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

Appendices

Tiger Team Assessment of the Brookhaven National Laboratory

June 1990

U.S. DEPARTMENT OF ENERGY
WASHINGTON, DC 20585

DISCLAIMER

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TIGER TEAM ASSESSMENT REPORT
APPENDICES

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APPENDIX A-1

Biographical Sketches of
Tiger Team Assessment Team Leader
and Team Leader Staff
Brookhaven National Laboratory

NAME: John C. Tseng

AREA OF RESP: Tiger Team Leader

ASSOCIATION: Office of Environment, Headquarters, Department of Energy

EXPERIENCE: 18 years

- Department of Energy, Washington, DC

  - Associate Deputy Assistant Secretary (DAS) for Environment: Assists DAS in development and implementation of DOE environmental oversight program; i.e., policy and guidance development, legislative and regulatory review, compliance assistance, NEPA implementation and oversight, and environmental audits.

  - Director, Environmental Guidance and Compliance, Office of Environment: directed development and implementation of a centralized program for issuing environmental policy and guidance, reviewing legislative and regulatory developments, and providing policy and technical assistance on compliance issues concerning all Departmental programs and operations.

  - Special Assistant to the Assistant Secretary for Defense Programs (ASDP) for Program Liaison: Assisted ASDP in addressing programmatic ES&H issues, and implemented ES&H planning process at nuclear weapons complex facilities.

  - Physical Scientist, Nuclear Material Production, Defense Programs: Began development of an environmental program for New Production Reactor Program.

- Savannah River Operations Office, Aiken, SC

  - Acting Director, Office of Environment: Managed Savannah River Plant (SRP) environmental compliance, ecological research, and nature resource management programs.

- Chief, NEPA Activities Branch: Developed and implemented a NEPA compliance program for SRS.

- Senior Environmental Engineer, Environmental Activities Branch: Conducted oversight of SRP environmental radiological monitoring program.

- Sargent and Lundy Engineers, Chicago, IL

  - Environmental Engineer: Managed preparation of environmental documents for licensing nuclear power plants, and designed and implemented environmental radiological monitoring program for nuclear power plants.

EDUCATION: MBA, Management, University of South Carolina
M.S., Environmental Health Engineering, Northwestern University
B.S., Aeronautics and Astronautics, Massachusetts Institute of Technology

OTHER: Member, Health Physics Society
Member, American Nuclear Society

NAME: Craig D. Zamuda

AREA of RESP: Tiger Team Coordinator

ASSOCIATION: Office of Special Projects, Headquarters, Department of Energy

EXPERIENCE: 17 years

- Department of Energy, Washington DC (On detail from U.S. Environmental Protection Agency)

  - Development of Tiger Team Assessment Guidance Manual, Coordinate Tiger Team Assessment process for several assessments, and Evaluate Tiger Team Assessment Report findings and Action Plans.

- U.S. Environmental Protection Agency, Washington, DC

  - Chief, Superfund, UST and Title III Section for the Office of Policy, Planning and Evaluation.

  - Program Manager, Toxic Integration Program of the Office of Emergency and Remedial Response.

  - Environmental Scientist, Policy Analysis Staff, Office of Emergency and Remedial Response.

- U.S. House of Representatives

  - Congressional Fellow to the Merchant Marine and Fisheries Committee

- University of Maryland

  - Research Scientist

EDUCATION: Ph.D., Environmental Sciences, University of Virginia/University of Maryland
M.S., Biological Sciences, East Carolina University
B.S., Biological Sciences, Rutgers University

NAME: Michael A. Kilpatrick

AREA OF RESP: Special Assistant

ASSOCIATION: Office of Environment, Headquarters, Department of Energy

EXPERIENCE: 14 years

- Department of Energy, Washington, DC
  - Special Assistant to Deputy Assistant Secretary for Environment: Responsible for coordinating Tiger Team Assessments, developed and presented Tiger Team Training Program.
- Maryland Department of Environment, Baltimore, MD
  - Administrator of Superfund and Underground Storage Tank Program: Responsible for planning and implementing regulatory, enforcement, and cleanup programs.
- Environmental Protection Agency, Washington, DC
  - Chief, Compliance Branch, Office of Waste Programs Enforcement: Responsible for national implementation of enforcement programs under RCRA and CERCLA.
- Naval Ship Research and Development Center, Annapolis, MD
  - Chemical Engineer: Responsible for developing wastewater treatment systems and other pollution control systems for Navy ships.

EDUCATION: B.S., Chemical Engineering, University of Maryland
Graduate Studies, Chemical/Energy Engineering, University of Maryland

NAME: Dartha R. Simpson

AREA OF RESP: Special Assistant

ASSOCIATION: Office of Environment, Headquarters, Department of Energy

EXPERIENCE: 6 years

- Department of Energy, Washington, DC
  (On detail from Pacific Northwest Laboratory)

  - Special Assistant: Assist with writing, coordination, and production of reports, papers, presentations, questions and answers, and briefing materials produced by the Office of Environment. Assist in office management. Edited and coordinated Department of Energy Needs Assessment Report.

- Pacific Northwest Laboratory, Richland, WA

  - Technical Communications Specialist: Edited, rewrote, and coordinated production of reports, papers, articles, speeches, brochures, posters, presentations, and exhibits for the Earth and Environmental Sciences Center (EESC). Lead proposal editor/writer for EESC Program Office.

- Rockwell-Hanford Operations, Richland, WA

  - Technical Editor/Writer: Edited and coordinated reports and papers for the Basalt Waste Isolation Project.

EDUCATION: B.A., Education/English, Washington State University.

OTHER: Member, Society for Technical Communications

APPENDIX A-2

Biographical Sketches of
Environmental Subteam
Brookhaven National Laboratory

NAME: Joseph O. Boda

AREA OF RESP: Environment Subteam Leader

ASSOCIATION: Office of Environmental Audit Headquarters, Department of Energy

EXPERIENCE: 20 Years

- Department of Energy, Germantown, MD

  - Environmental Engineer: Principal responsibilities include leading multi-disciplinary teams of professionals in performing environmental surveys, assessments and audits. Acted as Assistant Team Leader for three environmental surveys (Mound Plant, Pantex Plant, and Los Alamos National Laboratory) and Team Leader for seven environmental surveys (Argonne National Laboratory, Idaho National Engineering Laboratory, Component Development and Integration Facility, Solar Energy Research Institute, Princeton Plasma Physics Laboratory, Ames Laboratory and the National Institute for Petroleum and Energy Research). Also served as the Environment Subteam Leader for the Pantex Plant and Brookhaven National Laboratory Tiger Team Assessments.

- Prior experience in the environmental field includes environmental research, environmental assessments and impact statements, and managing hazardous and toxic materials and waste under RCRA and TSCA. Also managed operations for a U.S. Air Force installation and major U.S. waterways and reservoirs for environmental issues including endangered species, cultural and natural resources preservation and surface water and groundwater protection.

EDUCATION: M.S., Sanitary Engineering, Oregon State University
B.S., Soil and Water Science, University of California, Davis

NAME: Robert A. Crowley, P.E., P.L.S.

POSITION: Assistant Environment Subteam Leader

ASSOCIATION: Office of Environmental Audit, Headquarters, Department of Energy

EXPERIENCE: 15 Years

Environmental Protection Specialist: Under the direction of the Environment Subteam Leader, provides guidance, direction and assistance to a multidisciplined group of professionals performing environmental surveys, Tiger Team Assessments, and environmental audits at DOE facilities.

- Prior experience in the environmental field includes providing guidance on the implementation of water quality criteria for a water quality task force, developing land use conservation plans to minimize the impacts of non-point source pollution, managing site planning and development of a strategic metals storage area and dredged spoil containment areas, and assessing the safety and adequacy of energy projects to insure compliance with NEPA requirements.

EDUCATION: B.S., Agricultural Engineering, University of Maryland

NAME: Richard A. Barringer

AREA OF RESP: National Environmental Policy Act

ASSOCIATION: JAYCOR/Oak Ridge National Laboratory
Tiger Team Assessment

EXPERIENCE: 5 Years

- Oak Ridge National Laboratory

  - Participant in Pinellas Plant Tiger Team Assessment

  - Prepared Environmental Impact Statement (EIS) for the U.S. Forest Service (Eldorado and Stanislaus National Forests) for Mokelumne River Wild and Scenic designation.

  - Prepared Environmental Impact Statement (EIS) detailing the environmental consequences of vegetation treatment in 13 Western States, for the Bureau of Land Management (BLM).

  - Evaluated contractor-prepared Defense Facilities Decommissioning Program and FUSRAP RI/FS work plan documents for compliance with the National Environmental Policy Act (NEPA) and EPA guidelines, and technical accuracy for DOE.

  - Reviewed and evaluated NRC policy guidance documents for groundwater protection standards and alternate concentration limit application procedures for active/inactive uranium mill tailing sites for the DOE.

  - Prepared EPA Uncontrolled Hazardous Waste Site Ranking System environmental evaluations of DOD installations for the EPA in support of nominations to the NPL.

  - Assisted in the development and technical review of the revised version of Guidance Criteria for Identifying Areas of Vulnerable Hydrogeology for the EPA Office of Solid Waste.

EDUCATION: USDA Graduate School, National Environmental Policy Course, 1989.
M.S., Geological Sciences, Old Dominion University
B.S., Geological Sciences, Old Dominion University

NAME: Warren D. Black

AREA OF RESP: National Environmental Policy Act

ASSOCIATION: Office of NEPA Project Assistance Headquarters, Department of Energy

EXPERIENCE: 15 Years

- Department of Energy, Washington, DC
  - Environmental Protection Specialist, Office of NEPA Project Assistance
- Environmental Protection Agency, Region II
  - Scientist, Environmental Impacts Branch
  - Scientist, Marine and Wetlands Protection Branch
- Army Corps of Engineers, New York District
  - Biologist, Environmental Analysis Branch

EDUCATION: B.S., Biology, State University of New York at Stony Brook

NAME: Joseph G. Crist

AREA OF RESP: Air Quality

ASSOCIATION: NUS Corporation

EXPERIENCE: 30 Years

- Air Quality Specialist for Feed Materials Production Center (FMPC) and the Portsmouth Gaseous Diffusion Plant (PORTS) Tiger Team Assessments. Air Quality Specialist for the DOE Environmental Survey Program and participated in surveys at FMPC, PORTS, Brookhaven, Lawrence Livermore, Sandia Livermore, Fermi, and Santa Sussanna Laboratories as well as the Paducah and Oak Ridge Gaseous Diffusion Plants.

- Over 30 years experience in environmental affairs including over 10 years experience in conducting environmental surveys, audit, assessments, evaluations. Conducted specific training for Air Quality Tiger Team Specialists. Established and managed environmental evaluation (i.e. Audit) program for a Fortune 500 corporation. Authored "Reporting, Recordkeeping, and Disclosure Requirements for the Environmental Audit," one volume of the series Environment Audit Handbook, Executive Enterprises, New York, 1989.

EDUCATION: Ph.D., Organic Chemistry, Pennsylvania State University
B.S., Chemistry, University of Notre Dame

NAME: Helen F. Gram

AREA OF RESP: National Environmental Policy Act

ASSOCIATION: ICF Kaiser Engineers, Inc., Los Alamos, NM

EXPERIENCE: 18 Years

- ICF Kaiser Engineers, Inc.
  - Vice President: Environment, Safety, and Health
- Los Alamos Technical Associates, Inc., Los Alamos, NM
  - Department Manager: Environment, Safety, Health and Quality Assurance
  - Program Manager and Section Manager, Environment and Safety Programs
- New Mexico Environmental Improvement Agency, Santa Fe, NM
  - Program Manager: National Pollutant Discharge Elimination System (NPDES)
- Stanford Research Institute, Menlo Park, CA
  - Research Organic Chemist

EDUCATION: M.S., Organic Chemistry, Stanford University
B.S., Chemistry, Whitman College

NAME: Ernest C. Harr Jr.

AREA OF RESP: Radiation and Soils/Sediments/Biota

ASSOCIATION: NUS Corporation

EXPERIENCE: 12 Years

- Radiation, Soils/Sediments/Biota, and Environmental Monitoring Specialist for the Mound Plant Tiger Team Assessment and Radiation and Soils/Sediments/Biota Specialist for the Feed Materials Production Center Tiger Team Assessment. Radiation and Soils Specialist for the DOE Environmental Survey Program and participated in surveys at Oak Ridge National Laboratory, Idaho National Engineering Laboratory, Laboratory for Energy-Related Health Research, Lawrence Berkeley Laboratory, Stanford Linear Accelerator Center, Ames Laboratory, and Princeton Plasma Physics Laboratory.

- Environmental scientist with broad experience in radiological environmental monitoring activities including radiological laboratory management, radiological analysis procedure development, and radiological environmental monitoring program design and oversight.

EDUCATION: B.S., Zoology, University of Maryland

NAME: Donald C. Habib

AREA OF RESP: Waste Management

ASSOCIATION: NUS Corporation

EXPERIENCE: 8 Years

- Waste Management Specialist for the West Valley Demonstration Project, the Feed Materials Production Center, the Pantex Plant, and the Kansas City Plant Tiger Team Assessments. Waste Management Specialist for the DOE Environmental Survey Program and participated in surveys at the Solar Energy Research Institute, the National Institute of Petroleum and Energy Research, the Ames Laboratory, and the Princeton Plasma Physics Laboratory.

- Provided RCRA and CERCLA technical support in the development and evaluation of remedial studies. Provided engineering and technical support in the development and evaluation of solid waste facility operation and leachate quality characterization studies. Provided chemical engineering support in the design and evaluation of commercial nuclear power radioactive waste processing systems.

EDUCATION: B.S., Chemical Engineering, Massachusetts Institute of Technology

NAME: William M. Levitan

AREA OF RESP: Inactive Waste Sites and Environment Subteam Contractor Coordinator

ASSOCIATION: NUS Corporation

EXPERIENCE: 14 Years

- Environmental Subteam Coordinator and Inactive Waste Sites Specialist for the Pantex Plant Tiger Team Assessment. Inactive Waste Sites Specialist for the Rocky Flats Special Assignment Team and the Pinellas Plant Tiger Team Assessment.

- Inactive Waste Sites Specialist for the DOE Environmental Survey Program and participated in surveys at Argonne National Laboratory, Idaho National Engineering Laboratory, Component Development and Integration Facility, Solar Energy Research Institute, National Institute for Petroleum and Energy Research, Ames Laboratory, and Princeton Plasma Physics Laboratory.

- Environmental scientist with experience in a broad array of CERCLA-related studies including preliminary assessments, remedial investigations/feasibility studies, risk assessments, and field investigations.

EDUCATION: M.S., (Incomplete) Environmental Engineering/ Engineering Management, University of Maryland
M.S., Marine Studies, University of Delaware
B.A., Natural Science, Johns Hopkins University

NAME: Lorene L. Sigal

AREA OF RESP: National Environmental Policy Act

ASSOCIATION: Oak Ridge National Laboratory, Martin-Marietta Energy Systems, Inc., Oak Ridge, TN

EXPERIENCE: 9 Years

- Oak Ridge National Laboratory
  - Technical assistance to the DOE Office of NEPA Project Assistance: developed the draft DOE NEPA Compliance Guide and the DOE NEPA Compliance Audit Protocol
  - Team Leader: Oak Ridge National Laboratory environmental compliance assessments for the U.S. Air Force under their Environmental Compliance and Management Program
  - Preparation of the DOE Regulatory Compliance Guide for Prevention of Significant Deterioration Under the Clean Air Act
  - Basic research in the effects of air pollutants on vegetation
  - Preparation of terrestrial ecology sections of EISs for coal-fired, oil-fired, and nuclear power plants; U.S. Army disposal of chemical agents and munitions; and U.S. Air Force base closures and reuse

EDUCATION: Ph.D., Botany and Microbiology, Arizona State University

NAME: Thomas N. Smith

AREA OF RESP: Groundwater

ASSOCIATION: NUS Corporation

EXPERIENCE: 11 Years

- Registered geologist in the States of North Carolina, Tennessee, Florida, and Arkansas. Groundwater specialist, drinking water specialist, and spill response specialist for an operational readiness review at Defense Waste Processing Facility Savannah River.

- Hydrogeologist experienced in the conduct of both Renedral investigation/feasibility studies and RCRA facility investigations under CERCLA and RCRA. Expertise in the design and implementation of hydrogeologic assessments and characterization studies.

  Also experienced in drilling activities, geophysical surveys, and sampling protocols.

EDUCATION: M.S., Environmental Science, University of Texas at Dallas
B.A., Geosciences, University of Texas at Dallas

NAME: Richard E. Tarbert

AREA OF RESP: Surface Water

ASSOCIATION: NUS Corporation

EXPERIENCE: 36 Years

- Surface Water Specialist for the West Valley Demonstration Project, the Y-12 Plant, and the Nevada Test Site Tiger Team Assessments. Surface Water Specialist for the DOE Environmental Survey Program and participated in surveys at the Rocky Flats Plant, the Y-12 Plant, the Kansas City Plant, the Nevada Test Site, the Strategic Petroleum Reserves and the Naval Petroleum and Oil Shale Reserves in Colorado and Wyoming. At four of these facilities, also served as Team Contractor Coordinator. Participated in the Environmental Program Audit of the Portsmouth Gaseous Diffusion Plant, Oak Ridge Gaseous Diffusion Plant, Paducah Gaseous Diffusion Plant, and the Brookhaven National Laboratory in 1985.

- Chemist/Chemical Engineer experienced in water and wastewater treatment methods, validation of analytical data for the EPA-Contract Laboratory Program and environmental auditing in the industrial sector.

EDUCATION: Coursework toward M.S., Chemical Engineering, Carnegie Mellon University
B.S., Chemistry, University of Pittsburgh

NAME: Gary M. Verban

AREA OF RESP: Inactive Waste Sites

ASSOCIATION: NUS Corporation

EXPERIENCE: 3 Years

- Chemical/Environmental engineer with previous responsibility for the proper implementation of the computer modeling of waste sites for the DOE Environmental Survey Program effort to prioritize findings; responsible for data assimilation, input, and analysis of output; responsible for incorporation of data into report form.

EDUCATION: M.S., Chemical Engineering, University of Virginia
B.S., Chemical Engineering, University of Virginia

NAME: David M. Wunsch

AREA OF RESP: Toxic and Chemical Materials and Quality Assurance

ASSOCIATION: NUS Corporation

EXPERIENCE: 12 Years

Toxic and Chemical Materials and Quality Assurance Specialist for the Feed Materials Production Center and the Portsmouth Gaseous Diffusion Plant Tiger Team Assessments.

Environmental scientist with broad experience including: laboratory management in medical research and environmental analytical chemistry, toxic and hazardous materials management, writing of laboratory QA manuals, and writing environmental chemistry sections of QA project plans and program plans.

EDUCATION:
M.B.A., Management Studies, Loyola College
M.S., Pharmacology, New York Medical College
M.Sc., Applied Physiology, University of Guelph
B.S., Animal Science, Rutgers University

APPENDIX A-3

Biographical Sketches of
Safety and Health Subteam
Brookhaven National Laboratory

TEAM COMPOSITION AND AREAS OF RESPONSIBILITY
TIGER TEAM COMPLIANCE ASSESSMENT - SAFETY AND HEALTH
BROOKHAVEN NATIONAL LABORATORY

Area of Responsibility	Name/Organization
EH Senior Manager	O.D.T. Lynch, Jr Office of Safety Appraisals Department of Energy
Team Leader	Yo Taik Song Office of Safety Appraisals Department of Energy
Team Leader (Trainee)	Myrna Steele Office of Safety Appraisals Department of Energy
Organization & Administration Experimental Activities	Lorin Brinkerhoff Private Consultant
Operations	Mayhue Bell Private Consultant
Training and Certification Nuclear Criticality Safety	Glenn A. Whan Private Consultant
Maintenance Auxiliary Systems	Robert (Spike) McCormick ANL West
Site/Facility Safety Review Technical Support	James A. Buckham Private Consultant
Radiological Protection Emergency Preparedness	Roland A. Jalbert Private Consultant
Radiological Protection	Carl M. Stroud PNL
Industrial Hygiene Occupational Safety	Jack Enright Occusafe Inc.
Fire Protection	Thomas V. Kraft EG&G Idaho, Inc.
Medical Services	Warfield Garson, M.D. Private Consultant

Area of Responsibility	Name/Organization
Quality Verification	Richard Glover Office of Quality Programs Department of Energy
Report Quality	Larry D. Warren Private Consultant
REPORT SUPPORT, OBSERVERS AND LIAISON:	
Appraisal Specialists	Mary Meadows Office of Safety Appraisals Department of Energy
	Patricia Davidson Office of Safety Appraisals Department of Energy
Coordinators in Training	Robin Longerbeam Office of Safety Appraisals Department of Energy
	Terry Blanton Office of Quality Programs Department of Energy
HQ/ER Liaison	H.C. Field ER/Office of Management Department of Energy
EH Compliance	Dae Y. Chung Department of Energy
Field Office	Justin Zamirowski Chicago Operations Office Department of Energy
Area Office	Michael A. Butler Brookhaven Area Office Department of Energy

NAME: Oliver D. T. Lynch, Jr.

AREA OF RESP: EH Senior Manager

ASSOCIATION: Office of Safety Appraisals, Headquarters, Department of Energy

EXPERIENCE: 26 years

- Department of Energy, Germantown, Maryland
  - Director, Safety Inspections Division, OSA
- U. S. Nuclear Regulatory Commission, Rockville, Maryland
  - Radiation Measurements and Health Effects Section Chief
  - Standardization and Decommissioning Section Chief
  - Safeguards and Non-Power Reactors Section Chief
  - Radiation Protection Section Leader
  - Senior Operating Reactor Project Manager
  - Environmental Assessment Section Chief, TMI Program Office
  - TMI Special Inquiry Group (Rogovin)
  - Senior Environmental Project Manager
- International Atomic Energy Agency
  - Technical Working Group Leader, Vienna, Austria
  - Instructor, Cairo, Egypt
- General Dynamics, Electric Boat Division, Groton, Connecticut
  - Chief, Radiological Control Health Engineering
- U. S. Atomic Energy Commission, Las Vegas, Nevada
  - Radiological Specialist
- San Diego State University, San Diego, California
  - Assistant Radiological Safety Officer

EDUCATION:	M.S., Nuclear Physics, San Diego State University B.S., Applied Physics, San Diego State University
OTHER:	Member, Health Physics Society Member, American Forestry Association Sigma Pi Sigma Author, Textbooks and Training Manuals, Small Craft Safety, Operations and Navigation

NAME: Yo Taik Song

AREA OF RESP: Team Leader

ASSOCIATION: Office of Safety Appraisals, Headquarters, Department of Energy

EXPERIENCE: 28 years

- Team Leader - Office of Safety Appraisals, DOE
- Nuclear Engineering and Reactor Physics
- Research in Neutron and Photon Transport. Nuclear and Radiation Safety for U. S. Navy Nuclear Weapons Program
- Teaching reactor physics, radiation transport and radiation shielding in universities
- Management of Nuclear Weapons Research, Development and Testing
- Appraisals and reviews of DOE reactor designs and operations

EDUCATION: M.S. and Ph.D., Nuclear Engineering with minor in Mathematics and Chemical Engineering, University of Illinois, Urbana, Ill.
B.S., Chemical Engineering

OTHER: Licensed Reactor Operator, Qualified Instructor for fall-out shelter design

NAME: James C. Snell

AREA OF RESP: Occupational Safety and Health Subteam Leader

ASSOCIATION: Office of Safety Appraisal, Headquarters, Department of Energy

EXPERIENCE: 27 Years

- Department of Energy, Germantown, MD
  - Team Leader for Technical Safety Appraisals of DOE facilities
  - Policy review and revision to DOE Environmental Health and Safety Policies
  - Participation in three Tiger Team/TSA reviews
- Department of Transportation, Washington, DC
  - Safety engineer for regulatory review of Motor Vehicle Codes and Standards
- Department of Defense (Army), Alexandria, VA
  - Inspector General, Team Leader responsible for technical engineering inspection teams and reviews of Defense Weapons Systems
- General Physics Corporation, Columbia, MD
  - Manager of Licensing, responsible for nuclear power plant licensing concerns
- NUS Corporation, Gaithersburg, MD
  - Manager of Licensing, responsible for review and compliance of licensing activity for power plant clients
- Nuclear Regulatory/Atomic Energy Commission, Bethesda, MD
  - Regulatory Project Manager to variety PWR's and BWR's responsible for Government acceptance and review of applications to construct and operate facilities

- U. S. Navy

  - Communication Division Officer responsible for both fleet and ship communication

EDUCATION: Graduate studies in Nuclear Engineering and Mechanical Design
B.S., Math and Physics, Lebanon Valley College

NAME: Myrna Steele

AREA OF RESP: Team Leader (Trainee)

ASSOCIATION: Office of Safety Appraisals, Headquarters, Department of Energy

EXPERIENCE: 28 years

- Department of Energy
  - Nuclear Engineer, Technical Safety Appraisal Team Leader
- 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"
  - Task Force that organized NRC from AEC
  - Member, Rasmussen Report group (WASH-1400)
  - Technical Assistant/Licensing for AEC Chairman
  - Managing Editor, <u>Reactor Technology</u> 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: Diploma, Federal Executive Institute, Charlottesville, VA
Law School, University of Toledo
Graduate courses in nuclear engineering and physics, University of Toledo (Ohio) and University of Tennessee
B.S., Physics and Mathematics, University of Kentucky

OTHER: Congressional Fellowship, USNRC/OPM
Member, American Nuclear Society
Reactor Operator
Member, National Contract Management Association
Member, Society for Information Management

NAME: Mayhue A. Bell

AREA OF RESP: Operations

ASSOCIATION: Private Consultant, EG&G Idaho, Inc.

EXPERIENCE: 30 years

- Department of Energy, Headquarters

  - Managed the DOE Reactor Safety and Emergency Preparedness programs: Policy development and safety requirements, planning, coordinating and performing safety appraisals, individually and as team leader; covering organization and administration, management assessment, operations, maintenance, training and certification, technical support, experimental activities, facility safety review and quality assurance.

- Carolinas Virginia Nuclear Power Associates, Inc.

  - General Manager: Responsible to sponsoring power companies (Duke, CP&L, SCE&G, Virginia Electric)

  - Operating Director: Responsible for company operations, including technical support, health, plant testing, experimental research programs, training and certification, emergency preparedness, and plant operations through the plant Superintendent. Dual responsibilities of Training Director and Operating Director during initial staffing and plant startup phase.

- Nuclear Regulatory Commission

  - Reactor Inspection Specialist: Responsible for performing inspections of licensed facilities during construction, plant testing and operation.

- Dupont, Savannah River Plant, Aiken, S.C.

  - Senior Supervisor, Plant Operations: Shift Supervisor Reactor operations including operator training and qualification. Nuclear Engineer on loan to Homogeneous Reactor Experiment, Oak Ridge National Laboratory.

EDUCATION:	Diploma, Nuclear Power Reactor Safety, Harwell, England Diploma, Quality Assurance Nuclear Power Industry, NRC Diploma, Federal Executive Institute, University of Virginia Bachelor of Nuclear Engineering, with honors, North Carolina State University
OTHER:	U.S. Representative to IAEA - Served on panel of experts and editor, preparing manual on emergency preparedness, and on IAEA team responsible for training representatives from all Spanish speaking nations on emergency preparedness.

NAME: Lorin C. Brinkerhoff

AREAS OF RESP: Organization and Administration and Experimental Activities

ASSOCIATION: Private Consultant

EXPERIENCE: 36 years

- Nuclear Safety Technical Consultant under contract with EG&G, Idaho, Scientech, and ORAU
- Technical Safety Appraisal Team Leader, Office of Safety Appraisals, DOE
- Reactor and Nuclear Facility Safety Specialist, AEC/ERDA/DOE
- Senior Nuclear Engineer, Aerojet General Corporation, Nuclear Rocket Development Center, Nevada Test Site
- Manager, Nuclear Critical Facility, Lawrence Livermore National Laboratory, Nevada Test Site
- Reactor Foreman, Phillips Petroleum Company, Idaho Test Site
- Graphite Research Analyst, Hanford Test Site, General Electric Company.

EDUCATION: B.S., Chemical Engineering, University of Utah

OTHER: Past member of ANS-15 Standards Committee on Research Reactor Safety
Past Member of ANSI N-16 Standards Committee on Nuclear Criticality Safety
Listed in:
Who's Who in the East
Who's Who in the World

NAME: James A. Buckham

AREA OF RESP: Technical Support and Facility Safety Review

ASSOCIATION: Private Consultant

EXPERIENCE: 37 years

- TSA Team Member
  - Feed Materials Production Center, Y-12 Plant, Rocky Flats Plant, West Valley Facility, Portsmouth Gaseous Diffusion Plant, and Savannah River Laboratory TSAs.
- Oversight Team Leader
  - To ensure safe, effective restart of Sequoyah Facility
- Allied-General Nuclear Services
  - Executive VP and President with overall responsibilities for the Barnwell Nuclear Fuels Plant
- Idaho National Engineering Laboratory
  - Research and Development, Operations, and Management at the Idaho Chemical Processing Plant

EDUCATION: Ph.D., Chemical Engineering, University of Washington
M.S., Chemical Engineering, University of Washington
B.S., Chemical Engineering, University of Washington

OTHER: Member, Sigma Xi, Tau Beta Pi
Fellow, American Institute of Chemical Engineers
Member, American Nuclear Society
Member, American Chemical Society
Instructor, University of Washington
Adjunct Professor, University of Idaho

NAME: John C. Enright

AREA OF RESP: Industrial Hygiene and Occupational Safety

ASSOCIATION: OCCUSAFE Inc., Wheeling, Illinois

EXPERIENCE: 18 Years

- OCCUSAFE, Inc.
  - Senior Consultant: Provides consulting services to program administration, and technical liaison with the academic, governmental, and labor communities in industrial hygiene and safety.
- General Motors Corporation
  - Held technical positions with automotive components manufacturing division and the corporate staff, and administrative responsibilities for major divisions. Presented technical papers at professional seminars within the automotive industry and national technical conferences. Assisted with peer review for papers published in the American Industrial Hygiene Association Journal.
  - Provided technical consultation and support to epidemiological studies of workers involved in wood and metal model and pattern making.
  - Participated as team leader in multi-disciplinary technical teams in resolving major occupational health and product health and safety questions and concerns.

EDUCATION: M.B.A., Engineering, University of Dayton
B.S., Engineering, Purdue University

OTHER: Member, American Industrial Hygiene Association
Member, American Academy of Industrial Hygiene
Member, Michigan Industrial Hygiene Society (Director, 1985-1987, President Elect, 1987-1988, President, 1988-1989)
Certified Industrial Hygienist
Certified Safety Professional

NAME: Warfield Garson, M.D.

AREA OF RESP: Medical Services

ASSOCIATION: Private Consultant

EXPERIENCE: 45 Years

- Medical Director, Shippingport Nuclear Reactor Decommissioning Project DOE/General Electric Corp. Shippingport, PA.
- Medical Director, Bituminous Coal Research National Laboratory, University of Pittsburgh, Monroeville, PA.
- Medical Director, Centerville Clinic, Inc., Frederick Town, PA.
- Medical Director, Regular Corps, U.S.P.H.S., Retired, Washington, DC.
- Private Consultant, Hanford Environmental Health Foundation Occupational Medical Program Appraisals of Portsmouth Gaseous Diffusion Plant, Portsmouth, Ohio and Mound Plant, Miamisburg, OH.
- Private Consultant, Hanford Westinghouse Corp., Occupational Medical Program Appraisals of National Laboratory Sites.
- Clinical Professor of Occupational Health and Health Services Administration, Graduate School of Public Health, University of Pittsburgh.
- Attending Physician - Professor, Pulmonary Program Department of Medicine, School of Medicine, University of Pittsburgh and Veteran's Administration Medicine Center, Pittsburgh, PA.

EDUCATION: A.B., Bacteriology, University of California at Los Angeles
M.D., School of Medicine, University of Southern California
M.P.H., School of Hygiene and Public Health, The Johns Hopkins University

OTHER: Diplomate, American Board of Preventive Medicine
Fellow, American College of Occupational Medicine
Fellow, American College of Preventive Medicine
Chairman, Governors Advisory Committee of Occupational Respiratory Disease.

NAME:	N. Richard Glover
AREA OF RESP:	Quality Verification
ASSOCIATION:	Office of Quality Programs, Headquarters, Department of Energy
EXPERIENCE:	30 Years

- Appraisal Performance Group Leader and Quality Assurance Engineer in Office of Quality Assurance, DOE
- Supervisory Operations Research Analyst in Operational and Environmental Safety Division, DOE
- Inspector, Office of Internal Review, ERDA
- Chief, Quality Assurance and Safety Branch, Rocky Flats Area Office, AEC/ERDA
- Materials & Test Engineer, Quality Assurance Division, Albuquerque Operations Office, AEC
- Fire Protection Engineer, Operational Safety Division, Albuquerque Operations Office, AEC
- Fire Protection Engineer, Factory Insurance Association and Nuclear Energy Property Insurance Association

EDUCATION: M.P.A., Public Administration, University of New Mexico
B.S., Mechanical Engineering, University of Maine

OTHER: Certified Safety Professional
Member, American Society for Quality Control
Member, American Society of Safety Engineer
Member, Society of Fire Protection Engineers
Member, American Society of Mechanical Engineers

NAME: Joseph A. Hopkins. Jr.

AREA OF RESP: OSHA Compliance, Part Time

ASSOCIATION: DOE Headquarters - Office of Safety Appraisals

EXPERIENCE: 16 years

- Department of Energy
  - Occupational Safety Engineer, participated in tiger team and functional appraisals
- Department of Labor - OSHA
  - Mechanical Engineer / National Technical Expert, responsible for the enforcement of OSHA standards in unprecedented cases of national interest
- U.S. Environmental Protection Agency
  - Environmental Engineer, responsible for providing technical support for the enforcement of regulations promulgated under the Clean Air Act
- Bethlehem Steel Corporation
  - Mechanical Engineer, responsible for developmental engineering of production equipment for a fully integrated steel mill, including prototype equipment for controlling environmental and workplace exposures to toxic substances

EDUCATION: B.S., Mechanical Engineering, University of Maryland

OTHER: Member, American Society of Mechanical Engineers

NAME: Roland A. Jalbert

AREAS OF RESP: Emergency Preparedness and Radiological Protection

ASSOCIATION: DOE Headquarters, Office of Safety Appraisal

EXPERIENCE: 32 Years

- Los Alamos National Laboratory
  - Field health physics involving accelerators, x-ray machines, portable radiation sources, in addition to instrument development, neutron shielding, radiological engineering, tritium handling safety.
  - Member of "Tritium Systems Test Assembly" staff responsible for safety systems and for tritium contamination studies and tritium monitor research and development.
  - DOE Safety Appraisals and Assessment.
- University of Alaska
  - Assistant Professor of Physics
- General Electric Company, Richland, WA
  - Member Health Physics Group
- Private Consultant:
  - Technical safety appraisal, Savannah River Site
  - American Atomics Corporation (Tucson, AZ) on tritium handling, safety, monitoring, dosimetry
  - Quadrex Corporation (Richland, WA) on decommissioning radiochemistry laboratory
  - Skyway Consulting, Inc. (Tucson, AZ) on tritium accident analysis

EDUCATION: M.S., Biophysics, Massachusetts Institute of Technology
B.S., Physics, Massachusetts Institute of Technology

OTHER:

- Certified by American Board of Health Physics
- Member, Panel of Examiners, American Board of Health Physics
- Member, ANSI Committee that drafted Tritium Bioassay Standard
- Member, Office of Fusion Energy, DOE, panel that reviewed Oak Ridge National Laboratory generic fusion safety technical basis document

NAME: Thomas V. Kraft

AREA OF RESP: Fire Protection

ASSOCIATION: EG&G, Idaho

EXPERIENCE: 14 Years

- EG&G Idaho, Fire Protection Engineer
  - Responsible for Plan Review, Probable Maximum Loss Analysis, Fire Protection Impairment Handling Procedures Development, Training and Safety Audits for Power Reactors Program. Developed Test Reactor Area (TRA) Site Baseline Safety Study, Life Safety Analysis, Advance Test Reactor 10CFR 50 App. R. Study, and TRA-Risk Management Resource Manual. Currently involved in Site Wide Fire Protection and Alarm System Line Item Project Development.

- Crawford & Company, Risk Control Consultant
  - Develop and service wide range of property accounts, including plan review, risk hazard analysis, field surveys and training seminar development.

- CIGNA Loss Control Services (LCS), Senior Fire Protection and Utilities Specialist
  - Services all property accounts including utilities and engineering risks. Coordinates major accounts, performs field and report audits. Engineering consultant for staff. Instructs seminars in house and risk management services for customers. Approves proposed protection system installations.
  - LCS Fire Protection Specialist II, Serviced all property accounts, property inspections and coordinated service for major industry groups and conducted loss investigations. Developed loss control materials for distribution to insureds. Highly Protected Risk (HPR) property and engineering and loss control including plan review, training and administration of programs for a district office, handled impairments and developed training seminars for insureds.

- Factory Mutual Engineering Association, Fire Protection Consultant

  - Serviced HPR properties providing surveys, water tests and loss incident investigations.

EDUCATION: B.S., General Engineering, Idaho State University

OTHER: Society of Fire Protection Engineers
National Fire Protection Association
Certified Fire Protection Specialist
American Society of Mechanical Engineers

NAME: Robert P. McCormick

AREA OF RESP: Maintenance and Auxiliary Systems

ASSOCIATION: Argonne National Laboratory (West)

EXPERIENCE: 30 years

- Participated in the 221-H Canyon TSA, Savannah River Site, 1986. Areas of responsibilities included Technical Support, Experimental Activities, and Facility Safety Review.
- Participated in the HFBR Reactor TSA, Brookhaven National Laboratory, 1987. Responsible for Training and Certification.
- Participated in the HFBR Reactor TSA Followup, Brookhaven National Laboratory, 1989. Areas of responsibility included Training and Certification, Maintenance, and Operations.
- Participated in the FFTF Reactor TSA, Hanford, Washington, 1989. Responsible for Maintenance.
- Argonne National Laboratory
  - Reactor Operator, EBR-I Reactor
  - Reactor Operator, Treat Reactor
  - Participated in construction and pre-operational checkout of Experimental Breeder Reactor II.
  - Participated in initial EBR-II startup and operation as a member of the Critical Systems Maintenance Group and as a Reactor Operator.
  - Shift Supervisor, EBR-II
  - Staff Specialist EBR-II: Responsible for major electrical power distribution and experimental activities.
  - Operations Analysis: Participated in development and implementation of Technical Specifications. Development of Technical Specifications Surveillance Program, and procedures.

- Manager, Training and Procedures: Responsible for development and implementation of procedures for experimental activities, operations, and maintenance. Development and implementation of the training programs for Operations, Maintenance, and Plant Chemistry.

EDUCATION: Two years at University of Idaho (Architecture)

NAME: Jacqueline D. Rogers

AREA OF RESP: Industrial Hygiene and Safety

ASSOCIATION: Headquarters, Department of Energy

EXPERIENCE: 13 years

- Senior Level Industrial Hygienist, Department of Energy, Germantown, MD

- Occupational Safety and Health Administration (OSHA), U. S. Department of Labor

  - Directorate of Compliance Programs, Office of Health Compliance Assistance. Senior Level Industrial Hygienist. Responsible for developing compliance guidance documents for OSHA field staff for a wide range of health enforcement issues.

  - Directorate of Field Operations. Industrial Hygienist. Project Coordinator for the OSHA Industrial Hygiene Technical Manual

  - Directorate of Technical Support. Industrial Hygienist responsible for assisting in the development of chapters for the OSHA Field Operation Manual. Accompany senior level industrial hygienist on official OSHA compliance inspections.

EDUCATION: M.S., Physiology, University of Connecticut
B.S., Biology, Federal City College

NAME: James W. Slawski

AREA OF RESP: Industrial Hygiene and Safety

ASSOCIATION: Headquarters, Department of Energy

EXPERIENCE: 18 years in occupational safety and health

- Department of Energy - Industrial Hygiene
- Department of Navy - Industrial Hygiene
- Library of Congress - Safety and Occupational Health
- Fireman's Fund American - Safety
- CNA Insurance - Safety
- Insurance Company of North America - Safety

EDUCATION: M. S., Safety, University of Southern California
B. A., Economics, Claremont McKenna College

OTHER: Certified Safety Professional

NAME: Anthony Straquadine

AREA OF RESP: Quality Verification

ASSOCIATION: Los Alamos National Laboratory, Appraisal Group, OM-2

EXPERIENCE: 39 Years

- ES&H Appraisal Team Member, Appraisal Group, Los Alamos National Laboratory
- Quality Assurance Department Head, Zia Company
- ONWI Project, Quality Assurance Field Office, Albuquerque, Battelle Memorial Institute
- Quality Assurance Engineer, Albuquerque Operations Office, DOE
- Quality Assurance Engineer, NASA Lewis Research Center
- Materials Engineer, TRW (formerly Thompson Products)
- Materials & Process Engineer, Jack & Heintz Company (Lear Sigler)
- Staff Metallurgist, Bingham Herbrand Forging Company

EDUCATION: B. Met. E., Metallurgical Engineer, Ohio State University

OTHER: Member, American Welding Society (36 Years Life Member)
Participant in the formulation of original NASA Quality Assurance Standards, NPC 200-1, 200-2, & 200-3

NAME: Carl M. Stroud

AREA OF RESP: Radiological Protection

ASSOCIATION: Pacific Northwest Laboratory

EXPERIENCE: 31 years

- Staff Scientist, Health Physics Department
  - Manager, Personnel Neutron Dosimetry Evaluation and Upgrade Project
  - Contributor, Hanford Defense Waste Environmental Impact Statement
  - Contributor, Three-Mile Island Programmatic Environmental Impact Statement
  - Technical Liaison to Department of Defense
  - Eight previous Technical Safety Appraisals
  - Co-author of the Draft DOE procedure for Radiation Protection Functional Appraisals
- U.S. Army Corps of Engineers
  - Civil Engineer, Combat Engineer Emergency Readiness
  - Defense Nuclear Agency, Health Physicist and Contracting Officer Technical Representative
  - Chairman, Joint DOD/DOE Intrinsic Radiation from Nuclear Weapons (INRAD) Committee
  - DOD Representative, Interagency Radiation Research Committee (IRRC) and Committee on Interagency Radiation Research and policy Coordination (CIRRPC)
- Savannah River Plant, DuPont
  - Research Analytical Radiochemist/Lab Supervisor

EDUCATION: M.S., Nuclear Engineering, University of Missouri, Rolla
B.S., Chemistry, The Citadel

NAME: Ferman Stubblefield

AREA OF RESP: Quality Assurance

ASSOCIATION: Office of Quality Programs, Headquarters, Department of Energy

EXPERIENCE: 33 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.
- Manager, Hazardous Material and Radioactive Waste, HQDOE
  - Technical Nuclear Safety Appraisal Specialist on effluent from Fuel Cycle Facilities.
  - Nuclear Fuel Cycle Licensing Manager, Headquarters, Nuclear Regulatory Commission
  - Evaluated and analyzed from a Radiological Safety and Environmental Protection standpoint, License Applications and Environmental Reports for Nuclear Fuel Cycle Plants.
- Nuclear Safety Engineer, Richland Operations Office, AEC
  - Line Program Manager for Radioactive Waste Management Operations Contractor
- Chemical Finishing Specialist, Boeing, Seattle
  - Advisor on Special Finishes for critical aircraft parts
- Chemist, Julian Labs
  - Quality Assurance Chemist

EDUCATION:	Wiley College Roosevelt University University of Washington Oak Ridge Associated University International Atomic Energy Agency
OTHER:	Publication, "Handling Radioactive Waste", Chemical Engineer Progress, March 1974. Member of the American Institute of Chemical Engineers. Member of DOE Speakers Bureau. Past President of Toastmasters International.

NAME: John W. Teske

AREA OF RESP: Industrial Hygiene and Safety

ASSOCIATION: Headquarters, Department of Energy

EXPERIENCE: 25 years

- Occupational Health and Safety Program Management
  - Chief, Occupational Safety and Health Branch and Senior Industrial Hygienist, U. S. Department of Agriculture
  - Director, Industrial Hygiene Services, Versar Incorporated
  - Chief, Safety and Health Division, U. S. Fish and Wildlife Service
  - Instructor and Safety Engineer, University of Minnesota
- Occupational Health and Safety Compliance
  - Senior Industrial Hygienist, Department of Energy
  - Industrial Hygiene Program Leader, OSHA National Training Institute
  - Industrial Hygienist, Mining Safety and Health Administration

EDUCATION: Masters of Business Administration, George Mason University
Graduate Studies Industrial Hygiene/Environmental Health, University of Minnesota
B.S. Civil Engineering, University of Minnesota

OTHERS: Certified in Comprehensive Practice of Industrial Hygiene
Registered Professional Safety Engineer, California
Certified Safety Professional

NAME: Larry D. Warren

AREA OF RESP: Report Quality

ASSOCIATION: Private Consultant

EXPERIENCE: 26 Years

- Private Consultant
  - Technical and management consulting to the Department of Energy and its contractors: 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 office for construction and service contracts.
- Los Alamos National Laboratory
  - Program Manager, Insertable Nuclear Component Technology Program and Corps Support Weapon 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

AREAS OF RESP: Training and Certification and Nuclear Criticality Safety

ASSOCIATION: Emeritus Professor, Chemical and Nuclear Engineering University of Mexico

EXPERIENCE: 33 years

- Participated in DOE Technical Safety Appraisals from 1986 to 1990 for: Oak Ridge Y-12 Plant, Portsmouth and Paducah Gaseous Diffusion Plants, Idaho Chemical Processing Plant, Hanford Plutonium Finishing Plant and PUREX Plant, Rocky Flats Plant, West Valley Facility, and Savannah River Site.

- Professor and Department Chairman, Chemical and Nuclear Engineering Department, University of New Mexico, 1957-85

- International Atomic Energy Agency Technical Expert, Reactor Experimentation, 1966-67

- Los Alamos National Laboratory

  - High Temperature Gas-Cooled Reactor Safety Analysis, 1974-75; Nondestructive Assay Measurements for Special Nuclear Materials, International Safeguards, 1983 to present

- Other Nuclear Safety Reviews

  - DOE Independent Review Committee for Trans-uranic Waste (Chairman one year), 1980-84

  - NRC Nuclear Criticality Safety Appraisal Team, Nuclear Fuel Services Corporation, Erwin, Tennessee, 1986

  - DOE Readiness Review Team, Rockwell Hanford Operations, PUREX and PFP, Richland, Washington, 1986-88

  - Nuclear Criticality Safety Analysis, Oak Ridge K-25 Gaseous Diffusion Plant Decommissioning Project, 1987-89

  - EDS SAR Review, Criticality Safety, Lawrence Livermore National Laboratory, 1988

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

APPENDIX A-4

Biographical Sketches of
Management Subteam
Brookhaven National Laboratory

NAME: H. Wayne Hibbitts

AREA OF RESP: Management Subteam Leader

ASSOCIATION: Deputy Assistant Manager for Environment, Safety, and Quality, Oak Ridge Operations Office, Department of Energy

EXPERIENCE: 25 Years

- Currently responsible for environment, safety, health, and quality assurance oversight and support of line organizations for the Oak Ridge Operations Office.
- Three years experience as a health physicist at the Oak Ridge National Laboratory.
- Twenty two years with the AEC/ERDA/DOE in Oak Ridge, primarily in environmental oversight and support. Positions include Emergency Preparedness Director, Chief of the Safety and Environmental Branch of the Clinch River Breeder Reactor Project/Project Office, and Director of the Environmental Protection Division.

EDUCATION: M.S., Physics, Vanderbilt University (AEC Health Physics Fellowship)
B.A., Physics, University of South Florida

NAME: Roger F. Christensen

AREA OF RESP: Management

ASSOCIATION: Richland Operations Office, Department of Energy

EXPERIENCE: 13 Years

- Nuclear Engineer: Nuclear engineering experience was acquired through various positions in the Naval Nuclear Program and DOE. Assignments and qualifications have ranged from Reactor Plant Operator to Chief Refueling Engineer (CRE). Responsibilities and authorities as CRE included providing the overall management and final shipyard approval for the adequacy of all safety and technical matters governing the conduct of the reactor refueling operation.

- Current responsibilities include programmatic oversight and the associated line management functions in safety, environmental protection, and quality assurance for a segment of the research and technology development programs at Pacific Northwest Laboratory.

EDUCATION: B.S., Mechanical Engineering, University of Washington, Seattle

OTHER: DOE Tiger Team Training, Sandia National Laboratories, Albuquerque, March 1990
Nuclear Power Program, U.S. Navy.

NAME: Brian C. DeMonia

AREA OF RESP: Management

ASSOCIATION: Environmental Protection Division, Oak Ridge Operations Office, Department of Energy

EXPERIENCE: 5 Years

- Great Lakes Environmental Services
  - Prepared procedures for the packaging, handling, and disposal of hazardous wastes.
  - Provided technical guidance to clients in regard to the management and minimizations of hazardous wastes.
  - Administered a defense contract for the disposal of hazardous wastes.
- Defense Reutilization and Marketing Office, Crane Naval Weapons Support Center
  - Manager of Hazardous Waste Management Program including the handling, storage, and shipment of hazardous property.
  - Provided technical support for the sale and reutilization of hazardous property.
- Defense Reutilization and Marketing Region, Memphis Defense Depot
  - Provided regional oversight and technical support to field offices throughout the Southeast.
  - Researched and implemented a hazardous waste minimization program.
  - Responsible for providing annual refresher hazardous waste training to field office personnel.
  - Responsible for auditing field offices' hazardous waste management programs.
- Oak Ridge Operations Office, DOE
  - Facility lead for environmental affairs at the Portsmouth Gaseous Diffusion Plant.

- Responsible for RCRA audits of the Oak Ridge Operations Office facilities.
- Assisted in the development and preparation of the National Report on Land Disposal Restricted Wastes .

EDUCATION: B.S., Wildlife Management, Auburn University

NAME: Kenneth E. Honeycutt

AREA OF RESP: Management

ASSOCIATION: Engineering Consultant and Consulting Engineering Manager, PAI Corporation, Oak Ridge, TN

EXPERIENCE: 40 Years

- PAI Corporation and as Engineering Consultant
  - Specialist in environment management and risk management
  - Developed procedures for management appraisals of environment, safety, health, and quality assurance
  - Participated as team leader or team member: Technical Safety Appraisals and Management Appraisals.
- IT corporation
  - Managed engineering group designing hazardous waste incinerators
  - Project Director for a proposed Environmental Technology Development Center
  - President of IT Enviroscience subsidiary, environmental engineer and R&D
  - Managed corporate Health and Safety
  - Managed environmental R&D contract with USEPA
- The Dow Chemical Company
  - Vice President and President of Hydrosciences, Inc., subsidiary, environmental engineering and R&D
  - Managed Government Services Contracts
  - Assistant to Corporate Vice President
  - Managed Chemical Process Engineering Group

- Chief Project Engineer for design and construction of chemical plants.

- Design and Project Engineer

EDUCATION:	B.S., Chemical Engineering, Texas A&M University
OTHER:	Registered Professional Engineer Member, National Society of Professional Engineers Member, American Institute of Chemical Engineers

NAME: Joyce Hester Laeser

AREA OF RESP: Management

ASSOCIATION: Counsel, Los Alamos Area Office, Albuquerque Operations Office, Department of Energy

EXPERIENCE: 12 Years

- Responsible for law and legal policy issues arising out of Los Alamos National Laboratory operations.

- Management and Operating Contract Matters: Negotiation of 5-year contract rewrites; resolution of legal and management issues; interpretation of contract requirements; and the application of federal, state and local law to contract activities.

- Represent DOE at public hearings; in negotiations with EPA; State regulatory agencies; and Indian tribes on various environmental matters arising under RCRA, the Clean Water Act, the Clean Air Act, CERCLA, etc.; oversight of enforcement actions; and litigation arising from Los Alamos National Laboratory activities having a potential environmental impact.

EDUCATION: J.D., University of New Mexico
M.A., University of Wisconsin-Madison
B.A., University of North Carolina-Greensboro

OTHER: Tiger Team Training Session, Savannah River, December 1989.

NAME: William G. Lloyd

AREA OF RESP: Management

ASSOCIATION: Idaho Operations Office, Department of Energy

EXPERIENCE: 7 Years

- Program Analysts: Current responsibilities include development, financial, and planning direction on the Environmental Restoration and Waste Management Five Year Plan.

- Provided direction and guidance on development of the "Salgado - Glenn" ES&H Long Range Plans for the Idaho National Engineering Laboratory.

EDUCATION: B.A., Accounting and Philosophy, Regis College.

Appendix B. Technical Safety Appraisal of the Brookhaven National Laboratory

October 1989

DOE/EH-0104

U.S. Department of Energy
Environment, Safety, and Health
Washington, D.C. 20545

Technical Safety Appraisal of the Brookhaven National Laboratory

October 1989

TABLE OF CONTENTS

ACRONYMS

The following acronyms are used throughout this report. Other acronyms are defined in the sections in which they exist.

AGS	Alternating Gradient Synchrotron
ALARA	As low as reasonably achievable
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
AUI	Associated Universities, Inc.
BHO	Brookhaven Area Office
BNL	Brookhaven National Laboratory
CH	Chicago Operations
DOE	U.S. Department of Energy
ES&H	Environment, Safety and Health
HQ	Headquarters
HWM	Hazardous Waste Management
I&SM	Isotopes and Special Materials
NSLS	National Synchrotron Light Source
OSA	Office of Safety Appraisals
OSHA	Occupational Safety and Health Administration
QA	Quality Assurance
S&EP	Safety and Environmental Protection
S&M	Supply and Materiel
SAR	Safety Analysis Report
SOP	Standard Operating Procedure
TSA	Technical Safety Appraisal
UOR	Unusual Occurrence Report

I. INTRODUCTION

This report presents the results of one of a series of Technical Safety Appraisals (TSAs) being conducted of Department of Energy (DOE) operations (nuclear and non-nuclear) by the Assistant Secretary of Environment, Safety and Health (ES&H), Office of Safety Appraisals. These TSAs are one of the initiatives announced by the Secretary of Energy on September 18, 1985, to enhance the DOE's environment, safety, and health program.

This TSA report focuses on the non-nuclear operations of Brookhaven National Laboratory (BNL). Figure 1 illustrates the layout of the BNL site and identifies all important buildings and facilities. The appraisal was conducted by a team of experts assembled by the Office of Safety Appraisals and took place during onsite visits from August 28 through September 2 and September 11 through 22, 1989.

Brookhaven National Laboratory is a multiprogram national laboratory operated for DOE by Associated Universities, Inc., a nonprofit research management organization. Its missions are to (1) design, build, and operate large facilities in high-energy physics and life sciences for university and other users, (2) conduct original research in broad areas, and (3) respond to national needs. The 5,200-acre Laboratory was founded in 1948 on the site of Camp Upton, a military training facility. Current staff comprise 3,200 people, including approximately 700 scientists and an equal number of engineers.

Among BNL's scientific efforts, the physics program is one of the most important; three Nobel prizes have been awarded for experiments performed at BNL in the area of high-energy physics. Other major research areas at BNL include chemistry, biology, mathematics, medicine, oceanography, atmospheric sciences, and energy technology.

Brookhaven National Laboratory has unique experimental facilities and operates some of these primarily as user facilities. For example, the National Synchrotron Light Source (NSLS), with a staff of about 210, currently serves over 1,200 users from 162 organizations including all other DOE laboratories and many major universities (e.g., Cornell, Johns Hopkins) and corporations (e.g., IBM, Exxon). BNL's own scientific and engineering staff account for between 15% and 20% of the total experimental work done at some of these facilities. Of this, over 80% is DOE-sponsored.

User facilities at BNL include the Alternating Gradient Synchrotron (AGS), which produces protons and, in conjunction with the Tandem Van de Graaff accelerator, heavy ions; the High-

Flux Beam Reactor (HFBR)[a]; the NSLS, which produces x-ray and ultraviolet radiation; the Linear Accelerator (LINAC); and a scanning transmission electron microscope (STEM).

The operations of the various facilities on this site present potential health and safety hazards that vary with the diversity of the site's facilities. These potential hazards are localized, present no off-site risks, and are considered to be of low probability and severity. Such hazards include radiation from various large and small accelerators, the light source, and radioactive materials used in research laboratories. Industrial and occupational hazards exist site wide. Packaging and transportation, treatment and handling, and disposal of radioactive materials, toxic chemicals, and biological materials also pose site-wide hazards.

Again, it is noted that the scope of this TSA is limited to non-nuclear facilities; the operation of nuclear facilities at BNL involves a unique set of hazards, which were assessed in part in a previous TSA specific to the HFBR. Limited aviation and marine hazards exist on the site, but are not considered in this TSA.

TSAs are operationally focused evaluations. As such, a TSA appraises how, in terms of safety, health, and quality assurance, a facility is being operated and the condition of its equipment. The design of a facility and its systems to permit safe operation is presumed by the TSA process to be adequate. This approach is based upon the assumption that an appropriate selection and application of design standards was used by the architect-engineer and that appropriate independent reviews were made by DOE or its predecessor agencies of the design, the construction activities, and the Safety Analysis Reports (SARs). This TSA does address whether the current operations are being conducted within the operational safety procedures established for the facility.

The Appraisal Team's efforts were guided by the performance objectives and supporting criteria for TSAs of non-nuclear facilities. The performance objectives which generated concerns are identified, together with the concerns and supporting findings, in Section III of the report. The concerns identified by the Appraisal Team are located under the performance objectives that are the most relevant to the concerns. The summary section provides general conclusions regarding the performance objectives pertaining to that appraisal area. In many cases, findings supporting a concern can also be found under other performance objectives. When this is the case, cross-references have been provided. Only findings that led the Team to a concern are included in this report; thus, a number of the

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[a] This nuclear facility was not in the scope of this TSA.

performance objectives are not discussed in detail, as no significant findings were identified for them.

A concern addresses a situation that in the judgment of the Appraisal Team (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 addressing the excellence of the operation, more concerns are reported than would result from a strictly compliance-oriented appraisal.

In addition to identifying concerns, the Appraisal Team looked for exceptionally good practices in accomplishing performance objectives.

This appraisal is an evaluation at a fixed point in time. As a result, improvements to safety that were planned, but are not yet completed, are identified as concerns if the Appraisal Team judged that failure to complete the improvements would significantly impact the safety of facility operations.

To ensure the accuracy and appropriateness of the report's contents, the Appraisal Team divided into review groups to provide detailed critiques to other review group members; each team member validated his or her findings and concerns with contractor management counterparts; and, as a last step, the entire Appraisal Team, as a group, spent considerable time addressing the report's clarity and consistency.

The findings and concerns developed by the Appraisal Team were shared with BNL and DOE Chicago Operations (DOE-CH) in an exit meeting held on September 22, 1989. The final report has been validated for factual accuracy with BNL, the DOE Brookhaven Area Office (BHO), and DOE-CH. A general assessment of the TSA findings and their bearing on BNL's operations is provided in Section II. Results of this TSA are given in Section III for each of the 14 technical safety areas reviewed at BNL. For ease in reading, this report includes a summary of only the findings that support concerns in each performance objective. Appendix A describes the systems for categorizing concerns. The concerns are categorized and tabulated in Appendix B.

The Appraisal Team was guided by the EH Senior Manager, Mr. Oliver Lynch, Director, Safety Inspections Division, Office of Safety Appraisals (OSA). Dr. Yo Taik Song of OSA was the Team Leader, and Mr. Albert D. Morrongiello, OSA, was the Assistant Team Leader. The Appraisal Team consisted of 18 experts including DOE employees, DOE contractors, and outside consultants. The members of the Appraisal Team and their areas of principal assignment are listed in Appendix C. A biographical sketch of each of the Appraisal Team members is included in Appendix D.

The Appraisal Team wishes to express its appreciation for the excellent cooperation provided by all levels of BNL management and staff and for the hospitality and support of DOE-BHO and DOE-CH.

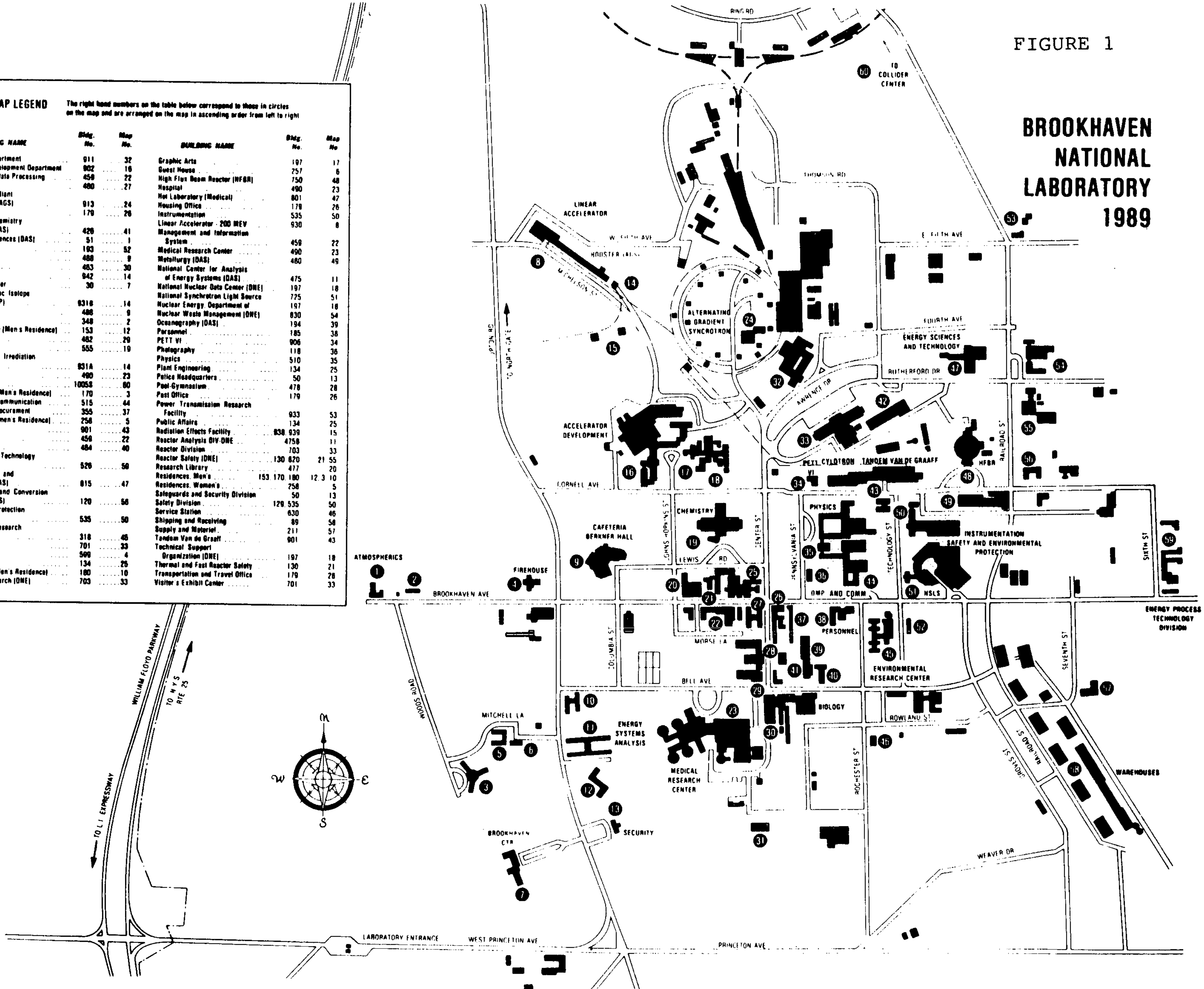
FIGURE 1

BROOKHAVEN NATIONAL LABORATORY 1989

MAP LEGEND

The right hand numbers on the table below correspond to those in circles on the map and are arranged on the map in ascending order from left to right

BUILDING NAME	Bldg. No.	Map No.
Accelerator Department	911	32
Accelerator Development Department	902	16
Administrative Data Processing	459	22
Administration	460	27
Alternating Gradient Synchrotron (AGS)	913	24
Applied Science	179	26
Atmospheric Chemistry Laboratory (DAS)	426	41
Atmospheric Sciences (DAS)	51	1
Bank	193	52
Berkner Hall	488	9
Biology	463	30
Booster (AGS)	942	14
Brookhaven Center	30	7
Brookhaven Linac Isotope Producer (BLIP)	931B	14
Cafeteria	488	9
Calibration	348	2
Cavendish House (Men's Residence)	153	12
Central Shops	462	29
Chemistry	555	19
Chemistry Linac Irradiation Facility (CLIF)	931A	14
Clinic	490	23
Collider Center	1005S	60
Compton House (Men's Residence)	170	3
Computing and Communication	515	44
Contracts and Procurement	355	37
Curie House (Women's Residence)	258	5
Cyclotron	901	43
Data Processing	459	22
DOE-BHO	464	40
Energy Process Technology Division (DAS)	526	59
Energy Sciences and Technology (DAS)	815	47
Energy Storage and Conversion and CFMG (DAS)	120	56
Environmental Protection Division (SEP)	535	50
Environmental Research Center (DAS)	318	46
Exhibition Center	701	33
Fire Department	599	4
Fiscal	134	25
Fleming House (Men's Residence)	180	10
Gas Reactor Research (DNE)	703	33
Graphic Arts	197	17
Guest House	257	6
High Flux Beam Reactor (HFBR)	750	48
Hospital	490	23
Hot Laboratory (Medical)	801	47
Housing Office	179	26
Instrumentation	535	50
Linear Accelerator - 200 MEV	930	8
Management and Information System	459	22
Medical Research Center	490	23
Metallurgy (DAS)	480	49
National Center for Analysis of Energy Systems (DAS)	475	11
National Nuclear Data Center (DNE)	197	18
National Synchrotron Light Source	725	51
Nuclear Energy, Department of	197	18
Nuclear Waste Management (DNE)	830	54
Oceanography (DAS)	194	39
Personnel	185	38
PETT VI	906	34
Photography	118	36
Physics	510	35
Plant Engineering	134	25
Police Headquarters	50	13
Pool-Gymnasium	478	28
Post Office	179	26
Power Transmission Research Facility	933	53
Public Affairs	134	25
Radiation Effects Facility	838, 939	15
Reactor Analysis DIV-DNE	475B	11
Reactor Division	703	33
Reactor Safety (DNE)	130, 820	21, 55
Research Library	477	20
Residences, Men's	153, 170, 180	12, 3, 10
Residences, Women's	258	5
Safeguards and Security Division	50	13
Safety Division	129, 535	50
Service Station	630	46
Shipping and Receiving	89	58
Supply and Materiel	211	57
Tandem Van de Graaff	901	43
Technical Support Organization (DNE)	197	18
Thermal and Fast Reactor Safety	130	21
Transportation and Travel Office	179	28
Visitor's Exhibit Center	701	33



II. PERFORMANCE EVALUATION

This was the first sitewide TSA conducted at the Brookhaven National Laboratory (BNL), although a previous TSA was conducted at the High Flux Beam Reactor (HFBR) facility in July 1987. The TSA Team's findings and concerns indicate that management authority and responsibility is generally understood, but it is promulgated informally. Safety is considered a line responsibility, and the presence of upper-level management in the work place is manifested daily. There is a multi-tiered, relatively independent safety review mechanism in place, operating vertically within the various laboratory departments, from the line, through various safety committees, to as high as the Associated Universities, Inc., Board of Trustees, if necessary. Coordination between groups is excellent relative to operational interaction requirements for experimental activities. Because of exceptional individual expertise, very effective, face-to-face, verbal communication and a one-on-one, on-the-job training approach have been successful in imparting knowledge for conducting operations.

Under this patina, however, the informal approach to safety manifests itself in several sitewide deficiencies in the Laboratory's safety program. Safety organizations lack charters, and BNL functional responsibilities are expressed by sometimes conflicting and uncontrolled organization charts, rather than explicitly, by more formal documentation. Documentation, in general, is inconsistent, uncontrolled, and in many cases lacking. Procedures provide practices rather than controls, lack adequate content and specification, are uncontrolled, and non-existent in many areas. The BNL Safety Manual, viewed as optional by many, is sometimes substituted for procedures. A formal training program including curricula, examinations and documentation is essentially nonexistent for many experimental operations and safety-related activities; shortcomings go unrecognized and the information conveyed goes unchallenged. As the long-tenured BNL staff retire, they are likely to take with them essential, but undocumented, knowledge of facility operation and configuration.

The safety program is fragmented. The autonomy of the various laboratory departments in the management of their respective programs has resulted in some insularity and inconsistency in safety program application, approach, quality and its verification, and level of involvement of management. Some individuals abdicate a part of their safety responsibility to the safety program functionaries. Middle management lacks presence in safety activities. The safety program is, in effect, being carried by concerned and very knowledgeable individuals. The results are mixed and wide ranging depending upon the department and individual group leadership.

The fire protection program does not fully conform to codes and standards, especially in the areas of sprinkler configuration. Unsatisfactory housekeeping practices place fire loads in critical areas. Potentially severe fire losses have not been evaluated, and corrective actions of longstanding life safety code deficiencies have been deferred for years.

Occupational safety performance has been declining in the past four years. Personnel protection equipment requirements and construction safety practices for excavation activities are inadequately enforced. Although a safety awareness program has recently been initiated within the Plant Engineering Department, and safety communications (newsletters, bulletins, safety memos) are generated by all levels down to the safety coordinators/officers and Division Heads, there is no evidence of an effective BNL safety awareness program at the working level.

Intrasite transportation of radioactive and hazardous materials is inconsistently managed and controlled, and constitutes a subtle threat to site personnel proceeding between facilities or residing onsite.

There is evidence of an emerging modern safety culture at BNL, but it struggles against a lack of rigor toward safety and the absence of effective central guidance and oversight for the safety program. Today, safety at BNL is adequate, but it can and should be improved.

III. FINDINGS AND CONCERNS

The TSA team's observations, both positive and negative, on each functional area are discussed in this section. The August 1989 performance objectives and criteria for non-nuclear sites and facilities were used as guides to conduct this TSA. The findings that led to concerns for each performance objective address the more significant facts obtained, and conclusions drawn, from (1) observing routine operations and the physical condition of the facilities; (2) discussions with BNL management, technical, and craft personnel; and (3) reviewing policy statements, records, procedures, and other documents.

This team identified 93 concerns. Addressing these concerns with appropriate corrective actions will improve the level of safety of the operation in conformance with DOE Orders or industry practice, or to a level of excellence for this facility. Each concern has been classified as to its seriousness in accordance with the system described in Appendix A. Of the 93 concerns, most were Category III. One, however, was a Category I. Category I concerns are defined as having a hazard significance and urgency such that a "clear and present danger" exists to workers and/or members of the public. Category III concerns are expected to be addressed in a normal, responsive manner.

The positive aspects of BNL operations are discussed in summaries preceding the detailed discussion of each appraisal area. Findings that led to specific concerns are presented under the relevant performance objective. Noteworthy practices that should be adopted by other DOE facilities are discussed in Section IV.

To understand the full intent of any concern, it is necessary to read its basis. The resolution of individual concerns may not be sufficient to prevent their recurrence. The Appraisal Team is aware that most of its concerns are only symptomatic of underlying causal factors. The Team has therefore made an effort, drawing upon the extensive relevant experience of its members, to identify the underlying causal factors in developing its statements of concern. However, the Team recognizes that this effort is imperfect at best because of the limited time it could devote to analyzing the problem and its relative unfamiliarity with the details of the contractor's overall operation. Therefore, the Appraisal Team believes the contractor should consider the findings, and the statements of concern, as symptomatic of some set of deeper root causes, and should search out and correct those root causes so that there will be reasonable assurance that improvements in the safety of the operation will be sustainable.

A listing of the complete set of concerns developed by the Appraisal Team can be found in Appendix B.

A. ORGANIZATION AND ADMINISTRATION

The review of the BNL organization was accomplished through interviews with associate and assistant laboratory directors, department chairmen, safety coordinators, safety officers, and division heads, as well as a vice president and an auditor from the parent corporation, Associated Universities, Inc. (AUI). Selected documents were also reviewed.

The organizational structure of BNL is generally well understood. However, there are no guidelines, controls, or approvals required for the issuance of organization charts. The responsibilities and authorities are well understood by BNL management. However, formal job descriptions only exist at the Directorate level.

The overall assessment of management safety is that the facilities are generally being operated safely, but safety appears to be given a secondary priority in a number of key areas. BNL management expounds the line safety concept, but some individuals seem to abdicate a part of their safety responsibilities to the line safety coordinators and officers and to the Assistant Director for Reactor, Safety, and Security or the Safety and Environmental Protection Division. Safety-related decisions are almost always elevated to the Safety Officer or Safety Coordinator level and usually involve the safety representative of the S&EP Division. Management may or may not be involved in resolving safety issues.

The presence of upper-level management in the workplace is in most cases manifest daily; for example, upper management is periodically involved in regularly scheduled walkthrough safety inspections. The lowest level safety review is performed in the line organization by those independent of the actual operation. These reviews are coordinated by the Safety Coordinator/Safety Officer or by department/division-established safety review groups. The next level of independent review of site activities is performed under the direction of the S&EP Division, which has no program responsibilities. A higher level of review is provided by Laboratory-wide standing and ad hoc safety review committees. AUI also performs safety reviews and audits. Major safety issues may even come before the AUI Board of Trustees, when appropriate.

As a means of promoting safety, the S&EP division has instituted a pilot Team Safety Incentive Program to help reduce the number of lost-day incidents from job-related injuries. Currently, this program is only directed at a small part of the Laboratory but it has been effective. The BNL safety goals are in some cases vague and unmeasurable, and the department/division goals are rather simplistic, but some improvement has been demonstrated.

AUI and BNL each have a written Safety Policy and an Alcohol and Substance Abuse Policy. Each of these policies is promulgated throughout the Laboratory by means of various documents and memos. BNL has started a training program for supervisors to help them detect and deal with alcohol and substance abuse offenders.

The S&EP division has recently started a new safety newsletter called Super Safe for all BNL supervisors. Other Safety Bulletins are generated at the Department/Division level and circulated to staff members. Safety memos are generated at all levels from the Laboratory Director down to Safety Coordinator/Safety Officer and Division Head level. However, there is no formal system for filing and preserving these safety memos, or ensuring that each employee is apprised of current safety policy statements.

Events of a lower order than required by DOE 5000.3 "Unusual Occurrence Reporting System" are being reported. From the number of problems being reported concerning the safety interlock system, management has not been effective in trending and correcting the root cause of this very important personnel protection system. A new program has been proposed by BNL to exchange UORs with other DOE laboratories doing similar types of work.

SARs for the AGS and the 60-inch Cyclotron have never been written. A High Hazard Review was performed for the AGS in the mid 1970s and an SAR is planned for completion in September 1991. There is no current plan to develop an SAR for the 60-inch cyclotron.

Many safety management deficiencies were noted throughout the Laboratory. These common problems include the general lack of documentation; inadequate management guidance, policy, procedures, or directives; poor housekeeping; training deficiencies which include lack of training, documentation of training, or requirements.

In summary, management attention to many issues is critical to improving the overall level of safety at BNL.

OA.1 SITE ORGANIZATION

PERFORMANCE OBJECTIVE: Management should organize and manage the site's work, programs, and resources so that safety and health are an integral part of the personnel duties and requirements are consistently implemented.

FINDINGS:

- Although organization charts exist for most of the departments and divisions at BNL, there are no guidelines, tight controls, or approvals required for issuing these charts.
- BNL relies on mission and function statements and organization charts to define line-safety responsibility.
- Mission and function statements for many organizations exist in various forms and in various documents at the Laboratory.
- In one organization chart provided to the TSA team, several staff members were shown reporting simultaneously to three different supervisors. On another organization chart, some staff members' actual supervisor was not shown in the direct line.

CONCERN: (OA.1-1) (H3/C2) Lines of authority and responsibility cannot always be traced on existing organization charts, nor are organization charts controlled or approved. (See also Concern OP.1-1.)

OA.2 ADMINISTRATION

PERFORMANCE OBJECTIVE: Administrative programs and controls are in place to assure that policies concerning health and safety are administered throughout the site.

FINDINGS:

- Middle management is not providing the detailed guidance to assure a safe and healthful workplace.
- Inadequacies (nonexistent, unavailable, lack of detail, or lack of compliance) in procedures, guidance, policy or directives were noted by the team in seven appraisal areas; i.e., Operations, Training and Certification, Technical Support, Packaging and Transportation, Occupational Safety, Industrial Hygiene, and Fire Protection.
- Training problems such as non-compliance, lack of training, lack of documented training and no qualification standards were noted in six of the appraisal areas; i.e., Operations, Packaging and Transportation, Radiological Protection, Occupational Safety, Industrial Hygiene, and Training and Certification.
- The housekeeping in some facilities is poor and is not in accordance with DOE 5483.1A, 29 CFR 1910.22, and generally accepted industry practice. Deficiencies in housekeeping were noted by the team in four appraisal areas; i.e., Fire Protection, Occupational Safety, Maintenance, and Operations.
- The lack of documentation to substantiate the safe operation of the Laboratory is noted by the appraisal team in seven areas; i.e., Training and Certification, Emergency Preparedness, Technical Support, Radiological Protection, Industrial Hygiene, Fire Protection, and Maintenance.

CONCERN: (OA.2-1) (H2/C2) Administrative policies and controls are not in place to ensure the conditions that are necessary for a healthful and safe workplace.

OA.3 MANAGEMENT OBJECTIVES

PERFORMANCE OBJECTIVE: Site management objectives should ensure commitment to safe operation, including enforcement of approved work practices and procedures.

FINDINGS:

- The BNL environment, safety, and health goals for FY 88-89 are rather simplistic and vague; e.g.:
  - "increase line management involvement in safety"
  - "increase safety awareness of all laboratory personnel"
  - "increase ground water assessment program."
- Many departmental safety goals are also simplistic and vague in nature, e.g.:
  - "distribute safety policy and bulletins"
  - "continue training operations groups"
  - "we plan to make personnel more aware of our accidents and our safety statistics."
- Many management personnel interviewed regarded safety goals as being the responsibility of the Safety and Environmental Protection Division.
- At least one department chairman said that he did not have any safety goals and did not believe in them.

CONCERN: (OA.3-1) (H2/C2)
The BNL environment, safety and health goals are neither definitive nor measurable and in many cases lack specific departmental action plans to accomplish the BNL-wide goals as well as the specific departmental goals. Safety goals are also not embraced or appreciated by all Laboratory management. (See also Concern OP.1-3.)

OA.5 MANAGEMENT ASSESSMENT

PERFORMANCE OBJECTIVE: Management and supervisory personnel should monitor and assess site and facility activities to improve performance in all aspects of the operation.

FINDINGS:

- The trending of interlock problems is not being documented; therefore, the root cause of the problem has not been addressed.
- In the past three years (Sept. 1986 - Sept. 1989) there have been eight UORs dealing with interlock failure, bypassing, or other misuse of interlocks.
- In April 1988 it was reported that the E-802 Test Beam was operated while the test area was occupied. No interlock was installed. This was not reported as a UOR.
- In August 1988 a Chemistry Department appraisal reported that a class IV laser had been in use for three months with no room interlock. This was also not reported as a UOR.

CONCERN: (OA.5-1) (H1/C2) Interlock problems, including their use, misuse and nonreporting, have not been evaluated, and the root cause of the problems determined; nor has corrective action been taken to upgrade and enforce this primary system of personnel protection. (See also Concerns RP.3-4 and TS.4-1.)

OA.6 PERSONNEL PLANNING AND QUALIFICATION

PERFORMANCE OBJECTIVE: Personnel programs should ensure that appropriate job qualification requirements or job descriptions are established for all positions that affect safe and reliable operation.

FINDINGS:

- No official job description exists for individuals below the Directorate level.
- Generic job descriptions for classes of employees such as "Staff Engineer" exist in various documents such as the <u>Brookhaven National Laboratory Safety Manual</u> and the <u>Supervisors Handbook</u>.
- Specific job qualifications are generally not established.

CONCERN: (OA.6-1) (H3/C2) Personnel programs do not ensure that specific job descriptions and job qualifications are established for all positions that affect safe and reliable operation.

OA.7 DOCUMENT CONTROL

PERFORMANCE OBJECTIVE: Document control systems should provide correct, readily accessible information to support site operations.

FINDINGS:

- There is no guidance or order in the issuance of Safety Policy memos.
- The BNL Safety Policy is contained in the Brookhaven National Laboratory Safety Manual. Many copies of this document are not kept up-to-date.
- The BNL Safety Policy statements are amplified, expounded upon, interpreted, and re-emphasized by memos from various BNL management. However, these memos are not always readily available to the staff.
- One organization, in an attempt to make order out of chaos, assembled all applicable Safety Policy memos from all authority levels. The number of separate memos filled a large notebook.
- With the current lack of structure and order in the issuance of Safety Policy memos, employees cannot retrieve and, therefore, be conversant on the latest Safety Policy issuance.
- Operating procedures are not always clearly identified or readily available to the operators and supervisors at work stations. (See Performance Objective OP.3.)
- Implementing procedures governing the availability and control of drawings and other operator references do not exist. (See Performance Objective OP.3.)
- Drawings, technical manuals, and other documents pertinent to safe operations are not available at each facility or from other sources. (See Performance Objective OP.3.)

CONCERN: (OA.7-1) (H2/C2) Management is not ensuring control of vital safety and operating documents.

FINDINGS:

- An SAR has never been written for the AGS and the 60-inch Cyclotron.

- A High Hazard Review of the AGS that evaluated some high level hazards was performed in the mid 1970s.

- The AGS is being modified to incorporate a booster ring that will increase the AGS capability. An SAR for the booster ring is being prepared and is scheduled for completion in March 1991.

- An SAR for the AGS is currently scheduled for completion in September 1991.

- There are no current plans to develop an SAR for the 60-inch Cyclotron.

- DOE 5481.1B dated 9/23/86, "Safety Analysis and Review System," that requires an SAR for DOE facilities, was first issued on 3/20/79.

CONCERN: (OA.7-2) (H2/C1) The AGS and the 60-inch Cyclotron are not in compliance with DOE 5481.1B, which requires an SAR for each DOE facility.

B. OPERATIONS

This appraisal of BNL's operational safety encompassed 22 facilities, which were chosen because of their contribution to the fulfillment of the BNL mission as well as their size, complexity, and hazard potential: these facilities included the 150-keV X-Ray Irradiation Facility (Maxitron), the ^{60}Co Irradiation Facility, the Electron Microscope Facility, the PETT VI, the Tandem Van de Graaff, 41-inch and 60-inch Cyclotrons, the Controlled Environment Radiation Facility, the Brookhaven Linac Isotope Producer, the Total Body Neutron Activation Facility, the Prompt Gamma Nitrogen Neutron Activation Facility, the Partial Body (Hand) Neutron Activation Facility, the AGS, the LINAC (AGS injector), the Radiation Exposure Facility, the Neutral Beam Test Facility, the NSLS, and the hot labs associated with the production of neutron-deficient nuclides for use in the Medical Department. Also visited were the water treatment, steam, and sewage treatment plants.

Management and staff were interviewed to ascertain how operations were conducted, managed, and controlled. The facilities were inspected; log books, records, and procedures were examined; and policy and practices were reviewed.

Operations at BNL can be divided into three major groups, the research facility operations, support facility operations and experiment operations. These groups function independently and have an informal relationship.

Wherever possible, actual facility operations were monitored. It became apparent that there are no site-wide policies governing operations, each facility's approach to and philosophy of operational safety is unique. This precipitated a number concerns relative to the definition and delegation of authority and responsibility throughout the operating organizations. The operating organization's structure is not well defined and the responsibilities and authorities of each manager, supervisor, and operator are not explicitly stated.

Operations were conducted in an informal but professional manner. The operators were attentive and responsive to equipment parameters and conditions. The policy and procedures which typically support operations and govern the shift change process, log practices, and the control and use of operating procedure do not exist. Consequently, there is a general absence of control over the preparation and use of procedures, record keeping and the communication of information related to operations.

The lack of training curricula and testing and performance standards could severely impact operations if attrition of current operators were to occur. Such a risk appears unacceptable in view of the unique and irreplaceable facilities at BNL. The team observed that operators were not knowledgeable about the support systems of their facilities and did not fully understand the impact of status changes of support equipment on the machines they operate.

Housekeeping, in some areas, is neglected and is not in accordance with DOE 5483.1A and 29 CFR.

Many of the facilities at BNL pre-date the widespread use of human engineering applications. However, the use of human factors considerations in the design of future facilities and the identification of installed equipment can reduce the potential for error.

The safety aspects of experiments are thoroughly reviewed by committees within the department conducting the experiment, as well as by a safety committee. These committee approvals are also the vehicle by which the competence of the experimenters is investigated. While this tandem review process seems to be thorough, documentation of requirements placed on the experiment by the committees has been found to be wanting.

A lock-out/tag-out program and procedures are in place at BNL. The program is not rigorously enforced, is therefore ineffective and increases the possibility of injury to the staff. The program as enforced is not in compliance with DOE 5483.1 and 29 CFR.

At all levels of the facility operating organization, from operators and technicians to management, BNL staff displayed an enthusiasm for their work and for improving the operation of their facilities.

OP.1 ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE: Operations organization and administration should ensure effective implementation and control of operations activities.

FINDINGS:

- The organization chart is the primary means by which the relationships of the BNL operations organizations are identified; however, there is no policy governing the preparation, format, approval, and control of organization charts.
- Several facilities have multiple, conflicting organization charts.
- Operations' organization charts for several facilities did not clearly delineate lines of authority.
- A formal document defining the authority, responsibility, and accountability of each facilities operations organization does not exist.

CONCERN: See Concern OA.1-1.

FINDINGS:

- The responsibilities and authorities of each position within the operating organization are promulgated in an informal and primarily verbal manner.
- The responsibilities and authorities of each person responsible for operations activities are discussed as part of the annual employee evaluation.

CONCERN: (OP.1-1) (H3/C2) The responsibilities and authorities of each position in the organization are not uniquely defined in a formal document made available to the staff at large. (See Concern OA.6-1.)

FINDINGS:

- Goals and performance indicators were not specified at most operating facilities.
- Where goals and performance indicators exist, they are not always stated in terms that are measurable.

CONCERN: (OP.1-2) (H3/C2) Measurable goal and performance indicators are not used at many facilities to effectively improve performance and safe operations. (See also Concern OA.3-1.)

OP.2 CONDUCT OF OPERATIONS

PERFORMANCE OBJECTIVE: Operational activities should be conducted in a manner that achieves safe and reliable operation.

FINDINGS:

- Generally accepted recordkeeping practices dictate that all official operations logbooks are maintained in a bound journal having numbered pages. BNL Facility operating logbooks are not always maintained in a bound journal having numbered pages.
- All changes in equipment status and the time at which the change occurred were not always entered in the facility operations logs.
- Log books were not initialed by members of other shifts or the supervisors to indicate their review and understanding of the log book entries.
- Log entries are not always explicit enough to permit the reconstruction of facility status at any given time.
- Use and maintenance of operating logs is informal.
- Documentation (log books) of facility operations is inadequate to provide a history of conditions and actions necessary to assure continued safe operation by subsequent crews.

CONCERN: (OP.2-1) (H3/C2) BNL, in general, does not have policy and procedures establishing the requirements for facility operations logs, their content, use, and review.

OP.3 OPERATIONS PROCEDURES AND DOCUMENTATION

PERFORMANCE OBJECTIVE: Approved written procedures, procedure policies and data sheets should provide effective guidance for normal and abnormal operation of each function on the site.

FINDINGS:

- The preparation, review, approval, and revision of operating procedures and data sheets were not properly controlled or auditable.
- The information contained in various operating procedures was not of uniform quality or content for facilities of similar complexity, and within the same facility.
- In general, the content and format of operating procedures were not specified for each facility.
- A formal methodology for verifying and validating procedures prior to use was not evident.
- A policy governing the use of procedures has not been implemented.
- Operating procedures are routinely transmitted in memorandum form.
- Numerous operating procedures do not identify the equipment to which they apply and are not identified as procedures to be used in the operation of equipment.
- At many facilities the operating procedures are not controlled and maintained in an easily retrievable form such as an operations manual.
- Some operating facilities did not have operating procedures.
- A lack of operating procedures has been cited as contributing to several accidents dating to 1986. One of the accidents reviewed resulted in a loss of life and property. However, BNL does not have a definitive program plan and schedule for evaluating and implementing operating procedures programs at each BNL facility.

CONCERN: (OP.3-1) (H2/C2) In general, the BNL process for procedure preparation, approval, modification, distribution, and safety impact determination is inconsistent, not formalized, and undocumented.

FINDINGS:
- Indices of operating procedures and checklists did not exist at most facilities.
- Indices of drawings, technical manuals, and other documents applicable to the operation of the facilities were not available at each facility.
- The drawings, technical manuals, and other documents pertinent to the operations of the facilities were not always available at each facility.

CONCERN: See Concern OA.7-1.

FINDINGS:
- Supplemental operating information and instructions were posted in control rooms. These were not signed, dated, or controlled. Personnel stated that the supervisors viewed the information often enough to ensure its validity.

CONCERN: (OP.3-2) (H2/C2) A policy controlling the posting and implementation of operating aids in the control rooms does not exist.

FINDINGS:
- <u>National Synchrotron Light Source Safety Analysis Report</u>, July 1982, 2.4.1.2 "Responsibilities" requires that, "On each shift at least two qualified operators will be on duty and will have responsibility for the operation of the NSLS facility. A third person will be available on call at all times to insure that the control room is always manned."
- The NSLS shift complement during normal operations consists of one qualified control room operator and an operations coordinator, not required to be a qualified operator.
- A formal method to ensure that a third person is available on call has not been implemented at NSLS.
- <u>Phase II Safety Analysis Report National Synchrotron Light Source</u>, June 1989, 2.4 "Safety Training," states that "Users who will be staying for more than two weeks, or will be returning repeatedly, are required to attend the New Employee Safety Orientation and the Film Badge Wearer's Orientation given by the S&EP Division."
- The practice at the NSLS is to require users who will be at the facility 4-5 weeks or less to view an 11-minute videotape in lieu of attending the training required by the SAR.

- 200 MeV Radiation Effects Facility Final Safety Analysis Report, BNL/NPB-87-29R, 3.4 "Training" states, "A Radiation Effects Facility Procedures document will be developed as the facility is brought on-line. Typical procedures in this document will include access control procedures, emergency evaluation procedures, security procedures, operating procedures for specialized equipment--alarm response procedures for facility annunciators--response procedures to malfunctions in the facility electrical power distribution system, and similar procedures."

- The REF is now "on-line." Alarm response procedures, access control procedures, and response procedures to malfunctions in the facility electrical power distribution system have not been developed.

CONCERN: (OP.3-3) (H2/C2) The operation of the NSLS and REF facilities is not in compliance with their Safety Analysis Reports.

OP.5 OPERATION OF EXPERIMENTS

PERFORMANCE OBJECTIVE: Experiments performed on the site should not present undue risk or significantly increase the risk previously evaluated for the facility or the site.

FINDINGS:

- The requirement for the use of procedures during the conduct of experiments is determined during the experiment review and approval process. The responsibility for safety during the conduct of an experiment is not documented in the experiment procedures.

- Procedures governing the operation of experiments do not include:

  - Operating and safety limitations on the experiments. Limitations are understood by the personnel involved but are not necessarily documented in the experiment procedures.

  - Provisions for approval of the procedure.

  - Actions to be taken in the event of abnormal or off-normal conditions.

CONCERN: (OP.5-1) (H2/C2) The control, use, and content of operating procedures for experiments are not sufficient to ensure that the experimenter is provided a well-defined safe operating envelope.

FINDINGS:

- A list authorizing access for qualified experimenters, and users to the NSLS does not exist.

- Access points to the NSLS experiment floor area are not under surveillance.

- The digital lock combination for the access doors to the experiment floor area is not controlled and is widely known.

CONCERN: (OP.5-2) (H2/C2) Controls and procedures are not in place to ensure that access to the NSLS experiment floor area is restricted to authorized and trained users and escorted visitors.

OP.6 FACILITY STATUS CONTROLS

PERFORMANCE OBJECTIVE: Operations personnel should know the status of the systems and equipment under their control and the effect of non-operational systems and equipment on continued operation. They should ensure that systems and equipment are controlled in a manner that supports safe and reliable operation.

FINDINGS:

- Most facilities do not post the current facility status at a central location.
- The acceptable operating states (operating, shutdown, standby) of facilities and the condition of supporting equipment and components have not been defined.
- Policies and procedures defining controls for determining facility status did not exist.

CONCERN: (OP.6-1) (H3/C2) Management has not established standards and directives providing a clear concise statement of acceptable operating states for facilities and experiments.

FINDINGS:

- Several electrical breakers were locked-out using wire instead of padlocks as required by BNL Occupational Health and Safety Guide 1.5.1, "Lock-Out/Tag-Out Requirements."
- The operating staff of most facilities were not aware of all the hold tags in use within their facility.
- A pump had been removed from a system. The pump motor circuit breaker had been properly secured with a hold tag. The fluid system inlet and outlet valves for the pump had been shut but a hold tag had not been attached to preclude inadvertent opening of the valves.
- Adequate reviews of the hold tag records at some facilities are not being performed as required by "Lock-Out/Tag-Out Requirements."
- Supervisory Safety Meeting Notes, October 14, 1988, contains this: "The discussion on 'How do we handle safety problems?' led to the following: The rules should be clearly stated.
However, the Red Tag rule which is clearly stated is not followed. Two supervisors report that they allow turning off equipment from the MCR via phone conversation since having the caller Red Tag the

equipment may slow the job down."

CONCERN: BNL Health and Safety Guide 1.5.1, "Lock-Out/Tag-
(OP.6-2) Out Requirements" is not being enforced as required by
(H1/C1) DOE 5483.1A and 29 CFR 1910.147.

OP.7 OPERATIONS STATIONS AND EQUIPMENT

PERFORMANCE OBJECTIVE: Operations stations and equipment should effectively support the specific operation.

FINDINGS:

- Most areas visited were quite clean. Those areas "off the beaten path," such as utility equipment rooms and store rooms, were often dirty and cluttered.
  - Tools, parts, and material's used for repair work were left on scaffolds and catwalks.
  - Discarded paper, plastic material, and other combustibles were found in instrument racks in several control rooms.
  - Combustible and noncombustible scrap material generated during maintenance and modification activities was found in the instrument racks in several control rooms.
  - Some experiment areas were unkempt; tools and wastepaper were left lying about.

CONCERN: (OP.7-1) (H2/C1) The housekeeping in some facilities is poor and is not in accordance with DOE 5483.1A, 29CFR 1910.22, and generally accepted industrial practice. (See also Concerns OS.5-1 and FP.7-4.)

OP.8 OPERATOR KNOWLEDGE AND PERFORMANCE

PERFORMANCE OBJECTIVE: Operator knowledge and performance should support safe and reliable operation of the equipment and systems for which they are responsible.

FINDINGS:

- Most operating organizations have no formal operator training program, established curricula, or qualification program.
- On-the-job training was found to be informal. In most cases qualification checklists were not used.
- Operators are considered qualified when their supervision deems they are qualified.

CONCERN: See Concern TC.1-1.

FINDINGS:

- Some facility and control room operators interviewed exhibited detailed knowledge of the machines they operated but were not knowledgeable about the support systems of the facilities in which the machines are located.
- Several operations were witnessed and interviews conducted, from which it was apparent that the operators do not fully understand the impact of changes in the status of equipment and components upon the machines they operate.

CONCERN: (OP.8-1) (H2/C2) The depth and breadth of operator knowledge is not commensurate with acceptable industrial practices at facilities of comparable sophistication and complexity.

OP.9 HUMAN FACTORS

PERFORMANCE OBJECTIVE: **Human factors considerations should be incorporated in the design, layout, and operation of all facilities on the site in order to facilitate operator control, information processing, and the recognition of and proper response to alarms, instruments, and other equipment.**

FINDINGS:

- Color coding conventions for alarms and control were not consistent within or between facilities. Emergency shutdown buttons in one facility were colored green while in most facilities they are colored red. The equipment status associated with red lights and green lights was not consistent between facilities.
- Color and shape coding conventions for similar safety-related controls are inconsistent between facilities.
- Much of the mechanical equipment and many electrical breakers were not labeled.
- Many controls and displays were not labeled.
- The nomenclature and format used on labels is not consistent within or between facilities, which could cause emergency response personnel and personnel new to the facility to incorrectly identify equipment.
- Many labels were made using masking tape or paper and felt tip pens.

CONCERN: (OP.9-1) (H2/C2) BNL has not developed and implemented coding convention standards (color, size, shape, position and nomenclature) for facility components and equipment.

OP.10 SHIFT TURNOVER

PERFORMANCE OBJECTIVE: Turnovers conducted for each shift station should ensure the effective and accurate transfer of information between shift personnel.

FINDINGS:

- Written guides or checklists were not used at most facilities to ensure that all information essential to safe operation was transferred at shift change meetings. The shift change meetings were not consistent in content.

- A required reading file or similar formal mechanism which ensures the oncoming shift is aware of recently published information bearing on the safe operation of the facility does not exist.

- The shift changes witnessed did not include a review of the control boards, panels, lock and hold tag status, and computer-generated logs by the participating parties.

- The oncoming shift operator and safety coordinator did not discuss the facility status in their respective areas with each other. Close cooperation and coordination between the shift operator and safety coordinator is important to safe operation of the facility.

CONCERN: (OP.10-1) (H2/C2) The current shift turnover process does not assure effective and accurate transfer of essential information regarding the facility status between crews and interacting members of the same crew.

C. MAINTENANCE

This appraisal reviewed the maintenance activities of the NSLS, AGS, Biology and Nuclear Energy departments and the Plant Engineering, Central Shops, and Instrumentation divisions. Maintenance activities at BNL comprise real property activities, which pertain to buildings, grounds, roads and associated facilities and equipment, and are the responsibility of the Operations and Maintenance Group, Plant Engineering Division; and the project/experiment activities associated with department operated facilities and experiments, which are the direct responsibility of the NSLS, AGS, Biology, Medical, Applied Science and the rest of the research departments at BNL. Generally, experimental hardware is the responsibility of the experimenter and maintenance is either performed by the experimenter or is contracted to outside labs or firms. The Operations and Maintenance Group also provides maintenance support for the project/experiment activities when requested.

The organization and administration for the real property maintenance activities is in place, is well defined, and provides the ability to track and document work in accordance with the requirements of DOE 4330.4. Maintenance activities for the experimenter and departmental projects are not well defined, particularly for some facilities and experiments that are performed by or are in direct support of a department.

Maintenance of the material condition of the facilities, equipment and components is generally adequate. In some support facilities, however, space for equipment and machines is not sufficient to ensure safety. Housekeeping in some facilities is also poor, often as a result of high equipment density.

The conduct of maintenance is adequate and generally provides effective support of the facilities and experiments. Frequent meetings between operations, experimenters and maintenance support personnel provide for coordinated maintenance efforts. Regularly scheduled down time is provided for maintenance, modification, and new experiment setup for NSLS and AGS.

Preventive maintenance activities are scheduled and tracked, for real property, equipment and facilities and, to the extent possible, for the project/experiment equipment and facilities. Because of the operation of NSLS and AGS, preventive maintenance is performed during scheduled down time. In many cases the facilities, equipment and material are reaching end of life or are no longer state-of-the-art. As a result, effective maintenance support cannot always be accomplished and current safety standards met.

The planning, scheduling and control of work activity is administered very well in the Plant Engineering Division and is dictated by planned shutdown periods for AGS and NSLS and their associated support facilities. Daily maintenance is provided in Central Shops by onsite personnel.

Procedures for directing and documenting maintenance are not provided in all areas. Notably, some of the Central Shops and department experiment and experiment support activities are deficient. Vendor manuals are used to guide maintenance in these areas but records are not complete or comprehensive. The real property maintenance program recently instituted by Plant Engineering activities has established record keeping procedures that meet DOE 1324.2.

Because maintenance activities are not being adequately recorded and vendor manuals or outside vendor representative contractors are being used to perform maintenance activities, maintenance history is not being used to optimize equipment performance. This situation will pose serious difficulties as senior staff, intimately familiar with the one-of-a-kind equipment, begin to retire from BNL.

MA.1 ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE: Maintenance organization and administration should ensure effective implementation and control of maintenance activities.

FINDINGS:

- The maintenance activities for BNL have been divided into two categories. Real property maintenance activities are assigned to the Plant Engineering Division. Maintenance activities for the approximately 10 departments, facilities, and experiment equipment are assigned to the individual departments.
- The requirements for, and performance of, maintenance activities vary considerably across BNL and even within given departments.
- The organization and administration of maintenance activities for the departments, facilities and experiment equipment is not consistent with the requirements of DOE 4330.4.

CONCERN: (MA.1-1) (H2/C1) A uniform, BNL-wide maintenance program, consistent with the requirements of DOE 4330.4, industry standards, and good practices is not provided by the current organizational structure.

FINDINGS:

- The organizational structure for the NSLS does not indicate delegation of responsibility for the maintenance activity. For this appraisal, the Operations and Control Room manager provided the interface as the NSLS maintenance counterpart.
- The job description for the NSLS Operations Manager indicates that he is responsible for the "framing of long-range operations/studies/ maintenance/schedule."
- Based on the NSLS organizational chart and the information provided during this appraisal, the conduct of maintenance is performed by personnel assigned to a number of different groups at the NSLS.

CONCERN: (MA.1-2) (H2/C2) The responsibility for the maintenance activity at NSLS is not defined.

MA.2 MATERIAL CONDITION

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:

- Housekeeping in some of the Plant Engineering facilities, Central Shops, experiment areas, shop areas, and experiment lines, such as the steam plant, AGS Bldg. 912, AGS power room, AGS beam line, and some central shops, is poor.
- The old facilities and high density of machines in Central Shops Buildings 462 and part of 479, could lead to unsafe conditions.
- The Steam Plant facility is crowded and tightly packed with equipment and can lead to unsafe conditions.

CONCERN: (MA.2-1) (H2/C2) Many BNL facilities are crowded with equipment (which in some cases is unused) and may impact safe effective operation, industry safety standards, and good operating practices.

MA. 5 MAINTENANCE FACILITIES, EQUIPMENT, AND MATERIAL

PERFORMANCE OBJECTIVE: Facilities, equipment, and material should effectively support the performance of maintenance activities.

FINDINGS:

- Maintenance shops, in general, are so cramped and overloaded with equipment that there is insufficient room between equipment and machines to comply with industry standards and support efficient maintenance activities.

- Some maintenance facilities and work areas are not located and arranged in a manner that promotes safe and effective work completion.

- Floor markings to indicate safe clearance areas around machines are not provided in many of the shops.

- Signs indicating the requirements for wearing safety glasses are not posted in a consistent manner. In addition, the requirement to wear safety glasses in some shop areas is not adequately or uniformly enforced. (See Concern OS.5-1.)

CONCERN: (MA.5-1) (H2/C2) Lack of consistent application of safety requirements in maintenance shop areas promotes unsafe conditions and contributes to the potential for accidents and injury.

MA.7 PROCEDURES AND DOCUMENTATION

PERFORMANCE OBJECTIVE: Maintenance procedures should provide appropriate directions for work and should be used to ensure that maintenance is performed safely and effectively.

FINDINGS:

- Maintenance procedures and records are not provided and maintained uniformly across the BNL site.

- The Plant Engineering Division records are maintained using a computer-based system and are in accordance with DOE 1324.2.

- Maintenance documentation for department experiments and facilities is inconsistent and not in compliance with DOE 1324.2.

- Documentation of maintenance activities for the Central Shops consists primarily of equipment type inventory/job cards and does not provide adequate documentation information.

- Documentation of maintenance activities in some of the AGS and NSLS areas, such as the Experiment Planning and Support Division and the Power Room, is inadequate. Incomplete log books, which dated back 15 years and did not have any entries for the past 3 to 5 years, were presented as evidence of documented maintenance activities.

- Vendor log books and subcontractor maintenance and repair service receipts are being used as evidence of some department maintenance activities. In many cases these receipts do not provide the information necessary to document maintenance activities, nor does this practice enforce adherence to the requirement for documentation.

- Many of the maintenance activities in the AGS and AGS support groups are being performed on equipment that is one-of-a-kind and was built in-house with minimal or no documentation. Essentially, the builder is also the operator as well as the maintainer, and is the only one familiar with the equipment.

CONCERN: (MA.7-1) (H2/C1)

Documentation of maintenance requirements, procedures, and activities is incomplete and not sufficiently accurate to ensure safe and effective maintenance. This lack of documentation may affect the continuity of operations of one-of-a-kind and other special equipment should existing experienced personnel retire or transfer.

MA.8 HISTORY

PERFORMANCE OBJECTIVE: Maintenance history should be used to support maintenance activities and optimize equipment performance.

FINDINGS:

- Maintenance history records are not being maintained for some department and experiment equipment.
- Examination of the receipts from outside contract maintenance and calibration services indicates that maintenance information and data are not provided in sufficient detail for maintenance history purposes.

CONCERN: (MA.8-1) (H2/C2)
Documentation of maintenance data and information is not adequate to support a maintenance history program. (See also Concern TS.4-1.)

D. TRAINING AND CERTIFICATION

The status and effectiveness of safety and operational training programs at BNL were appraised. Departments, facilities, and activities that were included in this effort are listed as follows: S&EP, Safeguards and Security (SSD), Supply & Materiel (S&M), Plant Engineering (PE) (Central Steam, Water Treatment), NSLS, AGS, Personnel, Chemistry (PETT VI Facility), and Biology (Controlled Environment Radiation Facility - CERF). Interviews were conducted with personnel at the various facilities, and three training presentations and an emergency drill at AGS were observed.

Personnel at BNL exhibit a general concern for safety, but several weaknesses have been identified in the area of training and certification. BNL has no Laboratory-wide training policy or requirements for initial and ongoing qualification programs related to operational job tasks. Trainee evaluation techniques and methods vary from department to department and in many cases do not exist. There is no assurance that employees will be adequately trained to safely carry out their assigned duties.

Safety representatives from S&EP coordinate any specific training that may be requested by a department. Training facilities and equipment are for the most part adequate. The training courses observed during this appraisal period were presented effectively and professionally. However, there is no formalized system of lesson plans, creating the potential for inconsistencies in the presentation of basic safety information to BNL employees.

Radiation Protection Technician training is satisfactory. Courses are planned for development by January 1990 to comply with increased training as specified in DOE 5480.11.

Certification of equipment operators, such as crane and heavy equipment operators, is coordinated and documented by S&EP.

S&EP maintains a data base on BNL safety training courses. Flagging of retraining requirements is presently being done manually on a quarterly basis. Plans are being made to automate the system of retraining notification. Some departments send in-house training documentation to S&EP to be put on the data base.

The frequency and content of safety meetings varies within individual departments. The AGS department initiated a safety training program for many of its supervisors that included an initial safety course presented by DuPont. Supervisors attend monthly followup safety meetings and then relay information to their staff.

The Personnel office coordinates training in communication skills and supervisory and management skills as requested. Onsite technical training programs have also been arranged upon request to address technical training needs shared by a number of departments.

Job-specific training at BNL is deficient in documenting of established training plans and programs and in evaluating employee performance. Graded exams to demonstrate qualification are virtually nonexistent. Documentation of OJT and classroom training is rarely evident. The AGS and NSLS departments have no formalized training programs for equipment operators and maintenance activities. However, the following efforts are encouraging:

- The Cryogenics Target group in AGS has developed a formal operator training manual, which is used to present classroom lectures. Although exams are not administered, OJT checklists were recently developed to document operator qualification.

- The police group has a training plan that incorporates course and certification requirements. Training is well documented.

- Plant Engineering has a training plan for facility operators and maintenance personnel. Course topics and frequencies have been set, but actual schedules have not been determined. The training instructor/coordinator is certified in OJT trainer techniques. Additional training is planned to improve lesson plan development and presentation skills. (New York State environmental certifications are required and maintained for the Plant Engineering water treatment and sewage treatment workers, but no BNL plant certification is required.)

TC.1 ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE: The training organization and administration should ensure effective implementation and control of training activities.

FINDINGS:

- BNL Personnel office maintains a document listing personnel requirements for general work classifications. However there are very few position-specific requirements established at BNL.
- BNL has not established specific qualification requirements for all job tasks, thus having no standards with which to develop performance measurement techniques. Individual job accountability cannot be tracked.

CONCERN: See Concern OA.6-1.

FINDINGS:

- The AGS training program for its operators has no formalized plan for presentation of initial operator training. Graded exams are not required for qualification. A schedule of classes given during the summer maintenance period is followed, using informal lesson plans, and no graded exams are administered.
- Operator training at the NSLS has no formal plan. Training videotapes exist and are recommended viewing for all NSLS employees, but it is not required. OJT does not incorporate checklists or guides for evaluation of trainees. There are no schedules or documentation for operational training.
- Plant Engineering facilities such as Central Steam, Water Treatment, and Sewage Treatment facilities provide no formal classroom training on plant operation and/or design for plant operators.
- The Biology Department's Controlled Environment Radiation Facility (CERF) has an ongoing retraining program for its operators. The training does not include formalized classroom training. Exams are not required for qualification.

CONCERN: (TC.1-1) (H2/C2) BNL has no lab-wide training policy or requirements for initial and ongoing qualification programs. (See also Concern OA.6-1.)

FINDINGS:

- OJT at the NSLS is not documented. Supervisory approval is the mechanism for qualification;

however, no documentation is kept on the training being done, or the method and outcome of the trainer's evaluation.

- OJT at the AGS is not documented. A new individual is placed with an experienced operator until he is approved to be on his own. There is no documentation on how the approval was determined.
- The Plant Engineering facilities do not have documentation available for current operations personnel on initial OJT training completed for employee qualification.
- The Chemistry Department's PETT VI facility does not have a documented training and qualification program for facility operators.

