inc.
  - Testimony in toxic tort litigation and an expert on engineering controls
  - OSHA-type health and safety inspections

- Occupational Safety and Health Administration (OSHA) Health Response Team - Director
  - Assessment of complex industrial hygiene problems
  - Engineering control assessment
  - Program evaluation/development
  - Emergency response to health catastrophes

- National Institute for Occupational Safety and Health (NI- OSH)
  - Industrial hygiene field investigations
  - Engineering control assessments

- Kennecott Copper Corporation
  - Developed hygiene program
  - Performed industrial hygiene field surveys
  - Reviewed engineering controls

- National Lead Company of Ohio (Fernald)
  - Monitored decontamination activities (reviewed personnel activities and checked levels afterward)
  - Developed water monitoring program
  - Conducted plant surveys

EDUCATION: B.S., Biology/Minor Chemistry, Ft. Lewis College, Colorado
M.S., Industrial Hygiene, University of Cincinnati

OTHER: Certified Industrial Hygienist
Clinical Faculty, University of Utah
Advisory Board, University of Utah
NAME: Deana L. Colley

AREA OF RESP: Worker Safety and Health (OSHA) Compliance

ASSOCIATION: Westinghouse Hanford Company
Prime Contractor to Department of Energy

EXPERIENCE: 18 years

- Westinghouse Hanford Company/Rockwell Hanford Operations
  - Senior Safety Engineer: Responsible for facility safety oversite and surveillance, hazard evaluation, design review, safety audits and appraisals, pre-job safety planning, accident investigation, technical training oversite, employee complaint resolution, and industrial hygiene monitoring.
  - Safety Awareness Coordinator: Responsible for safety incentive program, Governor's Restraint Council, site-wide safety awareness program coordination, ADHOC safety task forces, and technical training.

- J. A. Jones Construction Services
  - Safety Inspector: Responsible for field safety surveillance, construction project inspection, hazard identification and evaluation, accident/incident investigation, pre-job planning and job safety analysis, RCRA/CERCLA Hazards Abatement Council.
  - Radiation Timekeeper: Provided radiation exposure timekeeping to support reactor outage, conducted contamination investigation and recordkeeping, and dosimetry recordkeeping.
  - Whole Body Count Coordinator

- Eastern Washington University
  - Academic Advisor for Undergraduate Studies: Responsible for new student academic orientation, undergraduate registration advising, academic probation counseling, and transfer requirement administration.

- Washington Public Schools
  - Secondary Teacher: Responsible for health instruction, physical education instruction, state representative to Health Curriculum Council, interscholastic girls coaching, and Intermediate District Representative to Federal Title Implementation.

EDUCATION: B.A., Education, Central Washington University
OTHER:
Certified Safety and Security Professional, World Safety Organization (WSO)
Industrial First Aid/CPR Instructor, Washington Dept. of Labor & Industries (DL&I)
Standard Teaching Certification, Washington State, Secondary
Certified Asbestos Worker, Washington DL&I
Certified Hazardous Waste Operator, Washington DL&I
Cross Connection Control Specialist I, Washington DL&I,
Washington Water Works Association
Member, American Society of Safety Engineers
World Safety Organization
National Management Association
NAME: Gary J. Gottfried

AREAS OF RESP: Personnel Protection/Industrial Hygiene

ASSOCIATION: Apex Environmental, Inc.

EXPERIENCE: 15 years

- Apex Environmental, Inc.
  - Principal Industrial Hygienist: Responsible for conducting industrial hygiene, public/occupational health and safety and environmental programs; manage and perform studies involving asbestos programs, indoor air quality, environmental audits, occupational exposure assessment and control, hazard assessment and control, health and safety program development/implementation and industrial hygiene surveys; concentration in the petroleum industry, utility, laboratory, and manufacturing sectors.

- Biospherics Incorporated
  - Vice President, Laboratory and Industrial Hygiene Services: Responsible for operations of the Industrial Hygiene and Laboratory Divisions, including program management, business development, protocol development, technical direction and supervision of over 100 industrial hygienists, chemists and environmental scientists; managed major industry and government contracts; performed technical programs as an industrial hygienist and chemist; led and managed major hazard and environmental assessments, industrial hygiene surveys, laboratory studies, and health and safety programs; concentration in the petroleum industry, utilities, laboratories, and manufacturing facilities.

EDUCATION: B.S., Chemistry, Purdue University

OTHER: Certified Industrial Hygienist - Certified in the Comprehensive Practice and Chemical Aspects of Industrial Hygiene by the American Board of Industrial Hygiene, 1982 and 1983
EPA Accredited Asbestos Inspector and Management Planner
Past President, Past Vice President and Past Treasurer, Potomac Section, AIHA
NAME: Henry P. Himpler, Jr.

AREA OF RESP: Quality Verification

ASSOCIATION: ARINC Research Corporation

EXPERIENCE: 35 years

- Safety and Health Subteam Member: Mound Plant, Lawrence Livermore National Laboratory, and Hanford Site Tiger Team Assessments.

- TSA Team Member: N Reactor, Plutonium Finishing Plant, Hanford Tank Farm, Naval Petroleum Reserves, Strategic Petroleum Reserves, Brookhaven National Laboratory, and High Flux Isotope Reactor.

- Quality Verification Inspection Team Member: Portsmouth and Paducah Gaseous Diffusion Plants, Oak Ridge National Laboratory, and SP-100 (Space Reactor Program).

- QA Audit Team Member: Savannah River and San Francisco Operations Offices, and Annular Core Research Reactor.


- Test and Evaluation Systems Engineering, Management and Design, Westinghouse Corp. and Raytheon Co.

- QA Project Engineer and Project Manager, Westinghouse and General Electric Co.

- Consultant to the U.S. Department of Energy in QA Program Planning and Auditing, ARINC Research Corp.

- Consultant to the U.S. Navy Weapon Systems/Project Management, Planning and Auditing, ARINC Research Corp.

- Electronic Systems Design Engineering, Westinghouse Corp.

EDUCATION: B.S., Electrical Engineering, Johns Hopkins University
B.S., Industrial Technology, Roger Williams College
NAME: Charles R. Jones
AREAS OF RESP: Maintenance/Auxiliary Systems
ASSOCIATION: SCIENTECH, Inc.
EXPERIENCE: 24 years
  • SCIENTECH Inc.
  • Tenera Corporation
    - Senior Project Manager: Assisted commercial nuclear plants in safety system functional assessments, technical troubleshooting, and operation reliability and safety. Evaluated safe shutdown and fire protection requirements for nuclear plants.
  • U.S. Department of Energy
    - Technical Adviser: On loan from Navy Nuclear Propulsion Program to Naval Advanced Weapons Program for troubleshooting and comprehensive nuclear safety matters.
    - Served as Executive Secretary, Defense Programs, Safety, Security, and Control Committee
  • Nuclear Powered Cruiser Bainbridge
    - Operations Officer; Nuclear plant qualified
  • Nimitz Precommissioning Unit
    - Reactor Mechanical Assistant; Reactor Controls Division Officer
    - Qualified Nuclear Plant Chief Engineer, Systems Acceptance Inspector
  • USS Enterprise
    - Station Officer in charge of reactor plant overhaul
    - Reactor Mechanical Division Officer
EDUCATION: M.S., Mechanical Engineering, Massachusetts Institute of Technology
             B.S., U.S. Naval Academy
             Ocean Engineering, Massachusetts Institute of Technology
OTHER: Member, American Nuclear Society
       Certified Nuclear Chief Engineer (Naval Reactors)
NAME: William C. King
AREA OF RESP: Radiation Protection
ASSOCIATION: Private Consultant
EXPERIENCE: 38 years

- Private Consultant
  - Battelle Pacific Northwest Laboratory and Scientech, Inc.: Technical safety appraisal team member for the appraisals of the Rocky Flats Plant Site, Feed Materials Production Center, and Brookhaven National Laboratory; Peer Reviews at the Hanford Purex Plant and the Pantex Plant.

- Lawrence Livermore National Laboratory
  - Consultant to the Hazards Control Department.
  - Group Leader, Information Services Group, Safety Division, Hazards Control Department: Development of computer databasing and production of annual and monthly reports from the databases.
  - Staff Assistant, Radiation and Environmental Safety Division: Provide radiation safety expertise in the planning of Nuclear Weapons Accident exercises, develop classification system for radioactive wastes, evaluate underground water contamination issues, evaluate internal U, Pu, Am, and Cm doses to employees, provide backup health physics services for the laser fusion program, laser isotope separation program and the tritium facilities.

- American Cyanamid Co. and Phillips Petroleum Co.
  - Health Physics Supervisor for the start-up and operations of the Idaho ICPP and ETR Plants.

EDUCATION: M.S., Physics, Vanderbilt University
B.A., Physics, Linfield College
A.A., Physics, Eastern Oregon College

OTHER: Charter Member, Health Physics Society
Certified Health Physicist, American Board of Health Physicists
Adjunct Professor of Radiation Physics, University of Nevada, Las Vegas - 1968 to 1973
NAME: Bernard R. Kokenge
AREA OF RESP: Safety/Security Interface and Site/Facility Safety Review
ASSOCIATION: Consultant, EG&G Idaho, Inc.
EXPERIENCE: 25 years
- TSA/Tiger Team Member on 11 DOE Headquarters Tiger Team Assessments and Technical Safety Appraisals
- Consultant on Special Assignments, Headquarters, Department of Energy
- Price-Anderson Amendment Act Visiting Team, Headquarters, Department of Energy
- Kentucky Christian College, Vice President, Strategic Planning and Program Development
- Monsanto Research Corporation, Mound Plant, Miamisburg, OH
  - Associate Director of Mound Plant: Responsible for all component development and production activities associated with primary detonators, timers, actuators and pyrotechnic devices.
  - Nuclear Operations Director: Responsible for all radiological development and production technology as applied to the isotopes of hydrogen, analytical chemistry support for Mound and production/testing of radioisotopic thermoelectric generators for the Galileo and Ulysses space missions.
  - Nuclear Technology Manager: Covering diverse technical radiological functions including plutonium-238 processing technology, plutonium waste management development, tritium process development in support of weapons programs and processing/engineering technology for Mound’s tritium operations.
  - Plutonium Processing Manager: Responsible for plutonium processing building operation, wherein plutonium-238 fuel forms were produced and plutonium-238 scrap recovered and recycled.
  - Plutonium Fuels Group Leader: Investigated the behavior and physical properties of plutonium-238 as a fuel for space applications.
EDUCATION: Ph.D., Inorganic Chemistry, Ohio University
B.S., Chemistry, University of Dayton
OTHER: Patent on Plutonium-238 isotopic fuels
Achievement awards from DOE for significant overall program contributions
DOE Management Team Chairman for the Galileo and Ulysses RTG space mission programs
NAME: Thomas H. Lovatt
AREA OF RESP: Worker Safety and Health (OSHA) Compliance
ASSOCIATION: Kaiser Engineers Hanford, Richland, WA
EXPERIENCE: 25 years

General Information
- Twenty-five years of safety management experience in all phases of nuclear power plants, construction, mining, and tunnel construction; Industrial safety management and oversight.
- Kaiser Engineers Hanford
  - Responsible for management of company safety/radiation and hazardous waste management programs at the DOE Hanford Nuclear facility. Supervised up to sixteen safety/radiation staff. Innovative in the micro-computerization of safety/radiation, and hazardous waste tracking systems and functions.
- J. A. Jones Construction Company
  - Safety Manager: Washington Public Power Supply System Units No. 1 and 4 Construction Project, Richland, WA.
- Ebasco Services, Inc.
  - Safety Manager: Washington Public Power Supply System, Units No. 3 and 5 Construction Project, Elma, WA; and Florida Power & Light Company, St. Lucie County, FL.
- Litton Industries, San Carlos, CA
  - Managed Corporate Safety Programs, including company safety meetings, safety inspections, and completed accident reports and worker’s compensation claims.
- Fluor Utah, Inc., San Mateo, CA
  - Safety Supervisor, Cordero Coal Mine Construction Project, Gillette, WY; and Mineral Creek Tunnel Construction Project, Kearney, AZ.


