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Environmental Management Assessment of the National Renewable Energy Laboratory (NREL)

U.S. Department of Energy
Office of Environmental Audit
Washington, DC 20585

September 1993

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PREFACE

Preface

U.S. Department of Energy

Environmental Management Assessment Conducted at the National Renewable Energy Laboratory

The Secretary of Energy's July 20, 1993, Environment, Safety and Health Policy establishes daily excellence in protection of the worker, the public, and the environment as the hallmark and highest priority of all DOE activities. That policy also calls for a proactive program of continuous improvement to move the Department beyond minimal compliance with laws and regulations. To further that policy, the Office of Environment, Safety and Health (EH) has established as part of the internal oversight responsibilities within DOE, a program within the Office of Environmental Audit (EH-24), to conduct environmental assessments of DOE programs and operating facilities. The ultimate goal of this program is enhancement of environmental protection and minimization of risk to public health and the environment through systematic and periodic evaluations of the Department's environmental programs within line organizations.

Through its environmental evaluation program, which provides measurable goals with milestones, EH-24 is committed to helping establish the DOE as a model of responsible environmental stewardship. In addition, this program will serve to reinforce the Secretary's goal of building on the efforts currently ongoing to attain and maintain compliance in cooperation with the regulatory authorities and other stakeholders.

This document contains the findings identified during the environmental management assessment of the National Renewable Energy Laboratory, conducted from September 14 through September 27, 1993. The assessment's objective is to advise the Secretary of Energy through the Assistant Secretary for Environment, Safety and Health, of the adequacy of management systems to ensure that compliance with Federal, state, local and DOE environmental requirements, and to evaluate application of proactive management practices. The scope of the assessment was comprehensive and covered all areas of environmental management, and included focused reviews of waste management, environmental monitoring, and National Environmental Policy Act programs.

September 1993
Washington, D.C.

TABLE OF CONTENTS

**ENVIRONMENTAL MANAGEMENT ASSESSMENT
of the
NATIONAL RENEWABLE ENERGY LABORATORY (NREL)**

TABLE OF CONTENTS

PREFACE	.....	i
EXECUTIVE SUMMARY	.....	ES-1
1.0 INTRODUCTION	.....	1-1
1.1 Purpose	.....	1-1
1.2 Scope	.....	1-5
1.3 Approach	.....	1-5
1.4 Background and Project Description	.....	1-6
1.5 Environmental Programs and Organization	.....	1-10
2.0 SUMMARY OF ENVIRONMENTAL MANAGEMENT ASSESSMENT RESULTS	.....	2-1
2.1 Findings Summary	.....	2-1
2.2 Key Finding	.....	2-4
3.0 ENVIRONMENTAL OVERVIEWS AND ASSESSMENT FINDINGS	.....	3-1
3.1 Organizational Structure (OS)	.....	3-2
3.1.1 Overview	.....	3-2
3.2 Environmental Commitment (EC)	.....	3-5
3.2.1 Overview	.....	3-5
3.3 Environmental Protection Programs (EP)	.....	3-8
3.3.1 Overview	.....	3-8
3.3.2 Technical Assessment	.....	3-8
3.3.3 Environmental Monitoring	.....	3-8
3.3.3.1 Overview	.....	3-8
3.3.3.2 Findings	.....	3-11
3.3.4 National Environmental Policy Act	.....	3-14
3.3.4.1 Overview	.....	3-14
3.3.5 Waste Management	.....	3-16
3.3.5.1 Overview	.....	3-16
3.3.5.2 Findings	.....	3-20
3.4 Formality of Environmental Programs (FP)	.....	3-23
3.4.1 Overview	.....	3-23
3.4.2 Findings	.....	3-26
3.5 Internal and External Communication (IC)	.....	3-29
3.5.1 Overview	.....	3-29
3.6 Staff Resources, Training, and Development (SR)	.....	3-32
3.6.1 Overview	.....	3-32
3.7 Program Evaluation, Reporting, and Corrective Action (PE)	.....	3-34
3.7.1 Overview	.....	3-34
3.8 Environmental Planning and Risk Management (RM)	.....	3-35
3.8.1 Overview	.....	3-35

TABLE OF CONTENTS (continued)

LIST OF FIGURES

Figure 1-1	NREL Location Map	1-7
Figure 1-2	Distribution of NREL Areas	1-8
Figure 1-3	DOE/NREL Management Structure	1-11
Figure 1-4	GO Organizational Structure	1-13
Figure 1-5	NREL Organizational Structure	1-14
Figure 1-6	NREL Safety & Security Office	1-15

LIST OF TABLES

Table 1-1	List of Environmental Management Requirements and Guidelines . .	1-2
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LIST OF APPENDICES

Appendix A	Biographical Sketches of the Assessment Team	A-1
Appendix B	Assessment Plan	B-1
Appendix C	Schedule of Onsite Activities	C-1
Appendix D	List of Site Documents Reviewed by the Assessment Team	D-1
Appendix E	List of Contacts/Interviews Conducted by the Assessment Team . .	E-1
Appendix F	Glossary of Acronyms and Abbreviations	F-1

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

This report documents the results of the environmental management assessment performed at the National Renewable Energy Laboratory (NREL) in Golden, Colorado. The onsite portion of the assessment was conducted from September 14 through September 27, 1993, by DOE's Office of Environmental Audit (EH-24) located within the Office of the Assistant Secretary for Environment, Safety, and Health (EH-1).

EH-24 carries out independent assessments of DOE facilities and activities as part of the EH-1 Environment, Safety and Health (ES&H) Oversight Audit Program. The EH-24 program is designed to evaluate the status of DOE facilities and activities with respect to compliance with Federal, state, and local environmental laws and regulations; compliance with DOE Orders, Guidance and Directives; conformance with accepted industry practices and standards of performance; and the status and adequacy of management systems developed to address environmental requirements.

During this assessment, the activities conducted by the assessment team included reviews of internal documents and reports from previous audits and assessments; interviews with U.S. Department of Energy (DOE) and NREL contractor personnel; and inspections and observations of selected facilities and operations. The environmental management assessment of NREL focused on the adequacy of environmental management systems and assessed the formality of programs employing an approach that recognizes the level of formality implementing environmental programs may vary commensurate with non-nuclear research and development operations. Inherent in this perspective is the presence of an active process, which considers a flexible approach to implementation based on all risk considerations, being employed in determining the formality with which that policy or program is implemented. This concept is stated in DOE 5480.19, "Conduct of Operations," and is an implied tenet of DOE 5700.6C, "Quality Assurance." It should be noted that this risk-based approach concept is only applicable to decide the rigor of implementing requirements and is not to be used to eliminate required responsibilities. This flexible approach may not be applicable to DOE organizations that have numerous organizations with many organizational interfaces and large numbers of personnel, where rigorous formality requirements are essential for effective and efficient operations. EH-24 worked closely with the line program and the facility to scope the assessment in response to requests by Facilities and Systems Coordination Division (EE-64), and the Environment, Safety and Health & Operations Division within the Golden Field Office (GO). Considering this input, the Assessment Team evaluated environmental monitoring, waste management, and National Environmental Policy Act (NEPA) activities at NREL, from a programmatic standpoint. The results of the evaluation of these areas are contained in the Environmental Protection Programs section of this report.

The scope of the NREL Environmental Management Assessment was comprehensive and included all areas of environmental management. At the same time, environmental monitoring, waste management, and NEPA activities were evaluated to develop a programmatic understanding of these environmental disciplines, building upon the results of previous appraisals, audits, and reviews performed at the NREL. Although the assessment was designed to be thorough and to consider a representative sample of NREL environmental activities, programs, and personnel involved in these activities, it was not

intended to be exhaustive in scope. Instead, it was meant to provide DOE organizations, including the Secretary, with an indication of the status of GO and NREL management's effectiveness in achieving their mission in an environmentally responsible manner.