CONCERN:
(TC.1-2)
(H2/C2)

Training records of each individual's training participation and performance are not documented at BNL in several departments and divisions.

TC.2 GENERAL EMPLOYEE/PERSONNEL PROTECTION TRAINING

PERFORMANCE OBJECTIVE: General employee and personnel protection training programs should ensure that site 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:

- Radiation worker training is currently being accomplished with the film badge wearers orientation. In order to comply with DOE 5480.11, S&EP is planning to administer an upgraded radiation worker course to retrain all BNL film badge wearers (approximately 2000 employees).

- Presently, a schedule for retraining has not been defined. Implementation of DOE 5480.11 concerning radiation worker retraining will not be accomplished by the 1/1/90 compliance date. (A six-month extension has been requested by BNL to comply with DOE 5480.11.)

CONCERN: See Concern RP.3-1.

FINDINGS:

- The Hazards Communications Training program consists of a right-to-know course and a Hazards Communications standards course taught by IH.

- BNL first-line supervisors attend the Hazards Communication course given by IH and are to relay the applicable information to their employees. There is no documentation to indicate that the information is passed on to all employees. Additional courses on Hazards Materials Training are listed in the Safety Manual training catalogue, but records do not indicate who teaches the courses and at what frequency.

- Hazards Communications Training has not been fully implemented.

CONCERN: See Concern IH.6-1.

FINDINGS:

- Site-wide safety training provided by S&EP training lacks formalized lesson plans for courses listed in the safety manual training catalogue. General training files are disorganized and contain material not necessarily related to the course.

- S&EP safety training has not established a formal system of developed lesson plans.

CONCERN: (TC.2-1) (H2/C2) BNL does not have formalized lesson plans to ensure adequacy of safety training.

TC.3 MAINTENANCE PERSONNEL

PERFORMANCE OBJECTIVE: The maintenance personnel training programs should develop and improve the knowledge and skills necessary to perform assigned job functions.

FINDINGS:

- Maintenance done on the operational equipment at AGS and NSLS facilities is accomplished by equipment operators. No differentiation is made between maintenance training and operational training. There is no formal documentation of maintenance training being performed in those areas.

CONCERN: See Concern TC.1-1.

FINDINGS:

- The maintenance training lesson plans and visual aids are informal and not in a consistent format. QA procedures are used as lesson plans in Plant Engineering. Plans are being made to develop formal lesson plans to ensure consistent presentations.

CONCERN: See Concern TC.2-1.

FINDINGS:

- AGS and NSLS facilities do not administer graded exams for personnel maintaining operations' equipment.
- No formal exams are administered to the maintenance personnel within Plant Engineering.

CONCERN: (TC.3-1) (H2/C2) BNL has not developed and documented qualification standards and evaluation methods to adequately verify trainee competence in maintenance activities.

E. EMERGENCY PREPAREDNESS

The Laboratory-wide emergency preparedness program as well as the local emergency preparedness programs for the Medical Department, the Chemistry Department, Hazardous Waste Management, the Accelerator Department, and the National Synchrotron Light Source Department were evaluated. This review was conducted through observation of two emergency preparedness exercises, discussions with local emergency coordinators and building safety coordinators and reviews of their local emergency plans, inspections of facilities based on the information provided in emergency plans and S&EP emergency logs, review of the BNL Laboratory Emergency Response Plan, and discussions with S&EP emergency response personnel.

The organization and administration of the emergency preparedness function is generally well defined in the BNL Laboratory Emergency Response Plan. BNL is prepared to respond to emergencies involving radiological, fire, or security areas, although the formality and completeness of emergency plans and other documentation in these areas are uneven.

A "crisis manager" concept was being used during the conduct of the emergency exercise involving activation of the Emergency Operations Facility (EOF). This approach and terminology are not reflected in the Plan. Also, a complete structure for responding to nonradioactive hazardous materials emergencies is not defined in the Plan or other implementing procedures, and the magnitude and consequences of emergencies involving these materials have not been identified. There is no agreement to provide offsite treatment for contaminated, injured personnel, although discussions are under way.

Classrooms, conference rooms, and offices in Police Headquarters are taken over to establish the Laboratory EOF. Communications equipment and reference materials are either stored at Police Headquarters or are brought by members of the EOF cadre. The EOF exercise observed by members of the TSA Team indicated that this area provided satisfactory space for conduct of this particular exercise; however, aids were not used to facilitate internal communications or the control of all postulated emergencies. In addition, this area is not hardened or provided with a filtered ventilation system to permit occupancy if radioactive or hazardous materials are present in the vicinity, and no backup facility has been designated.

The Laboratory emergency preparedness organization coordinates annual local emergency preparedness exercises for all major BNL facilities, as well as the annual review/update of emergency plans. These tasks are generally well done, although some local emergency plans were found not to be updated in accordance with the requirements of the BNL Laboratory Emergency Response Plan.

During emergency exercises, both BNL-wide and local emergency response personnel performed their assigned duties. However, neither initial nor continuing training/qualification programs are documented for most of these positions.

EP.1 ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE: Emergency preparedness organization and administration should ensure effective planning for, and implementation and control of, facility/site emergency response.

FINDINGS:

- Neither the current BNL Laboratory Emergency Response Plan nor the draft revision to this plan, dated 9/1/89, addresses an organizational structure to respond to an emergency involving the release of nonradioactive, hazardous material. Discussions with cognizant emergency response personnel indicated that much of the identified structure for responding to radioactive material releases would be suitable for emergencies involving nonradioactive hazardous material. However, this approach has not yet been formalized, nor have issues such as how industrial hygiene personnel would be integrated into this structure been resolved.

- There has been no consistent, quantitative assessment of nonradiological hazards at BNL. There are nonradioactive hazardous materials on the BNL site that, if released, would have measurable onsite and possible offsite consequences. Examples of these include potential releases of chlorine and fires/explosions involving hydrogen or large fuel oil storage tanks.

- The draft revision to the BNL Laboratory Emergency Response Plan, dated 9/1/89, includes general reference to emergency action levels (EALs) and protective action guidelines (PAGs) for nonradioactive hazardous materials. However, these EALs and PAGs do not address which specific hazardous materials would potentially necessitate implementation of these response levels/ guidelines.

CONCERN: (EP.1-1) (H2/C2)

The magnitude and consequences of emergencies involving nonradioactive hazardous materials have not been identified, nor have BNL emergency plans or emergency organization structures been well defined to respond to this type of emergency. (See also Concerns PT.5-4, PT.6-2, and FP.3-1.)

EP.2 EMERGENCY PLAN AND IMPLEMENTING PROCEDURES

PERFORMANCE OBJECTIVE: The emergency plan, the emergency plan implementing procedures, and their supporting documentation should provide for effective response to operational emergencies.

FINDINGS:

- The BNL Laboratory Emergency Response Plan and DOE N 5500.3 of 3-23-88 require that local emergency response plans be developed and that they be maintained current.

- There is no local emergency plan for the Hazardous Waste Management (Igloo) area. The document provided to the TSA Team that is intended by the Hazardous Waste Management organization to fulfill this need is the draft "Contingency Plan - Hazardous Waste Management Facility," which was submitted to the State of New York as part of the application for a hazardous waste management facility in accordance with the requirements of 40 CFR. The application is not yet approved by the State.

- The Accelerator Department Local Emergency Plan was most recently revised on 2/6/84. A draft revision to this Plan was issued on 8/21/89 but has not yet been approved. The Plan currently in effect has out-of-date information, including the site warning and evacuation signals.

- Several of the local emergency plans reviewed had been recently revised. In some cases these revisions updated plans that had not previously been revised for up to four years.

CONCERN: (EP.2-1) (H2/C1) Not all local emergency plans are being kept current in accordance with the requirements of the BNL Laboratory Emergency Response Plan.

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:

- A DOE-CH Emergency Preparedness Surveillance Review was conducted of BNL during the period January 23-27, 1989, using TSA emergency readiness performance objectives and criteria. Among the concerns identified by this Review was that "an Emergency Preparedness training program, either initial or continuing, has not been developed for the majority of emergency support groups, the emergency cadre, or the Laboratory's general populace." The BNL action plan prepared in response to this concern identified that a training plan would be developed by 7/31/89. This training plan has not yet been issued, although a consultant was contracted to provide recommendations in this area.

- The TSA Team reviewed a draft training matrix, developed by a consultant to BNL, which cross references emergency organization positions with training modules. This matrix is intended to be included in the next revision to the BNL Laboratory Emergency Response Plan. While this matrix is generally comprehensive, it does not address Radiological Assistance Program (RAP) members.

- There is no documented schedule for implementing this training/qualification program for either current or new emergency response personnel.

- DOE N5500.3 of 3-23-88 and Draft DOE 5500.3A both require that training and retraining programs be established for emergency response personnel.

CONCERN: (EP.3-1) (H2/C1) Neither initial nor continuing training programs for most emergency response personnel have established formal qualification/requalification requirements. (See also Concern TC.1-1.)

EP.5 EMERGENCY FACILITIES, EQUIPMENT, AND RESOURCES

PERFORMANCE OBJECTIVE: Emergency facilities, equipment, and resources should adequately support site emergency operations.

FINDINGS:

- There is no dedicated BNL Emergency Operations Facility (EOF). When the EOF is activated, offices, a conference room, and a classroom in Police Headquarters are put into service for the emergency management team, tactical operations center, technical support center, hostage negotiation team, and public relations. Telephones, radios, and other communication equipment are stored in cabinets/closets in Police Headquarters. Some members of the EOF cadre bring special plans and procedures with them when they report to the EOF. A Bldg. 51 conference room is used for radiological support, including dose assessment and field team control.

- The primary use of the BNL EOF facilities has been for security emergencies. Most status boards in the EOF relate to security functions and status.

- During the EOF emergency exercise, team members observed several situations where effective emergency response was limited because communication aids were not used. These included use of handwritten drawings of the incident scene rather than site maps and building drawings; no use of checklists and preformatted forms for activities (e.g., press releases); road blocks and travel routes not clearly identified to crisis manager; no structured mechanism to control and distribute historian's information to emergency management personnel; no mechanism used for the crisis manager to overview situation/status with EOF cadre (e.g., large maps/drawings); and technical information, such as local emergency plans, safety analysis reports and procedures, not in evidence.

- The primary EOF is not a hardened facility and the ventilation system is not filtered to provide habitability in the event that a plume of radioactive or hazardous material threatens the EOF.

- Communications and electronic equipment for a backup EOF were ordered in August and September of 1989. Discussions among BNL Associate/Assistant Directors have been held, but no location for a backup EOF has been established.

- DOE N 5500.3 of 3-23-88, Section 6.a(2) requires that emergency backup equipment be located in readily accessible areas away from the scene of the potential accident. Draft DOE 5500.3A, Chapter IV, requires that, if a hazards assessment identifies that the EOF may need to be evacuated for personnel safety during an emergency, an alternate/backup EOF should be provided.

- There is no backup EOF available in the event that the primary EOF is uninhabitable.

CONCERN: (EP.5-1) (H2/C2) The BNL Emergency Operations Facility is not equipped to facilitate the control of all postulated emergencies.

EP.6 EMERGENCY ASSESSMENT AND NOTIFICATION

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:

- DOE-CH conducted an emergency preparedness surveillance of BNL from January 23-27, 1989, using TSA criteria for emergency readiness. Concerns identified from this surveillance included the following: emergency plans were not using emergency classifications consistent with DOE 5500.1A and DOE N 5500.3 of 3-23-88 and protective action guides (PAGs) were not available, except for radioiodine exposures. The BNL action plan developed in response to this surveillance indicated that emergency classifications, action levels, and PAGs would be added to the BNL Laboratory Emergency Response Plan by 7/31/89. While this action has not been completed, a draft revision to the Plan, dated 9/1/89, was reviewed by the TSA Team. This draft revision addresses Emergency Action Levels (EALs) and PAGs in a manner that is consistent with DOE Orders. What has not yet been accomplished is to determine, for specific BNL facilities and operations, the radioactive and other hazardous materials that could potentially require implementation of these EALs and PAGs.

- During the EOF exercise there was inconsistency as to the EAL assigned to the event, there was no simulation of the EAL being communicated to DOE-CH, and the assigned EAL was not identified on the crisis manager's status board.

CONCERN: (EP.6-1) (H2/C1) Emergency assessment and notification practices and procedures are not based on current DOE emergency event classifications or protective action guides.

F. QUALITY VERIFICATION

The quality verification efforts at BNL were reviewed by conducting interviews, observing activities, and/or examining selected documents at a sampling of departments and divisions under each of the Associate Directors and under the Chairman of the Accelerator Development Department (ADD). Included were the Quality Assurance Office, Contracts and Procurement Division, Central Shops Division, Plant Engineering Division, Supply and Materiel Division, Safety and Environmental Protection Division, Instrumentation Division, AGS Department, Medical Department, NSLS Department, ADD, and Department of Applied Science.

The BNL quality verification activities have shown considerable improvement in the last two years. The overall quality assurance policy and program has been documented and organizational responsibilities for quality verification have been described. Only 11 of the 21 departments and divisions have their individual QA programs documented. Several research activities have formalized many of their verification activities. Many of these programs, however, have been driven by external forces, such as technical safety appraisals, accident investigations, or unusual occurrences. Lessons from these experiences are sensitizing BNL management to the relationship of quality achievement to safety.

The BNL quality assurance program has been evolving over the past six years, and BNL policy for it was recently reiterated in a memorandum from the Laboratory Director to all employees. Each department, division, and project is responsible for establishing and implementing appropriate quality assurance programs. Basic requirements, generic guidelines, and detailed guide procedures for line managers to use in developing their quality assurance programs are documented in the comprehensive BNL Quality Assurance Manual. The manual includes 1) necessary requirements for QA programs intended to meet NQA-1 standards and 2) limited requirements for QA programs intended to satisfy independent scrutiny and verification of research projects.

A Quality Assurance Steering Committee, which has existed for several years, is charged with making recommendations for the development and implementation of formal quality assurance programs throughout the Laboratory, resolving BNL-wide QA issues, and establishing compatibility among the diverse organizational QA programs and quality verification activities. Nonetheless, only about one-half of the departments and divisions have prepared quality assurance programs. The Quality Assurance Steering Committee has encouraged QA awareness through "Recommended Short-Term Commitments" from each of the operating departments and divisions. Quarterly status reports on these commitments show that quality assurance plans are gradually being formalized throughout BNL. However, line managers and their quality assurance representatives have not given adequate priority to the conduct of quality verifications, surveillances, and audits of their operations. Furthermore, the BNL QA Office has only scheduled a few independent verifications or audits per year. As a result, the BNL Director and his line managers cannot be certain that the quality assurance programs are being appropriately implemented.

Recent significant changes and improvements in the control of special processes have been achieved. Personnel performing or monitoring these activities are being qualified or certified. Procedures are established and inspections are performed and recorded to verify the work.

Adequate controls are now being used in the procurement process. QA classification categories have been adopted by several major operating groups for their activities according to potential impacts upon safety, reliability, availability, cost, and schedule. These controls are now being used almost routinely in determining QA requirements for purchase orders, contracts, and intra-laboratory requisitions. The specification of QA requirements has provided a basis for assessing supplier quality, for inspecting purchased and in-house fabricated items, and controlling hardware, materials, parts, and components. However, nonconformance reporting remains a weak area. Requisitioners are solely responsible for quality inspections, and have developed their own inspection reporting systems that do not ensure that nonconformance issues are routinely raised to the appropriate level of management. The AGS Trouble Report Committee and the NSLS Fault Reporting Committee have been established to develop trends and identify root problems. Their experiences and procedures could serve as the basis for compatible nonconformance reporting throughout BNL.

The BNL policy for calibration of measuring and testing equipment allows for much latitude and is therefore not consistently implemented by the departments and divisions. Available lists of equipment that requires periodic calibration are not compatible and cannot be used to verify overall BNL conformance.

QV.1 QUALITY PROGRAMS

PERFORMANCE OBJECTIVE: Administrative programs and controls are in place to assure policies concerning quality are administered throughout the site.

FINDINGS:

- The Laboratory Director reiterated the 1985 BNL quality assurance policy in a memorandum to all employees on April 3, 1989. The policy requires each department, division, and project to establish and implement appropriate quality assurance programs.
- The BNL Quality Assurance Manual provides guidance procedures based upon DOE 5700.6B, and ANSI/ASME NQA-1, for the development of QA programs to the departments, divisions, and projects. Only 11 of the 21 departments/divisions currently in the BNL quality program have documented and approved quality verification plans. Of the many BNL projects and subdivisions, only eight have developed QA plans.

CONCERN: (QV.1-1) (H2/C1) Documented and approved quality assurance plans are not all in place at BNL as required by the BNL Quality Assurance Manual and DOE 5700.6B.

FINDINGS:

- The BNL Quality Assurance Manager is responsible for providing independent verifications or audits of the departments, divisions and projects to assure compliance with and appropriate implementation of their specific QA plans. The BNL Quality Assurance Office has performed initial audits of 10 of the 21 departments or divisions since 1986. The remaining initial audits are scheduled through 1991.
- The BNL QA office has scheduled 7 to 11 audits per year. Therefore, a 6-year cycle will be needed to complete the initial audits of all the BNL departments, divisions, projects, and subdivisions. Thereafter, a 3-year cycle is to be established.
- Line managers are responsible for evaluating, within their organization, the effectiveness of QA program implementation in assuring the safety of their activities. Quality assurance representatives have been designated by line managers for all but one of the departments or divisions in the BNL QA program to assist in implementation and verification.

- Not all line managers are evaluating the effectiveness of quality activities within their purview. The monitoring and auditing responsibilities of the designated quality assurance representatives (DQARs) are unofficially described in the BNL QA Manual and in the BNL QA Training Course. The appraisal team's review of operations radiological protection, industrial hygiene occupational safety, fire protection, packaging, and transportation showed that surveillance and internal audits by line managers need to be improved. (See Sections OP.6, OP.7, OP.9, PT.2, PT.4, PT.5, PT.6, RP.3, RP.9, IH.5, OS.4, OS.5, FP. 1, FP.2, FP.7). An examination of the few surveillances or audits by the DQARs showed that quality program verifications are not a priority function.

CONCERN: (QV.1-2) (H2/C1) Independent verifications, surveillances, and audits of quality attainment within the departments, divisions, and projects are too few to enable the BNL Director and his line managers to review and evaluate the implementation of their quality assurance programs, as required by DOE 5700.6B.

QV.4 CALIBRATION PROGRAM

PERFORMANCE OBJECTIVE: Provisions are made to assure that tools, gages, instruments, and other measuring and testing devices are properly identified, controlled, calibrated, and adjusted at specified intervals.

FINDINGS:

- BNL calibration policy is stated in the BNL "Quality Assurance Program". (Part I.C of the BNL QA Manual). It requires that each department and division develop and implement its own calibration procedures for measuring and testing equipment. Not all departments and divisions have delineated inputs and requirements for their calibration programs. Readily available listings of equipment requiring periodic calibration were obtained from NSLS, Medical Department, S&EP, AGS, Central Shops, Central Steam Plant, Sewage Treatment Plant, Water Treatment Plant, Instrumentation Division, and Plant Engineering. The data received could not always be assembled to verify conformance to requirements for a typical calibration program, such as identifications, calibration frequencies, dates, tolerances, reference standards, status, or limitations.

- Outside the Reactor Division, only one BNL QA audit of measuring and testing devices was made (Central Shops, June 1989). Only one division-level quality verification of calibration was reported (also Central Shops, August 1989). The Medical Department and S&EP undergo periodic audits by external groups which review their calibrated equipment. (Also see Sections TS.4 and RP.8.)

- Instrument calibration information from the departments and divisions is not assembled and coordinated by BNL management to ensure compatibility and to verify conformance to policy.

CONCERN: (QV.4-1) (H2/C2) The BNL policy for calibration of measuring and testing equipment is not implemented by all departments and divisions.

QV.5 CONTROL OF NONCONFORMING HARDWARE

PERFORMANCE OBJECTIVE: Provisions are established to control the use or disposition of nonconforming hardware, materials, parts, or components.

FINDINGS:

- Procedures have been established for receiving personnel to document receipt of purchased items. However, receiving personnel provide no quality inspection. The requisitioner who requires incoming quality inspection of purchased items is solely responsible for such measuring and testing. Receiving inspections are performed at many sites within BNL and several different types of receiving inspection reports were found.

- A BNL form exists to provide an Inspection/Test Record (BQF-003) and includes a Nonconformance Report section. However, its use is not required. Basic policy and requirements for the control of nonconforming items are in the BNL QA Manual. Several departments and divisions have developed their own inspection and deficiency report sheets which requisitioners use. (Also see Section TS.4.)

- A small fraction of nonconformance reports have been distributed to Contracts & Procurement Division as required by BNL QA policy. Several departments (e.g., Central Shops, NSLS, AGS) have established their own internal fault reporting systems.

CONCERN: (QV.5-1) (H2/C2) BNL management is not enforcing its basic policies for nonconformance issues.

G. TECHNICAL SUPPORT

Facilities and operations reviewed during appraisal of the Technical Support area were the AGS, NSLS, Inhalation Toxicology Laboratory, Metallurgical Hot Cells, Brookhaven LINAC Isotope Producer (BLIP), Instrument Development Laboratories, Analytical Chemistry Laboratories, Acid Cleaning Facility, and Central Shops. In addition, the reviews included the Plant Engineering, AGS Booster Project, and Safety and Environmental Protection organizations.

Overall, technical support at BNL is good. Appropriate services, provided by qualified personnel, are available to BNL site operations and to the various organizational subcomponents. The technical support programs, although characterized largely by informal working arrangements that lack documentation and formal structure, are effective in meeting the significant safety, environmental protection, and operational needs.

Technical support for BNL as a whole is provided by a number of technical organizations whose functions range from plant-wide services, provided by Plant Engineering, to support of individual plants and operations by technical groups within several BNL subcomponents. Technical support staffing within these organizations is adequate, and personnel are well qualified.

There are general weaknesses in documentation of procedures, reviews, and definition of authority and interfaces. However, some areas such as Plant Engineering and Analytical Chemistry have established very good procedures to govern their activities, and there are recent and ongoing efforts in a number of other organizations to develop, upgrade, and update procedures.

Equipment monitoring and testing are scheduled and performed. However, use of procedures for these activities varies widely. Some of the data files are not readily auditable. There is no comprehensive program for systematic evaluation of equipment performance.

No deficiencies were identified relative to auxiliary systems, ventilation systems, and vital supply systems or to technical support provided for these systems. With a few exceptions such as shielding, interlocks to prevent personnel entry into high-radiation areas, and a few ventilation systems, these systems primarily serve operational needs rather than safety needs. The BNL facilities within the scope of this TSA are all categorized as low or moderate hazard under the guidance of DOE 5481.1B.

Environmental programs are in good order. BNL operates under permits and agreements with the U.S. Environmental Protection Agency, New York State, and Suffolk County. These address liquid and gaseous effluents and solid wastes. Effective on-site and off site monitoring programs are in place. Measurements for 1988 show releases from the site to be within applicable limits. BNL has commissioned studies by outside contractors in areas such as waste minimization, and initiatives and programs to correct historical problems are being planned and implemented. Monitoring data are being recorded, analyzed, and reported by BNL However, the 1988 Site Environmental Report has not yet been issued, despite the fact that issuance by June 1, 1989, was mandated by DOE Orders.

TS.1 ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE: The technical support organization should ensure effective implementation and control of technical support activities.

FINDINGS:

- BNL has a number of technical support components distributed among its divisions and departments; for example:
  - Plant Engineering is responsible for site services and utilities, structures, ventilation systems, and project management. Plant Engineering also provides facility and equipment engineering for smaller BNL divisions, and craft services for all of BNL, on request.
  - AGS Engineering and NSLS Engineering provide engineering services for their respective facilities.
  - Other individual engineers or small groups support the organizations to which they belong.
  - Liaison Engineers and Liaison Physicists at the AGS, and engineers and physicists at the NSLS, provide interfaces between facility equipment and users, who typically design their own equipment.
- There are functional and responsibility interfaces between various technical support components. With a few exceptions, there are no organizational charters that fully define authorities, responsibilities, and interfaces with other organizations. Interactions occur, but are largely based upon informal working arrangements.
- Overview of technical activities is conducted largely by committees that may or may not have charters that clearly define their functions and the standards by which they assess the technical adequacy of the activities.
- In most cases, there are no procedures requiring submittal of design documents to specified interfacing organizations for formal review. Even where such documents are provided for review, written responses or signoffs are not consistently required.

CONCERN: (TS.1-1) (H2/C2)	BNL has no formal system to ensure review of proposed actions by interfacing organizations whose interests might be impacted.

TS.2 PROCEDURES AND DOCUMENTS

PERFORMANCE OBJECTIVE: Technical support procedures and documents should provide appropriate direction, allow for adequate record generation for important activities, and should be properly and effectively used to support safe operation of all facilities on the site.

FINDINGS:

- Not all facilities have SARs, or other safety analysis documents, that are consistent with current requirements. For example, the AGS has a number of separate safety analysis documents for specific areas, but no single, comprehensive SAR for the facility. Steps to produce such an SAR for this facility have been initiated. (See Performance Objective OA.7.)

- Engineering support personnel within Plant Engineering, which is responsible for providing utility services and for building ventilation systems, and AGS Engineering stated that they were not familiar with SARs and did not have copies readily available.

- Engineering personnel depend largely upon interaction with others, such as facility Safety Representatives, Safety Coordinators, and various committees, to identify facility safety considerations relevant to their design tasks. This process does not ensure timeliness of information relevant to design.

CONCERN: (TS.2-1) (H2/C2) Engineering personnel who design facility modifications do not all have cognizance of or full access to documents that define the safety requirements for individual facilities.

FINDINGS:

- The BNL policy governing use of procedures is stated in Part I of the BNL <u>Quality Assurance Manual</u>. Existence of procedures for BNL departments and divisions varies widely. Some organizations, Plant Engineering and S&EP Analytical Chemistry for example, have detailed procedures for their work. Other organizations have procedures of limited scope and detail, or no procedures at all.

- Structured written operating and maintenance procedures do not exist for all operations. (See Performance Objectives OP.3 and MA.7.)

- Where procedures do exist, there is no formal process for review by relevant technical support functions to ensure technical accuracy.

CONCERN: (TS.2-2) (H2/C2) There is no system of procedures for formal interchange of information between technical and operations/maintenance staffs that ensures operation/maintenance practices and designs are consistent.

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 which should assure proper design, review, control, implementation, and documentation in a timely manner.

FINDINGS:

- The BNL Quality Assurance Manual specifies that specific procedures be prepared for technically complex or repetitive items or operations when deemed necessary by department or division management.
- Some organizations, such as Plant Engineering, have extensive, detailed procedures. Other organizations, such as AGS and NSLS, make only limited use of procedures for modifications.
- Typically, there are no procedures detailing requirements for review by interfacing organizations.

CONCERN: (TS.3-1) (H3/C2) Many of the BNL organizations do not have written procedures controlling design and review of modifications.

TS.4 EQUIPMENT PERFORMANCE TESTING AND MONITORING

PERFORMANCE OBJECTIVE: Effective equipment performance testing and monitoring should be performed by technical support groups to assure that equipment and system performance is within established safety parameters and limits.

FINDINGS:

- Equipment is tested and monitored in accordance with defined schedules, by qualified personnel. However, use of procedures is variable, ranging from use of detailed written procedures to reliance upon personal knowledge of the tester. (See Performance Objective MA.7.)

- Compilation, trending, and analysis of equipment performance data vary throughout BNL. Two committees, the AGS Trouble Report Committee and the NSLS Fault Reporting Committee, have been established and are in the process of developing data bases that will be used for trending and root cause analyses. The AGS Liaison Engineer's files showed evidence of systematic evaluation of equipment failure experience. Other technical support organizations interviewed, however, have no formal system for compiling such information and analyzing it for root causes. (See Performance Objectives OA.5, MA.8, QV.1, and QV.5.)

- None of the technical support organizations interviewed indicated that they had a program for exchanging performance data with other organizations, either within BNL or at other accelerator sites. BNL-generated UORs, however, are distributed to Safety Coordinators, who make further distribution as they deem appropriate.

CONCERN: (TS.4-1) (H3/C2) There is no comprehensive program for systematic evaluation of equipment performance. (See also Concerns OA.5-1, MA.8-1, QV.1-2, and QV.5-1.)

FINDINGS:

- Existence of policies, procedures, and data records for performance testing and monitoring varies from organization to organization.

- In some instances (filter testing and analytical chemistry, for example), procedures and data records provided good auditability. In other instances, however, the data files were not organized or ordered so that compliance with requirements could be readily confirmed.

CONCERN: (TS.4-2) (H3/C2)	Not all performance testing and monitoring files are readily auditable by a third party for verification of compliance with requirements. (See also Concern QV.1-2.)

TS.8 ENVIRONMENTAL IMPACT

PERFORMANCE OBJECTIVE: The impact on the environs from site operations should be minimized.

FINDINGS:

- DOE 5400.1, Part II.4.C, requires that all DOE facilities that conduct significant environmental protection programs prepare an Annual Site Environmental Report, and specifies that reports covering the previous calendar year be prepared and distributed to EH-1, et al., by June 1. BNL falls into the category of facilities required to prepare and distribute such reports.
- The report for calendar year 1988 had not been distributed at the time of this TSA.

CONCERN: (TS.8-1) (H3/C1) The BNL Annual Site Environmental Report was not completed on the schedule required by DOE 5400.1.

H. PACKAGING AND TRANSPORTATION

This appraisal reviewed BNL policies and procedures, as well as the training and qualifications of P&T personnel involved with the offsite shipment and onsite handling, storage, and movement of hazardous materials, substances, and wastes (including hazardous, mixed, and radioactive). Organizations and facilities visited during the appraisal included the Safeguards and Security Division (SSD), Isotopes and Special Materials (I&SM) Group, Plant Engineering, the Accelerator Development Department (ADD), the waste accumulation areas of the Medical, Physics, and Chemistry Departments, and the Supply and Materiel (S&M) Division.

I&SM prepares radioactive materials packages for offsite shipment. A review of recent shipping records indicates that offsite shipments of radioactive materials comply with DOE 5480.3. Interviews with I&SM personnel having responsibilities in this area indicate that they are competent. The I&SM training program lacks formality and documentation, and the training of personnel is not recurrent. Additionally, I&SM transfers incoming radioactive materials from S&M to the user(s). This "double handling" of incoming radioactive materials packages by both S&M and I&SM personnel and the deferral of a receiving radiation survey until the package is in Bldg. 703 are not consistent with an effective ALARA program.

Since BNL operates with an "open door" policy, almost anyone who approaches the main gate and shows identification can gain access to the site. Some visiting scientists, students, technicians, and their families reside onsite. Dependents, including children, are not restricted from any onsite roadways where hazardous materials may be in transit. BNL is a community in the full sense of the word.

Shipments of hazardous materials through our communities must adhere to the strict regulations of the U.S. Department of Transportation. These regulations rely on the package to keep the hazard away from the populace. An alternative, of course, is to keep the populace away from the hazard. BNL has neither established requirements that intrasite movements of hazardous materials rely upon package integrity, nor established measures to ensure that the populace be isolated from the hazardous materials during transit.

In general, BNL <u>Safety Manual</u> Guides, especially Guides 3.6.0 and 3.7.0, which relate to intrasite P&T policies, lack sufficient requirements, e.g., packaging requirements, to ensure that intrasite movements of hazardous materials are safe.

Since <u>any</u> employee or visitor may make an intrasite movement of <u>nonradioactive hazardous materials</u> or waste, it is impossible to determine whether all of these movements are in compliance with

BNL published policies. Similarly, an unknown number of intrasite movements of radioactive materials is, or may be, made by anyone authorized to "possess" the materials. There is no requirement that these people (employees, as well as visiting scientists) be trained in this function.

The Supply and Materiel (S&M) Division receipts for incoming radioactive materials packages, and the Isotopes and Special Materials (I&SM) Group moves the packages from the receiving section for radiation survey and delivery to the user.

Nonradioactive hazardous materials and substances are packaged and shipped by the S&M Division. Although some S&M procedures lack specificity regarding the safe handling, storing, packaging, and intrasite movement of hazardous materials, interviews with the Shipping and Receiving Group indicate they are competent to perform their P&T functions. Although the S&M training program lacks formality and some documentation, the training of personnel with P&T functions is current. In addition, many S&M personnel attended the course, "Hazardous Material Training for On Site Transportation Personnel," earlier this year.

The Hazardous Waste Management Group moves waste (hazardous, radioactive, and mixed) from the user(s) to the waste management storage area, and then prepares the material for offsite shipment. Interviews indicate that HWM personnel with P&T functions are competent; however, the HWM training program lacks formality and some documentation.

The Spill Prevention, Control and Countermeasures program covers only one division and does not meet current DOE requirements. The plan lacks definitive requirements for prevention, control, and countermeasures of spilled materials. Even though it is reviewed every two years, revisions to the plan are usually limited to changes in fuel oil tankage.

PT.2 SURVEILLANCE OF ACTIVITIES

PERFORMANCE OBJECTIVE: Appropriate surveillance of packaging and transportation activities should be conducted to maintain control of potential consequences to the public and employees and to minimize accidental losses and damage to government property.

FINDINGS:

- A June 1985 internal audit of the I&SM Group, including P&T functions, was made in accordance with DOE 5480.3 and DOE 5482.1B, which require routine internal audits of contractor packaging and transportation, and operations, respectively. The March 1989 internal audit of the I&SM Group included their security and safeguards functions, but it did not include their radioactive materials packaging and transportation functions.
- Internal audits of Hazardous Waste Management (HWM) and the Supply and Materiel Division (S&M) have not included their respective packaging and transportation functions.
- There are no plans to include P&T functions in internal audits.

CONCERN: (PT.2-1) (H3/C1) BNL has not routinely audited packaging and transportation functions as required by DOE 5480.3 and DOE 5482.1B.

PT.3 POLICIES, DIRECTIVES AND PROCEDURES

PERFORMANCE OBJECTIVE: Official policies, directives and procedures should define the safety and health responsibilities and authorities, provide a statement of management participation and support, require compliance with DOE requirements and provide resources for overall packaging and transportation program implementation.

FINDINGS:

- As discussed in OA.6, there is no BNL policy or procedure that requires an employee to be qualified for a particular job or specifies how such qualification should be achieved and/or demonstrated.
- There is no policy of how to follow-up with employees involved in P&T if training is not completed, or an examination is failed.
- There is no requirement or mechanism to keep employee knowledge up to date through recurrent training.
- BNL Safety Manual, Guide 3.6.0, Section IV.A, "Packaging Requirements," lacks sufficient requirements, such as securing packages on vehicles, to ensure safe transport of radioactive waste.
- BNL Safety Manual, Guide 3.7.0, Section IX, "Transportation of Radioactive Materials Onsite," lacks sufficient requirements, such as package specifications, to ensure safe transport of radioactive materials.
- BNL policy permits any employee authorized to "possess" radioactive material to move it on site provided the movement is accomplished in accordance with BNL Safety Manual, Guide 3.7.0. Although interviews indicate that users will seek advice and counsel from their Safety Coordinator and/or their S&EP Representative, there is no requirement that this be done, or that these employees be trained and/or certified as competent for this function.
- I&SM P&T policies and procedures have been in "draft" for more than a year, re: combined DOE/HQ and CH safety site visit, March 1988. No policies or individual procedures have been formalized; i.e., issued as an SOP.

- Offsite shipments of radioactive materials are packaged in Bldg 703, Lab W-9. Procedures for assembling the various packages used for transporting radioactive materials are not available in the packaging area.

- Some offsite shipments of radioactive materials, e.g., Chemistry Department shipments of short-lived isotopes, are taken (by government vehicle) to the Brookhaven Airport by BNL personnel. There is no requirement that these people be trained to the requirements of DOE 5480.3 (49 CFP).

- Current I&SM practices do not assure that each incoming radioactive materials package receives radiation survey for both content and contamination.

- Although there is no BNL site-wide requirement that procedures be subjected to routine review, SEP-QA-6.0.1, Preparation of Standard Operating Procedures (SOPs), requires that S&EP SOPs be reviewed every three years. There is no similar requirement for other divisions or departments.

CONCERN: (PT.3-1) (H3/C1) BNL does not have policies and procedures for handling, packaging, and shipping hazardous materials, substances, and wastes, as required by the health, safety, and environmental requirements of DOE 5480.1A, or all the requirements of DOE 5480.3 and 5480.4. (See also Concern OA.2-1.)

PT.4 MANAGEMENT CONTROL SYSTEMS

PERFORMANCE OBJECTIVE: Management control systems should be in place to assure that safety and health requirements are effectively carried out in packaging and transportation activities.

FINDINGS:

- A review of available records and an interview with S&EP staff indicate that there is no BNL safety oversight of P&T operations.

CONCERN: (PT.4-1) (H3/C1)
BNL does not have safety oversight of P&T operations as required by DOE 5480.1A.

PT.5 CONDUCT OF PACKAGING AND TRANSPORTATION

PERFORMANCE OBJECTIVE: Site-wide operations involving packaging, materials handling and movement, and transportation (PHMT) should be conducted in a safe, consistent and accountable manner, following approved procedures, in conformance with applicable standards and accepted practices.

FINDINGS:

- DOE 5480.3 applies to offsite shipments of hazardous materials and does not address the safety aspects of intrasite movements of hazardous materials, substances and wastes (including radioactive, mixed, and hazardous wastes); therefore, DOE 5480.1A has been used to evaluate the overall health, safety, and environmental protection aspects of BNL intrasite movements of these materials. Since BNL is essentially an open campus, i.e., families with children live on site, the safe intrasite movement of these materials is essential to the overall health and safety program at BNL.

- BNL has established neither safety standards nor operating requirements for the intrasite movement(s) of all hazardous materials. For example, there is no requirement that:

  - packages of hazardous materials be labeled to indicate their hazards.
  - vehicles be placarded, if applicable.
  - packages be secured while in transit.
  - users receive P&T training, or package materials in specified packaging to get the material to T-89 for offsite shipment.
  - cargo on the truck be carried in accordance with existing compatibility guides.
  - the driver of the truck carrying hazardous materials have shipping information available for use by emergency response personnel in the case of an accident.

- BNL Safety Manual, Guide 3.7.0, Section IX, "Transportation of Radioactive Material Onsite," does not contain sufficient requirements to ensure the safe transport of radioactive materials onsite. For example, it does not require that:

- the package(s) be secured while in transit.

- the driver of the truck carrying radioactive materials have shipping information available for use by emergency response personnel in the case of an accident.

- packaging used for intrasite shipments of radioactive material be of specified design or standard.

- Radioactive materials received from and shipped offsite are handled by I&SM, whose procedures have not been formalized or audited.

- Incoming (man portable) packages of radioactive materials are received by S&M at Bldg 89. The packages are not subjected to radiation surveys immediately, upon receipt. The packages are handled by both S&M and I&SM personnel, who take the packages to Bldg. 703 before delivery to the user. This "double-handling" of radioactive materials packages is not in keeping with good ALARA practices.

- Handling the package prior to its being surveyed is not in keeping with good ALARA practices. (See Performance Objective RP.11.)

- The commercial vehicle which delivers radioactive materials is not surveyed before it departs BNL.

- The S&M Division is responsible for the distribution of nonradioactive hazardous materials from the warehouse to the user, and return, if necessary. The user then may move the material to any other onsite location - there is little or no guidance or control of the latter movements.

- Procedures for S&M Division personnel do not include handling and packaging hazardous materials. In addition, they do not include the safety aspects of the transportation (distribution) of hazardous materials from the warehouse to the user(s); e.g., securing packages while in transit.

- There is no secondary containment around the temporary drum storage areas inside, and outside, Bldg 158. (See Concern PT.6-3.)

- Although S&M helium tube trailers are properly maintained, there is no requirement for such in the BNL Safety Manual, Section 5.

- Helium tube trailer BNL 97452 belongs to the Accelerator Development Department (ADD). Discussion with an ADD employee indicates that it may have been used once, or twice, since 1974. There is no indication that it has been subjected to routine hydrostatic testing. The trailer may be out-of-service, but it is not so marked.

- Wastes (including hazardous, radioactive, and mixed) are handled, stored, moved (intrasite), and shipped (offsite) by HWM. SOP HWM 046, "RadWaste Pickup, Sorting, General Packing and Records," applies only to hazardous waste management personnel. It lacks sufficient requirements, such as package specifications, to ensure safe transport of radwaste, as well as effective response to intrasite spills of radioactive waste.

- Liquid hazardous wastes are stored temporarily in Bldg. 444. Procedure requires they be set in "spill pans." Three 5-gal. liquid waste containers were not set in "spill pans."

- Although the hazardous waste area is used only for temporary storage for most hazardous materials, HWM has not established loading limits (based either on fire prevention, toxic materials, or merely physical space) for the various buildings used for receipt of waste. (See Concern FP.3-1.)

- Emergency response personnel who would respond to an onsite transportation incident involving hazardous materials must be able to recognize DOT placards and labels. Their last documented "DOT training" was in 1983. (See Concerns EP.1-1 and EP.3-1.)

- There is no requirement that hazardous materials packages being moved onsite be labeled. An interview with emergency response personnel indicated that they incorrectly assume that all hazardous materials packages being moved onsite are marked and labeled. They claim to rely on recognizing the BNL trucks that normally carry hazardous materials, and they do not expect that these trucks would be properly placarded. This could pose a safety problem if the "recognizable truck" were replaced by a "loaner" from the motor pool. (See Concerns EP.1-1 AND EP.3-1.)

The "Contingency Plan - Hazardous Waste Management Facility" contains some conflicting information and lacks sufficient detail, such as names and phone numbers, to ensure adequate planning and response to hazardous waste spills.

CONCERN: (PT.5-1) (H2/C1) BNL does not conduct handling, storage, intrasite movements, and emergency response aspects of hazardous materials,substances, and wastes (including hazardous, mixed, and radioactive) and does not have adequate safety requirements to meet the full intent of the health, safety, and environmental requirements of DOE 5480.1A. (See Concern EP.1-1.)

PT.6 PACKAGING AND TRANSPORTATION OF HAZARDOUS MATERIALS

PERFORMANCE OBJECTIVE: Performance of the packaging and transportation (PT) function should assure conformance with existing standards and accepted practices as given in DOE 5480.3, DOE 1540.1, DOE 1540.2, and other DOE and Federal regulations.

FINDINGS:

- There are no "job task analyses" to determine the specific qualifications or training needed by employees with P&T functions.

- There are no requirements that I&SM Group employees who package and ship radioactive materials receive formal DOT (49 CFR) training. Two I&SM employees have received no formal 49 CFR training.

- P&T training must be recurrent (every 2 years). Review of training records of the I&SM Group employees reveals that two of them last received formal DOT (49 CFR) training in 1983 and 1981.

- Incoming radioactive materials packages receive radiation surveys by I&SM personnel (Bldg. 703) who are trained (OJT) to use survey instruments. This training is not documented.

- Although the user of a hazardous material may package the material to be moved onsite or shipped offsite, there are no provisions or requirements that the user be trained in, or otherwise be knowledgeable of, packaging and transportation requirements.

- In those cases where in-house training is being accomplished, there is no requirement for performance evaluation; i.e., an examination to determine if the trained employees know the material. There is no requirement that instructors receive additional technical training, or "instructor" training. There is no requirement that trainers receive recurrent training.

- Records of employees' training given by S&EP are maintained in a "central" S&EP training file. Records of employees' training given by most departments or divisions are maintained by supervisors. BNL has not established requirements or criteria for maintaining training records.

- Most department or division training is not supported by lesson plans, examinations, banks of examination questions, classroom attendance records, and employee examination records.

CONCERN: (PT.6-1) (H2/C1) The BNL training program for personnel with P&T functions does not meet the existing standards of DOE 5480.3 (7/9/85) for offsite shipment or 5480.1A for intrasite movements. (See Concern TC.1-1.)

FINDINGS:

- The BNL Spill Prevention Control and Countermeasures (SPCC) plan doesn't establish sufficient requirements for spill prevention (e.g., procedures and tankage standards), spill control (e.g., secondary containment), or spill countermeasures (e.g., cleanup protocol).

- The plan is prepared by Plant Engineering and is neither reviewed nor approved by anyone outside the Plant Engineering Division.

- Regulations and references cited in the plan are not current. No DOE Orders are cited.

- Whereas the plan must have site-wide implications, it addresses only facilities operated by Plant Engineering. Whereas the plan must, and does, address oil, good business practice would suggest that it should also address hazardous substances; e.g., caustic and sodium hypochlorite.

- The plan states that "All fuel unloading stations are provided with containment pads." Containment pads are actually "wicking pads" used for oil spills. They are located in the nearby steam plant and are not adequate to control the potential release of large amounts of fuel oil from a commercial cargo tank delivering fuel to BNL.

- There is an open storm drain catch basin in the immediate vicinity of several fuel oil unloading stations.

- Approximately ten truckloads of fuel oil are received at the central steam plant each week. None of the existing seven fuel unloading stations provides secondary containment barriers to control spilled fuel oil.

- Spills of fuel oil at the unloading stations are chronic and are cleaned up with sand. The oiled sand, which becomes a hazardous waste, is packed in 55-gal. drums and transferred to HWM for proper disposal. This operation generates an estimated 50-60 drums of oiled sand per year. At an estimated 400-500 lb per drum, this amounts to at least 20,000 lb of waste per year.

- All large aboveground fuel tanks have been properly equipped with secondary containment; however, some smaller tanks do not have secondary containment.

- The berm drain valve for Tank #4 is properly locked, but it is not labeled.

- Many aboveground tanks, such as liquefied propane tanks, fuel oil tanks, and the large spherical helium tank (Advanced Developmental Department) are not marked so as to indicate their contents (for emergency response purposes). (See Concern IH.6-1.)

- The "caustic" unloading station at Well No. 12 and the "sodium hypochlorite" unloading station at Bldg 576 are not equipped with secondary containment barriers to contain spilled liquid.

CONCERNS: (PT.6-3) (H3/C1) BNL does not have a spill prevention, control, and countermeasures program which meets all the requirements of DOE 5480.4 and 40 CFR 112.

I. SITE AND EXPERIMENT SAFETY REVIEW

The review of National Synchrotron Light Source, Medical Department, Alternating Gradient Synchrotron Department, and the Department of Nuclear Energy was accomplished through interviews with department and division chairman, safety coordinators, safety officers and chairmen of the various department safety committees. Selected documents were also reviewed.
Each department has at least one Safety Review Committee whose membership includes the Department Safety Coordinator, an S&EP representative and others who have technical competence in the areas being reviewed. Two Standing Committees exist which satisfy the DOE 5482.1B requirement.

Experiments are reviewed for safety and approval at the facility level prior to operation. The operation must be within the parameters defined in the approved safety documents issued by the Safety Review Committee. If experiments are operated beyond these authorized parameters they must be further reviewed and approved by the Laboratory Safety Committee or the Cryogenic Safety Committee, depending on the experiment. If the experiment is sufficiently complex, an SAR may be required.

Items that require review by the Safety Review Committees are well defined and understood by each department. These include incidents, accidents, UORs, all facility process equipment, and proposed experimental programs.

An effective followup system assures that appropriate and timely actions are taken to achieve safety improvements.

The Annual Facility Safety Review, initiated in 1988, is working well and is being documented and tracked by the S&EP coordinator. The assessment is made by the S&EP Division. Each assessment Team has a coordinator and six members, one each from Environmental Protection, Fire Protection, Health Physics, Industrial Hygiene, Hazardous Waste Management, and Industrial Safety. When required, specialists from other disciplines are included.

The Site and Experiment Safety Review has three concerns which are identified briefly in this summary and discussed in detail under the relevant performance objectives.

One concern is that a triennial appraisal of the safety review system is not being performed by BNL management except for reactors. A second concern is that an SAR has never been written for the AGS. A third concern is that the review process by the existing Ad Hoc Committee in the Department of Nuclear Energy for table top and planned larger (non-Radiation Effects Facility) experiments is not in compliance with DOE-5482.1B, Section 9.d.

SR.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 5482.1B., Section 9.d.

FINDINGS:

- The Department of Nuclear Energy has a Safety Review Committee for the Radiation Effects Facility (REF), where most of the experiments are done. However there is no Safety Review Committee for table-top experiments and other planned larger (non-REF) experiments. At present, table-top experiments and planned larger non-REF experiments are reviewed by an Ad Hoc Committee consisting of the Division Head, Group Leader, Safety Coordinator, and S&EP representative.

- The Ad Hoc Committee is not in strict compliance with DOE 5482.1B, Section 9.d. For example, there is no written charter.

- The Department of Nuclear Energy plans to develop a department-wide Safety Review Committee in about four weeks which will comply with DOE 5482.1B, Section 9.d. A draft charter for the committee was issued on September 15, 1989.

CONCERN:
(SR.1-1)
(H2/C1)

The Ad Hoc Committee for the review and approval of table-top and planned larger (non-Radiation Effects Facility) experiments are not in compliance with DOE 5482.1B, Section 9.d.

SR.7 TRIENNIAL APPRAISAL OF FACILITY/SITE SAFETY REVIEW SYSTEM

PERFORMANCE OBJECTIVE: A triennial appraisal of the safety review system should be performed by contractor management.

FINDINGS:

- The triennial appraisal of the safety review system is not being implemented by BNL management for adequacy of performance as specified in DOE 5482.1B, Section 9d.
- BNL does not have a triennial appraisal of the safety review system.

CONCERN: (SR.7-1) (H2/C1) BNL is not in compliance with DOE 5482.1B in all programmatic areas reviewed in this TSA.

J. RADIOLOGICAL PROTECTION

This appraisal was accomplished by interviewing personnel, visiting selected sites, observing activities, and reviewing documents. This appraisal was not comprehensive in that it did not assess each of the performance objectives in depth, nor were all facilities visited. The facilities specifically reviewed were AGS, NSLS, Liquid and Solid Hazardous Waste Management facilities, the radiation instrument calibration facility, Bldg. 801 hot cells, BLIP, Tandem Van de Graaff, 41-inch cyclotron with associated hot cells, the whole body counting facility, the dosimetry laboratory, and the Safety and Environmental Protection Department (S&EP).

The appraisal focused on higher risk activities. For AGS facilities and facilities which handled irradiated material from AGS, an adequate assessment of contamination control, radiation safe work permits, and high-radiation-area work could not be made because the machine had not been operating for several months and much of the induced radioactivity had decayed. Similarly, a comprehensive assessment of the adequacy of beam control in the secondary areas could not be made. In both cases the programs had to be reviewed through documentation, which was found to be a weak area for BNL.

The general assessment is that workers are receiving adequate radiological protection primarily because the staff are highly educated, experienced, and dedicated. BNL does not have a well developed, consistently applied radiation safety program nor does it comply with it own implementation plan of DOE 5480.11. BNL is aware of the deficiencies and has submitted a revised plan to DOE.

The S&EP Division provides effective support to the various departments and divisions; however, some of the departments/divisions do not always comply with the guides in the BNL Safety Manual, DOE Orders or recommendations of S&EP. The Health Physics Group spends much of its time negotiating with the department/division management to resolve these noncompliance issues. This puts an additional workload on the Health Physics staff, which was understaffed at the time of the appraisal.

S&EP has appointed a person full time to manage audits (both internal and external) and coordinate the Safety Assessments of BNL operations. This person tracks the recommendations until they are closed out by the various departments concerned.

The use of procedures and radiation area posting among the various departments at BNL is inconsistent. These inconsistencies may cause problems for personnel who move from one department to another on work assignments. High-radiation-hazard areas are interlocked, and the interlocks are tested in accordance with established procedures. However, the required interlock hardware is not always in compliance with the BNL Safety Manual.

The external radiation control program is adequate to prevent overexposure of personnel; however, it is not adequate to minimize exposures or to recognize, between film badge reading cycles, that higher-than-normal exposures are being received. The field application of ALARA is spotty and no written ALARA program exists.

The external and internal dosimetry programs are adequate to assess workers' radiation exposures. A vendor provides film badge service but is not presently DOELAP approved, although it is currently NVLAP approved. The vendor is working to obtain DOELAP approval before the end of CY 1989. Internal radiation exposures are adequately assessed by use of whole body counters, thyroid counters, and urine analyses.

BNL portable instrumentation use, maintenance, and calibration are adequate to assess the workplace environment even though they are not in full compliance with ANSI standards and DOE regulations. The fixed instrumentation is not recalled or calibrated; therefore, the adequacy of the fixed monitors cannot be determined.

Airborne radioactivity at BNL facilities is generally a minor problem. The few air monitoring systems reviewed are not adequate to assess the airborne radiation levels; however, other indicators of air activity (i.e., swipes) are used as a qualitative indicator.

Occupational external and internal radiation exposure records are maintained on all BNL employees and visitors in various files within the S&EP building. Other records such as logbooks, survey records, radiation work permits, and exposure records of department/division employees and visitors are maintained in the files of the department/division Safety Coordinator or S&EP representative.

RP.3 RADIOLOGICAL PROTECTION PROCEDURES AND POSTING

PERFORMANCE OBJECTIVE: Radiation protection procedures for the control and use of radioactive materials and radiation generation devices should provide for safe operations and for clearly identified areas of potential consequences.

FINDINGS:

- Many of the guides in the BNL Safety Manual, which address radiation safety, are out of date, nor are they in agreement with the standards of DOE 5480.11.
- The BNL Health Physics Group has revised many of the Radiation Safety Guides to conform to DOE 5480.11. At the time of this appraisal, many of these revisions have not been approved.
- BNL has applied for an extension on the compliance deadline of January 1, 1990, for meeting DOE 5480.11.

CONCERN: (RP.3-1) (H3/C2) Implementation of some aspects, particularly radiation worker retraining, of DOE 5480.11 will not be accomplished by January 1, 1990, as specified in BNL's implementation plan. (See also Concern TC.2-1.)

FINDINGS:

- Throughout most areas of BNL, posting and the present criteria used for posting are not uniform. BNL is in the process of changing its posting requirements and the actual posting of radiation areas.

CONCERN: (RP.3-2) (H2/C2) BNL does not have uniform posting in radiation areas.

FINDINGS:

- In general the various operating organizations at BNL do not have radiation protection procedures which implement the guides in the BNL Safety Manual. In the instances where there are procedures, they are not readily available or retrievable. Consequently, they cannot be easily used, tracked, reviewed, or revised.
- The facilities are generally run safely due to informal procedure use and the quality of the personnel on the job.
- Many of the departments/divisions have stated that the BNL Safety Manual is just advice and need not be implemented.

CONCERN: (RP.3-3) (H2/C2)
In general there are no formal, documented departmental radiation protection procedures which implement the guides in the BNL Safety Manual.

FINDINGS:

- The interlocks for high hazard areas in the AGS LINAC and Slow Beam areas, NSLS x-ray ring and LINAC, and Tandem Van de Graaff are not redundant as required by the BNL Safety Manual.

- The interlock testing procedures at NSLS and the 41-inch cyclotron do not adequately test the redundant portions of the systems. The interlock personnel agreed to change the procedure to provide for adequate testing.

- The detail of the interlock checklist varied across BNL. For example, NSLS had detailed checklists for most portions of the interlocks; AGS did not.

- Sequence boxes in the AGS secondary areas are generally not placed to ensure a thorough search of the beamline. No sequence box is located in the BLIP tunnel adjacent to the LINAC.

- Access through an interlocked gate in the AGS main ring does not necessarily require, via hardware, a search of the ring. The requirement for search is administrative.

- There is no BNL requirement that the design and development of interlock systems and checking procedures be independently reviewed.

CONCERN: (RP.3-4) (H1/C2)
Many of the interlock systems are not consistent with the BNL Safety Manual. (See also Concern OA.5-1.)

RP.4 EXTERNAL RADIATION EXPOSURE CONTROL PROGRAM

PERFORMANCE OBJECTIVE: External radiation exposure controls should minimize personnel radiation exposure.

FINDINGS:

- With the exception of AGS personnel, there is no requirement that personnel log and track their pocket dosimeter readings unless the dose rate or man-dose reaches the level that requires a Radiation Work Permit. This could conceivably result in a person receiving about 2 rem in a month without having to interact with the Safety Representative, Safety Coordinator, or Radiation Control Coordinator.
- Although boundaries to radiation and high radiation areas are posted, hot spots (for example, areas 10X greater than ambient) within radiation areas are not uniformly posted.
- There are no ALARA goals to compare with actual exposures. (See Performance Objective RP.8.)
- Although the adequacy of the shielding berm on top of the AGS ring has recently been assessed and problems identified, the adequacy of the lateral shielding of the AGS ring has not been assessed since 1967; consequently AGS and S&EP personnel were not cognizant of the magnitude of radiation doses possible outside the lateral shield (e.g., north gate at D-line) if abnormal conditions occur.
- The system for review of AGS secondary beamlines does not follow written criteria; therefore, it is not clear from the AGS Radiation Safety Committee reports whether the beamlines are adequately controlled to minimize external radiation from normal or accident conditions.

CONCERN: (RP.4-1) (H2/C2) External radiation exposure control is not adequate to minimize exposures or to quickly recognize that higher than normal exposure is being received by personnel.

RP.5 EXTERNAL RADIATION DOSIMETRY

PERFORMANCE OBJECTIVE: The routine and accident personnel radiation dosimetry programs should ensure that personnel radiation exposures are accurately determined and recorded.

FINDINGS:

- BNL has a contract with a commercial film badge service company to supply and process film badge and finger ring dosimeters.
- Performance testing for DOELAP was conducted during the first quarter of 1989 and the vendor failed several criteria; therefore, the vendor is not yet accredited under DOELAP.
- The vendor does have accreditation by the National Institute of Standards and Technology in the NVLAP (National Voluntary Laboratory Accreditation Program).
- The vendor is taking action to correct its DOELAP deficiencies.
- Retesting for accreditation is scheduled in the fourth quarter of CY 1989. Both BNL and Fermi Lab are participating in the testing process.
- The Chicago Operations Office is aware of the vendor DOELAP problems and tracking the progress towards accreditation.

CONCERN: (RP.5-1) (H3/C2) The commercial film badge service provided to BNL is not accredited under DOELAP.

RP.8 FIXED AND PORTABLE INSTRUMENTATION

PERFORMANCE OBJECTIVE: Personnel dosimetry and radiological protection instrumentation used to obtain measurements of radioactivity should be calibrated, used, and maintained so that results are accurately determined.

FINDINGS:

- Check sources are not available to check operation of the instrument before use.
- The portable instruments do not meet all of the ANSI N323 requirements.
- There is no system in place to recall and recalibrate the fixed monitors; therefore, fixed monitors are not routinely calibrated.
- Beta sources are not available to cover all energy ranges for calibration of beta detectors.
- The overload response of the highest scale of high range detectors cannot be checked because BNL does not have intense calibrated sources.
- Radiation instrument sensitivity to temperature effects is not periodically tested.
- BNL recognizes the above areas of noncompliance and has a program to correct the deficiencies.

CONCERN: (RP.8-1) (H2/C1) Calibration of radiation protection instruments does not meet ANSI N323 as required by DOE 5480.4.

RP.9 AIR MONITORING

PERFORMANCE OBJECTIVE: Air monitoring systems through selection, location, calibration, and maintenance should ensure reliable estimates of air activity for radiological control purposes.

FINDINGS:

- The air being monitored at the Hot Cells in Bldg. 801 is pulled through about 20 feet of small-diameter pipe with many 90-degree bends before the air reaches the sampler filter. Therefore, due to plate-out and deposition at the bends, a representative sample cannot be obtained.
- The air monitor at the liquid hazardous waste treatment plant is located adjacent to an open door and cannot adequately monitor inside air.

CONCERN: (RP.9-1) (H3/C2) Air monitoring systems do not ensure reliable estimates of air activity.

RP.11 ALARA PROGRAM

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:

- There is no formally structured and/or documented ALARA program at any of the areas visited at BNL.
- The application of informal ALARA programs is inconsistent across BNL.

CONCERN: BNL does not have a documented ALARA program.
(RP.11-1)
(H3/C2)

K. INDUSTRIAL HYGIENE

This portion of the appraisal is based on interviews with staff and inspections of some facilities of ten of the 32 departments/divisions at BNL (the Biology, Medical, AGS, Physics, NSLS, and Chemistry Departments; the Plant Engineering, Central Shops, and S&EP Divisions; and the Occupational Medical Clinic).

The challenges faced in providing safe and healthful working conditions for a wide variety of research and construction activities are considerable. BNL has met this challenge by assembling a staff of knowledgeable professionals and providing close working relationships with the research and support departments who have the principle responsibility for safety. The current IH program effectively protects workers except where staff, at any organizational level, circumvent the system. A BNL program of multidisciplinary safety appraisals of research and support departments, begun in 1988, has identified and corrected some significant deficiencies in departmental IH practices.

The IH staff is supported by the Building Safety Services (BSS) staff (also in S&EP). Many of the safety professionals in both IH and BSS have advanced degrees and/or are certified in IH, safety, or health physics. The professional competence of both the IH and BSS staffs appears to be recognized and respected by research and support personnel.

The Occupational Medical Clinic staff works closely with the IH staff. In addition, supervisors fill out a form providing specific information on workplace conditions and work activities prior to each worker's routine physical examination. This is considered to be a noteworthy practice (see Section IV).

The IH program has been developed over many years by professionals who have applied fundamental principles to the protection of people involved in BNL's unique activities. However, some S&EP staff seem to believe that BNL activities are so unique that national standards are only marginally applicable. In spite of having more than 100 class IIIB and IV lasers, BNL is not in compliance with the DOE-prescribed laser safety standard. There were items of noncompliance in the respiratory protection program as well.

IH policies and procedures have long been in place. Ten of the twelve IH Safety Guides available in the user's Safety Manuals were dated 1984 or earlier. Approved revisions of several guides, and in one case an unapproved draft, were available to the TSA Team but had not yet been placed in the BNL manuals. Implementing procedures were issued as SOPs. Although most of these were dated July 1989 or later, many codified existing practices.

IH measurements are made with calibrated instruments, and samples are analyzed by accredited laboratories, including the BNL laboratory on site that does asbestos analysis.

BNL also operates the Center for the Assessment of Chemical and Physical Hazards for DOE. The Center develops interim occupational exposure standards for DOE and disseminates hard-to-locate material safety data sheets (MSDSs).

The nature of BNL operations is such that there are few routine activities or exposures. Potential asbestos and noise exposure are exceptions for which routine monitoring and surveillance programs are in place. Laboratory hoods are also evaluated annually. Small asbestos removal jobs are performed by BNL in accordance with DOE and New York State standards. Large jobs are subcontracted and performed to the same standards. Data indicate that airborne asbestos concentrations are consistently below standards. Noise monitoring normally shows similar satisfactory results; however, there are a few jobs that require hearing protection to avoid exposure in excess of limits. Other monitoring is done on a case-by-case basis for a wide variety of chemicals, electromagnetic, RF and microwave fields, and biohazards. The dissemination of monitoring results to employees and line management, even when there has been no overexposure, is now a standard practice. Overexposures were not evident. Noise and asbestos data are computerized, and other data are being collected in a manner to permit computerization.

Hazard communication at BNL predates DOE and OSHA requirements. Chemical procurement is tracked and safety coordinators, BSS representatives, and industrial hygienists receive monthly printouts with new users flagged. MSDSs have been prepared by BNL, collected from chemical vendors, and delivered to chemical users for many years. The laboratory has an extensive file of MSDSs. As early as 1977, a Safety Guide established a program for identifying hazards present in laboratories and identifying emergency contact personnel by means of placards on the door. Safety Guides detailing hazard communications training and labeling requirements have been in place since December 1987; however, there are significant deficiencies in implementation.

IH.5 COMPLIANCE WITH OCCUPATIONAL HEALTH STANDARDS

PERFORMANCE OBJECTIVE: Facility operations comply with DOE-prescribed standards for the evaluation and control of occupational health standards.

FINDINGS:

- Although audits of the respiratory protection program are required by ANSI Z88.2-1980 (prescribed by DOE 5480.4), BNL has not audited the respiratory protection program since January 1985. However, portions of the program were covered in S&EP appraisals of the various departments. S&EP evaluated department programs relative to BNL Safety Guides but did not evaluate the Guides and S&EP responsibilities relative to DOE-prescribed standards.

- The training of those who repair air-purifying respirators is informal and not documented, making it impossible to verify. Training is required by ANSI Z88.2.

- The training of supervisors of respirator users is not an established part of the BNL respiratory protection program as required by ANSI Z88.2. However, many are trained.

- ANSI Z88.2 requires annual training and annual fit testing of respirator users. The BNL Safety Guide requires training and quantitative fit testing by the training group every three years. It also requires annual retraining and qualitative fit testing, but states that this can be accomplished by departments/divisions in-house training. Departments and divisions have no capability for fit testing except for positive and negative pressure checks, which do not qualify.

- Filter respirators are maintained in emergency kits for use by the Radiological Assistance Team and waste cleanup crews. Inspection records are not maintained as required by ANSI Z88.2. (SCBA inspection records were adequate.)

- BNL has an inventory of more than 100 class IIIB and class IV lasers. ANSI Z136.1-1986, the DOE-prescribed standard for the safe use of lasers, requires that the laser safety officer (LSO) be responsible for "...periodically auditing the functionality of the control measures in use." It also requires that "The LSO shall assure that protective equipment is audited periodically to ensure proper working order." A requirement for annual review of lasers was established in the Industrial Hygiene SOP covering lasers, issued the week preceding the TSA, but the LSO was not aware of the requirement and periodic reviews have not been done.

- In December 1988 it was determined that a class IV laser had been operated for three months without interlocks. This was not designated a UOR. (See OA.5-1.)

- ANSI Z136.1 (section 4.4.1) also requires written procedures, approved by the LSO, for operating, maintaining, and servicing class IIIB and IV lasers. BNL Safety Guides do not address laser procedures, and many lasers do not have procedures. The few such procedures observed did not show any indication of review. The LSO indicated that he had not reviewed any such procedures within the last two years.

- BNL Safety Guides, including the ones dealing with hazard communications and respiratory protection, do not require the generation of records to document performance of some required activities such as training. Other record generation requirements were not found. Internal audits of the pesticide and confined spaces entry elements of the IH program were performed in 1986. Audits in 1987 dealt only with the reactor, and a two-day audit of the entire IH program was performed for BNL by another national laboratory in 1988. These audits have failed to identify the noncompliance items in the laser safety and respiratory protection programs.

- An industrial hygiene SOP requiring internal audits of the industrial hygiene program was issued the week preceding the TSA. These internal audits have not yet commenced.

CONCERN: (IH.5-1) (H2/C1) BNL does not comply with the respiratory protection and laser safety standards required by DOE 5480.4. Internal audits have failed to identify these deficiencies.

IH.6 PERSONNEL COMMUNICATION PROGRAM

PERFORMANCE OBJECTIVE: Facility personnel should be adequately informed of chemical, physical, and biological stresses that may be encountered in their work environment.

FINDINGS:

- The Safety Manual, Safety Guides 2.1.0 and 2.1.1, outlines the requirements for the BNL hazard communications program, requiring appropriate generic and job-specific training and adequate labeling of containers of hazardous materials.

- Training records indicate that some non-laboratory groups, including most of the Central Shops Division, have not yet received generic training in hazard communications.

- Safety Guides 2.1.0 and 2.1.1 do not require training records for laboratory groups or for job specific training.

- In some laboratories in the Chemistry and Applied Science Departments, asbestos, a human carcinogen, continues to be present on equipment in use. It was not identified. In some cases, the placard on the door indicated "Health Hazards: None."

- Labels on BNL-filled containers (such as safety cans and spray bottles) outside of laboratories, in all but a few cases, indicated the material in the container; however, few contained all of the hazard information required.

- Tank labeling is not specifically addressed in the Safety Manual.

- Numerous tanks of flammable and other hazardous materials were not labeled as to contents or hazard. (See also PT.6.)

- Safety Guide 2.1.1 addresses chemical storage incompatibilities but applies only to laboratories.

- There were instances of incompatible chemicals stored together.

  - Perchloric acid was stored with ammonium hydroxide in the Chemistry Department. Numerous labs had acids and bases stored together.

  - A lecture bottle of hydrogen sulfide gas was stored in a pan with two glass bottles of nitric acid at the Physics Department waste collection point.

- Bromine was stored alphabetically with inorganic chemicals in the Chemistry Department storeroom.

CONCERN: (IH.6-1) (H2/C1) The BNL hazard communications program, required by DOE 5480.4 and 5483.1A, has not been fully implemented.

L. OCCUPATIONAL SAFETY

This assessment of the Occupational Safety Program at BNL was based on document reviews, staff interviews, and inspection of several facilities and construction sites.

The Industrial Safety Group within the S&EP Division is responsible for coordinating the development of the occupational safety program and assisting line organization in its implementation. S&EP does not have the overview responsiblity or the authority to order work to be stopped in cases of imminent danger; it can only make recommendations to line management.

During the past 5 years, the BNL total recordable cases respectively, lost work day cases, and lost work days have been, 53, 41, and 42 percent higher than the composite DOE rates for the same period. These rates are also higher than those for Chicago Operations and DOE-wide research contractors. During the same period, BNL has experienced two fatalities, both of which occurred in a steam line accident in 1986. These safety statistics could be indicative of middle managent's lack of commitment to occupational safety. Most BNL managers appear to believe that their professional staff can interpret safety rules and requirements without regard to meeting the strict letter of the law. In some instances, DOE, and OSHA standards were waived. BNL does not have safety promotion signs and billboards to enhance safety awareness.

In the last year, BNL has initiated a number of safety promotion programs such as "Team Safety" targeting the high-risk areas. BNL has also provided safety training to 150 of its line supervisors by a well-known outside contractor. A safety newsletter called "Super Safe" is distributed to all supervisors. A new electrical safety policy has been issued, and the relevant safety guide is being revised.

Current copies of DOE Orders and applicable codes are available. The Industrial Safety Group coordinates accidents and incidents, reporting to DOE as well as BNL divisions and departments. Safety coordinators and safety representatives regularly conduct facility and worksite inspections to identify, evaluate, and report to the congnizant line organizations.

BNL also has a construction safety engineer. Construction safety is actually a line responsibility, but it is not being enforced adequately.

Proper personnel protective equipment is available, but its use is not enforced. Machine guarding is generally adequate. Hoists and cranes are inspected, but documentation and tagging of inspection certificates at the site is inadequate in some cases.

OS.4 SURVEILLANCE OF SAFETY CONCERNS

PERFORMANCE OBJECTIVE: Appropriate surveillance of activities should be conducted to measure safety performance and ensure the continued effectiveness of controls.

FINDINGS:

- During the TSA, a number of construction sites were visited. At Bldg. 1005 a subcontractor crew was installing external styrofoam insulation. The crew was working on a fixed scaffolding without hardhats and without proper toeboards on all levels of the scaffold. The team reported the violation to S&EP on 9/11 and again on 9/12. After taking into consideration the type of work, the size of the work force, and the extensive amount of scaffolding required for the project, it was agreed by BNL that toeboards would not have to be installed, provided that the contractor would not store material on the scaffold and that all hand tools would be kept in the possession of the employees. The team noticed, however, that materials were still being stored on the scaffold; particularly the adhesive used to apply the insulation, which was kept in 5-gallon containers on the scaffolds.

- An S&EP manager believes that S&EP staff are hired on the basis of their expertise; thus, in some cases, when the safety standards are more stringent than needed, the staff have the authority to waive those requirements. This authority, however, is not documented.

- S&EP staff have the responsibility to recommend that work be stopped when imminent danger is observed. They do not, however, have the authority to order a stop to the work.

- All reportable accidents/incidents are properly reported and trend-analyzed. During the past five years (1984 through 1989), BNL experienced an average of 136 recordable injuries per year; 70 percent of those injuries resulted in lost time: 1,094 lost days and 340 restricted work days. In the same period, BNL experienced two fatalities as a result of a steam line accident in 1986. BNL injury rates during the past 5 years have been higher than comparable DOE rates. BNL total recordable cases, lost work day cases, and lost work days are 53, 41, and 42 percent higher, respectively, than the composite DOE rates for the same period.

- BNL has reported an average of 10 vehicle accidents and $10,000 in vehicle losses each year during the past five years. The BNL vehicle accident rate, 7.1 vehicle accidents per million vehicle miles, is about twice the DOE average of 3.1, and the BNL vehicle loss rate of $6.73 per 1000 miles of travel is almost one and a half times the DOE vehicle loss rate of 4.74.

CONCERN: (OS.4-1) (H2/C1) The priority given to safety is not adequate to ensure that safety performance meets DOE expectations as required by DOE 5483.1A.

FINDINGS:

- A tunnel construction project connecting the AGS booster, AGS, and LINAC is under way to the northwest of the AGS. During the TSA orientation week, a construction safety engineer took the Team on a tour of several construction sites, including an open tunnel, and stated that the contractor had previously been called into a meeting to discuss his excavation process. At that time, the contractor had been warned that a stop work order would be issued if trenching and shoring were found to be unsafe. On the morning of 9/15, the TSA appraiser visited the site and noted that a construction crew was working just below an unshored excavation wall approximately 25 feet deep. The appraiser's concerns about the hazards of this job site were reported to an S&EP representative. During a second visit, a cement truck was parked on the edge of the excavation wall above the construction crew (five people) and was pouring concrete into the bottom, in violation of 29 CFR 1926 (Tables P-1 and P-2). The S&EP counterpart informed the project manager to stop the work immediately. The project manager prepared a memorandum and also verbally instructed the contractor to stop the work. The appraiser was informed within 3 hours that a stop work order had been issued.

CONCERN: (OS.4-2) (H1/C1) BNL is not controlling hazardous conditions at its construction activities and is not enforcing construction safety standards as required by DOE 5480.4 and DOE 5480.9.

FINDINGS:

- BNL line organizations conduct safety inspections and follow up the corrective actions. There is no mechanism to track all the recommendations and deficiencies.

- All the recordable injury and illness cases are investigated by S&EP, and corrective actions are identified. However, BNL does not track these corrective actions.

CONCERN: BNL has not established a formal program to track the corrective actions identified during injury and illness recording, investigation, and reporting.
(OS.4-3)
(H1/C1)

OS.5 COMPLIANCE WITH OCCUPATIONAL SAFETY STANDARDS

PERFORMANCE OBJECTIVE: Work places should be free of uncontrolled physical safety concerns and in compliance with DOE-prescribed occupational safety standards.

FINDINGS:

- During the walkthroughs of Central Shops areas, three employees were observed not wearing safety glasses in designated areas.
- During a hoisting operation in Bldg. 902, five persons in the vicinity were not wearing hardhats as required by the BNL Safety Manual, 1.16.0.
- A subcontractor moving roofing materials by a mobile crane on Railroad Street did not have a hardhat on.

CONCERN: (OS.5-1) (H1/C1) BNL is not consistently enforcing the use of personnel protective equipment as required by DOE 5483.1A.

FINDINGS:

- S&M Division procedure requires that valves be removed from compressed gas cylinders that fail the required hydrostatic test. The valves have not been removed from all cylinders which have failed the required hydrostatic test, nor have these cylinders been "tagged out" of service.
- The gas detection system in the S&M cylinder storage area may not be able to detect leaks of gases that are heavier than air.
- Several compressed gas cylinders in the S&M cylinder storage area were not properly secured in their upright positions.

CONCERN: (OS.5-2) (H2/C1) The BNL Compressed Gas Cylinder Safety Policy and Procedures do not meet DOE 5480.4 requirements.

OS.6 PERSONNEL COMMUNICATION PROGRAM

PERFORMANCE OBJECTIVE: Facility personnel should be adequately informed of chemical, physical, and biological stresses that may be encountered in their work environment.

FINDINGS:

- There is no BNL directive that clearly specifies the implementation of DOE posting requirements for the BNL illnesses and injuries record.
- DOE 5483.1A, Chapter III as well as 29 CFR 1903 require that all DOE contractors shall post each year their injury and illness record. BNL did not post its injury and illness data for 1988.

CONCERN: (OS.6-1) (H2/C1) BNL is not posting their injury and illness data as required by DOE 5483.1A.

FINDINGS:

- Incident reports of six electrical-related incidents (UOR 89-7, 89-8, 89-14, 89-15, 89-18) which occurred in 1989 identified safety training as a method for preventing recurrence.
- Three BNL employees were interviewed regarding their safety training and their knowledge of DOE and BNL safety policies. None of the three indicated that they had safety training in recent years. One was a high-voltage electronic technician, the second was an intermediate-voltage technician, and the third was a mechanical technician. None had a clear understanding of their safety rights and the procedure for a DOE contractor employee to file safety complaints.

CONCERN: (OS.6-2) (H2/C1) BNL safety training program is not adequate as required by DOE 5483.1A.

M. FIRE PROTECTION

The TSA evaluation of the BNL fire protection program encompassed policy and overall direction; the fire department's manpower, training, and equipment; the effectiveness of installed fire protection equipment in providing an appropriate level of protection in site buildings for both life safety and property loss control; the degree to which fire or fire suppression activities can impact the environment or interrupt vital programs; and programs for control of hazards, design of fire protection features, and maintenance of fire protection equipment. Additionally, tours were conducted of fifty-nine buildings to assess compliance with fire protection requirements.

BNL meets many of the requirements of DOE Orders relating to fire protection. Several of the concerns raised during this TSA were identified in previous audits and appraisals and are being effectively tracked and prioritized by a capable site fire protection organization. Resources are not being allocated to accomplish these items.

The fire protection organization and structure is adequately defined in the Safety Manual and organizational charts. Responsibilities and authorities are directed through line management and the building safety coordinators. Technical safety guidance is provided by the S&EP Representative. The safety coordinators and representatives both receive the needed professional direction and review from the S&EP fire protection engineer. The fire protection policy is well established and standards are incorporated in plans and specifications for the facilities.

Several buildings do not meet the minimum requirements of NFPA 101-1988, The Life Safety Code. A Survey Plan of Action dated April 27, 1989, outlines a proposed survey to identify major action items for all BNL facilities regarding compliance with NFPA 101. An exemption request for compliance with NFPA 101 was submitted to DOE for the Heavy Ion Transfer Line.

There are no Fire Hazards Analyses and most of the SARs do not assess the potential for release of toxic or radioactive materials from the site boundary as a result of fire or firefighting operations. Some buildings have the potential to release contaminated materials through runoff of firefighting water.

BNL operations include important facilities that are vulnerable to major fire loss and extended interruption of operations in the event of a credible fire. BNL has not analyzed the potential to exceed the dollar fire loss limits or the programmatic impact of a fire loss. It is therefore not possible to confirm whether BNL meets DOE requirements for limiting property damage and unacceptable program delays. The TSA Team estimates that no loss to the site is expected to exceed $50 million, assuming the failure of a single automatic fire protection system.

The fire department organization, staffing, training, and equipment were found to be adequate to meet site fire, medical, and rescue emergencies. A plan to comply with recent standards on firefighter safety has been developed and is being implemented. In addition to normal duties, the fire department staff also to conducts building inspections and an effective valve and hydrant maintenance program using a computerized data base. Although quarterly inspections of all buildings are required by DOE, BNL has instituted a program whereby high value or vital facilities are scheduled for monthly inspections.

Concerns relating to fire protection program implementation include nonstandard arrangements of sprinkler and halon systems; lack of Class "A" extinguishers in several areas; instances of improper controls over ordinary combustibles, flammable liquids, and welding; lack of an effective fire barrier maintenance program; and noncompliance with DOE requirements for the placement of portable structures. Fire protection requirements are generally followed for new construction; many of the building deficiencies noted relate to older structures and are already being tracked. The fire alarm system on the site is being upgraded and no deficiencies were noted. Periodic inspection and survey programs are in place to identify fire protection problems (including life safety and impairments of fire protection equipment). Some deviations were noted in the inspection and testing program.

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:

- The DOE Resource Manual for fire protection states that one fire protection engineer should be provided for each vital facility (defined as a facility having a maximum possible fire loss value greater than $25 million). At BNL there are at least three facilities which exceed $25 million in value. There are two fire protection engineers at BNL, but one is in a management position with the Safety Department and devotes little time to the actual fire engineering work. The total engineering program is being largely accomplished by the other fire protection engineer. Even though he has support from the Plant Engineering Department and the Fire Department, essential engineer duties are not being completed.
- There is no documented job description for the fire protection engineer.
- Fire Protection engineering appraisals are not conducted at a frequency and depth to properly evaluate the risk of fire. Risk assessments and evaluations are not being made at existing facilities.
- This TSA evaluation of the BNL buildings produced a substantial list of fire protection items that do not comply with existing standards (See Performance Objectives FP.2, FP.3, and FP.7).

CONCERN: (FP.1-1) (H1/C2) Not all of the fire protection functions required by DOE 5480.7 and BNL Safety Department operations procedures and safety directives are being performed. (See also Concern OA.2-1.)

FINDINGS:

- In 1979 there was a Factory Mutual fire protection appraisal and in 1984 Professional Loss Control, Inc. made an appraisal, together resulting in a total of 171 recommendations. The BNL Plant Engineering Department and the Fire Protection Engineer have a continuing program for correction of these items, but many have not been completed. Funding of approximately $3 million for fiscal year 1989 has been identified by BNL, but cost estimates provided for compliance with all recommendations are $27.5 million. Because of funding restraints, there seems to be a substantial delay in achieving compliance with fire protection deficiencies.

CONCERN: (FP.1-2) (H1/C2) Fire protection deficiencies are not being corrected in a timely manner. (See Performance Objectives FP.2, FP.3, and FP.7.)

FP.2 LIFE PROTECTION

PERFORMANCE OBJECTIVE: All facilities on site should provide adequate life safety provisions against the effects of fire.

FINDINGS:

- A survey of all BNL facilities for compliance with NFPA 101, outlined in a BNL Survey Plan of Action dated 4/27/89, has not been implemented but is scheduled to be accomplished. Phase I, the initial scoping document, was scheduled for 10/1/89 but has been postponed for three months. (See Concern OA.3-1.)

- Adequate cut-offs have not been provided between the Bldg. 725 lobby atrium and a second floor corridor. Stairwell doors having fusible-link operated closing devices (but no smoke detector-activated hold-open devices) were noted by the appraisal team in the open position in Bldg. 510. Unenclosed stairwells were noted by the TSA Team in Bldgs. 130, 197, 422, 463, 510, 515, 555, 701, 902, and 911. These are all violations of NFPA 101-1988, Sections 2.9 and 5-2.1.8.

- Obstructions that impede or block exit passage were noted by the TSA Team in Bldgs. 526, 901, and 911. These are violations of NFPA 101-1988, Section 2.4.

- A screen door that does not swing in the path of exit travel is installed at the second floor sign shop access to a fire escape in Bldg. 422. Also, the solid door does not swing with the path of exit travel, nor does an exit door in the north wing of Bldg. 197. These are violations of NFPA 101-1988, Sections 5-2.1.4.1 and 5-2.1.4.4.

- Several stairwells in Bldgs. 510, 555, 938, and 939 do not discharge directly to the outside. Exits from Bldg. 510 discharge to an inner courtyard. The office exit on the third floor of Bldg. 911 passes across a metal deck roof. These are violations of NFPA 101-1988, Section 5-7.

- An "Exit" sign in Bldg. 30 was observed by the TSA Team to be obstructed by a curtain.

- "Exit" signs in Bldgs. 490 and 603 were observed by a TSA team member to have burned-out light bulbs.

- A corridor with partial-height partitions on the second floor of Bldg. 725 contains no directions to an exit. The existing exit is from a shop area off of this corridor, but no sign directing occupants to this exit is installed.

- An "Exit" sign in Bldg. 701 points to a closed roll-up door. An "Exit" sign in Nurses' Wing No. 1 of Bldg. 490 was observed by a TSA team member to point toward an office from which there is no exit.

- Non-illuminated "Exit" signs were observed by the TSA Team in Bldgs. 134, 197, and 815 to be without an emergency source of external illumination.

- Required "Exit" signs are not installed in Bldg. 348.

- Emergency lighting coverage does not provide complete building coverage for Bldgs. 463 and 515.

- Emergency lighting is necessary but not provided in Bldgs. 134, 197, 348, 701, and 815.

- Several of the outstanding deficiencies in compliance with NFPA 101 were addressed in a 1977 life safety evaluation by an outside contractor.

CONCERN: (FP.2-1) (H1/C1) BNL life safety provisions do not meet the minimum requirements of NFPA 101, The Life Safety Code, as required by DOE 5480.7-9.1(1).

FP.3 PUBLIC PROTECTION

PERFORMANCE OBJECTIVE: All facilities on site should provide protection to prevent any added threat to the public as the result of an onsite fire causing the release of hazardous materials beyond the site (or facility) boundary.

FINDINGS:

- With the exception of a draft SAR for the Radiation Therapy Facility, and the Heavy Ion Transfer Line SAR dated 5/8/89, no SARs contain an assessment of the potential for release of hazardous materials beyond the site boundary in the event of a fire.
- Building 446 contains radioactive waste and is not curbed to limit the release of contaminated water from fire-fighting operations.
- Building 448 contains waste liquids contaminated with PCBs. The building is not curbed to limit the release of contaminated water from fire-fighting operations.
- In Bldg. 463, low-low radwaste, packaged for transfer to Waste Management, is stored in an area containing flammable liquids in glass containers on open shelves. (See Concern FP.7-5.) This room is not curbed.

CONCERN: (FP.3-1) (H2/C1) No quantitative analysis has been performed to ensure that an offsite release of hazardous amounts of toxic or radioactive materials will not occur under maximum credible fire conditions as per DOE 5480.7-9.a.(3). (See also Concerns EP.1-1 and PT.5-1.)

FP.4 IMPAIRMENT OF OPERATIONS

PERFORMANCE OBJECTIVE: The site should not be vulnerable to being shut down for an unacceptable period as the result of a credible fire.

FINDINGS:

- During the TSA review, one of the major trailers in the AGS Experiments Bldg. 912, used for housing target data collection equipment, contained substantial fire loading consisting of shipping cartons and other combustible materials. Also, there were openings in the floor and walls which render the halon system ineffective.

- In Bldg. 901 unused equipment and combustible packing materials have been stored in the basement equipment room. The storage area is along the north wall, directly under six cable trays used to transfer data from the target area to the computer area. This could result in a significant loss and possible shutdown of the facility in the event of a fire.

- Specific Fire Hazard Analyses have not been made to identify those areas where a fire could have a significant programmatic impact that could shut down the operation or facility for a period greater than 6 months. The TSA team was unable to evaluate the impact of a fire on operations, however, because of the lack of fire risk analysis or fire hazards analysis reports.

CONCERN: (FP.4-1) (H3/C1)

BNL has not performed an analysis to verify that a credible fire loss could not impair an operation in a vital facility for a period greater than 6 months, as required by DOE 5480.7-9.b.

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:

- In at least 25 buildings at BNL, the Maximum Credible Fire Loss appears to exceed $1 million because of the lack of installed automatic fire protection systems (mainly fire sprinkler systems). Examples include Bldgs. 50, 179, 422, 477, 480, 510, 526, 555, 610, (Partial Protection), 629, 801, 815, 820, 830, 901, 902, 905, 906, 911, 912, 918, 929, 930, 938, and 939.

- Detailed Maximum Credible Loss Analyses have not been made of all major buildings to determine the dollar loss potential.

CONCERN: (FP.5-1) (H3/C1) BNL has not determined that a maximum credible fire may result in an unacceptable property loss as required by DOE 5480.7, Sections 9.c, 9.d, 10.b.(8), and 10.b.(11).

FP.7 PROGRAM IMPLEMENTATION

PERFORMANCE OBJECTIVE: A fire protection engineering program should be in place to effectively provide and maintain an "improved risk" level of fire protection.

FINDINGS:

- Sprinklers are installed at excessive distances below the ceiling in Bldgs. 87 and 88, in conflict with NFPA 13 requirements.
- In Bldgs. 86 and 134, control valves are installed above the sprinkler system alarm valve and fire department connection, thereby cutting off both water supplies to sprinklers in the event of valve closure.
- In Bldg. 100, materials are stored up to 15 feet high on racks. The sprinkler system has been designed for ordinary hazard occupancies, and it is not apparent that NFPA 231C, "Standard for the Protection of Rack Storage," was utilized.
- In Bldg. 158, a large storage deck obstructs ceiling sprinklers, and sprinklers have not been provided below the deck.
- No evaluation has been made of the impact of a fire in one of the hutches in Bldg. 725. A fire in a nonsprinklered area of a sprinklered building can overpower existing protection.
- The fire department connection at Bldg. 820 is blocked by a trailer.
- A sprinkler riser is obstructed by storage in the AGS office in Bldg. 911.
- In Bldg. 928 an opening in the control room floor will not provide containment of the halon fire extinguishing agent for a specified "soak" time to provide effective fire extinguishment.
- The halon system in Bldg. 906 (PETT VI) has been out of service for several months without replenishment of agent or compensating measures.
- A small room has been installed within the control room in Bldg. 901, apparently without any analysis of its effect on the existing halon system.

CONCERN: (FP.7-1) (H3/C1) Some sprinkler and halon systems at BNL do not completely conform to DOE 6430.1A-1530-4.1 and -5.25 requirements.

FINDINGS:

- The extinguishers in Bldgs. 445, 447, 463 (first floor lab areas), 490 (northeast wing), and 510 (lab areas) are carbon dioxide units suitable for use on fires involving flammable liquids. Ordinary combustibles (wood, paper, etc.) exist in these areas, but carbon dioxide extinguishers would be of little value in controlling a fire involving such materials. It appears that Class "A" extinguishers are not provided because past practices did not require them.

CONCERN: (FP.7-2) (H3/C1) The distribution of some portable fire extinguishers in several buildings is not in accordance with NFPA 10 and DOE 6430.1A-1530-7.

FINDINGS:

- In Bldg. 449, boxes were stored in the UPS (Uninterruptible Power Source) battery room. This area is not protected by the building halon extinguishing system, and the same problem was identified in the 1984 consultant survey.
- Significant amounts of combustible packaging materials and other storage materials add to the fuel loading, housekeeping, and fire problems in the following buildings: 444, 526, 913/F-10, 930, 902/905, 911, 912, 912-A, 913, 555 (Basement Equipment Room), 725 (control room instrument racks), CERF, 901 (Basement Equipment Room), and 938/939 (control room instrument racks).

CONCERN: (FP.7-3) (H2/C2) Housekeeping and the control of ordinary combustibles is not adequate in several buildings at BNL. (See also Concern OS.5-2.)

FINDINGS:

- Containers of flammable liquids were left in the open instead of being returned to existing flammable liquids cabinets in Bldg. 526 (Concrete/Polymer Lab).
- Flammable liquids are not being stored in approved flammable liquids cabinets in Bldgs. 422, 444, and 463 (Waste Pickup Area). (See Concern FP.3-2.) Also, aerosol containers using flammable propellants are stored in the open instead of within flammable liquids cabinets in Bldgs. 326 and 423.
- Due to previous fire damage (potential fire door degradation and loss of active ventilation), the flammable liquids room in Bldg. 422 no longer meets the requirements of NFPA 30. This condition has existed for approximately three months.

- No curb is provided for the chemical storage room on the second floor of Bldg. 463.

- An ordinary 5-gallon can of acetone is apparently being used for dispensing in the Solid State Physics Lab in Bldg. 510. Dispensing operations are required to be conducted using approved safety cans. This can is being kept in the open and not within a flammable liquids cabinet.

CONCERN: (FP.7-4) (H2/C1) Flammable liquid hazards at BNL are not being controlled in accordance with DOE 5480.7-9.a.(2)(b) and the requirements of NFPA 30.

FINDINGS:

- In Bldg. 490, a welding operation (Permit No. 2365) was observed by a TSA team member. During this operation the fire watch was not present during welding, and unprotected combustibles (wood and paper) were located within 10 feet of the welder. Both of these items were violations of the welding permit.

- Site procedures FR-4.12 and FR-4.12.1 require fire watches and protection of combustible materials during welding operations.

CONCERN: (FP.7-5) (H2/C1) During welding operations, site procedures for the protection of combustibles and use of fire watch personnel were not being followed, as required by NFPA 51B.

FINDINGS:

- There is no comprehensive, readily available list or set of marked drawings to identify which floors, walls, and partitions are required fire barriers at BNL.

- Several metal doors are being inspected as fire doors but lack a label from a recognized testing laboratory stating the fire rating of the door. No documentation exists to provide evidence that these unlabeled doors are considered equivalent to labeled fire doors. Inspection tags were noted by TSA team members on unlabeled doors in Bldgs. 510, 515, 701, and 815.

- Unsealed penetrations containing ducts and conduits were noted by the TSA team in walls containing labeled fire doors in Bldgs. 463 and 510.

- Deficiencies were noted by the TSA team in the enclosure of vertical openings. (See Concern FP.2-1 for details.)

- Per plant engineering specifications, doors can be replaced without reviewing the need (or lack of need) for fire barrier integrity.

CONCERN: (FP.7-6) (H2/C1) BNL is not implementing an effective fire barrier maintenance program as required by DOE 5480.7-10.b.(5) and 10.b.(7).

FINDINGS:

- Expanded plastic insulation on ductwork was noted by the TSA team in Bldgs. 197, 477, 510 (basement), 555, 815, 902, 905, 911, and 930. This material is extremely combustible and releases toxic products during combustion.

CONCERN: (FP.7-7) (H2/C1) Materials with unusually high fire characteristics, notably expanded plastic duct insulation, exist in interior finish applications at BNL, in conflict with DOE 5480.7-9.a.(2)(a) and 6430.1A-0110-6.1. (See also Concern FP.1-1.)

FINDINGS:

- The fire protection systems and equipment are inspected, tested, and maintained under a good site-wide plan to NFPA codes and standards: Plant Engineering handles water supply equipment surveillance; an outside contractor performs all alarm system and suppression system tests; and the Fire Department performs the remaining inspections. Three areas are not in accordance with NFPA requirements: 1) NFPA 291 requires annual fire main flow tests for capacity and loop tests. BNL's last test was five years ago with random testing since. 2) NFPA 22, Section 1-17.6 and 1-17.9, requires internal and external inspection of water storage tanks for corrosion and buildup of sediment every two years. BNL has not followed a regular schedule. 3) NFPA 101, Section 31-1.3.8, requires quarterly checks of batteries for emergency lights and exit signs. BNL has not checked these items regularly. Failures were noted by the TSA Team on several lights and signs throughout the site during the appraisal.

CONCERN: (FP.7-8) (H2/C1) Fire water main flows, water storage tanks, and emergency lights and signs are not tested or inspected at NFPA-specified frequencies.

FINDINGS:

- Bldg. 526A, a combustible modular building installed adjacent to Bldgs. 526 and 527 has not been sprinkled. This situation also exists at Bldgs. 130, 701, 820, and 830.

CONCERNS: (FP.7-9) (H2/C2)

Not all portable and modular buildings at BNL conform to the requirements of DOE/EV-0043, "Fire Protection for Portable Structures," with respect to exposure distances and sprinkler protection.

N. FIREARMS SAFETY

The purpose of the firearm safety appraisal was to evaluate compliance with DOE 5480.16, "Firearms Safety," and other applicable Orders, including the ammunition storage section of DOE 6430.1A, the "General Design Criteria Manual," and the storage compatibility section of DOE/EV/06194-4, the "DOE Explosives Safety Manual." The facilities appraised included Security Headquarters, where weapons are stored, repaired, cleaned, issued to security inspectors, and returned at the end of each shift; the ammunition storage area located directly behind this building; the live-fire range, which was not in operation at the time of the appraisal because modifications were in progress; and the four fixed security posts in the Reactor Building, including the only two posts where the Heckler & Koch Model 5 machine pistol is utilized in a loaded configuration. Also reviewed were the 11 vehicles used to provide roving security at the site and the two sedans used to transport individuals in custody. This TSA Team observed two firearms training exercises that were conducted during the appraisal period.

Firearms safety at BNL is good; there has not been a firearms-related incident since 1986. Security and safety organizations and procedures are adequate to ensure effective implementation of the firearms safety program.

Five security managers were interviewed in depth. All are knowledgeable of DOE firearms safety requirements, as were the three individuals interviewed in the safety office. Two security inspectors were also interviewed, as was the head of the BNL security inspectors' union. All three indicated that the firearms safety program has improved considerably since the publication of the DOE Firearms Safety Order 5480.16 in January 1988. Considering the small size of the BNL uniformed security force (69 persons), the number of staff responsible for firearms safety is adequate.

BNL has an excellent firearms health testing program that encompasses hearing, blood lead, and airborne lead. Data collection is clear and straightforward, and the results are explained to security personnel.

BNL employs a muster of security inspectors before the watch commander at the beginning of each shift so that the watch commander can determine whether the inspectors are fit for duty (as required by DOE 5480.16) and relay pertinent information to the next shift. There is also a weekly guard mount in which all the auxiliary equipment used by the security force is examined.

BNL has limited the number of weapon types used to only three; all other weapons have been relocated to other DOE sites where they are needed.

The housekeeping of the ammunition stored in the transportable container in back of Security Headquarters is excellent; however, signs need to be affixed to shelves to identify the types of ammunition being stored. The ammunition storage container did not have lightning protection or grounding as is good practice, but the new storage facility presently under construction incorporates these features.

BNL's training safety analysis reports were comprehensive and current; however, amendments to the original report do not reference the original document, and the reader may therefore not be aware of all applicable requirements.

The bullet trap that is located near the armory area is adequate for the Heckler & Koch Model 5 machine pistol and the Smith and Wesson Model 15 revolver used by security inspectors. However, the bullet trap is located in a wall behind which there is a dressing room. The Security Headquarters upgrade presently under way will relocate the bullet trap to a wall that is not part of an occupied room area.

The Occupancy Readiness Review (ORR) for the live-fire range was performed during this appraisal. The ORR identified several items that must be completed prior to operation: posting the general range rule safety signs, closing the back gate that allows access to the top of the bullet impact beam, regrading and placing a top covering of granular bluestone to improve foot safety and minimize dust, and reinstalling three missing bullet impact area warning signs.

The gun cleaning area, currently located in the Tactical Operations Center, is actually an office and not designed or intended for this use. Neither adequate room ventilation nor an emergency eyewash are provided. As part of the Security Headquarters upgrade, the gun cleaning area is scheduled to be moved to the present ammunition storage facility.

In general, the exercises were conducted as planned, and objectives were met. However, there are a few areas in which improvement is required and are discussed in the findings with concerns.

FS.2 FIREARMS AND SECURITY RELATED SAFETY PERFORMANCE

PERFORMANCE OBJECTIVE: Procedures and documentation should provide appropriate direction, record generation, and follow-up to minimize firearms and security-related accidents.

FINDINGS:

- There have been four ladder-climbing accidents involving security inspectors at the north and south posts of the Reactor Facility, in the last 24 months, including one during the appraisal. A replacement Lefreyre-type staircase has been approved and is expected to be installed in approximately two months.

- The BNL accident rate for security inspectors is higher than the DOE security personnel average.

- Corrective actions for BNL security and other personnel accidents have not been tracked until recently.

- There have been several complaints that the cage location in the sedans used to transport individuals in custody has produced a cramped, unsafe condition, especially for tall drivers. A BNL investigation concluded that the problem was inherent due to the small size of the vehicle. The TSA appraiser examined the vehicles and discovered that the cage in one vehicle was installed differently, resulting in more space for both the driver and the passenger in the back.

CONCERN: (FS.2-1) (H2/C2) Corrective actions and safety complaints are not being pursued on an aggressive, timely, and formal basis to reduce BNL's high accident rate involving security inspectors.

FS.3 FIREARMS SAFETY APPRAISAL PROGRAM

PERFORMANCE OBJECTIVE: Annual formal appraisals are conducted by safety personnel or by a joint safety/security appraisal team.

FINDINGS:

- Tracking of firearms safety corrective actions is not distinct and separate, but is conducted as part of the firearms safety appraisal process.
- Security inspector accident rates are recorded and monitored very closely through an internal BNL reporting system. However, BNL performance data have not been analyzed in comparison with other DOE security force accident rates, as is usual DOE practice.
- Due to a failure to follow procedures, BNL personnel safety performance was not until recently reported as a separate entity to the System Safety Development Center as required.

CONCERN: (FS.3-1) (H2/C3) Methods for reporting, evaluation, and tracking of BNL safety performance data are not in keeping with accepted industry practice.

FS.5 RANGE OPERATIONS AND ASSOCIATED EXERCISES

PERFORMANCE OBJECTIVE: Firearms range operations and associated exercises are in compliance with DOE requirements.

FINDINGS:

- The simulated first aid rendered during the September 18 emergency gunshot medical response exercise, consisting of placing plastic wrap and unopened gauze bandages on the "victim's" chest, did not fully demonstrate the capabilities of the individuals who have been trained to provide first aid.
- The site physician or a trained nursing professional was not present to evaluate the first aid or emergency medical techniques rendered during the exercise.
- The exercise was unrealistic; no mouth-to-mouth resuscitation was rendered despite the chest wound, use of medical supplies was limited, and the "victim" was not transferred to the ambulance. It was also unchallenging, a 110-lb person instead of the 250-lb person called for in the simulation was selected as the gunshot victim. The receiving hospital was not notified that a seriously wounded patient was on the way.
- The backing of the pick-up van, which is used to transfer the victim from the baffled portion of the range area (where the ambulance cannot reach) to the ambulance was considered dangerous.
- There is no videotape of the exercise to provide a visual record and to allow for a later critique.

CONCERN: (FS.5-1) (H2/C3) The emergency medical response simulation did not follow good industry practice, thereby diminishing the quality of the training received as a result of these drills.

FS.6 TACTICAL TRAINING EXERCISES

PERFORMANCE OBJECTIVE: Tactical training exercises should be conducted in an approved safe manner with all identified hazard analyzed and mitigated.

FINDINGS:

- Weapons utilized for tactical training exercises are marked as such, inspected at the beginning of the exercise, but not kept separate from the live-fire weapons as required.
- Present plans for the new weapons storage area do not contain a distinct locked physical separation of the Engagement Simulation System weapons from the live-fire weapons.

CONCERN: (FS.6-1) (H2/C1) The storage of Engagement Simulation System weapons does not comply with DOE 5480.16.

CONCERN: (FS.6-2) (H2/C2) There is potential for an inadvertent mix-up between the Engagement Simulation System weapons and spare live-fire weapons which are kept in the same locked cabinet.

IV. 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 they are applicable to their operation. Two noteworthy practices were found during this TSA; one in Operations and one in Industrial Hygiene. These are described in this section.

OP.9 HUMAN FACTORS

PERFORMANCE OBJECTIVE: Human factors considerations should be incorporated in the design, layout and operation of all facilities on the site in order to facilitate operator control, information processing, and the recognition of and proper response to alarms, instruments, and other equipment.

NOTEWORTHY PRACTICE: At the REF an interesting modification to the common crash-button (emergency shutdown switch) has been installed. In addition to crash-buttons, a cord similar to a railroad train emergency cord has been installed. This cord also activates the emergency shutdown switch, placing the emergency shutdown system literally within arms' reach of anyone in the tunnel. This arrangement is not only convenient, it has an important safety benefit. If, for example, a worker's clothing becomes caught in machinery, the emergency system can be easily and quickly activated. The system as installed does not prevent the original button from being used in the traditional way.

IH.1 ORGANIZATION AND ADMINISTRATION

PERFORMANCE OBJECTIVE: Site and facility organization and administration should ensure effective implementation and control of the industrial hygiene program.

NOTEWORTHY PRACTICE: Besides having protocols for particular job classifications, which specify medical examinations to be done, the occupational health physicians obtain additional information about job hazards from the employee's supervisor. Before conducting a pre-employment, routine, or rehire physical, the occupational medical department sends a form (see attached) to the employee's supervisor who fills it out and returns it in time for the exam.

This provides the occupational physician with detailed, current information on job hazards and working conditions to fulfill the requirements of DOE 5480.8.

This practice is especially beneficial in an organization such as BNL with few routine operations.

From: ______________________ (Department or Division

Employee Name: ____ Life No. ____________________

Occupation: _______________ Type of Examination*: ___Pre-Employment ___Recheck ___Re-hir
*Please return form prior to scheduled examination. ___Transfer ___Other (specify): ____________________

Please indicate those conditions/substances below which apply to the employee's job:

Condition/Substance:	Never	Some-times	Often
Strenuous exertion			
Moderate lifting (under 30 lbs)			
Heavy lifting (over 30 lbs)			
Work around moving machinery			
Powered hand tools			
Climbing (heights above 5 ft)			
Heavy equipment operation			
Welding			
Shift work			
Protracted or irregular hours			
Work out of doors			
Underground work			
Confined spaces			
Oxygen deficiency hazard			
Cool temperatures (below 60°F)			
Hot environments (above 95°F)			
Humidity extremes			
Possibility of intense heat, chemical splash, particulate atmosphere (all may cause problems with contact lenses):			
Continuous walking or standing			
Physical coordination required			
Full use of arms required			
Full use of legs required			
Full use of hands required			
Operator (reactor, accelerator, other):			
Visually demanding work:			
-near vision			
-far vision			
Accurate depth perception required			
Accurate color perception required			
Mental concentration			
Driver:			
-on site			
-off site			

Please specify ex. van, truck, tractor-trailer: ____________________

Condition/Substance:	Never	Some-times	Ofte
Electrical equipment			
High voltage			
Noise			
RF/microwave			
Vibration			
Laser operator (IIIB or IV laser)			
UV radiation			
Ionizing radiation			
Magnetic fields			
Video display terminal			
Animals			
Biohazards			
Chemicals			
Cryogens			
Dusts			
Explosives			
Fumes			
Hazardous wastes			
Metals			
Pesticides			
Radioisotopes			
Sewage			

Protective clothing required: ____________________
(specify): ____________________

	Never	Some-times	Ofte
Respirator use required			

(Specify type, if known): ____________________

Other information pertaining to job conditions: ____________________

Note: Form may be filled in and photocopied if more than one employee performs the same job.

Please sign/date. Thank you.

____________________ (Supervisor

___/___/___

OMC 8/83; REV. 4/85

APPENDIX A

System for Categorizing Concerns

Each concern contained in the report is categorized for SERIOUSNESS using the following criteria.

CATEGORY I: Addresses a situation for which a "clear and present" danger exists to workers and 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 (EH-1), or his designee, is informed immediately, so that consideration may be given to exercising the Secretary's facility shutdown authority or direction of other immediate mitigation.

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 the public). A concern in this category is to be conveyed to the manager of the facility no later than the appraisal close-out 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 and the routine development of an action plan.

Any issues surrounding the concern should be addressed during the appraisal or immediately thereafter. 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 significant need for improvement in the margin of safety, but is not of sufficient urgency to require immediate attention.

Each concern in the report is also categorized by its POTENTIAL HAZARD CONSIDERATIONS using the following criteria:

Level 1. Has the potential for causing a severe injury or fatality, a fatal occupational illness, or loss of the facility.

Level 2. Has the potential for causing minor injury, minor occupational illness, major property damage, or has the potential for resulting in, or contributing to, unnecessary exposure to radiation or toxic substance.

Level 3. Has little potential for threatening safety, health, or property.

Each concern in the report is categorized for its COMPLIANCE CONSIDERATION using the following criteria:

Level 1. Does not comply with mandatory DOE requirements (DOE Orders), prescribed policies or standards, or documented accepted practice (the latter is a professional judgment based on the acceptance and applicability of national consensus standards not prescribed by DOE requirements).

Level 2. Does not comply with DOE reference standards, guidance, or with good practice (as derived from industry experience, but not based on national consensus standards).

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--not deficiency-driven).

APPENDIX B

Categorization and Tabulation of Concerns

Using the criteria in Appendix A, the majority of the concerns have been categorized as Category III for seriousness. One concern was identified as a Category I issue, requiring prompt management attention. The concerns were also characterized by potential risk and compliance considerations. Appendix B-1 summarizes the results of the characterizations.

All of the concerns are tabulated in Appendix B-2 without their supporting bases. The user is cautioned that to fully understand any concern, it is necessary to read its basis in Section III.

APPENDIX B-1

Categorization of Concerns

Concern Number	Potential Hazard Level	Compliance Level
OA.1-1	3	2
OA.2-1	2	2
OA.3-1	2	2
OA.5-1	1	2
OA.6-1	3	2
OA.7-1	2	2
OA.7-2	2	1
OP.1-1	3	2
OP.1-2	3	2
OP.2-1	3	2
OP.3-1	2	2
OP.3-2	2	2
OP.3-3	2	2
OP.5-1	2	2
OP.5-2	2	2
OP.6-1	3	2
OP.6-2	1	1
OP.7-1	2	1
OP.8-1	2	2
OP.9-1	2	2
OP.10-1	2	2
MA.1-1	2	1
MA.1-2	2	2
MA.2-1	2	2
MA.5-1	2	2
MA.7-1	2	1
MA.8-1	2	2
TC.1-1	2	2
TC.1-2	2	2
TC.2-1	2	2
TC.3-1	2	2
EP.1-1	2	2
EP.2-1	2	1
EP.3-1	2	1
EP.5-1	2	2
EP.6-1	2	1

Concern Number	Potential Hazard Level	Compliance Level
QV.1-1	2	1
QV.1-2	2	1
QV.4-1	2	2
QV.5-1	2	2
TS.1-1	2	2
TS.2-1	2	2
TS.2-2	2	2
TS.3-1	3	2
TS.4-1	3	2
TS.4-2	3	2
TS.8-1	3	1
PT.2-1	3	1
PT.3-1	3	1
PT.4-1	3	1
PT.5-1	2	1
PT.6-1	2	1
PT.6-3	3	1
SR.1-1	2	1
SR.7-1	2	1
RP.3-1	3	2
RP.3-2	2	2
RP.3-3	2	2
RP.3-4	1	2
RP.4-1	2	2
RP.5-1	3	2
RP.8-1	2	1
RP.9-1	3	2
RP.11-1	3	2
IH.5-1	2	1
IH.6-1	2	1
OS.4-1	2	1
*OS.4-2	1	1
OS.4-3	1	1
OS.5-1	1	1
OS.5-2	2	1
OS.6-1	2	1
OS.6-2	2	1

*This concern is a Category I. All other concerns are Category III.