Occupational Safety and Health Training Institute (OSHA): Construction Safety and Health, General Hazard Recognition

OTHER: Member, American Society of Safety Engineers
Member, National Safety Council
Certified, DOE Accident/Incident Investigation and Management Oversight and Risk Analysis (MORT).
NAME: Thomas J. Mazour
AREA OF RESP: Training and Certification
ASSOCIATION: Private Consultant
EXPERIENCE: 20 years
  • Private Consultant
    - Participated in 21 Technical Safety Appraisals.
    - Developed and presented training programs for DOE site-surveillance personnel and DOE Tiger Team members.
    - Supporting development of nuclear facility training programs to meet DOE Training Accreditation Program.
    - Evaluated operations, organization and administration, and training areas for NRC inspections of commercial nuclear power plants.
  • Analysis & Technology, Inc.
    - Supported the NRC in evaluating utility training programs and developing training review criteria and regulations.
    - Supported INPO development of a performance-based training accreditation program.
    - Developed training programs for DOE Category A reactor operators and supervisors.
  • Burns & Roe, Inc.
    - Design engineer and licensing engineer for Clinch River Breeder Reactor and NRC licensed PWR.
  • U.S. Navy: Nuclear training officer - nuclear reactor operations, nuclear weapons officer.
EDUCATION: B.S., Mathematics, U.S. Naval Academy
            M.B.A., University of New Haven (UNH)
            M.S., Industrial Engineering, UNH
            Sc.D (candidate), Management Systems, UNH
OTHER: Registered Professional Engineer (Nuclear/Mechanical)
        Adjunct faculty member, instruct university courses in industrial engineering and operations research
NAME: N. Barrie McLeod

AREAS OF RESP: Nuclear Criticality Safety/Experimental Activities

ASSOCIATION: Vice President, E. R. Johnson Associates, Inc.

EXPERIENCE: 33 years

  - Provide technical services for clients related to nuclear fuel radiological and nuclear characteristics and nuclear measurements.
  - Provide technical services for clients related to the design, licensing, operation, and costs of facilities and equipment for handling, storage, transport, and disposal of spent nuclear fuel and other radioactive wastes.

- NUS Corporation
  - Directed and conducted the criticality design of spent fuel transport casks and high density spent fuel storage racks.
  - Used and/or developed computer programs for evaluating the criticality and depletion of nuclear fuel.
  - Established the NUS Licensing Information Service which completely characterizes the actual licensing practices of the Nuclear Regulatory Commission.
  - Directed the training of many domestic and foreign utility engineers in nuclear fuel management.

EDUCATION: B.A.Sc, Engineering Physics, University of Toronto
M.S.E., Nuclear Engineering, University of Michigan
Ph.D., Nuclear Engineering, Massachusetts Institute of Technology

OTHER: Registered Professional Engineer (Nuclear)
NAME: William R. Murphy

AREA OF RESP: Worker Safety and Health (OSHA) Compliance

ASSOCIATION: Murphy & Associates

EXPERIENCE: 20 years

- Director of Safety, Lurgi Corporation: Responsible for corporate and field operations safety programs.

- Senior Safety Engineer, Exxon, Special Assignment: Responsible to the President for all matters pertaining to safety, health, and environment.

- Safety Engineer, Exxon: Site safety responsibilities for all research/laboratory/pilot plant and construction projects.

- Safety Engineer, ESSO, Venezuela: Monitored, inspected and implemented project safety/health fire protection.

EDUCATION: B.S., Safety Engineering/Management, Emory-Riddle University

OTHER: Executive Secretary, National Safety Council Member, Systems Safety Society
Member, American Society of Safety Engineers
NAME: Leonard J. Owens

AREA OF RESP: Worker Safety and Health (OSHA) Compliance

ASSOCIATION: Nevada Operations Office, Department of Energy

EXPERIENCE: 19 years

- Nevada Operations Office, Department of Energy
  - Safety Engineer, Safety and Health Division; Mining/General Engineer, Commercial Nuclear Waste Program; Contractor Engineer, Waste Isolation Pilot Plant

- International Minerals and Chemicals, Bokum Resources Mining Co., Gulf Mineral Resources, Utah International, American Smelting and Refining
  - Various positions as Chief Engineer/Superintendent and Mining Engineer

- Southwestern Radiological Health Laboratories, Public Health Service
  - Research Technician

EDUCATION: B.S., Mining Engineering, University of Nevada

OTHER: OSHA Training for Other Federal Agencies
- DOE Accident Investigation MORT Training
- MSHA Safety Training
NAME: Joseph J. Shonka

AREAS OF RESP: Radiological Protection/Operations


EXPERIENCE: 23 Years
- Shonka Research Associates, Inc.
  - Research Director: Direct private industry and Federal government contracts.
- Atlan-Tech, Inc.
  - Principal Scientist: Established Secondary Standards Laboratory for external radiation, Radiation Monitoring System start-up and support for power reactors.
- Private Consultant
  - Research for private industry and utilities.
- Brookhaven National Laboratory
  - Head of Health Physics Group supporting Accelerator Department.
  - Head of Operational Health Physics Group supporting field offices at BNL.
- Oak Ridge National Laboratory
  - Theoretical and experimental work on neutron transport and dosimetry for use in radiotherapy and with neutron dose calculations.
- Georgia Institute of Technology
  - Radiation instrument calibration, activation analysis, neutron generator facility modifications, and instructor.
- Physical Sciences Laboratory
  - Participated in work involving manufacturing and calibration of ionization chambers.

EDUCATION:
B.S., Math/Physics, St. Procopius College
M.S., Physics, Georgia Institute of Technology
Ph.D., HP/NE, Georgia Institute of Technology

OTHER: Health Physics Society
Sigma Xi
American Association of Physicists in Medicine
NAME:       James A. Shurick

AREA OF RESP:  Fire Protection

ASSOCIATION:  Private Consultant

EXPERIENCE:  40 years

- Private Consultant, Tijeras, NM
  - Provide fire protection engineering services including fire protection program evaluations, facility design reviews, and facility evaluations.
- U.S. Department of Energy, Albuquerque, NM
  - Fire Protection Engineer: Responsible for all protection/prevention design efforts for new facilities construction and modifications to upgrade existing facilities.
- Factory Insurance Association, Chicago, IL
  - Assistant Chief Engineer: Supervised 200 field inspectors. Also assisted the Underwriting Section in reviewing existing insured businesses for renewals, review of prospective risks for insurance coverage, and in settling loss estimates.
  - Accounts Engineer: Responsibilities included the handling of large accounts and required complete engineering review of existing and prospective assureds’ facilities by use of plans, consultation and physical visits to property.

EDUCATION:  B.S., Fire Protection and Safety, Illinois Institute of Technology

OTHER:  Member, Society of Fire Protection Engineers
         Certified Safety Professional
         Licensed Professional Engineer, Fire Protection
NAME: Myrna Steele

AREA OF RESP: Experimental Activities/Organization and Administration

ASSOCIATION: Office of Safety Appraisals, Headquarters, Department of Energy

EXPERIENCE: 28 years

- U.S. Department of Energy, Germantown, MD
  - Nuclear Engineer, Technical Safety Appraisal Team Leader
- U.S. Nuclear Regulatory Commission/Atomic Energy Commission
  - Deputy Director, Division of Technical Information
  - Member, TMI Special Inquiry Group (Rogovin)
  - Reactor Operations Project Manager, originator/writer of "Reactor Operating Experience Reports"
  - Member, Task Force that organized NRC from AEC
  - Member, Rasmussen Report Group (WASH-1400)
  - Technical Assistant/Licensing for AEC Chairman
  - Managing Editor, Reactor Technology journal
- National Aeronautics and Space Administration (NASA)
  - Licensing Officer and startup test engineer for materials testing reactor licensed by AEC
  - Research physicist and experiment design engineer for space program

EDUCATION: B.S., Physics and Mathematics, University of Kentucky

Graduate courses in Nuclear Engineering and Physics, University of Toledo (Ohio) and University of Tennessee

Law School, University of Toledo

Dpl., Federal Executive Institute, Charlottesville, VA

OTHER: Congressional Fellowship, USNRC/OPM

Member, American Nuclear Society

Reactor Operator

Member, National Contract Management Association

Member, Society for Information Management
NAME: Ferman Stubblefield

AREA OF RESP: Worker Safety and Health (OSHA) Compliance

ASSOCIATION: Office of Quality and Safety Programs, Headquarters, Department of Energy

EXPERIENCE: 34 years

- International Atomic Energy Agency, Vienna, Austria
  - Senior Nuclear Safeguards Inspector for the Fuel Cycle
  - Expert on Non-Destructive Analysis of Gammas and Transuranics Nuclides
  - Adviser on the Nuclear Problems in the Nuclear Separations Facilities

- U.S. Department of Energy
  - Headquarters Manager for Hazardous Materials and Radioactive Waste
  - Technical Nuclear Safety Appraisal Specialist on effluent from Fuel Cycle Facilities

- U.S. Nuclear Regulatory Commission
  - Headquarters Manager for Nuclear Fuel Cycle Licensing
  - Evaluated and analyzed from a Radiological Safety and Environmental Protection Standpoint, License Applications and Environmental Reports for Nuclear Fuel Cycle Plants

- U.S. Atomic Energy Commission
  - Nuclear Safety Engineer: Line Program Manager for Radioactive Waste Management Operations Contractor

- Boeing Company, Seattle, WA
  - Chemical Finishing Specialist: Advisor on Special finishes for critical aircraft parts

- Julian Labs
  - Chemist: Quality Assurance Chemist for the production of Pharmaceutical

EDUCATION:
- Wiley College, Marshall, Texas
- Roosevelt University, Chicago, IL
- University of Washington, Seattle, WA
- Oak Ridge Associated University, Oak Ridge, TN
- International Atomic Energy Agency, Vienna, Austria

OTHER:
- Member, American Institute of Chemical Engineers
- Member, DOE Speakers Bureau
- Past President, Toastmaster International
NAME: Larry D. Warren

AREA OF RESP: Report Quality

ASSOCIATION: Private Consultant

EXPERIENCE: 26 years

- Private Consultant
  - Technical and management consulting related to nuclear weapons research and development, nuclear weapons manufacturing facilities operations, and nuclear facilities safety programs. Participant in Technical Safety Appraisals (TSAs), Tiger Team Assessments (TTAs), and management appraisals/reviews.

- U.S. Department of Energy, Germantown, MD
  - Safety Programs Manager, Office of Weapons Safety and Operations, Deputy Assistant Secretary for Military Application, Defense Programs: Formulated safety and health policy and long-range plans for three national laboratories and five manufacturing facilities in the nuclear weapons complex. TSA coordinator/contact and Program Representative on 11 TSAs.

- Wilmington District, U.S. Army Corps of Engineers
  - Deputy Commander: Managed/directed annual planning/execution of $60-70 million in civil works projects and $9-15 million in military construction projects; Contracting Officer for construction and service contracts.

- Los Alamos National Laboratory
  - Program Manager, Insertible Nuclear Component Technology Program and Corps Support Weapons System Concept Study; Design Engineer, Nuclear weapon components and subsystems.

- U.S. Army (Lieutenant Colonel, Retired)
  - Various command, operations, and training assignments; and nuclear weapons research and development staff assignments.

EDUCATION: M.S., Nuclear Engineering, N. C. State University
B.S., Nuclear Engineering, N. C. State University
U.S. Army Command and General Staff College

OTHER: Member, Society of American Military Engineers
NAME:        Glenn A. Whan  
AREA OF RESP:  Technical Support  
ASSOCIATION:  Private Consultant  
EXPERIENCE:   34 years  

- Oak Ridge Associated Universities  

- University of New Mexico  
  - Professor of Chemical and Nuclear Engineering, 1957 to 1985, including 11 years as Department Chairman and three years as Associate Dean of Engineering.  

- International Atomic Energy Agency  

- Los Alamos National Laboratory  

- Nuclear Safety Reviews, 1980 to 1990  

EDUCATION:  
Ph.D., Chemical Engineering, Carnegie-Mellon University  
M.S., Chemical Engineering, Montana State University  
B.S., Chemical Engineering, Indiana Institute of Technology  

OTHER:  
Fellow of American Nuclear Society  
Professional Engineer, Nuclear Engineering, State of New Mexico
NAME: Bernard S. Zager, M.D.

AREA OF RESP: Medical Services

ASSOCIATION: Private Consultant

EXPERIENCE: 36 years

- Consultant for occupational medical programs
- Medical Director and Manager Health and Safety Operation, General Electric Company, Nuclear Energy Operation
- Chief Physician Automotive Assembly Division, Ford Motor Company
- Private practice medicine and surgery
- Medical Officer - Mobil Army Surgical Hospital (MASH), Korea

EDUCATION: B.A., Wayne State University
M.D., Northwestern University
Intern and Resident, Detroit Grace Hospital

OTHER: Certified Occupational Medicine, American Board Preventive Medicine
Fellow, American College Occupational Medicine
Fellow, American College Preventive Medicine
Appendix A-4

BIOGRAPHICAL SKETCHES of
MANAGEMENT SUBTEAM MEMBERS
ARGONNE ILLINOIS SITE
NAME: Ernest S. Chaput

AREA OF RESP: Management Subteam Leader

ASSOCIATION: Assistant Manager for Administration, Savannah River Operation Office, Department of Energy

EXPERIENCE: 27 years

- Savannah River Operations Office, Savannah River, South Carolina (1978-present)
  - Assistant Manager for Administration - Responsible for performance of all Federal administrative functions and oversight of contractor administrative functions, including personnel, contracting and procurement, property, budget, accounting, automated data processing (ADP), telecommunications, industrial relations, management evaluation and office services.