The "Key Finding" that resulted from this assessment is summarized as follows:

GO has not defined management programs and procedures that incorporate quality concepts in implementing a system for planning, controlling, evaluating, and improving environmental operations.

In December 1992, the Secretary of Energy renamed the NREL Area Office the Golden Field Office in recognition of GO's expanded field management role to promote research and development and to facilitate technology transfer for the Department's technologies. To effect the change, a formal transition process was implemented that identified compliance requirements in all functional areas including environmental, safety, and health.

At this point in their transition to a Field Office, GO has not established a management plan that defines and formalizes quality concepts into their operations, including those operations that have any effect on the environment or management of environmental activities. The concepts that need to be integrated into their management plan are those delineated in DOE 5700.6C, "Quality Assurance," and DOE 5480.19, "Conduct of Operations," which also addresses the self-assessment process. These concepts need to be applied to the processes associated with environmental program planning, work process controls, program evaluation, and continual improvement activities.

Without this plan, there is a lack of definition and formality in the environmental activities that are currently expected of a DOE organization that has oversight responsibilities for a national laboratory. The formality of these activities would apply to DOE environmental responsibilities such as oversight, guidance, and reporting, and to other GO requirements that apply to the NREL site, identified as a result of transition activities. Development of this plan will provide a framework that would create a functional management document without creating duplicative DOE Order-driven programs that may strain efficient and effective use of GO resources and help to ensure improved environmental quality.

The overall conclusion of the Assessment Team is that the NREL M&O contractor has made progress in developing and implementing policies and programs for effective environmental management, while GO has yet to develop a management program for environmental operations. The size and relatively low environmental risk of the NREL research and support operations has not currently impacted the site's ability to function without formal programs but future change may require these programs to be established and implemented.

SECTION 1.0

INTRODUCTION

1.0

INTRODUCTION

This report documents the results of the environmental management assessment of the National Renewable Energy Laboratory (NREL) located in Golden, Colorado. The onsite portion of the assessment was conducted from September 14 through September 27, 1993, by the Office of Environmental Audit (EH-24).

DOE 5482.1B, "Environment, Safety and Health Appraisal Program," establishes the mission of EH-24 to provide comprehensive, independent oversight of Department-wide environmental programs on behalf of the Secretary of Energy. The ultimate goal of EH-24 is for the enhancement of environmental protection and minimization of risk to public health and the environment. EH-24 accomplishes its mission using systematic and periodic evaluations of the Department's environmental programs within line organizations, and through use of supplemental activities that serve to strengthen self-assessment and oversight functions within program, field, and contractor organizations.

These evaluations function as a vehicle to apprise the Secretary and Program Managers of the current status and vulnerabilities of Departmental environmental activities and environmental management systems. Several types of evaluations are conducted, including:

- comprehensive baseline environmental audits;
- environmental audits (or re-audits);
- environmental management assessments; and
- special issue reviews.

The purpose, scope, and approach of the environmental management assessment of NREL is described below.

1.1

PURPOSE

The purpose of the environmental management assessment of NREL is to provide the Secretary of Energy, through the Assistant Secretary for Environment, Safety and Health, with concise information pertaining to the following areas:

- adequacy of environmental management programs and organizations;
- DOE vulnerabilities and liabilities associated with environmental management practices;
- compliance with DOE Orders and DOE environmental policies (as identified in Table 1-1), which address environmental management programs;
- adherence to best management (and accepted industry) practices (BMPs) pertaining to environmental management programs;
- noteworthy environmental management practices.

TABLE 1-1

**LIST OF ENVIRONMENTAL MANAGEMENT
REGULATIONS/REQUIREMENTS/GUIDELINES**

Regulations/ Requirements/ Guidelines	Sections/Title	Authority
Executive Order 11514 and 11991	Protection and Enhancement of Environmental Quality	Office of the President
Executive Order 12088	Federal Compliance with Pollution Control Standards	Office of the President
Executive Order 12580	Superfund Implementation	Office of the President
Public Law 99-499	Superfund Amendments and Reauthorization Act (SARA) Title III, Emergency Planning and Community Right-to-Know Act (EPCRA)	EPA
DOE 1000.3B	Internal Control Systems Manual	DOE
DOE 1280.1	Memorandums of Understanding	DOE
DOE 2300.1B	Audit Resolution and Followup	DOE
DOE 2321.1B	Auditing of Programs and Operations	DOE
DOE 3410.1B	Training	DOE
DOE 4700.1	Project Management Systems	DOE
DOE 5000.3A	Occurrence Reporting and Processing of Operations Information	DOE
DOE 5400.1	General Environmental Protection Program	DOE
DOE 5400.2A	Environmental Compliance Issue Coordination	DOE
DOE 5400.3	Hazardous and Radioactive Mixed Waste Program	DOE
DOE 5400.3B	Occurrence Reporting and Processing of Operations Information	DOE
DOE 5400.4	Comprehensive Environmental Response, Compensation, and Liability Act Requirements	DOE
DOE 5400.5	Radiation Protection of the Public and the Environment	DOE
DOE N5400.9	Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance	DOE
DOE 5440.1E	National Environmental Policy Act Compliance Program	DOE

TABLE 1-1

**LIST OF ENVIRONMENTAL MANAGEMENT
REGULATIONS/REQUIREMENTS/GUIDELINES (continued)**

Regulations/ Requirements/ Guidelines	Sections/Title	Authority
DOE 5480.1B	Environment, Safety, and Health Appraisal Program	DOE
DOE 5480.4	Environmental Protection, Safety, and Health Protection Standards	DOE
DOE 5480.11	Radiation Protection for Occupational Workers	DOE
DOE 5480.19	Conduct of Operations Requirements for DOE Facilities	DOE
DOE 5480.20	Personnel Selection, Qualification, Training, and Staffing Requirements at DOE Reactor and Non-Reactor Nuclear Facilities	DOE
DOE 5482.1B	Environment, Safety, and Health Appraisal Program	DOE
DOE 5484.1	Environmental Protection, Safety and Health Protection Information Reporting Requirements	DOE
DOE 5500.2A	Emergency Notification Reporting and Response Levels	DOE
DOE 5700.6C	Quality Assurance	DOE
DOE 5820.2A	Radioactive Waste Management	DOE
DOE 6430.1A	General Design Criteria	DOE
DOE/EH-0173 T	Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance	DOE
DOE Memorandum, July 31, 1990	Guidance on Environment, Safety, and Health (EASE&H) Self-Assessment	DOE
15 U.S.C. 2601 et seq.	Toxic Substances and Control Act (TSCA)	EPA
42 U.S.C. 6901 et seq.	Resource Conservation and Recovery Act	EPA
42 U.S.C. 7401 et seq.	The Clean Air Act	EPA
10 CFR 20	Standards for Protection Against Radiation	EPA
10 CFR 1021	National Environmental Policy Act; Implementing Procedures and Guidelines Revocation; Final Rule and Notice	DOE

TABLE 1-1

**LIST OF ENVIRONMENTAL MANAGEMENT
REGULATIONS/REQUIREMENTS/GUIDELINES (continued)**

Regulations/ Requirements/ Guidelines	Sections/Title	Authority
29 CFR 1910.12	Occupational Safety and Health Standards	OSHA
40 CFR 61.93	National Emission Standards for Hazardous Air Pollutants (NESHAP)	EPA
40 CFR 112	Oil Pollution Control	EPA
40 CFR 122	EPA Administered Permit Programs: National Pollutant Discharge Elimination System (NPDES)	EPA
40 CFR 125	Criteria and Standards for the National Pollutant Discharge Elimination System	EPA
40 CFR 141	National Primary Drinking Water Regulations	EPA
40 CFR 241	Guidelines for the Land Disposal of Solid Waste	EPA
40 CFR 243	Guidelines for the Storage and Collection of Residential, Commercial, and Institutional Solid Waste	EPA
40 CFR 261	Identification and Listing of Hazardous Waste	EPA
40 CFR 268	Land Disposal Restriction Program	EPA
40 CFR 302	Designation, Reportable Quantities, and Notification	EPA
40 CFR 761	Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution, and Use Prohibitions	EPA
40 CFR 1500-1508	Regulations for Implementing the Procedural Requirements of NEPA	CEQ
6 CCR 1007-3	Colorado Hazardous Waste Management Regulations	CDH
7 CCR 1101	Colorado Underground Storage Tank Regulations	CDH

The information gathered during this assessment and embodied in this report will assist DOE in determining patterns and trends in environmental deficiencies and strengths. The Office of Energy Efficiency and Renewable Energy (EE), the Golden Field Office (GO), and NREL are expected to fully utilize this information to develop corrective actions, to make appropriate modifications to specific programs to prevent recurrence, and to supplement their formalized lessons learned programs to ensure broad applications to other operations, programs, and facilities.