Concern Number	Potential Hazard Level	Compliance Level
FP.1-1	1	2
FP.1-2	1	2
FP.2-1	1	1
FP.3-1	2	1
FP.4-1	3	1
FP.5-1	3	1
FP.7-1	3	1
FP.7-2	3	1
FP.7-3	2	2
FP.7-4	2	1
FP.7-5	2	1
FP.7-6	2	1
FP.7-7	2	1
FP.7-8	2	1
FP.7-9	2	2
FS.2-1	2	2
FS.3-1	2	3
FS.5-1	2	3
FS.6-1	2	1
FS.6-2	2	2

APPENDIX B-2

Tabulation of Concerns

A. ORGANIZATION AND ADMINISTRATION

CONCERN: (OA.1-1) (H3/C2)	Lines of authority and responsibility cannot always be traced on existing organization charts, nor are organization charts controlled or approved. (See also (Concern OP.1-1.)
CONCERN: (OA.2-1) (H2/C2)	Administrative policies and controls are not in place to ensure the conditions that are necessary for a healthful and safe workplace.
CONCERN: (OA.3-1) (H2/C2)	The BNL environment, safety and health goals are neither definitive nor measurable and in many cases lack specific departmental action plans to accomplish the BNL-wide goals as well as the specific departmental goals. Safety goals are also not embraced or appreciated by all Laboratory management. (See also Concern OP.1-3.)
CONCERN: (OA.5-1) (H1/C2)	Interlock problems, including their use, misuse and nonreporting, have not been evaluated, and the root cause of the problems determined; nor has corrective action been taken to upgrade and enforce this primary system of personnel protection. (See also Concerns RP.3-4 and TS.4-1.)
CONCERN: (OA.6-1) (H3/C2)	Personnel programs do not ensure that specific job descriptions and job qualifications are established for all positions that affect safe and reliable operations.
CONCERN: (OA.7-1) (H2/C2)	Management is not ensuring control of vital safety and operating documents.
CONCERN: (OA.7-2) (H2/C1)	The AGS and the 60-inch Cyclotron are not in compliance with DOE 5481.1B, which requires an SAR for each DOE facility.

B. OPERATIONS

CONCERN: (OP.1-1) (H3/C2)	The responsibilities and authorities of each position in the organization are not uniquely defined in a formal document made available to the staff at large. (See Concern OA.6-1.)

CONCERN: (OP.1-2) (H3/C2)	Measurable goal and performance indicators are not used at many facilities to effectively improve performance and safe operations. (See also Concern OA.3-1.)
CONCERN: (OP.2-1) (H3/C2)	BNL, in general, does not have policy and procedures establishing the requirements for facility operations logs, their content, use, and review.
CONCERN: (OP.3-1) (H2/C2)	In general, the BNL process for procedure preparation, approval, modification, distribution, and safety impact determination is inconsistent, not formalized, and undocumented.
CONCERN: (OP.3-2) (H2/C2)	A policy controlling the posting and implementation of operating aids in the control rooms does not exist.
CONCERN: (OP.3-3) (H2/C2)	The operation of the NSLS and REF facilities is not in compliance with their Safety Analysis Reports.
CONCERN: (OP.5-1) (H2/C2)	The control, use, and content of operating procedures for experiments are not sufficient to ensure that the experimenter is provided a well-defined safe operating envelope.
CONCERN: (OP.5-2) (H2/C2)	Controls and procedures are not in place to ensure that access to the NSLS experiment floor area is restricted to authorized and trained users and escorted visitors.
CONCERN: (OP.6-1) (H3/C2)	Management has not established standards and directives providing a clear concise statement of acceptable operating states for facilities and experiments.
CONCERN: (OP.6-2) (H1/C1)	BNL Health and Safety Guide 1.5.1, "Lock-Out/Tag-Out Requirements" is not being enforced as required by DOE 5483.1A and 29 CFR 1910.147.
CONCERN: (OP.7-1) (H2/C1)	The housekeeping in some facilities is poor and is not in accordance with DOE 5483.1A, 29 CFR 1910.22, and generally accepted industrial practice. (See also Concerns OS.5-1 and FP.7-4.)
CONCERN: (OP.8-1) (H2/C2)	The depth and breadth of operator knowledge is not commensurate with acceptable industrial practices at facilities of comparable sophistication and complexity.

CONCERN: (OP.9-1) (H2/C2) BNL has not developed and implemented coding convention standards (color, size, shape, position and nomenclature) for facility components and equipment.

CONCERN: (OP.10-1) (H2/C2) The current shift turnover process does not assure effective and accurate transfer of essential information regarding the facility status between crews and interacting members of the same crew.

C. MAINTENANCE

CONCERN: (MA.1-1) (H2/C1) A uniform, BNL-wide maintenance program, consistent with the requirements of DOE 4330.4, industry standards, and good practices is not provided by the current organizational structure.

CONCERN: (MA.1-2) (H2/C2) The responsibility for the maintenance activity at NSLS is not defined.

CONCERN: (MA.2-1) (H2/C2) Many BNL facilities are crowded with equipment (which in some cases is unused) and may impact safe effective operation, industry safety standards, and good operating practices.

CONCERN: (MA.5-1) (H2/C2) Lack of consistent application of safety requirements in maintenance shop areas promotes unsafe conditions and contributes to the potential for accidents and injury.

CONCERN: (MA.7-1) (H2/C1) Documentation of maintenance requirements, procedures and activities is incomplete and not sufficiently accurate to ensure safe and effective maintenance. This lack of documentation may affect the continuity of operations of one-of-a-kind and other special equipment should existing experienced personnel retire or transfer.

CONCERN: (MA.8-1) (H2/C2) Documentation of maintenance data and information is not adequate to support a maintenance history program. (See also Concern TS.4-1.)

D. TRAINING AND CERTIFICATION

CONCERN: (TC.1-1) (H2/C2) BNL has no lab-wide training policy or requirements for initial and ongoing qualification programs. (See also Concern OA.6-1.)

CONCERN: (TC.1-2) (H2/C2) Training records of each individuals's training participation and performance are not documented at BNL in several departments and divisions.

CONCERN: (TC.2-1) (H2/C2) BNL does not have formalized lesson plans to ensure adequacy of safety training.

CONCERN: (TC.3-1) (H2/C2) BNL has not developed and documented qualification standards and evaluation methods to adequately verify trainee competence in maintenance activities.

E. EMERGENCY PREPAREDNESS

CONCERN: (EP.1-1) (H2/C2) The magnitude and consequences of emergencies involving nonradioactive hazardous materials have not been identified, nor have BNL emergency plans or emergency organization structures been well defined to respond to this type of emergency. (See also Concerns PT.5-4, PT.6-2, and FP.3-1.)

CONCERN: (EP.2-1) (H2/C1) Not all local emergency plans are being kept current in accordance with the requirements of the BNL Laboratory Emergency Response Plan.

CONCERN: (EP.3-1) (H2/C1) Neither initial nor continuing training programs for most emergency response personnel have established formal qualification/requalification requirements. (See also Concern TC.1-1.)

CONCERN: (EP.5-1) (H2/C2) The BNL Emergency Operations Facility is not equipped to facilitate the control of all postulated emergencies.

CONCERN: (EP.6-1) (H2/C1) Emergency assessment and notification practices and procedures are not based on current DOE emergency event classifications or protective action guides.

F. QUALITY VERIFICATION

CONCERN: (QV.1-1) (H2/C1) Documented and approved quality assurance plans are not all in place at BNL as required by the BNL Quality Assurance Manual and DOE 5700.6B.

CONCERN: (QV.1-2) (H2/C1) Independent verifications, surveillance, and audits of quality attainment within the departments, divisions, and projects are too few to enable the BNL Director and his line managers to review and evaluate the implementation of their quality assurance programs, as required by DOE 5700.6B.

CONCERN: (QV-4.1) (H2/C2) The BNL policy for calibration of measuring and testing equipment is not implemented by all departments and divisions.

CONCERN: (QV.5-1) (H2/C2) BNL management is not enforcing its basic policies for nonconformance issues.

G. TECHNICAL SUPPORT

CONCERN: (TS.1-1) (H2/C2) BNL has no formal system to ensure review of proposed actions by interfacing organizations whose interests might be impacted.

CONCERN: (TS.2-1) (H2/C2) Engineering personnel who design facility modifications do not all have cognizance of or full access to documents that define the safety requirements for individual facilities.

CONCERN: (TS.2-2) (H2/C2) There is no system of procedures for formal interchange of information between technical and operations/maintenance staffs that ensures operation/maintenance practices and designs are consistent.

CONCERN: (TS.3-1) (H3/C2) Many of the BNL organizations do not have written procedures controlling design and review of modifications.

CONCERN: (TS.4-1) (H3/C2) There is no comprehensive program for systematic evaluation of equipment performance. (See also Concerns OA.5-1, MA.8-1, QV.1-2, and QV.5-1.

CONCERN: (TS.4-2) (H3/C2) Not all performance testing and monitoring files are readily auditable by a third party for verification of compliance with requirements. (See also Concern QV.1-2.)

CONCERN: (TS.8-1) (H3/C1) The BNL Annual Site Environmental Report was not distributed on the schedule required by DOE 5400.1.

H. PACKAGING AND TRANSPORTATION

CONCERN: (PT.2-1) (H3/C1) BNL has not routinely audited packaging and transportation functions as required by DOE 5480.3 and DOE 5482.1B.

CONCERN: (PT.3-1) (H3/C1) BNL does not have policies and procedures for handling, packaging, and shipping hazardous materials, substances, and wastes, as required by the health, safety, and environmental requirements of DOE 5480.1A, or all the requirements of DOE 5480.3 and 5480.4. (See also Concern OA.2-1.)

CONCERN: (PT.4-1) (H3/C1) BNL does not have safety oversight of P&T operations as required by DOE 5480.1A.

CONCERN: (PT.5-1) (H2/C1) BNL does not conduct handling, storage, intrasite movements, and emergency response aspects of hazardous materials, substances, and wastes (including hazardous, mixed, and radioactive) and does not have adequate safety requirements to meet the full intent of the health, safety, and environmental requirements of DOE 5480.1A. (See Concern EP.1-1.)

CONCERN: (PT.6-1) (H2/C1) The BNL training program for personnel with P&T functions does not meet the existing standards of DOE 5480.3 (7/9/85) for offsite shipment or 5480.1A for intrasite movements. (See Concern TC.1-1.)

CONCERN: (PT.6-3) (H3/C1) BNL does not have a spill prevention, control, and countermeasures program which meets all the requirements of DOE 5480.4 and 40 CFR 112.

I. SITE AND EXPERIMENT SAFETY REVIEW

CONCERN: (SR.1-1) (H2/C1) The Ad Hoc Committee for the review and approval of table-top and planned larger (non-Radiation Effects Facility) experiments are not in compliance with DOE 5482.1B, Section 9.d.

CONCERN: (SR.7-1) (H2/C1) BNL is not in compliance with DOE 5482.1B in all programmatic areas reviewed in this TSA.

J. RADIOLOGICAL PROTECTION

CONCERN: (RP.3-1) (H3/C2)	Implementation of some aspects, particularly radiation worker retraining, of DOE 5480.11 will not be accomplished by January 1, 1990, as specified in BNL's implementation plan. (See also Concern TC.2-1.)
CONCERN: (RP.3-2) (H2/C2)	BNL does not have uniform posting in radiation areas.
CONCERN: (RP.3-3) (H2/C2)	In general there are no formal, documented departmental radiation protection procedures which implement the guides in the BNL Safety Manual.
CONCERN: (RP.3-4) (H1/C2)	Many of the interlock systems are not consistent with the BNL Safety Manual. (See also Concern OA.5-1.)
CONCERN: (RP.4-1) (H2/C2)	External radiation exposure control is not adequate to minimize exposures or to quickly recognize that higher than normal exposure is being received by personnel.
CONCERN: (RP.5-1) (H3/C2)	The commercial film badge service provided to BNL is not accredited under DOELAP.
CONCERN: (RP.8-1) (H2/C1)	Calibration of radiation protection instruments does not meet ANSI N323 as required by DOE 5480.4.
CONCERN: (RP.9-1) (H3/C2)	Air monitoring systems do not ensure reliable estimates of air activity.
CONCERN: (RP.11-1) (H3/C2)	BNL does not have a documented ALARA program.

K. INDUSTRIAL HYGIENE

CONCERN: (IH.5-1) (H2/C1)	BNL does not comply with the respiratory protection and laser safety standards required by DOE 5480.4. Internal audits have failed to identify these deficiencies.
CONCERN: (IH.6-1) (H2/C1)	The BNL hazard communications program, required by DOE 5480.4 and 5483.1A, has not been fully implemented.

L. OCCUPATIONAL SAFETY

CONCERN: (OS.4-1) (H2/C1)	The priority given to safety is not adequate to ensure that safety performance meets DOE expectations as required by DOE 5483.1A.
CONCERN: (OS.4-2) (H1/C1)	BNL is not controlling hazardous conditions at its construction activities and is not enforcing construction safety standards as required by DOE 5480.4 and DOE 5480.9.
CONCERN: (OS.4-3) (H1/C1)	BNL has not established a formal program to track the corrective actions identified during injury and illness recording, investigation, and reporting.
CONCERN: (OS.5-1) (H1/C1)	BNL is not consistently enforcing the use of personnel protective equipment as required by DOE 5483.1A.
CONCERN: (OS.5-2) (H2/C1)	The BNL Compressed Gas Cylinder Safety Policy and Procedures do not meet DOE 5480.4 requirements.
CONCERN: (OS.6-1) (H2/C1)	BNL is not posting their injury and illness data as required by DOE 5483.1A.
CONCERN: (OS.6-2) (H2/C1)	BNL safety training program is not adequate as required by DOE 5483.1A.

M. FIRE PROTECTION

CONCERN: (FP.1-1) (H1/C2)	Not all of the fire protection functions required by DOE 5480.7 and BNL Safety Department operations procedures and safety directives are being performed. (See also Concern OA.2-1.)
CONCERN: (FP.1-2) (H1/C2)	Fire protection deficiencies are not being corrected in a timely manner. (See Performance Objectives FP.2, FP.3, and FP.7.)
CONCERN: (FP.2-1) (H1/C1)	BNL life safety provisions do not meet the minimum requirements of NFPA 101, The Life Safety Code, as required by DOE 5480.7-9.1(1).
CONCERN: (FP.3-1) (H2/C1)	No quantitative analysis has been performed to ensure that an offsite release of hazardous amounts of toxic or radioactive materials will not occur under maximum credible fire conditions as per DOE 5480.7-9.a.(3). (See also Concerns EP.1-1 and PT.5-1.)

CONCERN: (FP.4-1) (H3/C1) BNL has not performed an analysis to verify that a credible fire loss could not impair an operation in a vital facility for a period greater than 6 months, as required by DOE 5480.7-9.b.

CONCERN: (FP.5-1) (H3/C1) BNL has not determined that a maximum credible fire may result in an unacceptable property loss as required by DOE 5480.7, Sections 9.c, 9.d, 10.b.(8), and 10.b.(11).

CONCERN: (FP.7-1) (H3/C1) Some sprinkler and halon systems at BNL do not completely conform to DOE 6430.1A-1530-4.1 and -5.25 requirements.

CONCERN: (FP.7-2) (H3/C1) The distribution of some portable fire extinguishers in several buildings is not in accordance with NFPA 10 and DOE 6430.1A-1530-7.

CONCERN: (FP.7-3) (H2/C2) Housekeeping and the control of ordinary combustibles is not adequate in several buildings at BNL. (See also Concern OS.5-2.)

CONCERN: (FP.7-4) (H2/C1) Flammable liquid hazards at BNL are not being controlled in accordance with DOE 5480.7-9.a.(2)(b) and the requirements of NFPA 30.

CONCERN: (FP.7-5) (H2/C1) During welding operations, site procedures for the protection of combustibles and use of fire watch personnel were not being followed, as required by NFPA 51B.

CONCERN: (FP.7-6) (H2/C1) BNL is not implementing an effective fire barrier maintenance program as required by DOE 5480.7-10.b.(5) and 10.b.(7).

CONCERN: (FP.7-7) (H2/C1) Materials with unusually high fire characteristics, notably expanded plastic duct insulation, exist in interior finish applications at BNL, in conflict with DOE 5480.7-9.a.(2)(a) and 6430.1A-0110-6.1. (See also Concern FP.1-1.)

CONCERN: (FP.7-8) (H2/C1) Fire water main flows, water storage tanks, and emergency lights and signs are not tested or inspected at NFPA-specified frequencies.

CONCERN: (FP.7-9) (H2/C2) Not all portable and modular buildings at BNL conform to the requirements of DOE/EV-0043, "Fire Protection for Portable Structures," with respect to exposure distances and sprinkler protection.

N. FIREARMS SAFETY

CONCERN: (FS.2-1) (H2/C2)	Corrective actions and safety complaints are not being pursued on an aggressive, timely, and formal basis to reduce BNL's high accident rate involving security inspectors.
CONCERN: (FS.3-1) (H2/C3)	Methods for reporting, evaluation, and tracking of BNL safety performance data are not in keeping with accepted industry practice.
CONCERN: (FS.5-1) (H2/C3)	The emergency medical response simulation did not follow good industry practice, thereby diminishing the quality of the training received as a result of these drills.
CONCERN: (FS.6-1) (H2/C1)	The storage of Engagement Simulation System weapons does not comply with DOE 5480.16.
CONCERN: (FS.6-2) (H2/C2)	There is potential for an inadvertent mix-up between the Engagement Simulation System weapons and spare live-fire weapons which are kept in the same locked cabinet.

APPENDIX C

Team Composition and Areas of Responsibility
Technical Safety Appraisal
Brookhaven National Laboratory

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	Barbara Bowers Office of Safety Appraisals Department of Energy
	Lydia Reyes Westinghouse Idaho Nuclear Co., Inc.
Liaisons with the Team	
ER:	Herbert Field Office of Energy Research Department of Energy
EH Compliance:	John J. Stefano Office of Environment, Safety and Health Department of Energy
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Technical Editor	Pamela L. Gurwell Battelle Northwest
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Operations	Thomas L. Van Witbeck SCIENTECH, Inc.
	Ernest Nieschmidt EG&G Idaho, Inc.
Technical Support	J. Kenneth Anderson Private Consultant
Maintenance	Harry Heiselmann SCIENTECH, Inc.
Training and Certification	Richard W. Vinther Battelle Northwest
Emergency Preparedness	Thomas J. Mazour Private Consultant
Radiological Protection	Steve R. Velen Private Consultant
	William C. King Private Consultant
Industrial Hygiene	Linda Munson Evergreen Innovations, Inc.
Occupational Safety	Abdul Q. Dasti Office of Environment, Safety and Health Department of Energy
Packaging and Transportation	John M. Cece Menehune Marine Services
Site and Experiment Safety Review	William Jacober Private Consultant
Fire Protection	Ken Philips Private Consultant
	Harvey Goranson Professional Loss Control, Inc.

Quality Verification	Leonard M. Lojek Office of Environment, Safety and Health Department of Energy
Firearms Safety	Edward N. Patigalia Office of Environment, Safety and Health Department of Energy

APPENDIX D

Biographical Sketches of Team Members
Technical Safety Appraisal
Brookhaven National Laboratory

NAME: Yo Taik Song (Team Leader)

ASSOCIATION: Office of Safety Appraisals
Department of Energy

EXPERIENCE: 30 years

- Nuclear Engineering and Reactor Physics
- Research in Neutron and Photon Transport Nuclear and Radiation Safety for U.S. Navy Nuclear Weapons Program
- Teaching Reactor Physics, Radiation Transport, and Radiation Shielding in Universities
- Management of Nuclear Weapons Research, Development and Testing
- Team member on HFIR Design Review, HFBR TSA; team leader on Mound T-3, SNL-T Facility, LLNL-T Facility TSA follow-ups, Special OSHA-type Audit on Pantex, HFIR Restart Review, and BNL Site TSA

EDUCATION: M.S. and PhD., Nuclear Engineering with minor in Mathematics and Chemical Engineering, University of Illinois, Urbana, Illinois
B.S., Chemical Engineering, Yon Sei University (Seoul, Korea)

OTHER: Licensed Reactor Operator
Member, American Nuclear Society

NAME: Albert D. Morrongiello (Assistant Team Leader)

ASSOCIATION: Office of Safety Appraisals
Department of Energy

EXPERIENCE: 10 years

- Nuclear Engineer, assigned as an Assistant Team Leader in Safety Inspection Division, Department of Energy
- Nuclear Regulatory Commission, assigned as Resident Inspector
- Environmental Protection Agency

EDUCATION: M.S., Professional Management, Florida Institute of Technology
M.S., Biology, University of Maryland
B.A., Chemistry, University of Rhode Island

Additional studies at Rutgers University, Department of Radiation Science

NAME:	Pamela L. Gurwell (Technical Editor)
ASSOCIATION:	Battelle-Northwest
EXPERIENCE:	6 years

- Supervisor, Technical Communications, Battelle-Northwest
- Editor-in-residence, Materials and Chemical Sciences Center, Battelle-Northwest
- Technical editor for DOE Restart Readiness Review of High-Flux Isotope Reactor, Oak Ridge National Laboratory
- Technical editor for DOE Safety Evaluations of N-Reactor, PUREX, and Savannah River Reactors
- Lead editor, public comment volume, Hanford Defense Waste Environmental Impact Statement

EDUCATION:	M.A., English, University of Virginia B.A., English, University of Rochester

NAME: Lorin C Brinkerhoff (Organization and Administration)

ASSOCIATION: Private Consultant

EXPERIENCE: 35 years

- Technical Safety Appraisal Team Leader, DOE, Office of Safety Appraisals
- Reactor and Nuclear Facility Safety Specialist, AEC/ERDA/DOE
- Senior Nuclear Engineer, Aerojet General Corporation, Nuclear Rocket Development Center (Nevada Test Site)
- Manager, Nuclear Critical Facility, Lawrence Livermore National Laboratory (Nevada Test Site)
- Reactor Foreman, Phillips Petroleum Co., Idaho Test Site
- Graphite Research Analyst, Hanford Test Site, General Electric Co.

EDUCATION: B.S., Chemical Engineering, University of Utah

OTHER:

- Past member of ANS-15 Standards Committee on Research Reactor Safety
- Past Member of ANSI N-16 Standards Committee on Nuclear Criticality Safety
- Listed in:

  Who's Who in the East

  Who's Who in the World

NAME: Thomas L. Van Witbeck (Operations)

ASSOCIATION: SCIENTECH, Inc.

EXPERIENCE: 25 years

- SCIENTECH, INC.
    - Consultant: provide services to government and commercial nuclear industry in the areas of operations, maintenance and safety
- PLD Energy Services
    - Vice President: supported nuclear plant operations
- Energy Incorporated
    - Vice President: provided maintenance management systems, plant operations and quality assurance services
    - Director: technical support and management and quality assurance audits
    - Group Manager: onsite team to assess the Three Mile Island accident
    - Principal Consultant: Technical support of commercial reactors and DOE
- Westinghouse Electric Corporation
    - Shift Supervisor/Supervisory Engineer: commercial nuclear plant start-up and power ascension testing
- Oregon State University
    - Reactor operator and health physicist
- U.S. Navy
    - Petty Officer in charge of water chemistry and radiological programs

EDUCATION: B.S., Nuclear Engineering, Oregon State University
U.S. Navy Engineering Laboratory Technical School
U.S. Navy Nuclear Power School

OTHER: Registered Professional Engineer
Licensed Reactor Operator (OP-2315)

NAME:	Ernest B. Nieschmidt (Operations)
ASSOCIATION:	EG&G Idaho, Inc.
EXPERIENCE:	25 years

- Studies involving diagnostics of high-temperature plasma
- Development of transuranic assays for waste materials
- Aerojet Nuclear Company, nondestructive assay of nuclear fuels
- Idaho Nuclear Corporation, activation analysis and its application to geological prospecting

EDUCATION: M.S., San Diego State College
B.S., San Diego State College

OTHER: American Physical Society
IEEE Nuclear and Plasma Sciences Society
Health Physics Society

NAME: J. Kenneth Anderson (Technical Support)

ASSOCIATION: Private Consultant

EXPERIENCE: 38 years

- Manager, Safety Assessment Office, Westinghouse Hanford
- Manager, Nuclear Safety, Westinghouse Hanford
- Executive Secretary and member, Westinghouse Hanford Safeguards (Nuclear Facility Safety Review) Council
- Heat transfer/fluid flow experiments and analyses for nuclear reactor programs
- Safety analyses and design reviews for Hanford nuclear reactors and nonreactor nuclear facilities
- Member of five DOE-HQ Technical Safety Appraisal Teams
- Member of DOE-HQ HFIR Restart Readiness Review Team
- Member of DOE-NE Reactor Review team appraising DOE reactor safety following TMI-2 Accident
- Classification Officer (2.5 years), Westinghouse Hanford

EDUCATION: B.A., Physics, University of Utah
Graduate courses in physics, mathematics, and reactor design analysis, University of Idaho

NAME: Harry W. Heiselmann (Maintenance)

ASSOCIATION: SCIENTECH, Inc.

EXPERIENCE: 30 years

- Nuclear Safety Programs
  - Testing and Equipment Maintenance
  - Manufacture and Maintenance
- DOE Energy Conservation
  - Electric Vehicle Program
  - Safety Appraisals
- Industrial and Commercial
  - Product Research and Development

EDUCATION: B.S., Mechanical Engineering, Illinois Institute of Technology
University of Idaho Graduate Courses
Jet Propulsion Lab/U.S. Army Guided Missile School

OTHER: Member, American Society Mechanical Engineers/ Idaho Section Officer
Registered Professional Engineer
Member, American Nuclear Society/Symposium Finance Chairman

NAME: Richard W. Vinther (Training and Certification)

ASSOCIATION: Battelle-Northwest

EXPERIENCE: 12 years

- Battelle-Northwest
  - Contract examiner for NRC licensing program
- UNC Nuclear Industries, Inc.
  - Certified reactor operator, N Reactor
  - Systems certification instructor for N Reactor operator
  - N Reactor lead simulator instructor
  - Supervised development and training programs for N Reactor

EDUCATION: B.A., Business Administration, University of Puget Sound

NAME: Thomas J. Mazour (Emergency Preparedness)

ASSOCIATION: Private Consultant

EXPERIENCE: 18 years

- Private Consultant
  - Participated in evaluation of 14 emergency exercises for 15 Technical Safety Appraisals
  - Evaluated operations, emergency preparedness, and training areas for NRC inspections of commercial nuclear power plants
  - Evaluated emergency operating procedures and plans for a commercial nuclear power plant
- Analysis & Technology, Inc.
  - Supported the NRC in evaluating utility training programs related to emergency operations and emergency response
  - Supported INPO analysis of operator emergency response activities
- Burns & Roe, Inc.
  - Design engineer and licensing engineer
- U.S. Navy
  - Nuclear reactor operations, nuclear weapons officer

EDUCATION: Sc.D (candidate), Management Systems, University of New Haven
M.S., Industrial Engineering, University of New Haven
M.B.A., University of New Haven
B.S., Mathematics, U.S. Naval Academy

OTHER: Registered Professional Engineer (Nuclear/Mechanical)
Adjunct faculty member, University of New Haven, industrial engineering and operations research courses

NAME: Steve R. Velen (Radiological Protection)

ASSOCIATION: M. H. Chew & Associates, Inc.

EXPERIENCE: 18 years

- M. H. Chew & Associates, Inc.
  - Principal Associate: Provide services with expertise in health physics, operational safety, and environmental and safety analysis report preparation and review to DOE and government contractors. Also responsible for upgrading and preparing technical specifications for the Advanced Test Reactor at the INEL site. Provide technical health physics support to DOE site representative program. Participated in technical radiological safety appraisal at Oak Ridge National Laboratory.
- Lawrence Livermore National Laboratory
  - Safety Team Leader: Managed technicians and safety professionals in all aspects of safety in plutonium and tritium handling and processing facilities as well as all facilities in the Laser Research Program. Also served as an Emergency Action Coordinator.
- Fermi National Accelerator Laboratory
  - Radiation Safety Officer: Operational health physicist for experimental areas which include implementation of all aspects of radiation safety program

EDUCATION: M.S., Health Physics, Northwestern University
B.S., Chemistry and Math, Roosevelt University

OTHER: Certified Health Physicist

NAME: William C. King (Radiological Protection)

ASSOCIATION: SCIENTECH, Inc.

EXPERIENCE: 37 years

Lawrence Livermore National Laboratory

- Group Leader, Hazards Control Department: department computer networking, database management of safety records, and hazards control training of laboratory personnel
- Scientific staff assistant, Radiation and Environmental Science Division: provided and evaluated internal dose assessment to U, Pu, Am, and Cm isotopes; radiation safety advisor on three nuclear weapons accident exercises (NUWAX)
- Group leader, Environmental Measurements Group, responsible for measuring underground water, effluent run-off, sanitary sewer effluent, air, vegetation and dairy products
- Resident manager of the Super-Kukla and Fran fastburst reactors; resident physicist on disassembly of the Tory IIA reactor
- Health and Safety Manager, LLNL Nevada Department; safety advisor to LLNL nuclear weapons Test Group Director

Phillips Petroleum Company

- Supervisor of Health Physics at the Engineering Test Reactor during start-up and operation
- Senior Health Physicist at Idaho Chemical Processing Plant during start-up and operation.

EDUCATION: M.S., Physics, Vanderbilt University, 1953
B.A., Physics, Linfield College, 1950
ORINS, Health Physics, Post Graduate Fellow, 1951 and 1952.

NAME: Linda Munson (Industrial Hygiene)

ASSOCIATION: Evergreen Innovations, Inc.

EXPERIENCE: 16 years

- Evergreen Innovations
  - Project Manager for EPRI rad waste desk reference
  - Consultant to Battelle-Northwest on TMI cleanup
  - TSA participant: Industrial Hygiene, Emergency Readiness, and Radiation Protection

- Battelle, Pacific Northwest Laboratories
  - Associate Section Manager, Dosimetry Technology Section
  - Project Manager for various technical assistance programs including cleanup of TMI and upgrade of the RMI Health Physics program
  - Participated in the team appraisal of six uranium mills for and with the NRC
  - Appraised, with DOE-HQ, Emergency Preparedness of Rocky Flats
  - Observed about six Emergency Preparedness exercises for NRC

- UNC Nuclear Industries
  - Manager, Industrial Safety responsible for industrial hygiene, industrial safety and fire protection at N Reactor and the associated fuel fabrication facilities
  - Managed the preparation of Environmental Information Reports and license applications for various nuclear facilities, primarily uranium mills, and fuel fabrication plants
  - Evaluated decontamination alternatives for the West Valley Reprocessing Plant

EDUCATION: M.S., Analytical Chemistry, Iowa State University
B.A., Chemistry, U.S. International University
Short courses in Radiation Protection, Industrial Hygiene, Industrial Safety, MORT, Respiratory Protection, Management, and Communications

NAME: Abdul Q. Dasti (Occupational Safety)

ASSOCIATION: Office of Environment, Safety and Health
Department of Energy

EXPERIENCE: 24 years

- Safety Engineer, responsible for developing industrial and occupational safety policy for DOE-owned, contractor-operated facilities
- Environmental Engineer, responsible for overview of DOE environmental protection programs and activities
- Chemical Engineer, responsible for reviewing electrical utilities' fuel and production costs for regulating interstate power pooling charges

EDUCATION: M.E., Chemical Engineering, New York University
M.Sc., Chemical Technology, Panjab University (Pakistan)
B.Sc., Physics and Chemistry, Panjab University (Pakistan)

NAME: John M. Cece (Packaging and Transportation)

ASSOCIATION: Menehune Marine Services

EXPERIENCE: 31 years

- Served on Technical Safety Appraisals of Plutonium Finishing Plant, Feed Materials Production Center, PUREX, H-B Canyon, Rocky Flats, Hanford Tank Farms

- Member of team which completed peer review of Rocky Flats Safety Analysis Report (SAR)

- Safety Consultant, Hazardous Materials Packaging and Transportation: participated in safety reviews of 36" pipeline (Texas); chemical manufacturing plant (Connecticut); private clients

- Marine Surveyor

- U.S. Department of Energy DOE/Headquarters - Manager, Hazardous Materials Packaging and Transportation, Office of Operational Safety

- U.S. Department of Transportation (Coast Guard) - Manager, Transportation Safety R&D

EDUCATION: Ph.D., Physical Chemistry, University of Rhode Island
B.S., Engineering, U.S. Coast Guard Academy

NAME: William J. Jacober (Site and Experiment Safety Review)

ASSOCIATION: Private Consultant

EXPERIENCE: 41 years

- Savannah River Plant - Dupont
  - Tritium Development Technology: Implemented major improvements in the systems that separate, purify, contain, and recover tritium; responsible for the design liaison, testing and startup of a tritium confinement system and associated recovery systems
  - Tritium Production Technology: Provided critical technical support to the tritium separation and purification facilities
  - Waste Management Technology: Made a literature search for one year on methods for permanent storage of long-lived radioactive wastes; recommended that Savannah River Plant calcine the wastes, inbed the solids in a glass matrix, and seal the waste in stainless steel vessels for long-term storage
  - Reactor Technology: Provided critical technical support to the moderator (D_2O) purification systems and to the blanket gas purification systems for plutonium/ tritium production reactors
- Dupont Company
  - Research chemist in the cellophane research section

EDUCATION: Ph.D., Chemistry, Brown University

NAME: Ken C. Phillips (Fire Protection)

ASSOCIATION: EG&G Idaho, Inc.

EXPERIENCE: 24 years

- Fire Protection Engineer, EG&G Cognizant Representative
- Fire Protection Engineer, EG&G Audit Group
- Fire Protection Engineer, TRA Reactor Area
- Group Leader, for EG&G Fire Protection Engineering Group
- Fire Protection Engineer, Field Engineer for Factory Insurance Association

EDUCATION: M.S., Safety, University of Idaho
B.S., Tool and Manufacturing Engineering, Brigham Young University

OTHER: Registered Professional Engineer (California)
Member, National Fire Protection Association
Member, NFPA Halon Committee

NAME: Harvey E. Goranson (Fire Protection)

ASSOCIATION: Professional Loss Control, Inc.

EXPERIENCE: 15 years

- HPR-type industrial evaluations and inspections, including commercial nuclear power plants and DOE nuclear facilities
- Design and design review of fire protection systems
- Qualified lead auditor per ANSI N45

EDUCATION: M.B.A., University of Tennessee
B.S., Fire Protection and Safety Engineering, Illinois Institute of Technology

OTHER: Registered Professional Engineer (Tennessee)
Member, Society of Fire Protection Engineers, National Fire Protection Association, and National Society of Professional Engineers

NAME: Leonard M. Lojek (Quality Verification)

ASSOCIATION: Office of Environment, Safety and Health
Department of Energy

EXPERIENCE: 29 years

- Department of Energy
  - Participated in six TSAs
  - Quality Assurance Manager, Assistant Secretary for Environment, Safety and Health
  - Quality Assurance Program Manager, Assistant Secretary for Fossil Energy
  - Program Manager of R&D efforts in Solvent Refined Coal Conversion Programs (SRC-I and SRC-II), Assistant Secretary for Fossil Energy
- Department of Defense
  - Project Manager and Project Engineer for disposal of obsolete toxic chemical munitions, Chemical Systems Laboratory
  - Product Engineer for smoke and pyrotechnic chemicals and for riot control chemicals. Process Engineer for plasticized white phosphorus munitions, Chemical Systems Laboratory
- Calgon Corporation
  - Technical Service Engineer for industrial and utility water treatment systems

EDUCATION: M.S.A, Management Engineering, George Washington University
B.S., Chemical Engineering, Carnegie-Mellon University

OTHER: Member of AICHE, ASQC, ADPA

NAME: Edward N. Patigalia (Firearms Safety)

ASSOCIATION: Office of Environment, Safety and Health
Department of Energy

EXPERIENCE: 25 years

- Manager, firearms, explosives, and pressure safety programs
- Active in development of DOE 5480.16, "Firearms Safety"
- Chairman, Firearms Safety Committee
- Chairman, Explosives Safety Committee
- Helped develop DOE pressure safety guidelines
- Participated in explosives and propellant development, Picatinny Arsenal, Department of Defense

EDUCATION: B.E., Chemical Engineering, City College of New York

OTHER: Licensed Professional Engineer (New Jersey)

Appendix C. Fire Protection Projects and Status

FIRE PROTECTION

Scope:

It was not possible to cover all facilities of BNL; however, such a review is essential to the development of a complete analysis of the status of fire protection and loss control. Therefore, other deficiencies in protection or practice may exist and should be closely examined by BNL staff and CH.

During the appraisal, procedures relating to fire protection equipment testing and inspection were reviewed. Proposed and existing budget items for fire-protection related improvements were appraised. The BMRR, NSLS, Chemistry, Physics, Biology, and AGS facilities were physically surveyed.

Executive Summary:

BNL facilities did not meet all the requirements in DOE standards and NFPA codes. While identification of major hazards and physical protection improvement measures have been documented by BNL, funding constraints have delayed implementation of many of the original 171 recommendations from the 1974 Factory Mutual Engineering Association Report.

A detailed analysis of fire protection risks has not been updated, since the 1984 Professional Loss Control Report. Without this total analysis of the facility, including life safety (NFPA 101), a consolidated long-range improvement plan cannot be implemented. It is recognized that BNL is over 40 years old with buildings dating back to the 1940s. However, without a plan assessing the mission requirements and actual serviceable life of the plant, BNL cannot reach the "improved risk" criteria, as measured against Highly Protected Risks in the private sector. The key to this plan will be reasonable and sustained funding for upgrades, based upon existing and proposed studies conducted by BNL.

Fire Safety Program:

The fire safety program objectives for BNL are defined in the Occupational Health and Safety Guide, Fire Protection Program, Section 4.0.0. Generally, these follow the direction of DOE 5480.7 for minimum and improved risk levels of fire prevention and protection. Direct responsibility for the program is delegated to Department Chairmen, Line Supervisors, and Project Managers. S&EP and, in particular, the fire protection engineer are responsible for developing protection criteria, project plan review, and facility risk assessments and appraisals. S&EP also provides on-site fire department response services.

Physical Protection Features:

The 1974 Factory Mutual Engineering Association report is the most complete description of the fire protection features. It is recognized that additional automatic protection and detection have been installed since that report. However, a comprehensive update to the Factory Mutual report should be developed as a cornerstone to their risk analysis, fire prevention plans, and fire protection plans.

The water supply is a well-gridded system of the type generally associated with a municipality. Main sizes range from 6 inches to 12 inches in diameter and loop most buildings, providing a multiple feed arrangement. While heavy tuberculation has been encountered in smaller diameter piping, the location and extent appear to be understood (at least in a preliminary sense) by the BNL Fire Protection Engineer. Requests for long-range replacement have been made.

Water is supplied by 18 deep well pumps ranging in capacity from 450 gallons per minute (gpm) to 1300 gpm. The majority of pumps are electric driven with emergency diesel drivers as well. There are two elevated storage tanks, remotely located from each other, rated at 303,500 gallons and 1,000,000 gallons, respectively. The normal static pressure is 65 pounds per square inch. (See Appendix C-1 for details.)

Fire Protection Installation Projects:

Funding and priorities for fire protection improvements are as indicated in Appendix C-2. Relative costs are based upon past projects for BNL. These projects have been prioritized in accordance with the Hazard Assessment and Priority Matrices previously submitted to CH (highest priority is P-1 and lowest is P-5).

Appendix B-F-3 is the Summary Status of Fire Protection Improvements Phase II. Buildings, which are identified in this group, are generally of higher program priority than in Phase III. However, environmental constraints, such as encountering asbestos, have halted several of the projects. BNL is awaiting clarification from DOE as to whether or not funds from Phase III can be extended to cover these remaining areas.

Appendix C-4 is a detailed breakdown of the engineering work plan for the current Phase III Fire Protection Improvement Project estimated at $3M total. As of February 5, 1990, the following objectives had been met:

A. Title I preliminary design is complete or in draft form for 22 of the buildings.

B. Construction is under way in three buildings, and two additional buildings (Bldgs. 901A and 914) originally in Phase II are under construction using Phase III funds.

C. Three additional buildings have bid packages ready for release.

D. Title I estimates for the 22 buildings exceed the Concept Design Review/Capital Improvement Project by approximately $500K or 30 percent over the Concept Design Review estimate.

E. The first construction package for three buildings was $11K over the Title I estimate (4 percent over).

F. Four buildings in Phase II were never completed and are estimated at $400K.

Fire Protection Improvement Project Phase IV, scheduled for Fiscal Year (FY) 1994, and the Life Safety Upgrade Phase I, proposed for FY 1993, have not been scoped. This scoping is awaiting completion of the initial Life Safety Survey, scheduled for 1990. Appendix C-5 is a Survey Plan of Action for the Life Safety Survey for the total five-phase project.

Fire Protection Improvements Phase IV (FY 1993-1995) will focus on the replacement of old local fire alarm panels, replacement of old local fire alarm systems, and replacement and addition of emergency lights. The buildings targeted for work are selected by the age and condition of the systems currently in place. The total estimated cost for the project is $2.5M. Detailed scope of the plan is not scheduled until mid-1991. It will reflect the results of a planned detailed site Fire Loss Control Survey conducted by the new fire protection engineer.

Both the Waste Minimization Facilities Upgrade (FY 1991-1994) and the Hazardous Waste Management Upgrade II (FY 1992-1993) will include new fire protection water supplies, automatic sprinklers, and special suppression systems. Final scoping for this protection has not been established.

<u>Fire Protection Engineering Staffing:</u>

An offer has been accepted by a new Fire Protection Engineer. This individual should be on staff by mid-May 1990. It is planned that this new position will be dedicated to conduct of risk analysis, detailed site fire protection, and life safety studies to meet DOE 5480.7 requirements for Maximum Probable Fire Loss and Off-site Release Potential Reports.

SOP FE-1.1, "Fire Protection Engineering Program," details the Fire Protection Engineer duties and responsibilities at BNL. The current Fire Protection Engineer has largely been engaged in fire protection plan review and the current alarm system upgrade. The current position requirement does not stipulate minimum qualifications for the Fire Protection Engineer.

BNL Fire Department:

The firehouse is located approximately 200 feet north of Bldg. 422. It houses the Fire Rescue Brigade of the S&EP Division. Normal staffing is one fire captain, one fire sergeant, and a minimum of five fire fighters (two of which are emergency medical technicians).

The facility has a "watchroom" where fire alarm systems are monitored. Radio equipment is provided to communicate with BNL and Suffolk County emergency forces. The base station transmitters for the BNL fire frequency and the Suffolk County fire frequencies are in the firehouse. All fire and rescue apparatus are provided with both bands. Both radio networks are simplex systems (i.e., radio-to-radio as opposed to radio-to-repeater station). All other radio networks (i.e., Security, Plant Engineering) are connected to remote transmitters via telephone lines. The firehouse is provided with a 70-foot (above grade) metal antenna tower. Lightning protection is provided in accordance with the NFPA code recommendations.

The Fire Rescue Brigade has a preplan document for fighting fires involving major facilities. This document was updated in September 1988. It includes abnormal hazards, placement of apparatus, and description of construction.

The Fire Rescue Building Inspection procedure is documented and has been conducted routinely. The facilities are inspected on a rotating basis by designated officers of the Brigade.

During lightning storms and power outages, multiple alarms are investigated prior to committing fire apparatus. A minimum of two persons (together) respond. It is up to the fire captain to evaluate how many investigation teams are dispatched. Written mutual aid arrangements exist with local fire departments. Under the agreements BNL makes a request, by telephone or Suffolk County radio, to Suffolk County Fire Control. They dispatch the nearest suitable apparatus.

Fire Alarm System:

In the event of a significant fire, the fire captain, through Security, is to notify the fire chief and Fire Rescue Brigade supervisor. The fire ground Safety Officer is also to be notified under a recently released SOP.

The fire alarm control panels in many of the buildings are a Flexalarm model manufactured by Gamewell. These panels were installed in the 1960s. Alarm transmission to the firehouse and Security is through two systems. The older system is a Gamewell City Loop system. It transmits four rounds of a 3-digit code through a telegraph-style current loop to a console at the firehouse. There is one code per panel or building. The code is then re-transmitted to Security. Incoming circuits or loops to the firehouse are protected from excess current by quick acting fuses or "leaf hopper" fuses. These fuses are for equipment protection only.

The Gamewell system is being replaced in 1990 by a microprocessor-based, multiplexed system manufactured by Wormald Fire Systems. This system reports zone-by-zone information to the firehouse via telephone lines. It is provided with an on-line computer and a backup. If the on-line computer does not perform a "watchdog" task approximately every half second, the backup computer takes over. Incoming loops to the firehouse and loops leaving protected buildings are protected by semiconductor-type lightning protection. This is intended to protect the equipment from area strikes and not direct strikes.

The Wormald System was installed and running at the time of this summary. Both Wormald and Gamewell Systems are running concurrently until the Wormald System has passed a trial test period. The transmission panel of the Wormald System senses the zone-by-zone information via voltage detecting interface modules. These modules are LED-driven optical isolators and are sensitive to voltage fluxes.

- <u>Safeguards and Security for Fire Emergencies</u>:

  A documented procedure exists on accident/large property loss scene securement. This document was updated on April 1989.

- A documented procedure exists for the notification of Laboratory Emergency Supervisors (LES) and supplemental emergency support personnel.

- <u>BNL's Emergency Command Structure</u>:

  The BNL Emergency Plan places the Duty Security Captain as the acting LES. The Duty Fire Captain reports to him. The Acting LES has a chain of succession that progress to the Fire Chief and then to the Security Inspectors.

  The Acting LES remains in command until specifically relieved by the LES or one of his alternates. The LES chain progresses from uniformed officers to senior

Laboratory staff familiar with the site and operations. Several of these people have other supervisory roles that may require them to be on site.

Fire Protection Impairment Handling Procedures:

SOP FR-5.2, "Fire Protection Impairment Follow-up Procedure," specifies actions required to address outages of automatic fire protection systems. This procedure generally follows the intent of DOE 5480.7 for minimization and control of outages for automatic fire protection. It covers all alarm, detection, water supply, sprinkler, and Halon 1301 systems. A review was conducted during this appraisal of Fire Protection Impairment Summaries for 1989-90, wherein all impairments over 30 days were found to be adequately supervised and precautions applied.

Fire Protection Recommendation Tracking:

A computerized system is in place for tracking for fire protection improvement recommendations from inception, through design and implementation, to completion. This data base includes recommendations from outside and internal BNL studies. Appendix C-6 provides the latest status for these items.

Emergency Response Plan:

Fire Emergency Evacuation and Response is outlined in the site telephone directory FE-2.4.1, "Fire Alarm Review Evacuation Signal," and the emergency response plan for each department. Specific guidelines are provided in the S&EP response plan for general requirements of evacuation. This includes proper notification of authorities, a designated gathering site for evacuees, accounting for personnel, and delegation of authority.

Fire Protection Inspection Program:

Fire Doors are inspected for condition and operability according to FR-4.8, "Fire Door Inspections." This activity is performed by the Fire Rescue Brigade Building Inspectors. The procedure is included as part of a "regular inspection" in the Building Inspection Report. No specific frequency is stipulated in the procedure. Further, there has been some difficulty identifying those doors which are part of "true" fire wall assemblies. As a result, an independent consultant is conducting a fire wall and door review for major buildings to attempt to identify these critical subdivisions for appropriate review.

Water Supply Testing procedures are outlined within Procedure FE 4.0, "Water Supply Testing." Fire flow tests are now scheduled for the spring of each year. While OA is a condition of this procedure, no requirement for consistent location of water tests, gauge points, or pitot flows is given to provide for comparison and trending capability. Since this is a multiple loop, multi-source supply a pre-defined set of test points for the area is critical to accurate analysis of the grid. However, only a draft of this procedure is available and is used on an informal basis. (See Appendix C-7.)

To supplement an on-site testing program, an independent Master Utility study was conducted in 1989. The report did not review the fire flow reserve and its capacity. Normal standards typically require reserve supplies of 4 hours to 96 hours (depending on the standard at peak demand) with two of the largest pumps out of service. This analysis was not addressed. The report indicated an adequate supply (flow and pressure) for the highest anticipated water demand.

New sprinkler system designs at the laboratory require that flow tests be conducted prior to the development of building plans. A biannual examination of the interior of the water tanks will be incorporated into the Plant Engineering maintenance procedures.

<u>Fire Extinguisher Inspections</u> are conducted by the Fire Department on a monthly basis. A survey has been completed of the current inventory to identify buildings needing additional extinguishers. A study is under way by an independent consultant to identify optimum locations for extinguishers in each building. Upon completion, the units will be relocated, signs posted, and the inspection list updated. Completion of the installation of additional extinguishers is scheduled for September 30, 1990.

<u>The Building Inspection Program</u> is conducted by the Fire Rescue Brigade Building Inspector as part of the overall fire safety program, SOP FR-4.0, "Building Inspection Program." This procedure identifies changes in a facility, reports non-compliance issues to responsible managers for correction, and updates fire response plan information. The frequency of inspection is based upon the building's program importance, as well as previous recommendations. Work orders and recommendations are tracked to completion. A formal pre-printed inspection report is used. Inspection personnel are given specific training in hazard identification and fixed fire protection. (See Appendix C-8.)

Fire Rescue Group inspections are scheduled consistent with the requirements of DOE Orders and NFPA Codes. In general, all facilities with maximum possible loss potentials greater than $1M are scheduled for quarterly inspections. Inspections of major facilities with important life safety, programmatic, or property loss potentials are conducted monthly. Facilities with unsupervised fire protection system valves are normally scheduled for monthly inspections. All facilities have at least an annual inspection.

The following equipment is inspected during each building inspection:

Portable Fire Extinguishers
Fire Protection Valves
Fire Department Connections
Fire Doors and Fire Walls
Sprinkler Systems
Alarm Systems
Special Extinguishing Systems

Fire Protection Valves have inspection tags installed and are inspected monthly by the Fire Department. An inspection list is used to confirm that all valves are reviewed. However, this is not specifically required by the procedure.

Alarm System and Suppression System Tests are performed under an outside contract. This includes detectors, alarm pull stations, water flow alarms, valve tamper alarms, Halon Systems, and dry pipe or pre-action system trip tests. Inspections and testing are required by contract to be in accordance with applicable NFPA codes.

Other Tests Performed on Fire Protection Related Equipment include annual standpipe testing Fire Department connection inspections and 2-inch drain tests for sprinkler risers and uninterruptible power supply testing. Formal procedures have been developed for these actions and are used in the conduct of the testing.

Plan Review Program:

The fire protection plan review process is covered under S&EP Division SOP FE-2.1, "Fire Protection Design Reviews," and SEP-QA-4.1.1 and Safety Guide 1.3.0. Plans are submitted for all new construction, remodeling, renovation, and retro-fitting of fire protection systems. A formal plan submittal and review process format is provided, including checklists in the plan review SOP.

Facility Maintenance Oversight:

During the appraisal, numerous roof leaks were found throughout the facility. Some of these affected high-value programmatic equipment. The Deputy Manager of Maintenance Management identified the condition in January 1987, and a study was initiated to identify the condition and life expectancy of roofs for the entire facility. This study was completed in 1989. Appendix C-9 provides an Executive Summary of that report and identifies a proposed line item funding plan.

A formal facilities inspection program has been initiated. The buildings are placed on a schedule. For this inspection, a team is assembled with a maintenance management planner and applicable craft representatives. One full cycle of the process has been completed. The next cycle will include a roofing evaluation to continue the baseline report. While there is no formal procedure at this time, teams receive instruction and utilize a pre-printed inspection checklist. (See Appendix C-10.)

Cutting and Welding Permit Program:

The Safety Guide 4.3.0, "Cutting and Welding," outlines BNL policy for Cutting and Welding. SOP FR-4.12, "Fire Watches for Cutting/Welding 'Hot' Work," provides further direction for the Fire Rescue Brigade, who serve as fire watch during these periods. Generally, brazing and soldering operations are controlled by a permit program in Highly Protected Risk facilities within private industry. However, this is not a requirement of NFPA 51B. Precautions required for preparation of a welding area and the permit tag generally follow the code.

Modular "Trailers":

The modular trailers used to supplement main facilities buildings are inspected and receive protection, based upon S&EP SOP FR-4.5, "Inspection and Protection System Criteria for Trailers." Portable structures are defined in DOE/EV-0043 as all trailers, mobile homes, semi-trailer vans, portable buildings, and other relocatable structures or structure segments. These are normally complete modular units with walls, roofs, ceilings, floors and usually include installed utilities. This definition does not include plastic or fabric units, such as tents or air supported structures, or BNL's interpretation, in a request for DOE formal judgement:

"The "modular" additions referenced in the (September) TSA are prefabricated buildings that are designed to be permanently located and not portable. Since they are permanent structures, they were built according to the Uniform Building Code, as required by DOE 6430.1." In some cases, they were factory built; in other cases, they were site built. While the manufacturer and BNL call these modular additions, they are intended to remain as permanent structures.

The BNL standard refers to these structures as "trailers," as well. The concern for the materials used in their fabrication and combustible exposure to other major buildings remains in the TSA. The intent and format of DOE/EV-0043 is, therefore, considered applicable. (See Appendix C-11.)

Expanded Plastic Insulation:

BNL and DOE have recognized the existence of the expanded plastic duct insulation for many years. It was installed prior to the issuance of the DOE Order. The BNL approach to upgrading these areas has been to install full automatic sprinkler protection (with the exception of sensitive electronic areas where the foam insulation has been removed). This approach has been incorporated in the Phase I, II, and III fire protection upgrade projects which have had DOE support.

However, test research of the Factory Mutual Research Corp. has indicated that this material cannot be protected by automatic sprinklers alone. A fire resistive thermal barrier should be applied directly to the entire surface. Otherwise, such materials tend to burn as a flammable liquid, flowing and coating equipment and sprinkler piping below. Appendix C-12 is a summary of buildings with polystyrene insulation and the status of action toward providing fire sprinklers.

Annual Property Damage Experience:

Appendix C-13 is a copy of a Fire Protection Activities Report forwarded to DOE.

The following is of note:

1. BNL had the largest fire loss in the DOE system for 1990 ($240K - Carpenter Shop Fire).

2. BNL has at least 14 locations where a credible fire as defined by DOE 5480.7 can cause over $1M dollars in damage.

3. Major projects accomplished last year by BNL had a total cost of $1.061M.

4. Planned major projects for 1990 are estimated at $1.2M.

5. Annual "overhead" costs for Fire Protection are $2.143M.

Contributing factors for losses have been addressed in internal studies. In particular, the carpenter shop fire loss could have been controlled and reduced by the installation of automatic sprinklers planned for FY 1990. In addition, corrective actions have been implemented for the lessons learned applicable to actual root causes. A general identification of property damageability has been made. However, a formal risk analysis with a regular frequency for update is needed for the complete facility.

APPENDIX C-1

Wells and Potable Water System Data

WELLS AND POTABLE WATER SYSTEM DATA

A. WELLS

BNL Well #1, S-2476 - Bldg. 93 - Constructed 1941

Well:	12"	diameter, depth 101'
Pump:	6	stage turbine, capacity 450 gpm
Driver:	40	hp electric

Note: Out of Service - High level of 111 Trichloromethane

BNL Well #2, S-3197 - Bldg. 168 - Constructed 1942

Well:	12"	diameter, depth 135'
Pump:	7	stage turbine, capacity 450 gpm
Driver:	40	hp electric

Note: Out of Service - High levels of 111 Trichloromethane

BNL Well #3, S-6697 - Bldg. 610 - Constructed 1948

Well:	12"	diameter, depth 101'
Pump:	6	stage turbine, capacity 750 gpm
Driver:	60	hp electric

Note: Out of Service - Due to proximity to Cent. Steam Facility

BNL Well #4, S-17836 - Bldg. 614 - Constructed 1960

Well:	16"	diameter, depth 147'
Pump:	4	stage turbine, capacity 1200 gpm
Driver:	100	hp electric

Note: Out of Service - Reduced pumping capacity

BNL Original Well #5, S-3405 - Bldg. 576 - Constructed 1948

Well:	4"	diameter, depth 65'
Pump:		turbine, capacity 65 gpm
Driver:		gasoline engine

Note: Well capped and out of service

BNL New Well #5, (No Permit) - Bldg. 581- Constructed 1966

Well:	6"	diameter, depth 87'
Pump:	10	stage submersible, capacity 45 gpm
Driver:	3	hp electric

BNL Well #6, S-22150 - Bldg. 618- Constructed 1964

Well:	16"	diameter, depth 150'
Pump:	4	stage turbine, capacity 1200 gpm
Driver:	100	hp electric

BNL Well #7, S-22151 - Bldg. 619- Constructed 1964

Well:	16"	diameter, depth 150'
Pump:	4	stage turbine, capacity 1200 gpm
Driver:	100	hp electric

BNL Well #8, S-29723 - Bldg. 535- Constructed 1967

Well:	4"	diameter, depth 52'
Pump:	9	stage submersible, capacity 45 gpm
Driver:	2	hp electric

Note: Out of Service - No longer required

BNL Well #9, S-63771 - Bldg. 463- Constructed 1977

Well:	5"	diameter, depth 120'
Pump:		submersible, capacity 10 gpm
Driver:	1	hp electric

BNL Well #10, S-66944 - Bldg. 634- Constructed 1980

Well:	16"	diameter, depth 140'
Pump:	7	stage turbine, capacity 1200 gpm
Driver:	100	hp electric

BNL Well #11, S-72038 - Bldg. 635- Constructed 1981

Well:	16"	diameter, depth 142'
Pump:	5	stage turbine, capacity 1200 gpm
Driver:	100	hp electric

BNL Well #12, S-85965 - Bldg. 637- Constructed 1986

Well:	16"	diameter, depth 137'
Pump:		stage turbine, capacity 1200 gpm
Driver:	100	hp electric

BNL Well #101, S-15949 - Bldg. 915 - Constructed 1958

Well:	14"	diameter, depth 218'
Pump:	5	stage turbine, capacity 800 gpm
Driver:	40	hp electric

BNL Well #102, S-15950 - Bldg. 916 - Constructed 1958

Well:	14"	diameter, depth 118'
Pump:	4	stage turbine, capacity 1200 gpm
Driver:	75	hp electric

BNL Well #103, S-15951 - Bldg. 917 - Constructed 1958

Well:	14"	diameter, depth 207'
Pump:	5	stage turbine, capacity 800 gpm
Driver:	40	hp electric

BNL Well #104, S-14977 - Bldg. 490 - Constructed 1956

Well:	16"	diameter, depth 298'
Pump:	5	stage turbine, capacity 1200 gpm
Driver:	100	hp electric

BNL Well #105, S-18703- Bldg. 492 - Constructed 1960

Well:	16"	diameter, depth 145'
Pump:	5	stage turbine, capacity 1300 gpm
Driver:	100	hp electric

B. WATER TREATMENT PLANT - BLDG. 624

Capacity:

Constructed 1969

Original Design:	Rated Capacity:	6.5 MGD
	Actual Capacity:	5.2 MGD

Updated 1985

Revised Design:	Rated Capacity:	6.0 MGD

Plant Output:

FY	Avg. Output (MGD)	FY	Avg. Output (MGD)
72	2.54	83	2.70
73	2.47	84	2.21
74	2.61	85	1.77
75	2.57	86	.183*
76/76TQ	3.47	87	1.45
77	2.64	88	1.63
78	2.38		
79	3.51		
80	2.99		
81	3.95		
82	2.97		

Water treatment plant shut down for renovation 11/85 - 4/86. Apparent reduced water consumption during this period is due to conservation measures, production of water before completion of the metering system and AGS use of dedicated non-potable wells for cooling.

C. SYSTEM

Potable Water System

Wells 2, 4, 6, & 7	- To Water Treatment Plant
Wells 1, 3, 10, 11, & 12	- Direct into system

Well Water Cooling

Wells 101, 102, & 103	- To AGS cooling
Wells 104 & 105	- To MRC Reactor and A/C cooling

Non-Potable Water System

Well 5	- Sewage Treatment Plant
Well 9	- Biology Tropical Fish Tank System

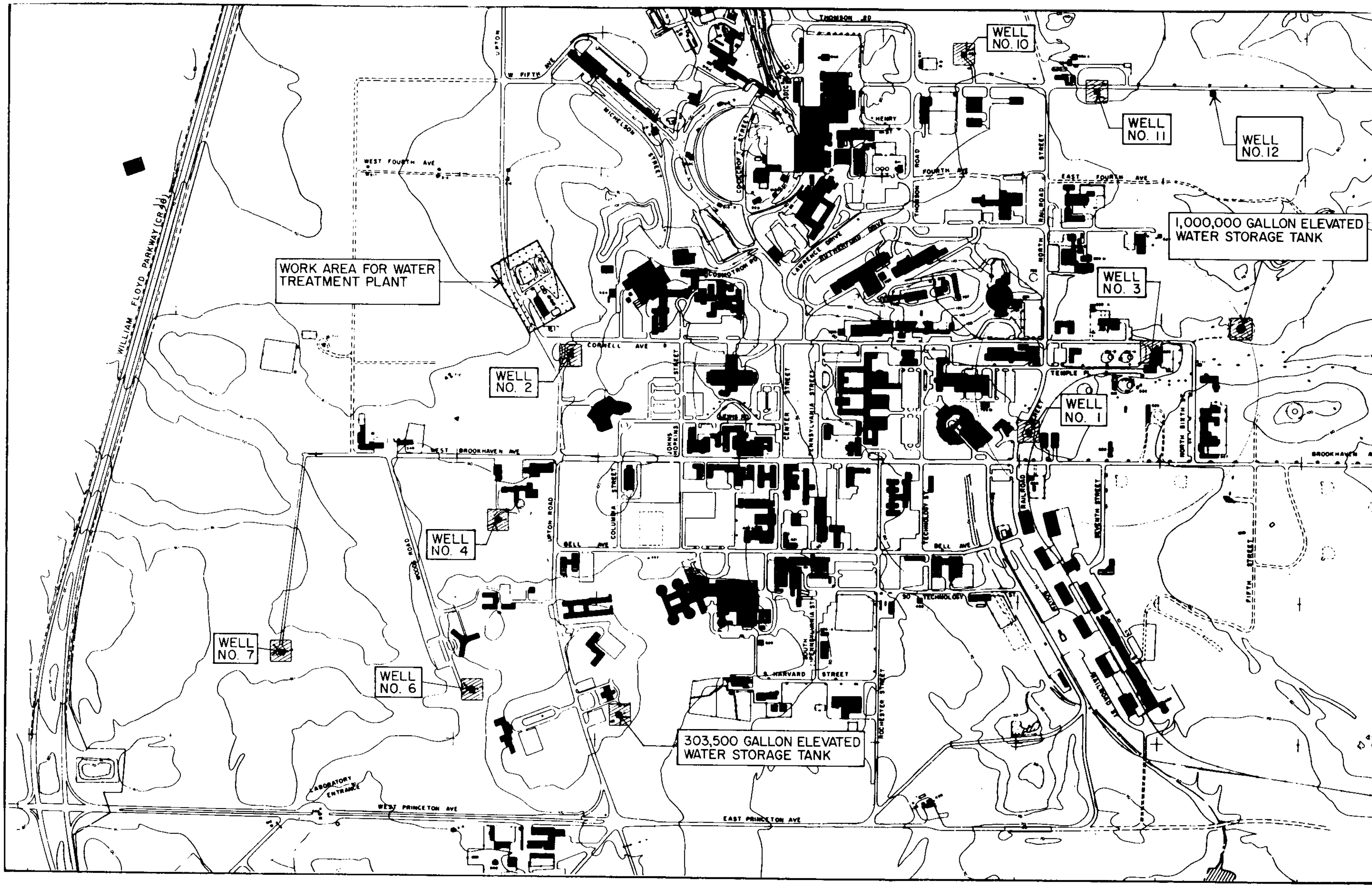
D. STORAGE TANKS

Bldg. 49 - Constructed 1941

Capacity: 303,500 gallons
Elevations(at mean sea level);
Tank Base: 115.22'
Tank Bottom: 202.57'
Tank High Water Level: 239.60'

Bldg. 640 - Constructed 1985

Capacity: 1,000,000 gallons
Elevations(at mean sea level);
Tank Base: 78.50'
Tank Bottom: 204.60'
Tank High Water Level: 239.60'
Tank Top: 248.55'



WELL NO. 10
WELL NO. 11
WELL NO. 12
1,000,000 GALLON ELEVATED WATER STORAGE TANK
WELL NO. 3
WELL NO. 1
WORK AREA FOR WATER TREATMENT PLANT
WELL NO. 2
WELL NO. 4
WELL NO. 7
WELL NO. 6
303,500 GALLON ELEVATED WATER STORAGE TANK
WILLIAM FLOYD PARKWAY (CR 46)
THOMSON RD
WEST FOURTH AVE
EAST FOURTH AVE
CORNELL AVE
WEST BROOKHAVEN AVE
BROOKHAVEN AVE
BELL AVE
UPTON ROAD
LABORATORY ENTRANCE
WEST PRINCETON AVE
EAST PRINCETON AVE
ROCHESTER STREET
FIFTH STREET
SEVENTH STREET

APPENDIX C-2

Fire Protection Recommendations

Listing

FIRE PROTECTION RECOMMENDATIONS LISTING

The following is a list of Fire Protection projects which 1) have no identified funding or 2) projected funding is insufficient to complete the full scope of the project. Costs provided are estimates by the Fire Protection Section based on past projects.

No	Bldg.	Project	Cost	Priority
1	91	Trailer sprinkler protection	$5K	P-3(C-1, H-3(II,D))
2	93	Protect Well House LP Tank	$20K	P-3(C-2, H-2(I,D))
3[1]	120M	Provide automatic sprinklers	$	P-3(C-1, H-3(II,D))
3a[1]	50	Provide Sprinkler Protection	$	P-2(C-1, H-2(I,D)
4[1]	129	Replace ladder with Stair	$25K	P-3(C-1, H-3(II,D))
5	130	Enclose open Stairway	$12K	P-3(C-1, H-3(II,D))
6[1]	130	North Wing & Modular sprinkler	$	P-2(C-1, H-2(I,D))
7	158	Provide Rack Sprinklers	$9K	P-3(C-1, H-3(III,D))
8	168	Well House LP Tank Protection	$20K	P-3(C-2, H-2(II,D))
8a	170	Separate Waterflow and Alarm Circuits	$10K	P-3(C-2, H-3(I,E))
9[1]	179	Automatic sprinkler	$	P-2(C-1, H-2(I,D))
10	184	Second Exit	$8K	P-2(C-1, H-2(I,D))
11[1]	184	Replace Fire Alarm Dry cell	$6K	P-3(C-2, H-3(II,E))
12	194	Loading Dock Sprinklers	$15K	P-4(C-2, H-3(II,D))
13	197	Drywall open joists	$7K	P-4(C-2, H-3(III,D))
14	197	Widen narrow Exit landing Rm D2-21	$25K	P-3(C-1, H-3(II,D))
15	197	Enclose both center stairs	$25K	P-3(C-1, H-3(II,D))
16	197	Enclose outside stairs from weather	$25K	P-4(C-1, H-3(III,D))
17	197	Automatic sprinkler above ceiling	$15K	P-4(C-2, H-3(III,D))
17A	197	Separate Waterflow & Manual Alarm	???	P-4(C-2, H-3,II,E))

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[1]Currently schedule for funding under Line Item Fire Protection Improvements, however the project is currently under funded with approximately 30% of the work not fully funded.

18	257	Smoke Door off Lounge	$8K	P-3(C-1, H-3(II,D))
19	257	Enclose stairs & outside discharge	$32K	P-3(C-1, H-3(II,D))
20	257	Weather cover outside stairs	$15K	P-4(C-1, H-3(III,D))
21	257	Replace sleeping room doors	$20K	P-3(C-1, H-3(II,D))
22	317	Install Sprinkler in Lounge	$12K	P-3(C-1, H-3(III,D))
23	317	Extend sprinklers 1st floor closet	$1K	P-3(C-1, H-3(III,D))
24	317	Enclose interior stairs	$3K	P-3(C-1, H-3(II,D))
25	317	Enclosure Stair Against Weather	$10K	P-4(C-1, H-3(III,D))
26	317	New exit from south rec hall	$25K	P-4(C-1, H-3(III,D))
27	317	Remove lock, lobby and rec hall	$3K	P-3(C-1, H-3(II,D))
28	317	Replace obsolete Sprinkler Station	$8K	P-4(C-2, H-2(I,D))
29	317	Emergency lighting should be provided	$5K	P-3(C-1, H-3(II,D))
30	388	Provide Electric Local Smoke Detectors	$3K	P-2(C-1, H-2(I,D))
31[1]	422	Provide AS Throughout	$	P-3(C-1, H-3(II,D))
32	452	Extend sprinkler protection	$35K	P-3(C-1, H-2(II,D))
32A	462	Enclosure Stair Against Weather	$25K	P-4(C-1, H-3(III,D))
33	463	Seal Fire Wall Penetration Phase I/II	$20K	P-4(C-2, H-3(III,D))
34	463	Replace Fire Door 5 w/ B Labeled Door	$7K	P-3(C-2, H-3(III,D))
35	463	Replace areaway fire detectors	$3K	P-4(C-3, H-3(III,D))
36	463	Enclose open stairs Phase II lobby	$35K	P-3(C-1, H-3(II,D))
37	463	Correct Basement Dead End Distance	$40K	P-3(C-1, H-3(II,D))
38	463	Provide Exits to Exterior From Stairs	$50K	P-3(C-1, H-3(II,D))
39	463	Correct exit access corridors used as plenums	$30K	P-3(C-1, H-3(II,D))
40	463	Additional exit signs	$7K	P-3(C-1, H-3(II,D))
42	463	Provide Water Motor Gongs on Sprinklers	$15K	P-3(C-1, H-3(III,D))
43	463	Correct Double Set of Fire Door, Exit	$15K	P-3(C-1, H-3(II,D))
44	463	Enclose Stair phase III lobby	$35K	P-3(C-1, H-3(II,D))
45	463	Survey and correct fire wall penetrations	???	P-3(C-1, H-3(II,D))

46	463	Screen door Rm 118, Swing direction	$4K	P-3(C-1, H-3(II,D))
47	463	Exit travel distance Rm B-210/Rm 295	$??	P-3(C-1, H-3(II,D))
48	463	Provide Fire Barrier Under S/W Stairs	$10	P-2(C-1, H-2(I,D))
48A	463	Upgrade STEM I & II Halon Panels	$20K	P-3(C-2, H-3(II,D))
48B	482	CO_2 System Flammable Liquids Room	$30K	P-3(C-2, H-3(IIIC))
49	490	Sliding fire doors between block 8 & 9 and between blocks 5 & 7	$20K	P-3(C-1, H-3(II,D))
50	490	Exit Signs at courtyard Doors	$3K	P-3(C-1, H-3(II,D))
51	490	Provide Smoke Compartments	$50K	P-3(C-1, H-3(II,D))
52	490	Smoke detectors Rm 1-6, 2-6,3-6, & 4-6	$3K	P-3(C-1, H-3(II,D))
53	490	Smoke barrier partitions	$???	P-3(C-1, H-3(II,D))
54	490	Sprinklers,bathrooms blocks 1, 2, 3 &4	$7K	P-3(C-1, H-3(III,D))
55	490	Enclose 2 Stairs Rm 9-924 & 9-524	$15K	P-3(C-1, H-3(III,D))
56	490	Roll down fire doors at 11-100, 11-100 and 11-0 block exits	$???	P-3(C-1, H-3(III,D))
57	490	Exit Corridor used as lab, Rm 9-290A & 9-931	$???	P-3(C-1, H-3(III,D))
58	490	Enclose stairs from basement to library	$10K	P-3(C-1, H-3(III,D))
59	490	Second exit from south corridor 9-400	$25K	P-3(C-1, H-3(II,D))
60	490	Additional exit signs	$15K	P-3(C-1, H-3(III,D))
61	490	B Labeled Door large seminar rm a-205	$5K	P-3(C-1, H-3(III,D))
62	490	Remove Key Deadbolt	$3K	P-3(C-1, H-3(II,D))
63	490	Sprinkler Patient Airlock	$10K	P-4(C-1, H-3(III,D))
64	490	Additional Exit Signs Nurse Stations	$3K	P-3(C-1, H-3(III,D))
65	490	Additional exit signs by 5-29 main entrance/lobby	$3K	P-3(C-1, H-3(II,D))
66	510	Replace pneumatic tube fire alarm system	$100K	P-3(C-2, H-2(I,D))
67	510	Provide automatic sprinkler throughout	$<2M	P-4(C-2, H-3(II,D))
68[1]	526	Install automatic sprinklers in basement	$???	P-2(C-1, H-2(ID))
69	555	Enclose Center Stairs	$150	P-3(C-1, H-3(II,D))

70	555	Sliding fire doors block Exit and are dry rotted	$60K	P-3(C-1, H-3(III,D))
71	555	Correct dead-end corridor 1 Floor North	$25K	P-3(C-1, H-3(III,D))
72	555	Enclose exit access through stockroom	$40K	P-3(C-1, H-3(III,D))
73	555	Provide North Center Stair Exit with exit passageway directly exterior	$20K	P-3(C-1, H-3(III,D))
74	555	South center stairs discharge outside or sprinkler entire 1st floor	$200K	P-3(C-1, H-3(II,D))
75	555	Additional exit signs	$15K	P-3(C-1, H-3(III,D))
76	555	Second exit D Fan Room	$???	P-3(C-1, H-3(II,D))
77	555	Provide break at first floor discharge, north interior stair	$15K	P-3(C-1, H-3(III,D))
78	555	Provide Smoke detection in Bsmt Elevator Room or isolate from stairwell	$10K	P-3(C-1, H-3(III,D))
79	555	Provide automatic sprinkler protection throughout.	$>2M	P-3(C-1, H-3(III,C))
80	610	Replace wood supports on tank #35	$???	P-4(C-2, H-3(III,C))
81	611	Provide emergency venting for tank 1 & 2	$???	P-4(C-2, H-3(III,C))
82	611C	Replace electrical equipment in valve house east of tank #3	$10K	P-4(C-2, H-3(III,C))
83	629	Improve ladder exit	$3K	P-4(C-2, H-3(III,D))
84	636	Provide emergency venting for tanks 30-35	$15K	P-3(C-2, H-2(II,C))
85	637	Protect LP tank BLEVE	$20K	P-3(C-2, H-2(I,D))
86	703	Provide automatic extinguishing system for two trailers	$40K	P-3(C-1, H-3(II,D))
87	703	Enclose Main Lobby open stairway	$25K	P-3(C-1,H-3(III,D))
88	705	Provide automatic fire detection	$8K	P-3(C-1, H-2(II,D))
89	725	LINAC power supply sprinklers blocked	$5K	P-3(C-1, H-3(III,D))
89a	725	Correct construction deficiencies (3/7/88 Memo)	$90K	P-3(C-1, H-3(II,D))
89b	725	Replace Fire Alarm Panel	$100K	P-3(C-1, H-3(II,D))
90	815	Provide automatic sprinkler protection throughout except for the high bay area	$200K	P-4(C-1, H-3(II,D))

91	901	Replace door w/ 1 hour Fire Door	$3K	P-4(C-1, H-3(III,D))
93	902	Enclose North East Hi Bay Stair	$45K	P-3(C-1, H-3(II,D))
94	902	Additional exit signs	$25K	P-3(C-1, H-3(III,D))
95	902	Excess Travel distances to exits high bay area		P-3(C-1, H-3(III<D))
96	902	Emergency lighting	$20K	P-3(C-1, H-3(III,D))
97[1]	902	Provide automatic sprinkler protection	$	P-3(C-1, H-2(I,D))
98[1]	905	Provide automatic sprinkler protection sprinkler system.	$	P-3(C-1, H-2(I,D))
99[1]	912.3	Cable tunnel sprinklers	$	P-3(C-1, H-2(II,D))
100	913	Sprinkler AGS Ring	$45K	P-4(C-1, H-3(III,C))
101[1]	930	Sprinkler protection	$	P-3(C-1, H-2(I,D))
102	87	Relocate sprinklers	$20K	P-3(C-1, H-2(II,D))
103	88	Relocate sprinklers to the roof	$20K	P-3(C-1, H-3(II,D))
104	89	Extend sprinkler to unsprinklered attic	$30K	P-4(C-2, H-3(II,E))
105	90	Extend sprinkler to unsprinklered attic	$30K	P-4(C-2, H-3(II,E))
106	91	Extend sprinkler to unsprinklered attic	$30K	P-4(C-2, H-3(II,E))
107	153	Add sprinkler protection in the attic	$30K	P-4(C-2, H-3(II,E))
108	170	Correct overspaced attic sprinklers	$15K	P-4(C-1, H-3(II,E))
109	197	Upgrade sprinkler protection for concealed spaces	$20K	P-4(C-1, H-3(II,E))
110	197	Upgrade sprinkler in attic	$20K	P-4(C-1, H-3(II,E))
111	479	Dike Combustible Liquids room	$5K	P-4(C-1, H-3(III,D))
112	Site	Replace defective Kidde Halon Manuals	$48K	P-4(C-3, H-3(I,E))
113	Site	Replace Various Fire Alarm Panel	$300K	P-5(C-3, H-3(I,E))
114	480	Provide Sprinkler Protection throughout	$200K	P-4(C-1, H-3(III,D))
115	Apart. Area	Upgrade interior power circuits	$500K	P-3(C-2, H-3(II,D))
116	Apart. Area	Seal Fire Walls MER/Apt	$20K	P-3(C-1, H-3(II,D))

APPENDIX C-3

Fire Protection Improvements

Phase II

7/11/89

SUMMARY STATUS
FIRE PROTECTION IMPROVEMENTS, PHASE II
PROJECT 86-R-726

1. Original Schedule 44 was submitted to DOE in April 1984. TEC for project estimated at $3,000,000. Breakdown of costs for the three major areas of

   a. Site Signaling System
   b. Fire Protection Systems (14 bldgs)
   c. Life Safety Improvements (Bldg. 30)

   are as follows:

   a. Site Signaling System

Engineering @ 12%	$ 108,000
Construction	900,000
Contingency @ 13%	132,000
Sub-Total	$1,140,000

   b. Fire Protection Systems

Engineering @ 12%	$ 176,000
Construction	1,470,000*
Contingency @ 13%	214,000
Sub-Total	$1,860,000

   * Approximately $30,000 was included for life safety modification at Building 30.

2. After the Line Item was approved and funded and before A/E selection, DOE determined that the site fire alarm signaling system could not be combined with the site security system. The site fire alarm system had to be a separate signaling system. In addition, DOE added Bldg. 197M to be sprinkled, increasing the number of buildings from 14 to 15. Since the site signaling system had first priority, the allocation of funds to accomplish this project was revised as follows:

a. Site Signaling System	$1,700,000
b. Fire Protection and Life Safety	1,300,000
Total	$3,000,000

   The fire protection portion of the project was reduced in funding by $560,000 with no reduction in scope. In fact, scope increased from 14 to 15 buildings.

3. The A/E (Gage and Babcock) Title I Report (12/86), summary of costs for the fire protection phase (15 buildings) of the project was:

Engineering	$ 127,000
Fire Prot. 15 Bldgs.	1,235,600
Sub-Total	$1,362,600
Life Safety Modification, Bldg. 30	30,000
Minimum Contingency 10%	139,400
Total	$1,532,000

At the completion of Title I (page 36 of the report), it was recognized that there were insufficient funds available to accomplish sprinkler protection in all buildings. Some buildings would have to be deferred.

4. Title II design was a split responsibility, with the A/E (Gage Babcock) doing seven (7) buildings and Plant Engineering doing the design of the remaining eight (8) buildings. Also Plant Engineering would design life safety modification for Building 30. All Title III construction inspection would be accomplished by Plant Engineering.

Listed below is a comparison of the Title I and Title II construction costs as of 7/11/89.

	Construction Cost ($1,000)			
Bldg. No.	Title I	Title II	Final	Notes
130	$ 118.7	$ 118.7		(1)
179	120.8	120.8		(1)
197	33.1	31.8	34.3	
211	40.1	-		(2)
355	75.4	125.0		
356	28.9	53.0	52.0	
480	137.3	47.1		
510	239.6			
555	105.4	478.0		(3)
610	31.7			
815	95.8	108.4		
830	54.0	54.1		
901A	92.4	50.3		
914	-	50.0		(1) (2)
923	55.1	-		(2)
928	7.3	22.0	22.6	
930	-	27.9	27.5	(2)
Life Safety (B.30)	30.0	190.0		
Asbestos Removal	-	48.0	48.0	(4)
Total	$ 1,265.6	$ 1,525.1		

Notes:
1. Title I estimate used; design not complete for Title II estimate.
2. Bldgs 914 and 930 substituted for Bldg. 211 and 923 due to change of use and priority with approval of DOE.
3. One contract for three buildings (510, 515 and 610).
4. Asbestos removal for Buildings 30, 510, 555, 815, 830 and 901A.

Installation of fire protection sprinkler systems are complete in Buildings 197, 356, 928 and 930. Construction work is underway in Buildings 355, 480, 510, 555, 610, 901A and 30. Building 130 is still in design. Construction work in Buildings 179, 815, 830 and 914 are on hold awaiting additional funding for construction.

5. In April 1988, it was decided to have Dames and Moore (A/E firm) evaluate extent of asbestos in Buildings 480, 510, 555, 815, 830, and 901A (asbestos previously removed from Building 610). Evaluation is to determine if asbestos must be encapsulated or removed before sprinkler work can be started.

   Based on the survey, selected areas where the sprinkler piping is to be installed, asbestos insulation on pipes, ducts and equipment was removed in Buildings 510, 555, 815, 830 and 901A. Scope of sprinkler protection was revised in Building 480 and no asbestos was removed.

6. In January, 1989 an additional $50,000 was transferred from the Fire Protection Systems project to the Site Signaling System project in order to complete miscellaneous construction items.

7. Status of Fire Protection Improvements project as of 7/11/89 is as follows:

   a. <u>Site Signaling System</u>

      TEC - $1,750,000
      Project approximately 98% complete and should be accomplished without any more additional funds being required.

   b. <u>Fire Protection Systems</u>

      Funds authorized - $1,250,000
      Present estimated costs - $1,828,000

      Estimated costs are broken down as follows:

Engineering......................................		$ 192,400
Gage Babcock - A/E Sprinkler Design	$ 97,400	
Dames & Moore - A/E Asbestos Evaluation	25,000	
BNL Engineering	50,000	
Butler Services	20,000	

8. Eleven (11) buildings are in the construction phase or are completed. It appears that the remaining five (5) buildings can not be completed under this project's funding. These five (5) buildings have been prioritized for completion by the BNL Fire Protection Group as follows:

Building No.		Construction Cost Estimate ($1,000)
914		50.0
179		120.8
130		118.7
830		54.1
815		108.4
	Total	$452.0 (1)

(1) Costs do not include any contingency.

9. If additional funding is not available, the buildings not completed under Phase II funding will be the first buildings completed under Phase III funding.

RCT-027:hlm

as of 7/11/89

FIRE PROTECTION IMPROVEMENTS, PHASE II
PROJECT NO 86-R-726
(ACCOUNT 74508)

BLDG	DESIGN		CONSTRUCTION		CONSTRUCTION COSTS ($1000)		
NO	START	COMPLETE	START	COMPLETE	ESTIMATE	ACTUAL	REMARKS
130	2/04/88	6/30/89			118.7		(6) (2)
179	9/12/88	6/01/89			120.8		(1) (2)
197	1/04/88	3/23/88	3/28/88	8/19/88	31.8	34.3 (C)	ILR 77357
355	2/19/88	8/30/88	10/13/88	8/31/89	125.0	116.2 (P)	ILR 77380
356	4/05/88	5/31/88	5/31/88	3/24/89	53.0	52.0 (C)	ILR 77369
480	4/13/87	2/15/88	10/15/88	7/31/89	47.1 (7)	35.4 (P)	ILR 77309
510	4/13/87	2/15/88					
555	4/13/87	2/15/88	12/09/88	4/30/90	478.0	0 (P)	C 421529 (4)
610	4/13/87	2/15/88					
815	4/13/87	2/15/88			108.4		(2)
830	4/13/87	2/15/88			54.1		(2)
901A	4/13/87	2/15/88	7/01/89	11/30/89	50.3	12.5 (P)	ILR 77410
914	9/12/88	6/30/89			50.0		(1) (2)
928	5/12/88	8/17/88	8/19/88	5/04/89	22.0	22.6 (C)	ILR 77377
930	4/25/88	5/18/88	4/25/88	11/30/88	27.9	27.5 (C)	ILR 77362
30	2/05/88	9/15/88	1/26/89	9/30/89	190.0	177.5 (P)	ILR 77396
Misc (5)	-	-	-	-	48.0	48.0	
				Total	1,525.1 (3)		

NOTES:
(1) Title 1 estimate used.
(2) On temporary hold, awaiting additional funding.
(3) Construction funds available $1,057,000.
(4) Lump Sum fixed price for Bldgs. 510, 555 & 610.
(5) Asbestos removal, misc. P.O., etc.
(6) Construction on temp. hold for possible re-design for dry pipe system.
(7) Scope reduced. Only activating existing sprinkler system.
(C) Construction complete.
(P) Construction in progress.

RCT-004

APPENDIX C-4

Fire Protection Improvements

Phase III

FIRE PROTECTION IMPROVEMENTS

PHASE III JUSTIFICATION

Codes/Standards Requirements

DOE Order 5480.1, Chapter VII establishes the minimum requirement for the level of fire protection at a DOE facility. For the Phase III buildings, sprinkler protection is planned due to the following criteria:

1. A fire loss potential over $1 million exists.
2. A programmatic interruption due to a fire can exceed 6 months.
3. A fire loss potential between $100,000 and $1 million exists and the cost of protection is less than 1/10 the loss potential (i.e. cost justified).

The Phase III buildings are a remaining portion of those facilities identified in a 1974 fire protection survey by Factory Mutual Engineering Association. Since that fire survey, DOE-CH has asked repeatedly for the installation of sprinkler protection. Except for Phase I funding in 1979 for slightly over $1 million, no additional funding has been received. A 1984 fire protection review by Professional Loss Control reaffirmed the need for sprinkler protection throughout BNL by stating:

"In general, Brookhaven National Laboratory does not meet the 'improved risk' philosophy advocated in DOE 5480.1, Chapter VII, Fire Protection due to the lack of automatic fixed suppression (i.e. sprinkler) systems in many high valued areas . . . "

Practical Justification

BNL's Fire Department has limited staffing. They are expected to control a fire involving no more than one room (an incident stage fire). BNL has many wooden buildings and many laboratories with flammable and highly combustible materials. An unchecked fire can quickly extend beyond one room (i.e. beyond the fire department capability). DOE statistics have shown that properly designed automatic sprinkler protection controls over 98% of all fire with less than 5 heads (a fire smaller than one room and within the capability of the fire department). With extremely rare exception, the remaining fires are contained by the sprinklers alone with less than 20 heads.

Summary

DOE and general industry has found sprinkler protection to be one of the most cost justified ways of controlling property damage due to fire. Beyond the obvious dollars saved in direct damage, the limited damage often allows a program to continue without a significant delay.

3/27/90

FIRE PROTECTION IMPROVEMENTS, PHASE III
PROJECT 89-R-102
CIP-FPI-89-1
ACCOUNT 74901
PROJECT COST $3,000,000
ENGINEERING WORK PLAN

BLDG DESIGN PACKAGE	COST ($1000) CIP EST.	T.O. EST.	A/E FEE	DESIGN DATES PLANNED START	ACTUAL START	ACTUAL COMP.	DESIGN BY
50,51,348,918	$ 37.0	$ 34.5	$ 32.4	3/89	4/89	9/89	Lizardos
902	40.0	113.0(1)	106.5	5/89	6/89		Carlson & Sweatt
244,422,930	58.0	49.0	44.5	6/89	8/89	1/90	Lizardos
120M,129,211, 477,488	35.0	36.0	35.9	10/89	10/89		Lizardos
184,321,326, 462,912	44.0	40.0	38.3	11/89	12/89		Lizardos
339,464,526, 923,924	34.0	42.0	41.1	1/90	2/90		Lizardos
412,460,479, 922,926,935,936	64.0	64.2	61.0	3/90	3/90		Lizardos
97	4.0	-	-	4/89	4/89	8/89	BNL
Life Safety	14.0	-	-	4/90			BNL
Sub-Total	$330.0	$378.7	$359.7				
BNL Eng. & Cont.	85.0	36.3	55.3				
Eng. Total	$415.0	$415.0	$415.0				

NOTES: (1) Sprinkler protection coverage for Bldg. 902 increased from 35,700 sq. ft. to 90,000 sq. ft.

RCT-033

3/27/90

CONSTRUCTION WORK PLAN

BLDG CONSTRUCTION PACKAGE	COST ($1000) CIP EST.	TITLE I EST.	TITLE II EST.	CONST. COST	CONSTRUCTION DATES (1) PLANNED START	ACTUAL START	SCHEDULED COMPLETION	ACTUAL COMPLETION	REMARKS
51,348,918	$ 174.4	$ 271.1	$ 222.9	290.8	11/89	12/89	6/90		
50	93.6	126.3	114.6	-	-				Note 2
902	281.0	331.0	547.8	-	-				Note 3
244,422,930	398.4	437.0	620.7		3/90				OFB
120M,129,211, 477,488	251.3	302.9	329.0		7/90				
184,321,326,912	214.4	281.5			7/90				
462, 479	245.5	318.8			9/90				
924	82.9	193.0		-	-				Note 4
339,526,923	126.5	161.9			9/90				
464	40.8	73.7		-	-				Note 7
412,460,926,936	157.2	180.8			10/90				
922,935	140.0	190.3			11/90				
97	27.0	27.0			4/90				Contract Labor
Life Safety	97.0	97.0			6/90				
Sub-Total	$2,330.0	$2,992.3							
914 (5)	-	32.0	35.0	37.2	9/89	9/89	10/89		
901A (5)	-	45.7	50.3		6/89	11/89			Contract Labor
Misc. (6)	-	-	-	52.5	-	-	-		
Const. Cont.	255.0								
Const. Total	$2,585.0	$3,070.0							

RCT-033

NOTES:

(1) Planned construction start dates based on no substitution of Phase II building for Phase III buildings.

(2) Awaiting approval by DOE for use of BNL labor to install sprinkler piping for security reasons.

(3) Construction sprinkler coverage increased from 35,700 sq. ft. to 90,000 sq. ft. Construction on hold due to asbestos throughout building.

(4) Construction delayed minimum 2 years due to magnet production.

(5) Bldg. 914 and 901A added from Phase II project.

(6) Miscellaneous includes, asbestos removal, contracts and contract Change Orders to Phase II buildings, ILR's for prep work for Phase III buildings, training.

(7) Construction on hold due to asbestos requiring gross removal in South section of Bldg. 464.

(8) If approval is received from DOE to complete Phase II buildings with Phase III funds, the following buildings will be substituted for Phase III buildings.

Bldg.	Cost Estimate	Type Estimate
130	$ 116,800	Title I (dated 12/86)
179	159,700	Title II (dated 6/14/89)
510	110,000	Title II (dated 5/4/87) Basement of three story addition.
815	84,500	Title II (dated 12/3/87)
830	42,100	Title II (dated 12/3/87)
Total	$ 513,100	

CONSTRUCTION PROJECT DATA SHEET

Brookhaven Area Office
Field Office

Multiprogram Energy Laboratory/Facility Support
Sub-Program

1. Title and location of project: Fire Protection Improvements - Phase III
Brookhaven National Laboratory, Upton, N. Y.

2. Project No. 88-CH-322

3. Brief Description of Project

This project provides for the design, fabrication and installation of various fire protection improvements consisting of providing automatic sprinkler protection in facilities designated as high loss potential listed below:

Building No.	Title	Extent of Sprinkler Protection
50	Police HQ	Attic & Crawl/Occupied Areas
51	Meteorology	Occupied Areas/Attic Crawl Space
97	Record Storage	Occupied Areas
120M	DAS	Modular Addition
129	DNE/S&EP	Occupied Areas
184	Library Annex	Occupied Areas
244	Carpenter & Paint Shops	Occupied Areas

FIRE PROTECTION IMPROVEMENT, PHASE III

BLDG. NO.	TITLE	EXTENT OF SPRINKLER PROTECTION	RECOMMENDATION SOURCE
50	Police H.Q.	Attic & Crawl/Occupied Areas	Factory Mutual
51	Meteorology	Occupied Areas Attic Crawl Space	Factory Mutual
97	Record Storage	Occupied Areas	Factory Mutual
120M	DAS	Modular Addition	BNL[1]
129	DNE/S & EP	Occupied Areas	Factory Mutual
184	Library Annex	Occupied Areas	Factory Mutual
244	Carpenter & Paint Shops	Occupied Areas	Factory Mutual
321	Site Maintenance Shops	Occupied Areas	Factory Mutual
326	Site Maintenance Services	Occupied Areas	Factory Mutual
339	Site Maintenance Storage	Occupied Areas	Factory Mutual
348	Calibrations	Occupied Areas	Factory Mutual

1 - Constructed after 1974 Factory Mutual Fire Protection Survey

FIRE PROTECTION IMPROVEMENT, PHASE III

BLDG. NO.	TITLE	EXTENT OF SPRINKLER PROTECTION	RECOMMENDATION SOURCE
412	Site Maintenance Storage	Occupied Areas	Factory Mutual
422	Bldg. Maintenance Service	Occupied Areas	Factory Mutual
460	Directors Office	Occupied Areas	BNL[2]
462	Light Machine Shop	Occupied Areas	BNL[2]
464	DOE	Occupied Areas	Factory Mutual
477	Library	Occupied Areas	Factory Mutual
479	Heavy Machine Shop	Occupied Areas	Factory Mutual
488	Cafeteria	Basement & Storage	Factory Mutual
526	DAS	Basement	Factory Mutual
902	High Energy Facility	Offices (Exclude High Bay)	Factory Mutual

1 – Constructed after 1974 Factory Mutual Fire Protection Survey

2 – Recommendation generated by BNL due to occupancy charge and/or fire fuel loading increase

FIRE PROTECTION IMPROVEMENTS, PHASE III

BLDG. NO.	TITLE	EXTENT OF SPRINKLER PROTECTION	RECOMMENDATION SOURCE
912 EEBA	AGS Target Hall	Cable Tunnels & Work Shop	Factory Mutual
914	Old Linac	Entire	Factory Mutual
918	AGS Warehouse	Entire	Factory Mutual
922	AGS Assemble	Entire	BNL[2]
924	AGS Magnet Assemble	Entire	Factory Mutual
926	AGS Receiving & Storage	Entire	Factory Mutual
930	200 MEV Linac	Offices, Labs & Lower Gallery	Factory Mutual
935	HEF Winding Facility	Entire	BNL[1]
936	AGS Storage	Entire	BNL[1]

1 - Constructed after 1974 Factory Mutual Fire Protection Survey

2 - Recommendation generated by BNL due to occupancy charge and/or fire fuel loading increase

Schedule II-8
(Schedule 44)

DEPARTMENT OF ENERGY
GENERAL SCIENCE AND RESEARCH - P&CE
FY 1988 BUDGET REQUEST
(Tabular dollars in thousands. Narrative material in whole dollars.)
CONSTRUCTION PROJECT DATA SHEET

Brookhaven Area Office
Field Office

Program: Plant Acquisition and Construction

Sub-Program: Multiprogram Energy Laboratory/Facility Support

1. Title and location of project: Fire Protection Improvements - Phase III
Brookhaven National Laboratory, Upton, N. Y.

2. Project No. 88-CH-322

3. Date A-E initiated: 1st Quarter FY 1988

3a. Date physical construction starts: 4th Quarter FY 1988

4. Date construction end: 4th Quarter FY 1991

5. Previous cost estimate: None
Date:

6. Current cost estimate: $3,700
Less amount for PE&D: 0
Net cost estimate: $3,700
Date: December 1985

7. Financial Schedule:

Fiscal Year	Authorization	Appropriation	Obligation	Costs
1988	$3,700	$3,700	$1000	$ 400
1989	0	0	2700	1000
1990	0	0	0	1300
1991	0	0	0	1000

CONSTRUCTION PROJECT DATA SHEET

Brookhaven Area Office
Field Office

Multiprogram Energy Laboratory/Facility Support
Sub-Program

1. Title and location of project: Fire Protection Improvements - Phase III
Brookhaven National Laboratory, Upton, N. Y.

2. Project No. 88-CH-322

8. Brief Description of Project cont.

All installations and modifications will be in accordance with DOE recommended standards. Specifically, sprinkler protection will conform to National Fire Protection Association Standard 13. Sprinkler systems will be hydraulically designed to minimize costs. Wetpipe system on 100 s.f. spacing will be used in heated areas. Dry pipe system will be used for unheated or partially heated areas. Water supplies will be taken from the existing BNL site water distribution system.

In addition to fire suppression systems, various facilities will be modified to raise their level of fire protection to acceptable levels. The major focus of these modifications will be Brookhaven's Fuel Storage Facility, which contains over three million gallons of fuel. In addition, stairways will be provided for ladder type exits in Buildings 120, 129, and 462.

9. Purpose, Justification of Need for, and Scope of Project

The purpose of this project is to reduce the risk of loss due to fire at BNL. In a 1984 Fire Protection Survey for DOE, Professional Loss Control, Inc. found that "...Brookhaven National Laboratory does not meet the 'Improved Risk' philosophy advocated in DOE 5480.1, Chapter VII, Fire Protection due to the lack of automatic fixed suppression systems (automatic sprinklers)..." For this project, only "key facilities" have been included. Key facilities are defined as:

a. Building containing operations directly involved in DOE program activities; or

b. Vital support buildings for program buildings.

Each key facility was examined in relation to several interrelated risk factors: potential dollar loss due to fire, effectiveness and reliability of existing fire protection (if any), amount of combustibles present, type of potential fire (i.e. smokey, flash, average), access by fire department, salvageability, potential extension of fire, impact on experiments, and life safety of occupants.

CONSTRUCTION PROJECT DATA SHEET

Brookhaven Area Office
Field Office

Multiprogram Energy Laboratory/Facility Support
Sub-Program

Title and location of project: Fire Protection Improvements - Phase III
Brookhaven National Laboratory, Upton, N. Y.

2. Project No. 88-CH-322

8. Brief Description of Project cont.

Building No.	Title	Extent of Sprinkler Protection
321	Site Maintenance Shops	Occupied Areas
326	Site Maintenance Shops	Occupied Areas
339	Site Maintenance Shops	Occupied Areas
348	Calibrations	Occupied Areas
412	Site Maintenance Storage	Occupied Areas
422	Building Maintenance Service	Occupied Areas
460	Director's Office	Occupied Areas
462	Light Machine Shop	Occupied Areas
464	Department of Energy	Occupied Areas
477	Library	Occupied Areas
479	Heavy Machine Shop	Occupied Areas

CONSTRUCTION PROJECT DATA SHEET

Brookhaven Area Office
Field Office

Multiprogram Energy Laboratory/Facility Support
Sub-Program

1. Title and location of project: Fire Protection Improvements - Phase III
Brookhaven National Laboratory, Upton, N. Y.

2. Project No. 88-CH-322

8. Brief Description of Project cont.

Building No.	Title	Extent of Sprinkler Protection
488	Cafeteria	Basement & Storage
526	DAS	Basement
902	High Energy Facility	Offices (Exclude High Bay)
912 EEBA	AGS Target Hill	Cable Tunnel & Work Shop
914	Old Linac	Entire
918	AGS Warehouse	Entire
922	AGS Assemble	Entire
924	AGS Magnet Assemble	Entire
926	AGS Receiving & Storage	Entire
930	200 MEV Linac	Offices, Labs & Lower Gallery
935	HEF Winding Facility	Entire
936	AGS Storage	Entire

CONSTRUCTION PROJECT DATA SHEET

Brookhaven Area Office
Field Office

Multiprogram Energy Laboratory/Facility Support
Sub-Program

1. **Title and location of project:** **Fire Protection Improvements - Phase III**
Brookhaven National Laboratory, Upton, N. Y.

2. Project No. 88-CH-322

9. **Purpose, Justification of Need for, and Scope of Project** cont.

Providing additional sprinkler systems will bring BNL further into compliance with DOE Order 5840.1 on fire protection. The method of analysis for fire suppression differs from what was previously used for funding requests. The previous method relied on a ten year old study done by an external engineering/fire insurance firm (Factory Mutual Engineering Association). However, the areas that BNL and the 1984 Fire Protection Survey identified as most needing protection coincide with Factory Mutual's work and provide verification of a long standing need.

CONSTRUCTION PROJECT DATA SHEET

Brookhaven Area Office
Field Office

Multiprogram Energy Laboratory/Facility Support
Sub-Program

1. Title and location of project: Fire Protection Improvements - Phase III
Brookhaven National Laboratory, Upton, N. Y.

2. Project No. 88-CH-322

10. Details of Cost Estimate*

	(Dollars in Thousands) Item Cost	Total Cost
a. Engineering, design and inspection at 12% of construction costs Item b		326
b. Construction costs		2,718
(1) New sprinkler systems in 30 buildings	$1,870	
(2) 30 new water mains with trenching control valves and wet tap	192	
(3) 30 new or modified supervisory and alarm panel	456	
(4) Modify various buildings for Life Safety Improvements	200 Low	
c. Contingency @ approximately 15% of above costs (Item a & b)		456
Total		$3,500

* Estimate is based on a completed conceptual design report. All costs are escalated by 4.0% for FY 1986, 5.1% for FY 1987, 5.7% for FY 1988, 5.9% for FY 1989 and 6.2% for FY 1990. These rates conform to the DOE's Independent Cost Estimate Staff's guidelines for general construction issued with this budget call. The costs area adjusted to the midpoint of construction. The 15% contingency reflects design intangibles normally associated with retrofit work in BNL's environment (i.e. relocation of utilities, repair of building after installation).

CONSTRUCTION PROJECT DATA SHEET

Brookhaven Area Office
Field Office

Multiprogram Energy Laboratory/Facility Support
Sub-Program

1. Title and location of project: Fire Protection Improvements - Phase III
Brookhaven National Laboratory, Upton, N. Y.

2. Project No. 88-CH-322

11. Method of Performance

Design, engineering, major procurement, construction, inspection and program administration will be accomplished by the operating contractor (BNL) either in-house or by contracting with local Architectural/Engineering firms. To the extent feasible, construction and procurement will be accomplished by fixed-price contracts and purchase orders awarded on the basis of competitive bidding.

2. Funding Schedule of Project Funding and Other Related Funding Requirements

Not required.

13. Narrative Explanation of Total Project Funding and Other Related Funding Requirements

Not required.

14. Incorporation of Fallout Shelters in Future Federal Buildings

Efforts will be made through the use of slanting techniques in design of this building to provide shelter space where feasible, at little or no additional cost.

15. Federal Compliance with Pollution Control Standards

As presently conceived, operation of this project will not generate any environmental pollutants, therefore, the requirments of Executive Order 12088 are not applicable.

CONSTRUCTION PROJECT DATA SHEET

Brookhaven Area Office
Field Office

Multiprogram Energy Laboratory/Facility Support
Sub-Program

1. Title and location of project: Fire Protection Improvements - Phase III
Brookhaven National Laboratory, Upton, N. Y.

2. Project No. 88-CH-322

16. Evaluation of Flood Hazards

The site of Brookhaven National Laboratory is located in an area not subject to flooding determined in accordance with Executive Order 11988.

17. Compliance with the National Environmental Policy Act, Floodplains/Wetlands Environmental Review Requirements, and Other Related Environmental Statutes

The proposed actions described above are within the scope of activities which are evaluated in the Environmental Impact Statement written for the Laboratory (ERDA 1540) and as such will not produce any adverse impacts. The proposed actions will not be located within nor will they impact upon floodplain and/or wetland areas.

CONSTRUCTION PROJECT DATA SHEET

Brookhaven Area Office
Field Office

Multiprogram Energy Laboratory/Facility Support
Sub-Program

1. Title and location of project: Fire Protection Improvements - Phase III
Brookhaven National Laboratory, Upton, N. Y.

2. Project No. 88-CH-322

C-4-18

10. Details of Cost Estimate*

	(Dollars in Thousands) Item Cost	Total Cost
a. Engineering, design and inspection at 12% of construction costs Item b		326
b. Construction costs		2,718
(1) New sprinkler systems in 30 buildings	$1,870	
(2) 30 new water mains with trenching control valves and wet tap	192	
(3) 30 new or modified supervisory and alarm panel	456 Low	
(4) Modify various buildings for Life Safety Improvements	200	
c. Contingency @ approximately 15% of above costs (Item a & b)		456
Total		$3,500

* Estimate is based on a completed conceptual design report. All costs are escalated by 4.0% for FY 1986, 5.1% for FY 1987, 5.7% for FY 1988, 5.9% for FY 1989 and 6.2% for FY 1990. These rates conform to the DOE's Independent Cost Estimate Staff's guidelines for general construction issued with this budget call. The costs area adjusted to the midpoint of construction. The 15% contingency reflects design intangibles normally associated with retrofit work in BNL's environment (i.e. relocation of utilities, repair of building after installation).

CONSTRUCTION PROJECT DATA SHEET

Brookhaven Area Office
Field Office

Multiprogram Energy Laboratory/Facility Support
Sub-Program

1. Title and location of project: Fire Protection Improvements - Phase III Brookhaven National Laboratory, Upton, N. Y.

2. Project No. 88-CH-322

11. Method of Performance

Design, engineering, major procurement, construction, inspection and program administration will be accomplished by the operating contractor (BNL) either in-house or by contracting with local Architectural/Engineering firms. To the extent feasible, construction and procurement will be accomplished by fixed-price contracts and purchase orders awarded on the basis of competitive bidding.

12. Funding Schedule of Project Funding and Other Related Funding Requirements

Not required.

13. Narrative Explanation of Total Project Funding and Other Related Funding Requirements

Not required.

14. Incorporation of Fallout Shelters in Future Federal Buildings

Efforts will be made through the use of slanting techniques in design of this building to provide shelter space where feasible, at little or no additional cost.

15. Federal Compliance with Pollution Control Standards

As presently conceived, operation of this project will not generate any environmental pollutants, therefore, the requirments of Executive Order 12088 are not applicable.

APPENDIX C-5

Life Safety Code

Survey Plan of Action

Brookhaven National Laboratory
Life Safety Code (NFPA 101)

Survey Plan of Action
April 27, 1989

The following is a preliminary outline of a "plan of action" to respond to DOE's ISFP appraisal recommendation 88-01, "The Laboratory will submit to DOE for review and approval a plan and schedule for a program to review all BNL facilities for compliance with the Life Safety Code (NFPA Standard 101)".

1 Phase I -Develop ***Scoping Document*** (up to about 35 work-days; Third and Fourth Quarters - FY 1989; completion about October 1, 1989).

1.1 Update buildings data and refine risk criteria. This task basically reviews the existing buildings and structures inventory list, assigns occupancy classifications to each building -- doing minimal effort surveys where necessary to update data, and refine criteria for assigning "risk factors" to a facility so that priorities for doing the work can be rationally assigned (perhaps 15 work-days).
1.2 Expand and update database (perhaps 5 work-days).
1.3 Develop *Scoping Document*. This document will establish the rational for doing or not doing detailed surveys, and establishing priorities for doing the work (perhaps 5 work-days).
1.4 **DOE approval** of *Scoping Document*.
1.5 Prepare task order for Phase 2 (if work is contracted, perhaps 10 work-days) or develop BNL work-order (if done in-house).

Phases 2 through 5 represent preliminary outline of priorities and buildings to be surveyed. This is included to give a general impression of the magnitude of the work to be accomplished. These would be further defined by the *Scoping Document* of Phase 1, and agreed to by DOE prior to commencing the work. Work effort includes survey work and CDR development. If done in-house, survey could be done by new S&EP Fire Protection Engineer with some assistance from Coordinators and Representatives, CDR work could be done by Plant Engineering. If done by contract, survey and CDR could be accomplished by a task-order to fire protection engineering consultant.

2 Phase 2 - **Priority 1 Surveys & CDR** (80 work-days of effort; First Quarter - FY 1990).

2.1 Task 2.1 Conduct Priority 1 Surveys, these are basically buildings included in the Gage-Babcock survey done about 1977.
Current estimates: about 21 buildings, 1,357,000 sf., about 34% of BNL's LSC "total occupancy load factor[1]".

[1] Total occupancy load factor is the code "density" factor that is used to determine many features of the exit design. While expressed in numbers of occupants, it is unrelated to the actual number of occupants. It varies depending on the building use, but is most usually at BNL the building's gross

2.2 Task 2.2 Develop Priority 1 Conceptual Design Report

2.3 Task 2.3 **DOE approval** of CDR

2.4 Task 2.4 Phase 2 Task/work order

3 Phase 3 - **Priority 2 Surveys & CDR** (75 work-days of effort; Second Quarter - FY 1990).

3.1 Task 3.1 Conduct Priority 2 surveys
Current estimates: about 30 buildings, 1,144,000 sf., about 41% of BNL's LSC "total occupancy load factor"

3.2 Task 3.2 Develop Priority 2 Conceptual Design Report

3.3 Task 3.3 **DOE approval** of CDR

3.4 Task 3.4 Phase 4 Task/work order

4 Phase 4 - **Priority 3 Surveys & CDR** (60 work-days of effort; Third Quarter - FY 1990).

4.1 Task 4.1 Conduct Priority 3 surveys
Current estimates: about 55 buildings, 567,000 sf., about 16% of BNL's LSC "total occupancy load factor"

4.2 Task 4.2 Develop Priority 3 CDR

4.3 Task 4.3 **DOE Approval** of CDR

5 Phase 4 - **Priority 4 Surveys & CDR** (65 work-days of effort; Fourth Quarter - FY 1990).

Consideration should be given to removing the priority 4 facilities from scope of work. These buildings are generally in either warehouse occupancies or buildings with gross areas from 2,000 sf. to 5,000 sf. -- all a low occupancy risk.