  - Director, Budget Examination Division - Responsible for the preparation of the DOE budgets for all non-nuclear programs, including coordination with OMB and Congressional Committees. Oversight provided to the fiscal aspects of program execution.

- Division of Military Application, Germantown, MD (1972-1975)
  - Various positions including senior program analyst for RD&T budgets, DMA-wide ADP programs and administrative support to the Laser Fusion and Laser Isotope Separation programs.

- Nevada Operations Office (1965-1972), Las Vegas, NV
  - Final position was Director Budget Division - responsible for the preparation and execution monitoring of fiscal resources needed to meet Operations Office program objectives.

  - Various positions.

EDUCATION: M.A., Economics, University of Nebraska
B.S., Business Administration, University of Nebraska
NAME: Frank E. Bingham

AREA OF RESP: Management Assessment

ASSOCIATION: Reynolds Electrical and Engineering Company

EXPERIENCE: 31 years

- Reynolds Electrical and Engineering Co., July 1990 to present.
  - Consultant to DOE on Environmental Compliance.
  - Waste Minimization Coordinator for implementation of the Nevada Test Site (NTS) Waste Minimization Plan.
  - Directing hazardous waste inventory of NTS.

  - Director, Environmental Protection Division: Managed Nevada Operations Office (NV) environmental compliance and environmental monitoring programs.
  - Chief, Environmental Compliance Branch: Responsible for ensuring NV programs complied with applicable environmental laws and regulations.
  - Environmental Specialist: Responsible for NV compliance with NEPA, Endangered Species Act and National Historic Preservation act.

  - Worked in New Mexico, Utah and Nevada in positions of Range Conservationist; Chief, Division of Operations; Chief, Division of Administration; and Chief, Division of Resource Management and Acting District Manager. Spent two years in Nigeria with BLM as a part of the United State foreign aid program. Was responsible for developing and instructing a two-year course in range management.

EDUCATION: B.S., Range Management, Utah State University
NAME: Peter J. Gross

AREA OF RESP: Management Assessment

ASSOCIATION: Department of Energy
Oak Ridge Operations Office (ORO)

EXPERIENCE: 

- Director, Env. Protection Div, ORO. Responsible for technical support to and environmental compliance oversight of all ORO activities.

- Director, Technical Services Division, ORO: Project Manager for the Formerly Utilized Sites Remedial Action Program. This involved directing and managing all aspects of the project to cleanup 30 sites in 13 states, 4 of which are on EPA's NPL.

- Manager, MRS Office, ORO: Represented DOE with state and local officials and the public regarding the DOE Office of Civilian Radioactive Waste Management's proposal to build a Monitored Retrievable Storage Facility in Oak Ridge, TN. Developed all aspects of the plan and organization to manage the project; assisted Headquarters in development of the Congressional proposal for an MRS.

- Acting Director, Nuclear Res. and Dev. Division, ORO: Managed a wide range of energy research, development and waste management programs at the Oak Ridge National Laboratory, including Fusion, Advance Reactor development, reprocessing, robotics, by-product utilization, hazardous and low-level waste programs.

- Assistant Project Director for Public Safety, Clinch River Breeder Reactor Project (CRBRP) Office, ORO: Organized, staffed, and managed the Public Safety Division, consisting of three branches, to obtain an NRC license to build and operate CRBRP, to obtain required EPA, TVA, Corps of Engineers, and the state of TN permits; and to provide guidance and independent oversight to ensure all DOE and NRC safety and environmental requirements were met in design, construction and operations.

- Engineering Division, CRBRP Project Office, ORO: Served in capacities of increasing responsibility, from cognizant engineer for all reactor core components to the Deputy Chief, Reactor and Plant Systems Branch with responsibility for design, procurement and installation of all reactor and plant systems.

EDUCATION: B.S., Mechanical Engineering, 1966, Lowell Tech. Institute
M.S., Nuclear Engineering, 1968, Purdue University
NAME: Carl Guidice

AREA OF RESP: Management Assessment

ASSOCIATION: Office of Environmental Restoration and Waste Management, Department of Energy

EXPERIENCE: 27 years

• U.S. Department of Energy
  - Currently Associate Director for Planning and Resource Management for Office of Environmental Restoration and Waste Management. Member Budget Formulation Tiger Team.
  - Seven years experience as DOE Assistant Controller for Financial Systems and Accounting and Director for Financial Policy.
  - Eight years with Fossil Energy R&D Programs as Deputy Assistant Secretary for Management and Director of Budget, Planning and Administration.

• U.S. Department of the Interior
  - Three years heading Departmental budget office.

• Office of Management and Budget
  - Five years; duties included budget, examination, and standards for financial systems.

• American Telephone and Telegraph
  - Three years as District Office Supervisor for Plant Operations.

EDUCATION: B.S., Finance, St. Vincent College
Graduate studies in Financial Management, American University
Mid-Career Fellow-Graduate Program at Princeton University
NAME: Joseph P. Juetten

AREA OF RESP: Management Assessment

ASSOCIATION: Department of Energy, San Francisco Operations Office

EXPERIENCE: 26 years

- DOE San Francisco Operations Office
  - Director, Environment and Safety Support Division, 1989 to present.
  - Served on LANL TSA (Pu Facility), 1987, as Fire Protection Engineer.

- Pacific Fire Rating Bureau
  - Assistant Director, Sprinklered Risk Department.
  - Director, Training and Field Inspections.
  - Field Inspector, Sprinklered Risks and Private Plant Protection.

EDUCATION: Ph.D., Mech. Engr./Liberal Arts., University of North Dakota

OTHER: Registered Fire Protection Engineer (California)
Graduate studies, J. F. Kennedy University School of Law
NAME: John R. Kirby

AREA OF RESP: Management Assessment

ASSOCIATION: U.S. Department of Energy, Pinellas Area Office

EXPERIENCE: 13 Years

- Pinellas Area Office, Chief, Programs and Operational Surety Branch
  - Developed and implemented operational surety program including surveys, databases, trending, project management, and risk assessment/safety analysis, and developing safety analysis report.
  - Deal with the following activities: facility/maintenance/utility operations and management, construction activities, classification, development/production/weapon activities weapon program, reimbursables, computer integration and support, technical information and patents site, planning, nuclear materials management, real property, and emergency preparedness.

- Weapon Programs Division, Albuquerque Operations Office
  - Duties included weapons programs management and liaison with armed services.

- Amarillo Area Office--Pantex Plant
  - Duties involved quality weapons activities, non-weapons quality assurance activities, and standard and calibration surveys.

- Mason & Hanger Silas Mason Co., Inc.--Pantex Plant
  - Senior Project Engineer: responsible for high explosive fabrication, high explosive machining, potting assembly, computer-aided graphics, test firing characteristics project engineering, and facility modification engineering dealing with contaminated pipelines.

EDUCATION: B.S., Mechanical Engineering, University of Texas, El Paso
NAME: Paul Thurmond

AREA OF RESP: Management Subteam


EXPERIENCE: 15 years

  - Management Consultant - Participates in management assessment and organizational development activities for DOE, NRC, and industrial clients. Has participated as a management team member on four NRC diagnostic evaluations of commercial nuclear power plants (NPPs). Served as Principal Investigator for DOE Human Performance Improvement Program. Conducted management appraisals for pulp and paper mills and chemical plants. Server as management consultant to DOD MANPRINT program.

- NUS Corporation, Gaithersburg, MD (1982-1987)
  - Department Head, Training and Personnel Development Department. Provided management, organizational Development, and training consulting to Government and industrial clients. Responsible for developing NPP operations and maintenance training programs for INPO accreditation. Responsible for all department administrative and personnel concerns, business development and planning, department budgets.

- Systems Exploration, Inc. (1975-1982)
  - Department Head, Training Department. Responsible for Government training and organizational development programs. Provided management consulting services to DOD agencies.

EDUCATION: Ed.D, Educational Research, Memphis State University
APPENDIX B

ENVIRONMENTAL TEAM ASSESSMENT PLAN for the
DOE TIGER TEAM ASSESSMENT
at the ARGONNE ILLINOIS SITE
1.0 INTRODUCTION

On June 27, 1989, Secretary of Energy, Admiral James D. Watkins, USN (Ret.), announced a 10-point Initiative to strengthen environmental protection and waste management activities in the U.S. Department of Energy (DOE). One of the initiatives involves conducting Tiger Team Assessments at DOE's operating facilities.

The purpose of the environmental assessment portion of the Tiger Team Assessment of the Argonne National Laboratory is to provide the Secretary with information on the current environmental regulatory compliance status and associated vulnerabilities of the facility, root causes for noncompliance, adequacy of DOE and site contractor environmental management problems, and response actions to address the identified problem areas.

The scope of the Argonne National Laboratory environmental assessment is comprehensive, covering all environmental media and applicable Federal, State, and local regulations, requirements, and best management practices. The environmental disciplines to be addressed in this assessment include air, soil, surface water, hydrogeology, waste management, toxic and chemical materials, radiation, quality assurance, and inactive waste sites. The assessment also addresses National Environmental Policy Act (NEPA) requirements.
2.0 ENVIRONMENTAL ASSESSMENT IMPLEMENTATION

The environmental assessment of the Argonne National Laboratory will be conducted by a Team managed by a Team Leader from the Office of Environmental Audit (OEV) with technical specialists from other DOE offices, NUS Corporation, Vertechs Corporation, ICF, Inc., and Civil and Environmental Consultants, Inc. (CEC). The names and responsibilities are listed below:

<table>
<thead>
<tr>
<th>Name</th>
<th>Affiliation</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Donna Bergman</td>
<td>DOE</td>
<td>Team Leader</td>
</tr>
<tr>
<td>Narendra Mathur</td>
<td>DOE</td>
<td>Assistant Team Leader</td>
</tr>
<tr>
<td>Ched Bradley</td>
<td>DOE</td>
<td>Special Assistant</td>
</tr>
<tr>
<td>J. David Yesso</td>
<td>NUS</td>
<td>Technical Coordinator</td>
</tr>
<tr>
<td>Eric Cohen</td>
<td>DOE</td>
<td>NEPA Subteam Leader</td>
</tr>
<tr>
<td>Joseph Boros</td>
<td>NUS</td>
<td>Surface Water</td>
</tr>
<tr>
<td>Lisa Drinkhall</td>
<td>NUS</td>
<td>Administrative Support</td>
</tr>
<tr>
<td>Tom Eckle</td>
<td>NUS</td>
<td>Air/Assistant Technical Coordinator</td>
</tr>
<tr>
<td>Mike Sutton</td>
<td>ICF</td>
<td>Waste Management</td>
</tr>
<tr>
<td>Steve Masciulli</td>
<td>Vertechs</td>
<td>Radiation</td>
</tr>
<tr>
<td>Tom Cox</td>
<td>NUS</td>
<td>Radiation</td>
</tr>
<tr>
<td>Mary Robison</td>
<td>NUS</td>
<td>Groundwater/Soil</td>
</tr>
<tr>
<td>John McCann</td>
<td>CEC</td>
<td>Inactive Waste Sites</td>
</tr>
<tr>
<td>S. Charles Caruso</td>
<td>NUS</td>
<td>QA/Toxic &amp; Chemical Materials</td>
</tr>
</tbody>
</table>

2.1 Pre-Assessment Activities

Pre-Assessment activities for the Argonne National Laboratory (ANL-E) environmental assessment included the issuance of an introduction and information request memorandum, a Pre-Assessment Site visit, and initial review of documentation which was sent to the environmental team by ANL-E as a result of the information request memorandum.

A Pre-Assessment Site visit was conducted on August 16-17, 1990, by the Tiger Team Leader, Management Team Leader, Team Leaders for Environment, and Safety and Health, and the NUS technical coordinator. The purpose of the Pre-Assessment visit was to become familiar with the site, to review information being supplied and request additional information, and to coordinate plans for the upcoming Assessment with the Chicago Operations Office, Argonne Area Office, and ANL-E personnel.

This Environmental Assessment Plan is based upon the information received by the Environmental Team as of August 31, 1990.

2.2 On-Site Activities and Reports

The on-site activities for the environmental assessment will take place from September 17, 1990, through October 19, 1990. On-site activities will include field investigations, file/record reviews, and interviews with site personnel. The preliminary schedule for the assessment is shown in the attached agenda. For some specialties, the agendas may be incomplete because there was not sufficient information available during the pre-assessment period to allow complete scheduling. These agendas will be expanded during the early part of the on-site assessment. Any and all modifications to the agenda will be
coordinated with the principal contacts from the Chicago Operations Office, Argonne Area Office, and ANL-E.