1.2 SCOPE

The scope of the environmental management assessment was comprehensive, addressing all areas of environmental management and included a programmatic assessment of environmental monitoring, NEPA, and waste management. Additional consideration was given to reporting and oversight relationships with EE and GO.

1.3 APPROACH

The environmental management assessment was conducted in accordance with the DOE Environmental Audit Program Guidance (DOE/EH-0232, January 1992), and the Protocols for Conducting Environmental Management Assessments of DOE Organizations (DOE/EH-0326), and followed accepted assessment techniques. Further, the management team assessed the formality of programs employing an approach that takes into account that not all organizations or activities require the same level of formality in the implementation of policies and programs. Inherent in this perspective is the presence of an active process, which considers a flexible approach to implementation based on all risk considerations, being employed in determining the formality with which that policy is implemented. This concept is stated in DOE 5480.19, "Conduct of Operations," and is an implied tenet of DOE 5700.6C, "Quality Assurance." It should be noted that this risk-based approach concept is only applicable to decide the rigor of implementing requirements, and is not to be used to eliminate required responsibilities. This flexible approach may not be applicable to DOE organizations that have numerous organizations with many organizational interfaces and large numbers of personnel.

The assessment was conducted by a team of professionals managed by a DOE Headquarters Team Leader and Deputy Team Leader from EH-24, and staffed by contractor technical support personnel. The names, areas of responsibility, affiliations, and biographical sketches of the team members are provided in Appendix A. The assessment included three phases: planning, onsite activities, and reporting.

Once the site selection and the type of assessment had been approved by EH-1, the Team Leader and the Deputy Team Leader contacted both EE and GO personnel to begin development of a scope for the assessment. These initial contacts assisted EH-24 with development of the assessment plan and provided both EE and GO with the opportunity to have EH-24 assess selected environmental programs that both EE and GO considered essential to achieve NREL's mission.

Also as part of the planning stage, a memorandum was sent to NREL announcing the environmental management assessment and requesting information about the management systems and selected environmental programs in general. A pre-assessment site visit was conducted on July 20 and July 21, 1993. The site's response to the information request

memorandum combined with the pre-assessment site visit and the planning activities with EE and GO formed the basis for the Plan for the DOE Environmental Management Assessment of NREL (see Appendix B), which included a preliminary agenda for onsite activities. The assessment team modified the preliminary agenda during the conduct of onsite activities as more information was obtained and additional areas of interest were identified. The final daily activity schedule is contained in Appendix C.

Before the Assessment Team arrived onsite at NREL, interviews were conducted in Washington, DC with EE personnel responsible for management of environmental activities at GO and the NREL site. Once onsite, assessment activities included interviews with NREL, GO, and EE personnel and document reviews (including previous audit and self-assessment reports). The assessment team conducted daily debriefs that were open to EE, GO, and NREL personnel. No regulatory officials attended the daily debriefs. A list of site documents reviewed and interviews performed are provided in Appendix D and E, respectively. Using these sources of information, the Assessment Team developed findings as discussed in Section 2.0 and 3.0 of this report.

Deficiencies identified by the Assessment Team were categorized as findings. Findings are conditions that, in the judgement of the Team, may not satisfy environmental regulations, DOE Orders, Consent Agreements with regulatory agencies, environmental permit condition, DOE or contractor environmental policies and procedures, regulatory agency guidance, accepted industry practices or technical standards, DOE guidance or professional judgement.

The section overviews and findings detailed in Section 3.0 are organized into the following eight categories: organizational structure; environmental commitment; environmental protection programs; formality of environmental program; internal and external communication; staff resources, training and development; program evaluation, reporting and corrective action; and environmental planning and risk management. The environmental protection program section includes a detailed discussion of the status of environmental monitoring, NEPA, and waste management programs. Each finding is organized into three sections: the performance objective, the finding statement, and a discussion of the facts and observations supporting the finding. The particular standards against which the finding is being evaluated are specified as performance objectives. The findings are not arranged in order of relative significance.

1.4 BACKGROUND AND PROJECT DESCRIPTION

The National Renewable Energy Laboratory (NREL), formerly called the Solar Energy Research Institute (SERI), is the primary laboratory for conducting research on renewable energy for the Department of Energy (DOE). NREL is located in Golden, Colorado, approximately 10 miles west of Denver, Colorado (see Figure 1-1).

NREL was established under the Solar Energy Research, Development, and Demonstration Act of 1974. It is a government-owned and contractor-operated (GOCO) Federal laboratory for DOE. NREL is operated by Midwest Research Institute (MRI) of Kansas City, Missouri, a not-for-profit laboratory that performs and manages research for public and private clients. Operations began at NREL in July 1977. At the time of this assessment, there were 846 employees at NREL, including 28 part-time and 44 temporary employees.

Figure 1-1. NREL Location Map

Distribution of Functions for NREL as of September, 1992

Figure 1-2. Distribution of NREL Areas

The NREL site consists of four primary areas (see Figure 1-2). The two major areas are the 300-acre NREL permanent site and three leased buildings in the Denver West Office Park; they are located approximately 1 mile apart. The third area is the Joyce Street Facility, which is also a leased building, and the fourth is the National Wind Technology Center (NWTC). NWTC was transferred to NREL from the DOE Rocky Flats Plant in July, 1993.

The 300-acre NREL permanent area contains the Field Test Laboratory Building (FTLB), the Biotechnology Research Facility (BTRF), and several smaller testing and research structures located west of FTLB in what is called the Field Experimental Test Area (FETA). All these facilities are located at the South Table Mountain (STM) site. The newly constructed Solar Energy Research Facility (SERF) is located at STM and consists of three office/laboratory modules with approximately 115,000 square feet of floor space. NREL will relocate some research and development activities that currently take place at Denver West to the SERF. Research projects to be relocated include those in photovoltaics, solar heat technologies, solar energy, and superconductivity. The Amorphous Silicon Deposition experiments will also be relocated to SERF from the Joyce Street Facility.

The Denver West Office Park is located approximately 1 mile east of the NREL permanent area. Three buildings in the Denver West Office Park have been leased by NREL since 1977. Although some of the laboratories located in the Denver West Office Park will be relocated in the SERF in about a year, new laboratories will be moved into the vacated space.

The Joyce Street Facility is approximately 5.5 miles north of the Denver West Office Park, in a commercial area with nearby undeveloped and agricultural land. Prior to its lease by NREL, the facility was used for the manufacture of photovoltaic collection equipment and is the manufacturing facility for the silicon-based solar cells for photovoltaic energy research.

The NWTC is located adjacent to the DOE-owned Rocky Flats reservation. The NWTC consists of several auxiliary research structures. These buildings are located northwest of the Rocky Flats Plant.

In carrying out its mission of conducting research and development of renewable energy technologies, NREL has several specific functions, including the following:

- Performing basic and applied research, engineering, exploratory and advanced development, and other activities in renewable energy and related technologies.
- Conducting field management responsibilities on behalf of DOE, including program integration, planning, and management of subcontracted research and development.
- Performing analytic studies and technology evaluations.
- Serving as a source of scientific and technical information on renewable energy.