5.1 Task 5.1 Conduct Priority 4 surveys
Current estimates: about 82 buildings, 450,000 sf., about 5% of BNL's LSC "total occupancy load factor"

5.2 Task 5.2 Develop Priority 4 CDR

5.3 Task 5.3 **DOE Approval** of CDR

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area divided by 100, since most of BNL's buildings are classed as "industrial occupancy".

6 Phase 6 - **Schedule 44** (First Quarter - FY 1991)

6.1 Task 6.1 Develop/submit Schedule 44, for FY 1993 budget.

Excluded facilities (priority 99 in attachment): Based on the preliminary work used to develop this report, we estimate that approximately 190 buildings, with a gross area of 153,000 sf., representing about 3% of BNL's LSC "total occupancy load factor", would not be included in the detailed surveys. The rational is that these facilities are of small area and very low risk, and that conducting detailed surveys is not cost effective. The Phase 1 work will further refine the rational for doing or not doing surveys, and adjust the priorities accordingly.

APPENDIX C-6

Fire Protection Recommendation

Tracking System

Brookhaven National Laboratory
Safety and Environmental Protection Division
Industrial Safety and Fire Protection Section

FIRE SAFETY RECOMMENDATIONS
Data Files: RECSOPEN.dbf, RECSHIST.dbf, RECSEXEM.dbf, RECSBACK.dbf
For Condition: "FM" $ Rec_By .or. "PLC" $ Rec_By
Order: REC_SOURCE

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
4	12/01/74	FM 41	FM	SS	0179	2	30 %	03/28/90		86-R-726	Line		09/12/88 / /	183.9

Recommendation: PROVIDE AUTOMATIC SPRINKLER PROTECTION THROUGHOUT.

Comment: Originally in Phase II, Design complete. Awaiting DOE approval for construction in Phase III. P-2(C-1,H-2(I,D)))

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
5	12/01/74	FM 46	FM	PR	0355	A	Closed	03/28/90		86-R-726	Line		02/19/88 08/31/89	183.9

Recommendation: PROVIDE AUTOMATIC SPRINKLER PROTECTION THROUGHOUT.

Comment: INCLUDED IN FIRE PROTECTION IMPROVEMENTS PHASE II. APPROVED AND ACCEPTED. JL

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
6	12/01/74	FM 65	FM	EE	0815	3	30 %	03/28/90		86-R-726	Line		04/13/87 / /	177.0

Recommendation: PROVIDE AUTOMATIC SPRINKLER PROTECTION THROUGHOUT, EXCEPT FOR THE HIGH BAY AREA.

Comment: BASEMENT AREAS INCLUDED IN FIRE PROTECTION IMPROVEMENTS PHASE II. THE REMAINDER OF THE BLDG. IS NOT PLANNED. Because of asbestos, work on hold. Awaiting DOE approval for construction in Phase III. P-3(C-1,H-3(II,D))

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
2005	12/01/74	FM 65	FM	EE	0815	3	Open	03/29/90		PL	Othr		/ / / /	183.9

Recommendation: Provide Automatic Sprinkler Protection Throughout, Except for hi-bay area.

Comment: Basement implemented in Phase II work. This item implements remainder of facility.

Report: R_Recs01

03/29/90

Brookhaven National Laboratory
Safety and Environmental Protection Division
Industrial Safety and Fire Protection Section

FIRE SAFETY RECOMMENDATIONS
Data Files: RECSOPEN.dbf, RECSHIST.dbf, RECSEXEM.dbf, RECSBACK.dbf
For Condition: "FM" $ Rec_By .or. "PLC" $ Rec_By
Order: REC_SOURCE

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
7	12/01/74	FM 80	FM	SM	0211	B	10 %	03/28/90		89-R-102	Line		08/01/89 / /	183.9

Recommendation: PROVIDE AUTOMATIC SPRINKLER PROTECTION THROUGHOUT.

Comment: Originally in Phase II, Design complete. DOE approved for Phase III.

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
135	12/01/74	FM 83	FM	EE	0051	B	10 %	07/25/89		89-R-102	Line		03/01/89 09/30/90	183.9

Recommendation: PROVIDE AUTOMATIC SPRINKLER PROTECTION THROUGHOUT.

Comment: INCLUDED IN FIRE PROTECTION IMPROVEMENTS PHASE III

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
8	12/01/74	FM 87	FM	SE	0050	B	20 %	03/28/90		89-R-102	Line		03/01/89 09/30/92	183.9

Recommendation: PROVIDE AUTOMATIC SPRINKLER PROTECTION THROUGHOUT.

Comment: INCLUDED IN FIRE PROTECTION IMPROVEMENTS PHASE III ON HOLD. AWAITING DOE APPROVAL FOR DAVIS-BACON, SECURITY REQUIREMENTS.

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
1995	03/08/90	FM 90	FM	EE	0480	4	Open	03/28/90		PL	Othr		/ / / /	183.9

Recommendation: PROVIDE AUTOMATIC SPRINKLER THROUGHOUT.

Comment: Phase II work reactivated sprinklers in high bay. Because of asbestos problem, work scope was reduced. This item completes original scope.
P-4(C-1,H-3(III,D))

Brookhaven National Laboratory
Safety and Environmental Protection Division
Industrial Safety and Fire Protection Section

FIRE SAFETY RECOMMENDATIONS
Data Files: RECSOPEN.dbf, RECSHIST.dbf, RECSEXEM.dbf, RECSBACK.dbf
For Condition: "FM" $ Rec_By .or. "PLC" $ Rec_By
Order: REC_SOURCE

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
9	12/01/74	FM 90	FM	EE	0480	M	Backlog	07/25/89		86-R-726	Line		04/13/87 07/31/89	0.7

Recommendation: PROVIDE AUTOMATIC SPRINKLER PROTECTION FOR BLDG. AND THE MODULAR ADDITION TO THE NORTH.

Comment: INCLUDED IN FIRE PROTECTION IMPROVEMENTS PHASE II. BECAUSE OF ASBESTOS PROBLEMS, ONLY ABLE TO REACTIVATE SYSTEM IN HIBAY AREA AND PROVIDE FIRE DOOR TO MODULAR. BACKLOG REMAINDER OF WORK

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
246	12/01/74	FM 95	FM	EE	0356	7	Closed	07/25/89		86-R-726	Line		04/05/88 03/24/89	183.9

Recommendation: PROVIDE SPRINKLER PROTECTION THROUGHOUT EXCEPT OVER THE GAMMA RAY IRRADIATION AREA

Comment: FUNDING PROVIDED UNDER FIRE PROTECTION IMPROVEMENTS PHASE II ACCEPTANCE TEST BY J. LEVESQUE

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
16	03/19/84	PLC 5.1.01	PLC	SS	0030	5	Closed	10/11/89		86-R-726	Line		02/05/88 10/10/89	171.7

Recommendation: REMOVE SCREEN DOORS FROM EXITS LEADING TO PATIO AREA SINCE THEY SWING AGAINST EXIT FLOW.

Comment: INCLUDED IN FIRE PROTECTION IMPROVEMENTS PHASE II. INCLUDED WITH SPRINKLER AND OTHER LIFE SAFETY IMPROVEMENTS 10/10/89 COMPLETED RH

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
17	03/19/84	PLC 5.1.02	PLC	EE	0051	0	Exemptn	07/20/89			Othr		/ / / /	66.7

Recommendation: ENCLOSE THE OPEN STAIRWELL BETWEEN THE BASEMENT AND FIRST FLOOR. THIS IS REQUIRED BY NFPA 101 TO LIMIT THE VERTICAL SPREAD OF FIRE FROM A STORAGE AREA(ie.BSMT.).

Comment: NFPA 101 ALLOWS AN OPEN STAIRWELL IF BLDG IS FULLY SPRINKLERED. SPRINKLER

PROTECTION IS INCLUDED IN FIRE PROTECTION IMPROVEMENTS PHASE III SEE ITEM 135.

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
18	03/19/84	PLC 5.1.03	PLC	SM	0086		Closed	01/16/86			Oper		/ / 12/12/84	72.3

Recommendation: THE FUEL OIL TANK NEXT TO BUILDING SHOULD BE BURRIED OR PROTECTED FROM VEHICULAR DAMAGE.

Comment: VEHICULAR BARRIER HAVE BEEN PROVIDED.

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
19	03/19/84	PLC 5.1.04	PLC	SM	0089	0	Closed	08/25/89			Othr		/ / 08/25/89	8.8

Recommendation: THE FUEL OIL TANK NEXT TO BLDG 89 SHOULD BE BURIED OR PROVIDED WITH A FIXED AUTO WATER SPRAY SYS WITH APPROPRIATE DIKING & DRAINS, OR SEPARATED FROM BLDG 89 WITH A FIRE RESISTIVE BARRIER (MINIMUM 2 HOURS) AND DIKED.

Comment: SEE LETTER BARON TO SCHWELLER, 12/12/84 8/25/89 - IN PLACE WITH VEHICLE BARRIER

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
20	03/19/84	PLC 5.1.05	PLC	SM	0091	3	Open	03/28/90		PL	Othr		/ / / /	65.2

Recommendation: PROVIDE SPRINKLER PROTECTION FOR THE FOUR TRAILERS EAST OF BLDG 91.

Comment: 4-50 FT. TRAILERS ARE 6 FT. AWAY FROM BLDG. DOE PORTABLE STRUCTURE GUIDE REQUIRES PROTECTION. INCLUDED IN PRIORITY LIST. PROJECT FOR BLDG. REPLACEMENT WAS CANCELLED 10-86. P-3(C-1,H-3(II,D))

Brookhaven National Laboratory
Safety and Environmental Protection Division
Industrial Safety and Fire Protection Section

FIRE SAFETY RECOMMENDATIONS
Data Files: RECSOPEN.dbf, RECSHIST.dbf, RECSEXEM.dbf, RECSBACK.dbf
For Condition: "FM" $ Rec_By .or. "PLC" $ Rec_By
Order: REC_SOURCE

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
21	03/19/84	PLC 5.1.06	PLC	NE	0130	3	Open	03/28/90		PL	Othr		/ / / /	72.3

Recommendation: ENCLOSE THE OPEN STAIRWAY BETWEEN THE FIRST AND SECOND FLOORS.

Comment: P-3(C-1,H-3(II,D)))

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
22	03/19/84	PLC 5.1.07	PLC	EP	0197	0	Exemptn	/ /			Othr		/ / / /	72.3

Recommendation: REPLACE OR COVER THE POLYSTYRENE INSULATION ON THE HVAC DUCTS WITH A NON-COMBUSTIBLE MATERIAL.

Comment: AREA IS PROVIDED WITH COMPLETE AUTOMATIC SPRINKLER PROTECTION.

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
23	03/19/84	PLC 5.1.08	PLC	SS	0449	Repair	Closed	12/18/86			Oper		/ / 12/16/86	72.3

Recommendation: SEAL THE PENETRATION BETWEEN THE MAIN FRAME ROOM AND THE BATTERY ROOM. THE PENATRATION OF THE FIRE WALL COULD CAUSE UNNECCASSARY DAMAGE IN THE EVENT OF A FIRE.

Comment: PENETRATION SEALED WITH A CEMENT PLUG VERIFIED ON 12-16-86 JWL & FS

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
24	03/19/84	PLC 5.1.09	PLC	SC	0457	0	Closed	08/25/89			Othr		/ / 08/25/89	32.9

Recommendation: THE FUEL OIL TANK ON THE WEST SIDE OF BLDG. 457 SHOULD BE BURIED OR PROVIDED WITH A FIXED WATER SPRAY SYSTEM WITH APPROP DIKING & DRAINS, OR DIKED AND THE ADJ OPENINGS IN THE WEST WALLS OF BLDGS 457 & 208 PROTECTED SO THAT THEY ARE SUITABLE FOR A 2 HR FIRE RATED BARRIER.

Comment: SEE LETTER BARON TO SCHWELLER, 12/12/84 8/25/89 - IN PLACE

Brookhaven National Laboratory
Safety and Environmental Protection Division
Industrial Safety and Fire Protection Section

FIRE SAFETY RECOMMENDATIONS
Data Files: RECSOPEN.dbf, RECSHIST.dbf, RECSEXEM.dbf, RECSBACK.dbf
For Condition: "FM" $ Rec_By .or. "PLC" $ Rec_By
Order: REC_SOURCE

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
25	03/19/84	PLC 5.1.10	PLC	DO	0460	0	Exemptn	07/24/89			Othr		/ / / /	65.2

Recommendation: THE OPEN STAIRWELL CONNECTING FIRST AND SECOND FLOORS SHOULD BE ENCLOSED TO COMPLY WITH NFPA 101-1981 SECTION 27-3.1.1.

Comment: SEE LETTER BARON TO SCHWELLER, 12/12/84 BLDG. SCHEDULED FOR SPRINKLERS, PHASE III, 89-R-102; ENCLOSURE NOT NOW REQUIRED.

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
26	03/19/84	PLC 5.1.11	PLC	EE	0475	0	Exemptn	/ /			Othr		/ / / /	72.3

Recommendation: INSTALL FIRE RATED BARRIERS TO ISOLATE THE TRAILERS CONNECTED TO THE SOUTHEAST AND SOUTHWEST WINGS OF BUILDING 475 FROM THE REMAINDER OF THE BUILDING.

Comment: SEE LETTER BARON TO SCHWELLER, 12/12/84

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
27	03/19/84	PLC 5.1.12A	PLC	EE	0480	3	Closed	08/25/89			Othr		/ / 08/25/89	72.3

Recommendation: PROVIDE A FIRE RATED BARRIER BETWEEN THE MAIN BUILDING AND THE COMBUSTIBLE MODULARS ON THE NORTH.

Comment: 7/25/89 - VERIFIED BY J. LEVESQUE

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
28	03/19/84	PLC 5.1.12B	PLC	EE	0480	0	Closed	07/20/89			Othr		/ / 01/01/88	65.2

Recommendation: RELOCATE THE STORAGE SHED ON THE SOUTH SIDE OF BLDG SO THAT IT DOES NOT PRESENT AN EXPOSURE HAZARD TO THE BUILDING.

Comment: SEE LETTER BARON TO SCHWELLER, 12/12/84 SHED REMOVED.

Brookhaven National Laboratory
Safety and Environmental Protection Division
Industrial Safety and Fire Protection Section

FIRE SAFETY RECOMMENDATIONS
Data Files: RECSOPEN.dbf, RECSHIST.dbf, RECSEXEM.dbf, RECSBACK.dbf
For Condition: "FM" $ Rec_By .or. "PLC" $ Rec_By
Order: REC_SOURCE

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
29	03/19/84	PLC 5.1.13A	PLC	MO	0490	1	Closed	12/10/86		GPP-FY85 F521	GPP		/ / 09/30/86	45.4

Recommendation: SEAL THE CABLE PENETRATION THRU THE WALL BETWEEN INHALATION/TOXIC. COMPUTER ROOM AND THE CORRIDOR.

Comment: AN AUTOMATIC HALON SYSTEM IS BEING INSTALLED IN THE COMPUTER ROOM, AND THE PENETRATION IS BEING SEALED AS PART OF THIS WORK. SEE ITEM 136. WORK COMPLETED 12-10-86

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
30	03/19/84	PLC 5.1.13B	PLC	MO	0490	9	Closed	12/10/86			Oper		/ / 12/10/86	30.4

Recommendation: REMOVE THE EXPANDED PLASTIC SOUND BARRIER IN THE INHALATION/TOXIC. COMPUTER FACILITY. THE HIGHLY COMBUSTIBLE MATERIAL POSES AN UNACCEPTABLE RISK DUE TO EXCESSIVE SMOKE DAMAGE.

Comment: FACILITY HAS BEEN SHUT DOWN AS OF 12-10-86 BARRICADE REMOVED. JWL

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
31	03/19/84	PLC 5.1.14	PLC	SE	0493	0	Backlog	08/25/89			Othr		/ / / /	32.7

Recommendation: REMOVE OR REPLACE OR ENCASE WITH NON-COMBUSTIBLE MATERIAL THE EXPANDED POLYSTYRENE INSULATION ON THE DUCTWORK IN BLDG 493. THE POLYSTYRENE INSULAT IF IGNITED, WILL CAUSE RAPID FIRE SPREAD IN THE CONCEALED SPACE ABOVE THE DROPPED CEILING.

Comment: SEE LETTER BARON TO SCHWELLER, 12/12/84. WHILE BLDG PART OCCUPIED, POLYSTYRENE AREA REMAINS UNOCCUPIED AND CUT-OFF FROM OCCUPIED AREAS. Polystyrene being replace as building is occuppied. 7/89 jl

Brookhaven National Laboratory
Safety and Environmental Protection Division
Industrial Safety and Fire Protection Section

FIRE SAFETY RECOMMENDATIONS
Data Files: RECSOPEN.dbf, RECSHIST.dbf, RECSEXEM.dbf, RECSBACK.dbf
For Condition: "FM" $ Rec_By .or. "PLC" $ Rec_By
Order: REC_SOURCE

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
32	03/19/84	PLC 5.1.15A	PLC	PO	0510	Repair	Closed	02/20/87			GPP		/ / 02/17/87	72.3

Recommendation: SEAL THE CABLE TRAY PENETRATIONS BETWEEN THE FIRST AND SECOND FLOOR LABS AND THE FIRE WALL PENETRATIONS IN THE BASEMENT.

Comment: INCLUDED IN SEP GPP PRIORITY LIST. BEING DONE BY AN ILR ISSUED BY PHYSICS

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
33	03/19/84	PLC 5.1.15B	PLC	PO	0510		Closed	01/16/86			Oper		/ / 12/12/84	35.0

Recommendation: THE STORAGE OF COMBUSTIBLE MAGNETIC TAPES, EQUIP-MENT, AND MISC. COMBUSTIBLES IN THE FIRST FLOOR CORRIDOR ABD BASEMENT, NORTH END, SHOULD BE REMOVED TO A STORAGE AREA.

Comment: A TAPE STORAGE VAULT HAS BEEN CONSTRUCTED IN BASE-MENT. REMAINING LEVELS OF STORAGE ARE LOW.

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
34	03/19/84	PLC 5.1.16A	PLC	EE	0526	0	Exemptn	08/25/89			Othr		/ / / /	8.8

Recommendation: REMOVE OR COVER THE HIGHLY COMBUSTIBLE POLYSTRENE INSULATION ON THE DUCTS IN THE BASEMENT AREA.

Comment: SPRINKLER PROTECTION FOR AREA INCLUDED IN FIRE PROTECTION IMPROVEMENTS PHASE III. ELIMATES NEED FOR THIS WORK. SEE ITEM 137. 89-R102

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
35	03/19/84	PLC 5.1.16B	PLC	EE	0527	0	Exemptn	/ /			Othr		/ / / /	72.3

Recommendation: RELOCATE STORAGE SHEDS ON THE NORTH SIDE OF BLDG SO THAT IT DOES NOT PRESENT AN EXPOSURE HAZARD TO THE BUILDING.

Comment: SEE LETTER BARON TO SCHWELLER, 12/12/84

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FIRE SAFETY RECOMMENDATIONS
Data Files: RECSOPEN.dbf, RECSHIST.dbf, RECSEXEM.dbf, RECSBACK.dbf
For Condition: "FM" $ Rec_By .or. "PLC" $ Rec_By
Order: REC_SOURCE

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
36	03/19/84	PLC 5.1.17A	PLC	CO	0555		Closed	01/16/86			Oper		/ / 12/12/84	72.3

Recommendation: REPLACE REAR DOOR TO FLAMMABLE LIQUIDS STORAGE ROOM WITH A 1-1/2 HOUR FIRE DOOR.

Comment: PLAIN GLASS WINDOW WAS REPLACED WITH WIRED-GLASS. THIS WAS CONSIDERED A SATISFACTORY FIX, PER J. ZAMIROWSKI

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
37	03/19/84	PLC 5.1.17B	PLC	CO	0555	0	Exemptn	/ /			Othr		/ / / /	8.8

Recommendation: REPLACE ENTRANCE DOORS AND TRANSOM FOR FLAMMABLE GAS STORAGE ROOM IN BUILDING 555 WITH FIRE RATED COMPONENTS.

Comment: SEE LETTER BARON TO SCHWELLER, 12/12/84

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
138	01/16/86	PLC 5.1.18A	PLC	NE	0703	3	Open	03/28/90			Othr		/ / / /	72.3

Recommendation: PROVIDE AUTOMATIC EXTINGUISHING SYSTEM FOR TWO TRAILERS LOCATED TO THE SOUTH OF THE EAST WING.

Comment: ALTERNATIVE TO ITEM 38, PLC 5.1.18A. P-3(C-1,H-3(II,D))

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
38	03/19/84	PLC 5.1.18A	PLC	NE	0703	0	Closed	03/27/90			Othr		/ / / /	50.4

Recommendation: RELOCATED THE TWO TRAILERS LOCATED TO THE SOUTH OF THE EAST WING. THE WOOD FRAME TRAILERS WILL SPREAD SMOKE AND FLAMES INTO THE BLDG IF INVOLVED IN A FIRE.

Comment: AN ALLOWABLE ALTERNATIVE BY DOE GUIDELINES IS TO PROVIDE AUTOMATIC PROTECTION. SEE ITEM 138.

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Order: REC_SOURCE

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
39	03/19/84	PLC 5.1.18B	PLC	RO	0703	3	Open	03/28/90		PL	Othr		/ / / /	72.2

Recommendation: ENCLOSE OPEN STAIRWAY THAT SERVES THE MAIN LOBBY.

Comment: ARRANGEMENT DOES NOT SATISFY NFPA 101-81, 27-3.1.1 COMBUSTIBLE LOADING LOW WITH MANY ALTERNATIVE EXIT PATHS. P-3(C-1,H-3(III,D))

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
41	03/19/84	PLC 5.1.18C	PLC	NE	0703	Repair	Closed	04/07/89			GPP		/ / 03/21/89	72.3

Recommendation: INSTALL WIRED GLASS IN METAL FRAMES IN EXPOSED WINDOWS ON EACH SIDE OF COMBUSTIBLE STORAGE SHED ON THE SOUTH SIDE OF THE WEST WING. AN ALTERNATIVE WOULD BE TO REMOVE THE UNUSED SHED.

Comment: ALTERNATIVE TO PLC RECOMMENDATION (SEE ITEM 40). ON GPP PRIORITY LIST. PE ESTIMATE OF 5-86.

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
40	03/19/84	PLC 5.1.18C	PLC	NE	0703	0	Exemptn	01/16/86			Othr		/ / / /	60.1

Recommendation: REMOVE COMBUSTIBLE STORAGE SHED ON THE WEST WING WHICH DIRECTLY EXPOSES THE EXTERIOR BUILDING FACADE AND INTERIOR THROUGH PLAIN GLASS WINDOWS.

Comment: LOSS POTENTIAL APPROXIMATELY $25K (1984). RELOCA-TING SHED NOT JUSTIFIED. WIRE GLASS WINDOWS IN METAL FRAMES PROPOSED FOR WINDOWS. SEE ITEM 41.

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
42	03/19/84	PLC 5.1.19	PLC	RO	0750	0	Exemptn	/ /			Othr		/ / / /	72.3

Recommendation: SEAL ALL OF THE PENETRATIONS (PIPE AND CONDUIT) IN THE FLOOR/CEILING ASSEMBLIES OF BUILDING 750 BETWEEN THE EQUIPMENT LEVEL AND THE EXPERIMENTAL LEVEL.

Comment: SEE LETTER BARON TO SCHWELLER, 12/12/84

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FIRE SAFETY RECOMMENDATIONS
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Order: REC_SOURCE

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
43	03/19/84	PLC 5.1.20	PLC	EE	0802	0	Exemptn	07/20/89			Othr		/ / / /	72.3

Recommendation: BURY THE FUEL OIL DAY TANK LOCATED OUTSIDE THE WEST WALL OF BUILDING 802 OR PROVIDE PROTECTION FROM VEHICULAR DAMAGE.

Comment: SEE LETTER BARON TO SCHWELLER, 12/12/84

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
44	03/19/84	PLC 5.1.21	PLC	EE	0815M	5	Closed	08/26/88			GPP		/ / 08/11/88	72.3

Recommendation: REPLACE THE DOOR CONNECTING MODULAR WITH BLDG 815 WITH A FIRE DOOR.

Comment: INCLUDED ON SEP GPP PRIORITY LIST. PE ESTIMATE OF 5-86

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
45	03/19/84	PLC 5.1.22	PLC	AD	0905	0	Closed	07/20/89			Othr		/ / 01/01/87	52.8

Recommendation: SEPARATE THE MAGNET CORE WELDING FROM THE HYDRAULIC MAGNET COMPRESSOR WITH A NON-COMBUSTIBLE BARRIER EXTENDING AT LEAST ONE FOOT BEYOND EITHER END OF EACH MACHINE AND THREE FEET ABOVE THE TOP OF THE MACHINE.

Comment: SEE LETTER BARON TO SCHWELLER, 12/12/84 OPERATION NO LONGER EXISTS, MOVED TO CLOSED FROM EXEMPTION FILE.

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
46	03/19/84	PLC 5.1.23	PLC	AD	0912	0	Exemptn	/ /			Othr		/ / / /	33.4

Recommendation: AN APPROVED NONCOMBUSTIBLE COATING SHOULD BE APPLIED TO THE UNDERSIDE OF THE CLASS II STEEL DECK ROOF.

Comment: SEE LETTER BARON TO SCHWELLER, 12/12/84

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FIRE SAFETY RECOMMENDATIONS
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For Condition: "FM" $ Rec_By .or. "PLC" $ Rec_By
Order: REC_SOURCE

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
47	03/19/84	PLC 5.1.24	PLC	AD	0927	0	Open	03/06/90			Othr		/ / / /	72.3

Recommendation: CLOSE THE OPENINGS, OR PROVIDE CLOSURE DEVICES, TO CLOSE OPENINGS WHICH ALLOW FOR HALON LEAKAGE. PROVIDE ADDITIONAL HALON 1301 TO MAKE CONCENTRA-TION GREATER THAN 6%.

Comment: SEE LETTER BARON TO SCHWELLER, 12/12/84 J. LEVESQUE TO VERIFY. RING RUNNING 3/5/90

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
48	03/19/84	PLC 5.1.25A	PLC	AD	0928	0	Exemptn	/ /			Othr		/ / / /	72.3

Recommendation: PROVIDE AT LEAST A FOUR INCH CURB AT THE OPENING BETWEEN THE OIL STORAGE ROOM AND THE SWITCHGEAR AREA.

Comment: SEE LETTER BARON TO SCHWELLER, 12/12/84

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
49	03/19/84	PLC 5.1.25B	PLC	AD	0928	0	Exemptn	/ /			Othr		/ / / /	72.3

Recommendation: PROVIDE A CURB BETWEEN THE LIQUID RHEOSTAT AREA WITH THE LIQUID ACID BATH AND THE SWITCHGEAR AREA.

Comment: SEE LETTER BARON TO SCHWELLER, 12/12/84

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
50	03/19/84	PLC 5.1.26A	PLC	AD	0930		Closed	01/16/86			Othr		/ / 12/12/84	72.3

Recommendation: CONTROL ROOM FOR LINAC SHOULD BE COMPLETELY CUT-OFF FROM ADJACENT AREAS. DOORS WHICH CAN NOT BE KEPT CLOSED SHOULD BE HELD OPEN BY AUTOMATIC RE-LEASE DEVICES INTERLOCKED TO DETECTION SYSTEM.

Comment: ALL DOORS ARE EQUIPPED WITH AUTOMATIC RELEASE DE-VICES AS PART OF ORIGINAL DESIGN. NO ACTION REQUIRED.

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FIRE SAFETY RECOMMENDATIONS
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Order: REC_SOURCE

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
51	03/19/84	PLC 5.1.26B	PLC	AD	0930	0	Exemptn	08/25/89			Othr		/ / / /	8.8

Recommendation: THE POLYSTRENE DUCT INSULATION IN THE SWITCH ROOM, LOWER TUNNEL AND THE MECH. EQUP. ROOM SHOULD BE REMOVED OR COVERED WITH A FIRE RESISTIVE MATERIAL.

Comment: SPRINKLER PROTECTION WILL BE IN FIRE PROTECTION IMPROVEMENTS PHASE III, SEE ITEM #98

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
52	03/19/84	PLC 5.1.26C	PLC	AD	0930	0	Exemptn	/ /			Othr		/ / / /	72.3

Recommendation: THE LARGE FLOOR OPENINGS BETWEN THE COMPUTER ROOM AND THE TERMINAL AREA (INCLUDING BATTERY ROOM) AND THE TERMINAL AREA AND THE SWITCHGEAR AREA SHOULD BE ENCLOSED AND THE HALON SYSTEMS DESIGNED TO BE INDEPENDENT FOR EACH AREA.

Comment: SEE LETTER BARON TO SCHWELLER, 12/12/84

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
53	03/19/84	PLC 5.1.27	PLC	AD	0943	B	10 %	08/31/89		89-R-102	Line		05/01/89 09/30/92	72.3

Recommendation: DUE TO THE PROGRAMMATIC IMPORTANCE OF THE COMPUTER CONTOL CENTER & THE MAGNET TEST POWER SUPPLY, THESE TWO FACILITIES SHOULD BE RELOCATED TO NON-COMBUSTIBLE BUILDINGS & PROTECTED WITH FIXED SUPPRESSION SYSTEMS TIED INTO THE SITE FIRE ALARM SYSTEM.

Comment: SEE LETTER BARON TO SCHWELLER, 12/12/84 MOVED TO OPEN, BLDG TO BE SPRINKLERED, PHASE III.

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
54	03/19/84	PLC 5.1.27	PLC	DD	0944	B	10 %	08/29/89		89-R-102	Line		01/05/89 / /	72.3

Recommendation: SEE PLC5.1.27 RECOMMENDATION FOR BLDG. 0943.

Comment: SEE LETTER BARON TO SCHWELLER, 12/12/84 BLDG WILL BE SPRINKLERED AS PART OF PHASE III

Report: R_Recs01

03/29/90

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FIRE SAFETY RECOMMENDATIONS
Data Files: RECSOPEN.dbf, RECSHIST.dbf, RECSEXEM.dbf, RECSBACK.dbf
For Condition: "FM" $ Rec_By .or. "PLC" $ Rec_By
Order: REC_SOURCE

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
55	03/19/84	PLC 5.1.28	PLC	AD	1005E		Closed	01/16/86			Oper		/ / 12/12/84	72.3

Recommendation: REPLACE FOAM SOUND DEADENING PARTITION WITH A NON-COMBUSTIBLE MATERIAL.

Comment: PARTITION HAS BEEN PERMANENTLY REMOVED.

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
56	03/19/84	PLC 5.1.29	PLC	HP	0000	M	Open	10/11/89			Oper		/ / / /	8.8

Recommendation: SURVEY THE ELECTRICAL POWER TRANSFORMERS THROUGHOUT THE SITE TO EVALUATE THEIR COMPLIANCE WITH RECOMMENDED PROTECTION SCHEMES.

Comment: ASSIGNED TO J. LEVESQUE WORK NOT SCHEDULED DUE TO WORKLOAD

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
57	03/19/84	PLC 5.1.30	PLC		0000	0	Exemptn	/ /			Othr		/ / / /	72.3

Recommendation: USE OF EXPANDED POLYSTYRENE FOAM INSULATED IN VARIOUS BUILDINGS SHOULD BE IDENTIFIED AND EVALUATED. WHERE UNACCEPTABLE EXPOSURE TO LIFE SAFETY &/OR PROPERTY EXIST, THE INSULATION SHOULD BE REMOVED, REPLACED WITH NONCOMBUST. INSULATION OR COVERED WITH NONCOMBUST. MATERIAL.

Comment: SEE LETTER BARON TO SCHWELLER, 12/12/84

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
58	03/19/84	PLC 5.1.31	PLC	AD	9999	0	Exemptn	/ /			Othr		/ / / /	72.3

Recommendation: AN AREA CLEAR OF BRUSH AND TALL GRASS SHOULD BE M MAINTAINED FOR A WIDTH OF 25 FT ALONG THE OVER-LAND CABLE TRAYS SERVING THE AGS RING. A REGULAR INSPECTION PROGRAM SHOULD BE ESTABLISHED TO ASSURE THIS CLEARANCE IS MAINTAINED.

Comment: SEE LETTER BARON TO SCHWELLER, 12/12/84

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59	03/19/84	PLC 5.2.01	PLC	PG	0118		Closed	01/16/86			Othr		/ / 12/12/84	72.3

Recommendation: REMOVE ALL EQUIPMENT, STORAGE, AND OTHER ITEMS THAT OBSTRUCT THE EXITWAY FROM FIRST FLOOR STUDIO TO OUTSIDE.

Comment: THIS "EXIT" IS NOT A REQUIRED MEANS OF EGRESS, AND IT'S ARRANGEMENT DOES NOT QUALIFY AS AN EXIT SINCE IT DISCHARGES 3-FT. ABOVE GRADE. EXIT SIGN HAS BEEN REMOVED.

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Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
60	03/19/84	PLC 5.2.02	PLC	SM	0158		Closed	01/16/86			Oper		/ / 01/30/86	8.8

Recommendation: MAINTAIN STOCK STORAGE LEVELS AT LEAST 18 INCHES BELOW THE DEFLECTORS ON THE SPRINKLERS HEADS. HIGH STORAGE CAN BLOCK SPRINKLER OPERATION DURING A FIRE.

Comment: SIGNS HAVE BEEN PURCHASED TO NOTIFY OCCUPANTS OF REQUIREMENT

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Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
61	03/19/84	PLC 5.2.03	PLC	HP	0196		Closed	01/16/86			Othr		/ / 11/27/85	22.4

Recommendation: DOCUMENT CALCULATIONS MADE TO DEMONSTRATE THE LEVEL OF ACCEPTABILITY OF THE RADIOACTIVE MATERIAL DISPERSION UNDER FIRE CONDITIONS.

Comment: SEE LETTER BARON TO SCHWELLER, 11/27/85; AND MEMO ROHIG TO BARON, 10/31/85; WHICH DEMONSTRATE THAT A FIRE WOULD NOT LEAD TO ADVERSE RADIOLOGICAL CONSEQUENCES.

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Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
62	03/19/84	PLC 5.2.04	PLC	EE	0197B		Closed	01/16/86			Oper		/ / 01/30/86	20.3

Recommendation: MAINTAIN STOCK STORAGE HEIGHTS AT LEAST 18 INCHES BELOW THE DEFLECTOR ON THE SPRINKLER HEADS. HIGH STORAGE CAN BLOCK SPRINKLER OPERATION DURING A FIRE.

Comment: SIGNS HAVE BEEN PURCHASED TO NOTIFY THE OCCUPANTS OF THE REQUIREMENT.

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Report: R_Recs01

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FIRE SAFETY RECOMMENDATIONS
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63	03/19/84	PLC 5.2.05	PLC	EP	0422		Closed	01/16/86			Oper		/ / 01/16/86	22.4

Recommendation: PROVIDE A FLAMMABLE LIQUIDS CABINET FOR THE PAINTS AND THINNERS STORED IN THE SIGN SHOP.

Comment: A FLAMMABLE LIQUID'S CABINET HAS BEEN PROVIDED.

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
64	03/19/84	PLC 5.2.06	PLC	SS	0449	L	Closed	01/16/86			Othr		/ / 01/16/86	21.9

Recommendation: REMOVE THE STORAGE OF COMBUSTIBLE MATERIALS FOR THE BATTERY ROOM TO AVOID AN UNNECESSARY FIRE EXPOSURE.

Comment: BLDG SPACE IS LIMITED. JANITORIAL SUPPLIES HAVE BEEN LOCATED IN A METAL CABINET. WIRE REELS CAN-NOT BE RELOCATED, BUT PRESENT LOW RISK.

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
65	03/19/84	PLC 5.2.07A	PLC	MS	0459		Closed	01/16/86			Oper		/ / 12/12/84	21.9

Recommendation: REMOVE ALL UNNECESSARY ORDINARY COMBUSTIBLES NOT ESSENTIAL TO RECORDS STORAGE FROM RECORD STORAGE VAULT.

Comment: UNNECESSARY MATERIALS HAVE BEEN REMOVED.

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
66	03/19/84	PLC 5.2.07B	PLC	MS	0459	0	Exemptn	/ /			Othr		/ / / /	8.8

Recommendation: INSTALL AUTOMATIC DOOR CLOSERS ON ALL DOORS LEAD-ING TO OR FROM THE COMPUTER ROOM, ACTUATED BY SMOKE DETECTORS INSTALLED ON EITHER SIDE OF THE DOOR AND UPON ACTUATION OF THE COMPUTER ROOM AUTOMATIC HALON SUPPRESSION SYSTEM.

Comment: SEE LETTER BARON TO SCHWELLER, 12/12/84

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FIRE SAFETY RECOMMENDATIONS
Data Files: RECSOPEN.dbf, RECSHIST.dbf, RECSEXEM.dbf, RECSBACK.dbf
For Condition: "FM" $ Rec_By .or. "PLC" $ Rec_By
Order: REC_SOURCE

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
67	03/19/84	PLC 5.2.08A	PLC	MO	0490		Closed	01/16/86			Oper		/ / 12/12/84	72.3

Recommendation: REMOVE FLAMMABLE LIQUIDS AND WASTE OIL STORAGE FROM THE BASEMENT.

Comment: OF APPROXIMATELY 10-55 GAL. DRUMS, SEVEN WERE NON-COMBUSTIBLE WATER TREATMENT ADDITIVES. THREE WERE PARTIALLY FILLED HIGH FLASH POINT WASTE OIL, WHICH POSE LOW RISK IN A.S. AREA. NO FURTHER ACTION.

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
68	03/19/84	PLC 5.2.08B	PLC	MO	0490	M	Closed	01/16/86			Oper		/ / 01/16/86	8.8

Recommendation: REMOVE EXCESSIVE COMBUSTIBLES FROM THE VAX COMPUTER ROOM.

Comment: THE VAX HAS BEEN RELOCATED TO A NEW ROOM WITH PROPER ARRANGEMENTS FOR STORAGE.

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
69	03/19/84	PLC 5.2.09	PLC	IO	0535	Repair	Closed	07/20/89			Oper		/ / 12/12/84	21.9

Recommendation: PROVIDE APPROVED FLAMMABLE LIQUID STORAGE CABINETS FOR STORAGE OF FLAMMABLE LIQUIDS AND SOLVENTS IN EXCESS OF ONE DAYS SUPPLY LOCATED IN LAB AREAS.

Comment: SEE LETTER BARON TO SCHWELLER, 12/12/84

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
70	03/19/84	PLC 5.2.10	PLC	AO	0515	0	Exemptn	/ /			Othr		/ / / /	8.8

Recommendation: INSTALL AUTOMATIC DOOR CLOSURES ON ALL DOORS LEAD-ING TO AND FROM THE COMPUTER ROOM, ACTUATED BY SMOKE DETECTORS INSTALLED ON EITHER SIDE OF THE DOOR AND UPON ACTUATION OF THE COMPUTER ROOM AUTO-MATIC HALON SUPPRESSION SYSTEM.

Comment: SEE LETTER BARON TO SCHWELLER, 12/12/84

Report: R_Recs01

03/29/90

Brookhaven National Laboratory
Safety and Environmental Protection Division
Industrial Safety and Fire Protection Section

FIRE SAFETY RECOMMENDATIONS
Data Files: RECSOPEN.dbf, RECSHIST.dbf, RECSEXEM.dbf, RECSBACK.dbf
For Condition: "FM" $ Rec_By .or. "PLC" $ Rec_By
Order: REC_SOURCE

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
71	03/19/84	PLC 5.2.11	PLC	LS	0725	0	Exemptn	/ /			Othr		/ / / /	72.3

Recommendation: THE 55 GALLON DRUM OF OIL SHOULD BE REMOVED FROM THE MECHANICAL EQUIPMENT ROOM AND LOCATED IN A CUT OFF AREA NOT EXPOSING OPERATING AREAS OR EQUIPMENT

Comment: SEE LETTER BARON TO SCHWELLER, 12/12/84

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
72	03/19/84	PLC 5.2.12	PLC	AD	0913	4	Open	03/28/90		PL	Othr		/ / / /	72.3

Recommendation: INSTALL AUTOMATIC SPRINKLER PROTECTION IN THE AGS RING FROM MAGNET F-10 TO G-1 & G-10 TO G-16.

Comment: ORIGINALLY IN PHASE III WORK. REMOVED WHEN DOE REDUCED AMOUNT OF REQUEST. P-4(C-1,H-3(III,C))

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
73	03/19/84	PLC 5.2.13	PLC	AD	0912.3	3	Open	03/28/90		PL	Othr		/ / / /	72.3

Recommendation: PROVIDE SPRINKLER PROTECTION THROUGHOUT THE CABLE TUNNELS LOCATED BY THE EAST AND WEST WALLS OF 912EEBA.

Comment: ORIGINALLY INCLUDED IN PHASE III LINE ITEM. REMOVED WHEN DOE REDUCED FUNDING REQUEST. ON PRIORITY LIST P-3(C-1,H-2(II,D))

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
74	03/19/84	PLC 5.2.14A	PLC	AD	0924		Closed	01/16/86			Oper		/ / 01/01/85	72.3

Recommendation: RELOCATE 55-GAL DRUM OF ACETONE STORED IN THE ATTTACHED REFRIGERATION UNIT TO OUTSIDE OR A FLAM-MABLE LIQUIDS STORAGE ROOM.

Comment: DRUM RELOCATED.

Report: R_Recs01

03/29/90

Brookhaven National Laboratory
Safety and Environmental Protection Division
Industrial Safety and Fire Protection Section

FIRE SAFETY RECOMMENDATIONS
Data Files: RECSOPEN.dbf, RECSHIST.dbf, RECSEXEM.dbf, RECSBACK.dbf
For Condition: "FM" $ Rec_By .or. "PLC" $ Rec_By
Order: REC_SOURCE

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
75	03/19/84	PLC 5.2.14B	PLC	AD	0924	0	Exemptn	01/16/86			Othr		/ / / /	9.5

Recommendation: REPLACE PLASTIC VENT PIPE ON FLAMMABLE LIQUIDS STORAGE CABINET AT THE NORTH END OF BLDG. WITH NONCOMBUSTIBLE PIPE.

Comment: SEE COMMENT, LETTER BARON TO SCHWELLER, 12/12/84.

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
76	03/19/84	PLC 5.2.15	PLC	AD	0928		Closed	01/16/86			Oper		/ / 01/01/85	72.3

Recommendation: REMOVE MISCELLANEOUS STORAGE FROM RECTIFIER ROOM.

Comment: MATERIALS REMOVED.

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
77	03/19/84	PLC 5.3.01	PLC	XX	0000		Closed	01/16/86			Othr		/ / 12/12/84	9.5

Recommendation: PERFORM A STUDY TO ACCESS THE ADEQUACY OF EMER-GENCY LIGHTS AND ILLUMINATED EXIT SIGNS.

Comment: SURVEY CONDUCTED. SEE COMMENTS, LETTER BARON TO SCHWELLER, 12/12/84.

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
78	03/19/84	PLC 5.3.02	PLC	SS	0030	A	Closed	03/28/90		86-R-726	Line		02/05/88 03/06/89	8.8

Recommendation: PROVIDE AN EXTINGUISHING SYSTEM FOR THE RANGE HOOD AND FRYER.

Comment: INCLUDED IN FIRE PROTECTION IMPROVEMENTS PHASE II INSPECTED AND ACCEPTED., J. LEVESQUE

Brookhaven National Laboratory
Safety and Environmental Protection Division
Industrial Safety and Fire Protection Section

FIRE SAFETY RECOMMENDATIONS
Data Files: RECSOPEN.dbf, RECSHIST.dbf, RECSEXEM.dbf, RECSBACK.dbf
For Condition: "FM" $ Rec_By .or. "PLC" $ Rec_By
Order: REC_SOURCE

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
79	03/19/84	PLC 5.3.03	PLC	EE	0194	4	Open	03/28/90		PL	Othr		/ / / /	59.6

Recommendation: PROVIDE NONFREEZING SPRINKLER PROTECTION FOR THE LOADING DOCK OVERHANG.

Comment: P-4(C-2,H-3(II,D))) COST ESTIMATE 1989.

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
80	03/19/84	PLC 5.3.04	PLC	CO	0906	5	Closed	07/25/89			GPP		/ / 07/01/88	72.3

Recommendation: PROVIDE AN AUTOMATIC HALON EXTINGUISHING SYSTEM FOR THE PETT VI FACILITY.

Comment: ALTHOUGH THE LOSS POTENTIAL IS BELOW $1 MILLION, THE PROGRAMMATIC DELAYS WOULD BE EXCESSIVE. HALON SYSTEM PROVIDED.

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
81	03/19/84	PLC 5.3.05	PLC	DD	0960	0	Closed	07/25/89			Othr		/ / / /	51.4

Recommendation: IN THE BLOCK HOUSE (EXPERIMENT NO. 734), THE SYSTEM CONTROL VALVES AND FOAM SUPPLY EQUIPMENT SHOULD BE LOCATED OUTSIDE THE FIRE AREA BEING PROTECTED.

Comment: SEE LETTER BARON TO SCHWELLER, 12/12/84 FORMERLY ON EXEMPTION LIST. EXPERIMENT TERMINATED MOVED TO CLOSED 7/89. J.D./J.L.

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
82	03/19/84	PLC 5.3.06	PLC	AD	1002	0	Exemptn	/ /			Othr		/ / / /	64.2

Recommendation: EXTEND AUTOMATIC SPRINKLER PROTECTION TO THE ENLARGED TUNNEL AREA THAT IS ADJACENT AND OPEN TO THE EXPERIMENTAL HALLS.

Comment: SEE LETTER BARON TO SCHWELLER, 12/12/84

Brookhaven National Laboratory
Safety and Environmental Protection Division
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FIRE SAFETY RECOMMENDATIONS
Data Files: RECSOPEN.dbf, RECSHIST.dbf, RECSEXEM.dbf, RECSBACK.dbf
For Condition: "FM" $ Rec_By .or. "PLC" $ Rec_By
Order: REC_SOURCE

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
83	03/19/84	PLC 5.3.06	PLC	AD	1006	0	Exemptn	/ /			Othr		/ / / /	72.3

Recommendation: EXTEND AUTOMATIC SPRINKLER PROTECTION TO THE ENLARGED TUNNEL AREA THAT IS ADJACENT AND OPEN TO THE EXPERIMENTAL HALLS.

Comment: SEE LETTER BARON TO SCHWELLER, 12/12/84

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
84	03/19/84	PLC 5.3.06	PLC	AD	1008	0	Exemptn	/ /			Othr		/ / / /	72.3

Recommendation: EXTEND AUTOMATIC SPRINKLER PROTECTION TO THE ENLARGED TUNNEL AREA THAT IS ADJACENT AND OPEN TO THE EXPERIMENAL HALLS.

Comment: SEE LETTER BARON TO SCHWELLER, 12/12/84

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
85	03/19/84	PLC 5.3.07	PLC	AD	1002A	0	Exemptn	/ /			Othr		/ / / /	72.3

Recommendation: IN THESE SUPPORT BUILDINGS EXTEND AUTOMATIC SPRINKLER PROTECTION TO TECHNICAL AND SHOP AREAS.

Comment: SEE LETTER BARON TO SCHWELLER, 12/12/84

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
86	03/19/84	PLC 5.3.07	PLC	AD	1006A	0	Exemptn	/ /			Othr		/ / / /	72.3

Recommendation: IN THESE SUPPORT BUILDINGS EXTEND AUTOMATIC SPRINKLER PROTECTION TO TECHNICAL AND SHOP AREAS.

Comment: SEE LETTER BARON TO SCHWELLER, 12/12/84

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Industrial Safety and Fire Protection Section

FIRE SAFETY RECOMMENDATIONS
Data Files: RECSOPEN.dbf, RECSHIST.dbf, RECSEXEM.dbf, RECSBACK.dbf
For Condition: "FM" $ Rec_By .or. "PLC" $ Rec_By
Order: REC_SOURCE

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
87	03/19/84	PLC 5.3.07	PLC	AD	1008A	0	Exemptn	/ /			Othr		/ / / /	72.3

Recommendation: IN THESE SUPPORT BUILDINGS EXTEND AUTOMATIC SPRINKLER PROTECTION TO TECHNICAL AND SHOP AREAS.

Comment: SEE LETTER BARON TO SCHWELLER, 12/12/84

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
88	03/19/84	PLC 5.3.07	PLC	AD	1010A	0	Exemptn	/ /			Othr		/ / / /	72.3

Recommendation: IN THESE SUPPORT BUILDINGS EXTEND AUTOMATIC SPRINKLER PROTECTION TO TECHNICAL AND SHOP AREAS.

Comment: SEE LETTER BARON TO SCHWELLER, 12/12/84

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
89	03/19/84	PLC 5.3.07	PLC	AD	1012A	0	Exemptn	/ /			Othr		/ / / /	72.3

Recommendation: IN THESE SUPPORT BUILDINGS EXTEND AUTOMATIC SPRINKLER PROTECTION TO TECHNICAL AND SHOP AREAS.

Comment: SEE LETTER BARON TO SCHWELLER, 12/12/84

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
92	03/19/84	PLC 5.3.08	PLC	AD	1008	9	Closed	07/20/89			Othr		/ / 12/12/84	72.3

Recommendation: IN AREAS OF THE CBA PROJECT WITHOUT SPRINKLER PROTECTION AND PRESENTLY USED FOR STORAGE, PUT DETECTION SYSTEMS INTO SERVICE.

Comment: SEE LETTER BARON TO SCHWELLER, 12/12/84 SYSTEMS PLACED IN SERVICE.

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FIRE SAFETY RECOMMENDATIONS
Data Files: RECSOPEN.dbf, RECSHIST.dbf, RECSEXEM.dbf, RECSBACK.dbf
For Condition: "FM" $ Rec_By .or. "PLC" $ Rec_By
Order: REC_SOURCE

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
93	03/19/84	PLC 5.3.09	PLC	AD	1005E	0	Exemptn	/ /			Othr		/ / / /	8.8

Recommendation: THE SMOKE DETECTION DEVICES CURRENTLY LOCATED TWO FEET BELOW THE ROOF SHOULD BE RAISED TO THE ROOF LEVEL TO BE MORE RESPONSIVE IN A FIRE SITUATION.

Comment: SEE LETTER BARON TO SCHWELLER, 12/12/84

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Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
94	03/19/84	PLC 5.3.10	PLC		1101	0	Exemptn	/ /			Othr		/ / / /	72.3

Recommendation: INSTALL AUTOMATIC FIXED SUPPRESSION CAPABILITY SIMILAR TO THAT INSTALLED AT THE BLOCK HOUSE AND DESIGNED TO ACCOMPLISH THE SAME LOSS LIMITING OBJECTIVES.

Comment: SEE LETTER BARON TO SCHWELLER, 12/12/84

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Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
95	03/19/84	PLC 5.4.01	PLC	HP	9999		Closed	01/16/86			Oper		/ / 12/12/84	72.3

Recommendation: CONTINUE CONDUCTING ANNUAL PRACTICE SESSIONS IN FIREMATICS FOR FIRE/RESCUE GROUP AT THE SUFFOLK COUNTY FIRE TRAINING ACADEMY.

Comment: SESSIONS ARE CONDUCTED SEMI-ANNUALLY. THERE WERE NO PLANS TO DISCONTINUE PRACTICE. RECOMMENDATION WAS GRATUITOUS. FETY INSPECTION
87

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Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
96	12/01/74	PLC 6.1.01	PLC	AD	0928	1	Closed	07/25/89		86-R-726	Line		05/12/88 05/04/89	8.8

Recommendation: PROVIDE AUTOMATIC SPRINKLER PROTECTION OVER THE LUBE OIL PUMP FOR THE MG SET IN THE BASEMENT.

Comment: INCLUDED IN FIRE PROTECTION IMPROVEMENTS PHASE II ACCEPTED 5/4/89. J.L.

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Brookhaven National Laboratory
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FIRE SAFETY RECOMMENDATIONS
Data Files: RECSOPEN.dbf, RECSHIST.dbf, RECSEXEM.dbf, RECSBACK.dbf
For Condition: "FM" $ Rec_By .or. "PLC" $ Rec_By
Order: REC_SOURCE

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
97	12/01/74	PLC 6.1.02	PLC	AD	0928	M	Backlog	10/11/89			Othr		12/12/84 / /	173.1

Recommendation: PROVIDE AUTOMATIC DELUGE PROTECTION FOR THE SWICTHGEAR AND TRANSFORMERS SERVING BLDG 928.

Comment: THIS RECOMMENDATION IS BEING REVIEWED AS PART OF THE GENERAL SITE WIDE FIRE PROTECTION SURVEY OF POWER TRANSFORMERS. NOT PRESENTLY ON SCHEDULE

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
98	12/01/74	PLC 6.1.03	PLC	AD	0930	3	10 %	03/28/90		89-R-102	Line		06/01/89 09/30/92	183.9

Recommendation: PROVIDE AUTOMATIC SPRINKLER PROTECTION IN THE RF LABS AND SHOPS.

Comment: INCLUDED IN FIRE PROTECTION IMPROVEMENTS PHASE III Because of cost of asbestos work, may not be able to be fully completed.
P-3(C-1,H-2(I,D))

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
139	12/01/74	PLC 6.1.04	PLC	AD	0928	5	Closed	07/25/89		86-R-726	Line		05/12/88 04/14/89	183.9

Recommendation: PROVIDE AUTOMATIC EXTINGUISHING SYSTEM FOR TRAIL-ER LOCATED ALONG THE NORTH WALL OF MG CONTROL ROOM.

Comment: THIS IS ALTERNATIVE TO RELOCATING TRAILER, SEE ITEM NO. 99. INCLUDED IN FIRE PROTECTION PHASE II

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
100	12/01/74	PLC 6.1.05	PLC	AD	0000	Repair	Closed	07/25/89			Oper		/ / / /	172.4

Recommendation: PROVIDE SKIRTING AROUND THE BOTTOM OF TRAILERS TO PREVENT THE ACCUMULATION OR STORAGE OF COMBUSTIBLES, OR PROVIDE SPRINKLER PROTECTION BENEATH.

Comment: THIS IS A ROUTINE MAINTENANCE ITEM. AGS HAS POLICY AND PROGRAM FOR SKIRTING OF TRAILERS INSIDE BUILDINGS AND NEAR TO BUILDINGS.

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Industrial Safety and Fire Protection Section

FIRE SAFETY RECOMMENDATIONS
Data Files: RECSOPEN.dbf, RECSHIST.dbf, RECSEXEM.dbf, RECSBACK.dbf
For Condition: "FM" $ Rec_By .or. "PLC" $ Rec_By
Order: REC_SOURCE

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
101	12/01/74	PLC 6.1.06	PLC	MO	0490	0	Exemptn	/ /			Othr		/ / / /	175.8

Recommendation: THE ASPHALT-SATURATED PAPER COVERING DUCT INSULATION IN THE HOSPITAL SHOULD BE REPLACED OR COVERED WITH A SUBSTANTIAL NON-COMBUSTIBLE COVERING.

Comment: SEE LETTER BARON TO SCHWELLER, 12/12/84

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
2004	12/01/74	PLC 6.1.07	PLC	PO	0510	4	Open	03/28/90		PL	Othr		/ / / /	183.9

Recommendation: PROVIDE AUTOMATIC SPRINKLERS THROUGHOUT.

Comment: Partual sprinklers provided in Basement in Phase II.

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
102	12/01/74	PLC 6.1.07	PLC	PO	0510	A	Closed	03/28/90		86-R-726	Line		04/13/87 03/02/90	183.9

Recommendation: PROVIDE AUTOMATIC SPRINKLER THROUGHOUT WITH THE THE EXCEPTION OF THE TWO STORY OFFICE WING WHICH ONLY REQUIRES SPRINKLERS IN THE CONFERENCE ROOM AND LIBRARY This item for basement sprinklers only.

Comment: A.S. For basement. Asbestos problems prevent doing some areas with available funds. Phase II work done. A.S. for remainder of the building are not planned at this time. Scheduled work completed.

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
103	12/01/74	PLC 6.1.08	PLC	RO	0707	0	Exemptn	/ /			Othr		/ / / /	183.0

Recommendation: THE FIVE CELL COUNTERFLOW COOLING TOWER SHOULD BE PROVIDED WITH SPRINKLERS ON A DELUGE SYSTEM BELOW THE FAN DECKS, INCLUDING THE AREA DIRECTLY BELOW THE FANS.

Comment: SEE LETTER BARON TO SCHWELLER, 12/12/84

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Industrial Safety and Fire Protection Section

FIRE SAFETY RECOMMENDATIONS
Data Files: RECSOPEN.dbf, RECSHIST.dbf, RECSEXEM.dbf, RECSBACK.dbf
For Condition: "FM" $ Rec_By .or. "PLC" $ Rec_By
Order: REC_SOURCE

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
104	12/01/74	PLC 6.1.09	PLC	DD	0902	B	10 %	03/28/90		89-R-102	Line		05/01/89 09/30/92	183.9

Recommendation: PROVIDE AUTOMATIC SPRINKLER PROTECTION DUE TO THE COMBUSTIBLE ROOF SYSTEM.

Comment: The low bay and office areas are being protected as part of Phase III work. Cost of asbestos work may prevent project from being completed. 3/90jd

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
105	12/01/74	PLC 6.1.10	PLC	DD	0905	3	10 %	03/28/90		89-R-102	Line		01/05/89 01/30/92	183.9

Recommendation: PROVIDE AUTOMATIC SPRINKLER PROTECTION THROUGHOUT.

Comment: THIS STRUCTURE IS CONSIDERED PART OF BLDG. 902. SEE COMMENT TO PLC 6.1.09 (ITEM 104). INCLUDED IN PHASE III. Cost of Asbestos work may prevent fully completing work. P-3(C-1,H-2(I,D))

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
106	12/01/74	PLC 6.1.11	PLC	PO	0901	A	60 %	03/28/90		86-R-726	Line		04/13/87 06/30/90	183.9

Recommendation: PROVIDE AUTOMATIC SPRINKLER PROTECTION THROUGHOUT THE MECHANICAL EQUIPMENT AREA.

Comment: INCLUDED IN FIRE PROTECTION IMPROVEMENTS PHASE II.

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
2001	12/01/74	PLC 6.1.14	PLC	CO	0555	3	Open	03/28/90		PL	Othr		/ / / /	183.9

Recommendation: PROVIDE AUTOMATIC SPRINKLER PROTECTION THROUGHOUT.

Comment: Phase II provided sprinklers in the Basement. P-3(C-1,H-3(III,C))

FIRE SAFETY RECOMMENDATIONS
Data Files: RECSOPEN.dbf, RECSHIST.dbf, RECSEXEM.dbf, RECSBACK.dbf
For Condition: "FM" $ Rec_By .or. "PLC" $ Rec_By
Order: REC_SOURCE

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
109	12/01/74	PLC 6.1.14	PLC	CO	0555	A	Closed	03/28/90		86-R-726	Line		04/13/87 03/10/90	183.9

Recommendation: PROVIDE AUTOMATIC SPRINKLER PROTECTION THROUGHOUT. THE PENTHOUSE CAN BE EXCLUDED. This item for Basement sprinklers.

Comment: SPRINKLER PROTECTION FOR THE BASEMENT INCLUDED IN FIRE PROTECTION IMPROVEMENTS PHASE II. SPRINKLERS FOR REMAINDER OF THE BUILDING ARE NOT PLANNED.

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
110	12/01/74	PLC 6.1.15	PLC	NE	0130	2	10 %	03/28/90		86-R-726	Line		02/04/88 / /	183.3

Recommendation: PROVIDE AUTOMATIC SPRINKLER PROTECTION FOR THE NORTH WING, INCLUDING THE ATTIC AND CRAWL SPACE THE SOUTH WING SHOULD HAVE THE CRAWL SPACE PROTECTED ALSO.

Comment: Originally in Phase II. Awaiting DOE approval for Phase III. THE CRAWL SPACES ARE BEING OMITTED, OFFICE OCCUPANCY. P-2(C-1,H-2(I,D)))

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
111	12/01/74	PLC 6.1.16	PLC	EP	0134	L	Backlog	03/28/90			Othr		/ / / /	183.9

Recommendation: PROVIDE SPRINKLER PROTECTION ABOVE THE SUSPENDED CEILING WHERE IT IS LACKING.

Comment: BLDG 134 HAS BEEN GREATLY MODIFIED OVER THE YEARS. A SURVEY IS NEEDED TO IDENTIFY THE NEEDY AREAS, IF ANY! IT IS BELIEVED THAT THE AREAS NOT COVERED ARE A SMALL PERCENTAGE OF TOTAL AREA.

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FIRE SAFETY RECOMMENDATIONS
Data Files: RECSOPEN.dbf, RECSHIST.dbf, RECSEXEM.dbf, RECSBACK.dbf
For Condition: "FM" $ Rec_By .or. "PLC" $ Rec_By
Order: REC_SOURCE

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
112	12/01/74	PLC 6.1.17	PLC	NE	0197	4	Open	03/28/90		PL	Othr		/ / / /	183.9

Recommendation: UPGRADE SPRINKLER PROTECTION IN CONCEALED SPACES BETWEEN SUSPENDED CEILINGS AND COMBUSTIBLE ROOF OR FLOOR ABOVE.

Comment: THIS BUILDING UNDERGOES CONTINUAL MODIFICATIONS. AS NEW AREAS ARE MODIFIED, THIS DEFICIENCY IS BE-CORRECTED. UNPROTECTED AREAS ARE A SMALL PERCENT-AGE OF TOTAL AREA. P-4(C-1,H-3((II,E))

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
113	12/01/74	PLC 6.1.18	PLC	NE	0197	4	Open	03/28/90		PL	Othr		/ / / /	183.9

Recommendation: UPGRADE SPRINKLER PROTECTION IN ATTIC AREAS TO LIGHT HAZARD SPACING.

Comment: *PROTECTION IS PROVIDED THROUGHOUT ATTIC AREAS, BUT SPACING BETWEEN SPRINKLER* HEADS IS GREATER THAN STANDARD ALLOWS. AS RENOVATIONS ARE MADE, UPGRADE TO STANDARD. P-4(C-1,H-3(II,E))

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
114	12/01/74	PLC 6.1.19	PLC	EE	0426	L	Backlog	03/28/90			Othr		/ / / /	183.9

Recommendation: PROVIDE ADDITIONAL SPRINKLER PROTECTION FOR THE THE CRAWL SPACES AND CONCEALED ATTIC SPACES.

Comment: AREAS WITHOUT FLAMMABLE LIQUIDS ARE LOW RISKS TO CRAWL SPACE FIRES. THEREFORE, ONLY THE CONCEALED ATTIC PLANNED FOR SPRINKLERS.

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
115	12/01/74	PLC 6.1.20	PLC	EP	0452	3	Open	03/28/90		PL	Othr		/ / / /	183.9

Recommendation: EXTEND AUTOMATIC SPRINKLER PROTECTION TO THE REMAINING UNSPRINKLERED AREAS.

Comment: P-3(C-1,H-3(III,D)))

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For Condition: "FM" $ Rec_By .or. "PLC" $ Rec_By
Order: REC_SOURCE

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
117	12/01/74	PLC 6.1.22	PLC	SC	0479	B	10 %	03/28/90		89-R-102	Line		02/01/90 09/30/92	183.9

Recommendation: PROVIDE AUTOMATIC SPRINKLER PROTECTION IN THE OIL STORAGE ROOM ON THE SOUTH SIDE OF THE BUILDING.

Comment: INCLUDED IN FIRE PROTECTION IMPROVEMENTS PHASS III SPRINKLER INSTALLATION FOR THE ENTIRE BUILDING. SEE ITEM 140.

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
118	12/01/74	PLC 6.1.23	PLC	SC	0479	4	Backlog	03/28/90		PL	Othr		/ / / /	183.9

Recommendation: PROVIDE A FOUR INCH HIGH CURB AND WALL SCUPPERS TO PREVENT BURNING OIL FROM A POTENTIAL FIRE FROM ENTERING THE BUILDING.

Comment: ALL HIGH FLASHPOINT CUTTING OILS, LOW RISK. P-4(C-1,H-3(III,D))

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
120	12/01/74	PLC 6.1.24	PLC	SM	0089	4	Open	03/28/90		PL	Othr		/ / / /	183.9

Recommendation: EXTEND SPRINKLER PROTECTION TO UNSPRINKLERED ATTIC SPACES.

Comment: SINCE AREAS ARE NOT USED FOR STORAGE AND IGNITION SOURCES ARE LIMITED, RISK IS LOW. BUILDING IS SCHEDULED FOR REPLACEMENT - REF: 88-CH-333. P-4(C-2,H-3(II,E))

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
121	12/01/74	PLC 6.1.24	PLC	SM	0090	4	Open	03/28/90		PL	Othr		/ / / /	183.9

Recommendation: EXTEND SPRINKLER PROTECTION TO UNSPRINKLERED ATTIC AREAS.

Comment: SINCE ATTIC IS NOT USED FOR STRORAGE AND IGNITION SOURCES ARE LIMITED, RISK IS LOW. BUILDING IS SCHEDULED FOR REPLACEMENT - REF: 88-CH-333. P-4(C-2,H-3(II,E))

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FIRE SAFETY RECOMMENDATIONS
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For Condition: "FM" $ Rec_By .or. "PLC" $ Rec_By
Order: REC_SOURCE

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
122	12/01/74	PLC 6.1.24	PLC	SM	0091	4	Open	03/28/90		PL	Othr		/ / / /	183.9

Recommendation: EXTEND SPRINKLER PROTECTION TO UNSPRINKLERED ATTIC AREAS.

Comment: SINCE ATTIC IS NOT USED FOR STORAGE AND IGNITION SOURCES ARE LIMITED, RISK IS LOW. BUILDING IS SCHEDULED FOR REPLACEMENT - REF: 88-CH-333. P-4(C-2,H-3(II,E))

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
119	12/01/74	PLC 6.1.24	PLC	SM	0086	L	Backlog	07/19/89			Othr		/ / / /	183.9

Recommendation: EXTEND SPRINKLER PROTECTION TO UNSPRINKLER ATTIC SPACE.

Comment: SINCE AREA NOT USED FOR STORAGE AND IGNITION SOURCES ARE LIMITED, RISK IS LOW. UPGRADE WILL BE MADE IF BUILDING UNDERGOES RENOVATION.

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
123	12/01/74	PLC 6.1.25	PLC	SM	0087	3	Open	03/28/90		PL	Othr		/ / / /	183.9

Recommendation: RELOCATE SPRINKLERS TO BELOW THE ROOF MEMBERS.

Comment: WHILE SPRINKLER HEADS ARE LOCATED 2 TO 15 FT. BE-LOW ROOF MEMBERS, RISK IS LOW. P-3(C-1,H-2(II,D))

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio- rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
124	12/01/74	PLC 6.1.25	PLC	SM	0088	3	Open	03/28/90		PL	Othr		/ / / /	183.9

Recommendation: RELOCATE SPRINKLERS TO THE ROOF MEMBERS.

Comment: WHILE SPRINKLERS ARE 2 TO 15 FEET BELOW ROOF LINE, RISK IS LOW. P-4(C-2,H-3(II,E))

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For Condition: "FM" $ Rec_By .or. "PLC" $ Rec_By
Order: REC_SOURCE

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
125	12/01/74	PLC 6.1.26	PLC	SM	0158	3	Open	03/28/90		PL	Othr		/ / / /	183.9

Recommendation: EXTEND SPRINKLER PROTECTION TO BELOW THE TWO WOOD ON STEEL FRAME STORAGE MEZZANINES.

Comment: P-3((C-1,H-3(III,D)))

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Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
126	12/01/74	PLC 6.1.27	PLC	SM	0210	0	Exemptn	/ /			Othr		/ / / /	183.9

Recommendation: ALL ELECTRICAL EQUIPMENT IN THE ROOMS OF BLDG. NO. 210 USED FOR THE STORAGE OF FLAMMABLE GASES, SHOULD BE SUITABLE FOR CLASS I, DIVISION 2 LOCA-TIONS IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE.

Comment: SEE LETTER BARON TO SCHWELLER, 12/12/84

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Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
127	12/01/74	PLC 6.1.28	PLC	SS	0153	0	Exemptn	/ /			Othr		/ / / /	183.9

Recommendation: AUTOMATIC SPRINKLER PROTECTION SHOULD BE PROVIDED THROUGHOUT THE SPACE BELOW THE FIRST STORY AND IN THE SPACE ABOVE THE SUSPENDED CEILING OF THE FIRST STORY.

Comment: SEE LETTER BARON TO SCHWELLER, 12/12/84

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Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
128	12/01/74	PLC 6.1.29	PLC	SS	0153	4	Open	03/28/90		PL	Othr		/ / / /	183.9

Recommendation: PROVIDE ADDITIONAL SPRINKLER PROTECTION IN THE ATTIC CRAWL SPACE. THE PRESENT SPACING IS IN EXCESS OF WHAT IS ALLOWED.

Comment: ALTHOUGH THE RECOMMENDATION IS VALID, CHANCE OF FIRE SLIGHT.
P-4(C-2,H-3(II,E))

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For Condition: "FM" $ Rec_By .or. "PLC" $ Rec_By
Order: REC_SOURCE

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
129	12/01/74	PLC 6.1.30	PLC	SS	0170	0	Exemptn	/ /			Othr		/ / / /	183.9

Recommendation: AUTOMATIC SPRINKLER PROTECTION SHOULD BE PROVIDED THROUGHOUT THE SPACE BELOW THE FIRST STORY AND IN THE SPACES ABOVE THE SUSPENDED CEILING ON THE FIRST STORY.

Comment: SEE LETTER BARON TO SCHWELLER, 12/12/84

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
130	12/01/74	PLC 6.1.31	PLC	SS	0170	4	Open	03/28/90		PL	Othr		/ / / /	183.9

Recommendation: PROVIDE ADDITIONAL SPRINKLER PROTECTION TO THE ATTIC TO SUPPLEMENT THE OVERSPACED SYSTEM.

Comment: P-4(C-2,H-3(II,E))

Rec_ Number	Rec_Date	Rec_Source	Rec_by	Dept/ Div	Bldg	Prio-rity	Status	Status Date	Maint	Project_ID/ CIP_FAC_ID	Fund_ Srce	Def_ Class	Start_ End_ Dates	Age * (Mnth)
131	12/01/74	PLC 6.1.32	PLC	SS	0180	0	Exemptn	01/16/86			Othr		/ / / /	183.9

Recommendation: AUTOMATIC SPRINKLER PROTECTION SHOULD BE PROVIDED IN THE SPACE BELOW THE FIRST STORY AND IN THE SPACE ABOVE THE SUSPENDED CEILING OF THE FIRST AND SECOND STORIES.

Comment: SEE LETTER BARON TO SCHWELLER, 12/12/84

REPORT SUMMARY:

Total Number of Records in Report: 124
Average Age* (Months): 98.5
Maximum Age* (Months): 183.9

* Age is calculated as follows: If item is closed, or only requires verification, age is time between Rec_Date and End_Date (if End_Date entered, else Stat_Date). If item is not closed, then age is time from Rec_Date to date report prepared. Age is given in months. End_Date is usually approximate, since Fire/Rescue Group is usually not able to capture actual completion dates. End_date is often date Fire Inspector reinspects facility and finds item completed.

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Order: REC_SOURCE

Stat_Date is date status last changed.
Start_Date is planned start of work. Except for Line or GPP projects, this date is usually not captured by the Fire/Rescue Group.
End_Date: If closed, or only requires verification, this is estimate of completion date. For open items, this is current schedule for completion.

Report: R_Recs01

03/29/90

APPENDIX C-7

Draft Fire Flow Test Protocol

SAFETY AND ENVIRONMENTAL PROTECTION DIVISION BROOKHAVEN NATIONAL LABORATORY STANDARD OPERATING PROCEDURE			PROCEDURE NO.: FE-4.0
PROCEDURE BY/DATE J. Levesque	TITLE: WATER SUPPLY TESTING		PAGE 1 OF 3
GROUP LEADER/DATE J. Levesque			DQAR/DATE
SECTION HEAD/DATE J. Deitz 7/29/88			DIVISION HEAD/EFFECTIVE DATE
COMMENTS/REMARKS			SQAR/Date: J. Levesque

1. INTRODUCTION

An adequate source of water volume and pressure is essential for Firefighting operations and effective sprinkler protection. Water supply testing is important in evaluating the supply's adequacy. In addition, tracking the water system's performance will identify deteriorating conditions prior to reaching critically low levels of protection.

2. SCOPE

This Standard Operating Procedure (SOP) applies to the periodic and special testing of water supplies relative to meeting fire protection requirements. It excludes potability of supply.

3. PROCEDURE

3.1 Equipment

3.1.1 Use only equipment intended for water supply testing (ie. pressure gauges, pitot tubes, hydrant wrenches).

3.2.1 Check equipment for obvious defects (gauge indicators off zero, damage equipment). Use alternate equipment if test equipment is questionable.

NOTE: Tag suspect equipment for repair and set aside.

3.3.1 Ensure that all gauges have been calibrated within one year. Calibration is performed by the S&EP Technician Support Group using dead weight testing equipment.

3.2 Testing

Two classes of testing are conducted. A special water supply test is conducted when evaluating changes or additions to sprinkler systems (See SOP FP-4.2). A special test may be conducted when problems are suspected in a system. A routine test is conducted annually to ensure the general adequacy of the site supply system. These tests are scheduled through the Fire Protection Management Information System "Work Order" System.

3.2.1 Follow good engineering practices as outlined in Factory Mutual Data Sheet 3-0, Water Supply Testing. Several key points are: achieve a flow as close to the design

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demand as practical, establish a steady flow and allow the supply system to equalize, take accurate readings on static, residual, and pitot pressures, and document the flow tests as clearly as practical (see Section 4).

3.2.2 Avoid damaging the terrain and disrupting traffic flow as much as practical. Use traffic barrier when flowing large streams across roadways. Only under extreme circumstance, conduct flow test when freezing weather is expected within 24 hours and water accumulation may cause icing conditions.

3.2.3 Avoid water hammering by slowly closing the hydrant.

3.2.4 Ensure that the hydrant barrel is draining by testing for the development of a slight suction when the palm of the hand is placed over the outlet. If the hydrant does not drain, notify PE Maintenance Management. Arrange for repair. Notify the Fire Rescue Group during freezing weather so that non-draining hydrants can be pumped out immediately.

3.2.5 When conducting loop tests, follow the attached procedure (Attachment A).

4. DOCUMENTATION

Information on special flow tests should be conveyed to the project group via a memorandum.

Any flow test on site should also be recorded in the Fire Protection Engineering files. The record should have the following: residual location (hydrant number, rise identification), flow location(s), nozzle type and coefficient, date, time, person supervising the test (see Attachment B). Note any elevation difference between location of residual and intended location of supply (ex. new sprinkler station).

The supply shall be plotted on 1.85 graph paper (Attachment C). When hydraulic calculations are conducted, the form is to be attached to the calculations and completed as shown in Attachment D).

5. QUALITY ASSURANCE DESIGNATION

This procedure is part of a DOE mandated policy. It provides important information regarding design requirements for the water supply system. Sufficient design factors are present to avoid major reliance on the results. This procedure is considered a QA-3 activity.

SAFETY AND ENVIRONMENTAL PROTECTION DIVISION BROOKHAVEN NATIONAL LABORATORY STANDARD OPERATING PROCEDURE		PROCEDURE NO.: FE-4.0
PROCEDURE BY/DATE J. Levesque	TITLE: WATER SUPPLY TESTING	PAGE 3 OF 3
GROUP LEADER/DATE J. Levesque		DQAR/DATE
SECTION HEAD/DATE J. Deitz 7/29/87		DIVISION HEAD/EFFECTIVE DATE
COMMENTS/REMARKS:		SQAR/Date: J. Levesque 7-29-87

Attachments
Reference Document: Factory Mutual Data Sheet 3-0
Simplified Water Supply Testing, 4th Edition

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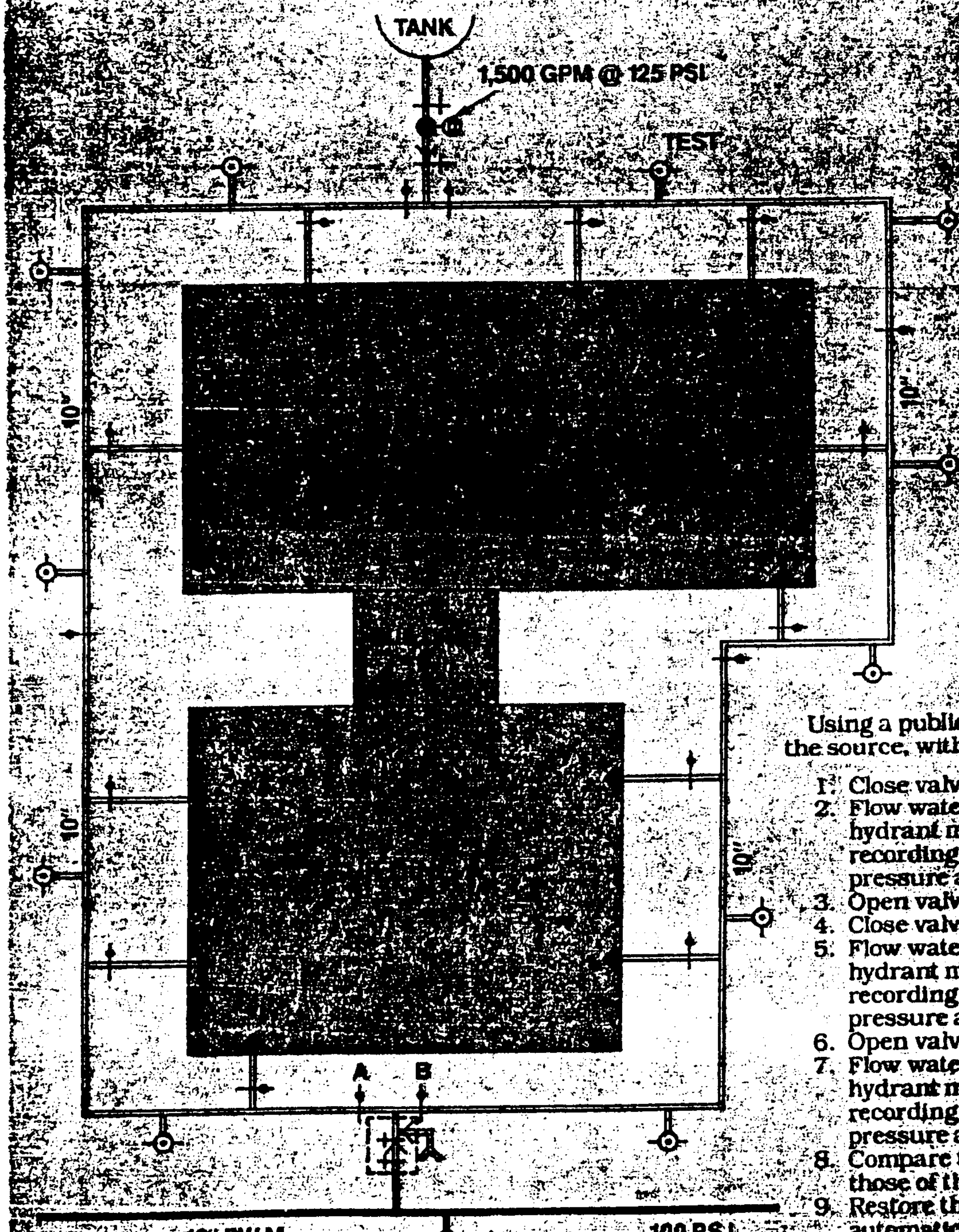
Procedure for Loop Testing



Using a public water supply as the source, with the fire pump off:

1. Close valve A.
2. Flow water from the hydrant marked TEST, recording the flow and pressure available.*
3. Open valve A.
4. Close valve B.
5. Flow water from the hydrant marked TEST, recording the flow and pressure available.*
6. Open valve B.
7. Flow water from the hydrant marked TEST, recording the flow and pressure available.*
8. Compare the results with those of the previous tests.
9. Restore the fire pump to automatic operation.

*Residual pressures should be recorded at an adjacent hydrant or sprinkler system rather than at the flowing hydrant.

Note: When testing the fire protection underground, impairments to the system are unavoidable. Proper precautions as outlined in the IRI impairment handling program should be followed.

WATER TESTS

Purpose

1. Do we have an adequate water supply?
2. Are all valves open? (public and plant)
3. Condition of pumps. (Also driver and controls)
4. Discover any problems.(tuberculation, changes in public system)
5. Check on shut valve tag procedure.
6. To determine how to improve deficient supply.

PREPARATION FOR TESTS

1. Review files and determine point of highest demand.
2. Arrange tests to determine supply at this high demand point.
3. Repeat last year's tests only if they meet above requirements.
4. Decide which valves must be operated for loop tests and in what order.
5. Review FC for special instructions (joint FIA tests, notify water department, special time of day for tests, advance notice for tests, etc.)
6. Generally set up tests first thing so maintenance can start laying hose, etc.

Helpful Hints When Testing or Twenty-Two Ways to Stay Out of Trouble

1. At locations with pressure tanks, shut them off.
2. If combined pump and public water, test pump first to pressure test mains.
3. <u>Never</u> flow from an FM nozzle attached to a hose.
4. Flow all sources or connections together last. (to be sure all valves are reopened)
5. Use Valve Shut Tags or better, have plant use tags.

6. Seal or lock all valves after tests.

7. Be careful to <u>never</u> shut off all water.

8. Check to see where the 2 in. drain goes before opening it.

9. Flow max. amount of water possible (at least max. demand).

10. When plotting curves plot demand before plotting supply.

11. <u>Never</u> let one man hold the hose.

12. Check coef. of hydrant butts and size of nozzles and butts (see hydraulic table)

13. <u>Always</u> plot results before tearing down water test equipment.

14. Overflow all tanks before leaving.

15. If there is no hydrant or hose can pitot drain if length of pipe ahead of outlet is at least 10 diameters long.

16. Report all accidents to District Office.

17. Station someone at pump or valve for emergency shut down. Be sure you also know how to shut down the fire pump.

18. <u>Don't open</u> the valves.

19. Always use own gage.

20. Residual pressure at flowing hydrant not generally acceptable. Understand what you are really reading.

21. Wait for residual to settle to minimum before recording.

22. <u>Don't</u> wash out lawns, driveways, etc.

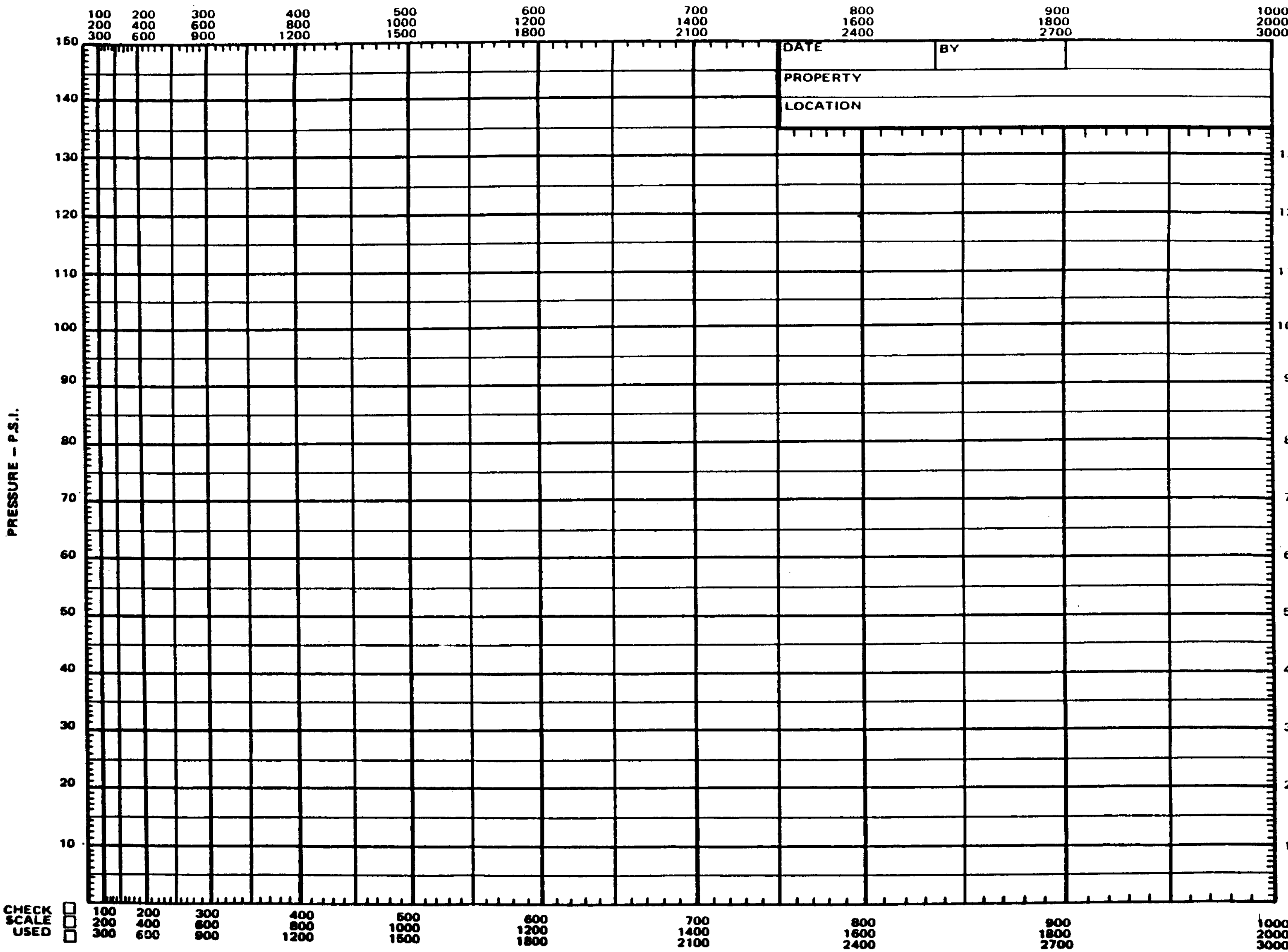
BROOKHAVEN NATIONAL LABORATORY

FIRE FLOW TESTS

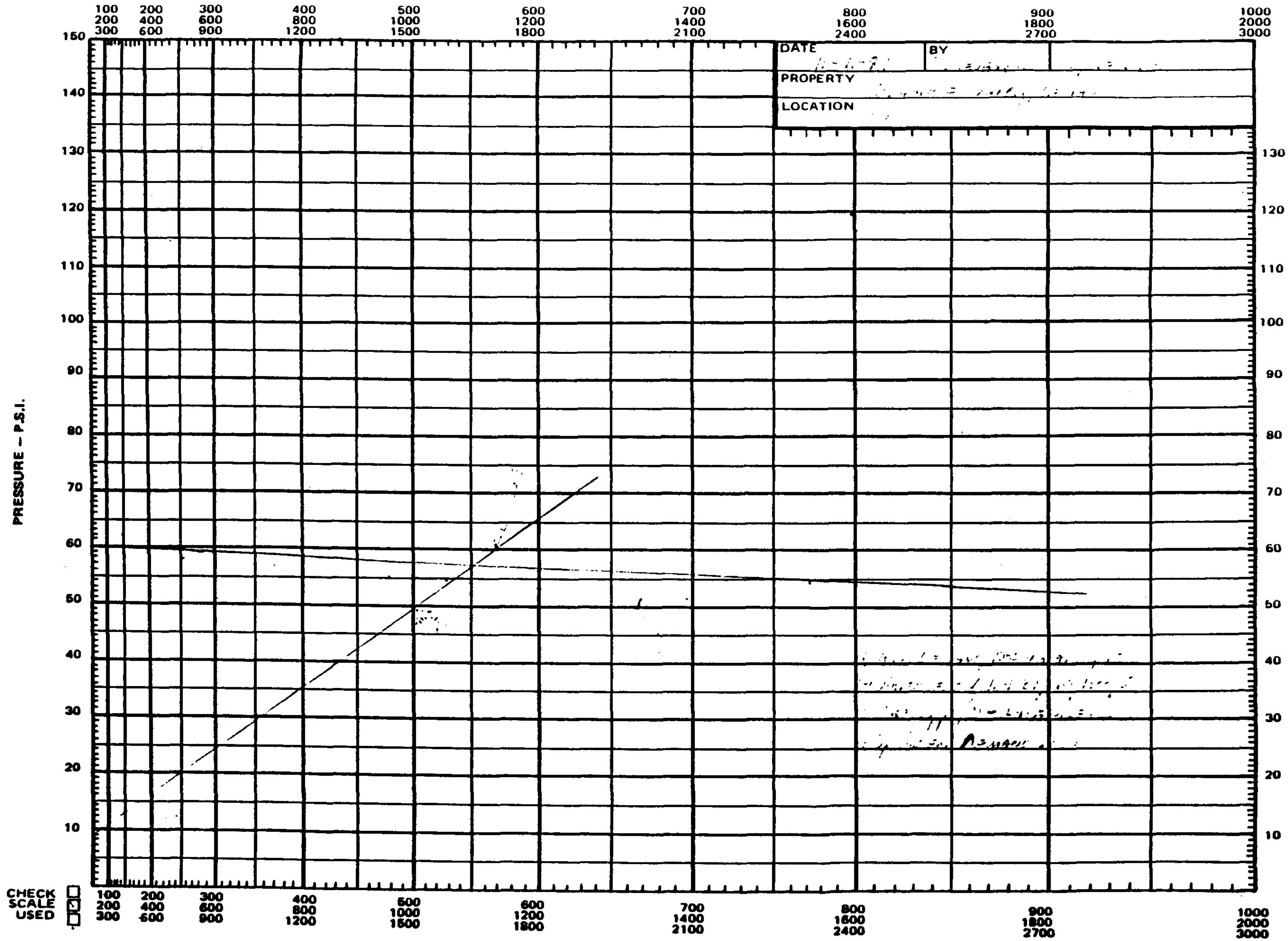
DATE: ____________________

Location	Location Number	Time	Residual Hydrant			Flow Hydrant						Corrected Flow	Avail. @ 20 psi
			No.	Static Pressure	Resid. Pressure	No.	# Of Outlets	Diameter	Correction Factor	Pitot Pressure	Flow C=1.0		

WATER SUPPLY GRAPH NO. $N^{1.85}$



WATER SUPPLY GRAPH NO. $N^{1.85}$



C-7-9

BROOKHAVEN NATIONAL LABORATORY

By: J. Deitz

No.	Location	Time	Residual Hydrant No.	Static Press.	Resid. Press.	Flow Hydrant No.	Outlets	Diam.	Pressure	Flow C=1.0	Total Flow C=0.9	Avail. @ 20 psi	Avail. @ Other	Computer Simu.	Recommended
1	Apartment Area - Yale Road	1035	2	49	30	3	2	2 1/2	15/15	1444	1300	1600		2000	2500
					12	3	2	2 1/2	7/7	988	1800				
						1	2	2 1/2	8/8	1056					
1A	Same as Test 1 with system valve #33 closed	1045	2	49	20	3	2	2 1/2	10/10	1180	1100	1100			2500
2	Summer Houses	1115	191	60	39	181	2	2 1/2	20/20	1668	1500	2200			1000
3	Building 170 - Dormitory Woods Road	1015	163	58	28	59	2	2 1/2	13/12	1319	1200	1400	1000 @ 35		1500 @ 20 750 @ 35
4	Buildings 51 and 348 W. Brookhaven	1025	42	62	16	41	2	2 1/2	10/9	1150	1000	900			1500
5	Center & Bell Biology, Medical, Light Machine Shop	1255	69	56	42	86	2	2 1/2	23/23	1788	1600	3000	2200 @35	2000 @35	1500 @ 35 2500 @ 20
					24	86	2	2 1/2	15/15	1444	2500				
						62	2	2 1/2	12/12	1292					
5A	Same as Test 5 with system valve #43 closed	1300	69	63	34	86	2	2 1/2	20/20	1668	1500	2000	1600 @ 35		1500 @ 35 2500 @ 20
					18	86	2	2 1/2	15/15	1444	2300				
							2	2 1/2	9/9	1120					
6	Buildings 493 and 494 Animal Quarters	1305	182	61	21	67	2	2 1/2	9/9	1120	1000	1000	800 @ 35	800 @35	1500 @ 35
7	Building 479-Heavy Machine Shop	1315	89	68	30	90	2	2 1/2	9/9	1120	1000	1100			1500
7A	Same as Test 7 with valve #184 closed	1320	89	68	7	90	2	2 1/2	2/2	528	480	420			1500
8	Brookhaven and Rochester	1340	98	66	59	97	2	2 1/2	23/23	1788	1600	4500	3600 @35	3500+ @20	3500 @ 20 1000 @ 35
					45	97	2	2 1/2	17/17	1538	3100				
						99	2	2 1/2	26/26	1902					
8A	Same as 8, with valve #127 closed	1350	98	67	58	97	2	2 1/2	22/22	1750	1600	4200	3400 @ 35		2500 @ 20
					43	97	2	2 1/2	17/17	1538	3100				
						99	2	2 1/2	26/26	1902					
9	Warehouses	1410	122	71	55	183	2	2 1/2	25/25	1865	1700	3100	2500 @ 35		2500 @ 20 1500 @ 35
					32	183	2	2 1/2	16/16	1492	2500				
						124	2	2 1/2	12/12	1292					
9A	Same as 9, with valve #137 closed	1415	122	70	49	183	2	2 1/2	20/20	1668	1500	2300	1900 @ 35		2500 @ 20 1500 @ 35
					24	183	2	2 1/2	11/11	1220	2100				
						124	2	2 1/2	9/9	1120					

BROOKHAVEN NATIONAL LABORATORY
HEALTH PHYSICS AND SAFETY DIVISION

By: J. Deitz

No.	Location	Time	Residual Hydrant No.	Residual Hydrant Static Press.	Residual Hydrant Resid. Press.	Flow Hydrant No.	Flow Hydrant Outlets	Flow Hydrant Diam.	Flow Hydrant Pressure	Flow Hydrant Flow C=1.0	Total Flow C=0.9	Avail. @ 20 psi	Avail. @ Other	Computer Simu.	Recommended
10	Landfill site	1425	189	70	14	186	2	2 1/2	7/7	988	890	900			500
11	Building 526, Sixth Street	1435	134	67	35	133	2	2 1/2	16/16	1492	3000	3800		2000+ @20	2000
						135	2	2 1/2	24/24	1828					
12	Building 901, 535 Cornell and Technology	1525	101	66	59	100	2	2 1/2	31/31	2077	1900	5500			2500
					46	100	2	2 1/2	24/24	1828	3000				
						113	2	2 1/2	14/18	1489					
12A	Same as Test 12, with valve #76 closed	1530	101	66	39	100	2	2 1/2	19/19	1626	2800	3700			2500
						113	2	2 1/2	16/18	1537					
13	HFBR, Buildings 815, 820, 830 Rutherford and Railroad	1535	141	62	58	142	2	2 1/2	14/14	1396	1300	4200	2100 @50		2500 @ 20 700 @ 50
					42	142	2	2 1/2	11/11	1220	2700				
						140	2	2 1/2	22/22	1750					
13A	Same as Test 12, with valve #84 closed	1540	141	62	42	142	2	2 1/2	11/11	1220	2970	4200	2100 @50		2500 @ 20 700 @ 50
						140	2	2 1/2	22/22	1750					
14	Not conducted														
15	North of Building 902	1550	205	58	48	43	2	2 1/2	31/31	2077	1700	3600			3500
					34	43	2	2 1/2	22/22	1750	2900				
						206	2	2 1/2	15/15	1444					
16	AGS Ring Interior Buildings 928 and 929	1600	167	62	38	168	2	2 1/2	24/24	1828	1600	2200		2400	2500
					23	168	2	2 1/2	17/17	1538	2100				
						166	1	2 1/2	20	834					
17	East Side - Building 911	1605	164	68	56	190	2	2 1/2	30/30	2044	1800	3800			3500
17A	Same as Test 17, with valve #106 closed	1610	164	70	54	190	2	2 1/2	28/28	1974	1800	3400			3500
18	Northeast Corner EEBA	1620	194	71	63	193	2	2 1/2	24/24	1828	1600	4300	2700 @50	4000+	4000 @ 20 1000 @ 50
					46	193	2	2 1/2	18/18	1582	3000				
						195	2	2 1/2	22/22	1750					
19	Not conducted														
20	80-inch Bubble Chamber Complex	1630	173	70	49	174	2	2 1/2	28/28	1974	1800	2900			2500
					29	174	2	2 1/2	17/17	1538	2600				
						172	2	2 1/2	13/13	1346					
20A	Same as Test 20, with valve #107E closed	1635	173	70	20	174	2	2 1/2	11/11	1220	2000	2000			2500
						172	2	2 1/2	8/8	1056					

APPENDIX C-8

Sample Fire Department
Building Inspection
Report

INSP_FRM.prg (861222)
BNL - SEP Division
Fire Protection Section
02/05/90

FIREFIGHTR

WORK ORDER NO. 34713

REPORT OF BUILDING INSPECTION

ZONE: 07 LOCATION: 0725 BUILDING: 0725
ADDRESS: 75 Brookhaven Ave.

Access information	Use	Dept
	Synchrotron Light Source	LS

Type of Inspection: SCHED
Supv: CHIEF

Priority: 6
Date:Stat: 90-02-05
Status: 1

Schedule Week: 6
Date:Rqst: 90-02-05

TASK

Task:Num: I100 Task: GENERAL BUILDING INSPECTION

CONDUCT FULL FIRE SAFETY INSPECTION OF BUILDING OR STRUCTURE.

1. CHECK PORTABLE EXTINGUISHERS.
2. INSPECT SPRINKLER & STANDPIPE VALVES, FIRE DEPT CONN., IF ANY
3. CHECK AUTOMATIC SYSTEMS SUCH AS HALON FOR OPERATIONAL STATUS.
4. CHECK FIRE ALARM PANEL FOR OPERATIONAL STATUS, IF ANY.
5. INSPECT FIRE DOORS, IF ANY.
6. LOOK FOR UNUSUAL CONDITIONS WHICH WOULD AFFECT FIREFIGHTING OPERATIONS; REPORT ANY TO CAPTAIN.
7. LOOK FOR "COMMON" FIRE HAZARDS.
8. CHECK STATUS OF PENDING RECOMMENDATIONS.

RECOMMENDATIONS

Rec:Number	Rec:Source	Recommendation
717	ENGINEERING	A SPRINKLER HEAD OVER THE NEW PLATFORM IN THE VUV AREA HAS BEEN PAINTED. REPLACE THE HEAD SINCE THE PAINT CAN PREVENT IT'S PROPER OPERATION IN THE EVENT OF A FIRE

Comment: COMMENT TO BE TRANSMITTED TO THE NSLS BY C WEILANDICS

No Inspector action required on this item.

1608	38895	THE LINAC POWER SUPPLY AREA BY SR1 TO SR6 APPEAR TO HAVE CEILING SPRINKLER SYSTEM SHEILDED BY HVAC DUCTS. PROVIDE ADDITIONAL HEADS BELOW THE DUCTWORK

Status: [ ] Closed [✓] Open [ ] Not found [ ] Other...

CNTRL 3/23/90

continued

INSP_FRM.prg (861222)
BNL - SEP Division
Fire Protection Section

WORK ORDER NO. 34713
Continued

REPORT OF BUILDING INSPECTION

BUILDING: 0725

RECOMMENDATIONS

Rec:Number	Rec:Source	Recommendation
1645	38894	ROOM 1-152 HAS A CHEMICAL HOOD. THE RIGHT SIDE OF THE HOO'S WALL HAS AN OPENING. THIS SHOULD BE SEALED. THE OPENING IS APPROXIMATELY 8" X 10"
		Status: [✓] Closed [ ] Open [ ] Not found [ ] Other...
1653	38936	EXTINGUISHERS ARE NEEDED IN ROOM 1-116 AND IN ROOM 2-152 WHERE THERE ARE NOT ANY
		Status: [ ] Closed [✓] Open [ ] Not found [ ] Other...
1656		REPLACE OS&Y TAMPER SWITCH ON 2ND FLOOR COMPUTER ROOM PREACTION SYSTEM. IT WAS REMOVED DURING MAINTENANCE AND IS REQUIRED BY NFPA 72D
		Status: [ ] Closed [✓] Open [ ] Not found [ ] Other...
1657	38896	THE FLAMMABLE LIQUID STORAGE ROOM (X1 TO X16) REQUIRES TWO HOUR FIRE RATED PROTECTION FOR THE STEEL BEAM ON THE NORTH SIDE OF THE ROOM. IT IS STRUCTURAL STEEL AND COULD LEAD TO SERIOUS DAMAGE IN A FIRE.
		Status: [ ] Closed [ ] Open [✓] Not found [ ] Other...
1681	38933	HAVE HEATING UNIT LOCATED ON SECOND FLOOR STAIRWELL BY ROOM 2-222 COVERED
		Status: [✓] Closed [ ] Open [ ] Not found [ ] Other...
1682	38937	REPAIR HOLE IN WALL IN STORAGE ROOM LOCATED ACROSS FROM ROOM 2-197 ON SECOND FLOOR
		Status: [ ] Closed [ ] Open [✓] Not found [ ] Other...
1683	38938	REPAIR CEILING TILE IN ROOM ACROSS FROM ROOM 2-197 LOCATED ON SECOND FLOOR
		Status: [ ] Closed [ ] Open [✓] Not found [ ] Other...
1684	38939	HAVE EXTINGUISHER LOCATED BY ELEVATOR CONTROL ROOM ON FIRST FLOOR HUNG ON WALL.
		Status: [✓] Closed [ ] Open [ ] Not found [ ] Other...

Continued

INSP_FRM.prg (861222)
BNL - SEP Division
Fire Protection Section

WORK ORDER NO. 34712
Continued

REPORT OF BUILDING INSPECTION

BUILDING: 0725

RECOMMENDATIONS

Rec:Number	Rec:Source	Recommendation
1820	39275	REMOVE THE FILE CABINENTS WHICH CONTAIN COMBUSTIBLE MATERIALS BEING STORED AT THE SECOND FLOOR LANDING OF THE NORTH STAIRWELL IN BLDG 725.

Status: [ ] Closed [✓] Open [ ] Not found [ ] Other...

Rec:Number	Rec:Source	Recommendation
1822	39277	REPAIR THE EMERGENCY LIGHTING UNIT LOCATED IN RM 2-122 IN BLDG 725.

Status: [ ] Closed [✓] Open [ ] Not found [ ] Other...

EXTINGUISHERS

Route	CompID	Component Description	Floor	Location
0.010	639783	Hnd/Prt, H1211, General		BY CONTR RM
0.012	463520	Hnd/Prt, H1211, General	FIRST	ELE EQUIP ROOM
0.016	966530	Hnd/Prt, MultiP, Ansul	1ST	RING TUNL X9-X10
0.020	639813	Hnd/Prt, H1211, General		EXP AREA W SIDE
0.030	639808	Hnd/Prt, H1211, General		EXP AREA W SIDE
0.040	639767	Hnd/Prt, H1211, General		EXP AREA W SIDE
0.050	639796	Hnd/Prt, H1211, General		EXP AREA W SIDE
0.060	914090	Hnd/Prt, H1211, General		EXP. AREA NORTH
0.080	639795	Hnd/Prt, H1211, General		EXP AREA X-208
0.090	639793	Hnd/Prt, H1211, General		EXP AREA
0.110	639792	Hnd/Prt, H1211, General		VUV EAST
0.120	639779	Hnd/Prt, H1211, General		VUV WEST WALL
0.130	639782	Hnd/Prt, H1211, General		RING TUNL STA 2
0.140	639809	Hnd/Prt, H1211, General		RING TUNL ST 10
0.150	639790	Hnd/Prt, H1211, General		RING TUNL ST 18
0.160	639789	Hnd/Prt, H1211, General		POWER SUPPLY RM
0.170	640459	Hnd/Prt, H1211, General		BOOSTER RING
0.190	639804	Hnd/Prt, H1211, General		2ND FLR CABINET
0.200	639772	Hnd/Prt, H1211, General		2ND FL COMP RM
0.210	639778	Hnd/Prt, H1211, General		EXP AREA S WALL
0.220	639781	Hnd/Prt, H1211, General		VUV INNER RING

Continued

INSP_FRM.prg (861222)
BNL - SEP Division
Fire Protection Section

WORK ORDER NO. 34713
Continued

REPORT OF BUILDING INSPECTION

BUILDING: 0725

EXTINGUISHERS

Route	CompID	Component Description	Floor	Location
0.221	40373	Fxd/Aut, H1301, Manufac?	1	VUV RING, U6 BEAMLINE
0.230	892400	Hnd/Prt, H1211, General		S ENT EXP AREA
0.240	892409	Hnd/Prt, H1211, General		OPP CONTROL RM
0.250	248310	Hnd/Prt, H1211, General		MECH EQPT RM 2
0.260	248316	Hnd/Prt, H1211, General		RF POWER SUPPLY
0.270	526037	Hnd/Prt, H1211, General		1ST FLOOR EAST END
0.280	914077	Hnd/Prt, H1211, General	1ST	BAC LAB ENT
0.290	914081	Fxd/Aut, H1211, General	1ST	VAC LAB EXIT
0.300	913448	Hnd/Prt, H1211, General	1ST	LEGS DIV-TARGET ROOM
0.310	914086	Hnd/Prt, H1211, General		COMPUTER ROM BY LEGS
0.320	811687	Hnd/Prt, H1211, General	ROOF	PENTHOUSE
0.330	913488	Hnd/Prt, H1211, General		BOOTH 12
0.340	914047	Hnd/Prt, H1211, General		ROLL UP DOOR
0.350	914071	Hnd/Prt, H1211, General		OPP TUNNEL ENTRANCE
0.360	914079	Hnd/Prt, H1211, General		X RAY FL BY TUNNEL ENT
0.370	914087	Hnd/Prt, H1211, General		VUV U1
0.380	914043	Hnd/Prt, H1211, General		BUB RING U3
0.390	914044	Hnd/Prt, H1211, General		RIGHT OF TUNNEL ENT
0.400	463558	Hnd/Prt, H1211, General	01	EAST/SIDE STOCKROOM
0.420	937449	Hnd/Prt, H1211, Amerex	01	BY EXIT TUNNEL
0.440	937450	Contrl, H1211, Amerex	02	BY ROOM 2-125
0.450	529703	Hnd/Prt, H1211, Amerex	02	BY ROOM 2-171
0.460	462502	Hnd/Prt, H1211, General	2ND	ROOM 2-190
0.470	463539	Hnd/Prt, H1211, General	2ND	HALLWAY ACROSS FR-RM2-197
0.480	462486	Hnd/Prt, H1211, General	2ND	ROOM 2-190A
0.490	879313	Hnd/Prt, H1211, General	1ST	XLS POWER SUPPLY
0.500	527894	Hnd/Prt, H1211, General	2ND	NORTH STAIRWELL
0.510	462561	Hnd/Prt, H1211, General	1ST	ROLL-UP DR CENTER OF BUIL
0.520	879244	Hnd/Prt, H1211, General	2ND	ROOM 2-122

COMPONENTS (EQUIPMENT)

CompID	Component Description	Floor	Location
PV046	PIV NORTH SECTIONAL VALVE		75 BROOKHAVEN AVE

Continued

INSP_FRM.prg (861222)
BNL - SEP Division
Fire Protection Section

WORK ORDER NO. 34713
Continued

REPORT OF BUILDING INSPECTION

BUILDING: 0725

COMPONENTS (EQUIPMENT)

CompID	Component Description	Floor	Location
PV047	PIV SOUTH SECTIONAL VALVE		75 BROOKHAVEN AVE
PV048	PIV SPRINKLERS/STANDPIPES		75 BROOKHAVEN AVE
F560A	MAIN AS SUPPLY	1ST	MER #3
F560B	MAIN STANDPIPE SUPPLY	1ST	MER #3
F562	SECTIONAL VALVE - AS SYST	1ST	S. XRAY RING FLOOR - Z02
F563A	SECTIONAL VALVE - AS SYST	1ST	XRAY RING FLOOR - Z03
F563B	SECTIONAL VALVE - AS SYST	1ST	XRAY RING FLOOR - Z03
F564	SECTIONAL VALVE - AS SYST	1ST	XRAY RING FLOOR - Z04
F565	SECTIONAL VALVE - AS SYST	1ST	XRAY RING FLOOR - Z05
F5617A	AS SUPPLY VALVE	1ST	MER #3-XRAY RING PREACTN
F5618A	AS SUPPLY VALVE	2ND	COMPUTER RM PREACTION AS
F5619A	AS SUPPLY VALVE	1ST	MER#3-VUV RING PREACTION
F5620A	AS SUPPLY VALVE	1ST	RF ROOM PREACTION SYSTEM
F5621A	AS SUPPLY VALVE	1ST	MER#3 & LABORATORY AS
F5622A	AS SUPPLY VALVE	1ST	MER#3-WET AS SYSTEMS
F5623A	AS SUPPLY VALVE	1ST	MER#3 - 2ND FL AS SYSTEM
F5624A	AS SUPPLY VALVE	1ST	XRAY EXPANSION AS
F5631A	AS SUPPLY VALVE	1ST	N. OFFICES
F5633A	AS SUPPLY VALVE	1ST	TECHNICIANS ROOM
F5633B	AS SECTIONAL VALVE	1ST	STEAM ROOM
F5633C	AS SECTIONAL VALVE	1ST	STAIRWELL #1

Inspection date: 3-18-90 By: Cobbert Badge No. 54

Approx. total time to conduct inspection: 6 hours (to nearest 1/4 hour)

No. of new recommendations: 0 Recommendation Nos. ______

END WORK ORDER NO. 34713

INSP_FRM.prg (861222)
BNL - SEP Division
Fire Protection Section
02/05/90

FIREFIGHTR

WORK ORDER NO. 34706

REPORT OF BUILDING INSPECTION

ZONE: 06   LOCATION: 0488   BUILDING: **0488**
ADDRESS: 11 N. Columbia St.