A close-out briefing will be conducted at the conclusion of the on-site activities. Findings from the Environmental Assessment, as well as findings from the Safety and Health, and Management Assessments will be presented. A draft report containing the findings will be provided for review and comment to the Office of Energy Research, the Chicago Operations Office, Argonne Area Office, and ANL-E.
3.0 AIR

The air-related portion of the environmental assessment at ANL-E will include activities that emit or have a potential to emit one or more air-contaminating materials, the emission controls or administrative procedures applied to restrict those emissions, the in-stack emission monitoring systems, and ambient-air monitoring equipment and procedures. The assessment will address those air contaminants for which air-quality standards (criteria pollutants) or emission standards (new source performance standards or emission standards for hazardous air pollutants) have been established by the United States Environmental Protection Agency or by state and local agencies. Emissions to the atmosphere of organics through process vents and equipment leaks from hazardous waste TSDF that require permits under Subtitle C of RCRA will be assessed. Close liaison will be maintained with the radiation team member because of the importance of air-radiation issues. The primary contact at ANL-E for the air specialist will be Norbert Golchert, with other contacts as designated by the ANL-E Environment, Safety and Health Department.

3.1 Issue Identification

The general approach to the assessment will include a review of existing air permits, pending applications, and standard operating procedures. Processes and control equipment will be inspected for compliance with DOE ALARA requirements for radionuclide emissions. The assessment will also review the nonradiological air contaminants from the different buildings at the site, and evaluate any existing controls applied to the air emissions.

The ambient air monitoring program, including the meteorological monitoring system, will be evaluated to assess the adequacy of the existing monitoring network to characterize environmental impacts of the air emissions from the facility. The activities involved in this part of the assessment will include the inspection of the ambient air quality samplers, a review of documentation applicable to the ambient air data acquisition, and an evaluation of the processing procedures used to assure the accuracy of the data.

Areas of particular interest will include emissions of the criteria pollutants (e.g., particulates, sulfur oxides, nitrogen oxides, volatile organic compounds, carbon monoxide and lead) as well as regulated hazardous air pollutants (e.g., radionuclides, beryllium, and asbestos).

The use of organic solvents will be assessed as a potential or actual source of emissions to determine if they are adequately characterized, monitored, and controlled.

Asbestos and asbestos-containing materials (ACMs) have been widely used throughout ANL-E. A program to remove asbestos and ACMs from various locations has been on-going for several years. Since 1985 removal of asbestos has occurred at more than 260 locations. For the first half of calendar year 1990, removals have taken place at 32 locations within fifteen buildings. Additional information will be requested during the on-site phase of the assessment, and records pertaining to the handling and disposal of asbestos will be reviewed. Any on-going asbestos removal projects and/or disposal of asbestos on-site will be observed directly.

Fugitive emissions from the resuspension of contaminated soils will be
evaluated as a potential means of the airborne release of radionuclides and hazardous materials from the facility. Consideration will be given to historical and current operations to determine the potential for soil contamination and windborne releases.

Several areas of specific interest have been identified during a review of available documentation:

- **New Source Review Activities for Any Proposed New Sources.**
- **Sources of Contaminant Emissions**
  - Degreasers and cold cleaners
  - Boilers/lime silo
  - Machining operations
  - Radionuclide release sources
  - FEUL facility
  - Incinerators
  - Cooling towers
  - Alkali Metal Reaction Booths
  - Gasoline dispensing facilities
  - Solvent dispensing facilities
  - Fugitive dust emissions from coal handling, flyash and sorbant handling, landfill operations, roads, etc.
  - VOC emissions from French Drains
  - Asbestos-removal projects and disposal area
  - Open burning
- **Emission Controls**
  - Steam plant SOx scrubber/particulate baghouses
  - Spent Sorbant Dust Collector
  - HEPA filter systems
- **Effluent Monitors/Sampling**
- **Ambient Air Monitors**
- **Meteorological Monitoring and AIRDOS Modeling**

### 3.2 Records Required

Files will be reviewed as part of the assessment including documents not yet reviewed or received (e.g., classified documents, individual files, documents not yet identified). Specific documents and files to be reviewed as part of the assessment include, but will not be limited to, the following:

- Inventory of emission sources and quantification of emissions;
- Air permits;
- SARA 313 Form R Reports;
- Air effluent sampling and QA procedures;
- Ambient air sampling and QA procedures;
- Meteorological monitoring and QA procedures;
- Contractor stack test results;
- Effluent beryllium sampling results;
- Correspondence with EPA Region V and IEPA relative to ANL-E air sources;
- Reports on accidental releases of air contaminants;
- Asbestos-removal documentation; and
- Notices of violation for air sources.
4.0 SURFACE WATER

4.1 Issue Identification

Tentatively identified issues to be assessed include compliance with existing NPDES permit requirements, Title 35 of the Illinois Administrative Code regulations, USDOE Orders, Clean Water Act and Safe Drinking Water Act laws. Obvious problems with NPDES compliance have been identified at ANL-E, and the adequacy of proposed corrections will be assessed. Other potential pathways for off-site migration of pollutants via unauthorized discharges or uncharacterized waste streams will be evaluated.

Potential pathways for off-site migration of pollutants include:

- Spills or leaks into permeable soil areas.
- Releases to sanitary sewers, laboratory wastewater sewers, and/or storm drains without retention, chemical and radiological analysis, or treatment.
- Undetected leaks of concentrated liquid wastes to the sanitary or laboratory sewer systems, or to Sawmill Creek or its tributaries.

Liquid waste treatment, collection and handling equipment will be examined and records of operation will be reviewed. The assessment will include identification of potential discharges to surface waters, or the on-site sanitary system, which may not be addressed in operating permits or other documents from ANL-E. The site will be investigated for evidence of possible breaks or obstructions in the sewer systems which could result in releases of wastewater to the environment. The assessment will also address the possibility of cross-contamination of the potable water piping system by the sanitary, laboratory, or storm drainage systems. Measures taken at ANL-E to prevent back-flow of process wastewater or sanitary sewer flows into the drinking water piping systems will be reviewed, along with ANL-E's self-monitoring reports (required under primary drinking water regulations). Copies of standard operating procedures (SOPs), operating logbooks, and maintenance records will be reviewed with respect to wastewater monitoring and treatment systems. ANL-E field practices will be observed to determine how closely SOPs are being followed. Interviews with managers and operators of monitoring equipment and treatment systems will be conducted in order to understand modifications or significant deviations, if any, from written SOPs.

A walk-through of selected buildings will be made to observe normal routines, including maintenance activities which generate wastewaters. Various discharge and monitoring points will be reviewed, and actual sampling and analytical procedures will be observed. Emphasis will be placed on the major contributors to wastewater generation, including the water and wastewater treatment plants; the central boiler house; once-through cooling waters and cooling tower blowdowns; stormwater runoff locations; coal pile runoff controls; alkali metal reaction booths and water reaction tanks; lime sludge storage and disposal; and domestic wastewater sources.

A review of past water and wastewater conveyance, treatment, and disposal systems will also be accomplished during the assessment to evaluate what environmental problems may exist as a result of past practices. Site surface
drainage features, including channels, swales, culverts and catch basins, will also be reviewed. Spill protection provisions for fuels and hazardous materials storage units will be investigated, including review of the SPCC Plan and of such physical controls as tank containment dikes and runon/runoff drainage control for potential contaminants.

4.2 Records Required

Files will be reviewed as part of the assessment, including documents not yet reviewed or received (e.g., classified documents, individual files, documents not yet identified). Specific documents and files to be examined as part of the review process include, but will not be limited to, the following:

- Recent analytical data on wastewater releases to the receiving streams.
- Notices of violations relating to wastewater releases.
- Operators logbooks and treatment plant reports.
- Standard operating procedures for wastewater collection, holding and treatment.
- Sampling protocols and logbooks.
- Wastewater lab tracking reports.
- Treatment plant and monitoring equipment maintenance records.
- Detailed drawings of the domestic water supply, storage and distribution system.
- Records of drinking water quality.
- SPCC plan, or its equivalent.
- Progress report on proposed new wastewater treatment facility.
- Internal memos or correspondence relating to surface water/drinking water problems, e.g., backflow prevention measures.
- Memos and correspondence relating to minimizing infiltration of rainwater/groundwater into sanitary or laboratory sewers during wet seasons, and exfiltration of wastewaters into soil or groundwater during dry seasons. Include data on comparison of flow monitoring with precipitation readings.
- Any information on water quality/sludge characteristics for the various retention basins.
- Other records as determined on-site.
5.0 GROUNDWATER/SOIL

The groundwater/soil-related portion of the environmental assessment will address the adequacy of existing monitoring and characterization efforts by comparison with regulatory guidance documents and applicable orders. This effort will be coordinated with those of the RCRA, TCM/QA, inactive waste sites, and surface water specialists.

5.1 Issue Identification

The general approach to the assessment will involve the evaluation of existing documentation with respect to state and federal regulatory requirements and DOE Orders. Although it appears, on the basis of documents reviewed by the Tiger Team, that a routine, site-wide groundwater monitoring program has not been developed at ANL-E, monitoring and characterization activities are in progress at two major areas, the 317/319 Area and the 800 Area Landfill.

The 317/319 Area includes vaults for storage of radioactive waste prior to off-site disposal, an alkali metal reaction tank (passivation tank), a "shoot-and-burn" operation for reactive chemicals, and a shooting range. Inactive facilities include two French drains used for disposal of liquid organic waste materials, a landfill in the 319 Area, a second landfill ENE of the 319 Area, and a compressed gas cylinder disposal site (318 Area). Groundwater is known to be contaminated by iron, manganese, lead, tritium, strontium-90, cesium-137, trichloroethene, tetrachloroethene, 1,1,1-trichloroethane, carbon tetrachloride, chloroform, 1,2-dichloroethene, and 1,1-dichloroethane. Soil is also contaminated with volatile organic compounds. Radionuclides may be migrating off-site because low concentrations (below applicable standards) of tritium and strontium-90 are found in a well adjacent to the ANL-E property line.

The 800 Area Landfill itself is an active sanitary landfill for non-radioactive, non-hazardous waste, operating under a state permit. Leachate seeps from the landfill have been found to contain volatile organic compounds and tritium. Several inactive disposal sites exist in the landfill area, including a French drain used for disposal of non-radioactive liquid chemical wastes, including waste oil and PCBs, a dump used for undocumented disposals prior to permitting of the landfill in 1981, and probable disposal areas that are now outside the ANL-E property boundary. Known groundwater contaminants are manganese, tritium, low levels of arsenic in certain wells, and five different ketones in a single well.

Other areas of concern include the coal storage pile, equalization pond, lime sludge pond, Fossil Energy Users Laboratory (FEUL) pond, and former burn pits in the 100 Area; chromium-contaminated sediments in Freund Pond; soil contamination by radionuclides at an inactive earthen pond in the wastewater treatment area; and tritium in soil and groundwater near the CP-5 reactor building.

The status of current investigations and plans for future corrective actions will be evaluated for these and other sites. In addition to document review, visits will be made to areas of interest to observe field conditions, monitoring well location and construction, well purging and sampling techniques, and field QA/QC procedures. Discussions will be held with site personnel who have responsibilities for groundwater protection, remedial
action, and monitoring well sampling. The primary contacts identified so far are Lawrence Moos, Tom Duffy, and Judy Wingo. Applicable regulatory agencies will also be contacted if needed.

5.2 Records Required

The following documents are requested:

- Groundwater Protection Management Program Plan, required under DOE Order 5400.1 to be completed by May 9, 1990.
- Site Specific Plan for Environmental Restoration and Waste Management.
- Recent (1990) soil sampling and groundwater monitoring analytical data.
- Construction information on any current well installation.
- Standard Operating Procedures for disposal of purge water, drill cuttings, borehole samples, and drilling muds.
- Documentation for soil cleanup associated with Underground Storage Tank (UST) removal.
6.0 WASTE MANAGEMENT

The waste management assessment will address solid, hazardous, and mixed waste and the operation of regulated underground storage tanks. The assessment will be carried out by reviewing and evaluating all activities generating wastes and the treatment, storage, recycling and disposal practices involved in the handling of the wastes including handling of wastes by commercial off-site facilities.

Management of all solid waste streams from cradle to grave including mixed wastes, hazardous wastes, and non-hazardous wastes will be reviewed. The review will generally consist of several activities: 1) Facilities and operations associated with waste generation, identification, accumulation, storage, treatment, recycling, or disposal will be inspected; 2) Personnel involved in these activities will be interviewed; 3) Files including operating logs, inspection records, training records, etc. will be reviewed; 4) The potential for contamination of environmental media as defined by waste regulations will be assessed. Documents to be reviewed will include procedures, policies, guidances, and compliance-related documents and correspondence.