- Carrying out collaborative research and development with universities and private industry.
- Providing access to specialized facilities and equipment for scientists and engineers from industry, universities, and other Federal laboratories.
- Furnishing information and resources to the education community.

Research activities at NREL are conducted through the following seven major divisions: Photovoltaic, Alternative Fuels, Industrial Technologies, Wind Technology, Basic Sciences, Analytical Studies, and Buildings and Energy Systems Divisions.

Overall, NREL covers a broad spectrum of activities pertaining to renewable energy technologies, including: Alternate Fuels, Biofuels Energy, Biomass Power, Building Energy Technology, Chemical Sciences, Energy Biosciences, Fuel Utilization Data and Analysis, Material Sciences, Ocean Energy, Photovoltaic Energy, Solar and Renewable Technical Information, Solar Thermal Energy, Superconductivity, Waste Reduction Technologies, and Wind Energy.

1.5 ENVIRONMENTAL PROGRAMS AND ORGANIZATION

The DOE Office of Energy Efficiency and Renewable Energy (EE) formulates and directs programs designed to increase the production and utilization of renewable energy and improve the energy efficiency of the transportation, buildings, industrial, and utility sectors through support of research, development, and technology transfer activities. In support of this mission, some of the EE functions include assessing the impacts of renewable energy use and energy efficiency on the environment and economy; and providing for the development and maintenance of the facilities and programs of NREL. The organization chart of EE is included as Figure 1-3.

Under the Assistant Secretary of Energy Efficiency and Renewable Energy (EE-1), the Office of Management and Resource (EE-60) in DOE Headquarters is the Program Office with responsibility for establishing environmental policy, and program goals and objectives for DOE activities at NREL. EE-60 provides overall budget financial management of EE programs.

The Facilities and Systems Coordination Division (EE-64), under EE-60, is assigned to review program plans and funding allocations to NREL and national laboratories receiving EE funds to ensure compliance with EE policies and long-term planning facility development activities, and to coordinate EE's environmental, safety and health, and quality assurance programs. EE-64 also provides technical oversight for design, construction, and operation of laboratory and field facilities dedicated to EE programs including environmental assessment.

The Office of Planning and Assessment (EE-70) provides strategic planning, program planning and technology evaluation. Its functions also include coordination of environmental impacts and analyses for EE.

The Office of Waste Reduction Technologies (EE-22), under Deputy Assistant Secretary for Industrial Technologies (EE-20), is responsible for providing policy and analytical support to

Figure 1-3. DOE/NREL Management Structure

EE-20 and other DOE management in matters relating to efficiency enhancing, and waste reducing technologies, such as pollution prevention program/technologies, and waste reduction technology transfer.

The Waste Material Management Division (EE-222) manages the development, implementation and evaluation of a national waste stream reduction and utilization program to effectively achieve planned objectives. One of the functions is to identify and interpret the legislative requirements and intent applicable to the program, and so manage the implementation of the program to satisfy this need, including NEPA review oversight.

The Golden Field Office (GO), originally the SERI Area Office (SAO) was assigned the status of a Field Office on December 23, 1992. At this stage of evolution from an Area Office to a Field Office, GO has not reached the point where it has defined management programs and procedures, but these will be developed as part of their ongoing strategic planning process to become a dedicated full-service field office, assisting EE in promoting and commercializing new and promising technologies. GO currently has about 30 full time employees (FTEs) and is organized into three distinct divisions: the Technology Development Division; the Administrative Division; and the Environmental, Safety, and Health (EASE&H) and Operations Division. The EASE&H and Operations Division provides management and oversight of EASE&H activities and operational support for all activities administered by GO, including the NREL prime contract. Additionally, the EASE&H and Operations Division provides advisory and support services to other GO divisions and support offices in matters of EASE&H, facilities management, facility operations and construction, security, and real property management. The GO organization chart is shown in Figure 1-4.

NREL is dedicated to support DOE by leading the nation in developing renewable energy and related technologies, and facilitating their commercialization. The NREL Safety and Security Office (SSO) is responsible for the environmental management of the NREL site and for providing professional expertise and support to the laboratory in environmental compliance, remediation, and research. The manager of this office reports directly to the Director of NREL. SSO is organized into a Security Services Section, a Medical Services Section, an Environmental Section, and a Health and Safety Services Section. Environmental protection activities are conducted by the Environmental Manager and a staff of three FTEs. The organization charts of NREL and the Safety and Security Office are included in Figures 1-5 and 1-6, respectively.

Figure 1-4. GO Organizational Structure

Figure 1-5. NREL Organizational Structure

Figure 1-6. NREL Safety and Security Office

SECTION 2.0

SUMMARY OF ENVIRONMENTAL MANAGEMENT ASSESSMENT RESULTS

2.0 SUMMARY OF ENVIRONMENTAL MANAGEMENT ASSESSMENTS RESULTS

This section of the report summarizes the results and conclusions of the Office of Environmental Audit's (EH-24's) Environmental Management Assessment of the National Renewable Energy Laboratory (NREL), which took place from September 14 through September 27, 1993.

During the assessment, six findings were identified¹. Two in the management systems area and four in the environmental monitoring and waste management program areas. The finding numbers and titles are shown below.

EM-1:	Environmental Monitoring Program Reports and Plans
EM-2:	NREL Environmental Section Quality Assurance Plan
WM-1:	Offsite Transport of Hazardous Waste
WM-2:	Offsite Solid Waste Disposal
FP-1:	Formal Incorporation of Quality Concepts
FP-2:	Implementation of Quality Management Programs

To facilitate an understanding of the overall conclusions of this assessment, it is essential to look at GO and NREL separately. GO has not yet defined a management plan that embraces quality concepts integral with operations. Without this plan, there is a lack of definition and formality in the environmental activities that are currently expected of a DOE organization that has oversight responsibilities for a national laboratory. Current GO transition activities have initiated steps to redefine the responsibilities of GO to incorporate both the mission of NREL and the new field office focus. The intention of these activities is to reflect the current mission of DOE which has, as one of its goals, improved environmental quality. Development of this plan will provide a framework that would create a functional management document without creating duplicative DOE Order-driven programs that may strain efficient and effective use of GO resources.

Over the past 2 years, NREL implemented a quality management approach with an active continuous improvement process. As a result of this process, NREL has developed a total management plan for the implementation and integration of all DOE directives applicable to operations at the NREL site. While developing this management plan, NREL used draft procedures to ensure that DOE requirements contained in self-assessment directives, DOE 5700.6C, "Quality Assurance," and 5480.19, "Conduct of Operations," were met. As of this assessment, the strategy to implement total quality management has enhanced environmental programs since the Tiger Team Assessment in August 1991. This is evidenced by the fact that the Assessment Team's programmatic assessment of waste management and the NEPA programs revealed that NREL has addressed all waste management and NEPA findings contained in the Tiger Team Assessment. While the Assessment Team developed findings in the areas of waste management and environmental monitoring, these findings were not indicative of systematic or programmatic concerns with NREL's management of environmental operations.

2.1 FINDINGS SUMMARY

The following paragraphs briefly describe the findings in the management systems areas and technical disciplines discussed in the NREL Environmental Management Assessment.

Organizational Structure

There were no findings in this portion of the assessment. The organizational structure portion of the assessment identified and evaluated a number of mechanisms used by GO and NREL to establish organizational structures and to assign and clarify roles and responsibilities of personnel. The assessment found that the environmental protection, compliance, and management responsibilities necessary to operate and oversee NREL, although not all formalized, are generally well established. The working relationships between oversight, support, and line organizations are functioning in an effective manner that minimizes environmental compliance incidents.

Environmental Commitment

No findings were identified in this portion of the assessment. The commitment of both NREL and GO to environmental excellence in the conduct of site operations in an environmentally sound manner is adequately and effectively institutionalized through their current mechanisms. All NREL and GO personnel interviewed understood management's commitment to conduct site operations in an environmentally sound manner with full compliance as a minimum goal.