Access information	Use	Dept
	Berkner Hall	SS
	Cafeteria	SS
	BERA Store	PE

Type of Inspection: SCHED   Priority: 12   Schedule Week: 6
Supv: CHIEF   Date:Stat: 90-02-05   Date:Rqst: 90-02-05
Status: 1

TASK

Task:Num: I100   Task: GENERAL BUILDING INSPECTION

CONDUCT FULL FIRE SAFETY INSPECTION OF BUILDING OR STRUCTURE.

1. CHECK PORTABLE EXTINGUISHERS.
2. INSPECT SPRINKLER & STANDPIPE VALVES, FIRE DEPT CONN., IF ANY
3. CHECK AUTOMATIC SYSTEMS SUCH AS HALON FOR OPERATIONAL STATUS.
4. CHECK FIRE ALARM PANEL FOR OPERATIONAL STATUS, IF ANY.
5. INSPECT FIRE DOORS, IF ANY.
6. LOOK FOR UNUSUAL CONDITIONS WHICH WOULD AFFECT FIREFIGHTING OPERATIONS; REPORT ANY TO CAPTAIN.
7. LOOK FOR "COMMON" FIRE HAZARDS.
8. CHECK STATUS OF PENDING RECOMMENDATIONS.

RECOMMENDATIONS

No open recommendations

EXTINGUISHERS

Route	CompID	Component Description	Floor	Location
0.010	726486	Hnd/Prt, PK/Prs, Ansul		PLATFORM RR DR
0.019	0250905	Hnd/Prt, PK/Prs, Manufac?		SERV KITCHEN
0.020	726895	Hnd/Prt, PK/Prs, Ansul		KITCHEN
0.030	726455	Hnd/Prt, PK/Prs, Ansul		AC -M
0.060	726336	Hnd/Prt, PK/Prs, Ansul		PROJECTION RM

[illegible]ied

3/23/90

INSP_FRM.prg (861222)
BNL - SEP Division
Fire Protection Section

WORK ORDER NO. 34706
Continued

REPORT OF BUILDING INSPECTION

BUILDING: 0488

EXTINGUISHERS

Route	CompID	Component Description	Floor	Location
0.070	920446	Hnd/Prt, PressW, Kidde		BERK HALL RT
0.080	524726	Hnd/Prt, PressW, Kidde		DIN RM BY CASHR
0.090	295908	Hnd/Prt, PressW, Kidde		BERK HALL
0.100	497545	Hnd/Prt, PressW, Kidde		DINING ROOM EAS
0.110	295125	Hnd/Prt, PressW, Kidde		XIT E SIDE
0.120	294903	Hnd/Prt, PressW, Kidde		BY PHOTO SHOP
0.130	295891	Hnd/Prt, PressW, Kidde		BERK HALL 2NDFL
0.140	317892	Hnd/Prt, PressW, Kidde		REAR ENTR
0.150	295905	Hnd/Prt, PressW, Kidde		BERK HALL 1STFL
0.160	295885	Hnd/Prt, PressW, Kidde		CORR NE END
0.170	726643	Hnd/Prt, PK/Prs, Ansul		BSMT NXT EXIT
0.180	495847	Hnd/Prt, PK/Ctg, Ansul		BY GRILL
0.210	71820EF	Hnd/Prt, CO-2, Kidde		SERVING KITCH
0.210	84414CM	Hnd/Prt, CO-2, Kidde		XROX BERK HALL
0.220	879294	Hnd/Prt, H1211, General	1ST	BERKNER HALL AUDIO ROOM
1.010	48801	Fxd/Aut, SB/Ctg, Ansul	1ST	KITCHEN
1.020	48802	Fxd/Aut, SB/Ctg, Ansul	1ST	KITCHEN
1.030	48803	Fxd/Aut, SB/Ctg, Ansul	1ST	KITCHEN
1.040	48805	Fxd/Aut, SB/Ctg, Ansul	1ST	KITCHEN
2.010	48804	Fxd/Aut, SB/Ctg, Ansul	1ST	SERVING AREA

COMPONENTS (EQUIPMENT)

CompID	Component Description	Floor	Location
PV009	PIV STANDPIPES		11 N COLUMBIA ST
F25A	SP VALVE		
0488FC001	FDC-AS		UPTON

Inspection date: 3/19/90 By: RS RICHARD Badge No. 42

Approx. total time to conduct inspection: 1 1/4 hours (to nearest 1/4 hour)

No. of new recommendations: ______ Recommendation Nos. ____________ ________

END WORK ORDER NO. 34706

APPENDIX C-9

Roofing Study Executive Summary

December 8, 1989

Taylor Associates Inc.

Brookhaven National Laboratory
Associated Universities Inc.
Upton, Long Island, New York

BNL ROOFING STUDY
FINAL REPORT: PERMANENT STRUCTURES

I. EXECUTIVE SUMMARY

The following report details the findings of our Basic Survey of 89 Primary Structures. The buildings have a combined roof area of 1,859,202 square feet (Contract Allowance: 2,067,000 sq. ft.). Each primary roof area was assigned a priority rating value based upon our assessment of its condition, the highest value being given to the roof in the worse condition. Each roof also received a one word condition description and a projected remaining service life. Sorted by priority ranking, our findings may be summarized as follows:

Description of Condition		Square Feet	% of Total	Roof Areas	Life Expectancy
Failed	:	103,317	5.5%	7	1990
Poor	:	966,233	52.0%	30	1991-1993
Fair	:	514,676	27.5%	38	1994-1996
Good	:	274,976	15.0%	36	1997-2000
Total	:	1,859,202	100%	111	

Following completion of the Basic Survey, 46 roof areas totaling 1,195,530 square feet were identified as deserving of further investigation. This included infrared moisture detection, laboratory analysis of core samples, and the preparation of detailed CAD roof survey plans. These further activities allowed us to project a reroofing date and cost estimate for each of the 46 roof areas. Our five-year planning and budgeting schedule is broken into reroofing capital expenditures and maintenance/repair expenses:

Budget Year	Square Feet	% of Total	Roof Areas	Reroof Capital	Maint. Expense	Total Budget
1990 :	103,317	6.0%	7	$ 646,100	$ 85,850	$ 731,950
1991 :	339,404	18.0%	8	$1,730,800	$ 20,700	$1,751,500
1992 :	285,468	15.0%	11	$1,372,000	$ 12,500	$1,384,500
1993 :	341,361	18.0%	11	$1,626,050	$ 5,400	$1,631,450
1994 :	125,980	7.0%	9	$ 562,100	$ 400	$ 562,500
Total:	1,195,530	64.0%	46	$5,937,050	$124,850	$6,061,900

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Sixty-four percent of the total roof area surveyed is recommended for replacement in the next five years. This is a relatively high percentage (25% would seem normal if the original constructions were spread evenly over twenty years and each roof had a twenty-year life expectancy). It may be that many of the buildings were constructed at roughly the same time and all have come due for roof replacement now. On the other hand, it may be that many of the roofs are experiencing premature failure. The true answer is probably a combination of the two. During the course of our survey, several conditions which may lead to premature roof failure were noted:

1. Poor Repair Techniques:

   On many roofs large patches have been applied to suspected leak areas. These patches are not terminated at natural boundaries, e.g. expansion joints, parapet walls. This type of patch allows any infiltration of moisture through the patch or non-repaired area to migrate from one to the other causing failure.

2. Poor Application Techniques:

   The laboratory samples revealed many instances of heavy applications of asphalt between plies, combined with a cratering appearance of the asphalt at the interplies. This evidence suggests that the application temperatures of the asphalt were lower than required. Heavy interply moppings promote splitting within the roof membrane as thick layer of non-reinforced asphalt easily cracks. The cratering shows poor bonding of the plies which promotes slippage and contributes to splitting.

3. Inappropriate System Selection:

   At several locations, built-up roofs are being installed on pitched roof areas. Most manufacturers will allow this type of application, however, nailers must be installed at specified intervals to nail the roofing felts to. Without the use of nailers, the roof membrane will slip and split. It was our observation that nailers have not been installed in all cases.

4. Recovering of Existing Roofs:

   In order to maximize roofing dollars, several roof areas have been recovered with a built-up roof over an existing built-up roof. In some cases, it is suspected that wet insulation was left in the existing system. This practice promotes early failure of the new system as trapped moisture promotes blistering and interior rotting of the system. It is generally recognize within the roofing industry that by tearing off the existing roof, the new system will provide up to 50% more years of service life.

5. Metal Work:

   The use of copper and stainless steel for edge and flashing metal will provide many years of service and is a top quality selection for a roofing system. We do question the use of 50 year metal installed on roofing systems designed to last 10 years. Barring a corrosive environment, we find other types of metal will provide a more than adequate service life for less dollars.

6. Flashing:

   The use of metal for flashings appears to be a durable flashing system. It is not, however, a recommended practice as metal's thermal coefficient is different from that of a built-up roof system. Because of this difference, the roof tends to split or become loose from the metal resulting in leakage at these areas.

7. Ponding Water:

   Before reroofing of any building is accomplished, an evaluation of ponding conditions should be made and addressed when reroofing. Ponded water promotes plant and algae growth on the systems and combines with ultraviolet radiation to accelerate degradation. By minimizing ponding, several additional years of roof service life are possible.

These conditions can be avoided or minimized through the use of:

1. Detailed roof and facility evaluation prior to construction.

2. Review of system selection for appropriateness for conditions.

3. Comparison of materials and methods through life cycle costing.

4. Intensive quality control during application particularly on built-up systems.

5. Semi-annual preventive and corrective maintenance.

The goal of any roofing program is to minimize expenditures while maximizing roofing performance. In order to achieve this goal, it is first necessary to increase the level of performance of existing roofs. Though expensive in the short term, the benefits will be realized over the long term. This report represents the first step in achieving those benefits.

II. METHODOLOGY

The Taylor Associates Survey Team arrived at the Brookhaven site on September 6, 1989. Survey work was continuous until completion on September 14, 1989. The Survey Team was comprised of the following personnel:

Kevin Ernster ..... Certified Roofing Consultant
Project Manager

Alvin Nunnikhoven . Project Manager

Darran Sellers .... Field Consultant

Jeff Bakeris ...... Field Consultant

Survey activities were arranged through Mr. J. Bruce Medaris, Manager, Operations & Maintenance Division, Plant Engineering, BNL. Access to specific buildings was arranged through Mr. Michael F. Cardarelli, General Supervisor, Buildings Maintenance & Service, BNL. Messrs. Medaris and Cardarelli provided background and historical information as well.

Each Primary Structure's roof area was surveyed by the Survey Team working in pairs. Each investigation included:

1. Visual examination of the roof and roof related elements.
2. Written assessment of roof and roof related conditions.
3. Extraction of a core sample from each major roof area to identify roof assembly components and examine their condition.
4. Photographic documentation of deficient conditions.
5. Field measurement of major roof boundaries.

Upon completion of the Basic Survey, the Survey Team met with Messrs. Medaris and Cardarelli to review the preliminary findings. Following that meeting the Survey Team departed the site.

The data collected by the Basic Survey Team was entered into a relational data base. The software package "Advanced Revelation" was used to create a customized data base specifically for this project. The data base stores a record of each unique roof area on each building. Reports may be written and sorted by any field in the building record.

Upon completion of the Basic Survey, a preliminary report of the Basic Survey findings was submitted to BNL. This report identified 46 roof areas to be considered for further investigation. A second survey team returned to the site October 17-27, 1989, to perform the following services on the designated roof areas:

1. Infrared thermography moisture detection surveys.

2. Extraction of roof core samples for laboratory analysis.

3. Collection of roof landscape data to facilitate the preparation of detailed CAD roof survey plans.

The second survey team was comprised of the following personnel:

Kevin Ernster ..... Certified Roofing Consultant
Project Manager

Alvin Nunnikhoven .. Project Manager

Jeff Bakeris ...... Field Consultant

Dave Zuerlein ..... Field Consultant

The information gathered during the second survey was necessary to determine the relative severity of roof conditions, schedule roof replacements, and estimate the cost of those replacements and repairs. The new information gathered on each roof area was entered in that areas data record. In some instances the new information prompted a revision of the individual condition ratings. These revisions, in conjunction with BNL input regarding space planning requirements, triggered a slight realignment of the priority rankings.

A five-year maintenance, repair and replacement schedule was generated from the priority rankings. Roof replacement is recommended at the end of a given roof's life expectancy. A preliminary estimate of the cost to perform the work in the scheduled year was prepared without an inflation factor. Maintenance and repair dollars are recommended to maintain each roof area until such time as reroofing occurs.

The following Taylor Associates personnel participated in the reporting and drafting activities described above:

William Andresen .. Program Coordinator

Frank Kelm .... System Designer

Lynda Bordwell .... System Programmer

Mike Wilson .... CAD Technician

We welcome your comments and interdelineation. The Final Report is submitted in hard copy and is also available in other formats. The degree of access and manipulation available to you as a user of the system will be determined by the format you select. The following options are available:

1. Hard copy.

2. ASCII files on IBM formatted disks (360K or 1.2 MB 5 1/4" disks).

3. Data can be directly written to D-Base or Lotus files.

4. A run-time version of Advanced Revelation could be purchased. This would allow you to add, change, delete and print data. No programming changes can be made.

5. If you wish to purchase your own version of Advanced Revelation, we can provide you with the programs and data files to run this application.

MAINTENANCE SPENDING FORECAST

PRIOR. RANK.	TOTAL RATING	BLDG. NO.	BUILDING USE	1990	1991	1992	1993	1994
1	50	488	CAFETERIA					
2	50	704	SOLAR LABORATORIES					
3	49	207	SHEET METAL SHOP					
4	49	208	WELDING SHOP					
5	49	158	BULK WAREHOUSE					
6	47	494C	STORAGE					
7	46	490C	TOXICOLOGY					
8	43	911	OFFICE SERVICE BLDG.					
9	43	914	BEAM COMPONENTS					
10	42	725	NSLS					
11	42	490B	MEDICAL RESEARCH CENTER					
12	42	490A	HOSPITAL					
13	42	510	PHYSICS					
14	41	610	CENTRAL STEAM PLANT					
15	41	919	WORKS BUILDING					
16	40	490D	MEDICAL RESEARCH CENTER					
17	39	603	69 KV SUBSTATION	$500	$500			
18	38	134A	ADMINISTRATION DESIGN	$500	$500			
19	38	901	CYCLOTRON/DYNAMITRON	$1,000	$1,000			
20	37	901A	TANDEM VAN DE GRAAF	$5,000	$700			
21	37	197A	DEPT. ADMINISTRATION	$3,000	$400			
22	37	820	CABLE WINDING FACILITY	$800	$800			
23	37	701	EXHIBIT CENTER	$1,000	$1,000			
24	36	526A	ENERGY, LABS, STOR., CONV	$500	$500			
25	36	902A	NEUTRAL BEAM DIVISION	$2,000	$2,000			
26	36	703	WASTE MANAGEMENT	$8,000	$800			
27	35	912A	EXPERIMENTAL HALLS	$3,500	$800	$800		
28	34	457	METALS CUTTING	$400	$400	$400		
29	34	478	SWIMMING POOL	$500	$500	$500		
30	33	515	COMPUTING COMMUNICATION	$5,000	$800	$800		
31	33	930	200 MEV LINAC	$3,000	$1,000	$1,000		
32	33	463C	BIOLOGY BUILDING	$500	$500	$500		
33	33	510B	PHYSICS	$7,000	$700	$700		
34	32	928	MG POWER SUPPLY	$2,000	$400	$400		
35	32	912	EXPERIMENTAL HALLS	$15,000	$1,000	$1,000		
36	31	526B	ENERGY, LABS, STOR., CONV	$2,500	$500	$500		
37	31	1005S	COLLIDER CENTER	$3,000	$500	$500		
38	30	206	METALS WAREHOUSE	$600	$600	$600	$600	
39	30	209	BULK WAREHOUSE	$4,000	$500	$500	$500	
40	29	650	HOT LAUNDRY	$3,000	$400	$400	$400	
41	28	929	RF POWER SUPPLY	$2,000	$400	$400	$400	
42	28	406	SITE STORAGE	$3,000	$400	$400	$400	
43	28	575	SEWAGE PLANT	$2,000	$400	$400	$400	
44	27	535	NSLS	$5,000	$750	$750	$750	
45	26	459	MANAGEMENT INFO	$950	$950	$950	$950	
46	25	426	ATMOSPHERIC CHEM LAB	$600	$600	$600	$600	
***				$85,850	$20,300	$12,100	$5,000	$0

REROOFING SPENDING FORECAST

PRIOR. RANK.	TOTAL RATING	BLDG. NO.	BUILDING USE	1990	1991	1992	1993	1994
1	50	488	CAFETERIA	$400,000				
2	50	704	SOLAR LABORATORIES	$51,000				
3	49	207	SHEET METAL SHOP	$32,000				
4	49	208	WELDING SHOP	$58,000				
5	49	158	BULK WAREHOUSE	$51,500				
6	47	494C	STORAGE	$4,000				
7	46	490C	TOXICOLOGY	$49,600				
8	43	911	OFFICE SERVICE BLDG.		$304,500			
9	43	914	BEAM COMPONENTS		$25,600			
10	42	725	NSLS		$572,700			
11	42	490B	MEDICAL RESEARCH CENTER		$63,000			
12	42	490A	HOSPITAL		$439,000			
13	42	510	PHYSICS		$204,600			
14	41	610	CENTRAL STEAM PLANT		$46,900			
15	41	919	WORKS BUILDING		$74,500			
16	40	490D	MEDICAL RESEARCH CENTER			$365,000		
17	39	603	69 KV SUBSTATION			$23,200		
18	38	134A	ADMINISTRATION DESIGN			$48,000		
19	38	901	CYCLOTRON/DYNAMITRON			$127,500		
20	37	901A	TANDEM VAN DE GRAAF			$87,700		
21	37	197A	DEPT. ADMINISTRATION			$45,000		
22	37	820	CABLE WINDING FACILITY			$28,100		
23	37	701	EXHIBIT CENTER			$94,700		
24	36	526A	ENERGY, LABS, STOR., CONV			$42,900		
25	36	902A	NEUTRAL BEAM DIVISION			$357,400		
26	36	703	WASTE MANAGEMENT			$152,500		
27	35	912A	EXPERIMENTAL HALLS				$117,800	
28	34	457	METALS CUTTING				$16,000	
29	34	478	SWIMMING POOL				$65,950	
30	33	515	COMPUTING COMMUNICATION				$138,700	
31	33	930	200 MEV LINAC				$196,300	
32	33	463C	BIOLOGY BUILDING				$35,000	
33	33	510B	PHYSICS				$160,800	
34	32	928	MG POWER SUPPLY				$36,200	
35	32	912	EXPERIMENTAL HALLS				$683,300	
36	31	526B	ENERGY, LABS, STOR., CONV				$70,100	
37	31	1005S	COLLIDER CENTER				$105,900	
38	30	206	METALS WAREHOUSE					$53,800
39	30	209	BULK WAREHOUSE					$63,700
40	29	650	HOT LAUNDRY					$37,600
41	28	929	RF POWER SUPPLY					$19,800
42	28	406	SITE STORAGE					$18,000
43	28	575	SEWAGE PLANT					$15,300
44	27	535	NSLS					$266,800
45	26	459	MANAGEMENT INFO					$49,500
46	25	426	ATMOSPHERIC CHEM LAB					$37,600
***				$646,100	$1,730,800	$1,372,000	$1,626,050	$562,100

PRIOR. RANK.	RATING TOTAL	BLDG. NO.	BUILDING USE	DIV	STRUC	SQUARE FOOTAGE	GEN'L. COND.	LIFE EXP.	LAB SAMPLE	CAD FILE	INFRARED
1	50	488	CAFETERIA	SS	04	51000	FAILED	1990	YES	YES	YES
2	50	704	SOLAR LABORATORIES	EE	05	10188	FAILED	1990	YES	YES	YES
3	49	207	SHEET METAL SHOP	SC	01	7968	FAILED	1990	YES	YES	YES
4	49	208	WELDING SHOP	SC	01	14512	FAILED	1990	YES	YES	YES
5	49	158	BULK WAREHOUSE	SM	01	12829	FAILED	1990	YES	YES	YES
6	47	494C	STORAGE	SS	05	4012	FAILED	1990	YES	YES	NO
7	46	490C	TOXICOLOGY	MO	04	2808	FAILED	1990	YES	YES	YES
						103317	***				
8	43	911	OFFICE SERVICE BLDG.	AD	04	56391	POOR	1991	YES	YES	YES
9	43	914	BEAM COMPONENTS	AD	05	4745	POOR	1991	YES	YES	YES
10	42	725	NSLS	LS	04	104120	POOR	1991	YES	YES	YES
11	42	490B	MEDICAL RESEARCH CENTER	MO	04	13860	POOR	1991	YES	YES	YES
12	42	490A	HOSPITAL	MO	04	80503	POOR	1991	YES	YES	YES
13	42	510	PHYSICS	PO	04	53832	POOR	1991	YES	YES	YES
14	41	610	CENTRAL STEAM PLANT	EP	04	9380	POOR	1991	YES	YES	YES
15	41	919	WORKS BUILDING	AD	14	16573	POOR	1991	YES	YES	YES
16	40	490D	MEDICAL RESEARCH CENTER	MO	04	67002	POOR	1992	YES	YES	YES
17	39	603	69 KV SUBSTATION	EP	05	4640	POOR	1992	YES	YES	YES
18	38	134A	ADMINISTRATION DESIGN	EP	01	13931	POOR	1992	NO	YES	YES
19	38	901	CYCLOTRON/DYNAMITRON	CO	06	25500	POOR	1992	YES	YES	YES
20	37	901A	TANDEM VAN DE GRAAF	PO	06	17546	POOR	1992	YES	YES	YES
21	37	197A	DEPT. ADMINISTRATION	NE	05	9815	POOR	1992	YES	YES	YES
22	37	820	CABLE WINDING FACILITY	AD	14	15603	POOR	1992	YES	YES	YES
23	37	701	EXHIBIT CENTER	DO	04	21030	POOR	1992	YES	YES	YES
24	36	526A	ENERGY, LABS, STOR., CONV	EE	05	9535	POOR	1992	YES	YES	NO
25	36	902A	NEUTRAL BEAM DIVISION	DO	04	64973	POOR	1992	YES	YES	YES
26	36	703	WASTE MANAGEMENT	NE	04	35893	POOR	1992	YES	YES	YES
27	35	912A	EXPERIMENTAL HALLS	AD	04	26162	POOR	1993	YES	YES	YES
28	34	457	METALS CUTTING	SC	01	2976	POOR	1993	YES	YES	YES
29	34	478	SWIMMING POOL	PE	05	9928	POOR	1993	YES	YES	YES
30	33	515	COMPUTING COMMUNICATION	AO	04	27728	POOR	1993	YES	YES	YES
31	33	930	200 MEV LINAC	AD	04	41637	POOR	1993	YES	YES	YES
32	33	463C	BIOLOGY BUILDING	BO	05	6997	POOR	1993	YES	YES	YES
33	33	510B	PHYSICS	PO	04	32147	POOR	1993	YES	YES	YES
34	32	928	MG POWER SUPPLY	AD	04	8036	POOR	1993	YES	YES	YES
35	32	912	EXPERIMENTAL HALLS	AD	04	151828	POOR	1993	YES	YES	YES
36	31	526B	ENERGY, LABS, STOR., CONV	DE	05	12742	POOR	1993	YES	YES	YES
37	31	1005S	COLLIDER CENTER	DO	04	21180	POOR	1993	YES	YES	NO
						966233	***				
38	30	206	METALS WAREHOUSE	SL	01	11941	FAIR	1994	YES	YES	YES
39	30	209	BULK WAREHOUSE	SM	01	14144	FAIR	1994	YES	YES	YES
40	29	650	HOT LAUNDRY	EP	05	8340	FAIR	1994	YES	YES	NO
41	28	929	RF POWER SUPPLY	AD	04	4386	FAIR	1994	YES	YES	YES
42	28	406	SITE STORAGE	EP	15	3600	FAIR	1994	YES	YES	NO
43	28	575	SEWAGE PLANT	EP	15	3397	FAIR	1994	YES	YES	YES
44	27	535	NSLS	IO	04	48506	FAIR	1994	YES	YES	NO
45	26	459	MANAGEMENT INFO	MS	05	19123	FAIR	1994	YES	YES	NO
46	25	426	ATMOSPHERIC CHEM LAB	EE	01	12543	FAIR	1995	YES	YES	NO
47	24	480	MATERIAL SCIENCES	EE	05	37358	FAIR	1995	NO	NO	NO
48	24	423	VEHICLE REPAIR	SS	05	10591	FAIR	1995	NO	NO	NO

07 DEC 1989

ROOF CONDITION REPORT   FACILITIES ROOF PLANNING STUDY
BROOKHAVEN NATIONAL LABORATORY

PRIOR. RANK.	RATING TOTAL	BLDG. NO.	BUILDING USE	DIV	STRUC	SQUARE FOOTAGE	GEN'L. COND.	LIFE EXP.	LAB SAMPLE	CAD FILE	INFRARED
49	24	460B	DIRECTORS OFFICE	DO	05	10266	FAIR	1995	NO	NO	NO
50	23	479A	MACHINE SHOP B	SC	05	5292	FAIR	1995	NO	NO	NO
51	23	555	CHEMISTRY	CO	06	46728	FAIR	1995	NO	NO	NO
52	23	424	ACCELERATOR STORAGE	AD	15	9302	FAIR	1995	NO	NO	NO
53	23	473A	ELECTRON BEAM WELD	EP	05	3608	FAIR	1995	NO	NO	NO
54	23	801	HOT LABORATORY	EE	05	34691	FAIR	1995	NO	NO	NO
55	22	463A	BIOLOGY BUILDING	BO	05	11376	FAIR	1995	NO	NO	NO
56	22	30	BROOKHAVEN CENTER	SS	05	13062	FAIR	1995	NO	NO	NO
57	21	904	CRYOGENIC TEST FACILITY	AD	14	2592	FAIR	1995	NO	NO	NO
58	21	624	WATER TREATMENT PLANT	EP	05	6296	FAIR	1995	NO	NO	NO
59	20	830	NUCLEAR WASTE MANAGEMENT	NE	04	24085	FAIR	1996	NO	NO	NO
60	20	479B	MACHINE SHOP B	SC	05	12748	FAIR	1996	NO	NO	NO
61	20	421B	STRUCTURAL BIOLOGY	BO	05	4022	FAIR	1996	NO	NO	NO
62	19	1002A	SUPPORT BUILDING	DO	04	2842	FAIR	1996	NO	NO	NO
63	19	464	DOE-BHO	DE	05	8920	FAIR	1996	NO	NO	NO
64	19	210	GASES WAREHOUSE	SM	01	6763	FAIR	1996	NO	NO	NO
65	18	477	RESEARCH LIBRARY	ID	05	17709	FAIR	1996	NO	NO	NO
66	18	421	STRUCTURAL BIOLOGY	BO	05	2370	FAIR	1996	NO	NO	NO
67	18	180A	MEN'S RESIDENCE	SS	12	1400	FAIR	1996	NO	NO	NO
68	17	194	OCEANOGRAPHIC LABS	EE	01	12144	FAIR	1996	NO	NO	NO
69	17	473	ELECTRON BEAM WELD	EP	05	4832	FAIR	1996	NO	NO	NO
70	17	134B	ADMINISTRATION DESIGN	EP	01	18831	FAIR	1996	NO	NO	NO
71	16	460A	DIRECTORS OFFICE	DO	05	3360	FAIR	1996	NO	NO	NO
72	16	197B	DEPT. ADMINISTRATION	NE	01	29162	FAIR	1996	NO	NO	NO
73	16	493	VIDEO WORK AREA	PG	05	6785	FAIR	1996	NO	NO	NO
74	16	180B	MEN'S RESIDENCE	SS	12	9956	FAIR	1996	NO	NO	NO
75	16	452	UTILITIES MAINTENANCE	EP	01	31605	FAIR	1996	NO	NO	NO
						514676	***				
76	15	461	GYMNASIUM	PE	05	13417	GOOD	1997	NO	NO	NO
77	15	494B	STORAGE	SS	05	2900	GOOD	1997	NO	NO	NO
78	15	629	EMERGENCY POWER	EP	05	1147	GOOD	1997	NO	NO	NO
79	15	926	RECEIVING / WAREHOUSE	DO	14	10000	GOOD	1997	NO	NO	NO
80	14	1005H	COMPRESSOR BLDG.	DO	04	11713	GOOD	1997	NO	NO	NO
81	14	906	PETT VI	CO	05	2561	GOOD	1997	NO	NO	NO
82	14	130	REACTOR SAFETY	NE	01	12626	GOOD	1997	NO	NO	NO
83	14	1007E	EJECT POWER SUPPLY	DO	04	4800	GOOD	1997	NO	NO	NO
84	14	326	SITE MAINTENANCE OFFICE	EP	01	11285	GOOD	1997	NO	NO	NO
85	13	479C	MACHINE SHOP B	SC	05	3358	GOOD	1997	NO	NO	NO
86	13	975	STORAGE/SPS/WAREHOUSE	AD	14	5000	GOOD	1997	NO	NO	NO
87	12	635	WELL NO. 11	EP	05	680	GOOD	1997	NO	NO	NO
88	12	599	FIRESTATION	HP	04	10813	GOOD	1997	NO	NO	NO
89	12	1004A	SUPPORT BUILDING	DO	04	1617	GOOD	1997	NO	NO	NO
90	12	473B	ELECTRON BEAM WELD	EP	05	1224	GOOD	1997	NO	NO	NO
91	11	492	WELL HOUSE NO.5	EP	05	168	GOOD	1997	NO	NO	NO
92	11	462	CENTRAL SHOPS	SC	05	16186	GOOD	1997	NO	NO	NO
93	10	1006A	SUPPORT BUILDING	DO	04	2839	GOOD	1998	NO	NO	NO
94	10	634	WELL NO. 10	EP	05	500	GOOD	1998	NO	NO	NO
95	10	815	ENERGY SCIENCE & TECH.	EE	04	29674	GOOD	1998	YES	YES	YES
96	10	935	ASSEMBLY STORAGE	LS	14	6050	GOOD	1998	NO	NO	NO
97	8	449	TELEPHONE EQUIPMENT	AO	05	1674	GOOD	1998	NO	NO	NO
98	8	422	CABINET-SIGN SHOP	EP	01	13501	GOOD	1998	NO	NO	NO
99	8	907	HEAVY ION POWER SUPPLY A	AD	06	2296	GOOD	1998	NO	NO	NO

07 DEC 1989

ROOF CONDITION REPORT   FACILITIES ROOF PLANNING STUDY
BROOKHAVEN NATIONAL LABORATORY

PRIOR. RANK.	RATING TOTAL	BLDG. NO.	BUILDING USE	DIV	STRUC	SQUARE FOOTAGE	GEN'L. COND.	LIFE EXP.	LAB SAMPLE	CAD FILE	INFRARED
100	7	197C	DEPT. ADMINISTRATION	NE	02	6391	GOOD	1998	NO	NO	NO
101	7	463B	BIOLOGY BUILDING	BO	05	29609	GOOD	1998	NO	NO	NO
102	7	1005E	EJECT POWER SUPPLY	DO	04	4800	GOOD	1998	NO	NO	NO
103	7	1008A	SUPPORT BUILDING	AD	04	2842	GOOD	1998	NO	NO	NO
104	6	1008	FACILITY HALL (8 O'CLOCK)	PO	06	4884	GOOD	1998	NO	NO	NO
105	5	494A	STORAGE	SS	05	1698	GOOD	1999	NO	NO	NO
106	4	527	COMBUSTION RESEARCH	EE	05	6611	GOOD	1999	NO	NO	NO
107	4	902B	NEUTRAL BEAM DIVISION	DO	04	36162	GOOD	1999	NO	NO	NO
108	4	637	WELL NO. 12	EP	05	680	GOOD	1999	NO	NO	NO
109	2	600	CHILLED WATER PLANT	EP	05	6300	GOOD	1999	NO	NO	NO
110	2	1006	WIDE ANGLE HALL	AD	06	6490	GOOD	1999	NO	NO	NO
111	0	1101	NUTRINO LABORATORY	AD	04	2480	GOOD	2000	NO	NO	NO
						274976	***				
***						1859202					

07 DEC 1989

ROOF CONSTRUCTION ASSEMBLY REPORT BROOKHAVEN NATIONAL LABORATORY

PRIOR. RANK.	RATING TOTAL	BLDG. NO.	BUILDING USE	DIV	STRUC	SQUARE FOOTAGE	DECK TYPE.	INSULATION	MEMBRANE	MEMB. TYPE	SURFACING	GEN'L COND.
1	50	488	CAFETERIA	SS	04	51000	STRUCT. CO	PERLITE	BUILT-UP	PITCH	GRAVEL	FAILE
2	50	704	SOLAR LABORATORIES	EE	05	10188	STRUCT. CO	FOAMGLASS	BUILT-UP	PITCH	GRAVEL	FAILE
3	49	207	SHEET METAL SHOP	SC	01	7968	WOOD PLANK	ISO/PERL.	BUILT-UP	MOD. BIT.	ALUMINUM	FAILE
4	49	208	WELDING SHOP	SC	01	14512	WOOD PLANK	ISO/PERL.	BUILT-UP	MOD. BIT.	ALUMINUM	FAILE
5	49	158	BULK WAREHOUSE	SM	01	12829	WOOD PLANK	ISO/PERL.	BUILT-UP	MOD. BIT.	ALUMINUM	FAILE
6	47	494C	STORAGE	SS	05	4012	PLYWOOD	NONE	BUILT-UP	ASPHALT	MINERAL	FAILE
7	46	490C	TOXICOLOGY	MO	04	2808	STEEL	FIBERBOARD	BUILT-UP	ASPHALT	GRAVEL	FAILE
8	43	911	OFFICE SERVICE BLDG.	AD	04	56391	STEEL	FIBERGLASS	BUILT-UP	PITCH	GRAVEL	POOR
9	43	914	BEAM COMPONENTS	AD	05	4745	STEEL	FIBERGLASS	BUILT-UP	PITCH	GRAVEL	POOR
10	42	725	NSLS	LS	04	104120	LTWT. CONC	ISO/PERL.	BUILT-UP	ASPHALT	GRAVEL	POOR
11	42	490B	MEDICAL RESEARCH CENTER	MO	04	13860	LTWT. CONC	FIBERBOARD	BUILT-UP	PITCH	GRAVEL	POOR
12	42	490A	HOSPITAL	MO	04	80503	LTWT. CONC	FIBERBOARD	BUILT-UP	PITCH	GRAVEL	POOR
13	42	510	PHYSICS	PO	04	53832	STRUCT. CO	ISOCYAN.	BUILT-UP	ASPHALT	GRAVEL	POOR
14	41	610	CENTRAL STEAM PLANT	EP	04	9380	STRUCT. CO	FIBERBOARD	BUILT-UP	ASPHALT	GRAVEL	POOR
15	41	919	WORKS BUILDING	AD	14	16573	STEEL	FIBERBOARD	BUILT-UP	ASPHALT	GRAVEL	POOR
16	40	490D	MEDICAL RESEARCH CENTER	MO	04	67002	LTWT. CONC	FIBERBOARD	BUILT-UP	PITCH	GRAVEL	POOR
17	39	603	69 KV SUBSTATION	EP	05	4640	STRUCT. CO	ISOCYAN.	BUILT-UP	PITCH	GRAVEL	POOR
18	38	134A	ADMINISTRATION DESIGN	EP	01	13931	GYPSUM	FIBERGLASS	BUILT-UP	ASPHALT	GRAVEL	POOR
19	38	901	CYCLOTRON/DYNAMITRON	CO	06	25500	STRUCT. CO	FOAMGLASS	BUILT-UP	ASPHALT	GRAVEL	POOR
20	37	901A	TANDEM VAN DE GRAAF	PO	06	17546	STRUCT. CO	FIBERGLASS	BUILT-UP	ASPHALT	GRAVEL	POOR
21	37	197A	DEPT. ADMINISTRATION	ME	05	9815	STRUCT. CO	LWT. CONC.	BUILT-UP	PITCH	GRAVEL	POOR
22	37	820	CABLE WINDING FACILITY	AD	14	15603	STEEL	FIBERGLASS	BUILT-UP	PITCH	GRAVEL	POOR
23	37	701	EXHIBIT CENTER	DO	04	21030	STEEL	FIBERBOARD	BUILT-UP	PITCH	GRAVEL	POOR
24	36	526A	ENERGY, LABS, STOR., CONV	EE	05	9535	WOOD PLANK	NONE	BUILT-UP	ASPHALT	GRAVEL	POOR
25	36	902A	NEUTRAL BEAM DIVISION	DO	04	64973	GYPSUM	FIBERBOARD	BUILT-UP	PITCH	GRAVEL	POOR
26	36	703	WASTE MANAGEMENT	ME	04	35893	STRUCT. CO	FIBERBOARD	BUILT-UP	ASPHALT	GRAVEL	POOR
27	35	912A	EXPERIMENTAL HALLS	AD	04	26162	STEEL	FIBERGLASS	BUILT-UP	ASPHALT	GRAVEL	POOR
28	34	457	METALS CUTTING	SC	01	2976	WOOD PLANK	ISO/PERL.	BUILT-UP	ASPHALT	GRAVEL	POOR
29	34	478	SWIMMING POOL	PE	05	9928	PLYWOOD	PERLITE	BUILT-UP	ASPHALT	GRAVEL	POOR
30	33	515	COMPUTING COMMUNICATION	AO	04	27728	STRUCT. CO	PERLITE	BUILT-UP	ASPHALT	GRAVEL	POOR
31	33	930	200 MEV LINAC	AD	04	41637	STEEL	PERLITE	BUILT-UP	PITCH	GRAVEL	POOR
32	33	463C	BIOLOGY BUILDING	BO	05	6997	LTWT. CONC	FIBERGLASS	BUILT-UP	ASPHALT	GRAVEL	POOR
33	33	510B	PHYSICS	PO	04	32147	STRUCT. CO	PERLITE	BUILT-UP	ASPHALT	GRAVEL	POOR
34	32	928	MG POWER SUPPLY	AD	04	8036	STEEL	PERLITE	BUILT-UP	PITCH	GRAVEL	POOR
35	32	912	EXPERIMENTAL HALLS	AD	04	151828	STEEL	FIBERBOARD	BUILT-UP	ASPHALT	GRAVEL	POOR
36	31	526B	ENERGY, LABS, STOR., CONV	DE	05	12742	STEEL	URETHANE	BUILT-UP	PITCH	GRAVEL	POOR
37	31	1005S	COLLIDER CENTER	DO	04	21180	STRUCT. CO	ISOCYAN.	BUILT-UP	ASPHALT	GRAVEL	POOR
38	30	206	METALS WAREHOUSE	SL	01	11941	WOOD PLANK	ISO/PERL.	MOD. BIT.	MOD. BIT.	MINERAL	FAIR
39	30	209	BULK WAREHOUSE	SM	01	14144	PLYWOOD	FIBERGLASS	BUILT-UP	ASPHALT	MINERAL	FAIR
40	29	650	HOT LAUNDRY	EP	05	8340	STEEL	ISOCYAN.	BUILT-UP	ASPHALT	GRAVEL	FAIR
41	28	929	RF POWER SUPPLY	AD	04	4386	STEEL	PERLITE	BUILT-UP	PITCH	GRAVEL	FAIR
42	28	406	SITE STORAGE	EP	15	3600	WOOD PLANK	NONE	BUILT-UP	ASPHALT	SMOOTH	FAIR
43	28	575	SEWAGE PLANT	EP	15	3397	STEEL	PERLITE	BUILT-UP	ASPHALT	GRAVEL	FAIR
44	27	535	NSLS	IO	04	48506	LTWT. CONC	NONE	BUILT-UP	ASPHALT	GRAVEL	FAIR
45	26	459	MANAGEMENT INFO	MS	05	19123	TECTUM	URETHANE	BUILT-UP	ASPHALT	GRAVEL	FAIR
46	25	426	ATMOSPHERIC CHEM LAB	EE	01	12543	T&G	NONE	BUILT-UP	ASPHALT	SMOOTH	FAIR
47	24	480	MATERIAL SCIENCES	EE	05	37358	GYPSUM	PERLITE	BUILT-UP	ASPHALT	GRAVEL	FAIR
48	24	423	VEHICLE REPAIR	SS	05	10591	WOOD PLANK	FIBERBOARD	BUILT-UP	ASPHALT	SMOOTH	FAIR
49	24	460B	DIRECTORS OFFICE	DO	05	10266	CAST CONC.	NONE	BUILT-UP	ASPHALT	GRAVEL	FAIR
50	23	479A	MACHINE SHOP B	SC	05	5292	PLYWOOD	NONE	ELASTOMER.	PIB	BLACK	FAIR
51	23	555	CHEMISTRY	CO	06	46728	STRUCT. CO	LTWT. CONC	BUILT-UP	ASPHALT	GRAVEL	FAIR
52	23	424	ACCELERATOR STORAGE	AD	15	9302	WOOD PLANK	NONE	ELASTOMER.	PIB	BLACK	FAIR
53	23	473A	ELECTRON BEAM WELD	EP	05	3608	CAST CONC.	NONE	BUILT-UP	PITCH	GRAVEL	FAIR
54	23	801	HOT LABORATORY	EE	05	34691	STRUCT. CO	FIBERGLASS	BUILT-UP	ASPHALT	GRAVEL	FAIR
55	22	463A	BIOLOGY BUILDING	BO	05	11376	LTWT. CONC	NONE	BUILT-UP	PITCH	GRAVEL	FAIR

ROOF CONSTRUCTION ASSEMBLY REPORT BROOKHAVEN NATIONAL LABORATORY

PRIOR. RANK.	RATING TOTAL	BLDG. NO.	BUILDING USE	DIV	STRUC	SQUARE FOOTAGE	DECK TYPE.	INSULATION	MEMBRANE	MEMB. TYPE	SURFACING	GEN'L COND.
56	22	30	BROOKHAVEN CENTER	SS	05	13062	GYPSUM	FIBERBOARD	BUILT-UP	PITCH	GRAVEL	FAIR
57	21	904	CRYOGENIC TEST FACILITY	AD	14	2592	GYPSUM	NONE	BUILT-UP	ASPHALT	GRAVEL	FAIR
58	21	624	WATER TREATMENT PLANT	EP	05	6296	STEEL	FOAMGLASS	BUILT-UP	ASPHALT	GRAVEL	FAIR
59	20	830	NUCLEAR WASTE MANAGEMENT	NE	04	24085	CAST CONC.	ISOCYAN.	BUILT-UP	PITCH	GRAVEL	FAIR
60	20	479B	MACHINE SHOP B	SC	05	12748	LTWT. CONC	FIBERGLASS	BUILT-UP	ASPHALT	GRAVEL	FAIR
61	20	421B	STRUCTURAL BIOLOGY	BO	05	4022	T&G	NONE	SHINGLE	ASPHALT	MINERAL	FAIR
62	19	1002A	SUPPORT BUILDING	DO	04	2842	STEEL	ISO/PERL.	BUILT-UP	ASPHALT	GRAVEL	FAIR
63	19	464	DOE-BHO	DE	05	8920	STEEL	ISOCYAN.	BUILT-UP	ASPHALT	GRAVEL	FAIR
64	19	210	GASES WAREHOUSE	SM	01	6763	PLYWOOD	NONE	BUILT-UP	ASPHALT	GRAVEL	FAIR
65	18	477	RESEARCH LIBRARY	ID	05	17709	STRUCT. CO	FOAMGLASS	BUILT-UP	ASPHALT	GRAVEL	FAIR
66	18	421	STRUCTURAL BIOLOGY	BO	05	2370	STEEL	ISO/PERL.	BUILT-UP	ASPHALT	GRAVEL	FAIR
67	18	180A	MEN'S RESIDENCE	SS	12	1400	WOOD PLANK	NONE	BUILT-UP	ASPHALT	SMOOTH	FAIR
68	17	194	OCEANOGRAPHIC LABS	EE	01	12144	T&G	NONE	SHINGLE	ASPHALT	MINERAL	FAIR
69	17	473	ELECTRON BEAM WELD	EP	05	4832	STRUCT. CO	NONE	BUILT-UP	PITCH	GRAVEL	FAIR
70	17	134B	ADMINISTRATION DESIGN	EP	01	18831	T&G	NONE	SHINGLE	ASPHALT	MINERAL	FAIR
71	16	460A	DIRECTORS OFFICE	DO	05	3360	CAST CONC.	UNKNOWN	ELASTOMER.	PIB	BLACK	FAIR
72	16	197B	DEPT. ADMINISTRATION	NE	01	29162	WOOD PLANK	NONE	SHINGLE	ASPHALT	MINERAL	FAIR
73	16	493	VIDEO WORK AREA	PG	05	6785	CAST CONC.	URE./PER.	BUILT-UP	ASPHALT	GRAVEL	FAIR
74	16	180B	MEN'S RESIDENCE	SS	12	9956	WOOD PLANK	NONE	SHINGLE	ASPHALT	MINERAL	FAIR
75	16	452	UTILITIES MAINTENANCE	EP	01	31605	PLYWOOD	NONE	SHINGLE	ASPHALT	MINERAL	FAIR
76	15	461	GYMNASIUM	PE	05	13417	STRUCT. CO	PERLITE	BUILT-UP	ASPHALT	GRAVEL	GOOD
77	15	494B	STORAGE	SS	05	2900	METAL/WOOD	NONE	SHINGLE	ASPHALT	MINERAL	GOOD
78	15	629	EMERGENCY POWER	EP	05	1147	STEEL	PERLITE	BUILT-UP	ASPHALT	GRAVEL	GOOD
79	15	926	RECEIVING / WAREHOUSE	DO	14	10000	STEEL	URE./PER.	BUILT-UP	ASPHALT	GRAVEL	GOOD
80	14	1005H	COMPRESSOR BLDG.	DO	04	11713	STEEL	URETHANE	BUILT-UP	ASPHALT	GRAVEL	GOOD
81	14	906	PETT VI	CO	05	2561	STEEL	ISO/PERL.	BUILT-UP	ASPHALT	GRAVEL	GOOD
82	14	130	REACTOR SAFETY	NE	01	12626	T&G	NONE	SHINGLE	ASPHALT	MINERAL	GOOD
83	14	1007E	EJECT POWER SUPPLY	DO	04	4800	STEEL		METAL		PAINTED	GOOD
84	14	326	SITE MAINTENANCE OFFICE	EP	01	11285	WOOD PLANK	NONE	SHINGLE AN	ASPHALT	COATED	GOOD
85	13	479C	MACHINE SHOP B	SC	05	3358	STEEL	URETHANE	BUILT-UP	ASPHALT	GRAVEL	GOOD
86	13	975	STORAGE/SPS/WAREHOUSE	AD	14	5000	STEEL	PERLITE	BUILT-UP	ASPHALT	GRAVEL	GOOD
87	12	635	WELL NO. 11	EP	05	680	STRUCT. CO	ISOCYAN.	BUILT-UP	ASPHALT	SLAG	GOOD
88	12	599	FIRESTATION	HP	04	10813	STEEL	UNKNOWN	ELASTOMER.	EPDM	ROCK	GOOD
89	12	1004A	SUPPORT BUILDING	DO	04	1617	STEEL	URE./PER.	BUILT-UP	ASPHALT	GRAVEL	GOOD
90	12	473B	ELECTRON BEAM WELD	EP	05	1224	CAST CONC.		ELASTOMER.	PIB	BLACK	GOOD
91	11	492	WELL HOUSE NO.5	EP	05	168	STRUCT. CO	NONE	BUILT-UP	ASPHALT	GRAVEL	GOOD
92	11	462	CENTRAL SHOPS	SC	05	16186	STEEL	FIBERBOARD	BUILT-UP	ASPHALT	GRAVEL	GOOD
93	10	1006A	SUPPORT BUILDING	DO	04	2839	STEEL	URE./PER.	BUILT-UP	ASPHALT	GRAVEL	GOOD
94	10	634	WELL NO. 10	EP	05	500	CAST CONC.	ISOCYAN.	BUILT-UP	ASPHALT	SLAG	GOOD
95	10	815	ENERGY SCIENCE & TECH.	EE	04	29674	STRUCT. CO	URETHANE	BUILT-UP	PITCH	GRAVEL	GOOD
96	10	935	ASSEMBLY STORAGE	LS	14	6050	STEEL	URE./PER.	BUILT-UP	ASPHALT	GRAVEL	GOOD
97	8	449	TELEPHONE EQUIPMENT	AO	05	1674	STEEL	ISO/PERL.	BUILT-UP	ASPHALT	GRAVEL	GOOD
98	8	422	CABINET-SIGN SHOP	EP	01	13501	WOOD PLANK	FIBERGLASS	BUILT-UP	ASPHALT	MINERAL	GOOD
99	8	907	HEAVY ION POWER SUPPLY A	AD	06	2296	STRUCT. CO	ISOCYAN.	BUILT-UP	ASPHALT	GRAVEL	GOOD
100	7	197C	DEPT. ADMINISTRATION	NE	02	6391	PLYWOOD	NONE	ELASTOMER.	CSPE	SMOOTH	GOOD
101	7	463B	BIOLOGY BUILDING	BO	05	29609	LTWT. CONC	UNK	BUILT-UP	ASPHALT	UNK	GOOD
102	7	1005E	EJECT POWER SUPPLY	DO	04	4800	STEEL		METAL		PAINTED	GOOD
103	7	1008A	SUPPORT BUILDING	AD	04	2842	STEEL	ISO/PERL.	BUILT-UP	ASPHALT	GRAVEL	GOOD
104	6	1008	FACILITY HALL (8 O'CLOCK)	PO	06	4884	STEEL	URE./PER.	BUILT-UP	ASPHALT	GRAVEL	GOOD
105	5	494A	STORAGE	SS	05	1698	T&G	UNKNOWN	BUILT-UP	ASPHALT	GRAVEL	GOOD
106	4	527	COMBUSTION RESEARCH	EE	05	6611	PLYWOOD	NONE	SHINGLE	ASPHALT	MINERAL	GOOD
107	4	902B	NEUTRAL BEAM DIVISION	DO	04	36162	STEEL	FIBERGLASS	BUILT-UP	ASPHALT	GRAVEL	GOOD
108	4	637	WELL NO. 12	EP	05	680	STRUCT. CO	ISO/PERL.	BUILT-UP	ASPHALT	SLAG	GOOD
109	2	600	CHILLED WATER PLANT	EP	05	6300	STEEL	UNKNOWN	BUILT-UP	ASPHALT	GRAVEL	GOOD
110	2	1006	WIDE ANGLE HALL	AD	06	6490	STRUCT. CO	NONE	NONE			GOOD

ROOF CONSTRUCTION ASSEMBLY REPORT   BROOKHAVEN NATIONAL LABORATORY

PRIOR. RANK.	RATING TOTAL	BLDG. NO.	BUILDING USE	DIV	STRUC	SQUARE FOOTAGE	DECK TYPE.	INSULATION	MEMBRANE	MEMB. TYPE	SURFACING	GEN'L COND.
111	0	1101	NUTRINO LABORATORY	AD	04	2480	STEEL	NONE	METAL			GOOD

APPENDIX C-10

Sample Facility Inspection

Checklist

BLDG.______ FACILITY INSPECTION

DATE ___/___/___ INSPECTOR ____________________

TYPE OF BUILDING Wood Concrete Metal Glass

NUMBER OF STORIES ______________ SQ. FT.________________

YEAR BUILT ____

PRIMARY PURPOSE Office Lab Utility Multiple

BUILDING COORDINATOR _________________________EXT___________

ALTERNATE _________________________EXT___________

This Space Reserved for Key Plan of Building

UTILITIES INFORMATION

ELECTRICAL

AIR CONDITIONING

COMPRESSED AIR

HEATING

DEFICIENCIES

BUILDING ENVELOPE DEFICIENCIES

ROOF Type ____________ Condition/Comments ________
____
____

FOUNDATION Condition/Comments ______________________
____
____

DRAINS, GUTTERS & DOWNSPOUTS Condition/Comments ________
____
____

EXTERIOR WALLS Type of Construction ________________
Condition/Comments ______________________________
____
____

EXTERIOR TRIM Type ______________ Condition/Comments ____
____
____

EXTERIOR PAINT Condition/Comments ___________________
____
____

DOORS & ENTRANCEWAYS Condition/Comments ______________
____
____

WINDOWS Condition/Comments __________________________
____
____

CAULKING Condition/Comments _________________________
____
____

PAVED AREAS Approx Sq Ft ___________ Condition/Comments __
____
____

CURBS AND WALKWAYS Type ___________ Condition/Comments ____
____
____

LOADING DOCK / PLATFORM Condition/Comments ____________
____
____

ADDITIONAL BUILDING ENVELOPE DEFICIENCIES

INDIVIDUAL ROOMS AND SPACES WITHIN THE BUILDING

FLOORS ____
____
____

WALLS ____
____
____

CEILING ____
____
____

WINDOWS ____
____
____

MOLDING____
____
____

ELECTRICAL ____
____
____

PLUMBING ____
____
____

DEFICIENCIES____
____
____

DEFICIENCIES____
____
____

DEFICIENCIES____
____
____

DEFICIENCIES____
____
____

DEFICIENCIES____
____
____

ROOM NUMBER OR LOCATION ______________________________
____

FACILITY INSPECTION DEFICIENCY REPORT

==
BLDG. _______ DATE OF INSP ___/___/___ INSP. ___________________
==

DESCRIPTION ____
____
____
LOCATION ____
WO NUMBER ____________________ CRAFT CODE ________

HRS_ESTIM _______ X LABOR RATE ________ = _________

MATR_EST = _________
TOTAL COST = _________
FUTHER INVESIGATION REQUIRED __________
AWP________ LRWP________ BMAR ________
COMMENTS ____
____

DESCRIPTION ____
____
____
LOCATION ____
WO NUMBER ____________________ CRAFT CODE ________

HRS_ESTIM _______ X LABOR RATE ________ = _________

MATR_EST = _________
TOTAL COST = _________
FUTHER INVESIGATION REQUIRED __________
AWP________ LRWP________ BMAR ________
COMMENTS ____
____

DESCRIPTION ____
____
____
LOCATION ____
WO NUMBER ____________________ CRAFT CODE ________

HRS_ESTIM _______ X LABOR RATE ________ = _________

MATR_EST = _________
TOTAL COST = _________
FUTHER INVESIGATION REQUIRED __________
AWP________ LRWP________ BMAR ________
COMMENTS ____
____

DESCRIPTION ______________________________
____
____
LOCATION ______________________________
WO NUMBER ______________ CRAFT CODE ________

HRS_ESTIM ______ X LABOR RATE ________ = ________

MATR_EST = ________
TOTAL COST = ________
FUTHER INVESIGATION REQUIRED ________
AWP________ LRWP________ BMAR ________
COMMENTS ______________________________
____

DESCRIPTION ______________________________
____
____
LOCATION ______________________________
WO NUMBER ______________ CRAFT CODE ________

HRS_ESTIM ______ X LABOR RATE ________ = ________

MATR_EST = ________
TOTAL COST = ________
FUTHER INVESIGATION REQUIRED ________
AWP________ LRWP________ BMAR ________
COMMENTS ______________________________
____

DESCRIPTION ______________________________
____
____
LOCATION ______________________________
WO NUMBER ______________ CRAFT CODE ________

HRS_ESTIM ______ X LABOR RATE ________ = ________

MATR_EST = ________
TOTAL COST = ________
FUTHER INVESIGATION REQUIRED ________
AWP________ LRWP________ BMAR ________
COMMENTS ______________________________
____

BLDG. NO.	DP DV	ROOM NO.	ROOM SIZE	ROOM AREA	USE NAME	USE CODE
BLDG 460						
460	DO	1	9 X 12	108	OFFICE	10
460	DO	2	10 X 12	120	OFFICE	10
460	DO	3	13 X 9	117	RECEPT	12
460	DO	4	12 X 7	84	OFFICE	10
460	DO	5	12 X 33	396	OFFICE	10
460	DO	6	18 X 31	558	OFFICE	10
460	DO	6A	3 X 3	9	CLOSET	40
460	DO	7	X	0	OFFICE	10
460	DO	8	X	0	OFFICE	10
460	DO	8A	3 X 8	24	STORAGE	42
460	DO	8B	3 X 3	9	CLOSET	40
460	DO	15	12 X 14	168	CONF RM	10
460	DO	16	12 X 18	216	OFFICE	10
460	DO	17	8 X 12	96	OFFICE	10
460	DO	18	7 X 12	84	OFFICE	10
460	DO	19	7 X 12	84	FILE RM	12
460	DO	20	7 X 12	84	COMPUTER RM	67
460	DO	21	7 X 12	84	OFFICE	10
460	DO	22	7 X 12	84	OFFICE	10
460	DO	23	7 X 12	84	OFFICE	10
460	DO	24	7 X 12	84	OFFICE	10
460	DO	25	12 X 13	156	OFFICE	10
460	DO	26	5 X 12	60	KITCHEN	10
460	DO	26A	5 X 12	60	OFFICE	10
460	DO	29	13 X 14	182	COPY RM	16
460	DO	31	8 X 9	72	KITCHEN	24
460	DO	32	12 X 13	156	OFFICE	10
460	DO	33	19 X 13	247	OFFICE	11
460	DO	34	12 X 14	168	WORK AREA	11
460	DO	35	12 X 13	156	WORK AREA	11
460	DO	36	10 X 14	140	OFFICE	10
460	DO	37	14 X 27	378	CONF RM	13
460	DO				OFFICE	
460	DO	38	8 X 12	96	OFFICE	10
460	DO	39	8 X 12	96	OFFICE	10
460	DO	40	12 X 24	288		
460	DO	41	12 X 20	240	OFFICE	10
460	DO	42	12 X 26	312	OFFICE	10
460	DO	43	12 X 20	240	OFFICE	10
460	DO	44	12 X 12	144	OFFICE	10
460	DO	45	12 X 17	204	OFFICE	10
460	DO	46	12 X 12	144	OFFICE	10
460	DO	47	16 X 31	496	CONF RM	13
2ND FLOOR						
460	DO	1	22 X 26	572	OFFICE	10
460	DO	2	12 X 20	240	OFFICE	10
460	DO	3	12 X 20	240	OFFICE	10

APPENDIX C-11

Inspection and Protection

of Trailers

SAFETY AND ENVIRONMENTAL PROTECTION DIVISION BROOKHAVEN NATIONAL LABORATORY STANDARD OPERATING PROCEDURE			PROCEDURE NO.: FR-4.5
PROCEDURE BY/DATE 7/25/89 F. Strier	TITLE: INSPECTION OF AND		PAGE 1 OF 3
GROUP LEADER/DATE 7/25/89 F. Strier	PROTECTION SYSTEM CRITERIA		DQAR/DATE
SECTION HEAD/DATE 7/25/89 J. Deitz	FOR TRAILERS		DIVISION HEAD/EFFECTIVE DATE
COMMENTS/REMARKS: Replaces FR-4.5(9/9/80) Substantial Revisions			SQAR/Date: J. Levesque

1. INTRODUCTION

Trailers are assigned to a schedule for fire inspections through the Fire Protection Information Management System (FPMIS).

2. SCOPE

This Standard Operating Procedure (SOP) applies to all portable structures, movable facilities, etc. that are not conventional buildings, but are used for BNL operations. It defines the requirements for protection systems in trailers, etc. It assigns responsibilities for review of protection systems and recommendations.

3. RESPONSIBILITY

3.1 The designated building inspector (B.I.) is responsible for inspections.

3.2 The B.I. updates trailer movements.

3.3 The B.I. produces inspection recommendations.

3.4 The Captain reviews recommendations and work orders. Updates are to be passed to the database clerk.

3.5 The department who owns the trailer is responsible for assuring appropriate fire protection.

4. PROCEDURE

4.1 The B.I. should attempt to gain access into the trailer, after examining the trailer's exterior. Work Orders contain previous access information. This field should be updated by marking in red the new information. When a trailer cannot be accessed with a reasonable effort, a note is to be made on the bottom of the Work Order. This will allow for the Duty Captain's concurrence on the recommendation.

4.2 If a trailer is not at the location indicated, reasonable attempts should be made to find the correct location. As a minimum, this means contacting the Department/Division Safety Coordinator who is recorded as being responsible for the area.

4.2.1 If the new location can be determined, note the new location in red on the Inspection Work Order Form. Correct zone, location, and address fields as appropriate.

BNL F 2562A

4.2.2 IF the location cannot be determined, change zone, location, and address fields to Zone = "00", Location = "0000", Address = "cannot locate, date". The Work Order will be closed-out by database clerk with the notation in the comment that trailer could not be located.

4.3 The database clerk will also change the buildings database file to reflect changes in zone, location, address, and access information changes. It is important that the need to make these changes is clearly marked on the Work Order Form, since this requires changing the buildings database file, a separate step from the normal procedure for closing out Work Orders.

4.4 When a trailer is found which appears to need a suppression or detection system, the B.I. is to make this recommendation on an Inspection Memorandum. This is to be specifically reviewed with the Duty Captain. This type of recommendation requires a different level of review in order to ensure compliance with BNL policy (see SOP FR-4.13).

5. CRITERIA FOR SPECIAL SUPPRESSION SYSTEMS

5.1 1st Priority - (no exceptions) - All trailers or combustible portable structures within any building.

NOTE: Trailers within buildings are to have automatic sprinklers installed above and below the trailers.

5.2 2nd Priority - All trailers or temporary structures which contain BNL owned high value equipment with an aggregate value greater than $250,000, or which contain highly flammable materials and seriously expose a BNL structure (i.e. located within 20' of a BNL structure).

NOTE: BNL does not require this protection for trailers or temporary structures containing non-BNL equipment if these trailers do not expose BNL facilities (i.e. are greater than 20' from BNL structures and do not communicate via combustible constructions to within 20' of the BNL structures). However, BNL will assist the user in obtaining appropriate fire protection systems if desired. Any system installed must be reliable and compatible with the BNL alarm system to which it is connected.

5.3 3rd Priority - All other combustible trailers or temporary structures which provide moderate or serious exposure hazards to BNL structures (located within 20' of a building, or combustible interconnected trailers or structures, the nearest point of which is within 20' of a building).

6. FIRE DETECTION IN TRAILERS

It is desirable that all occupied trailers or similar structures be equipped with fire detection/alarm services; even if the trailer does not meet the more stringent requirements for an automatic extinguishing system. The Building Inspector is to prepare an Inspection Memorandum recommending fire detection for any occupied trailer, which does not have this service.

APPENDIX C-12

Areas Having Polystrene Expanded Insulation

1) Plant Engineering specfications contains the following condition regarding plastics insulation:

> The use of expanded plastic insulation is not permitted regardless of the manfactuers claim.

It has been in effect for at least ten years.

2) The following is a summary of building identified to has polystrene insulation and the status of action (AS - Spriklers, R - Removal, NA - No Action). Also include is the year in which action is to commence (C - Complete, XX - to be started in FY XX).

Bldg Number	Action	Year Start	Planned Complete
930*	AS	90	91
	R	95	-
913A to F	NA	-	-
928	NA	-	-
911	NA	-	-
510*	AS	Partial complete (hold - abestos)	
515*	AS	C	-
463	AS	C	-
902*	AS	90	92
901*	AS	89	90
555*	AS	C	-
459	AS	C	-
477	AS	89	91
493	R	As facility is activated	
535*	AS	C	-
815*	AS	89	On hold - Lack of funds
830*	AS	89	" " " " "
480*	AS	Partial complete (hold-abestos)	
488*	AS	89	92
526*	AS	90	92

• Indicates facilities were sprinklers were or are to be installed to protected the majority of the insulation. There are isolated segements of insulation which are located in chases, shafts ect. which do not have sprinkler coverage, but are limited in quanity and/or protcected by fire resistant construction for the remainder of the facility.

APPENDIX C-13

Annual Summary of Fire and Other Property Damage Experience

BROOKHAVEN NATIONAL LABORATORY
Annual Summary of Fire and Other
Property Damage Experience
CY 1989

NOTE: The information provided in this outline is confined to fire and property damage experience involving DOE owned property and to the property protection aspect with work for DOE Chicago Operations Office.

1. Recurring Loss Prevention Costs

	Fire Dept. Salaries*	Operating Expense	Fire Prot. Engineering	Fire Alarm & Sprinkler Maintenance	Total
CY 89	$1,522,000	$126,000	$147,000	$348,000**	$2,143,000
CY 88	$1,446,000	$113,000	$110,000	$379,900	$2,082,900
CY 87	$1,380,000	$ 95,000	$127,000	$245,200	$1,847,000
CY 86	$1,265,000	$105,000	$119,000	$198,900	$1,687,900
CY 85	$1,189,000	$ 95,300	$112,700	$165,600	$1,562,600

* Includes fire extinguisher, SCBA maintenance & mechanical aspects of extinguishing system maintenance.
** Includes a $81,000 contract for local building testing and maintenance.

2. Property Damage Vulnerability of DOE Property

The following is a list of locations where fire loss potentials exceed $1 million. For a description of each area see Attachment A.

A. Basement of Building 815

B. Building 130, Reactor Safety

C. Building 179, Staff Services

D. Central Steam Plant, LP Tank

E. Building 50, Police Headquarters

F. Building 348, Calibrations

G. AGS Target Halls

H. Bldg. 902, Accelerator Development Division

I. Basement of Building 510

J. Bldg. 918, AGS Storage

K. Bldg. 930, LINAC, Lower Equipment Bay

L. Bldg. 51, Meterology

M. Bldg. 422, Cabinet Shop

N. Bldg. 452, Maintenance

3. Major Fire Protection Accomplishments During 1989

NOTE: Costs are not included in Section 1 costs, unless marked with *

A. Installed sprinkler protection in Bldgs. 610 (Partial), 555 (Basement), and 510 (Basement); (total cost $400K).

B. Installed complete sprinkler protection in Bldgs. 355 and 356 (cost $116K & $52K).

C. Upgrade Life Safety at Bldg. 30 with new exits, dry chemical systems Fire Alarm Upgrade, and complete sprinkler (cost $210K).

D. Upgrade Fire/Rescue's station uniforms to comply with NFPA 1500 (cost $24K).

E. Replaced aging fire alarm equipment and upgrade building fire alarm and fire annunciation bell circuits to current standards at the High Flux Beam Reactor (Bldg. 750), Management Information Systems (Bldg. 459), and the Research Library (Bldg. 477) (cost $123K).

F. Completed the replacement of low reliability "shunt" type Gamewell alarm system with new NFPA 72D style system (cost $13,500).

G. Completed Phase I of the Fire Alarm System replacement for Bldg. 510 (Physics) (cost $37K).

H. Completed $86K of miscellaneous fire protection improvement projects (extension of sprinklers, bells, upgrades) which exclude new construction.

TOTAL EXPENDITURE $1,061,500

4. Major Fire Protection Objectives for 1990

A. Provide duct smoke detection in the High Flux Beam Reactor along with a series of Life Safety Code Improvements (estimated cost $250K). Project is 60% complete.

B. Decommission and remove the 18,000 gallon LP tank at the Central Steam Plant. The tank will be replaced by 10 underground tanks located at each user facility (estimated $120K project). Project is 60% complete.

C. Start the installation of sprinkler protection in Bldgs. 50, 51, 211, 244, 324, 422, 426, 348, 902, 918, and 923 under the Fire Protection Improvements, Phase III (estimated cost $700K).

D. Complete the upgrade of Bldg. 50's (Physics) fire alarm system (estimated cost $50K).

E. Partially upgrade the level of Life Safety at Bldg. 510 (Physics) by sealing vertical penetrations and providing latching devices on stair doors, etc. (estimated cost $48K).

F. Replace aging Kidde RS-48 manual Halon release stations (estimated cost $8K).

G. Replace the aging combustible gas detection system in Bldg. 210 and upgrading to include poisonous gases (estimated cost $30K).

H. Upgrade the Fire/Rescue training to comply with Hazardous Material Response Technician, as per NFPA 472.

TOTAL PLANNED EXPENDITURE $1,200,000

5. **Items of Interest**

A. Unusual Circumstances

(1) A Halon manual station failed to discharge the Halon system, but activated the fire alarm system when called on during a small fire (a reported UOR). The RS-48 manual by Kidde uses 2 circuits, one for alarms and one for Halon activation. Five other boxes were found faulty. BNL received an official response from Kidde, after BNL involved UL follow up services. Kidde stated the manuals are too old (17 years) and that there was no design flaw. BNL plans to replace all Kidde manuals with another manufacturer type.

B. Research

There was no loss prevention related research conducted by the Fire Prevention Group.

C. Systems Operation During a Fire

(1) There was no fire related operation of a sprinkler system at BNL for CY 89.

(2) There was no fire related operation of a gaseous extinguishing system at BNL for CY 89.

D. Accidental Release With Losses Over $1,000

There was one accidental release of a sprinkler system with losses at $1,000. Medical Dept. (Bldg. 490) had modifications to a sprinkler system. The workman forgot to replace one head. The water damaged some equipment.

One freeze up of a newly installed dry pipe system did occur. It was due to improper pitching (ie. 0 slope in pipe). No damage occurred.

One accidental discharge of a Halon system did occur during fire alarm testing. Loss was under $500.

E. Lesson Learned

As the result of a significant fire, BNL reexamined it's fire door inspection program. Although a fusible link melted, a fire door did not close. Apparently, the 20 year old mechanism lacked lubrication. In addition, the fire door inspection program tended to accept deficient arrangements because the existing door had no latch.

F. Changes/Awards/Rewards

Chief Strier retired after 40 plus years of service. The new Chief is Jim Roesler.

G. Suggested Research

DOE should provide guidance on the anticipated restriction on Halon. Should contractor stop installing Halon system? Should discharge tests be halted? Should long range system replacement be identified?

DOE should consider funding research on equivalency standards applicable to the Industrial and Business Occupancies of the Life Safety Code.

Explicit guidance should be given to DOE offices on the "authority having jurisdiction" (AHJ) interpretations on such terms as "nominal obstructions", "minimal reductions", etc. used by the Life Safety Code.

6. Loss Experience

A lightning strike started a fire in BNL's Finish Spray Shop of Bldg. 422. The June 15, 1989 fire caused $240K in damage. Operations were transferred to other facilities. A CAIRES report was filed.

Bldg. 928/929 experienced $3,000 damage as the result of a trailer fire (CAIRES reported).

Later in 1989 a relay rack fire occurred, which caused $900 damage (not CAIRES reportable).

BNL experienced windstorm damage to various buildings as the result of a summer storm. Total site damage was $60K. A CAIRES report is being filed this month.

7. Loss of Interest

None

ATTACHMENT A

Major Property Damage Vulnerability

A. The Basement of Bldg. 815 contains building systems and storage. Polystyrene duct insulation and difficult access for manual firefighting efforts increases the loss potential. The facility is heavy non-combustible, but anticipated clean up costs place the loss potential over one million dollars. Heat detection is presently provided. The installation of automatic sprinkler protection has been designed. Sprinkler protection installation was scheduled for 1989 under Fire Protection Improvements, Phase II. The project was delayed due to Asbestos abaitment concerns. Now Phase II money no longer exists. DOE has been asked to fund this project from Phase III money. No answer has been received. Phase III work is continuing as planned to avoid delays.

B. Reactor Safety (Bldg. 130) is a two-story, wood frame office building of 17,500 sq. ft. Heat detection is provided throughout. Fire frequency is considered low. However, a "worst case fire" would exceed one million dollars in property damage. This facility is connected to the fully sprinkled wood frame Plant Engineering (Bldg. 134). The fire wall separating these two buildings may not remain intact during a major fire due to deficiencies in construction. The installation of sprinkler protection was planned for Bldg. 130 under Fire Protection Improvements, Phase II. Construction did not start due to lack of funds. DOE has been asked to fund this project from Phase III money. No answer has been received. Phase III work is continuing as planned to avoid delays.

C. Bldg. 179 is used by Staff Services and the Department of Applied Sciences for office space. The one-story 14,300 sq. ft. wood frame building has heat detection installed throughout. The loss of the entire facility is possible in a "worse case fire". The fire loss potential exceeds one million dollars. The fire frequency is moderate. The installation of fire protection under Fire Protection Improvements, Phase II has been stopped due to lack of funds. A request to complete the work under Phase III has not received approval. BNL is proceeding with Phase III work to avoid delays.

D. An above ground, 18,000 gallon, horizontal LP tank is centrally located in Bldg. 610's complex (Steam Plant). It is used for main boiler pilots, the HFBR's (Bldg. 750) emergency generator, and experimental gas supplies to various buildings. The fire frequency for this facility is uncertain due to a lack of national statistics. There are several unfavorable factors. Since it was installed around 1948, plans and design criteria are not available. Although there is no ASME pressure vessel placard, relief valves appear to be adequately arranged. Early detection is probable since this area is constantly attended. Therefore, the potential for a BLEVE (Boiling Liquids Expanding Vapor Explosion) is diminished. If a BLEVE were to occur, the loss potential for an explosion could approach two million dollars with the involvement of the adjacent oil tanks and Hot Laundry (Bldg. 650). The installation of a new underground tank was funded from GPP, and started in FY 89. Completion should occur in 1990.

In addition to the LP tank hazard, several 600,000 gallon fixed roof tanks are used for the storage of Alternative Liquid Fuels (ALF). Concentrations of Class I flammable liquids generally exceed 20% in these tanks and are sufficient to consider the entire tank a Class I liquid. These tanks lack adequate emergency venting and do not have foam suppression systems. These two negative features can combine to produce a "worst case" loss (property damage and clean up costs) close to one million dollars. This project is intended to be funded by Fire Protection Improvements, Phase III.

E. Police Headquarters (Bldg. 50) is a two-story, 9,100 sq. ft. wood frame facility. The facility is presently the central security facility on site. Heat detection is provided throughout. A total fire loss is possible. Replacement costs of the facility and contents exceed one million dollars. Construction is holding pending DOE approval of a Davis Bacon waiver requested, based on security requirements.

F. Bldg. 348 is a one-story, 5,100 sq. ft., wood frame facility. It houses the Calibration section of the Safety and Environmental Protection Division. At any time, over $750,000 of radiation monitoring and other equipment is present. Several sealed radiation sources are also present. The total replacement cost of the equipment and facility exceeds one million dollars. Heat detection is provided throughout. The fire frequency is moderate. Sprinkler protection, under Fire Protection Improvements, Phase III is being installed in 1990.

G. Preliminary analysis of the AGS Target Halls indicates that there are loss potentials over one million dollats. There has been a recent shift by the experimental community toward large, high valued detectors. These experiments typically use flammable gases, combustible signal cables, plastic Scintillating materials, and are closely arranged in the experiments. The Target Halls are equipped with conventional heat or smoke detection at ceiling level. Early fire detection in not expected due to the high ceiling heights (over 70 feet). Localized spot detection is provided in some areas. The building's combustible Class II roof is not expected to be involved in a fire, unless large quantities of combustibles burn (as in a trailer). Strict housekeeping policies have been adopted to reduce the risk. The number of trailers have been reduced inside the building. Local protection has been provided over and above localized concerns.

H. Bldg 902 is a one and two story building used for offices and development of cryogenic magnets. The facility is primarily non-combustible with the exception of the Class II roof. Sprinkler protection is planned in Fire Protection Improvements Phase III. Design started in mid 1989 and construction is to start in late 1990. The only area not to be sprinklered is the High Bay area. The 70 ft. roof is not expected to become involved with the present occupancy. Exposure protection from the adjacent occupancies will be provided.

I. The basement of Physics (Bldg. 510) is utilized for equipment and experimental data storage, in addition to housing vital building equipment. Moderate combustible fire loading, continuous polystyrene duct insulation, difficult Fire Department access to the basement, and lack of automatic sprinkler protection increases the likelihood of a fire exceeding one million dollars in property damage. The fire frequency is considered low. This area has a potentially high impact on many users at Bldg. 510. The majority of the storage is sprinklered. Due to asbestos concerns, the Mechanical Equipment areas are on hold. Resolution is not planned until FY 92 or later. Extensive smoke contamination from the expanded plastic polystyrene duct work can be expected throughout all floors.

J. Bldg. 918 is a one story with Mezzanine "Butler Type" building. It is used for rack storage of various electrical parts (Class III material on double row racks 12 ft. high). Fire frequency is low. However, the value of equipment in buildings is slightly over one million dollars. No major programmatic impact is expected. Heat detection is present throughout. The installation of sprinkler protection is underway and should be complete by 9/90.

K. Bldg. 930, LINAC, the lower Equipment Bay (LEB) is the first floor of a two story 79,600 sq. ft. building. The LEB area houses the power supplies used to drive the LINAC, the primary injection source for the AGS. The HVAC ducts are covered with polystrene insulation. Fire frequency is low to moderate. Fire loading is moderate. Fire Department access is good. Sprinkler protection is being installed under Fire Protection Improvements, Phase III. Long range project will target the removal of insulation (FY 92 or later).

L. Bldg. 51 is a one story with a basement wood frame structure of 11,400 sq. ft. It houses the Meterological support for the Laboratory. Contents and building value exceed one million dollars. Fire frequency is low. Fire Department access is good. The facility is provided with heat detection. Sprinkler protection is being installed under Fire Protection Improvements, Phase III. As of 3/90, construction is 60% complete.

M. Bldg. 422 is a one story with a cockloft wood frame structure of 16,300 sq. ft. It houses the Laboratory's Cabinet Shop operations. Building and content replacement exceed one million dollars. The facility is provided with heat detection. Fire frequency is moderate. Fire Department access is good. Sprinkler protection is planned under Fire Protection Improvements, Phase III.

N. Bldg. 452 is the Site Maintenance facility. It is a one story wood frame structure of 28,600 sq. ft. The partially sprinklered facility is also equipped with heat detection. Building and contents are valued over one million dollars.

JL
f: dam_rpt.89

Appendix D. Table of OSHA Findings

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	3/29/90	Rogers

Regulatory Reference:
1904.2(a)(2)

The log and summary of occupational injuries and illnesses (OSHA Form No. 200 or its equivalent) was not completed as required.

Location of Violation: Bldg. 535, S&EP Division Building

Hazard Description: Occupational injuries and illnesses were not being recorded within 6 working days after receipt of information that a recordable injury or illness has occured.

Type of Violation	Date Observed	Inspector
Other than serious	4/03/90	Teske

Regulatory Reference:
1910.1001(d)

Eight-hour breathing zone samples shall be taken to determine the level of exposure of employees to asbestos fibers.

Location of Violation: Bldg. T-88, Supply and Materiel Division Warehouse

Hazard Description: Remington-Rand fireproof file cabinets which contain asbestos are located in Bldg. T-88. Employee monitoring, to determine the level of exposure, is not being performed.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	4/10/90	Rogers

Regulatory Reference:
1910.1001(d)(1)(ii)

Representative 8-hour TWA employee exposures shall be determined on the basis of one or more sample representing full-shift exposures for each shift for each employee in each job classification in each work area.

Location of Violation: Bldg. 488, Berkner Hall, Cafeteria

Hazard Description: Current monitoring of cafeteria employee exposure to asbestos has not been conducted. The sampling data are for 1983. The standard requires data dated after December 1985 for the TWA and after March 1988 for the excursion limit.

Type of Violation	Date Observed	Inspector
Other than serious	4/03/90	Teske

Regulatory Reference:
1910.1001(j)(2)

Warning labels shall be affixed to all raw materials, mixtures, scrap, waste, debris and other products containing asbestos...

Location of Violation: Bldg. T-88, Supply and Materiel Division Warehouse

Hazard Description: Remington-Rand fireproof file cabinets, which contain asbestos, were located in Bldg. T-88. They were not marked as required.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	4/04/90	Slawski

Regulatory Reference:
1910.101(b) #1

Compressed gases. The in-plant handling, storage, and utilization of all compressed gases in cylinders, portable tanks, rail tank cars, or motor vehicle cargo tanks shall be in accordance with Compressed Gas Association Pamphlet P-1-1965,(cont'd)

Location of Violation: Bldg. 725, NSLS, Vacuum Shop

Hazard Description: A compressed gas cylinder (helium) that was "not-in-use" had pressure registering on both gauges of its regulator.

Type of Violation	Date Observed	Inspector
Other than serious	4/04/90	Slawski

Regulatory Reference:
1910.101(b) #2

(continued from previous) BNL Safety Manual, Section 1.4.0, VI D.6. Before a cylinder is removed from service, determine that the cylinder valve is securely closed and that all pressure is released from the system.

Location of Violation: Bldg. 725, NSLS, Vacuum Shop

Hazard Description:

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	4/04/90	Slawski

Regulatory Reference:
1910.1025(d)

Evaluation and documentation of employee exposure to lead are required for all operations where lead is present. This evaluation shall be based on air monitoring and any other relevant considerations which may indicate employee exposure to lead.

Location of Violation: Bldg. 153, Cavendish House, 2nd Floor, Kitchen, and Men's Room

Hazard Description: Lead bricks were used as doorstops.

Type of Violation	Date Observed	Inspector
Other than serious	4/04/90	Slawski

Regulatory Reference:
1910.1025(d)

Evaluation and documentation of employee exposure to lead are required for all operations where lead is present. This evaluation shall be based on air monitoring and any other relevant considerations which may indicate employee exposure to lead.

Location of Violation: Bldg. 725, NSLS, Room 2-152 (Mail Room)

Hazard Description: Lead brick was used as doorstop.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	4/09/90	Slawski

Regulatory Reference:
1910.1025(d)

Evaluation and documentation of employee exposure to lead are required for all operations where lead is present. This evaluation shall be based on air monitoring and any other relevant considerations which may indicate employee exposure to lead.

Location of Violation: Bldg. 919, AGS, Design Room

Hazard Description: Two lead bricks were on the floor by a pair of doors (bricks used as doorstops).

Type of Violation	Date Observed	Inspector
Other than serious	4/10/90	Rogers

Regulatory Reference:
1910.106(d)(5)(iii)

Such storage shall be kept in closed metal containers, stored in a storage cabinet or in safety cans or in an inside storage room.

Location of Violation: Bldg. 510, Physics Department, high bay area

Hazard Description: Flammable liquids were being stored with combustible materials, respirators, and ear muffs.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	4/05/90	Stubblefield

Regulatory Reference:
1910.106(d)(5)(iii) #2

Office occupancies. Storage shall be prohibited except that which is required for maintenance and operation of building and operation of equipment. Such storage shall be kept in closed metal containers stored in a storage cabinet or in (continued)

Location of Violation: Bldg. 902, Relativistic Heavy Ion Collider Support, Instrument Room

Hazard Description: A flammable aerosol can was on a work bench in an area designated for smoking, thereby, creating a fire hazard.

Type of Violation	Date Observed	Inspector
Other than serious	4/05/90	Stubblefield

Regulatory Reference:
1910.106(d)(5)(iii) #2a

(continued from previous) safety cans or in an inside storage room not having a door that opens into that portion of the building used by the public.

Location of Violation: Bldg. 902, Relativistic Heavy Ion Collider Support, Instrument Room

Hazard Description:

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	4/06/90	Stubblefield

Regulatory Reference:
1910.106(d)(5)(iii) #3

Office occupancies. Storage shall be prohibited except that which is required for maintenance and operation of building and operation of equipment. Such storage shall be kept in closed metal containers stored in a storage cabinet or in (continued)

Location of Violation: Bldg. 445, Hazardous Waste Management, north door, storage shelf

Hazard Description: Flammables were on an open shelf in an area designated for smoking, thereby, creating a fire hazard.

Type of Violation	Date Observed	Inspector
Other than serious	4/06/90	Stubblefield

Regulatory Reference:
1910.106(d)(5)(iii) #3a

(continued from previous) safety cans or in an inside storage room not having a door that opens into that portion of the building used by the public.

Location of Violation: Bldg. 445, Hazardous Waste Management, north door, storage shelf

Hazard Description:

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	3/29/90	Stubblefield

Regulatory Reference:
1910.106(d)(7)(iii)

Sources of ignition shall be eliminated where the presence of flammable vapors is possible.

Location of Violation: Bldg. 610, Steam Power House, 1st floor, west end

Hazard Description: In a smoking area, log books were stored in the same wooden cabinet with flammable liquids, thereby, creating a fire hazard.

Type of Violation	Date Observed	Inspector
Other than serious	4/09/90	Stubblefield

Regulatory Reference:
1910.106(d)(7)(iii)

Open flames and smoking shall not be permitted in flammable or combustible liquid storage areas.

Location of Violation: Bldgs. 912 and 919C, AGS, throughout building

Hazard Description: Flammable liquids and aerosol spray cans are stored in work areas in which areas are also designated for smoking.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	3/28/90	Slawski

Regulatory Reference:
1910.1200(f)(5)(i)&(f)(5)(ii) #2

(continued from previous) (i) Identity of the hazardous chemical(s) contained therein; and (ii) Appropriate hazard warnings.

Location of Violation: Bldg. 750, HFBR, Experimental Floor, Room L-9B

Hazard Description:

Type of Violation	Date Observed	Inspector
Other than serious	4/02/90	Slawski

Regulatory Reference:
1910.1200(f)(5)(ii)

The employer shall ensure that each container of hazardous chemicals in the workplace is labeled, tagged or marked with ... appropriate hazard warnings.

Location of Violation: Bldg. 912, AGS, open shelf near Experiment 794

Hazard Description: Flammable liquids and other hazardous chemicals were stored on an open shelf and did not have appropriate hazard labels affixed. The shelf did not have a retaining lip as required by BNL Safety Manual, 2.1.1, VI.A.2.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	4/06/90	Stubblefield

Regulatory Reference:
1910.120(i)(2)(A)

Hazard waste operations and emergency response. Informational programs. Site safety and health plan, shall address key personnel.

Location of Violation: Bldg. 445, Hazardous Waste Management

Hazard Description: The safety personnel poster did not have all the names of key safety referral personnel listed.

Type of Violation	Date Observed	Inspector
Other than serious	3/28/90	Slawski

Regulatory Reference:
1910.1200(f)(5)(i)&(f)(5)(ii) #1

The employer shall ensure that each container of hazardous chemicals in the workplace is labeled, tagged, or marked with the following information: (continued)

Location of Violation: Bldg. 750, HFBR, Experimental Floor, Room L-9B

Hazard Description: Containers for "Vythene" (1,1,1 Trichloroethane), Acetone, Methyl Alcohol and Kerosene did not have hazard warning labels.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	4/02/90	Rogers

Regulatory Reference:
1910.1200(f)(5)(ii)

The employer shall ensure that each container of hazardous chemicals in the workplace is labeled, tagged or marked with the appropriate hazard warnings

Location of Violation: Bldg. 624, Water Treatment Plant

Hazard Description: Containers of chemicals in this area were not labeled with hazard warnings that would convey the hazards of the chemicals to employees.

Type of Violation	Date Observed	Inspector
Other than serious	4/03/90	Rogers

Regulatory Reference:
1910.1200(f)(5)(ii)

Employer shall ensure that each container of hazardous chemicals in the workplace is labeled, tagged or marked with the appropriate hazard warning.

Location of Violation: Bldg. 490, Medical Clinic, Machine Shop

Hazard Description: Chemical containers are not being labeled with the appropriate hazard warnings that would convey the hazards of the chemical to employees.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	4/03/90	Rogers

Regulatory Reference:
1910.1200(f)(5)(ii)

Employer shall ensure that each container of hazardous chemicals in the workplace is labeled, tagged or marked with the appropriate hazard warnings.

Location of Violation: Bldg. 494, Medical Clinic, dishwashing areas

Hazard Description: Chemical containers are not appropriately labeled to convey chemical hazards to employees.

Type of Violation	Date Observed	Inspector
Other than serious	4/05/90	Rogers

Regulatory Reference:
1910.1200(f)(5)(ii)

Employers shall ensure that each container of hazardous chemicals in the workplace is labeled, tagged or marked with the appropriate hazard warning.

Location of Violation: Bldg. 555, Chemistry Department, Room 308

Hazard Description: A custodial worker had chemical containers that were not labeled with the appropriate hazard warning that would convey the hazards of the chemicals to the employees.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	4/06/90	Rogers

Regulatory Reference:
1910.1200(f)(5)(ii)

Employer shall ensure that each container of hazardous chemicals in the workplace is labeled, tagged or marked with the appropriate hazard warning.

Location of Violation: Bldg. 555, Chemistry Department, Machine Shop

Hazard Description: Chemical containers are not appropriately labeled to convey chemical hazards to employees.

Type of Violation	Date Observed	Inspector
Other than serious	4/09/90	Slawski

Regulatory Reference:
1910.1200(f)(5)(ii)

The employer shall ensure that each container of hazardous chemicals in the workplace is labeled, tagged or marked with the appropriate hazard warning.

Location of Violation: Bldg. 919, AGS, Motor Control Room

Hazard Description: Hazardous material, containers of trichloroethane and acetone, lacked health hazard labels.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	3/29/90	Stubblefield

Regulatory Reference:
1910.1200(f)(9)

Employers shall ensure that labels on incoming containers of hazardous chemicals are not removed or defaced.

Location of Violation: Bldg. 610, Steam Plant, tank farm area

Hazard Description: The flammables sign on the liquid propane gas tank was not readable.

Type of Violation	Date Observed	Inspector
Other than serious	4/10/90	Rogers

Regulatory Reference:
1910.1200(f)(9)

Employers shall ensure that each container of hazardous chemicals in the workplace is labeled, tagged or marked with the appropriate hazard warnings.

Location of Violation: Bldg. 815, Molecular and Applied Sciences Department, Room 1-25

Hazard Description: The label and hazard warnings could not be read on a container of chemicals.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	4/09/90	Slawski

Regulatory Reference:
1910.1200(g)(1)

The employer shall maintain copies of any material safety data sheets ... and shall ensure that the material data sheets are readily accessible during each work shift to employees...

Location of Violation: Bldg. 919, AGS, Motor Control Room

Hazard Description: Material safety data sheets (MSDS) were not available for Acetone or 1,1,1-Trichloroethane.

Type of Violation	Date Observed	Inspector
Other than serious	3/28/90	Teske

Regulatory Reference:
1910.1200(g)(8)

Employer shall maintain copies of any material safety data sheets ... and shall ensure that the material data sheets are readily accessible during each work shift to employees...

Location of Violation: Bldg. 208, Central Shops

Hazard Description: MSDS are not maintained or available to employees for welding rods which are not included in the Hazard Communication Program.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	3/28/90	Stubblefield

Regulatory Reference:
1910.1200(g)(8)

Employer shall maintain copies of any material safety data sheets ... and shall ensure that the material safety data sheets are readily accessible during each work shift to employees...

Location of Violation: Bldg. 750, HFBR

Hazard Description: Flammables storage cabinets and laboratories had solvent containers with Vythene (1,1,1 Trichoroethane), a local trade name. Two days were required to locate the MSDS that referred to the local trade name. This was not a timely response.

Type of Violation	Date Observed	Inspector
Other than serious	3/29/90	Teske

Regulatory Reference:
1910.1200(g)(8)

Employer shall maintain copies of any material safety data sheets ... and shall ensure that the material safety data sheets are readily accessible during each work shift to employees...

Location of Violation: Bldg. 326, Plant Engineering

Hazard Description: MSDS are not maintained or available to employees for welding rods which are not included in the Hazard Communication Program.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	4/02/90	Rogers

Regulatory Reference:
1910.1200(g)(8)

Employers shall maintain copies of any material safety data sheets ... and shall ensure that the material safety data sheets are readily accessible during each work shift to employees...

Location of Violation: Bldg. 463, Biology Department, throughout building

Hazard Description: MSDS were not readily accessible to the employees.

Type of Violation	Date Observed	Inspector
Other than serious	4/03/90	Rogers

Regulatory Reference:
1910.1200(g)(8)

Employer shall maintain copies of any material safety data sheets ... and shall ensure that the material safety data sheets are readily accessible during each work shift to employees...

Location of Violation: Bldg. 490, Medical Clinic, Machine Shop

Hazard Description: MSDS were not readily accessible to the employees working in this area. MSDS are kept in S&EP.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	4/03/90	Rogers

Regulatory Reference:
1910.1200(g)(8)

Employers shall maintain copies of any material safety data sheets ... and shall ensure that the material safety data sheets are readily accessible during each work shift to employees...

Location of Violation: Bldg. 490, Medical Clinic, dishwashing areas

Hazard Description: MSDS sheets are not readily accessible to the employees working in this area. MSDS are kept in Safety and Environmental Protection. Employees must call a Safety Representative or S&EP to get MSDS.

Type of Violation	Date Observed	Inspector
Other than serious	4/03/90	Rogers

Regulatory Reference:
1910.1200(g)(8)

Employers shall maintain copies of any material safety data sheets ... and shall ensure that the material safety data sheets are readily accessible during each work shift to employees...

Location of Violation: Bldg. 490, Medical Clinic, throughout building

Hazard Description: MSDS are not readily accessible to the employees working in this area.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	4/03/90	Teske

Regulatory Reference:
1910.1200(g)(8)

Employers shall maintain copies of any material safety data sheets ... and shall ensure that the material safety data sheets are readily accessible during each work shift to employees...

Location of Violation: Bldg. 89, Supply and Materiels, chemical receiving area

Hazard Description: MSDS for Supply and Materiels Division are not maintained at their facilities. MSDS are available only through special request from S&EP.

Type of Violation	Date Observed	Inspector
Other than serious	4/04/90	Stubblefield

Regulatory Reference:
1910.1200(g)(8)

Employer shall maintain copies of any material safety data sheets ... and shall ensure that the material safety data sheets are readily accessible during each work shift to employees...

Location of Violation: Bldg. 820, AGS, Flammables Storage Cabinet

Hazard Description: The MSDS was reported to be kept in Bldg. 179 but could not be produced.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	4/04/90	Stubblefield

Regulatory Reference:
1910.1200(g)(8)

The employer shall maintain copies of any material safety data sheets ... and shall ensure that the material safety data sheets are readily accessible during each work shift to employees...

Location of Violation: Bldg. 725, NSLS, Flammable Storage Cabinet

Hazard Description: MSDS were not available for 190 proof ethyl alcohol. MSDS for denatured ethyl alcohol only was found.

Type of Violation	Date Observed	Inspector
Other than serious	4/04/90	Slawski

Regulatory Reference:
1910.1200(g)(8)

The employer shall maintain copies of any material safety data sheets ... and shall ensure that the material safety data sheets are readily accessible during each work shift to employees...

Location of Violation: Bldg. 725, NSLS, VUV experimental areas U7 and U8

Hazard Description: MSDS were not maintained in the work area (U7 and U8).

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	4/04/90	Stubblefield

Regulatory Reference:
1910.1200(g)(8)

The employer shall maintain copies of any material safety data sheets ... and shall ensure that the material safety data sheets are readily accessible during each work shift to employees...

Location of Violation: Bldg. 820, AGS

Hazard Description: A gallon of con-lux custom reducer (solvent) was stored in a metal wall cabinet. A note on the cabinet said to call C. Flagg on Ext. 3128 for information. A call was placed but he was in conference.

Type of Violation	Date Observed	Inspector
Other than serious	4/05/90	Teske

Regulatory Reference:
1910.1200(g)(8)

Employers shall maintain copies of any material safety data sheets ... and shall ensure that the material safety data sheets are readily accessible during each work shift to employees...

Location of Violation: Bldg. 423, Transportation and Travel

Hazard Description: MSDS are not maintained or available to employees for welding rods which are not included in the Hazard Communications Program.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	4/05/90	Rogers

Regulatory Reference:
1910.1200(g)(8)

Employers shall maintain copies of any material safety data sheets ... and shall ensure that the material safety data sheets are readily accessible during each work shift to employees...

Location of Violation: Bldg. 555, Chemistry Department, Room 308

Hazard Description: MSDS were not readily accessible to custodial workers. MSDS are kept in the supervisor's office (Bldg. 326), or S&EP.

Type of Violation	Date Observed	Inspector
Other than serious	4/05/90	Rogers

Regulatory Reference:
1910.1200(g)(8)

Employers shall maintain copies of any material safety data sheets ... and shall ensure that the material safety data sheets are readily accessible during each work shift to employees...

Location of Violation: Bldg. 555, Chemistry Department, throughout building

Hazard Description: MSDS are not readily accessible to the employees working in this area.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	4/05/90	Stubblefield

Regulatory Reference:
1910.1200(g)(8)

The employer shall maintain copies of any material safety data sheets ... and shall ensure that the material safety data sheets are readily accessible during each work shift to employees...

Location of Violation: Bldg. 905, Magnet Factory, south end

Hazard Description: A chemical (Dichloromethane) was in a cabinet. The MSDS could not be made available in a timely manner.

Type of Violation	Date Observed	Inspector
Other than serious	4/06/90	Rogers

Regulatory Reference:
1910.1200(g)(8)

Employers shall maintain copies of any material safety data sheets ... and shall ensure that the material safety data sheets are readily accessible during each work shift to employees...

Location of Violation: Bldg. 555, Chemistry Department, Machine Shop

Hazard Description: MSDS were not available for several chemicals found in this area.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	4/06/90	Rogers

Regulatory Reference:
1910.1200(h)(2)(ii)

Employee training shall include at least the physical and health hazards of the chemicals in the work area.

Location of Violation: Bldg. 555, Chemistry Department, Machine Shop

Hazard Description: Employees working in this area had not received training on the Hazard Communication Program.

Type of Violation	Date Observed	Inspector
Other than serious	4/06/90	Rogers

Regulatory Reference:
1910.1200(h)(2)(iii)

Employee training shall include the measures employees can take to protect themselves from these hazards, including specific procedures the employer has implemented to protect employees from exposure to hazardous chemicals.

Location of Violation: Bldg. 555, Chemistry Department, Machine Shop

Hazard Description: Employees had not received training on how to protect themselves from exposure to hazardous chemicals, on work practices, emergency procedures, and on personal protection equipment to be used.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	4/06/90	Rogers

Regulatory Reference:
1910.1200(h)(2)(iv)

Employee training shall include methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area(s).

Location of Violation: Bldg. 555, Chemistry Department, Machine Shop

Hazard Description: Employees working in this area had not received training on the Hazard Communication Program.

Type of Violation	Date Observed	Inspector
Other than serious	3/29/90	Teske

Regulatory Reference:
1910.132(a)

Protective equipment for eye, face, and extremity protection shall be provided, used and maintained in a sanitary and reliable condition.

Location of Violation: Bldg. 610, Steam Plant, Battery Room

Hazard Description: The battery room has a deluge shower in case an employee gets battery acid on his/her body or in his/her eyes. The shower has not been checked within the past year to verify that it functions properly.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	4/02/90	Teske

Regulatory Reference:
1910.132(a)

Protective equipment for eyes, face, head, and extremities shall be provided, maintained, and used in a sanitary and reliable condition.

Location of Violation: Bldg. 624, Water Treatment Plant, laboratory

Hazard Description: Eye wash fountain had not been checked within the past year to verify that it functions properly.

Type of Violation	Date Observed	Inspector
Other than serious	4/05/90	Stubblefield

Regulatory Reference:
1910.132(a)

Protective equipment for eye, face, and extremity protection shall be provided, used and maintained in a sanitary and reliable condition.

Location of Violation: Bldg. 905, Magnet Factory

Hazard Description: Throughout the building, there is no evidence that the eye wash fountains have ever been inspected or cleaned. They may not be operable if needed. The dust and dirt in uncapped fountains are potential source for eye contamination during use.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	4/06/90	Stubblefield

Regulatory Reference:
1910.132(a)

Protective equipment for eye, face, and extremity protection shall be provided, used and maintained in a sanitary and reliable condition.

Location of Violation: Bldg. 445, Hazardous Waste Management, lathe area

Hazard Description: The eye wash fountain may not be operable if needed. Dust and dirt in the uncapped fountain are potential sources for eye contamination during use.

Type of Violation	Date Observed	Inspector
Other than serious	4/10/90	Rogers

Regulatory Reference:
1910.132(a)

Protective equipment ... shall be provided, used, and maintained in a sanitary condition.

Location of Violation: Bldg. 510, Physics Department, high bay area

Hazard Description: A pair of ear muffs were kept in a storage cabinet with flammable material.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	4/10/90	Rogers

Regulatory Reference:
1910.132(a)

Protective equipment for eye, face, and extremities shall be provided, used, and maintained in a sanitary and reliable condition.

Location of Violation: Bldg. 815, Molecular and Applied Sciences Department, basement shop area

Hazard Description: The eye wash fountain was contaminated with dust and dirt.

Type of Violation	Date Observed	Inspector
Other than serious	4/10/90	Stubblefield

Regulatory Reference:
1910.132(d)

Protective equipment for eyes, face, head and other extremities ... shall be provided ... and maintained in a sanitary and reliable condition.

Location of Violation: Bldg. 510, Physics Machine Shop, 1-56

Hazard Description: No inspection tag was affixed to the eye wash fountain.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	4/10/90	Rogers

Regulatory Reference:
1910.134(b)(6)

Respirators shall be stored in a convenient, clean, and sanitary location.

Location of Violation: Bldg. 510, Physics Department, high bay area

Hazard Description: A respirator was being stored in a metal cabinet with flammable material and other paper goods.

Type of Violation	Date Observed	Inspector
Other than serious	4/02/90	Stubblefield

Regulatory Reference:
1910.136(b)(6)

In every building equipped for artificial illumination, adequate and reliable illumination shall be provided for all exit facilities.

Location of Violation: Bldg. 922, AGS, north/east door entrance

Hazard Description: Rear door entrance is not illuminated.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	4/06/90	Stubblefield

Regulatory Reference:
1910.136(b)(6)

In every building equipped for artificial illumination, adequate and reliable illumination shall be provided for all exit facilities.

Location of Violation: Bldg. 445, Hazardous Waste Management, east door entrance

Hazard Description: The exterior light for the door is out and is not secured to the wall. Rain water flows directly onto the open wires creating an electrical hazard.

Type of Violation	Date Observed	Inspector
Other than serious	3/28/90	Stubblefield

Regulatory Reference:
1910.106(d)(7)(iii)

Open Flames and Smoking shall not be permitted in flammable or combustable liquid storage areas.

Location of Violation: Bldg. 750, HFBR, Lab Room L14

Hazard Description: Fire potential. Cigarette butts found in ash tray in an area designated as non smoking.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	4/09/90	Teske

Regulatory Reference:
1910.141(a)(3)(i)

All places of employment shall be kept clean to the extent that the nature of the work allows.

Location of Violation: Bldg. 462, Central Shops

Hazard Description: Better enclosures and ventilation systems should be installed to control oil mists from the 5-axis Bostonmatic, Cincinnati 225, Cintimatic and simular milling machines.

Type of Violation	Date Observed	Inspector
Other than serious	4/09/90	Stubblefield

Regulatory Reference:
1910.145(c)(3)

Safety instruction signs shall be used where there is a need for general instructions and suggestions relative to safety measures.

Location of Violation: Bldg. 912, AGS, Gate 9

Hazard Description: A sign gave safety instructions for a fire alarm system which was not installed.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	4/06/90	Rogers

Regulatory Reference:
1910.151(c)

Where the eyes or body of any person may be exposed to injurious corrosive materials, suitable facilities for quick drenching or flushing of the eyes and body shall be provided within the work area for immediate emergency use.

Location of Violation: Bldg. 555, Chemistry Department, Room 265

Hazard Description: Emergency eye wash fountain was blocked creating a hazard to employees working in that area.

Type of Violation	Date Observed	Inspector
Other than serious	3/30/90	Stubblefield

Regulatory Reference:
1910.157(c)(1)

The employer shall provide portable fire extinguishers and shall mount, locate and identify them so they are readily accessible to employees.

Location of Violation: Bldg. 491, Medical Reactor Bldg. Rm 8-116 (Library) and hallway near entrance to the Carcinogen Room

Hazard Description: No signs were posted to indicate the location of the fire extinguishers.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	4/02/90	Stubblefield

Regulatory Reference:
1910.157(c)(1)

The employer shall provide portable fire extinguishers and shall mount, locate and identify them so they are readily accessible to employees.

Location of Violation: Bldg. 912, East Experimental Building Addition, Experiments 814 and 787

Hazard Description: No signs were posted to indicate the location of the fire extinguishers.

Type of Violation	Date Observed	Inspector
Other than serious	4/04/90	Stubblefield

Regulatory Reference:
1910.157(c)(1)

The employer shall provide portable fire extinguishers and shall mount, locate and identify them so they are readily accessible to employees.

Location of Violation: Bldg. 725, NSLS, Lobby

Hazard Description: There was no sign posted indicating the location of the fire extinguisher.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	4/05/90	Stubblefield

Regulatory Reference:
1910.157(c)(1)

The employer shall provide portable fire extinguishers and shall mount, locate and identify them so they are readily accessible to employees.

Location of Violation: Bldg. 1005-S, Relativistic Heavy Ion Collider, Lobby

Hazard Description: From a position in the center of the lobby, no sign giving the location of the one fire extinguisher is observable.

Type of Violation	Date Observed	Inspector
Other than serious	4/05/90	Stubblefield

Regulatory Reference:
1910.157(c)(1)

The employer shall provide portable fire extinguishers and shall mount, locate and identify them so they are readily accessible to employees.

Location of Violation: Bldg. 902, ADD, Lobby

Hazard Description: The location of the fire extinguisher is not obvious. There was no sign posted to indicate the location of the fire extinguisher.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	4/05/90	Stubblefield

Regulatory Reference:
1910.157(c)(1)

The employer shall provide portable fire extinguishers and shall mount, locate and identify them so they are readily accessible to employees.

Location of Violation: Bldg. 902, ADD, work station E-7.

Hazard Description: No fire extinguisher is located at the position designated as the fire extinguisher location.

Type of Violation	Date Observed	Inspector
Other than serious	4/06/90	Stubblefield

Regulatory Reference:
1910.157(c)(1)

The employer shall provide portable fire extinguishers and shall mount, locate and identify them so they are readily accessible to employees.

Location of Violation: Bldg. 445, Hazardous Waste Management Facility

Hazard Description: No sign was posted to indicate the location of the fire extinguisher. The view of the extinguisher is blocked by tall metal cabinets on both sides.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	4/06/90	Teske

Regulatory Reference:
1910.157(c)(1)

The employer shall provide portable fire extinguishers and shall mount, locate, and identify them so they are readily accessible to employees.

Location of Violation: Bldg. 445, Hazardous Waste Management Facility

Hazard Description: A fire extinguisher was sitting on the floor by the overhead door rather than being mounted on the wall.

Type of Violation	Date Observed	Inspector
Other than serious	4/09/90	Stubblefield

Regulatory Reference:
1910.157(c)(1)

The employer shall provide portable fire extinguishers and shall mount, locate and identify them so that they are readily accessible.

Location of Violation: Bldg. 912, AGS, several locations

Hazard Description: Signs to identify the locations of extinguishers were missing, and the locations were often obstructed by equipment.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	3/29/90	Teske

Regulatory Reference:
1910.157(e)(3)

Portable fire extinguishers shall be inspected and the inspection shall be recorded annually.

Location of Violation: Bldg. 610, Steam Plant, south east corner

Hazard Description: A portable fire extinguisher in the south east corner of the steam plant has not been inspected within the past year.

Type of Violation	Date Observed	Inspector
Other than serious	3/30/90	Stubblefield

Regulatory Reference:
1910.157(e)(3)

Portable fire extinguishers shall be inspected and the inspection shall be recorded annually.

Location of Violation: Bldg. 491, BMRR, Room 9-433

Hazard Description: Fire extinguisher had no inspection date on its tag.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	4/02/90	Rogers

Regulatory Reference:
1910.157(e)(3)

Portable fire extinguishers shall be inspected and the inspection shall be recorded annually.

Location of Violation: Bldg. 463, Biology Department, Room 251

Hazard Description: The last recording of a maintenance check on the fire extinguisher was entered on March 28, 1989.

Type of Violation	Date Observed	Inspector
Other than serious	4/03/90	Rogers

Regulatory Reference:
1910.157(e)(3)

Portable fire extinguishers shall be inspected and the inspections shall be recorded annually.

Location of Violation: Bldg. 490, Medical Clinic, Fire Extinguisher No. 12

Hazard Description: The fire extinguisher was labeled "Pool." No indication that a maintenance check had been performed.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	4/06/90	Teske

Regulatory Reference:
1910.179(j)(3)

Complete inspections of the crane shall be performed at intervals generally defined in paragraph 1910.179(j)(1)(ii)(b).

Location of Violation: Bldg. 446, Hazardous Waste Management Facility

Hazard Description: A 1-ton hoist used to handle 55-gallon drums had not received a periodic inspection.

Type of Violation	Date Observed	Inspector
Other than serious	4/09/90	Teske

Regulatory Reference:
1910.179(j)(3)

A complete inspection of the crane shall be made at periodic intervals as generally defined in 1910.179(j)(1)(ii)(b) depending on its activity, severity of service, and environment.

Location of Violation: Bldg. 462, Central Shops

Hazard Description: The 1-ton chain hoist on the bridge crane has not been inspected.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	4/09/90	Teske

Regulatory Reference:
1910.179(j)(3)

A complete inspection of the crane shall be performed at intervals as generally defined in 1910.179(j)(1)(ii)(b) depending on its activity, severity of service, and environment.

Location of Violation: Bldg. 462, Central Shops

Hazard Description: The 1-ton electric hoist has not been inspected.

Type of Violation	Date Observed	Inspector
Other than serious	4/02/90	Slawski

Regulatory Reference:
1910.23(d)

Every flight of stairs having four or more risers shall be equipped with standard stair railings or standard handrails...

Location of Violation: Bldg. 913, AGS, stairs and walkways over beamline

Hazard Description: The DEXTON 260 handrails and guardrails used in the "temporary" stairways and walkways over the beam stop are shaped like an inverted "L" and not readily graspable by human hands in the event of falling or tripping.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	4/04/90	Slawski

Regulatory Reference:
1910.23(d)(1)

In every building, the loads approved by the building official shall be conspicuously posted.

Location of Violation: Bldg. 820, ATF, storage area above Clean Room

Hazard Description: The live-load limit for the floor of the storage area was not posted.