Compliance of ANL-E non-hazardous, hazardous, and mixed waste management units with State and federal regulations, and DOE Orders will be evaluated. In the case of hazardous wastes, both Federal and State regulations will apply to ANL-E. The Illinois hazardous waste regulations are more stringent than the Federal regulations in that they contain an additional "special waste" category, a supplemental permit system, additional siting criteria for disposal sites, annual reporting requirements, and greater fines and prison penalties. Illinois solid waste regulations will be used to evaluate the management of non-hazardous solid wastes. USDOE Orders including 5400.1, 5400.3, 5820.2A, 5400.5, and 6430.1A will be used in evaluating the management of mixed wastes. In addition to DOE Orders and environmental regulations, ANL-E procedures will also be used as assessment criteria where appropriate.

Assessment activities involving regulated underground storage tanks will include appropriate interviews, inspections, and document review.

Issues surrounding mixed waste management will be examined with the assistance of the radiation specialist.
6.1 Issue Identification

Areas of particular concern will include the following:

- Treatment of hazardous wastes;
- Manifesting of hazardous and mixed wastes for offsite shipment;
- Storage, handling, treatment, and disposal of mixed wastes;
- Storage of hazardous waste in accumulation areas and longer term storage facilities;
- Classification of mixed wastes;
- Waste minimization plans for solid, hazardous, and mixed wastes;
- Land Ban issues including storage times for hazardous and mixed wastes;
- Resource Recovery Activities;
- Closure Plans for RCRA landfills;
- Physical status of hazardous waste treatment facilities (e.g., wastewater treatment facilities, storage areas, etc.);
- Training of hazardous waste generators and hazardous waste facility employees;
- Solid waste accumulation, collection, treatment, and disposal;
- Underground storage tanks (USTs) intended for regulated substances and the corrective actions for contaminated UST sites; and
- RCRA regulated 90-day and satellite waste accumulation areas.

6.2 Records Required

Files will be reviewed as part of the assessment, including documents not yet reviewed or received (e.g., classified documents, individual files, documents not yet identified). Specific documents and files to be examined as part of the review process include, but will not be limited to, the following:

- Waste minimization plan;
- Memoranda of Understanding for Environment, Safety, & Health, and Refuse Disposal for the Advanced Photon Source and any other ANL-E facilities;
- Procedures for Hazardous Waste Generation, Accumulation, and On- and Off-Site Transport;
- Preliminary Safety Analysis Report (for radiation and chemicals) (Environmental, Safety & Health Document);
Manifest Exception Reports;
Documents pertaining to the status of the ANL-E self-assessment waste management findings;
DOE list of approved hazardous waste contractors;
Any RCRA facility assessments (RFA's);
Notices of Deficiency and related correspondence;
Documents pertaining to any RCRA Section 30808(h) corrective action orders and any IEPA corrective action orders; and
Documents pertaining to any RCRA civil actions.

Discussions will be held with individuals having responsibilities in the area of waste management for:

Training
Waste minimization
Materials management and inventory
Procedures
Emergency response
Waste storage
7.0 TOXIC AND CHEMICAL MATERIALS

7.1 Issue Identification

The toxic and hazardous substances part of the ANL-E Tiger Team Environmental Assessment will address the management and use of raw materials and chemical products used at ANL-E with emphasis on their handling, storage, and disposal. Primary emphasis will be given to the substances regulated by the Toxic Substance Control Act (TSCA) (polychlorinated biphenyls [PCBs] and chlorofluorocarbons, and the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA). The large storage tanks used for bulk chemicals and fuels, as well as the drum storage and dispensing facilities, will also be included in the assessment. Management and control of the toxic and hazardous substances will be determined through interviews with appropriate site personnel, inspections of pertinent facilities, and a review of relevant documents. The information obtained will be evaluated to assess whether ANL's management and control of toxic and hazardous substances are in compliance with Federal, state, and local regulations and pertinent DOE Orders. In addition, for those situations not covered by regulations, the concept of Best Management Practice (BMP) will be applied to prevent or minimize releases of toxic substances to the environment.

The management of electrical equipment which contains or has contained PCB and PCB-contaminated fluids will be reviewed during the assessment. ANL documents reviewed indicate that there were 22 power transformers and switches in-service at ANL-E at the end of calendar year 1989, containing = 38,200 kg PCBs. At that time, there were also 39 PCB-contaminated (50-500 ppm) power transformers and switches in-service or as spares containing ≈ 27 kg PCBs, as well as 730 large capacitors holding 13,200 kg of PCBs. This equipment will be inspected to determine its condition, the potential for leakage, and spill control systems available. PCB fluid and equipment disposal practices will be reviewed for current and past inventories to determine the methods of disposal and the locations of disposal sites. Procedures for PCB analysis, removal, and handling will be reviewed. Inspection and reporting requirements for PCB equipment and any past spills will be evaluated to determine any potential problem areas.

Pesticide/herbicide usage on the site will be reviewed to determine the risks of environmental contamination. Several herbicides are used at ANL-E and application is conducted by certified personnel from a commercial firm. No pesticides or herbicides are stored on-site. The assessment will focus on application records, disposal practices, and environmental monitoring procedures.

Many other toxic/chemical substances are used and stored at ANL-E. There are many bulk chemical and/or fuel storage tanks located throughout the facility. A tank systems data base listing the product, tank location, tank volume, and tank construction material was provided. In addition, there are many chemicals stored in moderate quantities (55-gal. drum or less) at or near the point of use. As many as possible of these locations will be inspected during this assessment. The management and handling of these materials to prevent or minimize releases to the environment will be evaluated.
7.2 Records Required

Files will be reviewed as part of the environmental assessment, including documents not yet reviewed or received (e.g., classified documents, individual files, documents not yet identified). Specific documents and files to be reviewed as part of the assessment include, but will not be limited to, the following:

- Toxic substances labeling and tracking system;
- Procedures for handling, control, and management of toxic substances;
- PCB annual inventory documents (1985-1989);
- Inventory of current PCB-contaminated electrical equipment, or documentation of their removal;
- Records of inspections of PCB transformers (1985 to present);
- PCB handling, storage, and disposal procedures;
- Correspondence with fire department on PCB equipment;
- Pesticide training, handling, storage, disposal records, and environmental monitoring;
- SOPs for pesticides;
- Pesticide reports to regulatory agencies;
- Special procedures involving handling, storage, use and disposal of chlorofluoroalkanes (freons) and chloroorganic solvents;
- Spill control and emergency preparedness plans for aboveground storage tanks;
- Audits or inspections pertaining to the toxic substances program; and
- Other records as determined on-site.
8.0 RADIATION

The radiation portion of the environmental assessment at ANL-E will include reviewing all activities, facilities, and areas that involve or potentially involve radiation or radioactive material. Environmental radiation protection programs at ANL-E will be assessed to determine compliance with the documents listed in the Tiger Team Manual, applicable federal and state regulations and Department of Energy (DOE) Orders. These programs will also be reviewed against commonly accepted best industry practices and standards of performance.

The assessment will consist of evaluating environmental radiation protection programs in the following six areas: environmental surveillance, effluent monitoring, radioactive waste management, radiological analyses, decontamination and decommissioning, and inactive waste sites. Radiation issues cut across all media and areas to be evaluated during the environmental assessment; hence, the radiation specialist will coordinate his reviews with the other team specialists to ensure all radiation related issues are reviewed in sufficient detail.

8.1 Issue Identification

The general approach used in conducting the assessment will consist of interviews with ANL-E employees and contracted personnel; interviews with DOE personnel; inspections of selected ANL-E facilities and locations; observation of various operational processes; and review of documents, procedures, and records associated with each of the program areas reviewed. In addition, each of these program areas will be evaluated by reviewing its defined scope, design bases, data quality, and the effectiveness of program implementation. Facility design, safety analysis, engineered safety features, and monitoring and control devices will be evaluated as they pertain to the environmental release of radioactive materials.

Radiological Environmental Surveillance Program assessment will include evaluating the pathways monitored, their associated sampling locations, and the bases for selection. Monitoring equipment and the associated maintenance and calibration requirements will be reviewed. Analytical requirements will be reviewed for each medium sampled, including lower limits of detection, warning levels, and action levels. The analytical techniques, collection methods, and sampling frequency will be evaluated for the following media, as appropriate: air, surface water, groundwater, storm drain water, sanitary water, milk, soil, sediment, sludge, vegetation, direct radiation, and wild life samples. Off-site dose assessment methodologies, for maximum exposed individual, and population dose calculations, will be reviewed and evaluated including data validity, calculation methods, and analysis documentation. The methods used for data review and preparation of the radiological portion of the Annual Environmental Monitoring Report will be reviewed.

Review of the Radioactive Effluent Monitoring Program will include both liquid and gaseous effluents. The radiation specialist will coordinate these reviews with the surface water and air specialists respectively. The gaseous effluent review will include the following: release points monitored and the bases for selection; effluent monitor design, design basis, calibration, and maintenance; and ALARA techniques utilized. The liquid effluent review will include the following: continuous and batch release monitoring, including
surface run-off; continuous monitoring design, design basis, maintenance, and calibration; positive control of batch releases; and ALARA techniques utilized. Analytical requirements will be reviewed for each release point sampled, including lower limits of detection, warning levels, and action levels. In addition, the team will evaluate ANL's ability to identify, control, mitigate, evaluate, and quantify unmonitored or unplanned effluent releases.

Radioactive Waste Management Program review will include both solid and liquid radioactive and mixed wastes. The radiation specialist will coordinate this review with the waste management specialist. Waste generation and subsequent transportation to storage or process facilities will be evaluated. Waste decontamination, processing, incineration, solidification, compaction, and drumming operations will be evaluated as part of this review. Waste container characterization, packaging, labeling, storage, and shipment of low level radioactive waste, mixed waste, and transuranic waste will be reviewed. Compliance with Waste Isolation Pilot Plant acceptance criteria and other waste-site acceptance criteria will be reviewed, as applicable. This review will also include an evaluation of the site's waste minimization and volume reduction programs.

The Program for Decommissioning and Decontamination (D&D) of facilities will be evaluated. Facilities that have reached the end of their useful life or were utilized for programs that were completed may be demolished, mothballed, or cleaned up and re-used. In these cases, decontamination and possibly decommissioning would be required. Historical records for facilities that have undergone D&D, or decontamination and subsequent release for unrestricted use will be reviewed. Plans for existing facilities awaiting D&D and currently operational facilities requiring D&D at the end of their life time will also be reviewed.

Inactive radioactive material waste sites and radioactively contaminated areas will be reviewed. The radiation specialist will coordinate these reviews with the groundwater and inactive waste site specialists. The radiation specialist's concerns are limited to radiological monitoring of these sites, the degree to which radioactivity is migrating off-site into the environment, and the associated off-site dose impact, if any.

All of the above programs require radiological analyses of various sample media. Laboratories performing these analyses will be evaluated to ensure that analytical techniques, records, equipment, and QA/QC are adequate to produce accurate, high-quality data in a manner consistent with regulatory requirements. The radiation specialist will coordinate this review with the quality assurance specialist.

8.2 Records Required

Files will be reviewed as part of this survey, including documents not yet reviewed or received (e.g., classified documents, individual files, documents not yet identified). Specific documents and files to be reviewed as part of the assessment include, but will not be limited to the following:

- Annual Environmental Monitoring Reports;
- Radioactivity-related ambient air quality information;
Radioactivity data for all sampled media;

Inventories of air, soil, surface water, and groundwater radionuclide release points and quantities;

Unscheduled or unplanned release reports;

Radioanalytical quality assurance programs and procedures;

Dose assessment methodologies, including assumptions, calculations, reporting, etc.

Building plot plans showing equipment and locations;

Description of radiation monitoring equipment, practices and procedures (e.g., calibration, maintenance, etc.);

Reports or recommendations for upgrading radiation monitoring systems;

Reports prioritizing new radionuclide sampling point criteria;

Rad-waste management practices, policies, procedures, treatment, storage, and disposal;

Reports required by NESHAP Subpart H 61.90-61.98;

Environmental Protection Implementation Plan;

Radioactive Waste Management Implementation Plan;

Radioactive Waste Management Plan;

Waste Minimization Plan; and

Decontamination and Decommissioning information, plans, and data.
9.0 QUALITY ASSURANCE

9.1 Issue Identification

The Quality Assurance part of the Tiger Team Environmental Assessment will consist of an evaluation of current sampling and analysis (S&A) procedures performed by ANL-E or by any off-site contractor conducting analyses on ANL-E environmental samples to ensure that they result in the generation of scientifically valid and defensible data. Most of the environmental S&A is conducted by ANL-E personnel. There are analytical laboratories in building 200 (OHS Industrial Hygiene Control Laboratory), building 306 (WMO Control Laboratory), and building 350 (New Brunswick Laboratory). The objective will be to assess the QA procedures for collecting process effluents and environmental samples, and for performing the laboratory analyses to identify and quantify contaminants, as well as for evaluating and reporting the data. Aspects of the QA program relating to environmental management at ANL-E which will be evaluated include: training; instrument calibration and maintenance; sample collection, preservation, handling, and chain-of-custody procedures; blank, replicate and spiked sample results; data reduction and reporting; and data documentation, including logbook and calculation reviews, and archival data storage.