Environmental Protection Programs

As part of this assessment, the Team assessed environmental monitoring, waste management and NEPA programs. The results of this programmatic review are:

Environmental Monitoring. Two findings were identified in this portion of the assessment relating to the NREL site's environmental monitoring program reports and plans, and the NREL Environmental Section Quality Assurance Plan. At the NREL site, Annual Site Environmental Reports have not been distributed within the timeframe required by DOE 5400.1, and the content of the NREL Environmental Monitoring Plan has not been adequately developed in accordance with DOE 5400.1. Additionally, the NREL Environmental Section QA Plan does not completely address all criteria of DOE 5700.6C.

Waste Management. Two findings were identified in this portion of the NREL Environmental Management Assessment. The first finding deals with NREL's transportation of hazardous waste over public highways or over roads where public access is not controlled. NREL is currently transporting their hazardous waste without the use of a manifest, and NREL has not notified Colorado Department of Health that they are operating as a Hazardous Waste Transporter. The second finding discusses offsite disposal of NREL's solid waste. NREL lacks full assurance that the offsite solid waste disposal facilities used are in compliance with Federal guidelines.

National Environmental Policy Act. No findings were identified in this portion of the assessment. However, the portion of the assessment dealing with environmental program formality identified concerns related to the informality of GO's implementation of all environmental programs, including NEPA, and GO's oversight of the NREL NEPA program. Personnel responsible for the GO NEPA program recognize the need to address these issues.

Formality of Environmental Programs

Two findings were identified in this portion of the assessment that address the need to develop and/or implement defined programs that incorporate the quality management concepts inherent in the DOE directives for quality assurance, conduct of operations, and self-assessment into the management of environmental activities. NREL has developed a management program document that effectively incorporates these quality management concepts, however, they have not begun to plan the process that will fully and efficiently implement this new program over the next two years. GO has recognized a need to formalize DOE-directed quality issues into their management program, however, they have not developed a definitive approach to accomplish this task at this stage in their field office transition activities.

Internal and External Communication

The internal and external communication portion of this assessment did not identify any findings. The Assessment Team identified a number of formal and informal mechanisms that provide effective communication within GO and NREL, between them, and with outside organizations, including the regulatory agencies, EE, and the public. The assessment found that personnel with environmental protection, compliance, and management responsibilities were generally aware of their responsibilities and the status of environmental issues that affected their positions. This was recognized consistently within senior management, line organizations with both supervisory and nonsupervisory personnel, and support organizations responsible for ensuring environmental compliance.

Staff Resources, Training, and Development

No findings were identified in this portion of the assessment. The mechanisms used by both NREL and GO for staff resources, training, and development aspects of environmental operations were adequate and effective. These mechanisms are used for both current and future operational planning, however, the adequacy of the levels of formality of these mechanisms could not be assessed due to incomplete implementation of NREL's management plan and the lack of a documented GO management plan.

Program Evaluation, Reporting, and Corrective Action

The concerns usually addressed in this portion of the assessment are discussed as part of the Formality of Environmental Program section in this report. These findings relate the effectiveness of these activities with the informality with which they are performed.

Environmental Planning and Risk Management

No findings were identified in this portion of the assessment. The mechanisms used by both NREL and GO for addressing the environmental planning and risk management for conducting site operations in an environmentally sound manner were adequate and effective. These mechanisms are used for addressing these aspects for both near-term and long-term operations, however, the adequacy of the levels of formality of these mechanisms could not be assessed due to incomplete implementation of the NREL Management Plan, and the lack of a documented GO management plan.

2.2

KEY FINDING

A key finding was developed from the findings that are documented in this report. Key findings are findings, or groups of findings related to the same issue, which, in the judgment of the Assessment Team, are essential to understanding the nature and scope of the environmental management deficiencies at the NREL site. The following key finding was identified by the Assessment Team.

GO has not defined management programs and procedures that incorporate quality concepts in implementing a system for planning, controlling, evaluating, and improving environmental operations.

In December 1992, the Secretary of Energy renamed the NREL Area Office the Golden Field Office in recognition of GO's expanded field management role to promote research and development and to facilitate technology transfer for the Department's technologies. To effect the change, a formal transition process was implemented that identified compliance requirements in all functional areas including environmental, safety, and health.

At this point in their transition to a Field Office, GO has not established a management plan that defines and formalizes quality concepts into their operations, including those operations that have any effect on the environment or management of environmental activities. The concepts that need to be integrated into their management plan are those delineated in DOE 5700.6C, "Quality Assurance," and DOE 5480.19, "Conduct of Operations," which also addresses the self-assessment process. These concepts need to be applied to the processes associated with environmental program planning, work process controls, program evaluation, and continual improvement activities.

Without this plan, there is a lack of definition and formality in the environmental activities that are currently expected of a DOE organization that has oversight responsibilities for a national laboratory. The formality of these activities would apply to DOE environmental responsibilities such as oversight, guidance, and reporting, and to other GO requirements that apply to the NREL site identified as a result of transition activities. Development of this plan will provide a framework that would create a functional management document without creating duplicative DOE Order-driven programs that may strain efficient and effective use of GO resources and help to ensure improved environmental quality.

SECTION 3.0

ENVIRONMENTAL OVERVIEWS AND ASSESSMENT FINDINGS

3.0

ENVIRONMENTAL OVERVIEWS AND ASSESSMENT FINDINGS

The assessment findings presented in the following pages are not necessarily in order of importance. They are grouped by relevant management system areas as listed in the Protocols for Conducting Environmental Management Assessments of DOE Organizations (DOE-0326), and are preceded by an overview. The overview describes the approach taken by the management systems specialist in conducting that portion of the assessment, NREL programs and activities related to the relevant management system areas, characterization of the strengths and weaknesses of NREL activities, and a brief summary of the findings. Each finding is organized into three sections: the performance objective, the finding statement, and a discussion. The performance objective specifies the particular practices or standards against which the finding is being evaluated. The discussion details the facts and observations supporting the finding.

Within each finding, references to other findings, interviews, and documents are presented parenthetically. An example of a referenced finding is: "(see Finding OS-1)," in which "OS" stands for "Organizational Structure," and "1" is the sequential finding number. Other abbreviations used to identify findings are as follows:

OS	Organizational Structure
EC	Environmental Commitment
EP	Environmental Protection Programs
FP	Formality of Environmental Programs
IC	Internal and External Communications
SR	Staff Resources, Training, and Development
PE	Program Evaluation, Reporting, and Corrective Action
RM	Environmental Planning and Risk Management
EM	Environmental Monitoring
NEPA	National Environmental Policy Act
WM	Waste Management

Several of the specialists on the assessment team covered more than one of the management systems areas listed above. As such, interviews and document reviews were often completed with multiple areas of responsibility in mind. In order to reduce unnecessary duplication when referencing interviews and documents, they are identified as follows. An example of a referenced interview is (I-A-1) where "I" signifies an interview, "A" represents an individual assessment team member, and "1" is the specifically assigned sequential interview number. An example of a referenced document is NREL-001. The list of documents reviewed and interviews conducted are presented in Appendices D and E, respectively.

3.1 ORGANIZATIONAL STRUCTURE

3.1.1 Overview

The purpose of the organizational structure portion of the NREL Environmental Management Assessment was to evaluate the characteristics of the NREL and GO organizations such as: the definition, clarity, and understanding of organizational roles, responsibilities, and authorities; the consistency of the environmental management organizational structure with respect to the overall structure; the definition and understanding of reporting relationships; the stature and authority of environmental managers; the degree of accountability assigned to personnel for environmental responsibilities; and the independence of environmental management personnel responsible for policy and procedure development and oversight with respect to line management personnel.

The organizational structure portion of the assessment was conducted primarily through interviews with management and staff personnel in EE, GO, and NREL to determine whether personnel were cognizant of their environmental management responsibilities and the relationship between those responsibilities and those of other organizations, and to determine whether the existing organizational structures and assignment of roles, responsibilities, and authorities were effective in ensuring environmental compliance. Key draft and final documents reviewed as part of the assessment included organizational charts; mission and function statements; position descriptions; meeting agenda; policies and procedures; certain correspondence; and other documents associated with organizational structures and roles and responsibilities.