Type of Violation	Date Observed	Inspector
Other than serious	3/30/90	Slawski

Regulatory Reference:
1910.23(e)(1)

A standard railing shall have a vertical height of 42 inches nominal from upper surface of top rail to floor.

Location of Violation: Bldg. 490, BMRR, top of Reactor and Reactor Balcony area

Hazard Description: Handrail at both locations is less than 42 inches high.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	4/09/90	Slawski

Regulatory Reference:
1910.23(e)(1)

A standard railing shall have a vertical height of 42 inches nominal from upper surface of top rail to floor.

Location of Violation: Bldg. 912, AGS, "B" Line Power Separator

Hazard Description: Guardrails are less than 42 inches high.

Type of Violation	Date Observed	Inspector
Other than serious	4/06/90	Rogers

Regulatory Reference:
1910.252(a)(2)(ii)(d)

Valve protection caps, where cyclinder is designed to accept a cap, shall always be in place, hand-tight, except when cylinders are in use or connected for use.

Location of Violation: Bldg. 510, Chemistry Department, cyclinder storage area

Hazard Description: An oxygen cylinder was being stored without a valve protection cap in place.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	3/28/90	Slawski

Regulatory Reference:
1910.305(a)(4)(v)

Conductors within seven feet of the floor are considered exposed to physical damage. Where they cross walls they shall be protected.

Location of Violation: Bldg. 725, NSLS, corridor near X-1, and X-2 beam lines

Hazard Description: An electrical cord that runs outside on the wall is not in a conduit and could be snagged.

Type of Violation	Date Observed	Inspector
Other than serious	4/10/90	Stubblefield

Regulatory Reference:
1910.305(b)(1)

Openings for conductors entering electrical boxes shall be effectively closed.

Location of Violation: Bldg. 510, Physics, high bay area, all four walls

Hazard Description: Openings in electrical boxes have not been closed.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	4/10/90	Slawski

Regulatory Reference:
1910.305(b)(1)

Openings for conductors entering electrical connection boxes shall be effectively closed.

Location of Violation: Bldg. 924, ADD, curing area, western press electrical junction boxes at "#4 east" and at "#8 east"

Hazard Description: Electrical boxes are not effectively closed.

Type of Violation	Date Observed	Inspector
Other than serious	4/09/90	Stubblefield

Regulatory Reference:
1910.305(e)

Fittings and enclosures in damp locations shall be installed so as to prevent moisture or water from entering and accumulating within the enclosures.

Location of Violation: Bldg. 912, AGS, Gate ATF-23

Hazard Description: The roof above an electrical connection box was leaking.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	4/02/90	Slawski

Regulatory Reference:
1910.36(b)(5)

Every exit shall be clearly visible.

Location of Violation: Bldg. 912, near Overhead Door #5

Hazard Description: Exit sign is obscured by a beam stop.

Type of Violation	Date Observed	Inspector
Other than serious	4/10/90	Slawski

Regulatory Reference:
1910.36(d)

Every required exit, way of approach thereto, and way of travel ... shall be maintained free of all obstructions or impediments to full instant use in case of fire or other emergency.

Location of Violation: Bldg. 913, AGS, stairs and walkways over beamline

Hazard Description: The RAPISTEEL and INTERLAKE decking mate unevenly in places so as to present a tripping hazard.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	3/29/90	Teske

Regulatory Reference:
1910.37(b)(1)

Egress routes must be provided with a minimum of a one hour fire seperation from the rest of the building.

Location of Violation: Bldg. 422, Plant Engineering

Hazard Description: A janitor's closet with combustible materials and less than a 1 hour fire seperation is located under the stairs from the Sign Shop. A 1 hour fire seperation must be provided.

Type of Violation	Date Observed	Inspector
Other than serious	3/30/90	Stubblefield

Regulatory Reference:
1910.38(a)(2)(VI)

Emergency plans shall contain names of persons who can be contacted for further information.

Location of Violation: Bldg. 491, BMRR, entrance to Carcinogen Storage Room

Hazard Description: The emergency procedure contains reference names of personnel no longer employed at BNL.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	4/09/90	Rogers

Regulatory Reference:
1926.58(f)(1)(iii)

Representative 30-min. short-term employee exposures shall be determined on the basis of one or more samples representing 30-min. exposures associated with operations that are most likely to produce exposure above the excursion limit for employees.

Location of Violation: Bldg. 535, S&EP Division

Hazard Description: There is no indication that a 30-minute excursiom limit sample is being taken for employees in each work area.

Type of Violation	Date Observed	Inspector
Other than serious	4/10/90	Rogers

Regulatory Reference:
1926.58(k)(1)(i)

Warning signs that demarcate the regulated area shall be provided and displayed at each location where airborne concentrations of asbestos, tremolite, anthophyllite, or actinolite, or a combination of these minerals may be in excess of the PEL.

Location of Violation: Bldg. 815, Molecular and Applied Sciences Department, Basement

Hazard Description: Warning signs as described in 29 CFR 1926.58(k)(1)(ii) were not displayed at each entry to the regulated area. The area was demarcated only with barrier tape.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	4/09/90	Rogers

Regulatory Reference:
1926.58(m)(2)(ii)(B)

On initial examination, the standardized questionnaire contained in Appendix D, Part 1, shall be used.

Location of Violation: Bldg. 494, Medical Department

Hazard Description: On initial medical examination, employees required to remove asbestos were not given the questionnaire contained in Appendix D, Part 1.

Type of Violation	Date Observed	Inspector
Other than serious	4/02/90	Slawski

Regulatory Reference:
5(a)(1)

Each employer shall furnish to each of his/her employees employment and a place of employment which are free from recognized hazards that are causing or likely to cause death or serious physical harm to his/her employees.

Location of Violation: Bldg. 912, Experiment 859

Hazard Description: The roof leaks allowing rain water to drop onto equipment for Experiment 859. The potential for electric shock exists.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	4/05/90	Slawski

Regulatory Reference:
DOE Hoisting and Rigging Manual

Section 7.1.1 a.(2)(b). Records of inspection shall be readily available.

Location of Violation: Bldg. 905, 10 ton-crane

Hazard Description: Record of inspection of 10-ton crane was not readily available.

Type of Violation	Date Observed	Inspector
Other than serious	4/09/90	Slawski

Regulatory Reference:
NFPA 30

Approved dispensing containers must be used for flammable liquids.

Location of Violation: Bldg. 912, AGS, Gas Mixing Room

Hazard Description: Flammable liquid (Ethanol) was found in a dispensing container that is not approved for use with flammable liquids (plastic squeeze bottle).

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	4/10/90	Slawski

Regulatory Reference:
NFPA 30

Approved dispensing container must be used for flammable liquids.

Location of Violation: Bldg. 510, Physics Department, Room 1-52

Hazard Description: A flammable liquid (isopropyl alcohol) was found in a dispensing container that is not approved for use with flammable liquids (plastic squeeze bottle).

Type of Violation	Date Observed	Inspector
Other than serious	4/10/90	Slawski

Regulatory Reference:
NFPA 30

Incompatible chemicals should not be stored together.

Location of Violation: Bldg. 510, Physics Department, high bay, flammable liquids storage cabinet

Hazard Description: Hydrofluoric and phosphoric acids were stored in a flammable liquids storage cabinet along with a flammable liquid (Hexane).

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Other than serious	3/30/90	Slawski

Regulatory Reference:
Public Law 91-596, Sec. 5(a)(1)

Each employer shall furnish to each of his/her employees employment and a place of employment which are free from recognized hazards that are causing or likely to cause death or serious physical harm to his/her employees.

Location of Violation: Bldg. 490, BMRR, Basement, mechanical area

Hazard Description: The illumination level in the mechanical area was determined to be one foot-candle or less. Illumination levels should be increased in this work area to comply with levels specified in the IES Handbook, 6th edition.

Type of Violation	Date Observed	Inspector
Serious	3/31/90	Slawski

Regulatory Reference:
1910.101(b)

Compressed gases. The in-plant handling, storage, and utilization of all compressed gases in cylinders, portable tanks, rail tank cars, or motor vehicle cargo tanks shall be in accordance with Compressed Gas Association Pamphlet P-1-1965.

Location of Violation: Bldg. 912, outside near Overhead Door #1

Hazard Description: Acetylene cylinders were stored within 20 feet of oxygen cylinders. Compressed gas cylinders were stored in a location where they were vulnerable to being struck by vehicular traffic.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/02/90	Stubblefield

Regulatory Reference:
1910.101(b)

Compressed gases. The in-plant handling, storage, and utilization of all compressed gases in cylinder, portable tanks, rail tank cars, or motor vehicle cargo tanks shall be in accordance with Compressed Gas Association Pamphlet P-1-1965.

Location of Violation: Bldg. 912, AGS, North Vehicle Entrance

Hazard Description: A liquid petrolium gas cylinder was not tied down, was not in a proper storage area, and was subject to being struck by vehicular traffic.

Type of Violation	Date Observed	Inspector
Serious	4/02/90	Slawski

Regulatory Reference:
1910.101(b)

Compressed gases. The in-plant handling, storage, and utilization of all compressed gases in cylinders, portable tanks, rail tank cars, or motor vehicle cargo tanks shall be in accordance with Compressed Gas Association Pamphlet P-1-1965.

Location of Violation: Bldg. 922, north side

Hazard Description: Compressed gas cylinders are stored in a location where they are vulnerable to being struck by vehicular traffic.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/09/90	Slawski

Regulatory Reference:
1910.101(b)

Compressed gases. The in-plant handling, storage, and utilization of all compressed gases in cylinders, portable tanks, rail tank cars, or motor vehicle cargo tanks shall be in accordance with Compressed Gas Association Pamphlet P-1-1965.

Location of Violation: Bldg. 912, AGS, Gas Mixing Room

Hazard Description: A compressed gas cylinder was not secured. The chain for securing the cylinder was not in a serviceable condition.

Type of Violation	Date Observed	Inspector
Serious	4/09/90	Slawski

Regulatory Reference:
1910.101(b)

Compressed gases. The in-plant handling, storage, and utilization of all compressed gases in cylinders, portable tanks, rail tank cars, or motor vehicle cargo tanks shall be in accordance with Compressed Gas Association Pamphlet P-1-1965.

Location of Violation: Bldg. 919C, AGS, outside near old hydrogen line

Hazard Description: A compressed gas cylinder was not secured.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/05/90	Slawski

Regulatory Reference:
1910.101(b);1910.102(a) #1

Compressed gases. The in-plant handling, storage, and utilization of all compressed gases in cylinders, portable tanks, rail tank cars, or motor vehicle cargo tanks shall be in accordance with Compressed Gas Association Pamphlet P-1-1965.(cont'd)

Location of Violation: Bldg. 902, ADD, works area, Flammable Liquids Storage Cabinet

Hazard Description: One unsecured, "10 pound," compressed gas cylinder with unknown contents was stored in a flammable liquids storage cabinet along with one unsecured, "10 pound," acetylene cylinder.

Type of Violation	Date Observed	Inspector
Serious	4/05/90	Slawski

Regulatory Reference:
1910.101(b);1910.102(a) #2

(continued from previous) The in-plant handling, storage and utilization of Acetylene in cylinders shall be in accordance with Compressed Gas Association Pamphlet G-1-1966.

Location of Violation: Bldg. 902, ADD, works area, Flammable Liquids Storage Cabinet

Hazard Description:

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	3/29/90	Stubblefield

Regulatory Reference:
1910.106(b)(6)

Sources of ignition. In locations where flammable vapors may be present, precautions shall be taken to prevent ignition by eliminating or controlling sources of ignition. Sources of ignition may include open flames, lightning, smoking...

Location of Violation: Bldg. 610, Steam Plant, tank farm area.

Hazard Description: No smoking signs and flammables signs are posted throughout the tank farm area without listing the distance required from ignition sources. Residues from cigarette smoking were found throughout the area.

Type of Violation	Date Observed	Inspector
Serious	3/29/90	Teske

Regulatory Reference:
1910.106(d)(2)(i)

Only approved tanks and portable containers shall be used to store flammable liquids.

Location of Violation: Bldg. 326, Plant Engineering, Tool Crib

Hazard Description: Five gallon containers used for dispensing gasoline did not have flame arresters and were in a state of disrepair (unapproved containers).

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/02/90	Teske

Regulatory Reference:
1910.106(d)(2)(i)

Only approved containers and portable tanks shall be used for storing flammable and combustible liquids.

Location of Violation: Bldg. 624, Water Treatment Plant, shop area

Hazard Description: Two five-gallon containers, with the flame arresters removed, were being used to store gasoline. These were not approved containers.

Type of Violation	Date Observed	Inspector
Serious	4/05/90	Teske

Regulatory Reference:
1910.106(d)(2)(i)

Only approved containers and tanks shall be used to store flammable and combustible liquids.

Location of Violation: Bldg. 423, Transportation and Travel

Hazard Description: A five-gallon can is used in the stock room for storing gasoline. It did not have a flame arrester installed. This is not an approved container.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/02/90	Stubblefield

Regulatory Reference:
1910.106(d)(5)(iii) #1

Office occupancies. Storage shall be prohibited except that which is required for maintenance and operation of building and operation of equipment. Such storage shall be kept in closed metal containers stored in a storage cabinet or in (continued)

Location of Violation: Bldg. 922, AGS, north end

Hazard Description: A flammable liquid (190 proof ethyl alcohol) was not stored in a proper storage cabinet in an area designated for smoking.

Type of Violation	Date Observed	Inspector
Serious	4/02/90	Stubblefield

Regulatory Reference:
1910.106(d)(5)(iii) #1a

(continued from previous) safety cans or in an inside storage room not having a door that opens into that portion of the building used by the public.

Location of Violation: Bldg. 922, AGS, north end

Hazard Description:

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	3/29/90	Stubblefield

Regulatory Reference:
1910.106(d)(7)(iii)

Open flames and smoking shall not be permitted in flammable or combustible liquid storage areas.

Location of Violation: Bldg. 610, Steam Plant, 1st floor center.

Hazard Description: Flammable aerosol cans were stored over a work bench in an area designated for smoking.

Type of Violation	Date Observed	Inspector
Serious	4/05/90	Rogers

Regulatory Reference:
1910.106(d)(7)(iii)

Open flames and smoking shall not be permitted in flammable or combustible storage areas.

Location of Violation: Bldg. 555, Chemistry Department, throughout building

Hazard Description: Flammable liquids were stored near gas outlets used for bunsen burners, thereby, creating a potential for fire and explosion.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/10/90	Rogers

Regulatory Reference:
1910.106(d)(7)(iii)

Open flames and smoking shall not be permitted in flammable or combustible liquid storage areas.

Location of Violation: Bldg. 815, Molecular and Applied Sciences Department

Hazard Description: Flammable liquids are being stored over gas line and near a hot air glass dryer, thereby, creating a potential for explosion.

Type of Violation	Date Observed	Inspector
Serious	4/05/90	Rogers

Regulatory Reference:
1910.106(d)(7)(iv)

Material which will react with water shall not be stored in the same room with flammable or combustible liquids.

Location of Violation: Bldg. 555, Chemistry Department, throughout building

Hazard Description: Within the chemistry laboratories, flammable liquids were stored with other materials that will react with water.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	3/30/90	Stubblefield

Regulatory Reference:
1910.132

Protective equipment, including personal protective equipment for eyes, face, head, and extremities ... shall be provided and used whenever it is necessary by reasons of hazards of processes or environment.

Location of Violation: Bldg. 491, BMRR, Basement

Hazard Description: Service personnel without hard hats were observed working in an area designated as requiring hard hats.

Type of Violation	Date Observed	Inspector
Serious	3/28/90	Teske

Regulatory Reference:
1910.132(a)

Proper personal protective equipment has not been provided to protect against eye injuries. Street glasses and safety glasses without side shields were observed being used by employees.

Location of Violation: Bldgs. 462 and 452, Central Shops Buildings

Hazard Description: Proper personal protective equipment has not been provided to protect against eye injuries.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	3/29/90	Teske

Regulatory Reference:
1910.132(a)

Proper personal protective equipment has not been provided to protect against eye injuries. Street glasses and safety glasses without side shields were observed being used by employees.

Location of Violation: Bldg. 422, Plant Engineering

Hazard Description: Proper personal protective equipment has not been provided to protect against eye injuries.

Type of Violation	Date Observed	Inspector
Serious	4/02/90	Rogers

Regulatory Reference:
1910.132(a)

Protective equipment for eyes, face, head and extremities shall be provided, maintained, and used in a sanitary and reliable condition.

Location of Violation: Bldg. 463, Biology Department, Rooms 261 and 182

Hazard Description: Employees working in these areas were not wearing safety glasses with side shields or chemical safety goggles.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	3/28/90	Teske

Regulatory Reference:
1910.133(a)

Protective eye and face equipment shall be required where there is a reasonable probability of injury ... Protectors shall meet minimum requirements as listed in 1910.133(a).

Location of Violation: Bldg. 462, Central Shops

Hazard Description: Central Shop employees do not have eye protection that meets the requirements of 29 CFR 1910.133(a).

Type of Violation	Date Observed	Inspector
Serious	3/29/90	Teske

Regulatory Reference:
1910.133(a)

Protective eye and face equipment shall be required where there is a reasonable probability of injury ... Protectors shall meet minimum requirements as listed in 1910.133(a).

Location of Violation: Bldg. 422, Plant Engineering

Hazard Description: Plant Engineering employees do not have eye protection that meets the requirements of 29 CFR 1910.133(a).

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/04/90	Teske

Regulatory Reference:
1910.178(e)(1)

High Lift Rider trucks shall be fitted with an overhead guard manufactured in accordance with 1910.178(a)(2) unless conditions do not permit.

Location of Violation: Bldg. 581, Sewage Treatment Plant, yard

Hazard Description: A Clark 20,000-pound forklift truck, without overhead protection for the driver, is being used to move containers of sludge in the STP yard.

Type of Violation	Date Observed	Inspector
Serious	3/29/90	Teske

Regulatory Reference:
1910.212(a)(1)

One or more methods shall be used to protect employees from injury due to rotating machine parts.

Location of Violation: Bldg. 326, Plant Engineering, tractor mower

Hazard Description: The power takeoff on a tractor mounted mower did not have a guard over the power takeoff.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/10/90	Hopkins

Regulatory Reference:
1910.212(a)(1)

One or more methods of guarding shall be provided to protect the operator and other employees from hazards such as those created by point of operation, ingoing nip points, rotating parts, flying chips and sparks.

Location of Violation: Bldg. 815, Molecular and Applied Sciences Department, Laboratory C-4

Hazard Description: An electric drill, used to prepare samples, was placed in a vise and fitted with a wire wheel. The wire wheel was not guarded. This is also an improper use of a hand drill.

Type of Violation	Date Observed	Inspector
Serious	4/10/90	Hopkins

Regulatory Reference:
1910.212(a)(1)

One or more methods of machine guarding shall be provided to protect the operator and other employees in the area from hazards such as those created by point of operation, ingoing nip points, rotating parts, flying chips and sparks.

Location of Violation: Bldg. 815, Molecular and Applied Sciences Department, Laboratory D-4

Hazard Description: The chuck on a lathe in the laboratory was not guarded. The jaws of the chuck are extended past the outer surface of the body of the chuck.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/10/90	Hopkins

Regulatory Reference:
1910.212(a)(1)

One or more methods of machine guarding shall be provided to protect the operator and other employees in the area from hazards such as those created by point of operation, ingoing nip points, rotating parts, flying chips and sparks.

Location of Violation: Bldg. 815, Molecular and Applied Sciences Department, Room 1-21B

Hazard Description: Chucks on four lathes in the shop area were not guarded. The lathes are all used to turn pieces requiring the jaws to be extended past the surface of the body of the chuck.

Type of Violation	Date Observed	Inspector
Serious	4/10/90	Hopkins

Regulatory Reference:
1910.212(a)(1)

One or more methods of machine guarding shall be provided to protect the operator and other employees in the area from hazards such as those created by point of operation, nip points, rotating parts, flying chips, and sparks.

Location of Violation: Bldg. 815, Molecural and Applied Sciences Department, basement shop area

Hazard Description: The chuck on the clausing lathe was not guarded.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/02/90	Teske

Regulatory Reference:
1910.215(b)(9)

Safety guards on grinding wheels shall be adjusted to the decreasing diameter of the wheel including the tool rest and tongue guard.

Location of Violation: Bldg. 624, Water Treatment Plant, Maintenance Shop

Hazard Description: Tongue guards were missing from the bench grinders.

Type of Violation	Date Observed	Inspector
Serious	4/02/90	Slawski

Regulatory Reference:
1910.215(b)(9)

Safety guards on grinding wheels shall be adjusted to the decreasing diameter of the wheel including the tool rest and tongue guard.

Location of Violation: Bldg. 922, northwest area of building, bench grinder

Hazard Description: The tongue guard clearance was greater than 1/4 inch. The tool rest clearance was greater than 1/8 inch.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/25/90	Read

Regulatory Reference:
1910.213(b)(4)

Power controls and operating controls should be located within easy reach of the operator while s/he is at his/her regular work location, making it unnecessary for him/her to reach over the other to make adjustments.

Location of Violation: Bldg. 903, AGS, Machine Shop

Hazard Description: Bridgeport Milling Machines, serial #s J115730, J68699, J115748, J38826, J23740, J28815, and J90618. Power controls are located on the motor or belt drive housing requiring operator to reach over the work piece to stop the machines.

Type of Violation	Date Observed	Inspector
Serious	3/29/90	Teske

Regulatory Reference:
1910.215(b)(9)

Grinding wheel exposure adjustments must be maintained for the tool rest and the tongue guard.

Location of Violation: Bldg. 452, Plant Engineering, Metal and Steam Shop

Hazard Description: Tongue guards were not installed on grinders in the metal and steam shops.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	3/29/90	Slawski

Regulatory Reference:
1910.215(b)(9)

Grinding wheel exposure adjustments must be maintained for the tool rest and the tongue guard.

Location of Violation: Bldg. 610, Steam Plant, work bench area

Hazard Description: A tongue guard was not installed on a Black & Decker bench grinder located between two I-Beams.

Type of Violation	Date Observed	Inspector
Serious	3/29/90	Slawski

Regulatory Reference:
1910.215(b)(9)

Grinding wheel exposure adjustments must be maintained for the tool rest and the tongue guard.

Location of Violation: Bldg. 610, Steam Plant, work bench area

Hazard Description: A tongue guard was not installed on a Black & Decker bench grinder mounted on the work bench.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/04/90	Slawski

Regulatory Reference:
1910.215(b)(9)

Safety guards on grinding wheels shall be adjusted to the decreasing diameter of the wheel including the tool rest and tongue guard.

Location of Violation: Bldg. 820, ATF, brown building at end of tunnel area

Hazard Description: A tongue guard was not installed on the Milwaukee bench grinder.

Type of Violation	Date Observed	Inspector
Serious	4/05/90	Teske

Regulatory Reference:
1910.215(b)(9)

Safety guards on grinding wheels shall be adjusted to the decreasing diameter of the wheel including the tool rest and tongue guard.

Location of Violation: Bldg. 473, Transportation and Travel

Hazard Description: The pedestal mounted grinder did not have the tongue guard adjusted to 1/4 inch or less.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/09/90	Slawski

Regulatory Reference:
1910.215(b)(9)

Grinding wheel exposure adjustments must be maintained for the tool rest and the tongue guard.

Location of Violation: Bldg. 912, AGS, Gas Mixing Room, Sears best bench grinder

Hazard Description: Tongue guard clearance was greater than 1/4 inch.

Type of Violation	Date Observed	Inspector
Serious	4/09/90	Slawski

Regulatory Reference:
1910.215(b)(9)

Grinding wheel exposure adjustments must be maintained for the tool rest and the tongue guard.

Location of Violation: Bldg. 919, AGS, Motor Control Room, Thor bench grinder

Hazard Description: A tongue guard was not installed on the bench grinder. The tool rest clearance was greater than 1/8 inch.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/10/90	Hopkins

Regulatory Reference:
1910.215(b)(9)

...the distance between the (grinding) wheel periphery and the adjustable tongue shall never exceed 1/4.

Location of Violation: Bldg. 815, Molecular and Applied Sciences Department, Room 1-21B

Hazard Description: The adjustable tongue guard on the Delta floor stand grinder was positioned in excess of 1/4 inch from the periphery of the grinding wheel.

Type of Violation	Date Observed	Inspector
Serious	4/10/90	Rogers

Regulatory Reference:
1910.215(b)(9)

Grinding wheel exposure adjustments must be maintained for the tool rest and the tongue guard.

Location of Violation: Bldg. 510, Physics Department, Room 233

Hazard Description: Grinders were being used with tongue guard clearances greater than 1/4 inch.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/10/90	Rogers

Regulatory Reference:
1910.215(b)(9)

Grinding wheel exposure adjustments must be maintained for the tool rest and tongue guard.

Location of Violation: Bldg. 510, Physics Department, Room 233

Hazard Description: A tongue guard was not installed on bench grinder serial # A001365.

Type of Violation	Date Observed	Inspector
Serious	4/10/90	Slawski

Regulatory Reference:
1910.215(b)(9)

Safety guards on grinding wheels shall be adjusted to the decreasing diameter of the wheel including the tool rest and tongue guard.

Location of Violation: Bldg. 510, Physics Department, Machine Shop, Grinding Room, bench grinder

Hazard Description: Clearance between the tool rest and the grinding wheel was greater than 1/8 inch. Clearance between the tongue guard and the grinding wheel was greater than 1/4 inch.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	3/29/90	Teske

Regulatory Reference:
1910.219(c)(2)

Horizontal shafting seven feet or less from the floor shall be protected by a horizontal casing completely enclosing the shaft.

Location of Violation: Bldg. 600, Plant Engineering, Chilled Water Plant

Hazard Description: The main chilled water pumps have protective guards which protect only part of the shaft.

Type of Violation	Date Observed	Inspector
Serious	3/29/90	Teske

Regulatory Reference:
1910.219(c)(2)

Horizontal shafting seven feet or less from the floor shall be protected by guards completely enclosing the shaft.

Location of Violation: Bldg. 610, Steam Plant, barrel pump

Hazard Description: A barrel pump on a Zep cleaning solution drum did not have a protective guard on the shaft.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	3/29/90	Teske

Regulatory Reference:
1910.22(a)(1)

All places of employment, passageways, storerooms, and service rooms shall be kept clean and orderly and in a sanitary condition.

Location of Violation: Bldg. 610, Steam Plant Compressor Room

Hazard Description: The power cord to the sump pump was lying across the passageway creating a tripping hazard.

Type of Violation	Date Observed	Inspector
Serious	3/31/90	Slawski

Regulatory Reference:
1910.22(a)(1)

All places of employment, passageways, storerooms, and service rooms shall be kept clean and orderly and in a sanitary condition.

Location of Violation: Bldg. 912, just inside building at Overhead Door #1

Hazard Description: A heavy steel ladder was blocking the aisle. The aisle serves as a required emergency egress route.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	3/31/90	Slawski

Regulatory Reference:
1910.22(a)(1)

All places of employment, passageways, storerooms, and service rooms shall be kept clean and orderly and in a sanitary condition.

Location of Violation: Bldg. 918, south side (outside)

Hazard Description: Used lumber piled outside building had numerous nails protruding from the boards so that a person handling the lumber would have a significant potential of suffering a puncture or laceration type injury.

Type of Violation	Date Observed	Inspector
Serious	4/02/90	Stubblefield

Regulatory Reference:
1910.22(a)(1)

All places of employment, passageways, storerooms and service rooms shall be kept clean and orderly and in a sanitary condition.

Location of Violation: Bldg. 922, AGS, north/east entrance (outside)

Hazard Description: A water hose was blocking the path creating a tripping hazard.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/02/90	Slawski

Regulatory Reference:
1910.22(a)(1)

All places of employment, passageways, storerooms, and service rooms shall be kept clean and orderly and in a sanitary condition.

Location of Violation: Bldg. 912, near female restroom at east wall

Hazard Description: Cable trays on the floor created a tripping hazard.

Type of Violation	Date Observed	Inspector
Serious	4/04/90	Slawski

Regulatory Reference:
1910.22(a)(1)

All places of employment, passageways, storerooms, and service rooms shall be kept clean and orderly and in a sanitary condition.

Location of Violation: Bldg. 725, NSLS, VUV, Experimental Area U16

Hazard Description: The numerous cords on the floor in this work area create multiple tripping hazards.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/06/90	Slawski

Regulatory Reference:
1910.22(a)(1)

All places of employment, passageways, storerooms, and service rooms shall be kept clean and orderly and in a sanitary condition.

Location of Violation: Bldg. 901A, Room 124, NSLS, Machine Shop

Hazard Description: Oily metal filings had accumulated on the floor around the drill press and lathe.

Type of Violation	Date Observed	Inspector
Serious	4/04/90	Teske

Regulatory Reference:
1910.22(c)

Covers and/or guardrails shall be provided to protect personnel from the hazards of open pits, tanks, vats, ditches, etc.

Location of Violation: Sewage Treatment Plant Clarifier Tank

Hazard Description: The Clarifier Tank at the STP has a concrete edge approximately 25 inches high. A standard 42-inch railing is not installed.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/04/90	Teske

Regulatory Reference:
1910.22(c)

Covers and/or guardrails shall be provided to protect personnel from the hazards of open pits, tanks, vats, ditches, etc.

Location of Violation: Sewage Treatment Plant settling tank

Hazard Description: The settling tank for the incoming sewage is approximately 6 feet deep with a 6 inch curb at the top. A grating is not installed over the top of the tanks.

Type of Violation	Date Observed	Inspector
Serious	4/02/90	Slawski

Regulatory Reference:
1910.23(c)(1)

Every open-sided floor or platform 4 feet or more above adjacent floor level shall be guarded by a standard guardrail.

Location of Violation: Bldg. 912, walkway across beam line concrete radiation barrier - near Overhead Door #2

Hazard Description: No toeboard is provided where the walkway is near the edge of the beam line concrete radiation barrier.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/02/90	Slawski

Regulatory Reference:
1910.23(c)(1)

Every open-sided floor or platform four feet or more above the adjacent floor level shall be guarded by a standard guardrail.

Location of Violation: Bldg. 912, walkway from upper level of Experiment 791 counting house

Hazard Description: The walkway does not have a toe board.

Type of Violation	Date Observed	Inspector
Serious	3/29/90	Teske

Regulatory Reference:
1910.24(b)

Fixed industrial stairs shall be provided for access from one structural level to another.

Location of Violation: Bldg. 633, Steam Plant, Fuel Pump House

Hazard Description: A step-up distance of 18 inches is required from the ground to the pump house.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/02/90	Teske

Regulatory Reference:
1910.24(f)

All fixed industrial stair treads shall be reasonably slip-resistant and the nosings shall be of nonslip finish.

Location of Violation: Bldg. 624, Water Treatment Plant, Loading Dock

Hazard Description: The nosings on the loading dock stairs were loose and falling apart. They do not meet the design criteria of 29 CFR 1910.24(f).

Type of Violation	Date Observed	Inspector
Serious	4/02/90	Slawski

Regulatory Reference:
1910.24(f)

All fixed industrial stair treads shall be reasonably slip-resistant and the nosings shall be of nonslip finish.

Location of Violation: Bldg. 911, east stairs, between 1st and 2nd floors

Hazard Description: The nosing on the east stairs above the landing between floors was not serviceable. They do not meet the design criteria of 29 CFR 1910.24(f).

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/02/90	Slawski

Regulatory Reference:
1910.24(f)

Stair treads. Rise height shall be uniform throughout any flight of stairs.

Location of Violation: Bldg. 912, Stairway leading to top of beam line, near Overhead Door #2

Hazard Description: Vertical distance between risers is not uniform throughout the flight of stairs.

Type of Violation	Date Observed	Inspector
Serious	4/10/90	Rogers

Regulatory Reference:
1910.242(a)

Each employer shall be responsible for the safe condition of tools and equipment used by employees.

Location of Violation: Bldg. 815, Molecular and Applied Sciences Department, Laboratory C-4

Hazard Description: An electric hand drill was held in a vise, and used with a wire wheel which constitutes an unsafe condition of use.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/10/90	Hopkins

Regulatory Reference:
1910.243(c)(3)

Safety guards used on vertical portable grinders shall have a maximum exposure angle of 180 degrees, and the guard shall be located between the operator and the wheel during use.

Location of Violation: Bldg. 815, Molecular and Applied Sciences Department, Room 1-21B

Hazard Description: Rockwell 7" vertical sander/grinder is equipped with an abrasive wheel, but it does not have a guard installed.

Type of Violation	Date Observed	Inspector
Serious	3/29/90	Teske

Regulatory Reference:
1910.251(a)(2)(ii)

Welding gas cylinders shall be stored where they will not be damaged or knocked over.

Location of Violation: Bldg. 326, Plant Engineering, Store Room

Hazard Description: Acetylene gas cylinders in the store room of Bldg. 326 were not supported to prevent them from being knocked over or damaged.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/10/90	Rogers

Regulatory Reference:
1910.252(a)(2)(iv)(a)

Oxygen cylinders shall not be stored near highly combustible material, ... or near reserve stock of carbide and acetylene ... or near any substance likely to cause or accelerate fire.

Location of Violation: Bldg. 815, Molecular and Applied Sciences Department, Room D-4

Hazard Description: Oxygen and acetylene cylinders were kept on a cart for long periods without being used, (reported to be used about twice per year), thereby, creating a fire hazard.

Type of Violation	Date Observed	Inspector
Serious	3/29/90	Teske

Regulatory Reference:
1910.252(f)(3)(i)

Mechanical exhaust ventilation shall be provided for welding and cutting which shall include freely movable hoods or a fixed enclosure which provides a minimum velocity of 100 linear feet per minute.

Location of Violation: Bldg. 422, Plant Engineering, Steam Shop

Hazard Description: Canopy type exhaust hoods are provided for welding and cutting, but they do not provide positive ventilation in the welding zone of 100 linear feet per minute.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	3/29/90	Teske

Regulatory Reference:
1910.252(f)(3)(i)

Mechanical exhaust ventilation shall be provided for welding and cutting which shall include freely movable hoods or a fixed enclosure which provides a minimum velocity of 100 linear feet per minute.

Location of Violation: Bldg. 452, Plant Engineering, Metal Shop

Hazard Description: Canopy type exhaust hoods are provided for welding and cutting, but they do not provide positive ventilation in the welding zone of 100 linear feet per minute.

Type of Violation	Date Observed	Inspector
Serious	3/29/90	Teske

Regulatory Reference:
1910.303(b)(1)(vii)

Electrical equipment shall be free of recognized hazards that are likely to cause death or serious harm including other factors which contribute to practical safeguarding of employees.

Location of Violation: Bldg. 422, Plant Engineering

Hazard Description: A regular electrical outlet is installed within six feet of a sink in the bathroom creating an electrical shock hazard for malfunctioning equipment. A ground fault circuit interupter is not installed.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	3/29/90	Teske

Regulatory Reference:
1910.303(b)(1)(vii)

Electrical equipment shall be free of recognized hazards that are likely to cause death or serious physical harm including other factors which contribute to the practical safeguarding of employees.

Location of Violation: Bldg. 326, Plant Engineering, Men's Room

Hazard Description: A regular electrical outlet installed within reaching distance of a sink creating a potential shock hazard to employees using faulty electrical equipment. A GFCI is not installed.

Type of Violation	Date Observed	Inspector
Serious	3/29/90	Teske

Regulatory Reference:
1910.303(b)(1)(vii)

Electrical equipment shall be free of recognized hazards that are likely to cause death or serious physical harm including other factors which contribute to the practical safeguarding of employees.

Location of Violation: Bldg. 422, Plant Engineering, Bathroom

Hazard Description: A regular electrical outlet was installed within reaching distance of a sink in the bathroom. A ground fault circuit interrupter is not installed.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	3/29/90	Teske

Regulatory Reference:
1910.303(b)(1)(vii)

Electrical equipment shall be free of recognized hazards that are likely to cause death or serious physical harm including other factors which contribute to the practical safeguarding of employees.

Location of Violation: Bldg. 452, Plant Engineering, storage area kitchen

Hazard Description: The kitchen in the storage area had a regular electrical outlet within reaching distance of a sink. A ground fault circuit interrupter is not installed.

Type of Violation	Date Observed	Inspector
Sericus	3/29/90	Teske

Regulatory Reference:
1910.303(b)(1)(vii)

Electrical equipment shall be free of recognized hazards that are likely to cause death or serious physical harm including other factors which contribute to the practical safeguarding of employees.

Location of Violation: Bldg. 610, Steam Plant, Men's Room

Hazard Description: A regular electrical outlet is installed within reaching distance of a sink in the mens room. A ground fault circuit interrupter is not installed.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	3/29/90	Slawski

Regulatory Reference:
1910.303(b)(1)(vii)

Electrical equipment shall be free of recognized hazards that are likely to cause death or serious physical harm including other factors which contribute to the practical safeguarding of employees.

Location of Violation: Bldg. 610, Steam Plant, work bench area

Hazard Description: A water circulating pump for OMARK Bricksaw was not protected by a ground fault circuit interrupter.

Type of Violation	Date Observed	Inspector
Serious	3/30/90	Slawski

Regulatory Reference:
1910.303(b)(1)(vii)

Electrical equipment shall be free of recognized hazards that are likely to cause death or serious harm including other factors which contribute to practical safeguarding of employees.

Location of Violation: Bldg. 490, BMRR, Control Room, top of control panel

Hazard Description: A circulating fan on top of the control panel had a frayed electric cord.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	3/30/90	Slawski

Regulatory Reference:
1910.303(b)(1)(vii)

Electrical equipment shall be free of recognized hazards that are likely to cause death or serious physical harm including other factors which contribute to practical safeguarding of employees.

Location of Violation: Bldg. 490, BMRR, Control Room area, electrical outlet near sink

Hazard Description: A regular electrical outlet was installed within six feet of a sink creating an electrical shock hazard for malfunctioning equipment. A GFCI is not installed.

Type of Violation	Date Observed	Inspector
Serious	3/30/90	Slawski

Regulatory Reference:
1910.303(b)(1)(vii)

Electrical equipment shall be free of recognized hazards that are likely to cause death or serious physical harm including other factors which contribute to the practical safeguarding of employees.

Location of Violation: Bldg. 490, BMRR, Basement

Hazard Description: A regular electrical outlet was installed within six feet of a sink creating an electrical shock hazard for malfunctioning equipment. A ground fault circuit interrupter is not installed.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	3/30/90	Slawski

Regulatory Reference:
1910.303(b)(1)(vii)

Electrical equipment shall be free of recognized hazards that are likely to cause death or serious physical harm including other factors which contribute to the practical safeguarding of employees.

Location of Violation: Bldg. 490, Medical Research Center, corridor outside Room 9-243

Hazard Description: An electric outlet in the corridor wall was found to be defective.

Type of Violation	Date Observed	Inspector
Serious	4/02/90	Teske

Regulatory Reference:
1910.303(b)(1)(vii)

Electrical equipment shall be free of recognized hazards that are likely to cause death or serious physical harm including other factors which contribute to the practical safeguarding of employees.

Location of Violation: Bldg. 624, Water Treatment Plant, lime pit

Hazard Description: There are six electrical outlets in the lime pit where there is standing water. Ground fault circuit interrupters are not installed on these outlets.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/02/90	Slawski

Regulatory Reference:
1910.303(b)(1)(vii)

Electrical equipment shall be free of recognized hazards that are likely to cause death or serious physical harm including other factors which contribute to the practical safeguarding of employees.

Location of Violation: Bldg. 912, electrical outlet near sink outside Female Restroom

Hazard Description: A regular electrical outlet was installed within 6 feet of a sink creating an electrical shock hazard from malfunctioning equipment. A ground fault circuit interrupter is not installed.

Type of Violation	Date Observed	Inspector
Serious	4/02/90	Slawski

Regulatory Reference:
1910.303(b)(1)(vii)

Electrical equipment shall be free of recognized hazards that are likely to cause death or serious physical harm including other factors which contribute to the practical safeguarding of employees.

Location of Violation: Bldg. 922, vicinity of emergency eyewash fountain/shower

Hazard Description: A regular electrical outlet was installed 6 feet from the emergency shower/eyewash creating an electrical shock hazard from malfunctioning equipment. A GFCI is not installed, and the 250v outlet is installed too close to the potentially wet location.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/03/90	Rogers

Regulatory Reference:
1910.303(b)(1)(vii)

Electrical equipment shall be free from recognized hazards that are likely to cause death or serious physical harm including other factors which contribute to the practical safeguarding of employees.

Location of Violation: Bldg. 490, Medical Services, laboratories

Hazard Description: Regular electrical outlets were installed within six feet of sinks creating electrical shock hazards from malfunctioning equipment. Ground fault circuit interrupters are not installed at all locations.

Type of Violation	Date Observed	Inspector
Serious	4/03/90	Teske

Regulatory Reference:
1910.303(b)(1)(vii)

Electrical equipment shall be free of recognized hazards that are likely to cause death or serious physical harm including other factors which contribute to the practical safeguarding of employees.

Location of Violation: Bldg. 158, Supply and Materiel Building, Lunchroom

Hazard Description: A regular electrical outlet is installed on the combination sink/stove. A ground fault circuit interrupter is not installed.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/03/90	Teske

Regulatory Reference:
1910.303(b)(1)(vii)

Electrical equipment shall be free of recognized hazards that are likely to cause death or serious physical harm including other factors which contribute to the practical safeguarding of employees.

Location of Violation: Bldg. 87, Supply and Materiel Division. T-87, Men's Room

Hazard Description: A regular electrical outlet is installed within reaching distance of a sink in the Men's Room. A ground fault circuit interrupter is not installed.

Type of Violation	Date Observed	Inspector
Serious	4/03/90	Teske

Regulatory Reference:
1910.303(b)(1)(vii)

Electrical equipment shall be free of recognized hazards that are likely to cause death or serious physical harm including other factors which contribute to the practical safeguarding of employees.

Location of Violation: Bldg. 89, Supply and Materiel Division, T-89, Men's Room

Hazard Description: A regular electrical outlet is installed within reaching distance of a sink in the Men's Room. A ground fault circuit interrupter is not installed.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/03/90	Teske

Regulatory Reference:
1910.303(b)(1)(vii)

Electrical equipment shall be free of recognized hazards that are likely to cause death or serious physical harm including other factors which contribute to the practical safeguarding of employees.

Location of Violation: Bldg. 90, Supply and Materiel Division, T-90, Restroom

Hazard Description: A regular electrical outlet is installed within reaching distance of a sink in the restroom. A ground fault circuit interrupter is not installed.

Type of Violation	Date Observed	Inspector
Serious	4/03/90	Teske

Regulatory Reference:
1910.303(b)(1)(vii)

Electrical equipment shall be free of recognized hazards that are likely to cause death or serious physical harm including other factors which contribute to the practical safegurading of employees.

Location of Violation: Bldg. 91, Supply and Materiel Division, T-91, Restroom

Hazard Description: A regular electrical outlet is installed within reaching distance of a sink in the restroom. A ground fault circuit interrupter is not installed.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/04/90	Teske

Regulatory Reference:
1910.303(b)(1)(vii)

Electrical equipment shall be free of recognized hazards that are likely to cause death or serious physical harm including other factors which contribute to the practical safeguarding of employees.

Location of Violation: Bldg. 584, Sewage Treatment Plant, Screen House

Hazard Description: At the Sewage Treatment Plant the screen house has regular electrical outlets in the presence of wet and damp floors. A ground fault circuit interrupter is not installed.

Type of Violation	Date Observed	Inspector
Serious	4/04/90	Slawski

Regulatory Reference:
1910.303(b)(1)(vii)

Electrical equipment shall be free of recognized hazards that are likely to cause death or serious physical harm including other factors which contribute to the practical safeguarding of employees.

Location of Violation: Bldg. 725, NSLS, Mailroom (Room 2-109)

Hazard Description: A regular electrical outlet was installed within 6 feet of a sink creating an electrical shock hazard from malfunctioning equipment. A ground fault circuit interrupter is not installed.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/04/90	Stubblefield

Regulatory Reference:
1910.303(b)(1)(vii)

Electrical equipment shall be free of recognized hazards that are likely to cause death or serious physical harm including other factors which contribute to the practical safeguarding of employees.

Location of Violation: Bldg. 725, NSLS, Work Station U16

Hazard Description: An electrically powered piece of equipment had a frayed cord and a damaged wall plug.

Type of Violation	Date Observed	Inspector
Serious	4/04/90	Stubblefield

Regulatory Reference:
1910.303(b)(1)(vii)

Electrical equipment shall be free of recognized hazards that are likely to cause death or serious physical harm including other factors which contribute to the practical safeguarding of employees.

Location of Violation: Bldg. 725, NSLS, Work Station U4

Hazard Description: An electrical cord on the main feed line was frayed.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/04/90	Stubblefield

Regulatory Reference:
1910.303(b)(1)(vii)

Electrical equipment shall be free of recognized hazards that are likely to cause death or serious physical harm including other factors which contribute to the practical safeguarding of employees.

Location of Violation: Bldg. 820, NSLS, Accelerator Test Facility

Hazard Description: An electrical cord was frayed.

Type of Violation	Date Observed	Inspector
Serious	4/04/90	Teske

Regulatory Reference:
1910.303(b)(1)(vii)

Electrical equipment shall be free of recognized hazards that are likely to cause death or serious physical harm including other factors which contribute to the practical safeguarding of employees.

Location of Violation: Bldg. 576, Chlorine House

Hazard Description: At the Sewage Treatment Plant the Chlorine House has a regular electrical outlet in the presence of wet and damp floors. A ground fault circuit interrupter is not installed.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/05/90	Rogers

Regulatory Reference:
1910.303(b)(1)(vii)

Electrical equipment shall be free of recognized hazards that are likely to cause death or serious physical harm including other factors which contribute to the practical safeguarding of employees.

Location of Violation: Bldg. 555, Chemistry, all laboratories

Hazard Description: Regular electrical outlets are within 6 feet of sinks or cold water faucets creating an electrical shock hazard from malfunctioning equipment. Ground fault circuit interrupters are not installed throughout the building.

Type of Violation	Date Observed	Inspector
Serious	4/05/90	Slawski

Regulatory Reference:
1910.303(b)(1)(vii)

Electrical equipment shall be free of recognized hazards that are likely to cause death or serious physical harm including other factors which contribute to the practical safeguarding of employees.

Location of Violation: Bldg. 902, ADD, building coordinates Q13

Hazard Description: A regular electrical outlet was installed within 6 feet of a sink creating an electrical shock hazard from malfunctioning equipment. A ground fault circuit interrupter is not installed.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/06/90	Stubblefield

Regulatory Reference:
1910.303(b)(1)(vii)

Electrical equipment shall be free of recognized hazards that are likely to cause death or serious physical harm including other factors which contribute to the practical safeguarding of employees.

Location of Violation: Bldg. 445, Hazardous Waste Management Facility, lathe area

Hazard Description: An electric table lamp had a frayed cord and plug creating electrical shock hazard.

Type of Violation	Date Observed	Inspector
Serious	4/10/90	Rogers

Regulatory Reference:
1910.303(b)(1)(vii)

Electrical equipment shall be free from recognized hazards that are likely to cause death or serious physical harm including other factors which contribute to the practical safeguarding of employees.

Location of Violation: Bldg. 510, Physics Department, all laboratories

Hazard Description: A regular electric outlet is installed within 6 feet of a sink. A ground fault circuit interrupter is not installed.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/10/90	Rogers

Regulatory Reference:
1910.303(b)(1)(vii)

Electrical equipment shall be free of recognized hazards that are likey to cause death or serious harm including other factors which contribute to practical safeguarding of employees.

Location of Violation: Bldg. 815, Molecular and Applied Sciences Department

Hazard Description: Regular electrical outlets were installed within 6 feet of a sink creating an electrical shock hazard for malfunctioning equipment in all laboratories. Ground fault circuit interrupters are not installed.

Type of Violation	Date Observed	Inspector
Serious	4/11/90	Slawski

Regulatory Reference:
1910.303(f)

Each branch circuit shall be legibly marked at the panel box.

Location of Violation: Bldg. 170, Compton House, 1st floor, north wing, panel box #3; 2nd floor, east wing, panel box #9

Hazard Description: Panel directories were not complete.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/09/90	Slawski

Regulatory Reference:
1910.303(h)(2)

A fence less than eight feet in height is not considered to prevent access. National electrical code - 1990, Article 110-31.

Location of Violation: Bldg. 912, AGS, outside near Overhead Door #1

Hazard Description: The transformer yard is protected by a substandard fence.

Type of Violation	Date Observed	Inspector
Serious	3/28/90	Teske

Regulatory Reference:
1910.303(G)(1)(vii)

The employer shall establish and implement an assured equipment grounding conductor program...

Location of Violation: Bldgs. 462 and 452, Central Shops Buildings

Hazard Description: All electrically powered hand tools in the Central Shops were observed to have electrical ground wires and plugs, but there is no assurance that the grounds are properly connected to the metal cases.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	3/29/90	Teske

Regulatory Reference:
1910.303(G)(1)(vii)

The employer shall establish and implement an assured equipment grounding conductor program...

Location of Violation: Bldg. 422, Plant Engineering

Hazard Description: All electrically powered hand tools in Plant Engineering were observed to have electrical ground wires and plugs, but there is no assurance that the grounds are properly connected to the metal cases.

Type of Violation	Date Observed	Inspector
Serious	4/02/90	Teske

Regulatory Reference:
1910.303(G)(1)(vii)

The employer shall establish and implement an assured equipment grounding conductor program...

Location of Violation: Bldg. 624, Water Treatment Plant, Maintance Shop

Hazard Description: Electrically powered hand tools in the Water Treatment Plant were observed to have ground wires and plugs, but there is no assurance that the grounds are properly connected to the metal cases.

Brookhaven National Laboratory OSHA Violations

Type of Violation Serious | Date Observed 4/02/90 | Inspector Stubblefield

Regulatory Reference:
1910.303(G)(1)(vii)

The employer shall establish and implement an assured equipment grounding conductor program...

Location of Violation: Bldg. 912, East Experimental Building Addition

Hazard Description: The plug on an electrical cord on a hand tool did not have a ground wire.

Type of Violation Sericus | Date Observed 4/02/90 | Inspector Slawski

Regulatory Reference:
1910.303(G)(1)(vii)

The employer shall establish and implement an assured equipment grounding conductor program...

Location of Violation: Bldg. 922

Hazard Description: No record was available to establish that the integrity of the ground on a portable electric drill had been verified.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/04/90	Slawski

Regulatory Reference:
1910.303(G)(1)(vii)

The employer shall establish and implement an assured equipment grounding conductor program...

Location of Violation: Bldg. 725, NSLS, Naval Research Laboratory area

Hazard Description: Black & Decker 3/8-inch drill. No record was available to verify that the integrity of the ground has been determined.

Type of Violation	Date Observed	Inspector
Serious	4/04/90	Stubblefield

Regulatory Reference:
1910.303(G)(1)(vii)

The employer shall establish and implement an assured equipment grounding conductor program...

Location of Violation: Bldg. 725, NSLS, Work Station U16

Hazard Description: An electrically powered item of equipment had an improperly insulated wall plug.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/04/90	Stubblefield

Regulatory Reference:
1910.303(G)(1)(vii)

The employer shall establish and implement an assured equipment grounding conductor program...

Location of Violation: Bldg. 820A, NSLS, DNE Experiment Modeling Group

Hazard Description: Two pieces of electrical equipment had faulty wiring and wall plugs.

Type of Violation	Date Observed	Inspector
Serious	4/05/90	Slawski

Regulatory Reference:
1910.303(G)(1)(vii)

The employer shall establish and implement an assured equipment grounding conductor program...

Location of Violation: Bldg. 902, ADD, Electrical Shop

Hazard Description: No record was available to establish that the integrity of the ground had been verified on a portable electric drill.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/09/90	Stubblefield

Regulatory Reference:
1910.303(G)(1)(vii)

The employer shall establish and implement an assured equipment grounding conductor program.

Location of Violation: Bldgs. 912 and 919C, AGS, Multiple Particle Spectrometer

Hazard Description: Various hand tools, electronics instruments, table lamps, etc., had faulty wiring or plugs.

Type of Violation	Date Observed	Inspector
Serious	4/10/90	Slawski

Regulatory Reference:
1910.303(G)(1)(vii)

The employer shall establish and implement an assured equipment grounding conductor program...

Location of Violation: Bldg. 510, Physics Department, Room 1-52.

Hazard Description: No record was available to establish that the integrity of the ground of a Black & Decker 1/2 inch portable electric drill had been verified.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/05/90	Stubblefield

Regulatory Reference:
1910.303(G)(1)(vii)

The employer shall establish and implement an assured equipment grounding conductor program...

Location of Violation: Bldg. 902, Relativistic Heavy Ion Collider support Work Station E-9

Hazard Description: The main electrical line has a wall plug with the grounding stem removed.

Type of Violation	Date Observed	Inspector
Serious	4/06/90	Stubblefield

Regulatory Reference:
1910.303(G)(1)(vii)

The employer shall establish and implement an assured equipment grounding conductor program...

Location of Violation: Bldg. 445, Hazardous Waste Management Facility, Room 8

Hazard Description: Electrical unit with faulty cord and wall plug.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	3/28/90	Teske

Regulatory Reference:
1910.304(f)(5)(v)

Exposed non-current-carrying metal parts of cord- and plug-connected equipment which may become energized shall be grounded.

Location of Violation: Bldg. 510, Central Shops

Hazard Description: The plug on the electrical card of a portable sump pump had the grounding prong removed.

Type of Violation	Date Observed	Inspector
Serious	3/29/90	Teske

Regulatory Reference:
1910.304(f)(5)(v)

Exposed non-current-carrying metal parts of cord- and plug-connected equipment which may become energized shall be grounded.

Location of Violation: Bldg. 610, Steam Plant, Cut-off Saw

Hazard Description: The plug on the electric cord for the pump motor for the cooling fluid for the cut-off saw had the ground prong removed.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/02/90	Teske

Regulatory Reference:
1910.304(f)(5)(v)

Exposed non-current-carrying metal parts of cord- and plug-connected equipment which may become energized shall be grounded.

Location of Violation: Bldg. 624, Water Treatment Plant, Store Room

Hazard Description: The electric card for a portable sump pump did not have a grounding prong.

Type of Violation	Date Observed	Inspector
Serious	4/02/90	Stubblefield

Regulatory Reference:
1910.304(f)(5)(v)

Exposed non-current-carrying metal parts of cord- and plug-connected equipment which may become energized shall be grounded.

Location of Violation: Bldg. 922, AGS, work bench at west end

Hazard Description: The electrical cord for a portable fan had the ground wire removed from the wall plug.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/04/90	Stubblefield

Regulatory Reference:
1910.304(f)(5)(v)

Exposed non current-carrying metal parts of cord- and plug-connected equipment which may become energized shall be grounded.

Location of Violation: Bldg. 725, NSLS, RF Tech Lab 725B

Hazard Description: The electric cord on a vacuum cleaner had the ground wire removed from the wall plug.

Type of Violation	Date Observed	Inspector
Serious	4/03/90	Teske

Regulatory Reference:
1910.305(a)(4)(v)

Conductors within seven feet of the floor are considered exposed to physical damage. Where they cross walls they shall be protected.

Location of Violation: Bldg. 89, Supply and Materiel Division, T-89

Hazard Description: The electrical panels and equipment for charging forklift batteries is not protected from physical damage from materials and moving equipment.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	3/28/90	Stubblefield

Regulatory Reference:
1910.305(b)(1)

Openings for conductors entering electrical connection boxes not effectively closed.

Location of Violation: Bldg. 750, HFBR, Manager's Office rear wall

Hazard Description: Metal covers on two wall electrical outlets were not properly secured.

Type of Violation	Date Observed	Inspector
Serious	3/30/90	Slawski

Regulatory Reference:
1910.305(b)(1)

Openings for conductors entering electrical connection boxes shall be effectively closed.

Location of Violation: Bldg. 490, BMRR

Hazard Description: The knockout was missing from the side of the electrical box just below the "scram" button.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	3/30/90	Stubblefield

Regulatory Reference:
1910.305(b)(1)

Openings for conductors entering electrical connection boxes shall be effectively closed.

Location of Violation: Bldg. 491, BMRR, Control Room, balcony and stairway

Hazard Description: Metal electrical wall connection boxes were not effectively closed.

Type of Violation	Date Observed	Inspector
Serious	4/02/90	Stubblefield

Regulatory Reference:
1910.305(b)(1)

Openings for conductors entering electrical connection boxes shall be effectively closed.

Location of Violation: Bldg. 912, East Experimental Building Addition, north center of building

Hazard Description: An electrical connection box conductor opening was not effectively closed.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/02/90	Stubblefield

Regulatory Reference:
1910.305(b)(1)

Openings for conductors entering electrical connection boxes shall be effectively closed.

Location of Violation: Bldg. 922, AGS, interior west side entrance and entire east interior wall

Hazard Description: Potential for electrical shock, metal electrical connection boxes were not effectively closed.

Type of Violation	Date Observed	Inspector
Serious	4/04/90	Stubblefield

Regulatory Reference:
1910.305(b)(1)

Openings for conductors entering electrical connection boxes shall be effectively closed.

Location of Violation: Bldg. 820, NSLS, Mezzanine, south wall.

Hazard Description: Electrical connection box cover was partly open.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/04/90	Stubblefield

Regulatory Reference:
1910.305(b)(1)

Openings for conductors entering electrical connection boxes shall be effectively closed.

Location of Violation: Bldg. 820A, NSLS, electrical connection box on west wall

Hazard Description: Metal relay box was not effectively closed.

Type of Violation	Date Observed	Inspector
Serious	4/05/90	Stubblefield

Regulatory Reference:
1910.305(b)(1)

Openings for conductors entering electrical connection boxes shall be effectively closed.

Location of Violation: Bldg. 902, Relativistic Heavy Ion Collider, Work Station N-21 and S-14, southwest corner of high bay

Hazard Description: Four metal relay boxes were not effectively closed.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/05/90	Stubblefield

Regulatory Reference:
1910.305(b)(1)

Openings for conductors entering electrical connection boxes shall be effectively closed.

Location of Violation: Bldg. 905, Relativistic Heavy Ion Collider, east wall and three other locations

Hazard Description: Metal relay box was not effectively closed.

Type of Violation	Date Observed	Inspector
Serious	4/05/90	Stubblefield

Regulatory Reference:
1910.305(b)(1)

Openings for conductors entering electrical connection boxes shall be effectively closed.

Location of Violation: Bldg. 905, Relativistic Heavy Ion Collider, south end

Hazard Description: Metal relay box was not effectively closed.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/06/90	Stubblefield

Regulatory Reference:
1910.305(b)(1)

Openings for conductors entering electrical connection boxes shall be effectively closed.

Location of Violation: Bldg. 445, Hazardous Waste Management Facility, high up on the northwest corner wall

Hazard Description: The metal connection boxes had openings, thereby, creating an electrical hazard.

Type of Violation	Date Observed	Inspector
Serious	4/05/90	Stubblefield

Regulatory Reference:
1910.305(e)

Fittings and enclosures in damp locations shall be installed so as to prevent moisture or water from entering and accumulating within the enclosures.

Location of Violation: Bldg. 1005-S, Relativistic Heavy Ion Collider, tunnel

Hazard Description: Stairways and exit halls have connection boxes that are not effectively closed.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/02/90	Teske

Regulatory Reference:
1910.305(g)(1)(iii)(A)

Flexible cords and cables shall not be used for permanent building wiring unless specifically permitted.

Location of Violation: Bldg. 641, Water Filter Building, sump pump pipe gallery

Hazard Description: The sump pump is operated with extension cords instead of being permanently wired into the building electical system with automatic controls and circuit protection.

Type of Violation	Date Observed	Inspector
Serious	4/10/90	Hopkins

Regulatory Reference:
1910.305(g)(1)(iii)(A)

Flexible cords and cables shall not be used for permanent building wiring unless specifically permitted.

Location of Violation: Bldg. 815, Molecular and Applied Sciences Department, Basement

Hazard Description: Worthington air compressor marked "4L-520" is supplied power via 50 feet of flexible cord which is strung along the piping system.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/10/90	Teske

Regulatory Reference:
1910.307(2)(i)

Equipment shall be approved not only for the class of location but also for the ignitability or combustible properties of the specific gas, vapor, dust or fiber that will be present.

Location of Violation: Bldg. 485, Supply and Materiel Division

Hazard Description: Two electric heaters which are not approved for use in the presence of flammable liquids (class 1 division 1) are installed in hazardous locations. (Electromode Air Heater Type 6200-K, Model CX-2)

Type of Violation	Date Observed	Inspector
Serious	3/29/90	Teske

Regulatory Reference:
1910.307(b)(2)

Hazardous locations must have electrical wiring which is approved for those locations.

Location of Violation: Bldg. 244, Plant Engineering

Hazard Description: The paint shop does not have Class 1 Division 2 wiring as required by 29 CFR 1910.307 and the National Electrical Code.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/02/90	Stubblefield

Regulatory Reference:
1910.36(b)(4)

Exits shall be arranged and maintained as to provide free and unobstructed egress.

Location of Violation: Bldg. 912, East Experimental Building Addition Station Q-31

Hazard Description: The raised platform is not highlighted to indicate a walking hazard.

Type of Violation	Date Observed	Inspector
Serious	3/28/90	Teske

Regulatory Reference:
1910.94(d)(7)(iv)

Open surface tank ventilation shall be designed in accordance with the ANSI standard z9.2-1960 or the ACGIH 1970 Ventialtion Manual.

Location of Violation: Bldg. 462, Central Shops

Hazard Description: The vapor degreaser tank ventilation fan is located inside the building where exhaust vapors will be forced back into the work area through leaking ducts.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/04/90	Teske

Regulatory Reference:
1926.1000(b)

Material handling machinery manufactured after September 1, 1972 shall be equipped with rollover protection meeting the performance standards prescribed by 1926.1001 and 1926.1002 as applicable.

Location of Violation: Sewage Treatment Plant, yard

Hazard Description: An agricultural type tractor at the Sewage Treatment Plant used to maintain the settling beds did not have rollover protection as required.

Type of Violation	Date Observed	Inspector
Serious	4/04/90	Teske

Regulatory Reference:
1926.1000(c)

Material handling equipment manufactured, owned, or placed in service prior to September 1, 1972 shall be fitted with rollover protective structures no later than certain specified dates.

Location of Violation: Sewage Treatment Plant yard

Hazard Description: A Clark 20,000-pound forklift truck which appears to have been placed in service before 1972 is being used to move containers of sludge. It does not have a rollover protective structure.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/10/90	Rogers

Regulatory Reference:
1926.58(e)(5)

The employer shall ensure that employees do not eat, drink, smoke, chew tobacco, or apply cosmetics in the regulated area.

Location of Violation: Bldg. 815, Molecular and Applied Sciences Department, Basement

Hazard Description: Two asbestos abatement workers were observed drinking coffee in the demarcated area.

Type of Violation	Date Observed	Inspector
Serious	4/10/90	Rogers

Regulatory Reference:
1926.58(e)(6)(i)

Wherever feasible, the employer shall establish negative-pressure enclosures before commencing removal, demolition, and renovation operations.

Location of Violation: Bldg. 815, Molecular and Applied Sciences Department, Basement

Hazard Description: Asbestos removal operations were being conducted without establishing a negative pressure enclosure.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/10/90	Rogers

Regulatory Reference:
1926.58(e)(6)(ii)

The employer shall designate a competent person to perform or supervise activities related to the enclosure.

Location of Violation: Bldg. 815, Molecular and Applied Sciences Department, Basement

Hazard Description: A competent person was not present to supervise the removal operation.

Type of Violation	Date Observed	Inspector
Serious	4/10/90	Rogers

Regulatory Reference:
1926.58(e)(6)(ii)(C)

The competent person shall control entry to and exit from the enclosure.

Location of Violation: Bldg. 815, Molecular and Applied Sciences Department, Basement

Hazard Description: Entry into the demarcated area was not controlled. Two individuals entered the demarcated area without donning protective clothing or respiratory protection.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/10/90	Rogers

Regulatory Reference:
1926.58(j)(2)(i)

The employer shall establish a decontamination area that is adjacent and connected to the regulated area for te decontamination of employees contaminated with asbestos, tremolite, anthophyllite or actinolite.

Location of Violation: Bldg. 815, Molecular and Applied Sciences Department, Basement

Hazard Description: Decontamination facilities were not provided adjacent to the regulated area.

Type of Violation	Date Observed	Inspector
Serious	4/10/90	Rogers

Regulatory Reference:
1926.58(j)(2)(ii)

Clean room shall be equipped with a locker or appropriate storage container for each employee's use.

Location of Violation: Bldg. 815, Molecular and Applied Sciences Department, Basement

Hazard Description: A clean room equipped with a locker or storage container was not provided. Street clothing was stored in the open within the regulated area.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/10/90	Rogers

Regulatory Reference:
1926.58(j)(2)(vi)(B)

The employer shall ensure that employees remove their protective clothing in the equipment room.

Location of Violation: Bldg. 815, Molecular and Applied Sciences Department, Basement

Hazard Description: Employees, who were double suited, removed their outer suit of protective clothing within the regulated area possibilly cotaminating their second suit. The employees then exited the building directly.

Type of Violation	Date Observed	Inspector
Serious	4/10/90	Rogers

Regulatory Reference:
1926.58(j)(vi)(C)

The employer shall ensure that employees do not remove their respirators in the equipment room.

Location of Violation: Bldg. 815, Molecular and Applied Sciences Department, Basement

Hazard Description: The employees removed their respirators within the regulated area.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/02/90	Stubblefield

Regulatory Reference:
1910.106(G)(6)

In locations where flammable vapors may be present,precautions shall be taken to prevent ignition by eliminating or controling sources of ignition.

Location of Violation: Bldg. 912, outside of vehicle entrance east side

Hazard Description: A vehicle was parked and cigarette butts were found in an area near flammable gas storage.

Type of Violation	Date Observed	Inspector
Serious	4/04/90	Slawski

Regulatory Reference:
5(a)(1),PL 91-596

Each employer shall furnish to each of his/her employees employment and a place of employment which are free from recognized hazards that are causing or likely to cause death or serious physical harm to his/her employees.

Location of Violation: Bldg. 820, ATF, floor of storage area above Clean Room

Hazard Description: The floor is a corrugated metal surface. It is an uneven walking surface, increasing the potential for people to lose their balance and fall. Handling materials stored in this area will further increase potential for injury.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/10/90	Hopkins

Regulatory Reference:
5(a)(1),PL 91-596

Each employer shall furnish each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his/her employees.

Location of Violation: Bldg. 815, Molecular and Applied Sciences Department, Laboratory D-3

Hazard Description: The manually operated garage door could be opened or inadvertantly left open during the operation of the Class 4 Lasers. The front and rear entry doors to the laboratory are interlocked but the garage door is not.

Type of Violation	Date Observed	Inspector
Serious	3/31/90	Slawski

Regulatory Reference:
BNL Safety Manual, 1.4.0, VI.E.

Compressed Gas Cylinder Safety. Securing Cylinders. All cylinders with the exception of lecture bottles shall be secured.

Location of Violation: Bldg. 912, outside of Overhead Door #2

Hazard Description: One unsecured compressed gas cylinder was placed on the driveway near Overhead Door #2 where it was subject to being struck by vehicles.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/05/90	Slawski

Regulatory Reference:
DOE Hoisting and Rigging Manual

Section 3.6.2.a. Hooks over a five ton capacity should be provided with such a device (safety catch) unless the service conditions make it undesirable.

Location of Violation: Bldg. 902, south high bays, two cranes, 15-tons Shepard Niles

Hazard Description: A safety catch was not installed on the hook for either crane.

Type of Violation	Date Observed	Inspector
Serious	4/09/90	Slawski

Regulatory Reference:
DOE Hoisting and Rigging Manual

Section 3.6.2.a. Hooks over a five ton capacity should be provided with a safety catch unless the service conditions make it undesirable.

Location of Violation: Bldg. 919, AGS, high bay, 40-ton Shepard-Niles crane

Hazard Description: There was no safety catch on the hook of the 40-ton crane.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/10/90	Slawski

Regulatory Reference:
DOE Hoisting and Rigging Manual

Section 3.6.2.a. Hooks over a five-ton capacity should be provided with a safety catch unless the service conditions make it undesirable.

Location of Violation: Bldg. 924, ADD, 17-ton crane

Hazard Description: There is no safety catch on the hook of the 17-ton crane.

Type of Violation	Date Observed	Inspector
Serious	4/04/90	Slawski

Regulatory Reference:
NFPA 30

Approved dispensing container must be used for flammable liquids.

Location of Violation: Bldg. 725, NSLS, Experiment Area U16A

Hazard Description: A plastic squeeze bottle, approximately one liter capacity, is used for dispensing acetone which is a flammable liquid.

Brookhaven National Laboratory OSHA Violations

Type of Violation	Date Observed	Inspector
Serious	4/10/90	Slawski

Regulatory Reference:
National Electrical Code - 1990

Article 110-31. A fence less than eight feet in height shall not be considered as preventing access.

Location of Violation: Linac and Booster, walk-in 13.8KV switch gear unit #1, Thomson Road and East Fifth Avenue

Hazard Description: Fence around high-voltage electrical installation is less than eight feet in height.

Appendix E. An Aerial Radiological Survey of the Brookhaven National Laboratory

An Aerial Radiological Survey of the

BROOKHAVEN NATIONAL LABORATORY

and Surrounding Area

Upton, New York

Date of Survey: March 1990

P.P. Guss
Project Scientist

PRELIMINARY DATA

ABSTRACT

An aerial radiological survey was performed from 20 to 24 March 1990 over approximately a 64 square kilometer (25 square mile) area surrounding the Brookhaven National Laboratory (BNL). BNL is located in the center of Suffolk County, Long Island, New York. All gamma radiation data were collected flying east-west lines spaced 76 meters (250 feet) apart at an altitude of 46 meters (150 feet) above ground level (AGL). Count rates obtained from the aerial platform were converted to exposure rates at 1 meter above the ground. The typical terrestrial-plus-cosmic background exposure rate in the survey area ranged from 5 to 10 microroentgens per hour (uR/h). The reported exposure rate values include an estimated cosmic ray contribution of 3.6 uR/h. Ground-based measurements made during the same period were compared to the aerial survey results. Pressurized ion chamber readings and soil samples were taken from six locations within the survey areas. Exposure rate values obtained from these measurements were in general agreement with those obtained from the aerial data. A total of 16 areas of man-made radioactivity were identified in the data. The dominant isotopes found over these areas were cesium-137, sodium-22, manganese-54, indium-114m, cobalt-58 and cobalt-60. In addition, during one helicopter flight, argon-41 was detected and on another flight annihilation positrons were detected.

A similar survey was conducted in June 1983 and May 1980. The results of 1990 were similar to the results of the previous surveys.

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1.0 INTRODUCTION

The United States Department of Energy (DOE) maintains the Remote Sensing Laboratory (RSL) in Las Vegas, Nevada, and an extension facility in Washington, D.C. The RSL is operated for the DOE by EG&G Energy Measurements, Inc. One of the major functions of the RSL is to manage an aerial surveillance program called the Aerial Measuring System (AMS).

Since its inception in 1958, the AMS has continued a nationwide effort to document baseline radiological conditions surrounding energy-related sites of interest, including nuclear power plants, manufacturing and processing plants, and research laboratories employing nuclear materials. [1] AMS aircraft have the additional capability of being equipped with mapping and multispectral scanners for ultraviolet, visible and infrared imagery; a broad array of meteorological sensors; and air sampling systems for particulate and molecular gas measurements. All of the survey operations are conducted at the request of federal or state agencies and by direction of the DOE.

The aerial radiological survey of the Brookhaven National Laboratory (BNL) was requested by the DOE. The survey was conducted during the period 20 March to 24 March 1990. A similar aerial survey was conducted during May 1980 and June 1983. [2,3]

2.0 SURVEY SITE DESCRIPTION

BNL is located at Upton, New York on Long Island. It is approximately 100 kilometers (62 miles) east of New York City. The Laboratory occupies a 21-square-kilometer (8-square-mile) site situated approximately in the center of the island. The aerial survey covered approximately a 64-square-kilometer (25-square-mile) area with BNL at the center. BNL is operated by Associated Universities, Inc. (AUI), under contract with DOE.

BNL's site was formerly occupied by Camp Upton, which was originally used to train recruits during the First and Second World Wars. In 1947, the decommissioned training post was transformed into a center for the development of peaceful uses of atomic energy and named BNL. The role of the Laboratory is to provide a means for research in the high energy physics and energy fields that would not be easily attainable by universities or private industry. The nuclear research facilities contain various accelerators and reactors used to produce beams of protons, neutrons, and ions for research purposes. [4]

3.0 SURVEY PROCEDURES AND EQUIPMENT

The survey and data analysis procedures and the equipment used during this survey are briefly discussed in this section. A more detailed description of the procedures can be found in previously published reports. [1,5]

3.1 Data Acquisition Equipment

The survey utilized a Messerschmitt-Bolkow-Blohm (MBB) BO-105 helicopter (Figure 1) which carried a crew of two along with all the data collection and recording instrumentation. The radiation detector package consisted of an array of 8 sodium iodide (thallium-activated), NaI(Tl), scintillation crystals. Each crystal had the dimension of 2" x 4" x 16".

A photomultiplier tube mounted to each NaI(Tl) crystal converted the scintillation pulses to voltage pulses. The voltage pulses from 8 detectors were normalized and combined in summing amplifiers to produce a single gamma ray energy spectrum with high sensitivity. The remaining single tube was used to provide lower sensitivity data useful in areas with greatly enhanced radiation levels. Both spectra were simultaneously acquired and recorded, resulting in a wide operating range.

The outputs of the summing amplifier and the single tube were analyzed in separate analog-to-digital converters (ADCs) in the Radiation and Environmental Data Acquisition and Recorder (REDAR) system. The REDAR system is a multi-microprocessor, portable data acquisition and real-time analysis system. It has been designed to operate in the demanding environments associated with helicopters and fixed-wing aircraft.

The ADC signals were adjusted so that the photo-peaks due to calibration sources appeared in preselected channels of the multichannel analyzers (MCAs). Each MCA collected a 1024-channel gamma ray energy spectrum once every second. The collected spectrum was scaled to 4 keV per channel. The 1024-channel spectrum was compressed into 256 channels before storage on magnetic tape. The energy resolution of the NaI(Tl) crystals varies with energy, permitting the compression of the spectral data without compromising photopeak identification and data analysis techniques. This spectral compression technique reduced the data storage requirement by a factor of four. All 1-second data acquired by the REDAR system were placed into a buffer. After accumulating data for 4 seconds, the buffered information was recorded on magnetic tape as a 4-second record. In addition to gamma ray spectral data, other information acquired and recorded by the REDAR system included gross count data (gamma ray activity integrated over the energy range 0.04 MeV to 3.0 MeV), aircraft position data, system live time information, and environmental conditions, i.e., absolute barometric pressure and outside air temperature.

3.2 Aircraft Positioning

An aerial photograph was used to define the survey area. Area coverage was ensured by flying a series of parallel lines over the predetermined area. Radiological data were taken at an altitude of 46 meters (150 feet) above ground level (AGL) along flight lines up to 8 kilometers (5 miles) in length and spaced 76 meters (250 feet) apart. A total of 111 lines were flown for this survey.

The helicopter position was established by two systems: an ultra high frequency ranging system (URS) and a radar altimeter. The URS master unit, mounted in the aircraft, interrogated two remote transceivers which were mounted in an appropriate geometric configuration several kilometers outside the survey area. By measuring the round-trip propagation time between the master and remote units, the master unit computed the distance to each remote unit. These distances were calculated every second and transferred to magnetic tape every 4 seconds. In subsequent computer processing, the distances were converted to position coordinates and scaled to fit an aerial photograph of the survey area. In addition, the positional information was used in real-time during each flight to provide helicopter steering data to the pilot.

The radar altimeter aboard the helicopter measured the time lag for the return of a pulsed signal and converted this delay to aircraft altitude. These data were also recorded on magnetic tape so that any variation in gamma ray signal strength caused by altitude fluctuations could be accurately compensated.

3.3 Data Processing Equipment

The data recorded on magnetic tapes during the survey were processed with the Radiation and Environmental Data Analyzer and Computer (REDAC) system. This system consisted of a computer mounted in a mobile data processing laboratory (Figure 2). An extensive inventory of software routines and supporting equipment was available for detailed data analysis. Some of the data were processed during the actual survey period to assure complete data acquisition integrity and to provide preliminary results as soon as possible.

3.4 Aerial Photographs

Oblique documentary aerial photographs were taken of the Brookhaven National Laboratory during the survey period. The photographs are stored at EG&G/EM and available to qualified users. A high-altitude vertical photograph of the laboratory was taken on 15 March 1990. This photograph serves as part of the map underlay in Figures 3 and 4.

3.5 Ground-Based Measurements

Ground-based measurements were made at four locations, shown in Figure 3, within the boundaries of the aerial survey. Exposure rates were measured with a pressurized ion chamber for comparison to the values inferred from the aerial data. Soil samples were taken at each ground-sampling point to determine the radionuclide concentrations typical of the natural background in the area. In addition, estimates of the exposure rates due to these radionuclide concentrations will be made from soil sample analyses. Systems and procedures for soil sample data collection and analysis are outlined in a separate publication. [6]

4.0 DATA ANALYSIS

Data Analysis for the BNL survey produced the following: (1) a total gamma ray exposure rate contour map (Figure 3), (2) a man-made isoradiation contour map (Figure 4), (3) a typical background spectrum (Figure 5), and (4) gamma ray spectra of the man-made radiation areas (Figures 6 through 21).

4.1 Total Gamma Ray Exposure Rate Contour Map

A gamma ray exposure rate contour map was constructed from the gross counts obtained in the gamma ray energy spectrum between 0.04 MeV and 3.0 MeV. The exposure rate contour map was scaled and overlaid on an enlarged aerial photograph. Before the gross counts were converted to exposure rates, the non-terrestrial components were removed. These components consisted of: (1) aircraft background, (2) cosmic radiation, and (3) airborne radon daughter contributions. The non-terrestrial components were determined by flying over the Atlantic Ocean where the terrestrial signal was negligible. The resulting net gross count rate can be expressed in the form:

$$GC = [(A_e * W_{GC}) * LT - BKG] * ALT$$

where

GC = Net gross count rate normalized for systems live time and altitude variations (counts per second).

W_{GC} = Measured gross count rate (cps).

A_e = Detector effective area normalization factor.

LT = System live time counting loss normalization factor.

BKG = Non-terrestrial radiation background count rate (cps).

ALT = Altitude variations normalization factor.

Terrestrial exposure rate values in microroentgens per hour (uR/h) at the 1 meter level were calculated from the net count rate, i.e., gross count rate minus the non-terrestrial components, using the conversion factor of 973 counts per second equals 1 uR/h. This conversion factor was derived from experimental measurements acquired at a calibration range in Calvert County, Maryland. The soil in the calibration area contained a typical mix of naturally occurring radionuclides consisting of potassium-40 and members of the uranium and thorium decay chains. [5] A different isotopic mix will modify the shape of the spectrum over the energy interval covered by gross counts. Since the gross count conversion factor is dependent on the spectral shape, the established conversion factor will not apply precisely to areas where the mix is atypical or where extraneous radionuclides are present. An estimated cosmic ray contribution of 3.6 uR/h was added to the terrestrial exposure rates to obtain the total exposure rate values minus any contribution from airborne radon. The exposure rate contour map is shown in Figure 3.

4.2 Man-Made Isoradiation Contour Map

The energies of the gamma rays emitted by "man-made" contaminants typically fall below 1.4 MeV. In a background area (no man-made contaminants), the ratio of the activity from a low energy window (0.04 MeV to 1.39 MeV) to a high energy window (1.4 MeV to 3.0 MeV) is fairly constant. An algorithm that suppresses the variations of background radiation data and enhances man-made radiation can be written as follows:

CR (Man-Made) = CR (0.04 MeV to 1.39 MeV) - k CR (1.4 MeV to 3.0 MeV)

In the equation above, CR is the count rate from the portion of the spectrum indicated, and k is the average value of the ratio of low energy activity to higher energy activity in a natural background area. This equation leads to statistical oscillations around zero in normal background areas and a net positive count rate in areas containing man-made activities with gamma ray energy between 0.4 and 1.4 reV. Values from this algorithm were combined with corresponding position information to produce the isoradiation contour map showing the distribution of man-made radiation (Figure 4). Using similar techniques, isoradiation contour maps of cesium-137, cobalt-60, cobalt-58, manganese-54, and sodium-22 were also produced and analyzed.

4.3 Spectral Analysis

Spectral data were analyzed for background areas and for the man-made radiation areas indicated by the isoradiation contour maps. A net spectrum was obtained by subtracting a nearby background spectrum channel by channel from the spectrum obtained over the area of man-made activity. A typical background spectrum taken from the western portion of the survey area is shown in Figure 5. Figures 6 through 21 show the net spectra obtained over the 16 areas containing man-made radiation.

5.0 RESULTS

5.1 1990 Aerial Survey Results

The exposure rate contours (derived from gross count rates) are shown in Figure 3, overlaid on an aerial photograph of the BNL. The average terrestrial-plus-cosmic background exposure rate in the BNL survey area ranged from 5 to 10 uR/h. The exposure rates measured in the northeastern section of the survey area were generally somewhat lower than those in the western section.

It should be noted that for slowly varying activity distributed over large areas, such as typical of most natural background radiation, the agreement between ground-based readings and those inferred from aerial data is generally good. Due to the large-area averaging property of the airborne system, however, localized anomalies will appear to be spread over a larger area with a lower maximum activity than actually exists on the ground. For these situations, ground measurements will not necessarily agree very well with the aerial results. The aerial data, therefore, simply serve to identify the existence, the location and the spectral content of such anomalies. Ground surveys are required for a more accurate definition of their spatial extent and intensity.

The man-made isoradiation contour map for the 1990 BNL survey area is shown in Figure 4. A total of 16 areas were identified by the survey data analysis as containing man-made isotopes. The spectra for these areas are shown in Figures 6 through 21. The identified photo peaks are listed on each figure and their associated isotopes are likely sources of the enhanced radiation levels indicated on Figure 3. Other areas with lower radio nuclide concentrations may exist but could not be detected by the AMS. Table 1 presents a list of radioisotopes observed with the AMS at the BNL. Table 2 presents the minimum detectable activity (MDA) for various isotopes using the AMS.

Table 3 gives a description of the 16 locations identified with anomalies radiation levels. [7] Spectra for each of these locations are represented in Figure 6 through 21 consecutively. The annihilation gammas (0.511 MeV) detected at Locations 5, 14, and 15 may indicate the presence of oxygen-15.

5.2 1990 Ground-Based Measurements

Results of the ground-based measurements are given in Table 4 . The locations of the ground sampling points were chosen in an area where only naturally occurring radioisotopes were detected by the aerial system. Comparisons show agreement between the aerial data and the results obtained by the ground sampling. A major contribution to any discrepancy between ground and aerial survey results lies in the fact that each aerial measurement represents an average exposure rate over a much broader area than does a ground measurement.

Also included in Table 4 is a comparison of ground based and AMS measurements. The ground results at 6 locations were acquired to verify the quality and calibration of the AMS. The comparison is excellent. The ground measurements represent a more localized averaging of radiation at point locations, whereas in this case the aerial measurement for each location is an average over a land area approximately 100 meters (328 feet) in radius.

5.3 1990 In-Situ Measurements

Associated with the aerial survey, in-situ measurements were conducted on the ground. In the in-situ measurements, a high purity germanium detector is employed by counting for long times with the detector facing the earth at a distance of one meter. The purpose of these measurements are four-fold. First, the measurements provide greater sensitivity in searching for low levels of radioisotopes, particularly interesting along creeks and water drainage paths. Second, since the aircraft is located 150 miles above the earth during the AMS measurement, substantial averaging occurs: maxima in exposure rates are diminished and near sources substantial "shine" in the air can cause exposure rates reported by the AMS to be higher than actually true directly below the aircraft. Third, marginal signature for sources of man-made sources of radiation may not be easily identified using NaI (Tl) resolutions associated with the AMS, but may be with the much higher resolution germanium detector system. Finally, the in-situ measurements serve to provide a method of verifying the aerial results.

A combined report detailing the results of the in-situ measurements will be forthcoming.

5.4 Comparison of 1983 and 1990 Results

A comparison of survey parameters for the 1980, 1983, and 1990 surveys is presented in Table 5. There are three notably significant differences with the results of the 1983 results. First, during the 1990 measurement the Alternating Gradient Synchrotron (AGS) was operating. This led to intense (and pulsed) count rates by the AMS in the vicinity of location 5. The bulk of the measured exposure rate about this area, in fact, may be attributed to "shine" by AGS beam-related radiation. Figure 10 also indicates annihilation gammas due to positrons without evidence of any other associated photo peaks due to nuclear radiations. This may be due to the presence of oxygen-15 in the AGS area at the time of measurement. The primary gamma ray measured near Location 5 are 0.511 MeV annihilation gammas.

A second difference with the presence of an argon-41 gaseous plume detected by the aerial platform as it flew above Locations 6 and 13 (Figures 11 and 18). The isoradiation contours are even shaped as gaseous plumes, an indication that the material was airborne during measurement. Further, the contour patterns do not correlate with water drainage or ground features. The gamma-ray responsible for the excess radiation was precisely of the energy of gaseous argon-41.

Finally, the third major departure from results of 1983 was the strong signature of cobalt-60 at location 1 (Figure 16). In the 1983 (and 1980) measurement, cesium-137 was reported at this location.

Generally, the results of the 1983 and 1990 measurements agree very well. The terrestrial radiation exposure levels measured with the equipment were identical to within an absolute difference of 0.3 uR/h. (The error in AMS results is generally quoted as the greater of 1 uR/h or 5%.) An improved estimate of 3.6 uR/h due to cosmic radiation was applied to the 1990 results to obtain Figure 3. The differences in absolute scale and cosmic contribution create a 0.7 uR/h change in quoted exposure levels in order to obtain nearly identical isoradiation contour position of exposure rate in background areas.

6.0 CONCLUSION

At 64-square-kilometer (25-square-mile) area, centered on the Brookhaven National Laboratory, Upton, New York, was radiologically surveyed at an altitude of 46 meters (150 feet) utilizing the AMS. Average exposure rates at 1 meter above ground level over the survey area varied between 5 and 10 microroentgens per hour. Pending more detailed analysis at EG&G/EM, the presence of man-made sources of radiation was not detected outside the boundary of Brookhaven National Laboratory.

Figure 1. *MBB BO-105 HELICOPTER*

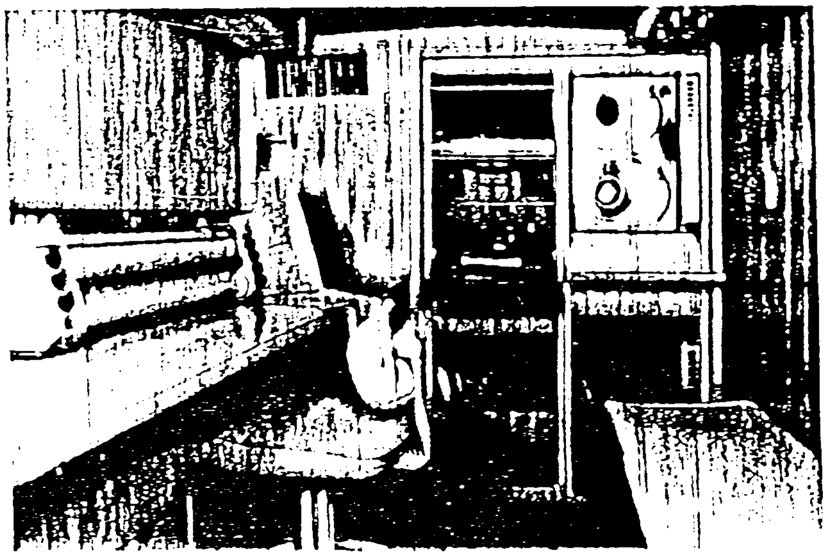

Figure 2. *MOBILE COMPUTER PROCESSING LABORATORY*

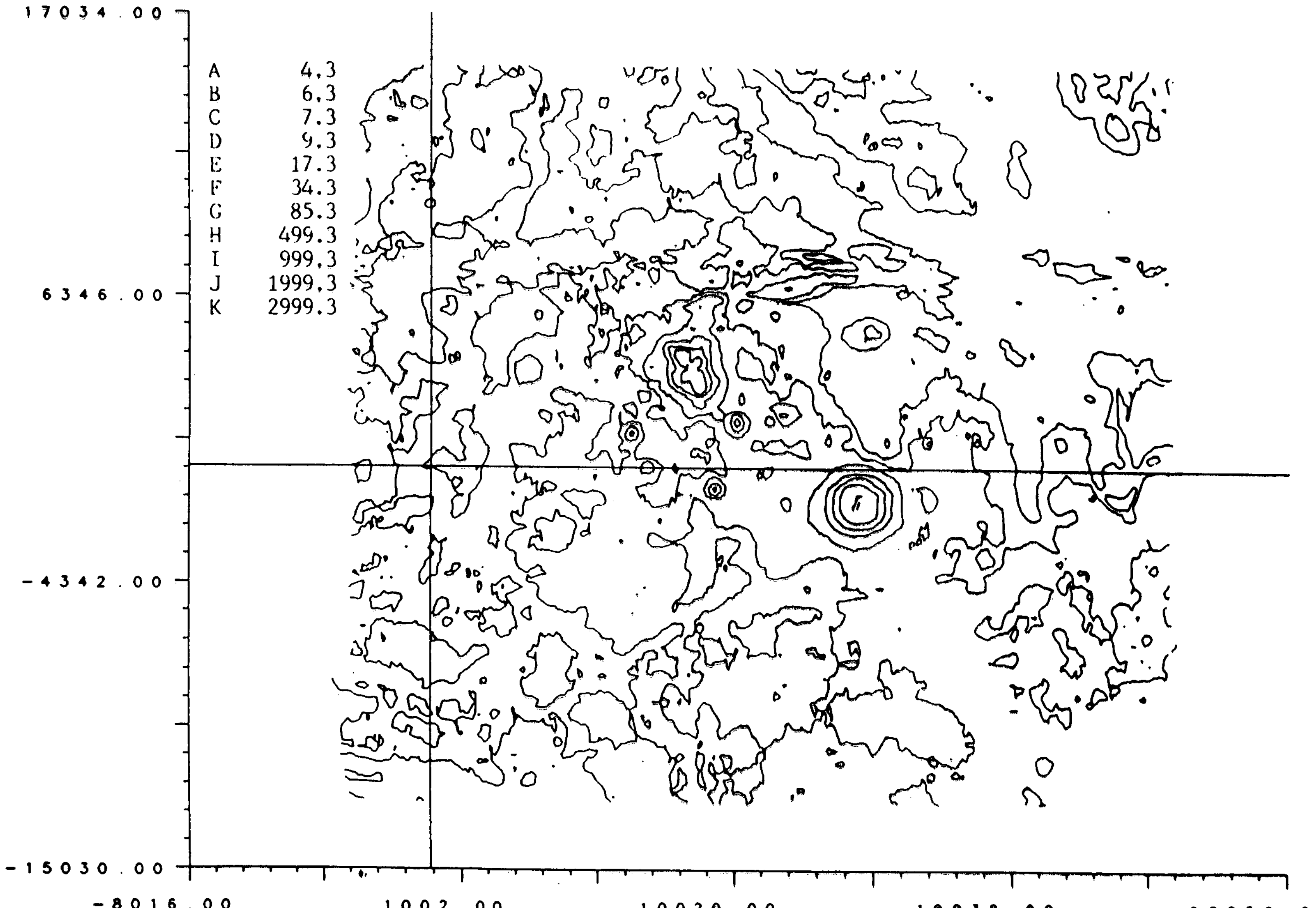

Figure 3. Exposure Rate

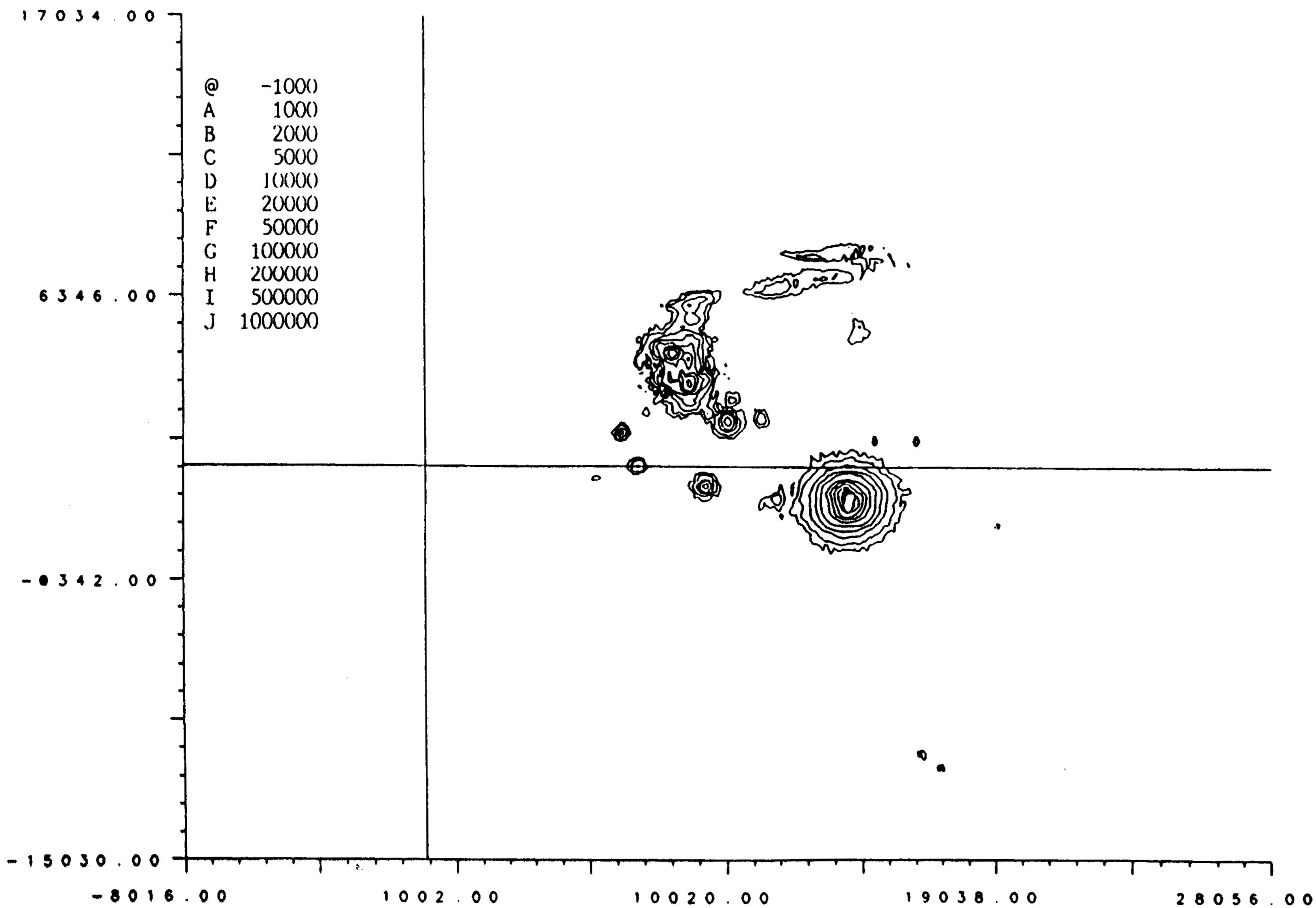

Figure 4. Man-Made Gross Count

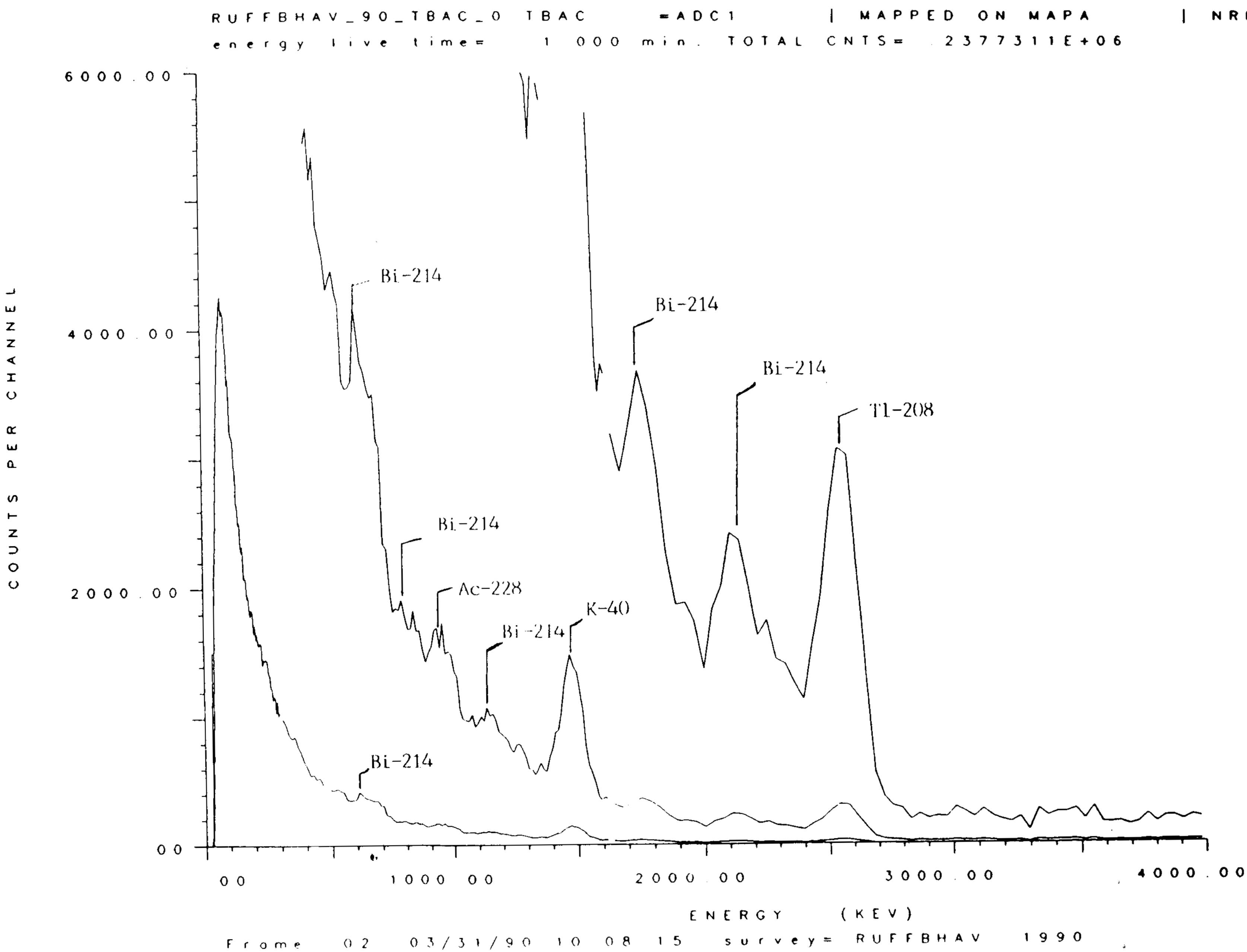

Figure 5. Natural Background.