S&A procedures will be reviewed to ensure that they conform to regulatory requirements and/or accepted practice and are being properly implemented by ANL-E and contractors. Also, the interlaboratory test programs participated in by the various laboratories as administered by the DOE's Environmental Measurements Laboratory and the EPA will be evaluated for the laboratories' performance and corrective action plans.

The QA procedures for the general environmental program will be reviewed for their effectiveness and compliance with DOE requirements. This will include an assessment of the QA organization and structure.

Primary contacts at ANL-E are expected to be the QA representatives and personnel from the environmental monitoring facilities.

9.2 Records Required

Part of the assessment will consist of a review of pertinent documents and files. This will include documents not previously reviewed or received, such as classified documents, individual files, and documents which have not been identified at this time. Some specific documents and files to be reviewed in this phase of the assessment include, but will not be limited to, the following:

- QA plans for ANL-E and the supporting analytical laboratories;
- ANL-E environmental sampling and analysis procedures manuals;
- QA audits of environmental sampling and analysis at ANL-E (1985-present);
- QA manuals and implementing procedures for the environmental monitoring and surveillance programs;
- Periodic or annual QA summary reports for ANL-E;
- Summaries of results of QA sample analysis of external performance evaluation samples (e.g., from DOE's Environmental Measurements Laboratory and from the EPA);
- Training records for sample collection personnel and ANL-E laboratory staff;
- Laboratory notebooks, standard data reporting forms and sampling logbooks;
- Instrument maintenance, repair and calibration records for laboratory and field equipment; and
- Results of internal precision and accuracy studies of environmental analysis.
10.0 INACTIVE WASTE SITES

This portion of the Tiger Team assessment will identify compliance issues related to inactive waste sites associated with ANL-E, both on- and off-site. The assessment will focus on CERCLA/SARA program activities, RCRA corrective action program activities, and inactive waste site management and cleanup activities conducted under State authority. Much of the effort will be coordinated with the Groundwater and Waste Management team members.

The assessment will use the results of the Environmental Survey (November 1988) and ANL-E Self-Assessment (August 1990) reports, as well as other available documents that characterize the inactive waste site areas of the facility. These areas include sites where contaminated materials were released, stored, or disposed.

10.1 Issue Identification

The majority of the inactive waste site portion of the assessment will consist of evaluating both current and planned remediation activities conducted under the site-specific environmental restoration program with respect to State and Federal regulatory requirements, and DOE Orders. The Environmental Survey Preliminary Report detailed 17 actual or potential inactive waste sites and releases resulting from ANL-E activities. Currently, the ANL's 1989 Five Year Plan for Environmental Restoration and Waste Management contains 16 projects termed remedial actions which involve site characterization activities as well as site remediation to prioritize and address these sites. Because it appears that a limited amount of remedial activity at inactive waste sites has been initiated, the assessment will evaluate the following issues at ANL-E:

- Compliance with existing Consent Orders and other similar regulatory obligations, if any.
- Schedule and planning status for remedial work at the inactive solid waste management units included as part of the RCRA Corrective Action Program conducted under the site’s RCRA Part B permit application.
- CERCLA compliance for remedial activities being conducted to address the inactive sites located on original ANL-E property turned over to the DuPage County Forest Preserve District.
- General compliance with other CERCLA related activities such as notification of releases, spill reporting, and SARA Title III reporting and recordkeeping.
- Program design and procedures in place to prioritize existing sites and to identify and evaluate as yet unidentified past waste disposal sites or releases.

The current status of each inactive waste site included in ANL’s data base will be determined. The assessment will focus on the more significant sites as exemplified by the 800 Area Landfill and French drains located at the 317 and 319 Areas, as well as the methods and procedures used to prioritize and characterize such sites. In addition to document and file review, field visits to many of the inactive sites and interviews with key facility personnel will be conducted.
Finally, the assessment will evaluate any areas of the site that should be considered for CERCLA requirements such as new sites or releases identified since the Environmental Survey, and developing policy issues where environmental laws overlap such as the integration of CERCLA requirements into the RCRA Corrective Action Program for ANL-E.

10.2 Records Required

An extensive file and document review will be required as part of the on-site assessment including documents not yet received or identified by the assessment team such as classified documents and individual files. Specific documents and files to be reviewed as part of the assessment include, but will not be limited to, the following:

- Site Specific Plan for Environmental Restoration and Waste Management.
- Preliminary Assessment ANL-E CERCLA Units.
- Preliminary Assessment ANL-E Solid Waste Management Units.
- List and status data base for inactive waste sites.
- CERCLA Section 103 notifications and updates.
- Environmental incident reports.
- Environmental Consent Orders.
- Documentation of inactive waste site prioritization, characterization, investigation and removal actions.
- Community Relations Plan - ANL-E Site and any additional community relations documentation.
- ANL-E Site risk assessment documents.
- RI/FS and RFI/CMS Work Plans.
- Closure Plans.
- Any additional correspondence or planning documents regarding the status of inactive waste site investigation under CERCLA or RCRA Corrective Action.
- SARA Title III documentation including:
  - spill notification documents
  - hazardous/extremely hazardous chemical inventories
  - emergency planning notification documents
  - Tier I/II Form submittals
  - Form R submittals

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11.0 NATIONAL ENVIRONMENTAL POLICY ACT

11.1 Issue Identification

The objectives of the NEPA assessment are (1) to evaluate the CHO and ANL-E NEPA management structure and review processes; (2) to identify problems that may lead to inappropriate procedures or inadequate NEPA documentation; and (3) to ensure consistency with the NEPA Council on Environmental Quality (CEQ) regulations, and DOE NEPA Guidelines, Orders, and Memoranda. The overall goal of the NEPA assessment is to foster improved and environmentally sound decisionmaking for those DOE actions having the potential for significant impacts on the environment.

A NEPA protocol, developed by the Office of NEPA Project Assistance (EH-25) and ORNL, includes worksheets that focus the team's lines of inquiry to ensure a comprehensive, consistent approach to the assessment. The content of the worksheets is divided into seven main areas as follows:

- Overview of NEPA issues;
- Management structure (overall organization, training, use of contractors, recordkeeping, etc.);
- NEPA compliance planning;
- NEPA/CERCLA, NEPA/RCRA integration;
- Determination of level of NEPA review required;
- Procedural aspects of NEPA documents; and
- Technical content of NEPA documents.

The general approach to the assessment will include interviews with the CHO and ANL-E staff responsible for the NEPA procedures and review process; ANL-E project and program managers; the legal and public relations staff and the classification officer; and others, as the need arises. The use of the categorical exclusion (Cat X), memoranda-to-file (MTFs), and action description memoranda (ADMs) will be evaluated for consistency with DOE guidelines.

11.2 Records Required

As part of the NEPA assessment, files will be reviewed, including documents not previously received or reviewed (e.g., classified documents, individual files, documents not previously identified). Specific documents and files to be reviewed as part of the assessment include, but will not be limited to, the following:

- Records that locate, identify, and describe both on-site and off-site occurrences on the following resources, which may be affected by facility activities: endangered and threatened species and their critical habitats; bald and golden eagles and migratory birds and their nests; waterways (including waters and navigable waters of the U.S., floodplains, wetlands and wild and scenic rivers); national recreation...
trails, wilderness and wilderness study areas; sacred Native American sites; prime/unique farmland; archaeological and historic and prehistoric ruins and monuments; and other Federal lands (e.g., National Forests).

- Documentation of consultation with agencies responsible for the administration of the natural resources listed above (e.g., Section 7 consultation with the Department of Interior on endangered species).

- Policies and procedures for implementation of related regulations (e.g., TSCA, RCRA, Clean Water Act, Clean Air Act, Safe Drinking Water Act, and Noise Control Act).

- Any facility-specific or Operations Office NEPA guidance or policies.

- Any correspondence or guidance which refers to delegation of authority to make NEPA determinations.

- Capital budget files, A-106 plans, and other appropriate records or proposed actions or initiated changes in operation.

- Lists of ongoing and proposed CERCLA response actions.

- Lists of ongoing and proposed RCRA closures and corrective actions.

- All NEPA-integrated documents prepared in support of remedial action.

- State or local "NEPA-type" statutes and regulations.

- Description of any litigation related to NEPA.

- All Memoranda-to-File pertaining to NEPA.

- All documents used to make, support, or record NEPA determinations (e.g., Environmental Evaluations, Environmental Checklists, ADMS) prepared since 1986.

- All environmental assessments (EAs) and EISs that are still used for assessment of all ongoing or proposed actions.

- Documents and studies that are cited in support of major aspects of facility EAs (e.g., biological assessments for endangered species, engineering details of projects).

- Monitoring or mitigation reports available for EAs and EISs.

- Printout from a database which tracks NEPA documents (if such a database exists).

- Current work orders and work orders for the past 5 years.
APPENDIX C

DAILY AGENDAS for the
ENVIRONMENTAL SUBTEAM
at the ARGONNE ILLINOIS SITE
### ENVIRONMENTAL TEAM DAILY AGENDAS

**WEEK 1 - SEPTEMBER 17 - 22, 1990**

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<td><strong>Safety &amp; Security</strong></td>
<td><strong>Flyash &amp; Bottom Ash Handling</strong></td>
<td><strong>Cyclotron (Blgd. 211)</strong></td>
<td><strong>In-place HEPA filter testing</strong></td>
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<td></td>
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<td><strong>Site Tour</strong></td>
<td><strong>Spent Sorbent Dust Collector</strong></td>
<td><strong>AGHCF (Blgd. 212)</strong></td>
<td><strong>Program</strong></td>
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<td></td>
<td><strong>Office Set-up</strong></td>
<td><strong>Lime Silo Operations</strong></td>
<td><strong>Emission Controls</strong></td>
<td><strong>Procedure</strong></td>
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<td><strong>-Emission Monitoring</strong></td>
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<td><strong>Schedule</strong></td>
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<td><strong>Training</strong></td>
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<td><strong>IPNS</strong></td>
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<td><strong>CP-5 Reactor (Blgd. 330)</strong></td>
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<td><strong>-Emission Controls</strong></td>
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<td><strong>-Emission Monitoring</strong></td>
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<td><strong>Tour 8583 (Canal Water Treatment Plant &amp; its Ancillaries), including B582 Pumphouse and sludge ponds</strong></td>
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<td></td>
<td><strong>Meet with M. Robison regarding B570 &amp; 317/19</strong></td>
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<td></td>
<td><strong>Tour B605 (Swimming Pool Filter &amp; Pumphouse)</strong></td>
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<td><strong>Record Review</strong></td>
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<td><strong>Permit Review</strong></td>
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<td></td>
<td><strong>Preliminary Versions of Any Potential Findings, thus far</strong></td>
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</table>

**Activities:**
- **Orientation**
- **Safety & Security**
- **Site Tour**
- **Office Set-up**
- **Tour Domestic Waterwells**
- **Tour B129 (Water Treatment Plant & its Ancillaries)**
- **Review Analytical Data for Finished Water & Distribution System**
- **Examine Backflow Prevention & Means for Eliminating Cross-Connections**
- **Tour B570 Complex (Wastewater Reclamation Plant & its Ancillaries)**
- **Tour B108 Complex (Central Boilerhouse & its Ancillaries), (W/GW Specialist)**
- **Tour B146 (Fossil Energy Users Lab) & B145 (Ample Fac)**
- **Inspect FEUL Pond**
- **Tour B583 (Canal Water Treatment Plant & its Ancillaries), including B582 Pumphouse and sludge ponds**
- **Meet with M. Robison regarding B570 & 317/19**
- **Tour B605 (Swimming Pool Filter & Pumphouse)**

**Additional Information:**
- **AM**
  - Central Boiler House (Blgd. 108)
  - Janus Reactor (Blgd. 202)
  - Cyclotron (Blgd. 211)
  - AGHCF (Blgd. 212)
  - Emission Controls
  - Emission Monitoring
### Environmental Team Daily Agendas