The performance objectives considered in this portion of the assessment included those addressing organizational structure that are presented in Section II.EM.1 of the Protocols for Conducting Environmental Management Assessments of DOE Organizations (DOE/EH-0326).

The two key organizations with responsibilities for environmental protection activities evaluated during this assessment are GO, the site DOE organization, and NREL, which is operated by Midwest Research Institute, the M&O contractor. The adequacy of the organizational structures and roles and responsibilities of the Facilities and Systems Coordination Division at DOE Headquarters (EE-64) and the several EE program offices, which are responsible for overseeing GO and EE programs at NREL, were not evaluated as part of this assessment. However, interviews with GO and EE personnel were conducted to evaluate whether the relationship between GO and EE with regard to oversight and reporting roles were well defined and thoroughly understood.

Within NREL, environmental management responsibilities and authorities reside within the Environmental Section (ES) of the Safety and Security Office (SSO), which is a support organization not responsible for the scientific research activities at the NREL site. The organizational structure of NREL, including that of SSO, is identified on formal organizational charts and is consistent with applicable NREL environmental management documents that address roles, responsibilities, and authorities (NREL-067).

SSO is a support organization, the manager of which reports directly to the NREL Director (I-B-3). The responsibilities and authorities of the SSO manager and ES staff are set forth

in formal position descriptions that describe the level and general areas of responsibility and an established individual-specific list of technical and regulatory areas that have been assigned (NREL-008, 176, 177, and 178). In addition, SSO responsibilities and authorities are identified in the NREL Management Guide, an NREL-approved document that contains policies and procedures applicable sitewide (NREL-050). The Section 4.0 of the NREL Management Guide, entitled Environment, Safety, and Health, also sets forth the environmental responsibilities of other NREL personnel and organizational groups, including line management groups, with respect to implementing ES&H policies and procedures. This document is currently the primary policy document at NREL and is distributed to approximately 100 NREL personnel, including all supervisors down to the branch/section level (i.e., no more than two levels above nonsupervisory personnel).

Among the roles and responsibilities specified in the NREL Management Guide is stop-work authority, which has been assigned to all NREL employees (NREL-054). This authority is reiterated in employee orientation training (I-A-15).

In addition to those identified in the NREL Management Guide, environmental responsibilities of personnel in the NREL line research organizations and the environmental impacts of their activities are specified in Safe Operating Procedure (SOP) and Field Work Proposal (FWP) documents, the content requirements of that are specified in NREL procedures. One procedure requires that FWPs be prepared by NREL line personnel, typically project leaders, and revised and approved by the ES Manager (NREL-133). Another procedure requires that SOPs be prepared by NREL line personnel, reviewed and commented on by ES staff, and approved by the SSO Manager (NREL-053). These procedures require that the approvals occur prior to the initiation of work. GO and EE also review and approve FWPs. Project leaders are then responsible for ensuring that group managers and nonsupervisory personnel are properly trained in FWP and SOP environmental requirements. FWPs and SOPs are updated and reapproved annually and when the project changes. There are approximately 150 to 200 active FWPs and 150 to 200 active SOPs at NREL (I-A-15).

SSO also has its own internal desk procedures that are less formal and comprehensive than those in the NREL Management Guide (I-A-10). These internal procedures do not include specific responsibilities but depend on SSO and ES management to assign responsibility for the activities they describe.

Key ES staff generally have high visibility with NREL personnel. Even with the recent staff growth at NREL, new employees effectively become acquainted with ES personnel as part of the FWP and SOP development process, orientation training, hazardous waste generator training, and NEPA training (I-A-7, I-A-8, and I-A-10). Personnel generally understand the role of ES personnel and call on them to assist in resolving day-to-day environmental issues. Due to the nature of NREL as a laboratory facility, the management of hazardous waste in laboratories and compliance with NEPA are the two primary environmental issues for which ES is consulted (I-A-10).

The GO organizational structure is also specified in a formal organizational chart (NREL-035 and NREL-066). Since December 1992 when DOE determined that GO would change from a DOE area office reporting to the DOE Chicago Field Office (CH) to an independent field office reporting directly to EE, the GO staff size has expanded and the organizational structure has been commensurately revised during the ongoing phased

transition (I-A-19). The transition resulted in GO assuming certain roles, responsibilities, and authorities formerly residing with CH.

Within GO, environmental management responsibilities and authorities are centered within the ES&H & Operations Division, which is the support organization responsible for oversight of NREL environmental protection activities (I-A-18 and I-A-19). The responsibilities of the division are described in a mission and function statement that is currently being drafted are part of the area-office-to-field-office transition at GO (NREL-064). The environmental oversight responsibilities of individuals in the group are described in formal position descriptions (NREL-060, 061, 062, and 167). More specific oversight responsibilities are assigned informally.

The GO ES&H & Operations Division is currently developing procedures that identify roles, responsibilities, and authorities for several key environmental activities, including NEPA determinations, closure of Tiger Team findings, stop-work authority (final), and handling ES&H complaints from GO and NREL (final) (NREL-045, 057, 058, and 069; I-A-19 and 22). GO is developing these procedures in accordance with a prioritization criteria that identifies situations where formal policies and procedures should be developed (NREL-044). However, until the procedures are finalized, the assignment of roles, responsibilities, and authorities within GO, beyond those described in position descriptions, remain informally established. Two key factors that currently help ensure effective environmental oversight under an informal system are the small number and limited complexity of NREL environmental issues and programs that GO is responsible for overseeing, and the small number of GO and NREL personnel primarily responsible for environmental program oversight and implementation.

As discussed above, the assessment identified and evaluated a number of mechanisms used by GO and NREL to establish organizational structures and to assign and clarify roles and responsibilities of personnel. The assessment found that the environmental protection, compliance, and management responsibilities necessary to operate and oversee NREL, although not all formalized, are well established. The working relationships between oversight, support, and line organizations are functioning in an effective manner that minimizes environmental compliance incidents. Where findings have been identified in this assessment, other factors besides organizational structure, such as program formality, contributed to the findings.

The organizational structure portion of the assessment did not identify any findings.

3.2 ENVIRONMENTAL COMMITMENT

3.2.1 Overview

Environmental commitment is the pursuit of environmental excellence in conducting all site activities demonstrated by top management support, line management accountability, and a formal environmental policy. The environmental commitment portion of the environmental management assessment was conducted to assess NREL's and GO's commitment to conduct site operations in an environmentally sound manner with full compliance as a minimum goal. This assessment involved a determination of the overall awareness of and importance placed on the environmental aspects of site operations by NREL and GO management and staff personnel. This determination involved a review of the effectiveness of both the formal and informal mechanisms used by NREL and GO to institutionalize a commitment to environmental excellence and the environmental awareness by all staff during the conduct of site operations.

The general approach used in the assessment was to review DOE Orders and guidances, conduct interviews with EE personnel oversight responsibility for NREL, and review applicable NREL and GO background documents prior to arrival onsite. Onsite activities included a review of NREL's and GO's management practices and programs, additional applicable documentation, and conducting interviews with all levels of management and their respective staffs. The review included documents pertaining to policies, implementing procedures, environmental planning and management, personnel training and development, staffing, and risk assessment. Interviews included discussions with NREL and GO management and staff personnel to determine their understanding of the: (1) mechanisms used to communicate and institutionalize environmental policies and the need for environmental awareness by all staff in the performance of assigned duties, within and between NREL and GO organizations, (2) staff resources and training needs and environmental planning activities necessary to adequately and effectively conduct site operations in an environmentally sound manner, (3) risk associated with environmental issue decisions and activities, and (4) applicable environmental requirements associated with performance of assigned duties. These document reviews and interviews were used to determine the consistency of management commitment to environmental excellence at various levels within both the NREL and GO organizations. These determinations of understanding and consistency of understanding were used to evaluate the effectiveness of the mechanisms used by NREL and GO to institutionalize management's commitment to environmental excellence and the environmental awareness by all staff. The performance objectives considered in this portion of the assessment included those addressing environmental commitment that are presented in Section II.EM.2 of the Protocols for Conducting Environmental Management Assessments of DOE Organizations (DOE/EH-0326).