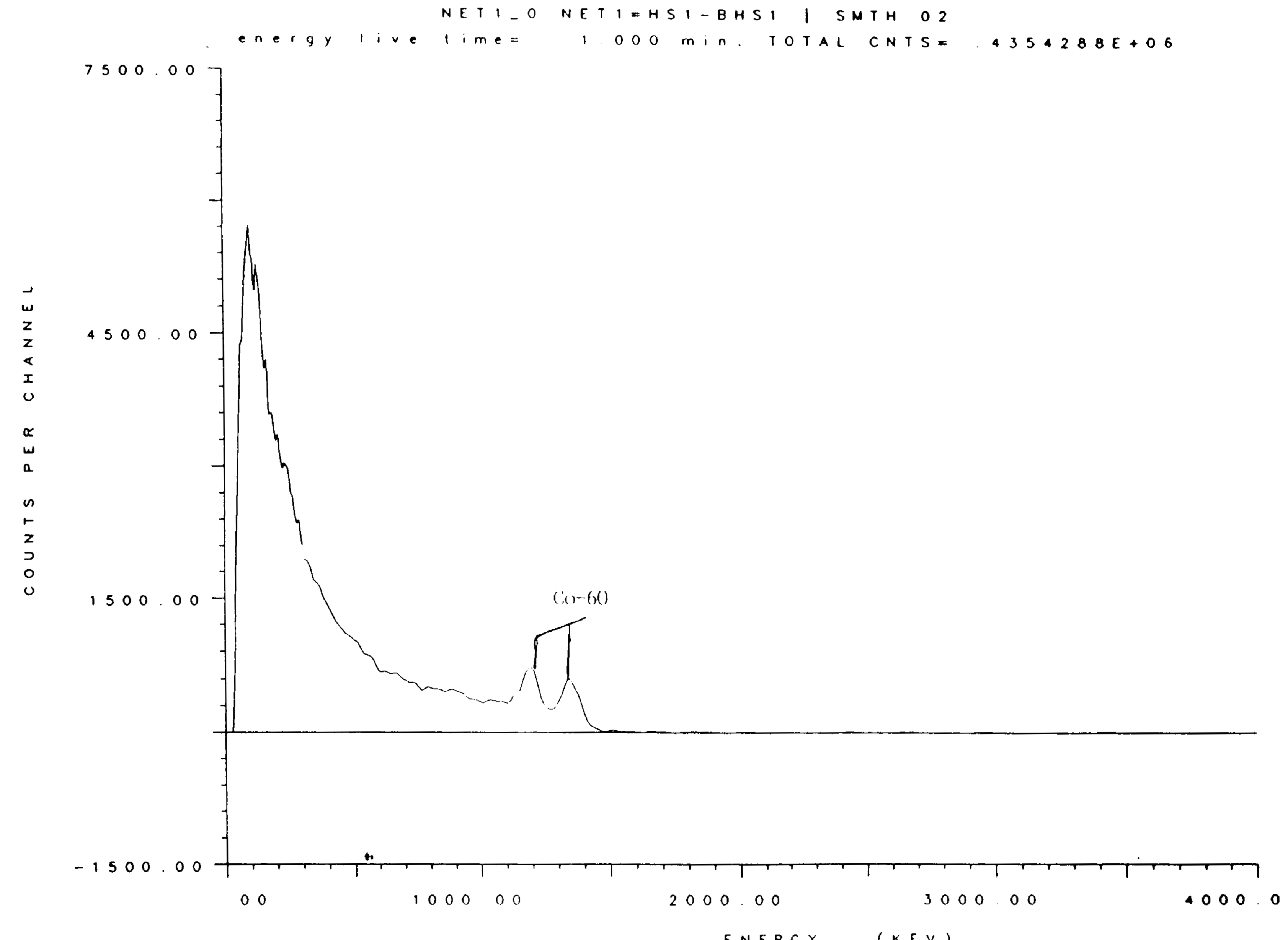

Figure 6. Location 1

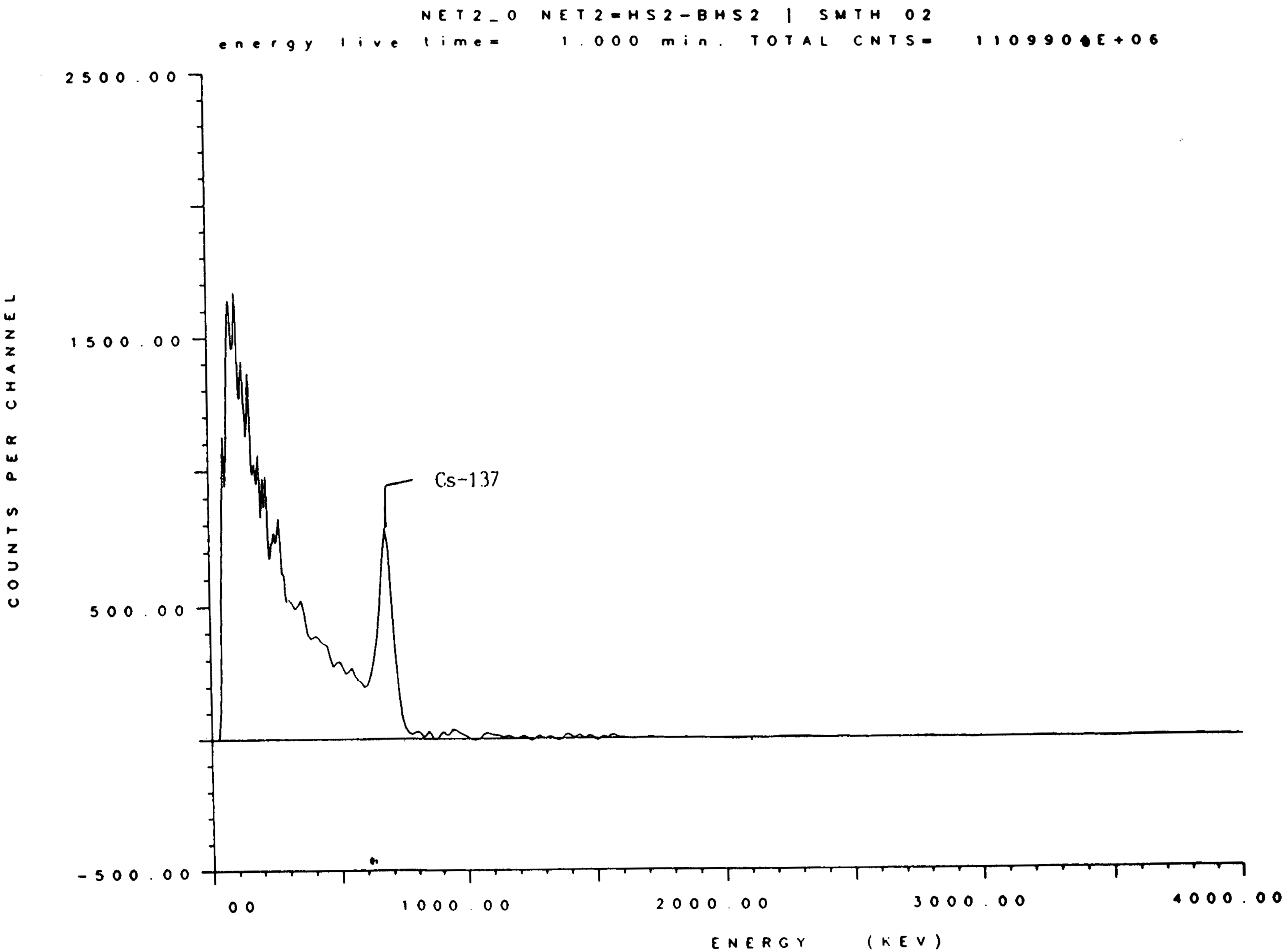

Figure 7. Location 2

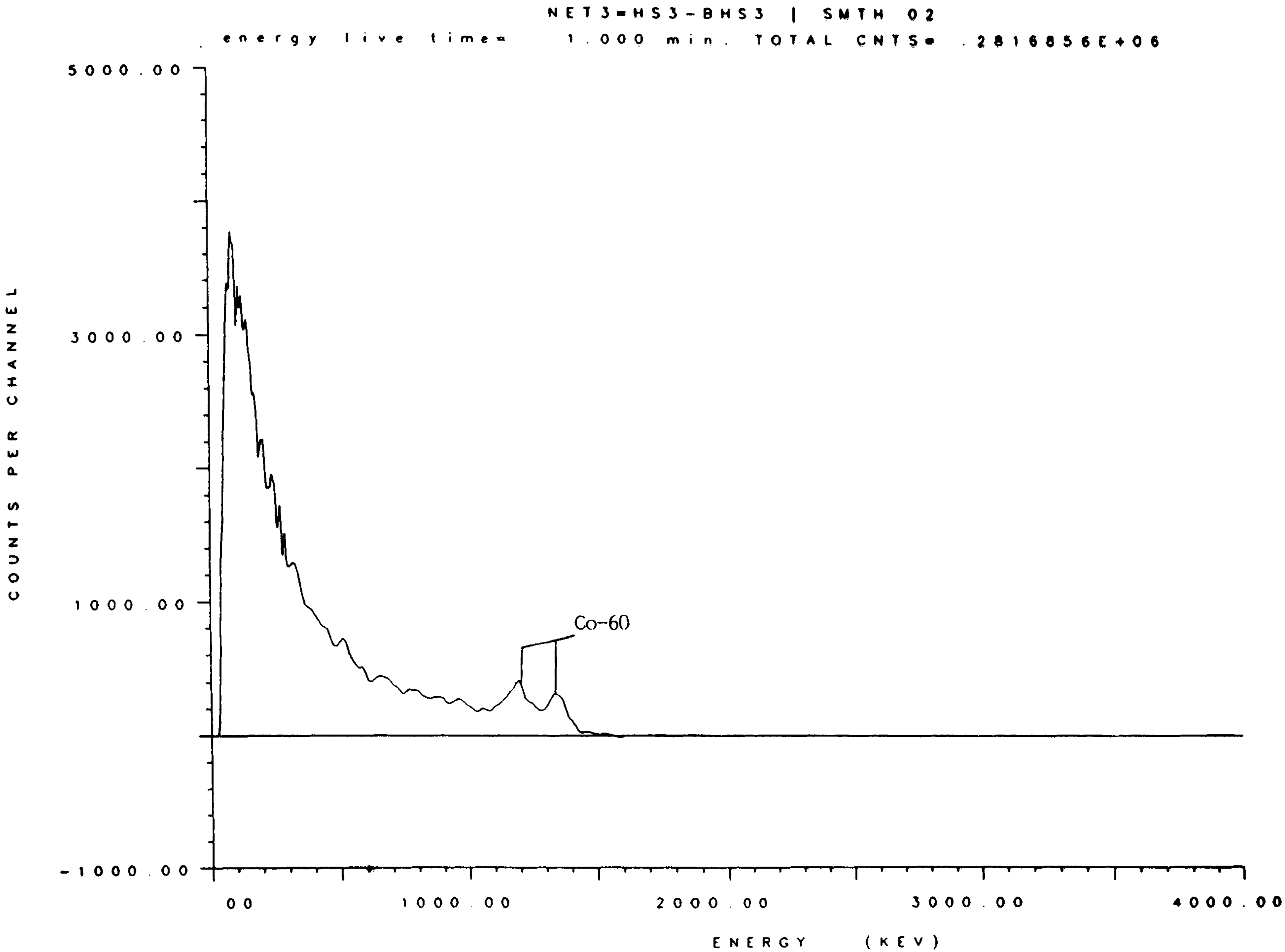

Figure 8. Location 3

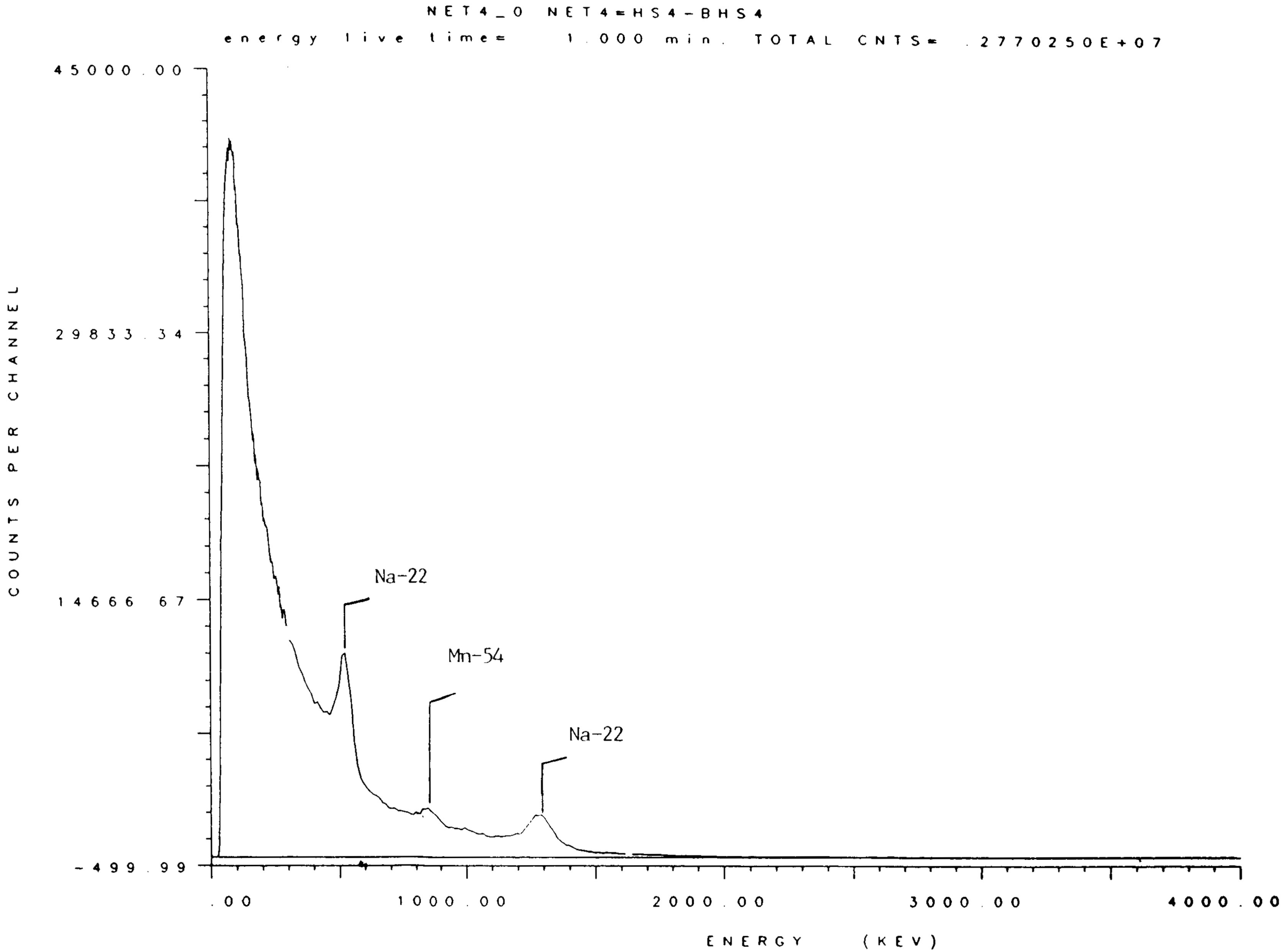

Figure 9. Location 4

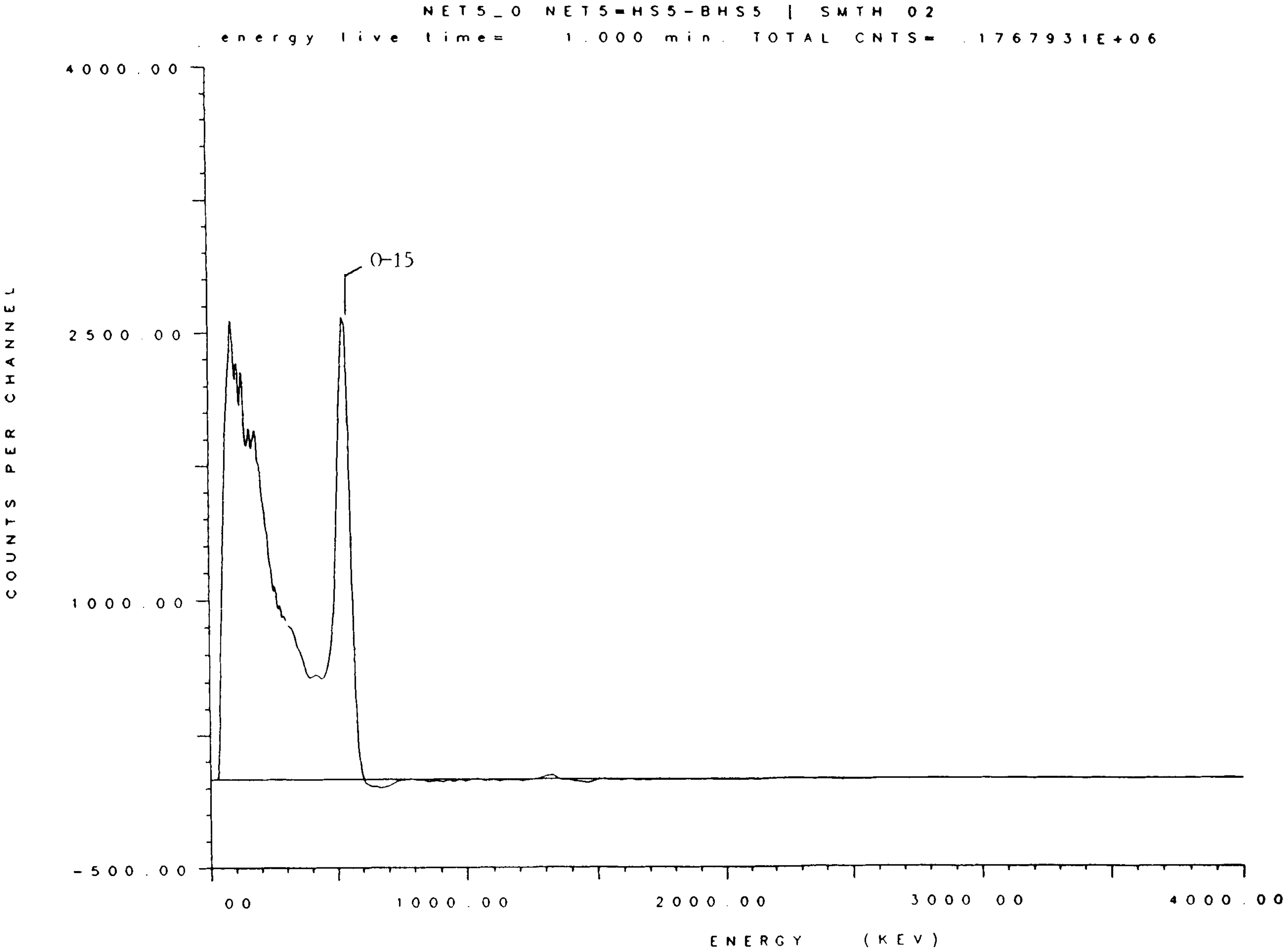

Figure 10. Location 5

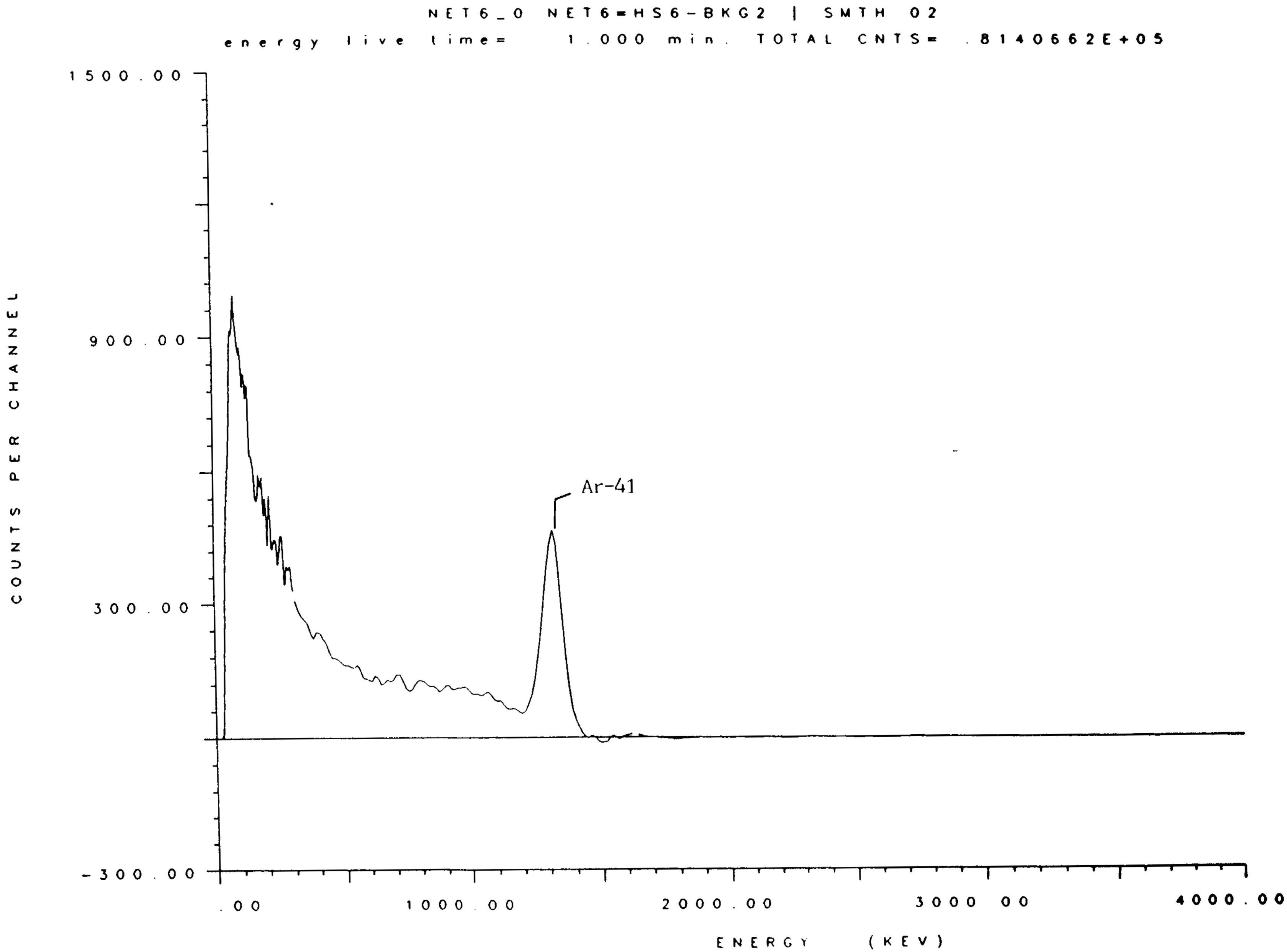

Figure 11. Location 6

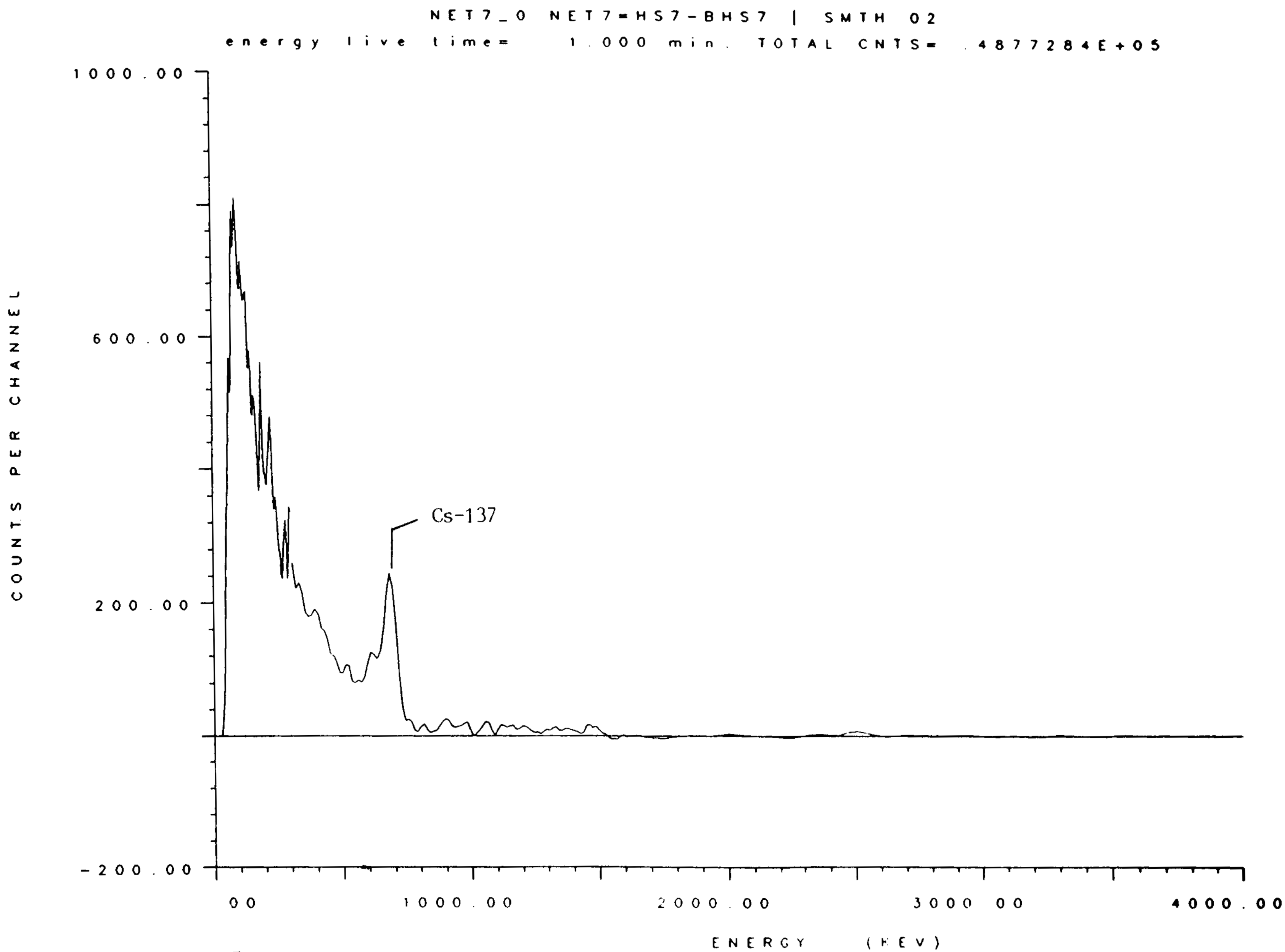

Figure 12. Location 7

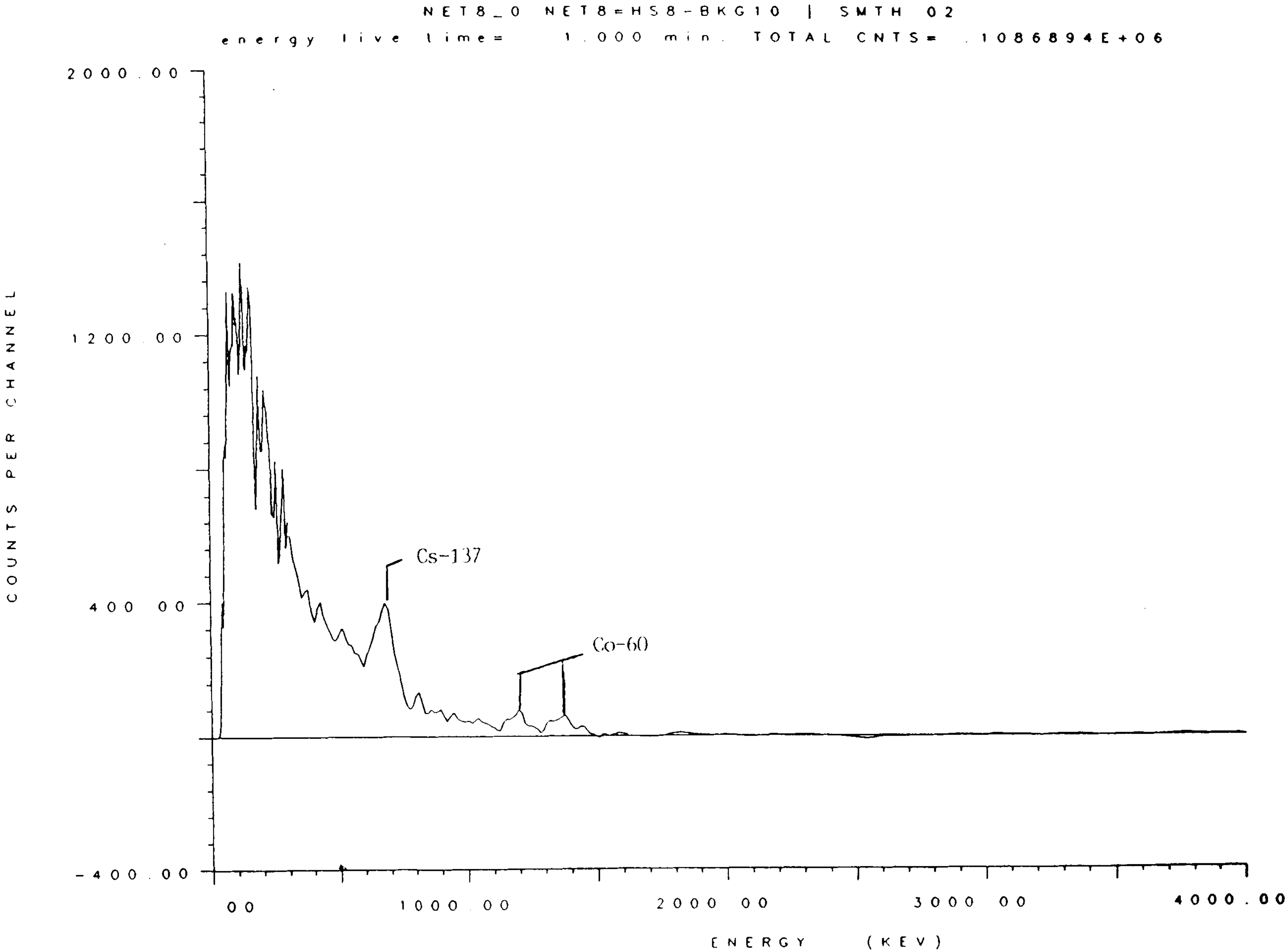

Figure 13. Location 8

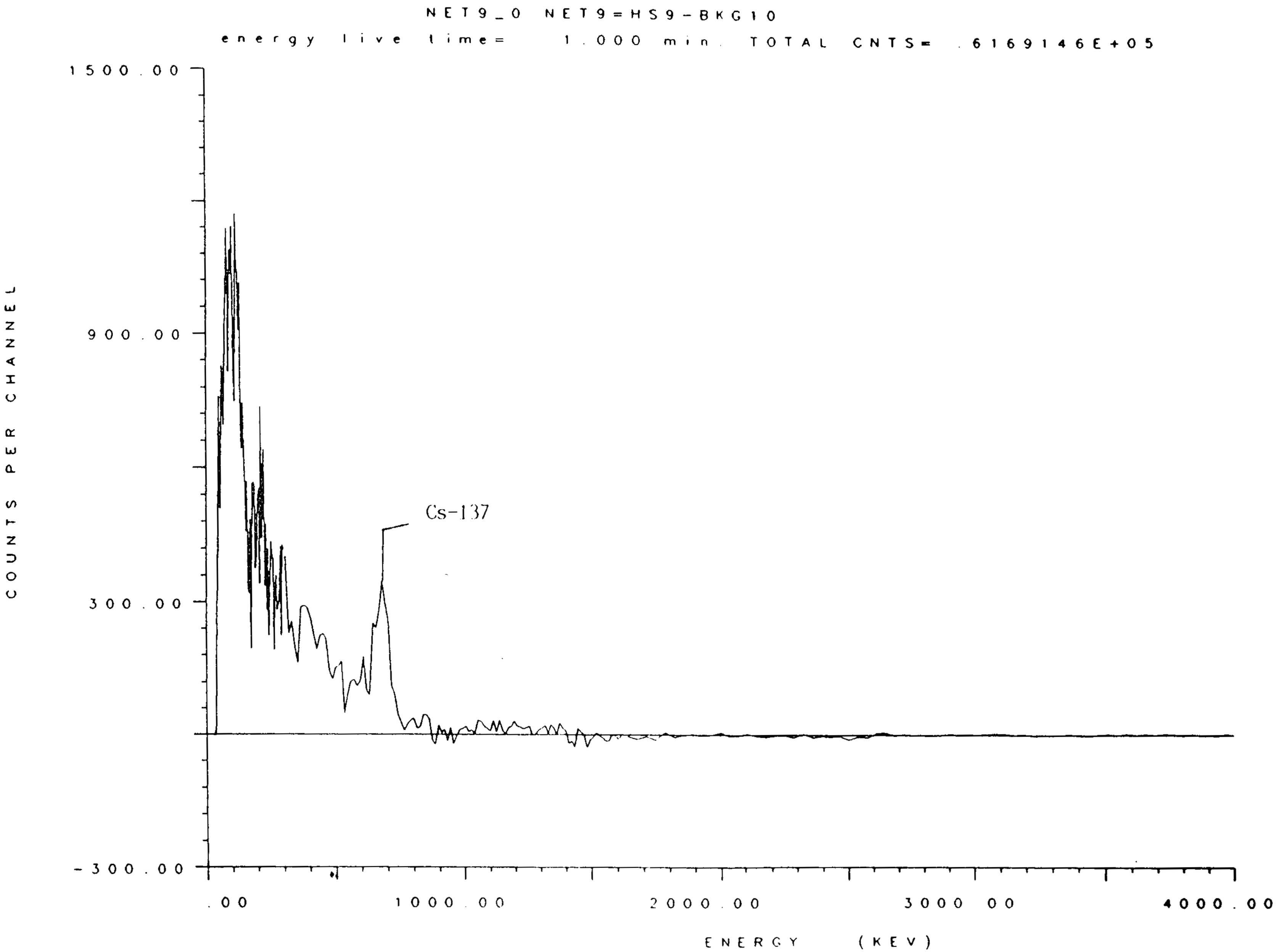

Figure 14. Location 9

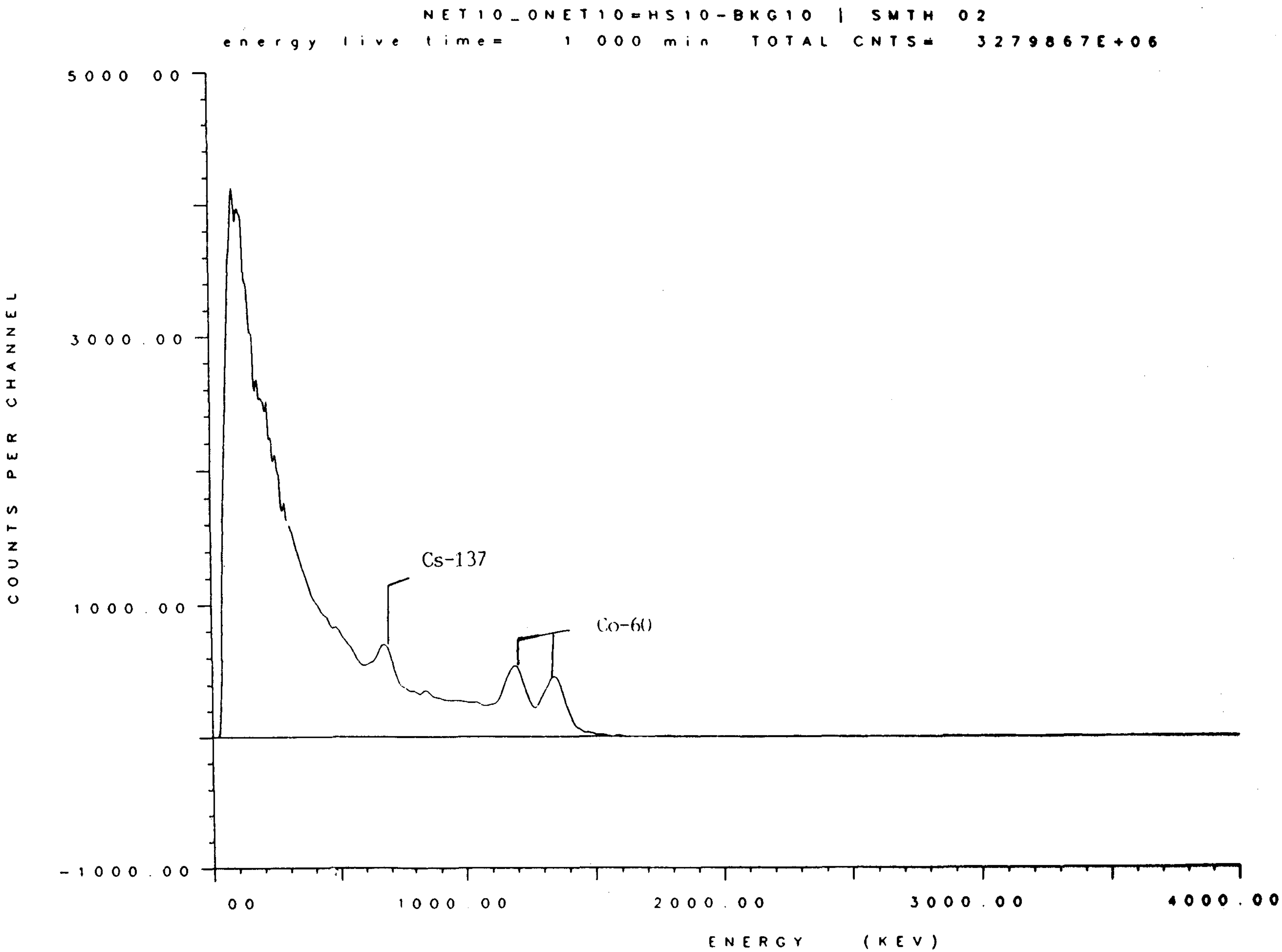

Figure 15. Location 10

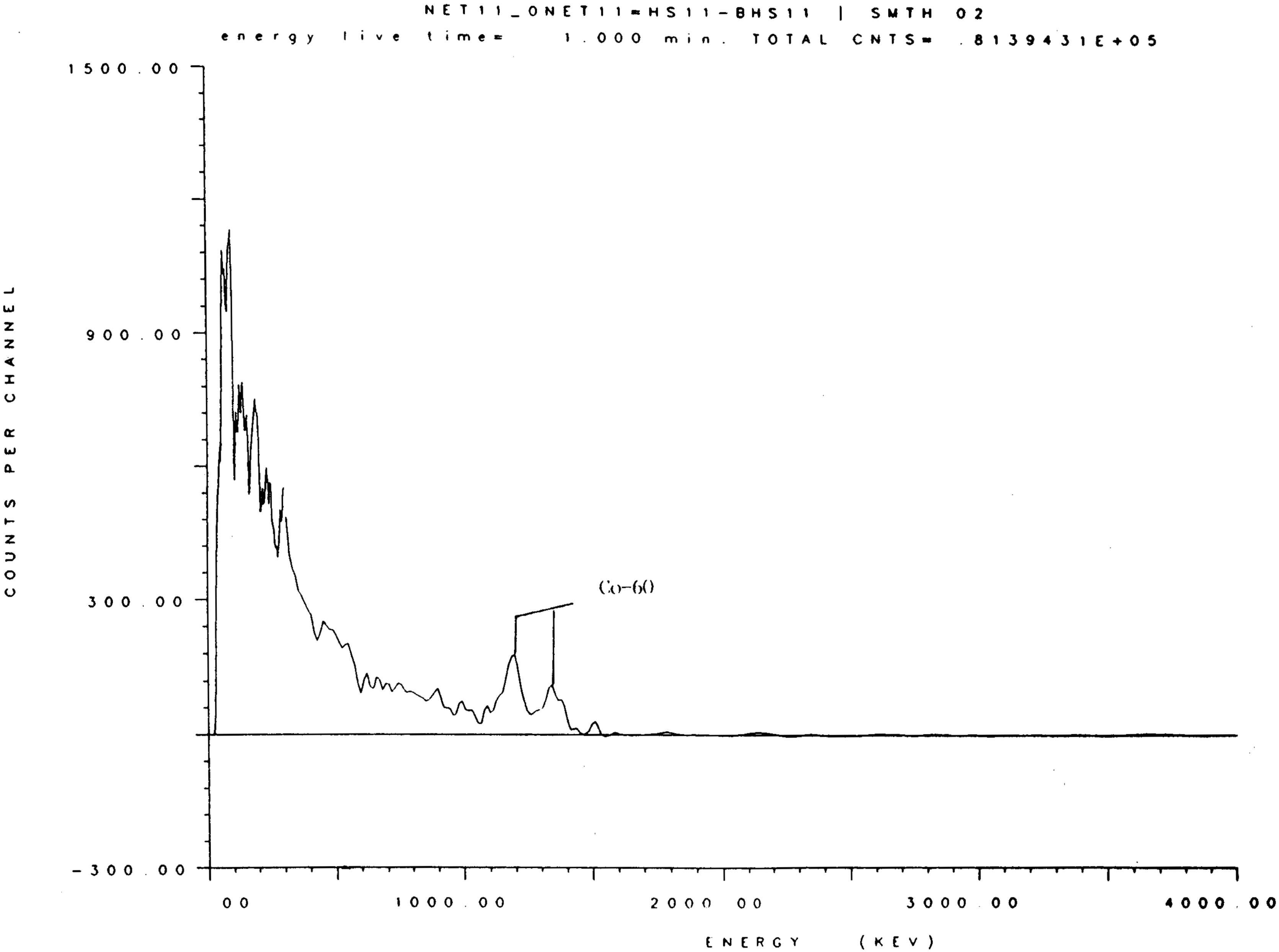

Figure 16. Location 11

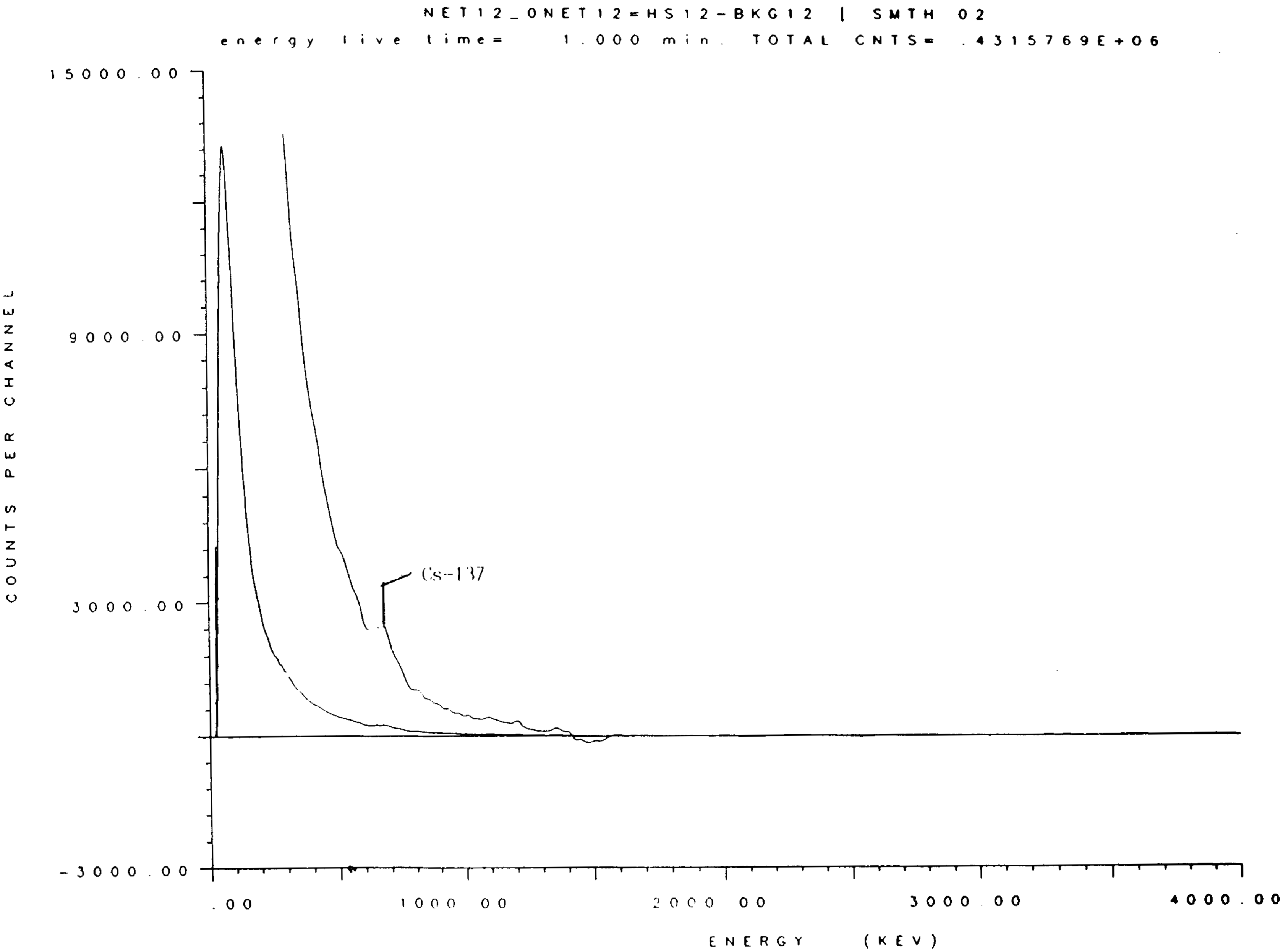

Figure 17. Location 12

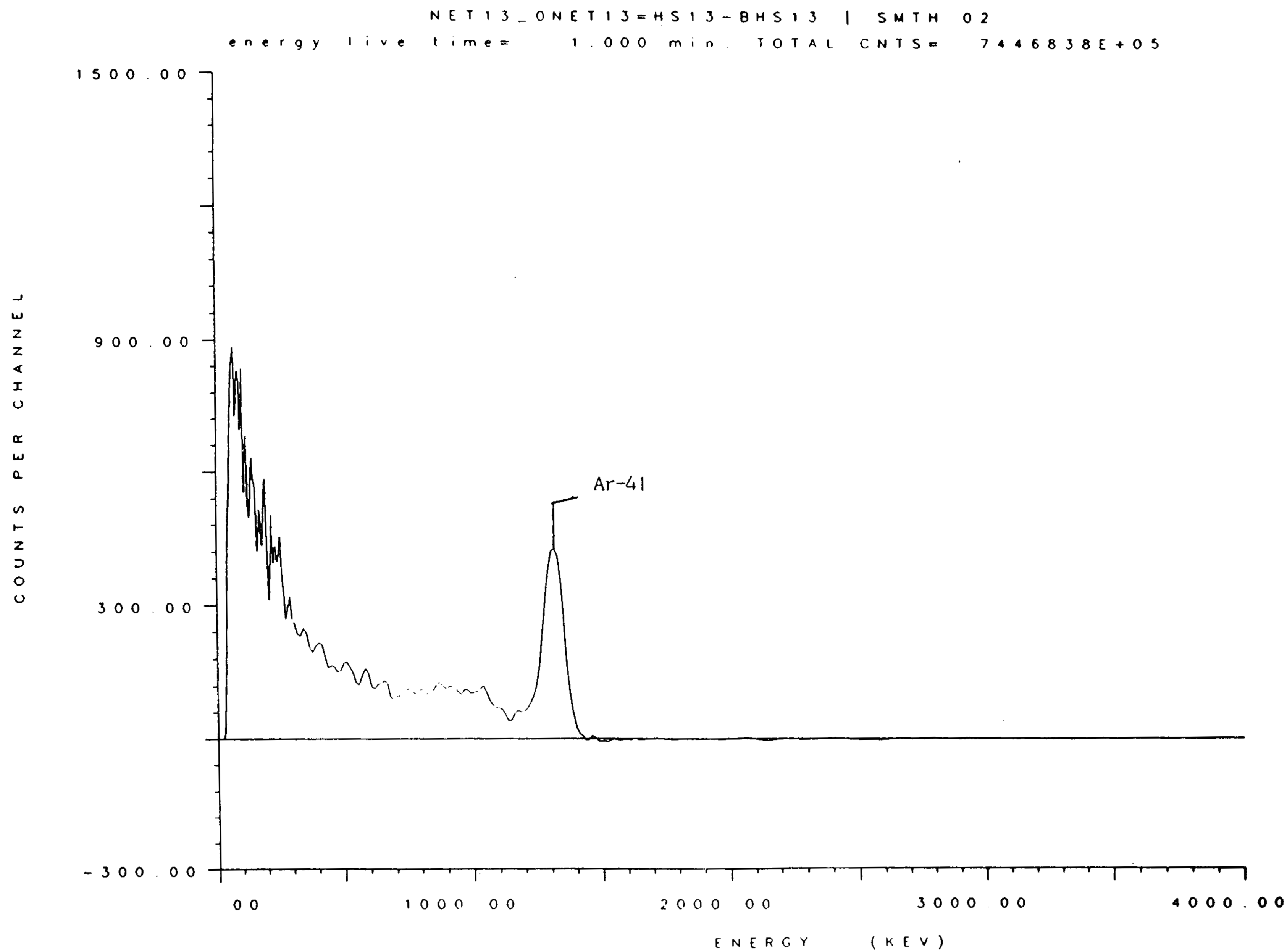

Figure 18. Location 13

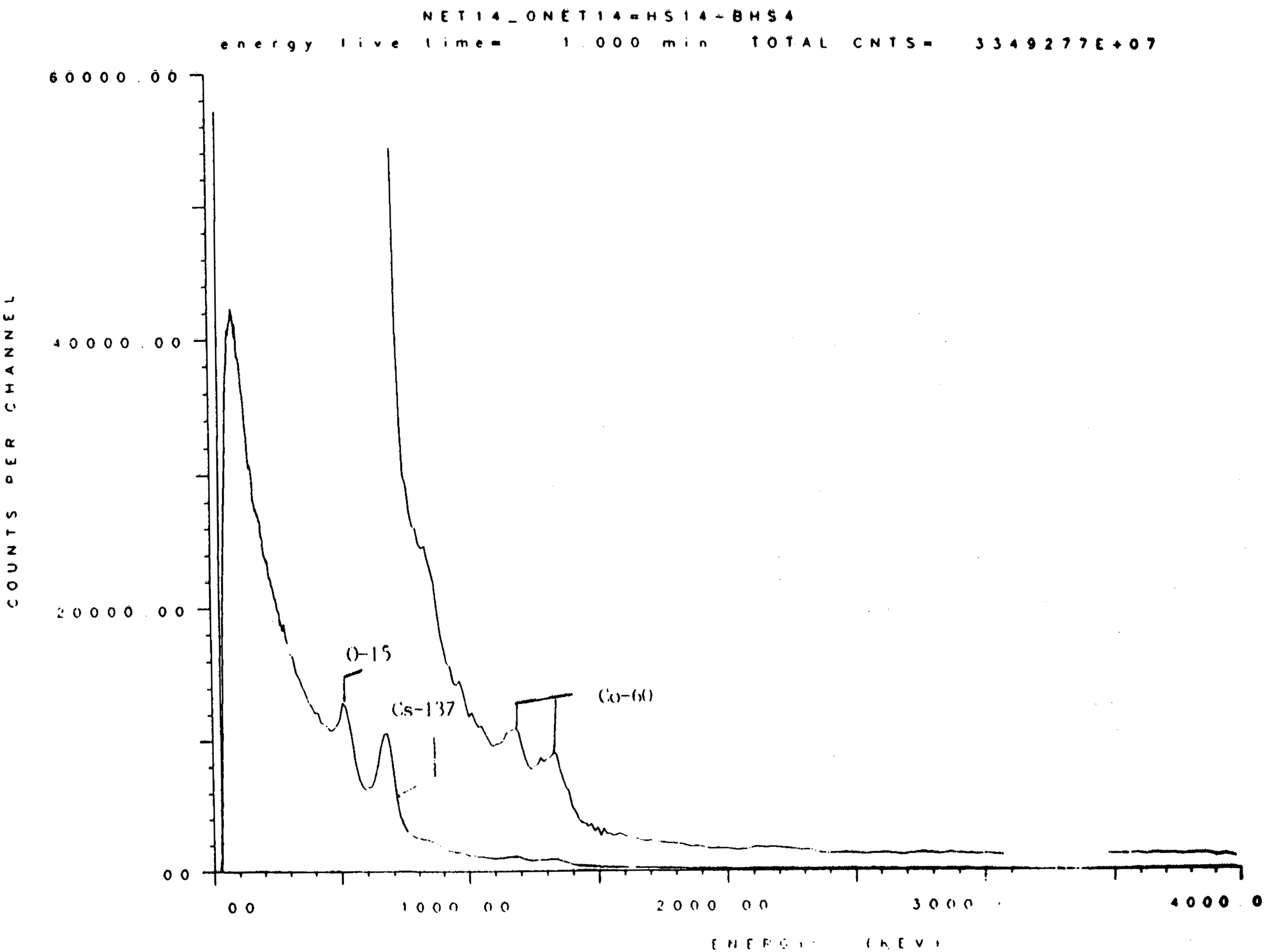

Figure 19. Location 14

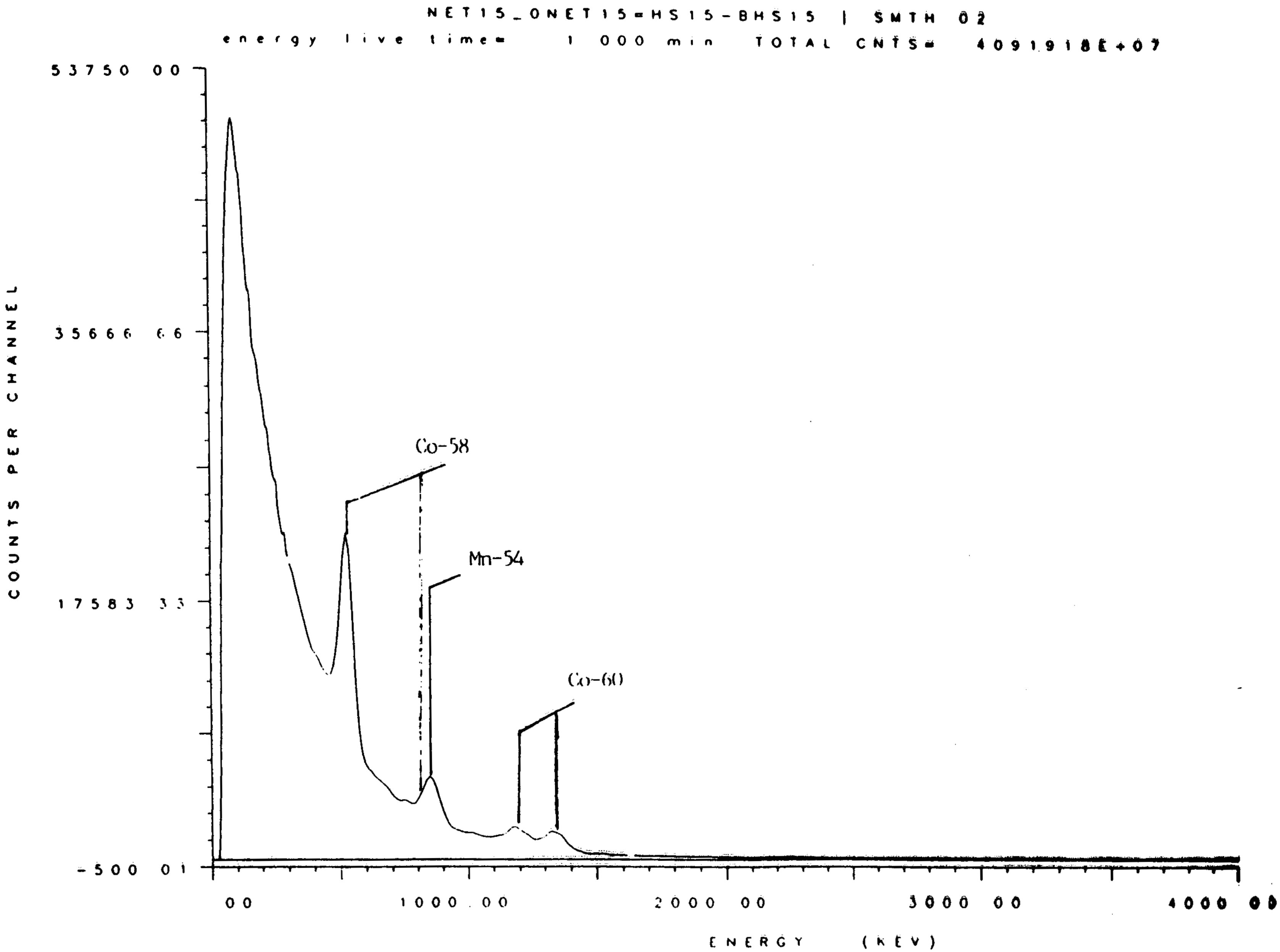

Figure 20. Location 15

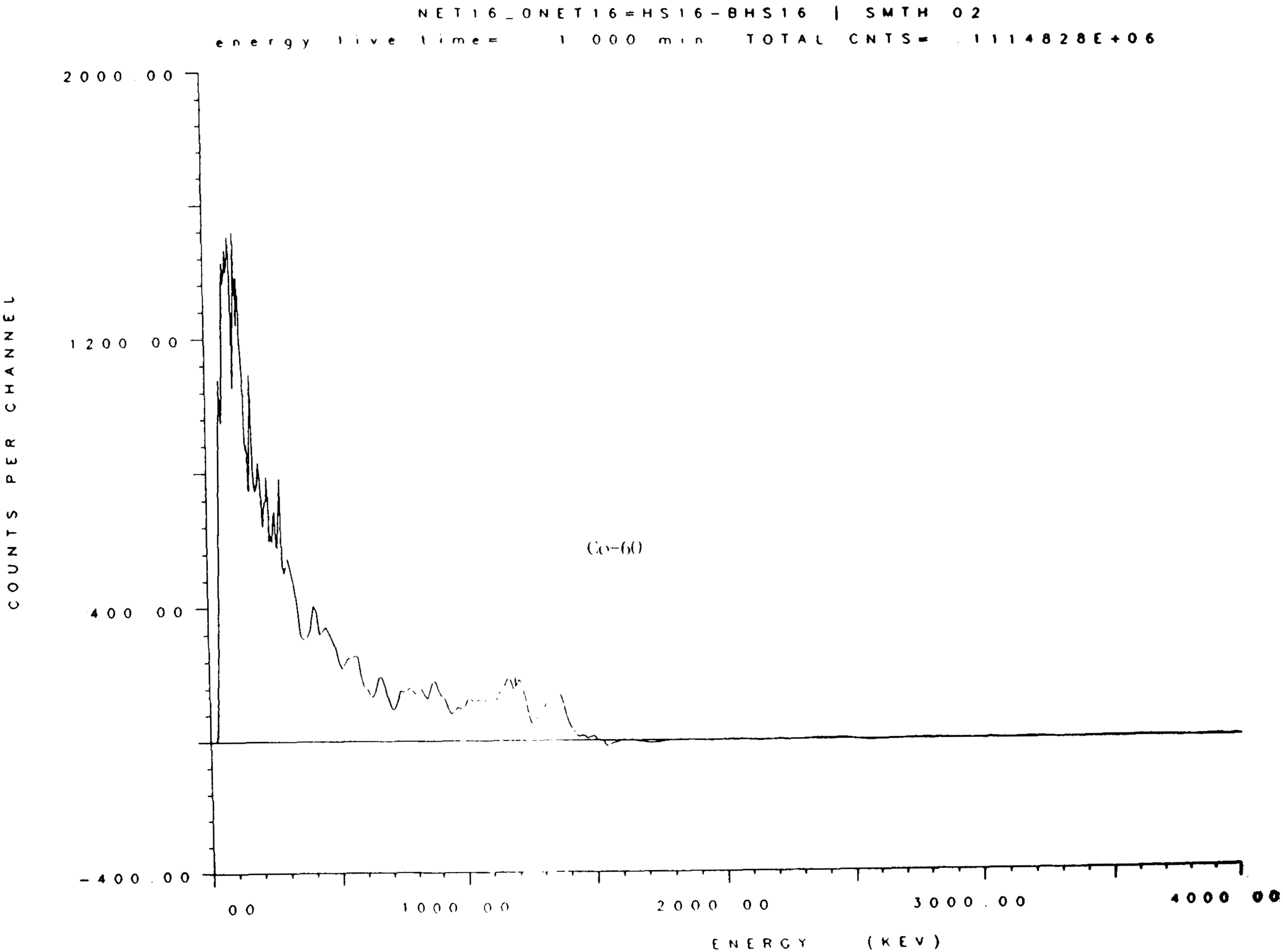

Figure 21. Location 16

Table 1. Radioisotopes Observed with the AMS at the BNL

	Energy (KeV)
Cesium-137	662
Cobalt-60	1173,1332
Sodium-22	511, 1275
Manganese-54	835
Iron-59	1095,1292
Cobalt-58	511,810
Zinc-65	1115
Argon-41	1296
Oxygen-15	511
Indium-114m	190,558,725

Table 2. Minimum Detectable Activities

Isotope	Cs-137	Co-60	Na-22
Distribution			
Surface[1] (uCi/sq-m)	0.05	0.02	0.04
Uniform[2] (pCi/g)	0.4	0.3	0.6
Point Source[3] (mCi)	0.6	0.3	0.6

1. Source uniformly distributed on the surface of the soil.
2. Source uniformly distributed with depth and breadth.
3. Local source on soil surface.

Table 3. Summary of Man-Made Radioactivity Areas

LOCATION*	DESCRIPTION	FINDING
# 1 (3)	Warehouse	^{60}Co
# 2 (10)	Medical Center	^{137}Cs
# 3 (9)	Accelerator Storage	^{60}Co
# 4 (new)	AGS access Road	^{22}Na, ^{54}Ma
# 5 (new)North	RHIC ring/AGS noise	^{15}O
# 6 (new)Plume	Due east of RHIC	^{41}Ar
# 7 (1)	Filtration Plant	^{137}Cs
# 8 (G)	Bldg 830, Nuclear Waste Management	^{137}Cs, ^{60}Co
# 9 (5)	Bldg 650, Waste Water Outfall	^{137}Cs
#10 (6)	Decontamination and Hot Laundry	^{137}Cs, ^{60}Co
#11 (11)	Old Landfill	^{60}Co
#12 (2)	Waste Management Area	^{137}Cs
#13 (new)Plume	Due east of RHIC	^{41}Ar
#14 (7)	Bldg 811, Waste Concentration	^{15}O, ^{137}Cs, ^{60}Co
#15 (F)	Near Bldg 912, Surplus Steel Shielding	^{54}Mn, ^{58}Co
#16 (18)	AGS Storage	^{60}Co

*(In parenthesis is site designation in 1983 report.)

Table 4. Comparison of Ground-Based and Aerial Measurement Results

Site Number	Description	Ground Survey (uR/h) Pressurized Ion Chamber	Aerial Survey (uR/h) 1
1	Location 12 (1000 ft SE)	15.6	20 - 50
2	Location 12 (2000 ft SE)	5.0	8 - 9
3	NW: Raynor Road between Whitely and Middle Island	6.6	6 - 7
4	SW: Racetrack at Long Island Express Way and William Floyd Express	5.4	6 - 7
5	SE: Woodland Road between South Street and Moriches Middle Island	7.2	7 - 8
6	NE: Grumann Blvd between Line Road and Wading River/Manmouth Road	5.9	6 - 7

1 Includes a cosmic ray contribution of 3.6 uR/h.

Table 5. Comparison of Parameters for the 1980 and 1983/1990 Aerial Surveys

Operational Parameters	Year of Surveys 1980	Year of Surveys 1983/1990
Aircraft Ground Speed (m/s)	36 (70 knots)	36 (70 knots)
Altitude (m)	61 (200 feet)	46 (150 feet)
Flight Line Spacing (m)	91 (300 feet)	76 (250 feet)
Total Area Covered (km2)	21	64
Flight Line Direction	North-South	East-West

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1. Jobst, J.E. 1979. "The Aerial Measuring System Program." Nuclear Safety, March/April 1979. 20:136-147.

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APPENDIX A

Survey Parameters

Site:	Brookhaven National Laboratory Upton, Long Island, New York
Survey Coverage:	64 Sq-Km (25 Sq-mi)
Survey Date:	20-24 March 1990
Survey Altitude:	46 m (150 feet)
Line Spacing:	76 m (250 feet)
Aircraft Speed:	36 m/s (70 knots)
Line Length:	9 Km (5 mile)
Line Direction:	East-West
Number of Lines:	111
Detector Array:	Eight 10.2 cm X 5.6 cm X 40.6 cm NaI (Tl) detectors (2 in X 4 in X 16 in)
Acquisition System:	REDAR IV
Aircraft:	MBB BO-105 Helicopter
Data Processing:	1. Gross Count: 40 - 3044 keV 2. Conversion Factor: 973 cps per uR/h 3. Cosmic Ray Contribution: 3.6 uR/h
Survey Crew:	P. Guss, A. Fritzsche, R. Vojtech, R. Maurer, R. Rieman, R. Frutrick, L. Ruff, M. Sheehan, C. Bluitt, R. Richmond, A. VanOrder, E. Smith, J. Holtzclaw, J. Cleland, C. Ward, L. Komich R. Rea, M. Rivera, B. Best, J. Shines, R. Lamison, K. Meade, D. Dwyer

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Appendix F. Hotline Calls and Response Actions

TIGER TEAM ASSESSMENT PROGRAM

BROOKHAVEN NATIONAL LABORATORY

ENVIRONMENT, SAFETY AND HEALTH HOTLINE

An on-site TTA Complaint line was established for the BNL assessment, and operated between March 26 and April 27, 1990. This special hotline, operated by the Tiger Team, was established to allow BNL personnel, as well as the general public, to report specific environment, safety, and health concerns. Notices of the complaint line were made through local newspapers, site newsletters, and notices (developed by the Tiger Team) distributed to each BNL department by the Associate Director for Reactor, Safety and Security. In addition, the notices informed BNL employees that information related to fraud, waste, abuse, misconduct, and environmental issues of a criminal nature can be reported directly to the Office of Inspector General at 800-541-1625, 202-586-4073 or FTS 896-4073.

This appendix summarizes the telephone calls received on the hotline and the subsequent response actions.

BROOKHAVEN NATIONAL LABORATORY COMPLAINT-LINE CALLS

CONTROL #1

DATE: March 28, 1990

NATURE OF CONCERN: Caller has participated as a member in a county task force interested in environmental issues at BNL. The task force has developed reports and recommendations on actions that should be undertaken at BNL and would like to share this information with the Tiger Team.

RESPONSE: Environmental Subteam member contacted the caller and confirmed that the Tiger Team had a copy of the November 13, 1986, Suffolk County Legislature Task Force Findings and Recommendations on BNL. The caller also referenced two additional reports: 1) the 1989 Suffolk County Inactive Waste Site Investigation and 2) a shellfish study being conducted by BNL. The information was used to help conduct the TTA.

CONTROL #2

DATE: March 28, 1990

NATURE OF CONCERN: Caller expressed concern about the information provided to the Tiger Team regarding the fiberglass machine operation area (Bldg. 462). The caller would like to discuss this issue with someone.

RESPONSE: OSHA Subteam members contacted the caller. Caller works on machines that use oil for cooling cut surfaces; a process that generates a fine mist of oil and for which BNL does not require operators to wear respirators. The OSHA team took air samples on April 9, 1990. The air samples will be analyzed and the results will be provided to BNL. In addition, the results will be presented in the Final Tiger Team Assessment Report.

CONTROL #3

DATE: March 29, 1990

NATURE OF CONCERN: Caller was interested in obtaining the results of the BNL Tiger Team Assessment.

RESPONSE: Tiger Team members contacted the caller and told that the draft report will be available in the BNL library after the Secretary of Energy and Congress were briefed on the results. The briefings are generally completed 1 to 2 weeks after the TTA site closeout. The caller was also informed that the final report would be available in the BNL reading room and copies available through the National Technical Information System.

CONTROL #4

DATE: March 30, 1990

NATURE OF CONCERN: Caller concerned about enforcement of traffic rules on the site.

RESPONSE: Complaint determined to be outside the scope of the TTA and was subsequently referred to the Manager, Brookhaven Area Office.

CONTROL #5

DATE: March 30, 1990

NATURE OF CONCERN: Caller concerned about the degree of cooperation being provided to the TTA from BNL management and whether it was adequate.

RESPONSE: The Tiger Team received excellent cooperation from BNL management. No action needed.

CONTROL #6

DATE: March 30, 1990

NATURE OF CONCERN: Caller concerned about employees who had worked in the chemical waste disposal unit at BNL. Her husband was one such person, and she represented that two members of that unit had contracted cancer.

RESPONSE: The caller was contacted by a Tiger Team member and told that as part of the TTA the adequacy of the BNL industrial hygiene and medical services programs, waste management practices, and compliance with OSHA requirements for protection of hazardous waste workers would be assessed. In addition, the Tiger Team has referred this caller's concern to the Manager, CH.

CONTROL #7

DATE: April 3, 1990

NATURE OF CONCERN: Caller concerned about the herds of deer on the site and had questions about whether or not they pose a safety hazard or a human health risk problem due to Lyme disease associated with deer ticks.

RESPONSE: S&H Subteam member contacted the caller and explained that the concern was outside the scope of the TTA, but would be referred to the Manager, BHO, for appropriate followup.

CONTROL #8

DATE: April 4, 1990

NATURE OF CONCERN: Caller stated that BNL has polluted their residential drinking water well. On prior occasions BNL had been contacted but had not provided any assistance.

RESPONSE: Environmental Subteam member contacted both the caller and BNL representatives to discuss the concern. BNL had previously responded to the callers concern by letter (dated September 29, 1988) stating that "it is highly unlikely that the contamination... is a result of BNL operations." The Subteam member contacted the caller and informed them that the existing data supported BNL's position. The caller was also informed that groundwater characterization efforts will be continuing at BNL as part of an Interagency Agreement between BNL, the EPA, and the State of New York, and the caller should periodically check with BNL for new information.

CONTROL #9

DATE: April 4, 1990

NATURE OF CONCERN: Caller stated that lead bricks are being used at Bldg. 52 as doorstops, posing potential safety problems.

RESPONSE: S&H Subteam member inspected the facility and identified instances of lead bricks being used as doorstops. Recommendations were made to the BNL that lead bricks should be used solely for the purpose of radiation shielding.

CONTROL #10

DATE: April 4, 1990

NATURE OF CONCERN: Caller wanted environmental contamination information on the BNL landfill.

RESPONSE: Environmental Subteam member contacted the caller and provided them with several titles of reports that address the caller's request. The caller was also provided the name of a BNL staffer to obtain copies of the relevant reports.

CONTROL #11

DATE: April 6, 1990

NATURE OF CONCERN: Caller interested in results of any studies concerning cancer or leukemia among BNL employees.

RESPONSE: The caller's request was referred to the Manager, BHO, for appropriate followup.

CONTROL #12 (Call referred to the Tiger Team from the Inspector General Hotline)

DATE: March 28, 1990

NATURE OF CONCERN: Caller represented Manor Park Community Group and alleged that contamination of their "underground water system" is related to burial of wastes by BNL.

RESPONSE: Environmental Subteam member informed the caller that off-site contamination would be a finding in the BNL Tiger Team Assessment Report.

<u>CONTROL #13</u> (Call referred to the Tiger Team from the Inspector General Hotline)

DATE: April 5, 1990

NATURE OF CONCERN: An anonymous caller stated that mercury wastes were buried in a fenced area behind the ball field at BNL.

RESPONSE: Tiger Team member contacted BNL representatives who indicated that previous efforts to locate the alleged wastes included excavation of soils to the depth of the former landfill, with the assistance of a former employee familiar with the this area. The area excavated was to the depth of the former landfill and was located where the former employee recalled approximately 30 gallons of mercury being buried. This area will be further characterized and remediated if necessary as part of the Interagency Agreement between BNL, EPA, and the State of New York.

<u>CONTROL #14</u> (Call referred to the Tiger Team from the Inspector General Hotline)

DATE: April 4, 1990

NATURE OF CONCERN: Former BNL employee complained that the ammonia used in the Graphics Arts Department printing machine to develop prints leaks out and poses a hazard to employees.

RESPONSE: OSHA Subteam member visited the Graphic Arts Department and interviewed BNL representatives and observed the operation of the printing machines. No detectable ammonia odor was observed. In addition, the printing machines were surveyed on April 24, 1990, for ammonia, and the levels were found to be substantially below the OSHA standards.

CONTROL #15

DATE: April 4, 1990

NATURE OF CONCERN: Former BNL employee states that there was asbestos in the cafeteria.

RESPONSE: OSHA Subteam member visited the cafeteria and confirmed that there was an apparent OSHA violation.

CONTROL #16 (Call referred to the Tiger Team from the Inspector General Hotline)

DATE: April 4, 1990

NATURE OF CONCERN: Former employee reported that sodium bromide (air conditioning solution) was dumped into the regular drains of Bldg. 815. The drains are connected directly to the site sewage system. The caller alleged that the operations manager ordered all department heads to cleanup. Waste was dumped down drains and excess equipment taken to the dump. This was done prior to a DOE inspection.

RESPONSE: Environmental Subteam member spoke with representatives from Plant Engineering on April 12, 1990, and was informed that the substance in question is probably lithium bromide (LiBr). LiBr is used in air conditioner absorbers. It is used in solution, and due to its cost, is always re-used. Any disposal of lithium bromide would be as a chemical waste sent to the HWMF.

CONTROL #17 (Call referred to the Tiger Team from the Inspector General Hotline)

DATE: April 6, 1990

NATURE OF CONCERN: An anonymous caller advised that the laundry in Bldg. 650 should be checked for high radiation levels as well as the personnel working in the same building. The caller advised that her husband, a contractor for BNL was checked for radiation and had a high radiation level. In addition, the caller stated that the drain in Bldg. 650 is radioactive; therefore, any water passing through the drain line would be contaminated. The caller wants the Office of Inspector General to investigate.

RESPONSE: A S&H Subteam member determined, based on discussions with BNL representatives and inspection of Bldg. 650, that the building is under control, and that BNL recognizes the potential radiation exposures to workers as well as appropriate protective measures.

CONTROL #18

DATE: April 11, 1990

NATURE OF CONCERN: The caller expressed concern about older models of Bridgeport Milling Machines used on site. The older models, according to the caller, did not have a drum reversal switch that was reachable to an average height or smaller operator. When an operator is milling, drilling, fly cutting, or power tapping, the operator is not in control of the spindle of the machine and is, therefore, not able to reverse the spindle or shut it off.

RESPONSE: OSHA Subteam member inspected selected machines in Bldg. 903, the caller's workplace. Several machines were identified as having potential OSHA violations due to power controls for which the operator had to reach across the "point of operation." This finding is part of the Tiger Team Assessment Report.

CONTROL #19

DATE: April 20, 1990

NATURE OF CONCERN: Caller has concerns about BNL Safety Division hiring practices. Caller has applied for advertised positions (i.e., Health Specialist position) and despite discussions with personnel, has never received a followup response to the applications. Believes that the hiring practices need improvement.

RESPONSE: The callers concern was referred to the Manager, BHO for appropriate followup.

CONTROL #20

DATE: April 22, 1990

NATURE OF CONCERN: Caller lives in apartments on-site. Concerned that no recycling is taking place at the apartment complex.

RESPONSE: The callers concern was referred to the Manager, BHO for appropriate followup.

Appendix G. Environmental Subteam Schedule

BROOKHAVEN NATIONAL LABORATORY
ENVIRONMENTAL SUBTEAM SCHEDULE

Week 1	Radiation Harr	Air Crist	Surface Water Tarbert	Inactive Waste Sites Verban/Levitan	Groundwater Smith	Waste Management Habib	QA/Toxic Substances Wunsch	NEPA Black et al.
Monday AM March 26	Overview	Overview	Overview	Overview	Overview	Overview	Overview	Overview
PM	Overview	Overview	Overview	Overview	Overview	Overview	Overview	Overview
Tuesday AM March 27	Overview of Environmental Monitoring Program	With Radiation	With Radiation	Document Review	With Radiation	Interview-General Waste Tracking and Management; Chemistry 555	Interviews regarding TSCA/FIFRA, environmental monitoring and arrange for site visits and operations interviews	Interview: BNL and BHO
Tuesday PM March 27	With Inactive Waste Sites	Non-rad sources/ emissions/controls Central Steam Plant	Photography and Graphic Arts - 118, 197, NSLS	Interview with site remedial/corrective action personnel	With Inactive Waste Sites	Physics - 510, 901, 1008, Supply & Materials - 86, 210, 158, Annexes		With Inactive Waste Sites
Wednesday AM March 28	Overview of D&D Actions. Inquires on A/P, orphaned facilities, non-orphaned facilities, SFMP Presentation of EG&G Aerial Radiological Survey results	Review of Air-Rad Emissions Source Controls - N.E. Facilities	Tour of Water Treatment System and Wells; Review Water System Records and Analysis	Tour Inactive Waste Sites	Toured Inactive Waste Sites; Ash Fill, Old Landfill, Current Landfill, Aquifer Restorations, HWMF, Meadow Marsh, STP, CSF	AGS/ADD Satellite Acc. Areas and 90-day Acc. Area (26 bldgs.)	Plant Engineering/ Interview RE:PCB Activities; Chemistry/Tour of PCB Regulators and Interview	With Inactive Waste Sites
Wednesday PM March 28	Overview of Dose Assessment and Pathways Analysis Methodologies. Discussions on Environmental Monitoring Program Design.	Continue at HFBR	Tour Sewage Plant and Oil Tank Farm; Discussed Operation and Procedures	Tour Inactive Waste Sites	Toured Inactive Waste Sites - Continued	AGS/ADD Satellite Acc. Areas - Continued	Site Engineering/Tours Interview RE: Pesticide Program and Application and Storage Practices	Not Present On-Site
Thursday AM March 29	Ground Truth Survey of EG&G Aerial Radiological Survey Results/With Air	Emission Sources Control; Reactor Division; Biology	Tour Steam Plant, Hot Laundry, Plant Engineering Shops, and Heating Boilers, Chilled Water Facility	Tour Inactive Waste Sites	Tour Inactive Waste Sites	Photo/Graphic Arts, Biology, Waste Generation and Accumulation	Document Review; AGS RE: PCB Equipment; Tour and Interviews	Not Present On-Site
Thursday PM March 29	Continuation of Ground Truth Survey of EG&G Aerial Radiological Survey Results	Emission Sources Control; Reactor Division; Biology; Physics & Chemistry Depts.	Tour Steam Plant, etc. - Continued	Interview with DOE/ BHO on Inactive Waste Sites Activities	Interview with DOE and BHO on Inactive Waste Site Activities; Get Monitor Well Map from Plant Engineering	Medical Research/ Occupational Medicine, Waste Generation and Accumulation (including medical waste)	Tour and Interviews; Dept. of Applied Sciences, PCB Equipment; Tour and Interviews	Not Present On-Site
Friday AM March 30	With Air	Ambient Air Monitoring Stations	Observe Surface Water Sampling	Interview with NYSDEC and EPA Regulators	Telephone Conference Call with EPA & State Regarding BNL Regulatory Climate	Plant Engineering Shops and CSF, Waste Generation and Accumulation	Interview Fire Chief, Tour of Biology, Re: Pesticides	Not Present On-Site
Friday PM March 30	With Air	Ambient Air Monitoring Stations	Tour Physics, Bldg 510	Document Review	Meeting with BNL Area Mgr; Document Review	Document Review and Biology Dept. USTs	Meeting with Hazardous Waste Management Staff	Not Present On-Site

BROOKHAVEN NATIONAL LABORATORY
ENVIRONMENTAL SUBTEAM SCHEDULE

Week 2	Radiation Harr	Air Crist	Surface Water Tarbert	Inactive Waste Sites Verban/Levitan	Groundwater Smith	Waste Management Habib	QA/Toxic Substances Wunsch	NEPA Black et al.
Monday AM April 2	With Waste Management	SARA Title III Program Review, PCB Burning, Air Permit Status	Tour AGS and ADD Departments and Recharge Basins	SARA Title III Interview with Facility Coordinator	Document Review	HWMF, WCF	Finish PCB Issues with S&EP Staff and Discuss Article 12 Issues	Overview/Health & Safety
Monday PM April 2	Document Review	DOP Testing, HEPA Filters	Continued Tour of Recharge Basins and Discussed Env. Projects with Engineering	Interview with Spill Coordinator	Interview with B. Royce Regarding Env. Compliance	Active Landfill, Instrumentation Division, S&EP Div. Lab.	Interviews with IH, Supply & Materiels, and Safety Assessment Coordinator	NEPA General Site Tour, Interview with J. Naidu
Tuesday AM April 3	Document Review	Non-Rad Air Sources	Tour and Interviews at DAS	DOE/BHO, Document Review	Document Review	Applied Science Dept. and S&EP Lab, Hazardous and Mixed Waste Generation and Accumulation	Tours of Biology and Chemistry Chemical Storage Areas	Tour NSLS, Interview J. Naidu and W. Casey
Tuesday PM April 3	BLIP, Van de Graaff, HFBR Incident	Continued Review of Air Sources	Tour and Interviews at Chemistry Dept., Meeting with SCDHS	DOE/BHO, Document Review	Interview with Groundwater Sampling Personnel and Bob Miltenberger	Nuclear Energy Dept. Hazardous Waste Generation and Accumulation, Meeting with Suffolk County Re: Articles 7 and 12	Tour of Chemical Storage Bldgs. at Supply & Materiel	Interview M. Bebon and G. Penny
Wednesday AM April 4	Document Review	Continued Review of Air Sources	Tour and Interviews at Medical and S&EP Departments	S&EP Document Review	Document Review	Meeting with HW Group Leader	Tour of Above Ground Tanks and Drum Storage Areas	Interview M. Goldman, A. Baittinger, J. Naidu, and A. Hull
Wednesday PM April 4	HFBR Incident	Begin Files Review	Continue S&EP Tour, Tour and Interview Biology Dept., Visit STP to Check Diversion	Interviews with Aquifer Restoration Project Participants; Observe Groundwater Sampling Analysis	Observe Groundwater Sampling Activities	Staff Services and Applied Math HW Gen. and Acc., Review of Site Emergency Plan and Contingency Plan	Tour of Above Ground Tanks and Drum Storage Areas - Continued	Interview D. Robbins and P. Rohrer - Document Review
Thursday AM April 5	With QA/Toxic Substances	Continued Air Sources Review, Observe Asbestos Removal at Bldg. 197	Zeeks Pond Tour	Interviews with Plant Engineering about Cesspools	Document Review, Develop Findings	Not Present On-Site	Interviews with BNL, S&EP and Environmental Prot. QA Staffs	Tour of AGS, Document Review, Findings Writing
Thursday PM April 5	Surveys of Activated Materials/Release of Materials for Unrestricted Use With QA Toxic/Substances	Continued Air Sources Review and Files Review, Discuss Gasoline Permits with DOE and NYSDEC	Reactor Division Interviews	S&EP Document Review, DOE Document Review	Tour Monitoring Wells	Not Present On-Site	Interviews with BNL - Continued, Responded to PCB Spill Incident	Tour of Forest Ecology Area, Findings Writing
Friday AM April 6	With QA Toxic/ Substances	Cooling Towers Inspections	Tour and Interviews at Central Shops	Findings Writing, Follow-Up	Develop Findings	Not Present On-Site	Tour of Analytical Laboratory, Re: QA Issues	Findings Writing
Friday PM April 6	Findings Writing, Follow-Up	Scrap Yards Inspections	Interviews Environmental Compliance	Findings Writing, Follow-Up	Develop Findings	Document Review	Document Review	Findings Writing

BROOKHAVEN NATIONAL LABORATORY
ENVIRONMENTAL SUBTEAM SCHEDULE

Week 3	Radiation Harr	Air Crist	Surface Water Tarbert	Inactive Waste Sites Verban/Levitan	Groundwater Smith	Waste Management Habib	QA/Toxic Substances Wunsch	NEPA Black et al.
Monday AM April 9	Findings Development and Follow-up	Inspect Asbestos Landfill	S&EP Interviews, BHO File Review	Findings Development and Follow-up	Findings Development	Follow-up at HWMF	Findings Development and Follow-up	Findings Development and Follow-up
Monday PM April 9	Findings Development and Follow-up	Findings Development	Findings Development and Follow-up	Findings Development and Follow-up	Interview with S&EP, Plant Engineering, and Well Driller	S&EP Interviews: USTs; Solid Waste Landfill, RCRA Contingency Plan	Findings Development and Follow-up	Findings Development and Follow-up
Tuesday AM April 10	Findings Development and Follow-up	Observe Gasoline Delivery at BNL Gulf Station, Inspect Flare at STP Digester	Findings Development and Follow-up	Findings Development and Follow-up	Findings Development	S&EP Interviews: USTs; Findings Development and Follow-up	Findings Development and Follow-up	Findings Development and Follow-up
Tuesday PM April 10	Findings Development and Follow-up, Reality Review with BNL and BHO Personnel	Findings Development	Findings Development and Follow-up	Findings Development and Follow-up	Findings Development	Findings Development and Follow-up	Findings Development and Follow-up	Reality Review with BNL and BHO Personnel
Wednesday AM April 11	Not Present On-Site	Findings Development	Findings Development and Follow-up	Findings Development and Follow-up	Findings Development	Findings Development and Follow-up	Findings Development and Follow-up	Findings Development and Follow-up
Wednesday PM April 11	Not Present On-Site	Findings Development	Findings Development and Follow-up	Findings Development and Follow-up	Findings Development	Findings Development and Follow-up	Findings Development and Follow-up	Findings Development and Follow-up
Thursday AM April 12	Not Present On-Site	Findings Development	Findings Development	Findings Development and Follow-up	Not Present On-Site	Interviews with NYSDEC; Re: Aquifer Restoration Project	Findings Development and Follow-up	Findings Development and Follow-up
Thursday PM April 12	Not Present On-Site	Findings Development	Findings Development	Findings Development and Follow-up	Not Present On-Site	Findings Development and Follow-up	Findings Development and Follow-up	Findings Development and Follow-up
Friday AM April 13	Not Present On-Site	Not Present On-Site	Not Present On-Site	Not Present On-Site	Reality Review with BNL and BHO Personnel	Not Present On-Site	Reality Review with BNL and BHO Personnel	Not Present On-Site
Friday PM April 13	Not Present On-Site	Not Present On-Site	Not Present On-Site	Not Present On-Site	Corrections to Findings	Not Present On-Site	Corrections to Findings	Not Present On-Site

Appendix H. List of Site Interviews

ENVIRONMENTAL SUBTEAM
CONTACTS/INTERVIEWS

Ref. No.	Date	Auditor	Organization	Position	Topic
I-A-1	3/27/90	Joe Crist	S&EP	Section Head	Monitoring Program(1)
I-A-2	3/27/90	Joe Crist	Plant Eng.	Operator	Steam Plant - Air Controls
I-A-3	3/27/90	Joe Crist	Plant Eng.	Supervisor	Steam Plant - Air Controls
I-A-4	3/27/90	Joe Crist	D. Appl. Sci.	Dept. Head	Meteorology and Modeling
I-A-5	3/27/90	Joe Crist	D. Appl. Sci.	Supervisor	Meteorology and Modeling
I-A-6	3/27/90	Joe Crist	D. Appl. Sci.	Operator	Meteorology and Modeling
I-A-7	3/28/90	Joe Crist	Nuc. Energy	Supervisor	REF
I-A-8	3/28/90	Joe Crist	Nuc. Energy	Operator	BLIP
I-A-9	3/28/90	Joe Crist	Nuc. Energy	Bldg. Supt.	Bldg. 703
I-A-10	3/28/90	Joe Crist	Nuc. Energy	Bldg. Supt.	Bldg. 830
I-A-11	3/28/90	Joe Crist	Nuc. Energy	Bldg. Supt.	Bldg. 801
I-A-12	3/28/90	Joe Crist	S&EP	Supervisor	HFBR(2)
I-A-13	3/28/90	Joe Crist	Reactor Div.	Dept. Chairman	HFBR
I-A-14	3/29/90	Joe Crist	S&EP	Safety Rep. - Medical	Air Control, Medical Dept.
I-A-15	3/29/90	Joe Crist	Reactor Div.	BMRR Supervisor	Air Emissions - MRR
I-A-16	3/29/90	Joe Crist	Reactor Div.	Deputy Department Head	Air Emissions - MRR
I-A-17	3/29/90	Joe Crist	S&EP	Safety Rep. - AGS	Air Emissions - AGS
I-A-18	3/29/90	Joe Crist	S&EP	Safety Rep. - Physics	Air Emissions - Physics

ENVIRONMENTAL SUBTEAM
CONTACTS/INTERVIEWS

Ref. No.	Date	Auditor	Organization	Position	Topic
I-A-19	3/29/90	Joe Crist	S&EP	Safety Rep. - Physics	Air Emissions - Physics
I-A-20	3/29/90	Joe Crist	Chemistry	Department Head	Air Control, Chemistry (3)
I-A-21	3/30/90	Joe Crist	S&EP	Section Head	Ambient Air Monitoring
I-A-22	3/30/90	Joe Crist	S&EP	Sampler	Ambient Air Monitoring
I-A-23	3/30/90	Joe Crist	S&EP	Sampler	Ambient Air Monitoring
I-A-24	4/02/90	Joe Crist	Center for Assessment of Chemical and Physical Hazards	Group Leader	SARA Title III
I-A-25	4/02/90	Joe Crist	DOE-BNL	Attorney	PCB Burning
I-A-26	4/02/90	Joe Crist	S&EP	Technician	DOP Testing of HEPA Filters
I-A-27	4/03/90	Joe Crist	Dept. Applied Science	Deputy Department Head	Non-RAD Air Sources
I-A-28	4/03/90	Joe Crist	Dept. Applied Science	Bldg. 526 Supervisor	Non-RAD Air Sources
I-A-29	4/03/90	Joe Crist	Dept. Applied Science	Bldg. 815 Supervisor	Non-RAD Air Sources
I-A-30	4/03/90	Joe Crist	Dept. Applied Science	Supervisor	Non-RAD Air Sources
I-A-31	4/03/90	Joe Crist	S&EP	Supervisor Ind. Hygiene	Asbestos Projects
I-A-32	4/03/90	Joe Crist	AGS	Safety Supervisor	Non-RAD Air Sources (4)

ENVIRONMENTAL SUBTEAM
CONTACTS/INTERVIEWS

Ref. No.	Date	Auditor	Organization	Position	Topic
I-A-33	4/03/90	Joe Crist	Multiple Particle Spectroscopy	Bldg. 912 Supervisor	Non-RAD Air Sources
I-A-34	4/03/90	Joe Crist	S&EP	Safety Coordinator	Non-RAD Air Sources
I-A-35	4/04/90	Joe Crist	S&EP	Instrumentation Supervisor	Air Emissions Sources
I-A-36	4/04/90	Joe Crist	Nuclear Energy	Group Leader	Air Emissions Sources
I-A-37	4/04/90	Joe Crist	Nuclear Energy	Supervisor	Air Emissions Sources
I-A-38	4/04/90	Joe Crist	Plant Eng.	Group Leader	Air Emissions Sources
I-A-39	4/04/90	Joe Crist	Contracts & Procurement	Supervisor	Contracting with Companies on EPA "Blacklist"
I-A-40	4/04/90	Joe Crist	Plant Eng.	Supervisor	Gasoline Stations
I-A-41	4/05/90	Joe Crist	Central Shops	General Supervisor	Air Emissions Sources
I-A-42	4/05/90	Joe Crist	S&EP	Group Leader - Ind. Hygiene	Asbestos Removal Projects
I-A-43	4/05/90	Joe Crist	NSLS	Safety Rep. - NSLS	Air Emissions Sources
I-A-44	4/05/90	Joe Crist	DOE, BNL	Chief Engineer	Permits - Gas Stations
I-A-45	4/05/90	Joe Crist	NYSDEC	Junior Engineer	Permits - Gas Stations
I-A-46	4/06/90	Joe Crist	Plant Eng.	General Supervisor	Cooling Towers
I-A-47	4/06/90	Joe Crist	Drew Chemical	Area Supervisor	Cooling Towers

ENVIRONMENTAL SUBTEAM
CONTACTS/INTERVIEWS

Ref. No.	Date	Auditor	Organization	Position	Topic
I-A-48	4/06/90	Joe Crist	Reactor Div.	Water Chemist	Cooling Towers
I-A-49	4/06/90	Joe Crist	AGS	Water Systems Engineer	Cooling Towers
I-A-50	4/06/90	Joe Crist	AGS	Safety Supervisor	Scrap Yards
I-A-51	4/06/90	Joe Crist	NYSDEC	Junior Engineer	Permits - Gas Stations

(1) With B. Royce and J. Naidu.
(2) With K. McIntyre and A. Epple.
(3) With E. Edwards and R. Stoner.
(4) With J. Durnan and S. Musolino

ENVIRONMENTAL SUBTEAM
CONTACTS/INTERVIEWS

Ref. No.	Date	Auditor	Organization	Position	Topic
I-SW-1	3/27/90	Richard Tarbert	S&EP	Section Head Group Leader, Env. Monitoring Group Leader, Env. Compliance	Environmental Monitoring Program
I-SW-2	3/27/90	Richard Tarbert	S&EP	QA Officer Safety Representative	Photography, Graphic Art & NSLS Liquid, Effluents
I-SW-3	3/27/90	Richard Tarbert	Photography & Graphic Arts	Safety Coordinator Asst. Graphic Arts Supervisor Photography Supervisor	Photography & Graphic Arts Liquid Effluents
I-SW-4	3/27/90	Richard Tarbert	NSLS	Safety Officer	NSLS Liquid Effluents
I-SW-5	3/27/90	Richard Tarbert	NSLS	Water Treatment Engineer	NSLS D.I. System Operation
I-SW-6	3/28/90	Richard Tarbert	Plant Eng.	General Supervisor Operation	Water and Sewage Treatment Systems
I-SW-7	3/28/90	Richard Tarbert	Plant Eng.	Plumbing Supervisor	Backflow Prevention
I-SW-8	3/28/90	Richard Tarbert	Plant Eng.	Leadman	Sewage Treatment Plant Operation
I-SW-9	3/28/90	Richard Tarbert	Plant Eng.	Supt. Utilities, Building Maintenance and Services	Tank Farm
I-SW-10	3/29/90	Richard Tarbert	Plant Eng.	Supt. Utilities, Building Maintenance and Services	Steam Plant Operation
I-SW-11	3/29/90	Richard Tarbert	S&EP	Safety Representative	Hot Laundry Operation
I-SW-12	3/29/90	Richard Tarbert	Plant Eng.	General Supervisor Operation	
I-SW-13	3/29/90	Richard Tarbert	Plant Eng.	Steam Plant Supervisor	Steam Plant Operation
I-SW-14	3/29/90	Richard Tarbert	Plant Eng.	General Supervisor, Building Maintenance and Services	Building Maintenance Shops

ENVIRONMENTAL SUBTEAM
CONTACTS/INTERVIEWS

Ref. No.	Date	Auditor	Organization	Position	Topic
I-SW-15	3/29/90	Richard Tarbert	Plant Eng.	General Supervisor, Grounds Maintenance	Grounds Maintenance Shops
I-SW-16	3/29/90	Richard Tarbert	Plant Eng.	Project Engineer	Chilled Water Facility
I-SW-17	3/29/90	Richard Tarbert	Plant Eng.	General Supervisor, Mechanical	Bldg. 452 Operations
I-SW-18	3/29/90	Richard Tarbert	Plant Eng.	General Supervisor, Electrical	Bldg. 452 Operations
I-SW-19	3/29/90	Richard Tarbert	Plant Eng.	Heating Maintenance Engineer	Heating Boiler Operations
I-SW-20	3/29/90	Richard Tarbert	Plant Eng.	Heating Service Supervisor	Heating Boiler Operations
I-SW-21	3/29/90	Richard Tarbert	S&EP	QA Officer	
I-SW-22	3/30/90	Richard Tarbert	S&EP	Env. Monitoring Technician Env. Monitoring Technician	Surface Water Sampling
I-SW-23	3/30/90	Richard Tarbert	S&EP	Group Leader, Env. Monitoring	Sampling & Recharge Basins
I-SW-24	3/30/90	Richard Tarbert	Physics Dept.	Facilities Manager	Physics Dept. Facilities
I-SW-25	3/30/90	Richard Tarbert	Physics Dept.	Lead Machinist	Machine Shop Operations
I-SW-26	4/02/90	Richard Tarbert	AGS	Safety Coordinator Group Leader, Mechanical Services	AGS & ADD Operations
I-SW-27	4/02/90	Richard Tarbert	S&EP	Group Leader, Env. Monitoring	Recharge Basins
I-SW-28	4/02/90	Richard Tarbert	Plant Eng. Plant Eng. Plant Eng.	Manager, Mechanical Group Engineer Manager, Design	Status of Water Environmental Project
I-SW-29	4/03/90	Richard Tarbert	DAS	Safety Coordinators	Dept. of Applied Science Facilities
I-SW-30	4/03/90	Richard Tarbert	DAS	Safety Coordinators	Bldg. 526 Facilities

ENVIRONMENTAL SUBTEAM
CONTACTS/INTERVIEWS

Ref. No.	Date	Auditor	Organization	Position	Topic
I-SW-31	4/03/90	Richard Tarbert	Chemistry	Chemist Safety Coordinator	Chemistry Facilities
I-SW-32	4/03/90	Richard Tarbert	Chemistry	Technical Associate I	Solvent Storage
I-SW-33	4/03/90	Richard Tarbert	Chemistry	Senior Chemist	Bldg. 901 and 906 Operations
I-SW-34	4/04/90	Richard Tarbert	Medical	Asst. to Chairman for Safety and QA Department Administrator	Medical Dept. Operation
I-SW-35	4/04/90	Richard Tarbert	S&EP	Medical Dept. S&EP Representative	Waste Tanks in Bldg. 490
I-SW-36	4/04/90	Richard Tarbert	Instrumentation	Safety Coordinator Technical Specialist Printed Circuit Technician Printed Circuit Technician	Instrumentation Division Operations, Printed Circuit Operations
I-SW-37	4/04/90	Richard Tarbert	S&EP	Supervisor, Analytical Chemistry Group Leader, Analytical Laboratory	Analytical Lab Operations
I-SW-38	4/04/90	Richard Tarbert	S&EP	Safety Coordinator	S&EP Operations
I-SW-39	4/04/90	Richard Tarbert	S&EP	Fire Captain	Fire Dept. Operations
I-SW-40	4/04/90	Richard Tarbert	S&EP	Technical Supervisor	Calibration Dept. Operations
I-SW-41	4/04/90	Richard Tarbert	S&EP S&EP	Group Leader, Waste Assessment & Reg. Group Leader, Hazardous Waste Oper.	Waste Management Operations
I-SW-42	4/04/90	Richard Tarbert	S&EP	Radioactive Material Technician	Waste Concentration Facility Operations
I-SW-43	4/04/90	Richard Tarbert	S&EP	Technical Associate	HWMF Operations
I-SW-44	4/04/90	Richard Tarbert	Biology	Safety Coordinator Bio-Associate	Biology Dept. Operations
I-SW-45	4/04/90	Richard Tarbert	Plant Eng.	Leadman	Diversion of STP Influent

ENVIRONMENTAL SUBTEAM
CONTACTS/INTERVIEWS

Ref. No.	Date	Auditor	Organization	Position	Topic
I-SW-46	4/05/90	Richard Tarbert	S&EP	Section Head	Zeeks Pond
I-SW-47	4/05/90	Richard Tarbert	Reactor	HFBR Plant Manager	HFBR Operations
I-SW-48	4/05/90	Richard Tarbert	Reactor	MRR Plant Manager Responsible Operator MRR	MRR Operations
I-SW-49	4/06/90	Richard Tarbert	Central Shops	Safety Coordinator	Central Shops Operations
I-SW-50	4/06/90	Richard Tarbert	S&EP	Group Leader - Env. Compliance	SPDES Permits and Reporting
I-SW-51	4/09/90	Richard Tarbert	S&EP	Group Leader, Env. Monitoring	Surface Water Sampling and Analysis
I-SW-52	4/10/90	Richard Tarbert	S&EP	Group Leader	SCDHS Building Inspections
I-SW-53	4/10/90	Richard Tarbert	NYSDEC	Principle Engineering Technician	SPDES Reporting Requirements
I-SW-54	4/10/90	Richard Tarbert	S&EP	Group Leader	Water Analyses and SCDHS-STP Inspections
I-SW-55	4/11/90	Richard Tarbert	S&EP	Group Leader, Env. Monitoring	Weir Measurement Holding Lagoon Discharge
I-SW-56	4/11/90	Richard Tarbert	S&EP	Section Head	Rainwater and pH at STP
I-SW-57	4/11/90	Richard Tarbert	Plant Eng.	STP Leadman STP Operator	Clarifier Installation and pH through STP
I-SW-58	4/23/90	Richard Tarbert	NYSDEC	Regional Water Engineer	NY State Regulations

ENVIRONMENTAL SUBTEAM
CONTACTS/INTERVIEWS

Ref. No.	Date	Auditor	Organization	Position	Topic
I-GW-1	3/27/90	Tom Smith	BNL/AUI BNL/AUI BNL/AUI	Section Chief, Environ. Monitoring Asst. Section Chief, Envir. Monitoring Engineer, Environ. Compliance	Environmental Monitoring
I-GW-2	3/27/90	Tom Smith	BNL/AUI BNL/AUI BNL/AUI	Assoc. Head, Environ. Plng. Group Leader, Environ. Restoration Group Leader, Waste Assessments	Inactive Waste Sites Tour
I-GW-3	3/28/90	Tom Smith	BNL/AUI BNL/AUI BNL/AUI BNL/AUI	Assoc. Head, Environ. Plng. Group Leader, Environ. Restoration Group Leader, Waste Assessments Section Chief, Environ. Monitoring	Inactive Waste Sites Tour
I-GW-4	3/29/90	Tom Smith	BNL/AUI BNL/AUI BNL/AUI BNL/AUI	Assoc. Head, Environ. Plng. Group Leader, Environ. Restoration Group Leader, Waste Assessments Section Chief, Environ. Monitoring	Inactive Waste Sites Tour
I-GW-5	3/29/90	Tom Smith	DOE	Environ. Engineer	Regulatory Climate, Remediation, IAG
I-GW-6	3/29/90	Tom Smith	BNL/AUI	Plant Engineering	Monitor Well Maps, Installations, Funding
I-GW-7	3/30/90	Tom Smith	EPA Region II NYSDEC, Albany NYSDEC, Albany	Project Manager, BNL Site Project Manager, BNL Site Remedial Action, BNL Site	Regulatory Climate, Remedial Activities, Well Installations
I-GW-8	4/02/90	Tom Smith	BNL/AUI	Group Leader, Environmental Compliance, Environmental Protection Section	Compliance with Monitor Well Regulations
I-GW-9	4/03/90	Tom Smith	BNL/AUI	Field Technicians, Environmental Monitoring	Sampling Procedures and Tracking
I-GW-10	4/03/90	Tom Smith	BNL/AUI	Group Leader, Environmental Monitoring	Monitor Wells Installations, Abandonment, Monitoring, Tracking

ENVIRONMENTAL SUBTEAM
CONTACTS/INTERVIEWS

Ref. No.	Date	Auditor	Organization	Position	Topic
I-GW-11	4/04/90	Tom Smith	BNL/AUI	Section Chief, Environmental Protection	Groundwater Monitoring Program
I-GW-12	4/04/90	Tom Smith	BNL/AUI	Group Leader, Environmental Monitoring	Groundwater Monitoring Program
I-GW-13	4/04/90	Tom Smith	BNL/AUI	Environmental Protection	Well Abandonment and Installation
I-GW-14	4/04/90	Tom Smith	BNL/AUI	Field Technicians, Environmental Monitoring	Groundwater Sampling
I-GW-15	4/05/90	Tom Smith	BNL/AUI	Field Technician, Environmental Monitoring	Groundwater Monitoring Well Construction and Maintenance
I-GW-16	4/09/90	Tom Smith	Hydro-Group	Driller	Abandonment of Previous Borings and AGS Wells

ENVIRONMENTAL SUBTEAM
CONTACTS/INTERVIEWS

Ref. No.	Date	Auditor	Organization	Position	Topic
I-WM-1	3/27/90	Don Habib	BNL, S&EP	Group Leader	Hazardous Waste Management
I-WM-2	3/27/90	Don Habib	BNL, Chemistry	Safety Coordinator	Hazardous Waste Generation and Accumulation
I-WM-3	3/27/90	Don Habib	BNL, Chemistry	Chemist	Hazardous Waste Generation and Accumulation
I-WM-4	3/27/90	Don Habib	BNL, Chemistry	Chemist	Hazardous Waste Generation and Accumulation
I-WM-5	3/27/90	Don Habib	BNL, Chemistry	Chemist	Hazardous Waste Generation and Accumulation
I-WM-6	3/27/90	Don Habib	BNL, Chemistry	Technician	Hazardous Waste Generation and Accumulation
I-WM-7	3/27/90	Don Habib	BNL, Supply & Materiel	Manager	Hazardous Waste Generation and Accumulation
I-WM-8	3/27/90	Don Habib	BNL, Supply & Materiel	Supervisor	Hazardous Waste Generation and Accumulation
I-WM-9	3/27/90	Don Habib	BNL, Physics	Safety Coordinator	Hazardous Waste Generation and Accumulation
I-WM-10	3/27/90	Don Habib	BNL, S&EP	Physics Dept. Liaison	Hazardous Waste Generation and Accumulation
I-WM-11	3/27/90	Don Habib	BNL, S&EP	Physics Dept. Senior Technician	Hazardous Waste Generation and Accumulation

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CONTACTS/INTERVIEWS

Ref. No.	Date	Audito.	Organization	Position	Topic
I-WM-12	3/27/90	Don Habib	BNL, S&EP	Physics Dept. Senior Technician	Hazardous Waste Generation and Accumulation
I-WM-13	3/27/90	Don Habib	BNL, Chemistry	Technician	Mixed Waste Generation and Accumulation
I-WM-14	3/28/90	Don Habib	BNL, AGS/AD	Safety Coordinator	Hazardous Waste Generation and Accumulation
I-WM-15	3/28/90	Don Habib	BNL, S&EP	Supervisor	Hazardous Waste Generation and Accumulation
I-WM-16	3/28/90	Don Habib	BNL, S&EP	Supervisor	Hazardous Waste Generation and Accumulation
I-WM-17	3/28/90	Don Habib	BNL, AGS/AD	Supervisor	Hazardous Waste Generation and Accumulation
I-WM-18	3/28/90	Don Habib	BNL, AGS/AD	Supervisor	Hazardous Waste Generation and Accumulation
I-WM-19	3/28/90	Don Habib	BNL, AGS/AD	Supervisor	Hazardous Waste Generation and Accumulation
I-WM-20	3/28/90	Don Habib	BNL, AGS/AD	Supervisor	Hazardous Waste Generation and Accumulation
I-WM-21	3/28/90	Don Habib	BNL, AGS/AD	Supervisor	Hazardous Waste Generation and Accumulation
I-WM-22	3/28/90	Don Habib	BNL, AGS/AD	Supervisor	Hazardous Waste Generation and Accumulation

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CONTACTS/INTERVIEWS

Ref. No.	Date	Auditor	Organization	Position	Topic
I-WM-23	3/28/90	Don Habib	BNL, AGS/AD	Supervisor	Hazardous Waste Generation and Accumulation
I-WM-24	3/28/90	Don Habib	BNL, AGS/AD	Supervisor	Hazardous Waste Generation and Accumulation
I-WM-25	3/28/90	Don Habib	BNL, S&EP	AGS/AD Depts. Liaison	Hazardous Waste Generation and Accumulation
I-WM-26	3/28/90	Don Habib	BNL, Physics	Supervisor	Hazardous Waste Generation and Accumulation
I-WM-27	3/28/90	Don Habib	BNL, AGS/AD	Supervisor	Hazardous Waste Generation and Accumulation
I-WM-28	3/28/90	Don Habib	BNL, AGS/AD	Supervisor	Hazardous Waste Generation and Accumulation
I-WM-29	3/28/90	Don Habib	BNL, AGS/AD	Supervisor	Hazardous Waste Generation and Accumulation
I-WM-30	3/28/90	Don Habib	BNL, AGS/AD	Supervisor	Hazardous Waste Generation and Accumulation
I-WM-31	3/28/90	Don Habib	BNL, AGS/AD	Supervisor	Hazardous Waste Generation and Accumulation
I-WM-32	3/28/90	Don Habib	BNL, AGS/AD	Supervisor	Hazardous Waste Generation and Accumulation
I-WM-33	3/29/90	Don Habib	BNL, Photo & Graphics Arts	Safety Coordinator	Hazardous Waste Generation and Accumulation

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CONTACTS/INTERVIEWS

Ref. No.	Date	Auditor	Organization	Position	Topic
I-WM-34	3/29/90	Don Habib	BNL, Photo & Graphics Arts	Safety Coordinator	Hazardous Waste Generation and Accumulation
I-WM-35	3/29/90	Don Habib	BNL, Biology	Safety Coordinator	Hazardous Waste Generation and Accumulation
I-WM-36	3/29/90	Don Habib	BNL, Biology	S&EP Technician	Hazardous Waste Generation and Accumulation
I-WM-37	3/29/90	Don Habib	BNL, Biology	Safety Coordinator	Hazardous Waste Generation and Accumulation
I-WM-38	3/29/90	Don Habib	BNL, S&EP	Biology Dept. Liaison	Hazardous Waste Generation and Accumulation
I-WM-39	3/29/90	Don Habib	BNL, Biology	Principle Investigator	Hazardous Waste Generation and Accumulation
I-WM-40	3/29/90	Don Habib	BNL, Biology	Investigator	Hazardous Waste Generation and Accumulation
I-WM-41	3/29/90	Don Habib	BNL, Medical	Safety Coordinator	Hazardous Waste Generation and Accumulation
I-WM-42	3/29/90	Don Habib	BNL, Occupational Medicine	Safety Coordinator	Hazardous Waste Generation and Accumulation
I-WM-43	3/30/90	Don Habib	BNL, Plant Engineering	Manager	Hazardous Waste Generation and Accumulation
I-WM-44	3/30/90	Don Habib	BNL, Plant Engineering	Shop Supervisor	Hazardous Waste Generation and Accumulation

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CONTACTS/INTERVIEWS

Ref. No.	Date	Auditor	Organization	Position	Topic
I-WM-45	3/30/90	Don Habib	BNL, Plant Engineering	Shop Supervisor	Hazardous Waste Generation and Accumulation
I-WM-46	3/30/90	Don Habib	BNL, Plant Engineering	Shop Supervisor	Hazardous Waste Generation and Accumulation
I-WM-47	3/30/90	Don Habib	BNL, Plant Engineering	Shop Supervisor	Hazardous Waste Generation and Accumulation
I-WM-48	3/30/90	Don Habib	BNL, Plant Engineering	Shop Supervisor	Hazardous Waste Generation and Accumulation
I-WM-49	3/30/90	Don Habib	BNL, Plant Engineering	Shop Supervisor	Hazardous Waste Generation and Accumulation
I-WM-50	3/30/90	Don Habib	BNL, Plant Engineering	CSF Supervisor	Hazardous Waste Generation and Accumulation
I-WM-51	3/30/90	Don Habib	BNL, S&EP	Biology Dept. Liaison	Abandoned Underground Tanks
I-WM-52	4/02/90	Don Habib	BNL, S&EP	Group Leader	HWMF & SWLF Operation
I-WM-53	4/02/90	Don Habib	BNL, S&EP	Associate Staff Engineer	HWMF Operation
I-WM-54	4/02/90	Don Habib	BNL, Plant Engineering	General Supervisor	SWLF Operation
I-WM-55	4/02/90	Don Habib	BNL, Plant Engineering	Supervisor	SWLF Operation
I-WM-56	4/02/90	Don Habib	BNL, Instrumentation	Safety Coordinator	Hazardous Waste Generation and Accumulation
I-WM-57	4/02/90	Don Habib	BNL, Instrumentation	PC Room Technician	Hazardous Waste Generation and Accumulation

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CONTACTS/INTERVIEWS

Ref. No.	Date	Auditor	Organization	Position	Topic
I-WM-58	4/02/90	Don Habib	BNL, S&EP Analytical Laboratory	Laboratory Supervisor	Hazardous Waste Generation and Accumulation
I-WM-59	4/02/90	Don Habib	BNL, S&EP Analytical Laboratory	GC/MS Chemist	Hazardous Waste Generation and Accumulation
I-WM-60	4/03/90	Don Habib	BNL, DAS	Safety Coordinator	Hazardous and Mixed Waste Generation and Accumulation
I-WM-61	4/03/90	Don Habib	BNL, DAS	Safety Coordinator	Hazardous and Mixed Waste Generation and Accumulation
I-WM-62	4/03/90	Don Habib	BNL, DAS	Technical Associate	Hazardous and Mixed Waste Generation and Accumulation
I-WM-63	4/03/90	Don Habib	BNL, DAS	Supervisor	Hazardous and Mixed Waste Generation and Accumulation
I-WM-64	4/03/90	Don Habib	BNL, DAS	Building Coordinator	Hazardous and Mixed Waste Generation and Accumulation
I-WM-65	4/03/90	Don Habib	BNL, DAS	Building Coordinator	Hazardous and Mixed Waste Generation and Accumulation
I-WM-66	4/03/90	Don Habib	BNL, S&EP Laboratory	Safety Coordinator	Hazardous and Mixed Waste Generation and Accumulation

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CONTACTS/INTERVIEWS

Ref. No.	Date	Auditor	Organization	Position	Topic
I-WM-67	4/03/90	Don Habib	BNL, Nuclear Energy	Safety Coordinator	Hazardous and Mixed Waste Generation and Accumulation
I-WM-68	4/03/90	Don Habib	BNL, Nuclear Energy	Building Coordinator	Hazardous and Mixed Waste Generation and Accumulation
I-WM-69	4/03/90	Don Habib	BNL, Nuclear Energy	Building Coordinator	Hazardous and Mixed Waste Generation and Accumulation
I-WM-70	4/03/90	Don Habib	BNL, Applied Mathematics	Safety Coordinator	Hazardous and Mixed Waste Generation and Accumulation
I-WM-71	4/03/90	Don Habib	Suffolk County DHS	Manager	Hazardous and Mixed Waste Generation and Accumulation
I-WM-72	4/04/90	Don Habib	BNL, S&EP	Group Leader	PCB Oil at CSF, Asbestos Disposal, RCRA Contingency Plan, Access to 90-day Accumulation Areas
I-WM-73	4/04/90	Don Habib	BHO	Environmental Compliance Coordinator	PCB Oil Consent Order
I-WM-74	4/04/90	Don Habib	BNL, Staff Services	Manager	Hazardous Waste Generation and Accumulation, USTs
I-WM-75	4/04/90	Don Habib	BNL, Staff Services	Supervisor	Hazardous Waste Generation and Accumulation, USTs

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CONTACTS/INTERVIEWS

Ref. No.	Date	Auditor	Organization	Position	Topic
I-WM-76	4/04/90	Don Habib	BNL, Computing & Communications	Safety Coordinator	Hazardous Waste Generation and Accumulation
I-WM-77	4/04/90	Don Habib	BNL, S&EP	Supervisor	Contingency and Emergency Plans and Agreements
I-WM-78	4/06/90	Don Habib	BNL, S&EP	Group Leader	USTs
I-WM-79	4/06/90	Don Habib	BNL, S&EP	Engineer	USTs
I-WM-80	4/09/90	Don Habib	BNL, S&EP	Associate Staff Engineer	Contingency Supplies at HWMF
I-WM-81	4/09/90	Don Habib	BNL, S&EP	Group Leader	HWMF Operations and Contingency Plan
I-WM-82	4/09/90	Don Habib	BNL, S&EP	Group Leader	USTs, Solid Waste Landfill Operations
I-WM-83	4/09/90	Don Habib	BNL, S&EP	Staff Engineer	Contingency and Emergency Plans
I-WM-84	4/09/90	Don Habib	BNL, S&EP	Group Leader	USTs
I-WM-85	4/10/90	Don Habib	BNL, S&EP	Group Leader	USTs
I-WM-86	4/10/90	Don Habib	BNL, S&EP	Manager	Contingency Plan, Aquifer Restoration
I-WM-87	4/11/90	Don Habib	NYSDEC/Albany	Division Chief	UST Notifications
I-WM-88	4/11/90	Don Habib	BNL, Plant Eng.	Superintendent	USTs

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CONTACTS/INTERVIEWS

Ref. No.	Date	Auditor	Organization	Position	Topic
I-TS-01	3/27/90	David Wunsch	Hazardous Waste Management	Staff Engineer Mgr., Waste Oper.	PCB Waste Management
I-TS-02	3/27/90	David Wunsch	Plant Eng.	Mgr., Oper & Maintenance	PCB Equipment & Pesticide Application
I-TS-03	3/27/90	David Wunsch	Safety & Envir. Protection	Group Leader, Envir. Compliance	PCB Regulatory Compliance, Article 12 Issues
I-TS-04	3/28/90	David Wunsch	Plant Eng.	Electrical Power Group Mgr.	Handling of PCB Electrical Equipment
I-TS-05	3/28/90	David Wunsch	Chemistry	Safety Coordinator Head of Cyclotron	PCB Regulator Inspection
I-TS-06	3/28/90	David Wunsch	Plant Eng.	Grounds and Sanitation Supervisor	Site Pesticide Application and Storage
I-TS-07	3/29/90	David Wunsch	AGS S&EP	Safety Coordinator Group Leader, Env. Compliance	PCB Equipment and Disposal
I-TS-08	3/29/90	David Wunsch	AGS	Power Group Supervisor	PCB Equipment and Disposal
I-TS-09	3/29/90	David Wunsch	AGS	Group Safety Coordinator	PCB Equipment and Disposal
I-TS-10	3/29/90	David Wunsch	AGS	Hazardous Waste Supervisor	PCB Equipment and Disposal
I-TS-11	3/29/90	David Wunsch	DAS	Safety Coordinators	PCB Equipment and Disposal
I-TS-12	3/30/90	David Wunsch	Fire Rescue Group	Fire Chief	Location of PCB Equipment's Toxic/ Hazardous Chemicals

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Ref. No.	Date	Auditor	Organization	Position	Topic
I-TS-13	3/30/90	David Wunsch	Biology Dept.	Supervisor of Greenhousing	Use, Handling & Storage of Pesticides
I-TS-14	3/30/90	David Wunsch	Hazardous Waste Management	Management Staff	Preparation for New PCB Manifesting Regulations
I-TS-15	4/02/90	David Wunsch	S&EP	Group Leader, Environ. Compliance	PCB Wrap-Up Article 12 Considerations
I-TS-16	4/02/90	David Wunsch	DOE S&EP	Legal Counsel Group Leader, Environ. Compliance	PCB Fuel Storage Issue
I-TS-17	4/02/90	David Wunsch	Supply & Materiel	Manager of Supply & Materiel	Receiving, Storage, & Distribution of Toxic/Hazardous Chemicals
I-TS-18	4/02/90	David Wunsch	S&EP	Safety Assessment Coordinator	Supply & Materiel's Improvements for Article 12
I-TS-19	4/02/90	David Wunsch	S&EP	Group Leader, IH IH Staff	Procurement Oversights by IH
I-TS-20	4/03/90	David Wunsch	Biology	Safety Coordinator	Tours of Biology Chemical Storage Areas
I-TS-21	4/03/90	David Wunsch	Chemistry	Safety Coordinator Dept. Manager	Tour of Chemical Storage Areas
I-TS-22	4/03/90	David Wunsch	Supply & Materiel	Dept. Manager	Tour of Chemical Storage Buildings
I-TS-23	4/03/90	David Wunsch	Suffolk County Dept. of Health Services		Article 7 and 12 Issues

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CONTACTS/INTERVIEWS

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I-TS-24	4/04/90	David Wunsch	Plant Eng. S&EP	Superintendent Group Leader	Above Ground Storage Tank Tours and Article 7 and 12 Issues
I-TS-25	4/04/90	David Wunsch	Central Shops S&EP	Safety Coordinator Group Leader - Env. Compliance	Above Ground Storage Tank Tours and Article 7 and 12 Issues
I-TS-26	4/04/90	David Wunsch	Hazardous Waste Management	Management Staff Management Staff Radioactive Materials Technician	Above Ground Storage Tank Tours and Article 7 and 12 Issues
I-TS-27	4/04/90	David Wunsch	S&EP Reactor Div.	Group Leader - Env. Compliance Project Engineer/Water Chemistry	Above Ground Storage Tank Tours and Article 7 and 12 Issues
I-TS-28	4/04/90	David Wunsch	Plant Eng. S&EP	Superintendent Group Leader - Env. Compliance	Above Ground Storage Tank Tours and Article 7 and 12 Issues