**WEEK 1 - SEPTEMBER 17-21, 1990**

<table>
<thead>
<tr>
<th>Groundwater/Soils</th>
<th>Monday 9/17</th>
<th>Tuesday 9/18</th>
<th>Wednesday 9/19</th>
<th>Thursday 9/20</th>
<th>Friday 9/21</th>
<th>Saturday 9/22</th>
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</thead>
</table>
| M. Robison        | *Orientation*  
|                   | *Phone Contacts*  
|                   | *Collecting & reviewed documents*  
|                   | *Orientation*  
|                   | *Safety & Security*  
|                   | *Site Tour*  
|                   | *Meeting with Key RCRA Personnel*  
|                   | *200 Chem & Sample Arch (except for hot-cell)*  
|                   | *Meet with Larry Moos on status of site character*  
|                   | *Review Toxic Chemical Materials Mgmt (procurement, handling, storage, disposal), MSDS*  
|                   | *Continue PCB Inspection*  
|                   | *Inspect Aboveground Storage Tanks (bulk chemicals)*  
|                   | *Inspect Chemical Storage Areas (Bldgs. 200 and 350)*  
|                   | *Draft Preliminary Findings*  
| Waste Management  | M. Sutton    |              |               |              |             |              |
|                   | *Orientation*  
|                   | *Safety & Security*  
|                   | *Site Tour*  
|                   | *Meeting with Key RCRA Personnel*  
|                   | *200 Area Tour (landfill and grounds)*  
|                   | *Inspect Aboveground Storage Tanks (bulk chemicals)*  
|                   | *Discuss Groundwater Sampling.*  
|                   | *Inspect Chemical Storage Areas (Bldgs. 200 and 350)*  
|                   | *Draft Preliminary Findings*  
| QA/TCM            | Caruso      |              |               |              |             |              |
|                   | *Orientation*  
|                   | *Safety & Security*  
|                   | *Site Tour*  
|                   | *Review Toxic Chemical Materials Mgmt (procurement, handling, storage, disposal), MSDS*  
|                   | *Inspect Aboveground Storage Tanks (bulk chemicals)*  
|                   | *Inspect Chemical Storage Areas (Bldgs. 200 and 350)*  
|                   | *Document Review Draft Findings*  
|                   | *Document Review Draft Preliminary Findings*  

- *Tour Inactive Sites in 800 Landfill Area*  
- *French Drain & Landfill, 319 Area*  
- *French Drain, 317 Area*  
- *Mud and Burn Area*  
- *Shooting Range*  
- *Gas Cylinder Disposal Area (318 Area)*  
- *Canal Water Sludge Basins*  
- *Meet with J. Boros on 570 Areas*  
- *200 Area Tour (landfill and grounds)*  
- *Inspect Aboveground Storage Tanks (bulk chemicals)*  
- *Inspect Chemical Storage Areas (Bldgs. 200 and 350)*  
- *Discuss groundwater sampling. Actual sampling postponed due to rain.*
<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Monday, 9/17</th>
<th>Tuesday, 9/18</th>
<th>Wednesday, 9/19</th>
<th>Thursday, 9/20</th>
<th>Friday, 9/21</th>
<th>Saturday, 9/22</th>
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<tbody>
<tr>
<td>AM</td>
<td>*Orientation, Safety &amp; Security, Site Tour</td>
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<tr>
<td></td>
<td>*Interviews, Environmental Surveillance Program, Annual Environmental Report</td>
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<td>AM</td>
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<tr>
<td>PM</td>
<td>*Interviews, Liquid &amp; Gaseous Effluent Monitoring</td>
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<tr>
<td>AM</td>
<td>*Interviews, Offsite Dose Calculations, Direct Radiation Monitoring Program</td>
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<td>PM</td>
<td>*Waste Management Operations</td>
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<tr>
<td>AM</td>
<td>*Tour Bldgs., 200, 202 (Janus Reactor), 211 (Cyclotron), 212 (AGHCF)</td>
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<td>*Interview Technical Support/ESH QA training session</td>
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<td>*Document Review - Environmental Procedures and Emergency Plans</td>
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<td>- Offsite Emergency Monitoring Plan</td>
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<td>- Effluent Reports</td>
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<td>- Document Review for Environmental - Sample Placement - Meterology -</td>
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<td>Documentation - Data Review - Calculations</td>
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<td>*Review Documents - Write Findings</td>
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<td>*Review Documents - Write Findings</td>
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<td>*Document Review</td>
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</table>
## Environmental Team Daily Agendas

### Week 1 - September 17-21, 1990

**Monday, 9/17**
- Inactive Waste Sites
  - Orientation
  - Safety & Security
  - Site Tour

**Tuesday, 9/18**
- Orientation
- Schedule Coordination w/ Counterparts
- Inactive Sites
- CERCLA/SARA Spill Response
- SARA Title III
- IUS Mgmt & Prioritization
- IUS Tours
- Collect Available IWS Documents

**Wednesday, 9/19**
- BDO Landfill Area Tour
- IWS Management, Data Base, Prioritization
- Continue IWS Tours

**Thursday, 9/20**
- IWS Mgmt, Data Base, Prioritization
- Continue IWS Tours
- 317 & 319 Area Tours
- Interview L. Cheever - RCRA corrective action program under Part B Permit
- Interview NEPA/CERCLA/RCRA ANL Staff

**Friday, 9/21**
- CERCLA Elements:
  - Property Transfer
  - IWS & Release Reporting
  - Natural Resource Transfer
  - Administrative Record
  - Document Review
  - Interview DOE AAO and CHO Personnel on CERCLA compliance and Site A, Plot M

**Saturday, 9/22**
- IWS Document Review
- IWS Finding Prep.

### NEPA

**Warren Webb**
- Orientation
- Safety & Security
- Site Tour
- Office setup

**Wayne Tolbert**
- Orientation
- Safety & Security
- Site Tour

**Cindy Hickman**
- Orientation
- Safety & Security
- Site Tour

**Rick Barringer**
- Orientation
- Safety & Security
- Site Tour

**Eric Cohen**
- Orientation
- Safety & Security
- Site Tour

**AM**
- Interview ANL, CHO, AAO NEPA Staff; PR Office
- Interview NEPA (Kolzow) AAO: & CHO (Nelson, Freeman), NEPA Staff (Con't)
- Document Review PM
- Interview AAO NEPA
- Document Review
- Interview Project Engineers (3), Research Program Mgrs.
- Interview NEPA/CERCLA/RCRA ANL Staff

**PM**
- Interview ANL NEPA Staff
- Document Review
- Interview AAO NEPA POC
- Interview NEPA/CERCLA/RCRA ANL Staff
- Document Review
- Review Mgmt. observe w/mgmt. sub-team
- Interview ANL APS Staff for Cultural Res. & Wetlands Mgmt.

**AM**
- Draft Findings
- Review Mgmt. observations w/ Mgmt. subteam.
- Review Expert System (Knudson, Kolzow)
- Draft Findings
- Interview DOE Legal, WFD (classified work) and New Brunswick Lab
- Review

**PM**
- Complete Draft Findings

- Interview DOE Legal, WFD (classified work) and New Brunswick Lab
- Document Review
# Environmental Team Daily Agendas

**Week 2 - September 24-28, 1990**

<table>
<thead>
<tr>
<th>Monday, 9/24</th>
<th>Tuesday, 9/25</th>
<th>Wednesday, 9/26</th>
<th>Thursday, 9/27</th>
<th>Friday, 9/28</th>
<th>Saturday, 9/29</th>
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</thead>
<tbody>
<tr>
<td>Air T. Eckle</td>
<td>AM</td>
<td><em>Ambient Air Monitoring Program</em>&lt;br&gt;- Monitor siting&lt;br&gt;- Monitor Calibration&lt;br&gt;- Monitor Operation</td>
<td>AM</td>
<td><em>FUEL Laboratory (Bldg. 145)</em>&lt;br&gt;- Emission Controls&lt;br&gt;- Emission Monitors&lt;br&gt;- Fluid-bed Combustor (Bldg. 205, Room J-117)&lt;br&gt;- Emission Controls&lt;br&gt;- Permit</td>
<td>AM</td>
</tr>
<tr>
<td>Groundwater/Soils M. Robison</td>
<td>AM</td>
<td><em>Visit all NPDES Sampling Locs</em>&lt;br&gt;- Observe NPDES Sampling Routes &amp; Lab Check-In w/C. Caruso&lt;br&gt;- Review all Surface Water Environmental Sampling Points (other than NPDES)&lt;br&gt;- Tour areas south of 317/319</td>
<td>AM</td>
<td>*Tour B206 &amp; B308 Alkali Metal Reaction Booths&lt;br&gt;- B301 Hot Lab&lt;br&gt;- Liquid Retention Systems&lt;br&gt;- Tour BB10 (Paint Shop) &amp; BB14 (Boiler House)&lt;br&gt;- 800 Area Landfill Runoff Patterns, 317/319</td>
<td>AM</td>
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</tbody>
</table>
## ENVIRONMENTAL TEAM DAILY AGENDAS

**WEEK 2 - SEPTEMBER 24-28, 1990**

### Monday, 9/24
- **Waste Management**
  - N. Sutton
  - *306 Waste Processing, Met w/ R. Ditch, J. Herman, and J. Thuot
  - *Bldg 40 uncharacterized waste storage.

### Tuesday, 9/25
- **QA/TCM**
  - C. Caruso
  - *Review QA Program for Environmental Monitoring (QA Plan, procedures, etc.)
  - *Review QA Program for Industrial Hygiene Control Lab (OHS) in Bldg 6200
  - *Observe Surface Water/Outfall Sampling (NPDES), Sawmill Creek, Treatment Area
  - *Visit WMO Control Lab (B306)

### Wednesday, 9/26
- **Radiation**
  - S. Masciulli
  - AM
    - *Tour Bldg. 306 & Review Operations
    - *Interviews, Decontamination & Decommissioning Program (recent, present, future, facility engineering and design)
  - PM
    - *Interviews w/ Toheey and Wynveen

### Thursday, 9/27
- **Waste Management**
  - N. Sutton
  - *NBL, shooting range 317 passivation tank, 330 CP-5 reactor
  - *Met w/ R. Kolzow
  - *Met w/ A. Colin: RCRA correspondence

### Friday, 9/28
- **Waste Management**
  - N. Sutton
  - *Bldg 214 RCRA permit review
  - *ESH (Dean Larson)
  - *212 MSD/MCT

### Saturday, 9/29
- **Waste Management**
  - N. Sutton
  - *202 Biological and Medical Research
  - *203 Biological and Medical Morgue

### Saturday, 9/29
- **Waste Management**
  - N. Sutton
  - *202 Biological and Medical Research
  - *203 Biological and Medical Morgue
### ENVIRONMENTAL TEAM DAILY AGENDAS

**WEEK 2 - SEPTEMBER 24-28, 1990**

<table>
<thead>
<tr>
<th>Radiation</th>
<th>T. Cox</th>
<th>Monday, 9/26</th>
<th>Tuesday, 9/25</th>
<th>Wednesday, 9/26</th>
<th>Thursday, 9/27</th>
<th>Friday, 9/28</th>
<th>Saturday, 9/29</th>
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</table>
| AM        | + Ambient air monitoring w/ T. Eckle  
PM        | + Interviews  
- EH  
- Data Mgmt. Sys. QA/QC  
- Data Calculation  
- Air particulate monitor calibration and maintenance  
- Meteorological data. | AM        | + Liquid Effluent Monitoring w/ J. Boros  
PM        | + Visit offsite air sampler and TLD site. | AM Building 203 Laboratories | AM        | + 306 Counting laboratory  
PM        | + 362 Counting laboratory | AM Building 205 Laboratories | AM Emergency  
Building 203 Laboratories | + Follow-up Meteorological Data Processing  
| PM | + Follow-up 306 Assay Lab |

| Inactive Waste Sites | J. McCann | AM        | + CERCLA/SARA Spill Response  
- Spill Reporting Procedures  
- Spill Reports  
- Spill Report Interviews  
+ Tour Site A & Plot M | AM        | + Spill Response & Reporting  
(continued)  
- Document Review  
- Telephone Interviews w/ FUSRAP personnel on Site A & Plot M  
| AM Building 205 Laboratories | AM        | + SARA Title III Procedures & Reporting  
+ Document Review  
+ Interviews  
+ Site A & Plot M Interviews with CHO (Barry Fritz) | AM        | + SARA Title III Reporting  
(continued)  
- Interviews  
- Interview RCRA Part B Permit Application Team (L. Cheever, IT Corp.)  
- Telephone Interviews IEPA Regional Manager | AM        | + Document Review  
+ Big Picture  
Assess  
+ Findings  
+ Planning  
+ Travel  
+ Interview NBL personnel for Title III compliance  
+ Telephone interviews with USEPA and IEPA regulators |