The two major aspects covered by the protocols identified above are environmental policy and management support. The commitment to environmental excellence is demonstrated by NREL and GO through the issuance of formal statements and policies that adequately state management's commitment to environmental excellence (NREL-020 and NREL-050). Management support of the commitment to environmental excellence is demonstrated at both NREL and GO through various formal and informal mechanisms. These include: (1) holding routine staff meetings (e.g., monthly Management Council meetings) that serve to convey environmental information to all NREL and GO staff, and management meetings

(e.g., biweekly Executive Committee meetings) to identify and discuss environmental issues and programs (I-B-3 through I-B-13) (communication is also discussed in Section 3.5 of this report, Internal and External Communication), (2) the generation and transmittal of weekly reports to management that identify and discuss environmental issues and programs (I-B-1 through I-B-4, I-B-6, and I-B-10 through I-B-13), (3) requiring the reviews and/or approvals of site activities and/or documents by environmental staff to ensure the incorporation of environmentally sound practices into site operations (NREL-050), (4) identifying environmental requirements associated with conducting site operations in position descriptions, environmental planning and program documents, and/or informational or process improvement meetings.

Interviews with NREL and GO management and staff (I-B-3 through I-B-13) revealed no inconsistencies with the intentions of the documents reviewed. There were also no inconsistencies identified on the understanding between NREL and GO of these documents, the various levels of management within each organization, or their respective staffs of the mechanisms used to institutionalize a commitment to environmental excellence. Additionally, all personnel interviewed understood that NREL and GO management were committed to environmental excellence in conducting site operations in an environmentally sound manner and felt that the mechanisms currently in place were effective. All staff interviewed indicated that their management had an open door policy on environmental issues. Further, no staff indicated any reluctance in communicating with their management on these issues.

Other environmental management elements that are indicative of environmental commitment include consideration of the staff resources and training needs, environmental planning activities, and risk management aspects necessary to adequately and effectively conduct site operations in an environmentally sound manner. These elements are considered by both NREL and GO through the budget process, the generation of environmental planning or program documents, and various issue specific working groups. The mechanisms associated with this activities were found to be adequate and effective with respect to the environmental commitment management element. Staff resources and training needs and environmental planning and risk management are discussed in more detail in Sections 3.6, Staff Resources, Training, and Development, and 3.8, Environmental Planning and Risk Management, respectively.

Based on the documents reviewed and the interviews conducted, the commitment of NREL and GO to environmental excellence in the conduct of site operations in an environmentally sound manner is adequately and effectively institutionalized through their current mechanisms. NREL's and GO's management practices and programs are based on total quality management (TQM) principles, which include applying a flexible risk-based approach to the level of formality (e.g., documentation requirements) associated with the application of quality assurance, conduct of operations, and self-assessment concepts to various activities. Therefore, all programs and activities are considered formal under the requirements of the NREL and GO management practices and programs, with the level of formality commensurate with the complexity and risk associated with the specific program or activity. However, the adequacy of the levels of formality of these mechanisms could not be assessed under the current status of the documentation and implementation of their management practices and programs. NREL has a documented management program, but has not implemented the program. GO has not documented their management practices. The findings associated with the formality of programs are discussed in Section 3.4 of this

report, Formality of Environmental Programs. These findings do not effect the overall environmental commitment assessment.

The environmental commitment portion of the NREL Environmental Management Assessment did not identify any findings.

3.3 ENVIRONMENTAL PROTECTION PROGRAMS

3.3.1 Overview

The environmental protection programs portion of the environmental management assessment reviewed the extent to which NREL and GO have developed and implemented specific environmental programs, plans, and standards. In conjunction with this environmental management assessment, supporting technical assessments were conducted of the NREL site environmental monitoring, waste management, and National Environmental Policy Act programs. The technical assessment was coordinated with the management specialists in an effort to assist in the development of management findings.

3.3.2 Technical Assessment

The Technical Assessment consisted of reviews of Environmental Monitoring, National Environmental Policy Act, and Waste Management Programs.

3.3.3 Environmental Monitoring

3.3.3.1 Overview

The purpose of the environmental monitoring portion of the technical assessment was to evaluate the site's adherence to the requirements of DOE 5400.1, "General Environmental Protection Program;" DOE 5700.6C, "Quality Assurance;" Federal and state laws and regulations; NREL guidance documents; and accepted industry standards. The review included an assessment of the organization, structure, and implementation of the environmental monitoring program.

The Environmental Monitoring Technical Specialist conducted interviews with Golden Field Office (GO) and NREL personnel and reviewed GO and NREL documents to evaluate the adequacy of management systems effecting environmental monitoring (including GO/NREL interfaces, and implementation activities in the field). NREL's environmental monitoring program was evaluated at the project plan and procedures level from both a programmatic and quality assurance standpoint.

The GO ES&H & Operations Division is responsible for oversight of NREL's environmental monitoring activities. The management of the NREL site environmental monitoring program is the responsibility of the Environmental Section (ES). Currently the GO/NREL interface is frequent and effective and GO is developing a guidance/assessment program covering site environmental monitoring.

Unlike many other DOE facilities, the environmental monitoring requirements at the NREL site are not driven by Federal, state, or local regulations, but by DOE 5400.1. DOE 5400.1 requires monitoring of groundwater quality, particulate ambient air monitoring (PM-10), wastewater monitoring, and stormwater monitoring for the purpose of establishing baseline environmental data (I-D-4). The only air permits required for NREL operations are for three natural gas burning boilers. These permits specify type and quantity of fuel, and no air monitoring is required. NREL is covered by EPA's General Permit for Stormwater Discharge associated with construction activities for site construction of the SERF Building. Current NREL site radiation sources consist of x-ray

diffraction machines and radioisotopes with an inventory of ≈ 7.8 mCi. The NREL site does not conduct stack or perimeter radionuclides monitoring per an EPA Region 8 waiver from these requirements. NREL demonstrates compliance with the National Emission Standard for Hazardous Air Pollutants (NESHAP) Subpart H requirements by using the Estimated Emission Rate Method in Appendix D and the computer model (COMPLY).

Particulate ambient air monitoring was initiated in May 1992 for the construction of the Solar Energy Research Facility (SERF), and consists of PM-10 analyses performed on a six-day schedule that is established by the State of Colorado. Two ambient air monitors are situated, one upwind and one downwind of the SERF. During the 10 months of sampling in 1992, there was no significant difference between the measurements of PM-10 at the two samplers indicating no significant impacts on ambient air quality due to SERF construction activity.

Research activities at the NREL site do not result in any industrial wastewater discharges to the environment; therefore, the site is not required to have an NPDES effluent permit. Composite wastewater samplers have been installed in Bldg. 16 and at the Field Test Laboratory Building (FTLB) to sample laboratory wastewater, which is collected in holding tanks. Both 24-hour composite and grab samples are taken at each location on a quarterly basis. Manual grab sampling is also performed at Bldg. 15 (photography laboratory) at the same frequency as the wastewater sampling at Bldg. 16 and the FTLB. Wastewater discharges are analyzed for constituents (e.g., volatile organic, metals, anions, oil and grease) specified by the Pleasant View Water and Sanitation District and the Metropolitan Wastewater Reclamation District.