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Ref. No.	Date	Auditor	Organization	Position	Topic
I-QA-1	4/05/90	David Wunsch	S&EP	Designated QA Representative and QA Coordinator	S&EP QA Procedures
I-QA-2	4/05/90	David Wunsch	BNL, QA	Manager of QA Office Senior QA Engineer	BNL QA Procedures
I-QA-3	4/05/90	David Wunsch	S&EP	Manager of S&EP Division Group Leader - Env. Compliance	PCB Spill in Bldg. 424
I-QA-4	4/05/90	David Wunsch	S&EP	Section QA Representative (EP) Supervisor - Analytical Laboratory	Laboratory QA Issues
I-QA-5	4/06/90	David Wunsch	S&EP, Analytical Laboratory	Supervisor Senior Technical Specialist Asbestos Specialist Senior Technical Supervisor	Laboratory QA Procedures

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CONTACTS/INTERVIEWS

Ref. No.	Date	Auditor	Organization	Position	Topic
I-RAD-1	3/27/90	Ernie Harr	BNL/AUI	Environmental Protection	Environmental Monitoring Program
I-RAD-2	3/27/90	Ernie Harr	BNL/AUI	Environmental Protection	Environmental Monitoring Program
I-RAD-3	3/27/90	Ernie Harr	BNL/AUI	Environmental Protection	Environmental Monitoring Program
I-RAD-4	3/27/90	Ernie Harr	BNL/AUI	Hazardous Waste Management & Environmental Restoration	Site Remediation/ Corrective Actions
I-RAD-5	3/27/90	Ernie Harr	BNL/AUI	Hazardous Waste Management & Environmental Restoration	Site Remediation/ Corrective Actions
I-RAD-6	3/27/90	Ernie Harr	BNL/AUI	Hazardous Waste Management & Environmental Restoration	Site Remediation/ Corrective Actions
I-RAD-7	3/27/90	Ernie Harr	BNL/AUI	Hazardous Waste Management & Environmental Restoration	Site Remediation/ Corrective Actions
I-RAD-8	3/28/90	Ernie Harr	BNL/AUI	Hazardous Waste Management & Environmental Restoration	D&D, SFMP, Abandoned in Place, Orphaned and Nonorphaned Facilities Programs
I-RAD-9	3/28/90	Ernie Harr	EG&G	Field Survey Team	Aerial Radiological Survey of BNL (1990)
I-RAD-10	3/28/90	Ernie Harr	BNL/AUI	Environmental Protection	Dose Assessment and Pathways Analysis Methodologies/ Environment Monitoring Program Design
I-RAD-11	3/29/90	Ernie Harr	BNL/AUI	Occupational Health & Safety Services	Radiation Source/ Emissions MRC & Biology
I-RAD-12	3/29/90	Ernie Harr	BNL/AUI	Reactor Division	Radiation Source/ Emissions MRR

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Ref. No.	Date	Auditor	Organization	Position	Topic
I-RAD-13	3/29/90	Ernie Harr	BNL/AUI	Occupational Health & Safety Services	Radiation Source/ Emissions AGS
I-RAD-14	3/29/90	Ernie Harr	BNL/AUI	Environmental Protection Ground Truth Survey of EG&G	Aerial Radiological Survey at BNL (1990)
I-RAD-15	3/30/90	Ernie Harr	BNL/AUI	Environmental Protection	Environmental Sampling
I-RAD-16	3/30/90	Ernie Harr	BNL/AUI	Environmental Protection	Environmental Sampling
I-RAD-17	3/30/90	Ernie Harr	BNL/AUI	Environmental Protection	Sampling Equipment Design
I-RAD-18	4/02/90	Ernie Harr	BNL/AUI	Hazardous Waste Management & Environmental Restoration	HWMF
I-RAD-19	4/02/90	Ernie Harr	BNL/AUI	Hazardous Waste Management & Environmental Restoration	Underground Radioactive Waste Tanks
I-RAD-20	4/03/90	Ernie Harr	BNL/AUI	Medical Department	Radiation Source/ Emissions - BLIP
I-RAD-21	4/03/90	Ernie Harr	BNL/AUI	Department of Applied Science	Radiation Source/ Emissions - Van de Graaff
I-RAD-22	4/04/90	Ernie Harr	EG&G	Field Survey Team	Follow-Up Activities to the Aerial Radiological Survey of BNL (1990)
I-RAD-23	4/04/90	Ernie Harr	DOE	EH	HFBR Incident
I-RAD-24	4/05/90	Ernie Harr	BNL/AUI	S&EP Quality Assurance Coordinator	S&EP Quality Assurance Program
I-RAD-25	4/05/90	Ernie Harr	Walter Analysis	Sampling Person	SPDES Sampling
I-RAD-26	4/05/90	Ernie Harr	BNL/AUI	Occupational Health & Safety Services	Surveys of Activated Materials/Release of Materials for Unrestricted Use

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I-RAD-27	4/05/90	Ernie Harr	BNL/AUI	Environmental Protection Environmental Protection	Quality Assurance Activities in Environmental Protection
I-RAD-28	4/05/90	Ernie Harr	BNL/AUI	Environmental Protection	Surveys of Activated Materials/Release of Materials for Unrestricted Use
I-RAD-29	4/06/90	Ernie Harr	BNL/AUI	Environmental Protection	Quality Assurance Activities in Environmental Protection

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I-IWS-1	3/27/90	Bill Levitan/ Gary Verban	BNL/AUI BNL/AUI BNL/AUI BNL/AUI	Assoc. Head, Envir. Plng. Group Leader, Envir. Restor. Group Leader, Waste Assessments & Regs Section Head, Environ. Prot.	Inactive Waste Sites Tour
I-IWS-2	3/28/90	Bill Levitan/ Gary Verban	BNL/AUI BNL/AUI BNL/AUI BNL/AUI	Assoc. Head, Envir. Plng. Group Leader, Envir. Restor. Group Leader, Waste Assessments & Regs Section Head, Environ. Prot.	Inactive Waste Sites Tour
I-IWS-3	3/29/90	Bill Levitan/ Gary Verban	BNL/AUI BNL/AUI BNL/AUI BNL/AUI	Assoc. Head, Envir. Plng. Group Leader, Envir. Restor. Group Leader, Waste Assessments & Regs Section Head, Environ. Prot.	Inactive Waste Sites Tour
I-IWS-4	3/29/90	Bill Levitan/ Gary Verban	DOE/BHO	Environmental Engineer	Inactive Waste Sites Activities
I-IWS-5	3/30/90	Bill Levitan/ Gary Verban	BNL/AUI BNL/AUI DOE/BHO NYSDEC NYSDEC EPA	Assoc. Head, Envir. Plng. Section Head, Environ. Prot. Environmental Engineer Project Manager Fed Proj Sect., Div of Haz. Waste Mgmt Project Manager, Region II	Interview with NYSDEC and EPA Region II Regulators
I-IWS-6	4/02/90	Bill Levitan/ Gary Verban	BNL/AUI	Group Leader, Center for Assessment of Chem. and Phys. Hazards	Interview on SARA Title III Requirements
I-IWS-7	4/02/90	Bill Levitan/ Gary Verban	BNL/AUI	Group Leader, Environmental Compliance	Interview with Spill Coordinator
I-IWS-8	4/02/90	Bill Levitan/ Gary Verban	BNL/AUI	Supervisor for Environmental Monitoring	Interview with Spill Coordinator (Radiation)
I-IWS-9	4/02/90	Bill Levitan/ Gary Verban	BNL/AUI	Fire Chief	SARA Title III
I-IWS-10	4/04/90	Bill Levitan/ Gary Verban	BNL/AUI	Group Leader, Waste Assessments & Regs	Aquifer Restoration Program

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Ref. No.	Date	Auditor	Organization	Position	Topic
I-IWS-11	4/04/90	Gary Verban	BNL/AUI	Plant Engineering, Design Engineer	Aquifer Restoration Program
I-IWS-12	4/04/90	Gary Verban	BNL/AUI	Supervisor, Environmental Monitoring	Aquifer Restoration Program
I-IWS-13	4/04/90	Gary Verban	BNL/AUI	Section Head, Environmental Protection	Aquifer Restoration Program
I-IWS-14	4/05/90	Gary Verban	BNL/AUI	Group Leader, Waste Assessments & Regs	Cesspools at Bldgs. 51, 197, 244, 348, and 422
I-IWS-15	4/05/90	Gary Verban	BNL/AUI	Plant Eng., Superintendent, Util. & Bldg. Maintenance & Services	Cesspools at Bldgs. 51, 197, 244, 348, and 422
I-IWS-16	4/05/90	Gary Verban	BNL/AUI	Plant Eng., Design Engineer	Cesspools at Bldgs. 51, 197, 244, 348, and 422
I-IWS-17	4/05/90	Bill Levitan	BNL/AUI	Plant Engineer	Chemical Use for SARA Title III
I-IWS-18	4/05/90	Bill Levitan	BNL/AUI	Head, Technical Support Section	SARA Title III
I-IWS-19	4/06/90	Bill Levitan	BNL/AUI	Supervisor, Mechanical Services, AGS	Chemical Use for SARA Title III
I-IWS-20	4/09/90	Gary Verban	BNL/AUI	Associate Head, Env. Plng.	Administrative Record and Community Relations Plan
I-IWS-21	4/09/90	Gary Verban	BNL/AUI	Public Affairs Manager	Community Relations Plan
I-IWS-22	4/11/90	Bill Levitan	NYSDEC, Region I	Regional Hazardous Substance Engineer	Aquifer Restoration Program
I-IWS-23	4/19/90	Gary Verban	DOE/BHO	Chief Engineer	Land Excessed by DOE North of BNL

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Ref. No.	Date	Auditor	Organization	Position	Topic
I-N-1	4/02/90	Helen Gram	BHO - ES&E Branch	Env./NEPA	Files & NEPA Review Process
I-N-2	4/02/90	Helen Gram	BNL, S&EP	Monitoring/NEPA	Site Tour, Facilities Built Since 1977 EIS
I-N-3	4/03/90	Helen Gram	BNL, NSLS	Safety Engineer	Sources of Environmental Effects/Hazards at NSLS
I-N-4	4/03/90	Helen Gram	BNL, S&EP	Env. Restoration	NEPA & Prep of Sitewide EIS
I-N-5	4/03/90	Helen Gram	BNL, S&EP	Env. Protection	NEPA & Prep of Sitewide EIS
I-N-6	4/04/90	Helen Gram	BNL, S&EP	Unknown	Dose Calc. Methods and Source Terms
I-N-7	4/05/90	Helen Gram	BNL, AGS	HS/Safety Rep.	Monitoring of Worker Exposure
I-N-8	4/02/90	Lorene Sigal	BNL, S&EP	NEPA Environmental Coordinator	NEPA Review Procedures
I-N-9	4/03/90	Lorene Sigal	BNL, S&EP	Division Head	NEPA Procedures
I-N-10	4/03/90	Lorene Sigal	BNL, PED	Manager	NEPA Review Procedures
I-N-11	4/03/90	Lorene Sigal	BHO	Env. Engineer	NEPA Review Procedures
I-N-12	4/04/90	Lorene Sigal	BNL	Legal Counsel	NEPA-SEQR
I-N-13	4/04/90	Lorene Sigal	BNL	Public Affairs Office	NEPA Litigation Reading Room
I-N-14	4/04/90	Lorene Sigal	BNL, S&EP	NEPA Environmental Coordinator	NEPA Review Procedures
I-N-15	4/04/90	Lorene Sigal	BNL	Budget Office	NEPA Review and Tracking

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Ref. No.	Date	Auditor	Organization	Position	Topic
I-N-16	4/04/90	Lorene Sigal	BNL	Budget Office	NEPA Review and Tracking
I-N-17	4/04/90	Lorene Sigal	BNL	Project Management	NEPA Tracking
I-N-18	4/04/90	Lorene Sigal	BNL	Project Management	NEPA Tracking

MANAGEMENT SUBTEAM
CONTACTS/INTERVIEWS

Ref. No.	Date	Auditor	Organization	Position	Topic
I-M-1	3/29/90	William Lloyd	BHO	Branch Chief, Admin. & Budget	Planning and Budgeting
I-M-2	3/29/90	William Lloyd	BHO/ES&EB	Project Engineer	BAO Environmental Mgmt.
I-M-3	3/29/90	Brian DeMonia	BHO/ES&EB	Environmental	BHO Env. Management
I-M-4	3/29/90	Wayne Hibbitts Joyce Laeser	BHO	Manager	Roles/ Responsibilities, Org., Staffing
I-M-5	3/29/90	Wayne Hibbitts Joyce Laeser	BHO	Deputy Manager	Roles/ Responsibilities, Org., Staffing
I-M-6	3/29/90	Wayne Hibbitts Joyce Laeser	BHO	Branch Chief, ES&EB	Roles/ Responsibilities, Org., Staffing
I-M-7	3/30/90	William Lloyd	BNL	Associate Director, Life Sciences	BNL ES&H Mgmt.
I-M-8	3/30/90	William Lloyd	BNL	Director, Medical Dept.	BNL ES&H Mgmt.
I-M-9	3/30/90	William Lloyd	BNL	Director & Deputy Director, Budget Office	Planning and Budgeting
I-M-10	3/30/90	William Lloyd	BNL	Director, Contracts & Procurement	ES&H Contracting and Procuring
I-M-11	3/30/90	Wayne Hibbitts	BNL	Director	ES&H Overview
I-M-12	3/30/90	Wayne Hibbitts	BNL	Deputy Director	ES&H Line Management
I-M-13	3/30/90	Wayne Hibbitts	BNL	Manager, Office of Public Affairs	Public Affairs
I-M-14	3/30/90	Roger Christensen	BHO/ES&EB	Program/Project Management	ES&H Responsibilities/ Activities

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Ref. No.	Date	Auditor	Organization	Position	Topic
I-M-15	3/30/90	Roger Christensen	BHO/ES&EB	Industrial Safety	ES&H Responsibilities/ Activities
I-M-16	3/30/90	Roger Christensen	BHO/ES&EB	Nuclear Safety	ES&H Responsibilities/ Activities
I-M-17	4/02/90	Wayne Hibbitts	CH	Manager	ES&H Line Management Oversight & Support
I-M-18	4/02/90	Wayne Hibbitts	BNL	Associate Director, Reactor, Safety, and Security	ES&H Oversight, Support, Guidance
I-M-19	4/02/90	Wayne Hibbitts	BHO/ES&EB	Environmental Staff	Review of Notification Adequacy
I-M-20	4/02/90	Joyce Laeser	AUI	Vice President	Corporate Support & Corporate Culture
I-M-21	4/02/90	Joyce Laeser	BNL	General Counsel	Environmental Issues
I-M-22	4/02/90	Roger Christensen	BNL/S&EP	Safety Assessment Coordinator	ES&H Responsibilities/ Activities
I-M-23	4/02/90	Roger Christensen William Lloyd	BNL/S&EP	Associate Head	ES&H Assessments
I-M-24	4/02/90	Ken Honeycutt Brian DeMonia	BNL/S&EP	Manager, Hazardous Waste Management & Env. Restoration	Mgmt. of ES&H
I-M-25	4/02/90 4/03/90 4/04/90	Ken Honeycutt Brian DeMonia	S&EP	Division Head	Mgmt. of ES&H
I-M-26	4/03/90 4/04/90	William Lloyd	BNL	Director, Personnel Division	ES&H Staffing at BNL

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Ref. No.	Date	Auditor	Organization	Position	Topic
I-M-27	4/03/90	Wayne Hibbitts	CH	Asst. Mng., Laboratory Management	ES&H Line Management
I-M-28	4/03/90	Joyce Laeser	BNL	Director, Personnel	Training, Recruitment
I-M-29	4/03/90 PM	Brian DeMonia	BNL/S&EP	Manager, Env. Protection	Roles/ Responsibilities
I-M-30	4/03/90	Roger Christensen	BNL/S&EP	Technical Support Section	ES&H Responsibilities
I-M-31	4/03/90	Roger Christensen	BNL	Safety Coordinator, Plant Eng.	ES&H Responsibilities
I-M-32	4/03/90	Ken Honeycutt	BNL/S&EP	Manager, Ind. Safety & Fire Protection	Mgmt. of ES&H
I-M-33	4/03/90	Ken Honeycutt	BNL/S&EP	Manager, Ind. Hygiene	Mgmt. of ES&H
I-M-34	4/04/90 4/06/90	William Lloyd	BNL	Head, Plant Eng. Division	ES&H Line Stem Projects
I-M-35	4/04/90	Wayne Hibbitts	BNL	Head, Plant Eng. Division	As-Built Drawings & Configuration Control
I-M-36	4/04/90	Wayne Hibbitts	BNL/QAO	Head	As-Built Drawings & Configuration Control
I-M-37	4/04/90	Joyce Laeser	BNL	Head, Plant. Eng. Division	ES&H Integration Into Plant
I-M-38	4/04/90	Joyce Laeser	BHO	Counsel	Issues in Dispute
I-M-39	4/04/90	Roger Christensen	BNL	Safety Coordinator, Chemistry	ES&H Responsibilities
I-M-40	4/04/90	Ken Honeycutt	BNL/S&EP	Manager, Bldg. Safety Services	Mgmt. of ES&H
I-M-41	4/04/90	Ken Honeycutt	BNL/S&EP	Technician, Bldg. Safety Services	Job Activities
I-M-42	4/05/90	William Lloyd	CH	Personnel Officer	BHO Staffing

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Ref. No.	Date	Auditor	Organization	Position	Topic
I-M-43	4/05/90	William Lloyd	CH	Branch Chief, Budget	BNL Funding Concerns
I-M-44	4/05/90	William Lloyd	CH	Director, Technology Development	Env. Planning at BNL
I-M-45	4/05/90	William Lloyd	CH	Director, Project Management & Eng.	Safety & Health Manning & Budgets
I-M-46	4/05/90	William Lloyd	ER	Manager, MEL-FS Program	ER Funding of Safety & Health Projects (Telecon)
I-M-47	4/05/90	Wayne Hibbitts	CH	Asst. Mgr. Safety Director, ES&H Division	ES&H Guidance, Oversight & Support
I-M-48	4/05/90	Wayne Hibbitts	CH	Director, Project Manager Staff Member	Quality Assurance Program
I-M-49	4/05/90	Wayne Hibbitts	CH	Director, Tech. Man. Division Branch Chief	Env. Restoration Technical Support
I-M-50	4/05/90 AM	Brian DeMonia	BNL/S&EP	Section Manager, Hazardous Waste & Environment Restoration	Roles/ Responsibilities, Interface w/Safety Coordinators, Operating Procedures
I-M-51	4/05/90	Brian DeMonia	BNL/S&EP	Safety Coordinator	Root Cause Analysis (Telecon)
I-M-52	4/05/90	Brian DeMonia	BNL/S&EP	Safety Rep. - Physics & Chemistry	ES&H Roles and Responsibilities
I-M-53	4/05/90	Roger Christensen	CH	Personnel, Branch Chief	DOE 3792.3
I-M-54	4/09/90	Roger Christensen	CH	Personnel Mgmt Spec	DOE 3792.3
I-M-55	4/09/90	William Lloyd	BNL/S&EP	Division Head	Life Safety & OSHA Requirements at BNL (Telecon)

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Ref. No.	Date	Auditor	Organization	Position	Topic
I-M-56	4/09/90	Wayne Hibbitts	CH	Director, ES&H Division	Facility Hazard Designation
I-M-57	4/09/90	Ken Honeycutt	BNL/QAO	Division Head	BNL Quality Assurance Program
I-M-58	4/10/90	Brian DeMonia	BNL/S&EP	Branch Chief, Industrial Safety	UORs & Root Cause
I-M-59	4/10/90	Brian DeMonia	BNL	Division Head, Plant Eng.	Env. Construction Projects
I-M-60	4/12/90	Wayne Hibbitts	DOE-ER	Director, Office of Assessment & Support	ER ES&H Activities
I-M-61	4/17/90	Wayne Hibbitts John Tseng	DOE-EM	Director for On-Site Remediation	Remedial Action Program
I-M-62	4/17/90	Wayne Hibbitts John Tseng	DOE-ER	Director, Office of Energy Research	ER ES&H Activities
I-M-63	4/17/90	Wayne Hibbitts John Tseng	DOE-ER	Asst. Director, High Energy Physics & Nuclear Physics	ER ES&H Activities
I-M-64	4/17/90	Wayne Hibbitts John Tseng	DOE-ER	Asst. Director, Basic Energy Sciences	ER ES&H Activities

Appendix I. List of Site Documents

ENVIRONMENTAL SUBTEAM
LIST OF SITE DOCUMENTS

Document Number	Title/Description	Author/Organization/Recipient	Document Date
A-1	DOE Environmental Survey, Brookhaven National Laboratory	USDOE	06/88
A-2	Preliminary Report of Blass Task Force to Investigate BNL	G. J. Blass	11/13/86
A-3	The Effect of Age on Structural Integrity of HEPA Filters	D. G. Beason/LLNL et al.	1988
A-4	Atmospheric Transport Calculations Versus Measured Tritium Concentrations	R. Miltenberger, J. Tichler, L. Day, J. Steimers/BNL	11/24/84
A-5	New York State Inspection at BNL, October 17, 1989	A. S. Lossos/NYSDEC	10/20/89
A-6	BNL - SOP for Field Testing HEPA Filters - IH-FP-6.1	R. Selvey/BNL	04/21/90
A-7	Monthly Environmental Compliance Report	BHO/BNL	03/01/90
A-8	Listing of Air Emission Sources Observed by the Suffolk County Department of Health Services, March 1, 1988 to February 7, 1989	S&EP/BNL	Undated
A-9	Cancellation of Seven Existing NYSDEC Air Emission Permits	G. Kinne/BNL/J. Bellows/DOE-BHO	10/10/89
A-10	BNL Site No. 1-52-009, Proposed Order - Incineration of Contaminated Jet Fuel	L. Evans/NYSDEC	02/08/90
A-11	Reply to Submitting 23 Sources for Permits on September 22, 1989	A. Lossos/NYSDEC	01/03/90
A-12	Application to NYSDEC for CTO - Spray Aeration Project	J. Bellows/DOE-BHO/D. DeRidder/NYSDEC	10/25/89
A-13	Conversation with Ellen Doering - USEPA	B. Royce/BNL	01/14/88 01/28/85
A-14	Action Plan - DOE Environmental Survey, 1987	BNL	04/89
A-15	Specifications for Bldg. 600, Cooling Water Treatment Chemicals, Work Copy 403055	Plant Engineering/BNL	10/23/86
A-16	Fed. Fac. Compliance Agreement (Burn PCBs)	L. Murphy/USEPA	09/04/87
A-17	Probe Siting Criteria for Ambient Air Quality Monitoring, 40 CFR 58, Appendix E	USEPA	07/88
A-18	Guidelines for the Control of Toxic Ambient Air Contaminants, New York State Air Guide - 1	NYSDEC, Division of Air Resources	09/89

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Document Number	Title/Description	Author/Organization/Recipient	Document Date
A-19	Environmental Program Audit - Brookhaven National Laboratory	NUS Corporation	11/85

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Document Number	Title/Description	Author/Organization/Recipient	Document Date
SW-1	Sanitary Utility Master Plan, 1989-2000	Plant Eng./BNL	10/89
SW-2	pH of Plant Effluent	J. Naidu/BNL/C. Meinhold	10/19/76
SW-3	Environmental Survey, Preliminary	USDOE	06/88
SW-4	List of Environmental Improvements	Plant Eng./BNL	12/89, 01/90
SW-5	PM Specifications, BF-001, BF-002, and BF-003	Plant Eng./BNL	03/28/90 (Computer Printout)
SW-6	SPDES/Memorandum	G. Penny/DOE-BHO/M. Butler	03/22/90
SW-7	Letter	T. Sanford/NYSDEC/J. Bellows/DOE-BHO	03/16/90
SW-8	Letter; Subject: SPDES Permit Application	G. C. Kinne/BNL/J. Bellows/DOE-BHO	10/26/88
SW-9	Letter; Subject: SPDES Permit Modification	D. Larkin/NYSDEC/D. Schweller	12/21/83
SW-10	Letter; Subject: Renewal of SPDES Permit	J. Bellows/DOE-BHO/D. Larkin	10/30/87
SW-11	Letter; Subject: Additional Information Request	G. C. Kinne/BNL/J. Bellows/DOE-BHO	01/11/90
SW-12	Memorandum; Subject: Potable Water Testing for 1990 Assessment Report, July 1988	W. Chaloupka/BNL	11/28/89
SW-13	Memorandum; Subject: Bldg. 930 D.I. Regeneration Water Suffolk	R. Miltenberger/BNL/L. Emma/BNL	03/12/90
SW-14	Draft SPDES Permit Renewal	NYSDEC	Undated
SW-15	Well Water Organic Analyses	R. Miltenberger/BNL	04/10/90
SW-16	Letter; Subject: UOA from On-Site Recharge Basins	G. C. Kinne/BNL/J. Bellows/DOE-BHO	02/12/90
SW-17	BNL Site Report for CY 1988	R. Miltenberger, B. Royce, and J. Naidu/BNL	06/89

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Document Number	Title/Description	Author/Organization/Recipient	Document Date
GW-1	Final Report, Site Geohydrological Evaluation, Brookhaven National Laboratory, Upton, New York	IT Corporation, Edison, NJ	12/88
GW-2	Brookhaven National Laboratory, Installation Assessment Report	Not Identified	04/86
GW-3	Environmental Survey, Preliminary, Brookhaven National Laboratory	USDOE	06/88
GW-4	Brookhaven National Laboratory Site Report for Calendar Year 1987	S&EP/BNL	04/88
GW-5	Brookhaven National Laboratory Monitoring Wells Specification Review	USEPA Region II	02/02/90
GW-6	Environmental Upgrade/Closure of Waste Disposal Sites	Burns and Roe	04/87
GW-7	Waste Management Area, Aquifer Evaluation & Program Design for Restoration, Volumes I and II	H2M	06/85
GW-8	Final Report, Subsurface Investigation of Former Army Landfill Site, Site X-26	IT Corporation	02/89
GW-9	Test Boring and Hydrogeologic Assessment, Former Landfill Area	C. A. Rich & Associates	06/85
GW-10	Groundwater Remediation Plan, Central Steam Facility, Brookhaven National Laboratory	IT Corporation	Undated
GW-11	Well Logs, AGS Well Nos. 1, 2, and 3	Layne-New York	1956-1958
GW-12	Brookhaven National Laboratory Site Report for Calendar Year 1988	B. Miltenberger, B. Royce, J. Naidu/BNL	06/89
GW-13	Geology of Brookhaven National Laboratory and Vicinity, Suffolk County, New York	USGS Bulletin 1156-A	1963
GW-14	NYCRR Parts 700 - 705, Water Authority Regulations	New York State Department of Environmental Conservation	03/31/86
GW-15	Specifications for Monitoring Wells	Plant Engineering/BNL/AUI	10/03/89
GW-16	RCRA Groundwater Monitoring Technical Enforcement Guidance Document	EPA	09/86

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Document Number	Title/Description	Author/Organization/Recipient	Document Date
GW-17	Rationale for Location of the 51 New Monitoring Wells, with Organic Analytical Results	Environmental Protection/BNL	Undated
GW-18	Off-Site Groundwater Contamination (BNL Memorandum)	J. Naidu/BNL/M. Blume/BNL	04/25/90

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Document Number	Title/Description	Author/Organization/Recipient	Document Date
WM-1	BNL Memorandum, Biology Department Safety Program Assessment Report, July 1988	J. Levesque/BNL/W. R. Casey	08/18/88
WM-2	BNL Memorandum, Plant Engineering Safety Program Appraisal (and Attachments)	W. R. Casey/BNL/A. Mahlmann	05/11/89
WM-3	BNL Staff Services Memorandum, Assessment Report	W. R. Casey/BNL/H. R. Manning	07/25/89
WM-4	BNL Memorandum Supply and Materiel Safety Assessment (and Attachments)	W. R. Casey/BNL/M. A. Guacci	08/09/89
WM-5	BNL Memorandum, Physics Department Safety Assessment Report	W. R. Casey/BNL/P. D. Bond	07/24/89
WM-6	BNL Memorandum, Photo & Graphics Arts Safety Assessment (and Attachments)	F. Marotta/BNL/O. White	08/09/89
WM-7	BNL Memorandum, Occupational Medicine Clinic Assessment Report (and Attachments)	W. R. Casey/BNL/B. Breitenstein	06/05/89
WM-8	BNL Memorandum, Assessment of the Department of Nuclear Energy Safety Program Reply (and Attachments)	W. Becker/BNL/W. R. Casey	04/24/89
WM-9	BNL Memorandum, Safety Assessment Follow Up (NSLS Department) (and Attachments)	W. R. Casey/BNL/M. L. Knotek	06/28/89
WM-10	BNL Memorandum, Medical Department Safety Appraisal Report	W. R. Casey/BNL/A. Chanana	05/16/89
WM-11	BNL Memorandum, Safety Assessment Report Corrections, (Instrumentation Division) (and Attachments)	G. H. Tiller/BNL/W. R. Casey	07/31/89
WM-12	BNL Memorandum, Response to Recommendations, Re: G. Hind's Memorandum to Biology Department	B. P. Schoenborn/BNL/O. White	01/23/89
WM-13	BNL Memorandum, Applied Mathematics Safety Program Appraisal Report (and Attachments)	S. S. Rideout/BNL/W. R. Casey	07/11/89
WM-14	BNL Memorandum, Chemistry Department Safety Assessment (and Attachments)	N. Sutin/BNL/W. R. Casey	04/18/89
WM-15	BNL Memorandum, Follow-Up on Biology Department Safety Program Assessment Report of August 31, 1988	G. Latham/BNL/G. Hind	06/02/89
WM-16	BNL Memorandum, DAS Safety Assessment, September 12-16, 1988 (and Attachments)	W. R. Casey/BNL/B. Manowitz	05/01/89

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Document Number	Title/Description	Author/Organization/Recipient	Document Date
WM-17	BNL Memorandum, AGS Safety Assessment (and Attachments)	D. Lowenstein/BNL/W. R. Casey	09/01/88
WM-18	BNL Memorandum, 1988 Safety Assessment, AGS	W. R. Casey/BNL/D. Lowenstein	02/14/89
WM-19	BNL Memorandum, ADD Appraisal Report, June 6-10, 1988	N. Rohrig/BNL/W. R. Casey	07/01/88
WM-20	Brookhaven National Laboratory Site Waste Management Plan	BNL	12/88
WM-21	Final BNL RCRA Compliance Audit	Black and Veatch	08/02/89
WM-22	1988 BNL Plan for Environmental Management (Preliminary)	L. C. Emma and L. E. Day/BNL	1987
WM-23	RFA Sampling Plan	NYSDEC	04/27/88
WM-24	BNL Memorandum, Summary of Findings from Suffolk County DHS Inspections of 24 BNL Facilities Conducted During April and May 1988	B. A. Royce/BNL/W. R. Casey	05/26/88
WM-25	Letter, Suffolk County DHS Inspection	E. Youngblood/DHS/B. Royce/BNL	05/18/88
WM-26	BNL Draft Memorandum, Suffolk County Sanitary Code Requirements for Storage of Drums and Other Similar Containers	B. A. Royce/BNL/L. C. Emma	02/11/88
WM-27	BNL Memorandum, DHS Inspection of HWMF	B. A. Royce/BNL/F. J. Manotta	04/20/88
WM-28	Agreement Between BNL and County of Suffolk	BHO and SCDHS	09/23/87
WM-29	Letter, NYSDEC Landfill Inspection Report and Copy of Applicable Regulations	M. A. Butler/BAO/G. Kinne/AUI	09/30/87
WM-30	BNL Mixed Waste Management Plan	Black and Veatch	11/22/89
WM-31	Environmental Protection Appraisal Report, June 12-16, 1989	DOE/CHO	02/12/90
WM-32	1990 Inventory of Federal Hazardous Waste Sites Under Section 3016 of RCRA	BNL	01/17/90
WM-33	BNL Safety Manual, Table of Contents	BNL	09/18/89
WM-34	Safety Manual, Section 1.1.0, Notification, Investigation, and Reporting of Unusual Occurrences	BNL	10/87
WM-35	Safety Manual, Section 3.6.0, Radioactive Waste Disposal, Decontamination, and Storage	BNL	10/27/86
WM-36	Safety Manual, Section 6.1.0, Environmental Protection	BNL	07/09/84

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Document Number	Title/Description	Author/Organization/Recipient	Document Date
WM-37	Safety Manual, Section 6.2.0, Hazardous Chemical Waste Minimization and Disposal	BNL	08/02/89
WM-38	List: BNL Areas of Concern	BNL	12/19/89
WM-39	UST Notification Forms	BNL	05/02/86
WM-40	1987 Leak Testing of Underground Fuel Tanks, Correspondence	BNL/NYSDEC	1987
WM-41	1987 Leak Testing Results of Underground Tanks	TankTest, Inc.	08/25/87
WM-42	1988 Leak Testing Results of Underground Tanks	TankTest, Inc.	04/20/88
WM-43	NYSDEC Hazardous Waste Generator Report for 1988	BNL	02/24/89
WM-44	Names and Locations of Past and Present Off-Site TSDFs	BNL	02/22/90
WM-45	Plant Engineering, Management Program for Non-Hazardous Solid Waste, with Landfill Monitor Procedure BSS-2 and Correspondence	BNL	1990
WM-46	BNL Memorandum, Building Hazardous Waste Collection Points	G. C. Kinne/BNL/W. Kato	08/24/89
WM-47	BNL Memorandum, Hazardous and Radioactive Mixed Waste	G. C. Kinne/BNL	08/17/89
WM-48	Inventory of Federal Hazardous Waste Sites Under Section 3016 of RCRA	DOE/CHO	12/20/89
WM-49	1985 NYSDEC RCRA Inspection Report	NYSDEC	12/26/85
WM-50	Letter, Documentation of Inspection Deficiency Correction	G. C. Kinne/BNL/D. Schweller/BAO	01/13/86
WM-51	November 1986 EPA/NYSDEC RCRA Inspection Report	EPA/NYSDEC	11/28/86
WM-52	1988 NYSDEC RCRA Inspection Report	NYSDEC	01/27/88
WM-53	1989 NYSDEC RCRA Inspection Report	NYSDEC	07/20/89
WM-54	1988 BNL TSDF Annual Report	BNL	05/18/89
WM-55	Guidance for Conduct of Waste Management Systems Performance Assessment	EG&G, Idaho, Inc.	6/88
WM-56	Activity Data Sheets for 1990 Environmental Restoration and Waste Management Five-Year Plan	BNL	1990
WM-57	Implementation Plan for DOE Order 5820.2A	BNL	4/89

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Document Number	Title/Description	Author/Organization/Recipient	Document Date
WM-58	RCRA Permitting of Radioactive Liquid Waste at BNL	Dames and Moore	1989
WM-59	UOR Number 88-13 with Root Cause Analysis	BNL	1988
WM-60	Draft Site Specific Plan for Environmental Restoration and Waste Management	DOE/CHO	11/01/89
WM-61	BNL Waste Minimization Report	Black and Veatch	2/89
WM-62	BNL Tank Removal Scoping Study, Phase IV - Conceptual Design Report	Chem-Nuclear Systems, Inc.	04/27/87
WM-63	Suffolk County Toxic Liquid Registration Forms for BNL	BNL	6/89
WM-64	BNL Safety and Environmental Protection Division Description	BNL	1989
WM-65	FY 1987 Summary Appraisal Report of BNL	DOE/CHO	03/18/88
WM-66	Environmental Protection Appraisal Report	DOE/BAO	08/25/88
WM-67	Suffolk County DHS Inspection Forms	Suffolk County DHS	1989
WM-68	Hot Laundry and Reclamation Facility, Bldg. 650, Description	BNL	1989
WM-69	Hazardous Waste Management Facility, Bldg. 444, Description	BNL	1989
WM-70	Calibration Facility, Bldg. 348, Description	BNL	1989
WM-71	BNL Organizational Chart and Introduction Presentation	BNL	1989
WM-72	BNL 1987 Environmental Monitoring Report	R. P. Miltenberger, B. A. Royce, J. R. Naidu/BNL	4/88
WM-73	BNL Site Report for CY 1988	R. P. Miltenberger, B. A. Royce, J. R. Naidu/BNL	6/89
WM-74	Draft 1989 Site Development Plan	BNL	1989
WM-75	BNL Memorandum, RAP and On-Site Emergency Call Procedures	C. W. Flood/BNL	01/03/89
WM-76	BNL Memorandum, Safety Manual Guide 2.1.1 (Biology Department)	G. Hind/BNL	10/07/88
WM-77	DOE/EPA/AUI Compliance Consent Agreements for Burning of PCB Oil	USEPA	09/15/87
WM-78	Letter; Subject: BNL Groundwater Spray Aeration	J. Bologna/NYSDEC/G. Penny/DOE-BHO	12/11/89
WM-79	Conceptual Design Report, Hazardous Waste Design Report	Plant Eng./BNL	12/87

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Document Number	Title/Description	Author/Organization/Recipient	Document Date
WM-80	BNL Newsletter, Supersafe, Issue 5	S&EP/BNL	02/90
WM-81	Letter; Subject: Management of Solvent-Laden Rags as RCRA Hazardous Waste	J. Kennedy/DOE-CH/Area Offices	02/02/90
WM-82	Draft Hazardous Waste Management Local Emergency Plan	F. Crifasi/S&EP, BNL	12/15/89
WM-83	BNL RCRA Part B/Part 373 Permit Application	Dames and Moore	11/89
WM-84	Draft BNL On-Site Medical Incineration Report	BNL	03/90
WM-85	BNL Solid Waste Landfill Permit and Permit Renewal Correspondence	BNL/NYSDEC	1981-1990
WM-86	BNL S&EP Draft SOP, Use of Explosives	P. Edwards/BNL	08/17/87
WM-87	BNL S&EP Draft SOP, Use of the Rifle	P. Edwards/BNL	08/17/87
WM-88	Termination/Transfer Statement	Dept. Applied Science/BNL	04/90
WM-89	BNL Memorandum; Subject: Responsibility for Laboratory Items and Housekeeping	N. Munhofen/BNL	05/24/89

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Document Number	Title/Description	Author/Organization/Recipient	Document Date
TS-1	Memorandum; Subject: Laboratory Requirements for PCB Equipment	G. C. Kinne/BNL/J. Laurie	02/14/90
TS-2	Environmental Evaluation of Brookhaven National Laboratory	CER Corporation	11/29/89
TS-3	Letter; Subject: 24 Building Inspections	E. Joungblood/SCDHS/B. Royce/BNL	05/18/88
TS-4	Memorandum; Subject: DHS Inspection of HWMF	B. Royce/S&EP, BNL/F. Marotta	04/20/88
TS-5	Annual PCB Report - 1985	S&EP/BNL	07/15/86
TS-6	Annual PCB Report - 1986	S&EP/BNL	07/87
TS-7	Annual PCB Report - 1987	S&EP/BNL	Undated
TS-8	Annual PCB Report - 1988	S&EP/BNL	Undated
TS-9	Letter; Subject: Capacitors in Bldg. 930	F. Grenier/Cornell-Dubilier Electronics/V. Lodesto	09/29/81
TS-10	RCRA Part B Permit - Appendix 10	Dames & Moore	1989
TS-11	Environmental Survey	NUS Corporation	06/88
TS-12	Memorandum; Subject: Biology Department Safety Program Assessment Report, July 1988	W. R. Casey/S&EP/J. Levesque/BNL	08/18/88
TS-13	Agreement Between Brookhaven National Laboratory and County of Suffolk	M. A. LoGrande, N. P. Samios/BNL and J. Bellows/DOE-BHO	09/23/87
TS-14	Draft SOP, PCB Recordkeeping, Handling, and Storage	S&EP	Undated
TS-15	Notification of PCB Activity	G. Penny/BNL/EPA	Undated
TS-16	Forms for PCB Handling	S&EP/BNL	N/A
TS-17	Federal Facility Compliance Agreement, Docket No. II TSCA-PCB-85-0255	DOE, AUI, and EPA	08/14/87
TS-18	Memorandum; Subject: Hazardous Waste Management Policy	D. Lowenstein/BNL/AGS Personnel	02/10/88
TS-19	Letter; Subject: FFCA Consent Agreement and Final Order Request for Time Extension	J. Bellows/BHO/W. Muszynski/EPA	08/17/89
TS-20	Memorandum to File; Subject: TSCA/RCRA PCB Contaminated Fuel	J. Shands/BHO	04/24/89

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TS-21	Letter; Subject: Disposing of PCB Contaminated Fuel at BNL	J. Bellows/BHO/H. Berger/NYSDEC	06/06/88
TS-22	BHO Incident Data Sheet; Subject: PCB Spill at Bldg. 424	B. Royce/S&EP, BNL/G. Penny	04/05/90
TS-23	Memorandum; Subject: BNL PCB Inventory	C. Meinhold/Plant Eng., BNL/B. Manowitz	06/08/87
TS-24	SOP No. 3.03, Polychlorinated Biphenyls	Plant Eng./BNL	03/01/89
TS-25	SOP No. 5.04, PCB Transformers	Plant Eng./BNL	02/02/88
TS-26	Memorandum; Subject: LILCO PCB Capacitor Bank at 603	A. Warren/P.E./M. Bebon/BNL	03/08/90
TS-27	Memorandum; Subject: Revision to BNL PCB Program Requirement Document	O. White/S&EP, BNL	03/01/90
TS-28	Memorandum; Subject: Hazardous Mat. Disposal	F. Thornhill/AGS/Dept. Supervisors/BNL	07/28/88
TS-29	Order on Consent No. T1-90-0034 in the Matter of Alleged Violation of Article 12	DOE and SCDHS	03/15/90
TS-30	Letter; Subject: Article 12 Tank Permits from SCDHS	M. Butler/BHO/G. Kinne/BNL	03/09/90
TS-31	Letter; Subject: Tank Registrations	V. Frisina/SCDHS/M. Butler/BHO	12/07/89
TS-32	Letter; Subject: BNL Tank Registrations	M. Butler/BHO/V. Frisina/SCDHS	11/30/89
TS-33	Letter; Subject: Article 12 Tank Registrations	J. Monhart/BHO/J. Pim/SCDHS	07/20/89
TS-34	Letter; Subject: Tank Registration Forms	G. C. Kinne/BNL/J. Bellows/BHO	02/21/90
TS-35	BNL Capital Improvement Proposal, Storage Tank Upgrades Phase III	BNL	Undated
TS-36	Letter; Subject: Consent Order No. T1-90-0034	G. C. Kinne/BNL/J. Bellows/BHO	03/29/90
TS-37	Letter; Subject: Tank Registration Package	J. Bellows/BHO/G. C. Kinne/BNL	10/04/89
TS-38	Summary Report, Secondary Containment System at BNL	ERM-Northeast	03/87
TS-39	Memorandum; Subject: Verification of Completed SCDHS Toxic Liquid Registration Forms	V. Gutierrez/BNL/J. Bellows/BHO	07/10/89
TS-40	Memorandum; Subject: Alarm Equipment for Storage Facilities	B. Royce/S&EP, BNL/Distribution	10/07/89
TS-41	Memorandum; Subject: SCSC Article 12-Revision	B. Royce/S&EP, BNL/Distribution	07/18/89
TS-42	Memorandum; Subject: Alarm Equipment for Storage Facilities	B. Royce/S&EP, BNL/Distribution	07/10/89

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TS-43	Memorandum; Subject: Alarm Equipment for Storage Facilities	B. Royce/S&EP, BNL/Distribution	05/12/89
TS-44	Memorandum; Subject: Agenda for Meeting with SCDHS	B. Royce/S&EP, BNL/Distribution	11/09/87
TS-45	Memorandum; Subject: Guidance Document for Article 12	B. Royce/S&EP, BNL/Distribution	04/06/87
TS-46	S&EP QA Project Plan Registration of Hazardous Substance Bulk Storage Tanks	B. Royce and V. Gutierrez/BNL	07/12/89
TS-47	Memorandum; Subject: Guidance on UST Design	B. Royce/S&EP, BNL/A. Mahlman	01/07/88
TS-48	Memorandum; Subject: Laboratory Compliance with Article 12	G. C. Kinne/BNL/A. Mahlman	10/15/87
TS-49	Memorandum; Subject: Article 12 Requirements for ASTs	B. Royce/S&EP, BNL/M. J. Rose	05/01/87
TS-50	Memorandum; Subject: Article 12 Requirements for USTs	B. Royce/S&EP, BNL/C. Meinhold	03/24/87
TS-51	Memorandum; Subject: Updated Inventory of PCB Containing Equipment at DAS	L. Petrakis/DAS, BNL/G. Kinne/BNL	04/09/90
TS-52	Memorandum; Subject: PCB Equipment Update Request	G. C. Kinne/BNL/D. Lowenstein/AGS, BNL	02/14/90
TS-53	U.S. DOE BNL Toxic Liquid Storage Part II: Site Maps	DOE and BNL	06/89
TS-54	Memorandum; Subject: Empty Cylinders	M. Guacci/S&M, BNL/BNL Administrators	03/21/90
TS-55	Memorandum; Subject: Containment Capacities Roundhouse	M. Guacci/S&M, BNL/D. Wunsch/Tiger Team	04/04/90
TS-56	S&EP Safety Assessment Program Tier II	S&EP, BNL	03/09/90
TS-57	S&EP Safety Assessment - Supply and Materiel	S&EP, BNL	04/28/89
TS-58	Memorandum; Subject: ES&H Assessment (April 1989)	M. Guacci/S&M, BNL/F. Marotta/BNL	08/14/89
TS-59	Safety Guide - Supply and Materiel Division	S&M, BNL	Undated
TS-60	Hazardous Materials Transport Training Program	Westinghouse Hanford Co.	Undated
TS-61	Memorandum; Subject: MSDS for Stock Materials	M. Guacci/S&M, BNL/J. Brower/BNL	08/14/89
TS-62	Memorandum; Subject: HMI Codes	J. Brower/S&EP, BNL/E. Gallagher/BNL	01/02/90
TS-63	Interim Permit to Operate - Job No. HM89-348	SCDHS	03/27/90
TS-64	Interim Permit to Operate - Job No. HM89-349	SCDHS	03/01/90
TS-65	Pesticide Inventory	Plant Eng., BNL	02/22/90

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Document Number	Title/Description	Author/Organization/Recipient	Document Date
TS-66	Pesticide Inventory	Biology, BNL	Undated
TS-67	Memorandum; Subject: Hazard Codes for S&M Stock Items	J. Brower/S&EP, BNL/Distribution	06/11/89
TS-68	SOP (IH-PP-5), Review of Purchase Orders	S&EP, BNL	08/24/89
TS-69	SOP (IH-PP-6), IH Hazard Inventory Tracking System	S&EP, BNL	08/24/89
TS-70	SOP (IH-PP-16), Hazardous Material Control Program	S&EP, BNL	08/25/89
TS-71	BNL Hazardous Material User Information Report	S&EP, BNL	02/06/90
TS-72	S&EP Emergency Log	S&EP, BNL	01/03/89
TS-73	BNL OH&S Guides (1.10.0, 6.2.0, and 1.1.0)	BNL	07/89
TS-74	BNL Monthly Environmental Compliance Report - August 1989	BHO	09/08/89
TS-75	BNL Monthly Environmental Compliance Report - September 1989	BHO	09/12/89
TS-76	BNL Monthly Environmental Compliance Report - October 1989	BHO	10/06/89
TS-77	BNL Monthly Environmental Compliance Report - November 1989	BHO	11/01/89
TS-78	BNL Monthly Environmental Compliance Report - December 1989	BHO	12/11/89
TS-79	BNL Monthly Environmental Compliance Report - January 1990	BHO	01/09/90
TS-80	BNL Monthly Environmental Compliance Report - March 1990	BHO	03/01/90
TS-81	Letter; Subject: Results of 36 Building Inspections	E. Joungblood/SCDHS/M. S. Davis/BNL	10/18/88
TS-82	Letter; Subject: Results of 46 Building Inspections	E. Joungblood/SCDHS/M. S. Davis/BNL	11/28/88
TS-83	Letter; Subject: Results of 23 Building Inspections	E. Joungblood/SCDHS/M. S. Davis/BNL	02/10/89
TS-84	Letter; Subject: Review of Air Emission Points	M. Butler/BHO/R. Capp	11/28/88
TS-85	Letter; Subject: Sample Analyses	M. S. Davis/BNL/E. Joungblood	10/05/88
TS-86	Letter; Subject: Information SPDES Permit	M. S. Davis/BNL/E. Joungblood	10/31/88
TS-87	Letter; Subject: Quarterly Summary, Article 12	M. S. Davis/BNL/E. Joungblood	01/20/89
TS-88	Letter; Subject: Response to Letter Sent 4/6-5/26/88	M. S. Davis/BNL/E. Joungblood	07/08/88
TS-89	Letter; Subject: Article 12 Inventory	M. S. Davis/BNL/E. Joungblood	03/15/89

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TS-90	14 Memoranda; Subject: DHS Inspections	B. Royce/S&EP, BNL/BNL Divisions & Depts.	1988-1989
TS-91	15 Memoranda; Subject: Inspection Schedules	B. Royce/S&EP, BNL/BNL Divisions & Depts.	1988-1989
TS-92	SCDHS Inspection Sheets for BNL Facilities	SCDHS	1988-1989

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Document Number	Title/Description	Author/Organization/Recipient	Document Date
QA-1	Quality Assurance Manual	BNL and AUI	02/01/85 with Revisions
QA-2	Memorandum; Subject: Implementation of RCRA Waste Analysis Plan	S. Chalasani/S&EP, BNL/L. Day/BNL	07/10/89
QA-3	Purchase Order No. 420785 - Analytical Services	Plant Eng., BNL/Ecotest Laboratories	11/22/89
QA-4	Memorandum; Subject: Request for Proposal for the Service of an Off-Site Laboratory	S. Chalasani/S&EP, BNL/W. Casey/BNL	02/21/90
QA-5	S&EP Quality Assurance Program Document	S&EP, BNL	05/89
QA-6	Analytical Chemistry QA Program	S&EP, BNL	1986
QA-7	QA Forms for Laboratory Sample Tracking	S&EP, BNL	Undated
QA-8	Technical Report for BNL (QA Section)	ETC, Inc.	11/89
QA-9	Letter; Subject: NYSDOH Audit Results	M. Prevost/NYSDOH/S. Chalasani/BNL	06/09/89
QA-10	Letter; Subject: Renewal of Certification	L. Madlim/NYSDOH/S. Chalasani/BNL	04/01/90
QA-11	Proficiency Test Results - Potable Water	NYSDOH	04/17/89
QA-12	Memorandum; Subject: QA Audit (11/89)	W. Litzke/S&EP, BNL/J. Naidu/BNL	12/05/89
QA-13	Memorandum; Subject: 11/89 Audit Response	S. Chalasani/S&EP, BNL/W. Litzke	12/11/89
QA-14	Memorandum; Subject: Audit Schedule	M. Shear/QA Office/W. Casey/BNL	03/14/90
QA-15	Memorandum; Subject: QA Audit	V. Gutierrez/QA Office/C. Meinhold	02/28/87
QA-16	Data on PCB Analysis of Tank No. 5	S&EP, BNL and NYTEST Environmental	1989
QA-17	Memoranda; Subject: Analyses Done at S&EP	S&EP, BNL	02/90
QA-18	Brookhaven National Laboratory Site Report for Year 1988	R. Miltenberger, B. Royce, and J. Naidu/BNL	06/89

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RAD-1	Brookhaven National Laboratory Site Report for Calendar Year 1988 (BNL 52207)	R. P. Miltenberger, B. A. Royce, J. R. Naidu/BNL	6/89
RAD-2	Review of Land Contamination at the BNL Site	R. P. Miltenberger, A. P. Hull, E. T. Lessard, P. Gollon/BNL	Undated
RAD-3	Memorandum to C. B. Meinhold; Subject: Disposal of Tritiated Waste Water	L. C. Emma/BNL	12/02/86
RAD-4	Air Emissions Annual Report for 1985, 40 CFR Part 61.94	BNL	Undated
RAD-5	Memorandum to Distribution; Subject: Landfill Radiation Monitoring Procedure	C. Flood/BNL	12/02/86
RAD-6	1986 Environmental Monitoring Report (BNL-52088)	R. P. Miltenberger, B. A. Royce, J. R. Naidu/BNL	06/87
RAD-7	Methodology for Dose-Equivalent Calculation-Inhalation Pathway (EDA-01)	Safety and Environmental Protection Division/BNL	04/08/86
RAD-8	Memorandum to J. R. Naidu; Subject: Environmental Assessment of Evaporation Techniques Suggested for the Disposal of WCF Condensate	R. P. Miltenberger/BNL	06/27/86
RAD-9	Memorandum to C. B. Meinhold; Subject: Airborne External Exposure Rates Due to Argon-41, Oxygen-15, and Cesium-137	R. P. Miltenberger/BNL	05/28/86
RAD-10	Possibility of Environmental Neutron Measurements Near AGS	P. J. Gollon/BNL	10/28/85
RAD-11	Atmospheric Transport Calculations Versus Measured Tritium Concentrations	R. P. Miltenberger, J. L. Tichler, L. E. Day, and J. P. Steimers/BNL	11/28/84
RAD-12	200-MeV Radiation Effects Facility Final Safety Analysis Report (BNL/NPB-87-29)	Neutral Particle Beam Division/BNL	3/87
RAD-13	Memorandum to R. Miltenberger; Subject: Tritium Release	R. Zantopp/BNL	04/29/86
RAD-14	Memorandum to L. Mausner; Subject: Projected Dose from Xe-123 Release and I-123 Daughter at the Continuous Flow I-123 Facility (BLIP)	K. McIntyre, N. Rohrig/BNL	11/12/86
RAD-15	Memorandum to L. E. Day; Subject: Dose Assessment for Groundwater Restoration Project	R. P. Miltenberger/BNL	05/28/86
RAD-16	Liquid Radioactive Waste Disposal and Related Environmental Concentrations at Brookhaven National Laboratory (BNL-14797)	A. P. Hull/BNL	Undated

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RAD-17	History of Elevated Tritium Concentrations in the 1984 BNL Sanitary Sewage Discharges and the Effect On Off-Site Monitoring Wells	Unknown	02/08/85
RAD-18	Memorandum to J. R. Naidu; Subject: Tritium and Gross Beta Activity in Sewage Treatment Plant Influent	R. Miltenberger/BNL	11/13/85
RAD-19	Handout Given to Tiger Team Members for Site Tour on March 26, 1990	Unknown	Undated
RAD-20	Preliminary Report Findings and Recommendations by the Task Force to Investigate Brookhaven National Laboratory	Suffolk County Task Force	11/13/86
RAD-21	Responses to Document No. R-RAD-20	Unknown	01/87
RAD-22	Memorandum to C. Simon; Subject: Brookhaven National Laboratory (BNL) Tritium Incident Report	P. A. Giardina (EPA Region II)	02/11/85
RAD-23	Summary of ES&H Program Handout Given to Tiger Team Members During Orientation	R. Casey/BNL	03/26/90
RAD-24	BNL Preliminary Decontamination and Decommissioning Plan	M. S. Davis, L. C. Emma, L. F. Phillips/BNL	11/87
RAD-25	Environmental Evaluation of Brookhaven National Laboratory (Draft)	CER Corporation	11/29/89
RAD-26	An Aerial Radiological Survey of the Brookhaven National Laboratory and Surrounding Area	EG&G Energy Measurements	06/83
RAD-27	Conceptual Design Report for Upgrade of Environmental Monitoring Program	Unknown	Undated
RAD-28	BNL Institutional Plan, FY 1985 - FY 1990	BNL/AUI	11/84
RAD-29	1989 Site Development Plan (Draft)	BNL	Undated
RAD-30	Memorandum to W. Weng; Subject: Environmental Assessment for AGS Booster Project - Contamination of Groundwater	R. Miltenberger/BNL	08/10/87
RAD-31	Production of Radioactivity in Local Soil at AGS Fast Neutrino Beam (BNL-43558)	P. J. Gollon, et al./BNL	10/89
RAD-32	Calibration Facility, Bldg. 348	Unknown	Undated
RAD-33	Hot Laundry and Reclamation Facility, Bldg. 650	Unknown	Undated

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RAD-34	Site Specific Plan for Environmental Restoration and Waste Management	BNL	11/01/89
RAD-35	Rationale for Location of the 51 New Monitoring Wells	Unknown	Undated
RAD-36	Memorandum to Distribution; Subject: Estimate of Groundwater Concentrations at Bldg. 830	R. Miltenberger/BNL	12/05/88
RAD-37	BNL Occupational Health and Safety Guide, Section 1.1.0	BNL	10/87
RAD-38	BNL Occupational Health and Safety Guide, Section 3.6.0	BNL	10/27/86
RAD-39	BNL Occupational Health and Safety Guide, Section 3.7.0	BNL	09/01/88
RAD-40	An Aerial Radiological Survey of the Brookhaven National Laboratory and Surrounding Area (Preliminary Data)	P. P. Guss/EG&G	03/90
RAD-41	Decommissioning Evaluations and Plan for the Brookhaven Graphite Research Reactor	Burns and Roe Company	03/89
RAD-42	Memorandum to W. R. Casey; Subject: ADD Appraisal Report, June 6-10, 1988	N. Rohrig/BNL	07/01/88
RAD-43	Memorandum to B. Manowitz; Subject: DAS Safety Assessment, September 12-16, 1988	R. Casey/BNL	05/01/89
RAD-44	Memorandum to G. Hind; Subject: Follow-Up on Biology Department Safety Program Assessment Report on August 31, 1988	G. Latham/BNL	06/02/89
RAD-45	Memorandum to Distribution; Subject: Hazardous and Radioactive Mixed Waste	G. C. Kinne/BNL	10/17/89
RAD-46	Letter to G. Kinne; Subject: Environmental Protection Appraisal Report	DOE-BHO	02/12/90
RAD-47	List of Radiological Analytical Parameters and Laboratories Performing Analysis	Unknown	Undated
RAD-48	1987 Environmental Monitoring Report (BNL-52152)	R. P. Miltenberger; B. A. Royce, J. R. Naidu/BNL	04/88
RAD-49	Unusual Occurrence Report; Subject: Tritium Release to Off-Site Groundwater	BNL/AUI	12/30/85-Initial 02/25/88-Interim

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RAD-50	1988 BNL Plan for Environmental Management (Preliminary)	L. C. Emma and L. E. Day/BNL	Undated
RAD-51	Brookhaven National Laboratory Mixed Waste Management Plan	Black and Veatch	11/22/89
RAD-52	Brookhaven National Laboratory Site Waste Management Plan	BNL/AUI	12/88
RAD-53	Memorandum to D. Lowenstein; Subject 1988 Safety Assessment AGS	W. R. Casey/BNL	12/14/89
RAD-54	Memorandum to W. R. Casey; Subject: AGS Safety Assessment	D. Lowenstein/BNL	09/01/88
RAD-55	Report of the Investigation Committee on Tritium Concentrations in Off-Site Groundwater Samples Near Brookhaven National Laboratory, Upton, New York from 12/84 Through 2/85	BNL/AUI	03/85
RAD-56	Environmental Planning Document, Brookhaven National Laboratory	S&EP Division/BNL	02/18/87
RAD-57	Occupational Health and Safety Guide, Procedure 6.1.0	BNL/AUI	07/09/84
RAD-58	Brookhaven National Laboratory Installation Assessment Report	BNL/AUI	04/86
RAD-59	HFBR Operations Procedures Manual, Procedure 7.4	BNL/AUI	02/22/83
RAD-60	Disposal of Tritium from WCF Tank No. 3	Unknown	05/22/85
RAD-61	Phase III Report: Igloo Survey, Summer 1975	G. Myrick, F. Ost/BNL	08/21/75
RAD-62	Letter to AUI; Subject: Environmental Protection Appraisal Report	J. L. Bellows/BHO	Undated; Report Dated 5/11/88 - 5/20/88
RAD-63	Letter to Dr. N. P. Samios; Subject: FY 1987 Summary Appraisal Report of Brookhaven National Laboratory	H. J. Rauch/DOE-CH	03/18/88
RAD-64	Implementation Plan for DOE Order 5820.2A	BNL/AUI	04/89
RAD-65	Memorandum to Distribution; Subject: Root Cause Analysis of UOR 88-13	W. R. Casey/BNL	12/12/89
RAD-66	Memorandum to W. R. Casey; Subject: Assessment of Safety Program - Central Shops	D. Hansen/BNL	08/22/88

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RAD-67	Memorandum to W. R. Casey; Subject: Safety Assessment Report Corrections (Instrumentation Department)	G. H. Tiller/BNL	07/31/89
RAD-68	Memorandum to A. Chanana; Subject: Medical Department Safety Appraisal Report	W. R. Casey/BNL	05/16/89
RAD-69	Memorandum to M. L. Knotek; Subject: Safety Assessment Follow-Up (NSLS)	W. R. Casey/BNL	06/28/89
RAD-70	Memorandum to W. R. Casey; Subject: Assessment of the Department of Nuclear Energy Safety Program Reply	W. Becker/BNL	04/24/89
RAD-71	Memorandum to B. Breitenstein; Subject: Occupational Medicine Clinic Assessment Report	W. R. Casey/BNL	06/05/89
RAD-72	Memorandum to P. D. Bond; Subject: Physics Department Safety Assessment Report	W. R. Casey/BNL	07/24/89
RAD-73	Memorandum to W. R. Casey; Subject: Biology Department Safety Program Assessment Report, July 1988	J. Levesque/BNL	08/18/88
RAD-74	Memorandum to J. Naidu; Subject: Radioactive Material in Sewage Plant Digester Sludge	R. Miltenberger/BNL	10/14/86
RAD-75	Memorandum to R. Mills; Subject: Response to Tritium Disposal Request	R. Miltenberger/BNL	09/09/85
RAD-76	Memorandum to Department Chairmen/Division Heads; Subject: Policy for Liquid Tritium Releases to the Sanitary Sewage System	S. Baron/BNL	06/03/85
RAD-77	Memorandum to J. Naidu; Subject: Response to Environmental Release of Tritium from the Van de Graaff	R. Miltenberger/BNL	09/09/85
RAD-78	Radioactive Effluent/On-Site Discharge Report	G. C. Kinne/BNL	05/05/86
RAD-79	Memorandum to C. Meinhold; Subject: E. P. Section: Regulatory Matters Group - Responsibilities and Activities	J. Naidu/BNL	01/20/87
RAD-80	Monthly Environmental Compliance Reports (September 12, 1989 through March 1, 1990)	DOE BHO	Various
RAD-81	Brookhaven National Laboratory Self-Assessment of Environment, Safety and Health Issues	BNL/AUI	04/90
RAD-82	Landfill Alarm Response Form (BSS-2)	BNL/AUI	Undated

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RAD-83	Criteria for Release of Possibly Activated Materials	Unknown	08/07/89
RAD-84	Letter to W. R. Casey; Subject: Criteria for Release of Activated Materials (Approval of Procedure by John P. Kennedy of DOE-CH)	M. A. Butler/BHO	10/19/89

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IWS-1	BNL Memorandum to J. Bellows; Subject: 1990 Inventory of Federal Hazardous Waste Sites Under Section 3016 of RCRA	G. C. Kinne/BNL	01/17/90
IWS-2	BNL Memorandum to W. R. Casey; Subject: AGS Safety Assessment	D. Lowenstein/BNL	09/01/88
IWS-3	BNL Memorandum to D. Lowenstein; Subject: Copy of the Draft AGS Safety Assessment	W. R. Casey/BNL	08/17/88
IWS-4	BNL Memorandum to D. Lowenstein; Subject: Responses to 1988 AGS Safety Assessment	W. R. Casey/BNL	02/14/89
IWS-5	BNL Memorandum to W. R. Casey; Subject: ADD Appraisal Report, June 6-10, 1988	N. Rohrig/BNL	07/01/88
IWS-6	BNL Occupational Health and Safety Guide, Section 1.1.0, Notification, Investigation, and Reporting of Unusual Occurrences	S&EP	10/87
IWS-7	DOE Memorandum to G. C. Kinne; Subject: NYSDEC Landfill Inspection Report and Copy of Applicable Regulations	M. Butler/DOE/BHO	09/30/87
IWS-8	BNL 1988 Plan for Environmental Management	L. Emma and L. Day/BNL	1988
IWS-9	Groundwater Remediation Plan for the Central Steam Facility	IT Corporation	1989
IWS-10	USEPA Potential Hazardous Waste Site Preliminary Assessments	USEPA	07/81
IWS-11	UOR No. 85-33; Subject: Tritium Releases to Off-Site Groundwater	Reactor Div., S&EP, Medical Dept./BNL	02/25/88
IWS-12	BNL Installation Assessment Report	BNL	06/86
IWS-13	Disposal of Tritium from Waste Concentration Facility Tank No. 3 - Draft	R. Miltenberger/BNL	05/22/85
IWS-14	BNL Memorandum to Distribution; Subject: Estimate of Groundwater Concentrations at Bldg. 830	R. Miltenberger/BNL	12/05/88
IWS-15	BNL Memorandum to J. Bellows; Subject: ROD Concerning the Remediation of Soil at Bldg. 830	G. C. Kinne/BNL	03/31/89
IWS-16	Predecisional Draft: Site Specific Plan for Environmental Restoration and Waste Management, Volume VI	DOE/Chicago	11/01/89

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Document Number	Title/Description	Author/Organization/Recipient	Document Date
IWS-17	Final Report, Subsurface Investigation of Former Army Landfill Site (Site X-26)	IT Corporation	02/89
IWS-18	BNL Safety and Environmental Protection Division, Chemical and Oil Spill Reports, 1987	S&EP	1987
IWS-19	Phase I Investigation: BNL Landfill	Woodward-Clyde Consultants, Inc.	12/85
IWS-20	Summary Appraisal Report of BNL for Fiscal Year 1987	DOE/Chicago	12/87
IWS-21	Environmental Protection Appraisal, BNL May 11-20, 1988	DOE/Chicago	05/88
IWS-22	Environmental Upgrade/Remediation of Hazardous Waste Disposal Sites: BNL	Burns and Roe	1987
IWS-23	Waste Management Area: Aquifer Evaluation and Program Design for Restoration, Volumes I and II	Holzmacher, McLendon, and Murrell, P.C.	06/85
IWS-24	Final Long Island Groundwater Management Program	NYSDEC	06/86
IWS-25	NYSDEC - Chemical Bulk Storage; Releases of Hazardous Substances: Reporting, Response, and Corrective Action; Registration of Hazardous Substance Bulk Storage Tanks; and List of Hazardous Substances	NYSDEC	07/88
IWS-26	BNL 1989 Site Development Plan	BNL	1989
IWS-27	BNL Site Report - 1988	R. Miltenberger, B. Royce, and J. Naidu/S&EP	06/89
IWS-28	BNL 1987 Environmental Monitoring Report	R. Miltenberger, B. Royce, and J. Naidu/S&EP	04/88
IWS-29	Preliminary Review Report, BNL	NYSDEC/EPA	04/87
IWS-30	BNL Memorandum to B. Royce; Subject: Environmental Protection Appraisal Conducted by DOE Chicago, 5/11-20/88	L. Warren/BNL	08/22/88
IWS-31	Analytical Results for Volatile Halogenated Organics (Paint Shop)	H2M Labs, Inc.	03/27/89
IWS-32	BNL Memorandum to A. Warren; Subject: Soil Sampling at Bldg. 244	B. Royce/BNL	05/23/89
IWS-33	BNL Memorandum to J. Naidu; Subject: Analytical Results for Paint Shop Soil Samples	S. Chalasani/BNL	08/07/89

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Document Number	Title/Description	Author/Organization/Recipient	Document Date
IWS-34	BNL Memorandum to J. Bellows; Subject: Closure of DOE Chicago Appraisal Recommendation EP-88-03	G. C. Kinne/BNL	10/11/89
IWS-35	BNL Memorandum to A. Warren; Subject: Closure of Excavation at Bldg. 244	B. Royce/BNL	10/31/89
IWS-36	DOE Environmental Survey of Brookhaven National Laboratory	DOE	1988
IWS-37	Letter Transmitting SARA Title III, Section 311 Report	G. C. Kinne/BNL/W. Miner/NYSDEC	09/26/88
IWS-38	Letter Transmitting SARA Title III, Section 311 Report	G. C. Kinne/BNL/W. Horst/Suffolk County Office of Fire, Rescue and Emergency Services	09/26/88
IWS-39	Form Listing Facility Emergency Coordinator	Unknown	05/05/87
IWS-40	Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III Tier I/II Report	J. Bellows/BHO/W. Horst/Suffolk County Office of Fire, Rescue and Emergency Services	03/09/89
IWS-41	Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III Tier I/II Report	J. Bellows/BHO/W. Miner/NYSDEC	03/09/89
IWS-42	Tier I/II Report - Updated Forms	G. C. Kinne/BNL/J. Bellows/BHO	10/31/89
IWS-43	Monthly Environmental Compliance Report for Brookhaven National Laboratory, August 1989 through February 1990	DOE/BHO	Monthly, 09/89 - 03/90
IWS-44	Final Report, Subsurface Contamination Investigation, Brookhaven National Laboratory, Upton, New York	IT Corporation	06/88
IWS-45	Federal Facility Agreement under CERCLA Section 120, USDOE Brookhaven National Laboratory, Draft No. 6	USEPA, Region II/USDOE, NYSDEC	03/90
IWS-46	EPA Potential Hazardous Waste Site Preliminary Assessments	Unknown	Undated
IWS-47	1990 Inventory of Federal Hazardous Waste Sites under Section 3016 of RCRA	G. C. Kinne/BNL/J. Bellows/BHO	01/17/90
IWS-48	Environmental Protection Section's Procedure for Oil/Chemical Spills Emergency Response at BNL (SOP No. RP-5)	B. Royce/BNL	02/21/90
IWS-49	Brookhaven National Laboratory Safety and Environmental Protection Chemical and Oil Spill Reports, Calendar Years 1987, 1988, and 1989	Unknown	Undated
IWS-50	Brookhaven Incident Reporting Program (BIRP)	DOE/BHO	03/90

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Document Number	Title/Description	Author/Organization/Recipient	Document Date
IWS-51	1986 Environmental Monitoring Report	R. Miltenberger, B. Royce, and J. Naidu/BNL	06/87
IWS-52	Brookhaven National Laboratory Site Report for Calendar Year 1988	R. Miltenberger, B. Royce, and J. Naidu/BNL	06/89
IWS-53	Final Environmental Impact Statement, Brookhaven National Laboratory	Energy Research & Development Administration (ERDA)	07/77
IWS-54	Memorandum to M. Bebon; Subject: HWMF Aquifer Restoration Project	V. Cam/EPA	02/20/86
IWS-55	Memorandum to J. Bellows; Subject: Waste Management Area; Aquifer Evaluation and Program Design for Restoration	J. Bologna/NYSDEC	02/26/90
IWS-56	Memorandum to G. Penny; Subject: EPA Comments on BNL Landfill Remedial Action Project	K. Stone/EPA	04/03/89
IWS-57	DOE/HQ Comments on BNL Landfill Remedial Action Project RI/FS Work Plan - Draft	Unknown	02/17/89
IWS-58	Memorandum to K. Stone; Subject: NYSDEC Comments on BNL Landfill RI/FS Work Plan	J. Bologna/NYSDEC	Undated
IWS-59	Memorandum to K. Stone; Subject: SCDHS Comments on BNL Landfill RI/FS Work Plan	J. Pim/SCDHS	04/06/89
IWS-60	Memorandum to Distribution; Subject: Brookhaven National Laboratory (BNL) Spray Aeration Project	G. Penny/BHO	04/02/90
IWS-61	Memorandum to G. Kinne; Subject: Spray Aeration Project	J. Bellows/BHO	03/27/90
IWS-62	Memorandum to M. Butler; Subject: NYSDEC Air Permits	G. Penny/BHO	02/26/90
IWS-63	Memorandum to V. Cam; Subject: BNL Aquifer Reclamation Program	M. Bebon/BNL	03/25/86
IWS-64	Memorandum to J. Farley; Subject: Areas of Potential Environmental Concern at BNL	G. Kinne/BNL	03/19/86
IWS-65	Memorandum to J. Bellows; Subject: Historic Information on the Brookhaven Site	G. Kinne/BNL	02/12/90
IWS-66	Memorandum to Distribution; Subject: BNL Environmental Cleanup	J. Farley/BHO	10/10/85

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Document Number	Title/Description	Author/Organization/Recipient	Document Date
IWS-67	Memorandum to Distribution; Subject: Sites for Potential Environmental Cleanup	J. Farley/BHO	08/14/85
IWS-68	Memorandum to Distribution; Subject: BNL CERCLA RI/FS Meeting Open Action Items	M. Butler/BHO	09/20/88
IWS-69	Memorandum to C. Daggett; Subject: Brookhaven National Laboratory (BNL) CERCLA Remedial Investigation/Feasibility Study (RI/FS) Process	J. Bellows/BHO	12/16/88
IWS-70	Memorandum to G. Penny; Subject: Brookhaven National Laboratory Remedial Activities	J. Bologna/NYSDEC	12/11/89
IWS-71	Memorandum to K. Stone; Subject; Information Regarding Brookhaven National Laboratory (BNL)	G. Penny/BHO	12/08/89
IWS-72	Memorandum to G. Penny; Subject: Brookhaven National Laboratory Remedial Activities	M. Chen/NYSDEC	11/24/89
IWS-73	Memorandum to G. Penny; Subject: Installation Remedial Program Brookhaven National Laboratory	M. Chen/NYSDEC	08/15/89
IWS-74	Memorandum to D. Schweller; Subject: BNL's Federal, State, and Local Relationships	G. Kinne/BNL	05/22/86

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Document Number	Title/Description	Author/Organization/Recipient	Document Date
N-1	FEIS Brookhaven National Laboratory, Upton, New York	ERDA-1540	07/77
N-2	FEIS Proton-Proton Storage Accelerator Facility (ISABELLE)	BNL/DOE	08/78
N-3	Transmittal Memorandum for the Environmental Assessment - NSLS Phase III Construction Project	J. Naidu and L. Emma/BNL and J. Godel/Unknown	04/30/86
N-4	Environmental Assessment - NSLS Phase III Construction Project	BNL	04/86
N-5	Draft Environmental Analysis Booster Project	G. A. Vasquez/DOE/W. Griffing/DOE-CH	12/87
N-6	Transmittal Memorandum from DOE Brookhaven Area Office; Subject: Draft Environmental Impact Analysis - Booster Project	G. A. Vasquez/DOE/W. Griffing/DOE-CH	12/17/87
N-7	Memorandum; Subject: Archeological Investigations at the Booster Site	J. R. Naidu/BNL/File	01/09/88
N-8	Telecommunications Message: (1) Comments on Draft Environmental Analysis Booster Project and (2) Environmental Impacts of Project or Activity Checklist	L. Freeman/DOE-CH-ESHD/G. Vasquez/DOE-BHO	01/15/88
N-9	Environmental Analysis Report AGS Accumulator Booster	BNL	02/09/88
N-10	Transmittal Memorandum; Subject: Environmental Analysis for the Booster Project	W. R. Casey/BNL/M. Butler/DOE	02/29/88
N-11	Transmittal Memorandum; Subject: AGS Accumulator Booster Environmental Analysis Report	M. A. Butler/DOE/R. Mayes/DOE, CH	03/10/88
N-12	ADM for Construction of a Relativistic Heavy Ion Collider at BNL	BNL/BHO/CH (R. Mayes)	08/07/89
N-13	ADM for Construction of a Relativistic Heavy Ion Collider at BNL	See N-12	Undated
N-14	Memorandum: NEPA Determination for Construction of the Relativistic Heavy Ion Collider at BNL	P. N. Brush/ES&H/J.F. Decker, Office of Energy Research	02/15/90
N-15	Site Development Plan (Draft), Brookhaven National Laboratory, USDOE	BNL/AUI	1989
N-16	BNL Site Report for CY 1988, BNL 52207	R. P. Miltenberger, B. A. Royce, and J. R. Naidu/BNL	06/89

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Document Number	Title/Description	Author/Organization/Recipient	Document Date
N-17	Letter of June 1, 1989 from J. Bellows (BHO) to New York State Dept. of Environmental Conservation, Attention: George Profous	J. Bellows/BHO-DOE/G. Profous/NYSDEC	06/01/89
N-18	NEPA Compliance Review - DOEs AGS/Booster Project at BNL	R. Mayes/ES&H/CH/H. J. Rauch, Mgr. CH	02/25/88
N-19	Phase II SAR National Synchrotron Light Source, BNL 52205	P. Stefan/BNL	06/89
N-20	Addendum to the High Flux Beam Reactor FSAR for 60 MW Operation	P. Tichler/BNL	04/82
N-21	FY 1990 GPP-NEPA Documentation Log	Plant Engineering/BNL	04/02/90
N-22	Plant Engineering Division Policies and Practices Manual, No. 3.09	Plant Engineering/BNL	02/12/90
N-23	Plant Engineering Division Design and Construction QA Procedure 017	Plant Engineering/BNL	11/03/89
N-24	Lesson Plan - National Environmental Policy Act of 1970: Policy and Implementing Procedures	Plant Engineering/BNL	Undated??
N-25	National Environmental Policy Act (NEPA) Review Procedures at BNL	DOE-BHO	03/14/90
N-26	Coordination of Information Regarding Immediate CH Activities Required in the Conduct of SEN-15-90 Implementation	J. Kennedy/CH/Distribution	Undated
N-27	Brookhaven National Laboratory Implementation Action Plans for Environmental Compliance	BNL	02/12/90
N-28	Regulatory Impact on Construction and/or Scientific Projects	G. C. Kinne/BNL/Dept. Chairman and Division Heads	08/15/89
N-29	SEQR/Short Environmental Assessment Form for the Radiation Therapy Facility	SUNY at Stony Brook	10/03/89
N-30	SEQR/Full Environmental Assessment Form for the Radiation Therapy Facility	J. R. Naidu/BNL/W. T. Newell Jr./SUNY at Stony Brook	02/15/90
N-31	Draft Order CH 5440.1C, Implementation of the National Environmental Policy Act (NEPA)	CHO/Principal Staff	Undated
N-32	Letter/Memorandum To File (MTFs)	H. J. Rauch/CH/J. D. Watkins	09/15/89
N-33	Letter/Documentation of NEPA Review (and Attached Report)	E. P. Rohrer/BNL/J. Bellows	09/08/89

SAFETY AND HEALTH SUBTEAM
LIST OF SITE DOCUMENTS

Document Number	Title/Description	Author/Organization/Recipient	Document Date
TSA-1	HFBR Operations Procedures Manual, Volume I	Reactor Division Training & Procedures Group/BNL	05/15/89
TSA-2	HFBR Operations Procedures Manual, Volume II	Reactor Division Training & Procedures Group/BNL	05/15/89
TSA-3	HFBR Plant Description Manual, Volume IV	Reactor Division Training & Procedures Group/BNL	03/21/90
TSA-4	HFBR Plant Description Manual, Volume III	Reactor Division Training & Procedures Group/BNL	03/21/90
TSA-5	HFBR Plant Description Manual, Volume II	Reactor Division Training & Procedures Group/BNL	03/21/90
TSA-6	HFBR Plant Description Manual, Volume I	Reactor Division Training & Procedures Group/BNL	03/02/90
TSA-7	HFBR Training Plan	Reactor Division Training & Procedures Group/BNL	08/07/89
TSA-8	BMRR Training Plan	Reactor Division Training & Procedures Group/BNL	01/20/88
TSA-9	Administrative Procedures Manual, Volume I	Reactor Division Training & Procedures Group/BNL	02/02/90
TSA-10	BMRR Operations Procedures Manual	Reactor Division Training & Procedures Group/BNL	06/08/89
TSA-11	BMRR Technical Specifications and References	Reactor Division Training & Procedures Group/BNL	11/22/88
TSA-12	HFBR Radiation Protection Plan (Revision 2)	Reactor Division Training & Procedures Group/BNL	08/14/89
TSA-13	RCG Procedures Manual	Reactor Division Training & Procedures Group/BNL	07/89
TSA-14	Reactor Division Quality Assurance Manual	Reactor Division Training & Procedures Group/BNL	12/29/89
TSA-15	HFBR Technical Specifications and References	Reactor Division Training & Procedures Group/BNL	02/10/89
TSA-16	Cold Neutron Facility Technical Specifications and References	Reactor Division Training & Procedures Group/BNL	01/20/87
TSA-17	Brookhaven National Laboratory Self-Assessment of Environment, Safety, and Health Issues		04/90
TSA-18	National Synchrotron Light Source Safety Analysis Report	Edited by K. Batchelor/BNL 51584	07/82
TSA-19	Phase II Safety Analysis Report National Synchrotron Light Source	P. Stefan/BNL 52205	06/89
TSA-20	Relativistic Heavy Ion Collider Preliminary Safety Analysis Report Manual	Accelerator Development Department/BNL	07/17/89, Rev. A
TSA-21	Heavy Ion Transfer Line, HITL, Safety Analysis Report and Heavy Ion Transfer Line to Booster, HTB, Preliminary Safety Analysis Report	Tandem Van de Graaff, Alternating Gradient Synchrotron Heavy Ion Transfer Line Project/BNL	10/01/86
TSA-22	200-MeO Radiation Effects Facility Final Safety Analysis Report	Neutral Particle Beam Division, DNE/BNL-AUI	04/87

Document Number	Title/Description	Author/Organization/Recipient	Document Date
TSA-23	Brookhaven National Laboratory Safety Assessment Report for Dynamitron Conversion and Operation as a Positron Accelerator	K. Lynn, R. Mayer, H. Huomo, and A. Vehanes/ Physics and J. Hurst/Materials Science Division, DAS/BNL	02/27/89
TSA-24	BLIP II Safety Analysis Report	L. F. Mausner, Ph.D. with assistance of S. Mirzadeh, Ph.D./BNL	06/20/85
TSA-25	Final Safety Analysis Report on the Brookhaven High Flux Beam Research Reactor (BNL 7661, Volume I of II)	J. M. Hendrie	04/64
TSA-26	200-MeO Radiation Effects Facility Final Safety Analysis Report (BNL/NPB-87-29R)	Neutron Beam Division, DNE/BNL-AUI	11/88
TSA-27	AGS Booster Project Preliminary Safety Analysis Report	AGS Booster Project	12/01/87
TSA-28	BNL Emergency Response Plan, Part II, Local Emergency Plans - HFBR and BMRR	Reactor Division Training & Procedures Group/BNL	12/01/88
TSA-29	Brookhaven National Laboratory Safety Manual		02/20/90

MANAGEMENT SUBTEAM
LIST OF SITE DOCUMENTS

Document Number	Title/Description	Author/Organization/Recipient	Document Date
M-78-1	Memorandum; Subject: Information for Tiger Team	E. B. Forsyth/ADD/G. C. Kinne/BNL	02/21/90
M-78-2	AGS Organizational Charts and Figures	D. Lowenstein/AGS	01/08/90
M-78-3	Memorandum; Subject: AGS Response to Tiger Team Request for Initial Information	E. T. Lessard/AGS/G. C. Kinne/BNL	02/21/90
M-78-4	Memorandum; Subject: AGS Building Contacts for Tiger Team	E. T. Lessard/AGS/G. C. Kinne/BNL	02/20/90
M-78-5	Memorandum; Subject: Progress To Date on AGS Department Action Plan	D. Lowenstein/AGS/G. C. Kinne/BNL	01/12/90
M-78-6	AGS Operations Yearly Summary, FY 1989	R. Zaharatos and I. Montanez/AGS	09/26/89
M-78-7	Draft AGS SAR Table of Contents	AGS	Undated
M-78-8	AGS Experiments - 1986, 1987, and 1988	J. C. Depken/AGS	04/88
M-78-9	Index of Titles of AGS Safety Documents	AGS	Undated
M-78-10	AGS Quality Assurance Procedure Table of Contents	AGS	11/27/89
M-78-11	Draft Booster SAR Table of Contents	AGS	Undated
M-78-12	AGS Quality Assurance Procedure Booster Facility Table of Contents	AGS	12/08/87
M-78-13	AGS Booster Project Preliminary Safety Analysis Report Table of Contents	AGS	Undated
M-78-14	Map of AGS Buildings	AGS	Undated
M-78-15	Description of Biology Department Organization and Functions	Unknown	Undated
M-78-16	Memorandum; Subject: Tiger Team Request for Information	R. C. Fernow/Ctr. Acc. Physics/G. C. Kinne/BNL	02/21/90
M-78-17	Memorandum; Subject: Information Requested for Tiger Team	S. S. Rideout/CCD/G. C. Kinne/BNL	02/20/90
M-78-18	Description of Central Shops Organization and Functions	Unknown	Undated
M-78-19	Description of Chemistry Department Organization and Functions	Unknown	02/01/90
M-78-20	Description of AUI Organization and Policy	Unknown	Undated
M-78-21	Memorandum; Subject: Root Cause Training	Distribution/G. C. Kinne/BNL	10/30/89

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Document Number	Title/Description	Author/Organization/Recipient	Document Date
M-78-22	Letter; Subject: Technical Safety Appraisal of Brookhaven National Laboratory Concerns with Packaging and Transportation	G. C. Kinne/BNL/J. Bellows/DOE-BHO	12/15/89
M-78-23	Description of Emergency Preparedness Policy and Index	Unknown	01/15/86
M-78-24	Description of Quality Assurance Policy and Index	Unknown	Undated
M-78-25	Floor Plans of Building 460, Director's Office	Unknown	Undated
M-79-1	Plant Engineering Organizational Chart and Designated Caller List	Unknown	02/01/90
M-79-2	Plant Engineering Policies and Practices Table of Contents	Unknown	03/01/89
M-79-3	Plant Engineering Quality Assurance Index	Unknown	1989
M-79-4	Plant Engineering Maintenance Management Procedures Manual Table of Contents	Unknown	05/01/89
M-79-5	Plant Engineering Central Steam Facility Training Manual Table of Contents	Unknown	06/08/89
M-79-6	Plant Engineering Central Steam Facility O&M Manuals' Table of Contents	Unknown	Undated
M-79-7	Plant Engineering Central Chilled Water Facility Manuals	Unknown	Undated
M-79-8	Memorandum; Subject: Tiger Team Request for Information	J. Laurie/Photography/G. C. Kinne/BNL	02/20/90
M-79-9	Memorandum; Subject: Tiger Team Information	W. Hempfling/Personnel/G. C. Kinne/BNL	02/20/90
M-79-10	Description of Physics Department Organization and Functions	Unknown	Undated
M-79-11	Memorandum; Subject: Information for Tiger Team	A. Baittinger/Public Affairs/G. C. Kinne/BNL	02/16/90
M-79-12	Memorandum; Subject: Tiger Team Request for Information	M. Shear/QA/G. C. Kinne/BNL	02/16/90
M-79-13	Reactor Division Organization Charts, Facility Descriptions, Table of Contents of Reactor Division Manuals, Listing of Independent Safety Reviews of HFBR from 6/87 to Present, Report of 1989 Ad Hoc Inspection Committee for HFBR and BMRR, and Triennial Review of Reactor Safety Management	Unknown	Undated

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Document Number	Title/Description	Author/Organization/Recipient	Document Date
M-79-14	Supply & Materiel Organization Chart, History of Operations, Floor Plans for S&M Buildings, Safety Guide Table of Contents, and Standard Operating Procedures	Unknown	Undated
M-79-15	Memorandum; Subject: Tiger Team Request for Information	L. Runge/SSD/G. C. Kinne/BNL	02/21/90
M-79-16	Police Group Supervisors Manual, Security Inspectors Manual Table of Contents	Unknown	02/90
M-79-17	Safety & Environmental Protection Division Description of Division Functions, Organization Chart, Facility Description and Diagram, and Table of Contents from S&EP Manuals and Procedures	Unknown	Undated
M-79-18	Description of Staff Services Organization, Functions, and Reports	Unknown	Undated
M-79-19	Memorandum; Subject: Tiger Team Request for Information	D. Mirvis/Technical Information/G. C. Kinne/BNL	02/20/90

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Document Number	Title/Description	Author/Organization/Recipient	Document Date	Document Received
M-1	BNL Quality Assurance Manual	Quality Assurance Office (QAO)	02/01/85	04/06/90
M-2	QAO Ten Year Audit Plan	QAO	01/22/90	04/09/90
M-3	QAO 1990 Audit Schedule	QAO	01/22/90	04/09/90
M-4	QAO 1991 Audit Schedule	QAO	01/22/90	04/09/90
M-5	Quality Assurance Steering Committee, Charter	Unknown	01/90	04/09/90
M-6	Quality Assurance Manual, S&EP	G. Adams/S&EP, BNL	05/89	04/04/90
M-7	Notebook, Reference Material for TSA Site and Experiment Safety Review	S&EP, BNL	Unknown	04/05/90
M-8	Table of Contents, S&EP Standard Operating Procedures	S&EP, BNL	Unknown	04/04/90
M-9	S&EP Administrative Manual (Draft)	S&EP, BNL	03/90	04/02/90
M-10	BNL Self-Assessment of ES&H Issues	BNL	04/90	04/04/90
M-11	BNL Institutional Plan, FY 1990 - FY 1995	BNL	11/89	04/03/90
M-12	Memorandum; Safety Coordinator Meeting	W. R. Casey/S&EP/Safety Coordinators & Representatives	10/19/89	04/04/90
M-13	Memorandum; Meeting	W. R. Casey/S&EP/Safety Coordinators & Representatives	01/11/90	04/04/90
M-14	Memorandum; Coordinators & Representatives Meeting	W. R. Casey/S&EP/Safety Coordinators & Representatives	01/12/89	04/04/90
M-15	Reports Generated to DOE by S&EP (List)	W. R. Casey/S&EP	Undated	04/04/90
M-16	Industrial Safety Statistics	J. Deitz/S&EP	03/90	04/03/90
M-17	S&EP Information Bulletin	S&EP	01/90	04/02/90
M-18	"SuperSafe"	S&EP	Issues for: 02/89, 04/89, 06/89, 12/89, 02/90	04/02/90

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Document Number	Title/Description	Author/Organization/Recipient	Document Date	Document Received
M-19	BNL NX Employee Performance Appraisal (Form)	BNL	Unknown	04/04/90
M-20	BNL Employee Performance Appraisal (Form)	BNL	Unknown	04/04/90
M-21	Approved Drug Testing Positions	R. W. Knisley/MA 411.3/Manager, CH	03/28/90	04/10/90
M-22	Memorandum; Subject: Safety Administration Procedures and Policies Manual	G. C. Kinne/Reactor, Safety and Security/Dept. Chairmen/Division Heads	02/12/90	04/03/90
M-23	Letter; Subject: Preliminary BNL Long-Range Environmental, Safety, and Health Plan	G. C. Kinne/BNL/J. Bellows/DOE-BHO	08/02/88	03/29/90
M-24	Memorandum; Subject: ES&H Management Appraisal	G. C. Kinne/Directorate	05/06/88	03/29/90
M-25	Memorandum; Subject: Task Force on Training	G. C. Kinne/BNL/Department Chairmen and Division Managers	12/20/89	03/29/90
M-26	Memorandum; Subject: Proposed Safety and Environmental Projects	W. R. Casey/BNL/M. Bebon/BNL	12/12/89	03/29/90
M-27	Memorandum; Subject: Prioritization of ES&H Projects (w/Attachments)	M. Bebon/BNL/J. Medaris, E. Murphy, T. Timko, and R. Terwilliger/BNL	1990	04/03/90
M-28	Assessment Recommendations Review	F. Marotta/BNL/O. White/BNL	06/05/89	04/04/90
M-29	Standard Operating Procedure, SEP-1, Procedure for Conducting a Departmental Safety Assessment	F. Marotta/S&EP, BNL/Lab-Wide	08/02/89	04/03/90
M-30	Brookhaven Highlights (FY 1988)	BNL/General Distribution	FY 1988	04/03/90
M-31	BNL Project Management Plan - Environmental Protection/ Remediation Projects	General	Unknown	04/10/90
M-32	Tiger Team Compliance Assessment Report - Nevada Test Site	Tiger Team	12/89	04/10/90
M-33	Tiger Team Guidance Manual (Draft)	Duffy and Brush/DOE HQ	09/25/89	04/03/90
M-34	S&EP SOP FE1.1 Fire Prot. Engineering - Duties and Responsibilities	General	Unknown	Undated
M-35	List of Safety Coordinators and S&EP Representatives	Unknown	02/90	04/04/90
M-36	Roster of Building Safety Services	C. Flood/BNL	05/09/89	04/04/90
M-37	Memorandum; Subject: Ground Truth	J. Bellows/DOE-BHO/D. Goldman	03/27/90	04/03/90
M-38	Organizational Chart/BHO	BHO	02/20/90	03/29/90

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Document Number	Title/Description	Author/Organization/Recipient	Document Date	Document Received
M-39	Mission & Function Statements - CH	Ops Mgmt Support Division/CH	04/12/89	03/29/90
M-40	Section 13 - Mgmt. Controls - Env. Audit Manual	Unknown	Undated	03/29/90
M-41	Summary of ES&H Program	W. R. Casey/S&EP, BNL/Tiger Team	03/26/90	03/26/90
M-42	BNL ES&H Policy	Unknown - Passout to Tiger Team	Undated	03/26/90
M-43	Memorandum; Subject: Tiger Team Assessment of BNL	J. Tseng/EH-24/H. Rauch	01/31/90	03/30/90
M-44	BNL ES&H Program - Passout to Tiger Team	S&EP, BNL/Tiger Team	Undated	03/30/90
M-45	Tiger Team Assessment of BNL - Passout to Tiger Team	H. Rauch and J. Bellows/DOE-CH & BHO/Tiger Team	03/26/90	03/26/90
M-46	Reprint/Brookhaven Bulletin	BNL	05/13/88 06/03/88 06/24/88	03/26/90
M-47	Organizational Chart - BNL	N. Samios/BNL/General	04/01/90	04/02/90
M-48	Memorandum; Subject: Div. Org.	W. R. Casey/S&EP, BNL/S&EP Personnel	03/20/90	04/02/90
M-49	Memorandum; Subject: Responsibilities for Safety	N. Samios/BNL/Associate Directors	03/10/88	04/16/90
M-50	Memorandum; Subject: S&EP Roles & Responsibilities	N. Samios/BNL/Dept. Chairmen and Division Heads	02/01/88	04/16/90
M-51	Tiger Team Compliance Assessment Report (Mgmt. Section) - Pinellas	Tiger Team	Undated	03/27/90
M-52	BNL Safety Manual	S&EP/General Distribution	02/20/90	03/27/90
M-53	Copy of Contract No. DE-AC02-76-CH00016/BNL/DOE		Thru Mod M237, 02/22/90	04/03/90
M-54	Org. Chart, Plant Engineering	E. P. Rohrer/BNL/General	03/01/90	04/03/90
M-55	Letter; Subject: Five Year Plan	M. Bebon/Plant Eng./M. Butler	11/16/89	04/03/90
M-56	Letter; Subject: Five Year Plans	M. Butler/BHO/E. P. Rohrer	10/20/90	04/03/90
M-57	Att. A, Fixed Price Const. Cont., G.P. (BNL F1592)	BNL	06/86	04/03/90
M-58	Memorandum; Subject: Stop Work Authority	M. Bebon/Plant Eng./All Plant Eng. Personnel	03/20/90	04/03/90

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Document Number	Title/Description	Author/Organization/Recipient	Document Date	Document Received
M-59	Miscellaneous Position Descriptions & Performance Appraisals	BHO	Undated	04/03/90
M-60	Safety Orientation/Neutron Beam	W. Becker/DNE/Lorraine, 185A	03/30/90	04/03/90
M-61	"Safety" - Extract from AGS User's Handbook	AGS	1986	04/03/90
M-62	AGS Handbook	AGS	Undated	04/03/90
M-63	NSLS Safety Orientation Certification	AGS	Undated	04/03/90
M-64	Guide to NSLS Experimental Floor	S. White-DePace/NSLS/General	01/90	04/03/90
M-65	NSLS Experimenters Handbook	S. White-DePace/NSLS/General	06/88	04/03/90
M-66	Supervisor's Personnel Manual, BNL	Personnel Div./BNL/All Supervisors	01/90	04/03/90
M-67	Order CH 5000.2A	CH	01/06/89	04/03/90
M-68	Order CH 5000.2	CH	09/30/87	04/03/90
M-69	Performance Appraisal Plan for BNL - CH - FY 1990 - 1994	BHO	11/89	04/02/90
M-70	Summary Appr. Report of BNL, FY 1988	CH	12/88	04/02/90
M-71	Summary Appr. Report of BNL, FY 1989	CH	12/89	04/02/90
M-72	Env. Prot. Appr. Report of BNL, June 12 - 16, 1989	BHO	06/12/89 - 06/16/89	03/20/90
M-73	Not Used			
M-74	"SuperSafe"	S&EP, BNL	02/90	04/03/90
M-75	Memorandum; Subject: Lab Requirements for PCB Equipment	G. C. Kinne/W. R. Casey/S&EP	02/14/90	04/03/90
M-76	Env. Prot. - Closed Commitments	Unknown	02/90	04/03/90
M-77	Memorandum; Subject: Rev. to BNL PCB Program Requirement Document	O. White/S&EP, BNL/Dept. Chairmen and Division Heads	03/01/90	04/03/90
M-78	Volume I of Notebook of Tiger Team Material (see index in Notebook)	G. C. Kinne/BNL/Tiger Team	Misc.	03/27/90
M-79	Volume III of Notebook of Tiger Team Material	G. C. Kinne/BNL/Tiger Team	Misc.	03/27/90

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M-80	Excerpt from Personnel Policy - Section H	BNL	Undated	03/27/90
M-81	Orders DOE 5482.1B, 5481.B; CH 5481.1A	DOE-CH	Various	03/27/90
M-82	Excerpt from Order DOE 5480.1B	DOE	09/23/86	03/27/90
M-83	Memorandum; Subject: Establish CH Div. of Environmental Restoration & Waste Management	H. Rauch/CH/L. Duffy	02/09/90	03/27/90
M-84	Memorandum; Subject: Audit Env. Compliance - BNL	S. Stronczer/IG/H. Rauch	12/02/89	03/27/90
M-85	Monthly Env. Compliance Report - BNL	BHO	03/01/90	03/27/90
M-86	Memorandum; Subject: ES&H Mgmt. Appr.	G. C. Kinne/BNL/Directorate	05/06/88	03/27/90
M-87	Listing of Const. Contracts	Unknown	03/30/90	04/02/90
M-88	Request for Tiger Team Information	Unknown	03/27/90	04/02/90
M-89	Letter; Subject: DOE Order 5480.11 Implem.	G. C. Kinne/BNL/J. Bellows/DOE-BHO	11/29/89	03/27/90
M-90	Summary - Budgets	CH	04/06/90	04/06/90
M-91	Roster - BHO - EC&FM Branch	BHO	Undated	03/27/90
M-92	Order CH 1100.b	CH	04/12/89	03/27/90
M-93	TSA/BNL (Draft)	TSA Team	09/89	03/27/90
M-94	Testimony - Martin Blume 03/20/90	M. Blume/BNL/House Subcommittee on Ener. Res. & Dev.	03/27/90	03/27/90
M-95	Letter; Subject: Spray Aeration Program	J. Bellows/BHO/G. C. Kinne/BNL	03/27/90	03/27/90
M-96	Letter; Subject: Waste Management Area, etc.	J. Bologna/NYSDEC/J. Bellows/BHO	02/26/90	03/27/90
M-97	Memorandum; Subject: Memorandum from G. Kinne	G. Hind/BNL/All Biology Dept. Personnel	02/13/90	03/27/90
M-98	Memorandum; Subject: Safety Glasses	R. Spellman/Central Shops, BNL/All Central Shops Employees	08/15/89	03/27/90
M-99	FY 1992 Budget Presentation	BNL	04/90	03/27/90
M-100	Env. Restoration & Waste Management Five Year Plan	BNL	02/28/90	03/27/90
M-101	Internal Audit Report, Transaction Testing FY 1989	BNL	01/26/90	03/27/90

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M-102	Internal Audit Report, Control Over Expensed Items	BNL	12/27/89	03/27/90
M-103	Internal Audit Report, Transaction Testing Journal Vouchers	BNL	10/26/89	03/27/90
M-104	Internal Audit Report, Cash Disbursements Audit	BNL	07/17/89	03/27/90
M-105	Budget Call FY 1992 for General & Administrative Groups	D. Robbins/Distribution	12/15/89	03/27/90
M-106	BNL - ES&H Funding Summary	BNL	03/28/90	04/01/90
M-107	BNL F2666A, BNL User Appointment	BNL	Undated	03/28/90
M-108	User Agreement, BNL Agreement for Use	BNL	Undated	03/28/90
M-109	Safety Meeting Letter	J. Gallo/W. R. Casey	02/22/90	03/28/90
M-110	Memorandum; Subject: Audit of Env. Compliance at BNL Notice	S. Stronczer/H. Rauch	12/12/89	03/28/90
M-111	Response to Document Requests for Tiger Team	O. White/Tiger Team Management Subteam	03/28/90	03/29/90
M-112	Secretary's Daily Operations Report and CHIRP Notification Procedures	D. Goldman/Distribution	02/15/90	03/27/90
M-113	Funding Guideline Policy for Construction, Capital Equipment, etc.	H. Grahn/Distribution	03/23/90	03/27/90
M-114	BHO FY 1990 Year End Assurance Letters	R. Gordon/G. Kuci	06/14/89	03/27/90
M-115	AUI Organization and Policy Manual	Unknown	01/01/88 (Incl. Updates)	04/02/90
M-116	ES&H Management Appraisal	G. Kinne/Directorate	05/06/88	03/27/90
M-117	Incident Data Sheets 89-01 to 89-16, 90-01 to 90-09	Varies	Varies	03/29/90
M-118	Monthly Env. Compliance Report	BHO/Chicago	03/01/90	03/27/90
M-119	Chicago Operations Office Org. Chart	Unknown	01/90	03/27/90
M-120	Memorandum; Subject: Task Force on Training	G. Kinne/Dept. and Division Managers	12/20/89	03/29/90
M-121	Catalog of Safety Training Programs	Training Office	04/02/84	03/27/90
M-122	New Employee Safety Orientation	BNL	10/86	03/27/90

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M-123	Fire Training Manual	M. Carroll/S. Pearsall	08/11/83	03/29/90
M-124	S&EP Division Training Report	BNL	06/26/89	03/29/90
M-125	Fire Training Manual	M. Carroll/F. Marotta	02/21/86	03/29/90
M-126	UOR File 1988	Varies	Undated	03/29/90
M-127	UOR File 1989	Varies	Undated	03/29/90
M-128	Draft Policy For Sitewide (EISs)	M. Butler/G. C. Kinne/BNL	03/23/90	03/29/90
M-129	NEPA Review of the Boiler Replacement at BNL	J. Bellows/DOE-BHO/M. Flannigan/DOE-CH	03/21/90	03/29/90
M-130	Coordination of Information Regarding Immediate CH Activities Required in the Conduct of SEN-15-90 Implementation	J. Kennedy/Principle Staff	Undated	04/03/90
M-131	NEPA	M. Butler/DOE-BHO/G. C. Kinne/BNL	03/16/90	03/29/90
M-132	NEPA Review Procedures at BNL	M. Butler/DOE-BHO/J. Kennedy	03/14/90	03/29/90
M-133	Interim Procedural Guidance for Implementation of SEN-15	EH-25/Distribution	03/02/90	03/27/90
M-134	NEPA Compliance	M. Healey/M. Butler/DOE-BHO	03/09/90	03/29/90
M-135	Draft NEPA Order SEN-15-90	M. Butler/DOE-BHO/G. C. Kinne/BNL	03/09/90	03/29/90
M-136	NEPA of 2/5/90	J. Kennedy/C. Borgstrom (EH-25)	02/21/90	03/29/90
M-137	Draft Memorandum; Subject: SEN-15 Guidance	H. Rauch/BHO	03/20/90	03/29/90
M-138	Levels of NEPA Documentation for Revised Activity Data Sheet (ADS) Submittal	J. Haugen/G. Penny	01/23/90	03/29/90
M-139	Levels of NEPA Documentation for ADS Submittals	V. Potent/File	02/06/90	03/29/90
M-140	Review of Draft Memorandum; Subject: Funding Priority for Activities Required by Federal & State Compliance Agreements and Regulatory Requirements	J. Tuck/Ops. Managers	02/06/90	03/29/90
M-141	BNL Fact Sheet Update	S. Woodbury/G. Penny	02/15/90	03/29/90
M-142	NEPA Determination for the Construction of RHIC at BNL	C. Richardson/J. Bellows	02/22/90	03/29/90
M-143	CH Operations Review & Comments on ADSs	S. Heston/G. Penny	02/26/90	03/29/90

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M-144	FY 1992 ADS Response to Comments of 2/14/90	M. Davis/J. Haugen	02/27/90	03/29/90
M-145	Proposed Schedule and Agenda for Program Reviews for the Office of ER and WM	L. Duffy/CH Manager	02/23/90	03/29/90
M-146	FY 1992 Activity Data Sheets for BNL	M. Davis/J. Haugen	01/30/90	03/29/90
M-147	MOA Among DOE Offices with Respect to Env. Mgmt. of DOE Facilities	L. Duffy/Manager CH	01/03/90	03/29/90
M-148	Supplemental Guidance for FY 1990 UMTRA Project Funding and ADS Preparation	S. Mann/G. Penny	01/24/90	03/29/90
M-149	BNL Preliminary D&D Plan	BNL	11/87	03/29/90
M-150	Updated ADSs	J. Haugen/G. Penny	02/07/90	03/29/90
M-151	Supplemental Guidance on Five Year Plan	EM-40/J. Haugen	01/26/90	03/29/90
M-152	BNL Implementation Plan for DOE Order 5820.2A	G. C. Kinne/BNL/J. Bellows/DOE-BHO	05/18/89	03/29/90
M-153	Updated ADSs and Disk	J. Haugen/S. Davis	02/07/90	03/29/90
M-154	CH Operations Of ES&HD Information	Chicago Office	10/07/87	04/03/90
M-155	Memorandum of Understanding Between Ops Offices Regarding OBES Support	Unknown	04/87	04/03/90
M-156	BNL Env. Protection Plan	G. C. Kinne/J. Bellows	10/18/89	03/27/90
M-157	BNL Mixed Waste Management Plan	Prepared by Black and Veitch for BNL	11/22/89	03/27/90
M-158	BNL Site Waste Management Plan	Unknown	12/88	03/27/90
M-159	1981 Triennial Safety Review	N. Samios/J. Hendrie	10/30/89	04/24/90
M-160	Safety & Health Clause - Standard Terms & Conditions	M. Goldman/J. King	03/21/90	04/24/90
M-161	Five Year Plan for KG-01, General Purpose Facilities Program	M. Butler/E. P. Rohrer	10/20/89	
M-162	Preparation of Summary Data Sheets for Nondefense Facilities Modernization	J. Yates/ER-HQ/M. Butler	03/29/90	
M-163	Planning Effort			
M-164	Project Priorities	W. R. Casey/M. Bebon	03/08/90	

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M-165	ES&H Projects	R. Terwilliger/Distribution	03/23/90	
M-166	Task Force on Training	G. C. Kinne/Dept. Chairmen and Division Managers	12/20/89	
M-167	Five Year Plan KG-01, General Purpose Facilities Program	M. Bebon/M. Butler	11/16/89	
M-168	Prioritization of ES&H Projects	M. Bebon/J. Medaris, E. Murphy, T. Timko, and R. Terwilliger	03/22/90	
M-169	Proposed Safety and Environmental Projects	M. Bebon/W. R. Casey	12/18/89	
M-170	Budget Call FY 1992 for General and Administrative Groups	D. Robbins/Distribution	12/15/89	
M-171	Budget Call FY 1992	D. Robbins/Distribution	12/15/89	
M-172	FY 1991/FY 1992 Budget Report	N. Samios/J. Bellows	03/26/90	
M-173	FY 1992 BNL Budget Submission - Office of Energy Research	Unknown	04/90	
M-174	FY 1990 Departmental Administration Travel Funds (WA21)	J. Ashford/G. Giarrante	01/23/90	04/24/90
M-175	Draft Management Agreement Between Nuclear Energy (NE) and Chicago Operations Office (CH) for the Operation of Energy Research Reactor Facilities at the Brookhaven National Laboratory (BNL)	Unknown	04/22/90	04/23/90
M-176	Institutional Quality Assurance at DOE-CH Laboratories DOE/CH-8801	Chicago Operations Office	06/88	04/05/90
M-177	Quality Assurance (QA) Responsibilities for the Chicago Operations Office (CH)	R. Selby/CH/File	03/24/90	04/05/90
M-178	CH 5700.6C Quality Assurance	DOE-CH	09/19/88	04/05/90
M-179	CH N5700.6 Quality Assurance	DOE-CH	01/25/88	04/05/90
M-180	Quality Assurance Appraisal BNL 6/11-13/85	DOE-CH	07/10/85	04/05/90
M-181	DOE 5700.6B Quality Assurance	DOE-HQ	09/23/86	04/05/90
M-182	CH 5000.1A Functional Appraisal System	DOE-CH	10/10/89	04/05/90
M-183	CH Functional Appraisal Guide	CH Appraisal Steering Committee	10/01/87	04/05/90
M-184	SEN-6A-89 Departmental Organization and Management Arrangements	DOE-HQ	09/28/89	04/18/90

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M-185	SEN-11-89 Setting the New DOE Course	DOE-HQ	09/05/89	04/18/90