| NEPA | E. Cohen, W. Webb | AM        | + Review draft findings & submit to subteam leader  
+ Obtain additional documents from CH | AM        | + Revise draft findings in response to comments | AM        | + Revise Draft Findings | AM Building 205 Laboratories | AM        | + Follow-up Meteorological Data Processing  
<p>| PM | + Phone interviews with USEPA and IEPA regulators |</p>
<table>
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<tr>
<th>ENVIRONMENTAL TEAM DAILY AGENDAS</th>
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<td><strong>WEEK 3 - OCTOBER 8-12, 1990</strong></td>
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<td>T. Eckle</td>
<td><em>VOC Sources</em></td>
<td><em>Asbestos Removal/ Demolition</em></td>
<td><em>Continue review of Asbestos Program</em></td>
<td><em>Draft Findings</em></td>
<td><em>Draft Findings</em></td>
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<td>- Vapor Degreasers</td>
<td>- Program</td>
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<td>- 815</td>
<td>- Emission Controls</td>
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<td>- Gasoline Dispensing</td>
<td>- Reports</td>
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<td></td>
<td>- Methanol Storage Tank</td>
<td>- Open Burning for Firefighting Training, G. Veerman</td>
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<td></td>
<td>- 810 Paint Shop</td>
<td><em>Review All On-Site Surface Water Issues</em></td>
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<tr>
<td><strong>Surface Water/ Drinking Water</strong></td>
<td><em>Tour Cooling Tower Ops. at 8377 &amp; Other Large Cooling Water Recirc. Sys.</em></td>
<td><em>Review All On-Site Surface Water Issues</em></td>
<td><em>Work on Findings</em></td>
<td><em>Follow-ups as needed</em></td>
<td><em>Finish Draft Findings</em></td>
<td><em>Finish Draft Findings</em></td>
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<tr>
<td>J. Boros</td>
<td><em>Follow-up and Findings Development</em></td>
<td><em>Follow-up Draft Findings &amp; Overview</em></td>
<td><em>Follow-up Findings &amp; Overview</em></td>
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<tr>
<td><strong>Groundwater/Soils</strong></td>
<td><em>Meet with Art Kuljian and Larry Woos on Freund Pond Characterization</em></td>
<td><em>Final Drafts of Findings &amp; Overview</em></td>
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<td><em>Work as needed</em></td>
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<tr>
<td>M. Robison</td>
<td><em>Follow-up Visits &amp; Interviews</em></td>
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<tr>
<td><strong>Waste Management</strong></td>
<td><em>Follow-up Visits &amp; Interviews</em></td>
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<tr>
<td>M. Sutton</td>
<td><em>WBL</em></td>
<td><em>Finish QA/TCM Report</em></td>
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<td><em>W/ R. Ditch</em></td>
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<td><em>Follow-ups as needed</em></td>
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<td><strong>QA/TCM</strong></td>
<td><em>Tour B-200 for TCMs</em></td>
<td><em>Finalize Findings &amp; Complete QA/TCM Report</em></td>
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<td>C. Caruso</td>
<td><em>Tour Central Shops</em></td>
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<td><em>Finalize Findings</em></td>
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<td><strong>Radiation I</strong></td>
<td><em>Quality Assurance Representatives</em></td>
<td><em>Office of Quality Assurance</em></td>
<td><em>Finalize Findings Prep</em></td>
<td><em>Follow-up</em></td>
<td><em>Follow-up</em></td>
<td><em>Write Findings</em></td>
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<td>S. Masciulli</td>
<td><em>Follow-up</em></td>
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<td><em>Follow-up</em></td>
<td><em>Write Findings</em></td>
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<td><strong>Inactive Waste Sites</strong>&lt;br&gt;J. McCann</td>
<td><em>Follow-up Visits &amp; Interviews</em>&lt;br&gt;<em>Toured East Area Inactive Sites and Old Shooting Range</em></td>
<td><em>Telephone Interview with Rick Lanham, Federal Site Management Unit, IEPA</em>&lt;br&gt;<em>Interview J. Himze, CHO, on Site A and Plot Achieved Records</em></td>
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# ENVIRONMENTAL TEAM DAILY AGENDAS

**WEEK 4 - OCTOBER 15-19, 1990**

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APPENDIX D

LIST of CONTACTS and INTERVIEWS CONDUCTED by
the ENVIRONMENTAL SUBTEAM
at the ARGONNE ILLINOIS SITE

Appendix D is attached in microfiche.
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## CONTACTS/INTERVIEWS

1-R-1 through 1-R-75 completed by S. Masciulli  
1-R-201 through 1-R-226 completed by T. Cox

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**Environment**

IWS = Inactive Waste Sites  
WM = Waste Management  
SW = Surface Water  
GW = Ground Water  
QA = Quality Assurance  
TCM = Toxic & Chemical Materials  
A = Air  
R = Radiation  
N = NEPA

A-N - - NEPA  
R5 - - Air - Radiation
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APPENDIX E

LIST of DOCUMENTS
for the ARGONNE ILLINOIS SITE

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<td>8/90</td>
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<td>D. Parzyck, SSD-ESH</td>
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Environment
IWS = Inactive Waste Sites
WM = Waste Management
SW = Surface Water
GW = Groundwater
QA = Quality Assurance
TCM = Toxic & Chemical Materials
A = Air
R = Radiation
N = NEPA
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<td>H. Rauch, CH</td>
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<td>&quot;Effectiveness Evaluation of National Environmental Policy Act (NEPA) Implementation Process&quot; memo and questionnaire by M.J. Flannigan, Director ES&amp;H</td>
<td>Flannigan, ES&amp;H, CH</td>
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<td>J. Nelson</td>
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<td>Johnnie Greenwood, Director, Contracts Division, CH</td>
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<td>W.A. Vaughn/Assistant Secretary, Environmental Protection, Safety, and Emergency Preparedness, U.S. DOE</td>
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<td>Memoranda-to-File (MTFs), Report to Admiral Watkins</td>
<td>H. Rauch/Manager, CH/Admiral James D. Watkins</td>
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<td>N-197</td>
<td>Interim Procedural Guidance for Interpretation of SEN-15-90</td>
<td>J.P. Kennedy/Acting Director, Environment, Safety, and Health Division, CH/Principal Staff, Chicago Operations Office</td>
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<td>N-198</td>
<td>National Environmental Policy Act (NEPA) Plans for Office of Nuclear Energy (NE)</td>
<td>M.J. Flannigan/Director, Environment Safety, and Health Division, CH Principal Staff, Chicago Operations Office</td>
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<td>Levels of NEPA Documentation for Revised Activity Data Sheet (ADS) Submittal</td>
<td>J.C. Haugen/CH/E, Bucki, G. Penny, H. Mix, and G. Marshall</td>
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<td>N-200</td>
<td>List of Projects sent to DOE for NEPA Review</td>
<td>R. Kolzow/ANL-E</td>
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<td>DOE/EA-0181 Environmental Assessment Related to the Operation of Argonne National Lab</td>
<td>ANL-E</td>
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<td>DOE/EA-0181 approval by HQ</td>
<td>W. Vaughan ASEPS and EP/DOE-HQ to R. Bauer, Mgr. CH Ops.</td>
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<td>N-203</td>
<td>DOE/EA-0173 EA Related to D&amp;D of the CP-5 Reactor at ANL-E</td>
<td>Division of Impact Studies - ANL-E</td>
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<td>N-205</td>
<td>DOE/EA-0389: EA-proposed 7-Gev Advanced Photon Services</td>
<td>ORNL for ANL-E</td>
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<td>FONSI for DOE/EA-0389</td>
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<td>Site and Survey Files for ANL-E</td>
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<td>ANL-E Cultural Resource Laboratory Management Procedures</td>
<td>S.A. Curtis/CRM/ANL-E</td>
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<td>Memorandum on Need for Guidance</td>
<td>A. Taboas, Manager, AAO M. Flannigan, Director ES&amp;H Division CH</td>
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<td>N-211</td>
<td>Environmental Planning and Review for Projects at Argonne-Illinois</td>
<td>Plant Facilities and Services Division Staff, ANL-E, ANL-E and DOE Staff</td>
<td>9/1/88</td>
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<td>N-212</td>
<td>Memorandum to File, 12/15/88 Meteorological Tower Project</td>
<td>R. Kolzow, ANL-QES, File</td>
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<td>N-213</td>
<td>Environmental Evaluation Notification Form (CH-560)</td>
<td>CH, ANL-E and DOE Staff</td>
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<td>N-215</td>
<td>Memorandum, &quot;Guidance on Section D Procedures for National Environmental Policy Act (NEPA) Documentation&quot;</td>
<td>M. Flannigan, Director, CH ES&amp;HD, CH Staff</td>
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<td>N-216</td>
<td>Letter, &quot;Draft Argonne National Laboratory-East (ANL-E) Self Assessment Report&quot; (Comments)</td>
<td>A. Taboas, Manager, DOE-AAO A. Schriesheim, Director, ANL-E</td>
<td>8/27/90</td>
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<td>N-217</td>
<td>Memorandum, &quot;Guidance Related to Analysis of Impacts to Workers in National Environmental Policy Act (NEPA) Documentation&quot;</td>
<td>E. Baynard, DOE ASEH, DOE Administrators</td>
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APPENDIX F

OSHA ASSESSMENT REPORT
of the ARGONNE ILLINOIS SITE

Appendix F is either located in microfiche or available through the Argonne Site OSHA Team Leader.
APPENDIX G

LIST of CONTACTS and INTERVIEWS CONDUCTED
by the MANAGEMENT SUBTEAM
at the ARGONNE ILLINOIS SITE
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APPENDIX H

ENVIRONMENT, SAFETY, AND HEALTH
HOTLINE REPORTS AND RESPONSES
ARGONNE ILLINOIS SITE
APPENDIX H

ENVIRONMENT, SAFETY, AND HEALTH HOTLINE REPORTS AND RESPONSES
ARGONNE ILLINOIS SITE

An onsite Tiger Team Assessment hotline for complaints was established for the AIS assessment, and operated between September 17 and October 12, 1990. This special hotline, operated by the Tiger Team, was established to allow AIS personnel, as well as the general public, to report specific environment, safety, and health concerns. Notices of the hotline were made through site newsletters and notices (developed by the DOE Office of Special Projects) were distributed to each AIS organizational entity. In addition, the notices informed AIS employees that information related to fraud, waste, abuse, misconduct, and environmental issues of a criminal nature could be reported directly to the DOE Office of the Inspector General at (800) 541-1625, (202) 568-4073 or FTS 896-4073.

This appendix summarizes the telephone calls and letters received on the hotline and the subsequent response actions taken.
ARGONNE ILLINOIS SITE COMPLAINTS

CONTROL #HS-1

DATE: September 24, 1990

NATURE OF CONCERN: The caller was concerned about a possible fire hazard on the covered area of the loading dock of Building 201. This is clearly posted as a no smoking area, however, employees continue to gather there to smoke.

RESPONSE: A Safety and Health Subteam member inspected the area. The roofed portion of the loading dock is posted as a no smoking area. Smoking is permissible in the uncovered area of the dock. Several sand-type cigarette butt cylinders were available on the dock for employee use. Receivables (boxes, etc.) were directly adjacent to the butt cylinders. Also on the dock were about nine plastic trash cans for recyclable paper and a compressed gas storage rack with no cylinders on it. The area was observed to be relatively neat with no paper debris lying around. No fire extinguisher was present.

At the time of the inspection, the area was neat and orderly with no employees smoking; therefore, the situation was not considered a fire hazard. Potential for a fire exists because of the nine plastic trash cans, the gas storage rack, and the lack of a fire extinguisher on the dock. The Argonne Area Office was notified of the potential hazard.
CONTROL #HS-2

DATE: September 19, 1990

NATURE OF CONCERN: An anonymous note was received that concerned the use of insect sprays in an office area. The author had become ill when a supervisor sprayed the office without any warning. When a complaint was made, the author was disciplined.

RESPONSE: This type of reaction to a chemical used in a building is typical of an indoor air quality complaint. It is unlikely that any OSHA permissible exposure limit (PEL) would be exceeded or even approached. However, various individuals can be very sensitive to products such as these, which cause adverse health effects. These concerns should not be dismissed out of hand, and certainly no disciplinary action should be taken. Whether an operation involves insecticides, solvent-based paints, or construction materials, personnel should be notified of their anticipated use. Options for control could be:

- isolating areas infected
- increasing outdoor air ventilation
- temporarily relocating personnel, especially those who do exhibit sensitivities or allergies
- seeking less offensive alternatives
- performing operations in off-normal hours.

The specific control(s) would need to be assessed for each individual operation.
CONTROL #ENV-1

DATE: September 28, 1990

NATURE OF CONCERN: The caller requested that a particular member of the Environmental Subteam call him.

RESPONSE: The Environmental Subteam member provided the caller with the location of a thermoluminescent dosimeter (TLD) card issued to him at the start of the Tiger Team Assessment.

CONTROL #TTL-1

DATE: September 19, 1990

NATURE OF CONCERN: This information was received via a personal memo addressed to the Tiger Team Leader. The author had information related to the past history of environmental, safety, and health concerns at AIS.

RESPONSE: The letter was distributed to the Subteam Leaders of the Tiger Team and a meeting was held with the author to further discuss the information provided. The Subteam Leaders used the information, as appropriate, for input into the assessment.
DATE: October 12, 1990

NATURE OF CONCERN: The caller requested followup information on concerns expressed earlier to a member of the Safety and Health Subteam regarding OSHA and personnel protection issues. The caller had provided the Safety and Health Subteam with specific documentation relating to the issues.

RESPONSE: Followup was performed on the part of the Tiger Team Leader. It was determined that the information could and would be used to support and verify concerns/findings presented in the assessment report.