Stormwater monitoring was initiated at the South Table Mountain (STM) site in July 1992 at five locations. Two locations, SW-1 and SW-4, are at the west and east borders of the site, which are undeveloped areas. Locations SW-2, SW-3, and SW-5 monitor runoff from the developed (south) area of the site. Due to the low rainfall associated with the local semi-arid climate, only three samples were collected between July 1992 and May 1993. Stormwater samples are analyzed for oil and grease, biological oxygen demand, chemical oxygen demand, total suspended solids, total Kjeldahl nitrogen, nitrate, nitrite, phosphorus, and pH. These parameters analyzed are those EPA considers to be conventional water quality parameters and requires such analyses for all surface water discharge individual permit applications. Additional constituents, (volatile organic compounds) were chosen based on NREL's judgment as to the type of activities that occur onsite and offsite. All three samples were collected from the developed area and the site attributes most of the sample to road runoff. One automatic sampler is employed and it is checked (by a contractor) when measurable precipitation is recorded at the rain gauge, operated by the Urban Drainage and Flood Control District, located north of the site.

Groundwater monitoring was initiated in 1990 and consisted of the quarterly sampling of eight monitoring wells. Currently, monitoring is annually conducted using five monitoring wells. Three monitoring wells are located upgradient of site activities and two are located downgradient. Samples are analyzed for volatile organics, metals, inorganics such as potassium and silica, and gross alpha and beta. The site evaluates groundwater quality by using the National Primary and Secondary Drinking Water Standards.

All samples, both aqueous and PM-10, are collected by a contractor who is responsible for chain-of-custody and delivery of the samples to the analytical laboratories. Three local

contractor laboratories are used (one for groundwater samples, one for storm and wastewater, and one for PM-10 analyses). NREL personnel visited all laboratories prior to initiation of sampling. NREL routinely assesses the sampling contractor, and have documented both the laboratory and sampling assessments.

The environmental monitoring program at the NREL site, in terms of sample locations and frequencies, is sufficient to obtain adequate baseline data. While NREL has included methods, protocols, and chain-of-custody in their contractual instruments and requires contractors to submit sampling plans, the quality assurance aspects of the environmental monitoring program are deficient in that there are no formal step-by-step procedures for actual sample collection (see Finding EM-2). The Environmental Monitoring Plan document is deficient in that rationales are not provided for surface water and wastewater sampling activities, and some documents have not been approved by management. These noted deficiencies may impact the quality and defensibility of the monitoring data generated by current monitoring activities.

Two findings were identified in the environmental monitoring portion of the technical assessment relating to the NREL site's environmental monitoring program reports and plans, and the NREL Environmental Section Quality Assurance Plan.

3.3.3.2 Findings

EM-1: Environmental Monitoring Program Reports and Plans

Performance Objective: DOE 5400.1, "General Environmental Protection Program," establishes the reporting criteria for Annual Site Environmental Reports (ASER) and the required content of Environmental Monitoring Plans.

Finding: At the NREL site, Annual Site Environmental Reports have not been distributed within the timeframe required by DOE 5400.1, and the content of the NREL Environmental Monitoring Plan (EMP) has not been adequately developed in accordance with DOE 5400.1.

Discussion: NREL is responsible for developing environmental monitoring program reports and plans as required by DOE 5400.1. During the Assessment, adherence to DOE 5400.1 requirements were evaluated, and certain nonconformances regarding the distribution requirements for the ASER and the content of the NREL Environmental Monitoring Plan were identified.

The NREL site's ASER describes the site's environmental activities and summarizes the results of its environmental monitoring program for a calendar year. Distribution of this report by June 1 of the following year is a requirement of DOE 5400.1.

Environmental reports covering the previous calendar year are not distributed by June 1 as required by DOE 5400.1, Chapter 11.4(c). Reports for calendar year 1992, 1991 and 1990 were reviewed and the following distribution dates were determined:

- The ASER for calendar year 1992 has not been distributed;
- The ASER for calendar year 1991 was distributed in April 1993, and;
- The ASER for calendar year 1990 was distributed in May 1992.

Although documentation shows the NREL reports were submitted to the appropriate field or Headquarters elements for comment prior to the June distribution date, comments were not received for incorporation prior to the June release deadline.

A baseline surface water monitoring program, a wastewater monitoring program, and an air monitoring (PM-10) program are currently being conducted at the NREL site. However, the NREL Environmental Monitoring Plan does not contain the rationale and design criteria, the extent and frequency of monitoring and measurements, and the procedures for laboratory analyses for these programs as required by DOE 5400.1, Chapter IV.4. The lack of these required elements could compromise effective design and implementation of these three monitoring programs and may lead to inappropriate environmental management decisions. Also, the environmental monitoring data generated may be adversely affected. In addition, the NREL Environmental Monitoring Plan does not contain the rationale for conducting soil/sediment/biota analyses to monitor the effects of site activities on onsite and offsite environmental and natural resources as required by DOE 5400.1, Chapter IV.5.b(1).

GO has not formally provided direction and guidance to NREL covering the implementation of DOE 5400.1. However, GO does plan to develop policies and procedures based on applicable Federal and state laws and DOE Orders and will provide NREL with guidance for implementing its environmental monitoring program. GO also plans to develop a schedule for the preparation and review of ASERs to ensure that they are distributed by the required date of June 1. The schedule will impose a preparation/review due date on both NREL and GO (I-D-2).

EM-2: NREL Environmental Section Quality Assurance Plan

Performance Objective: DOE 5700.6C, "Quality Assurance," establishes criteria that require work be performed under controlled conditions using approved instructions, procedures, or other means, and that the document be prepared, reviewed, approved, issued, used, and revised to prescribe processes, specify requirements, or establish design.

Finding: The NREL Environmental Section Quality Assurance Plan does not completely address all criteria of DOE 5700.6C.

Discussion: Environmental program activities, including environmental monitoring, are the responsibility of the NREL Environmental Section. Guidance for conducting environmental program activities is provided in the Environmental Section Quality Assurance Plan.

During this Assessment, activities, documents, procedures, and performance associated with the environmental monitoring program at the NREL site were reviewed. This review confirmed that the NREL Environmental Section Quality Assurance (QA) Plan does not completely address the following criteria of DOE 5700.6C. Criteria not addressed in the QA Plan include: Criterion 1 - Program; Criterion 2 - Personnel Training and Qualifications; Criterion - 3 Quality Improvement; Criterion 4 - Documents and Records; Criterion 5 - Work Processes; Criterion 6 - Design; Criterion 9 - Management Assessment; Criterion 10 - Independent Assessment.

Other nonconformances with the requirements of DOE 5700.6C identified during the assessment include, but may not be limited to, the following:

- The environmental monitoring program at the NREL site lacks formal procedures for conducting surface water, groundwater, and wastewater sampling activities, which is not in conformance with Criterion 5 (I-D-4). The lack of these formal procedures may compromise the validity of data generated from samples collected using informal procedures.
- Interviews during this assessment established that the NREL Environmental Monitoring Plan is reviewed annually by ES&H personnel. However, the reviews are not documented, and therefore, the Assessment Team could not verify that these annual reviews indeed occurred and resulted in comments that added to or updated the content of the NREL Environmental Monitoring Plan to meet requirements of DOE 5400.1.
- The Environmental Monitoring Plan, dated March 25, 1991 and the Environmental Protection Implementation Plans for 1991 and 1992 were issued by NREL without approval signatures, which is not in conformance with Criterion 4, that requires the approval of documents. However, the revised Groundwater Protection Management Program Plan issued September 8, 1993, included approval signatures, and the Environmental Section Manager indicated that in the future all environmental program reports will include provisions for approval signature (I-D-3).

NREL has developed, and is in the process of implementing, a NREL Management Program document, which is NREL's interpretation of the 10 criteria contained in DOE 5700.6C.

When implemented, the NREL Management Program document will require that the NREL Environmental Section QA Plan include implementing procedures for DOE 5700.6C that would correct the issues contained in this finding.

3.3.4 National Environmental Policy Act

3.3.4.1 Overview

The purpose of the National Environmental Policy Act (NEPA) portion of the NREL Environmental Management Assessment was to evaluate: (1) NREL's NEPA program management structure, (2) NEPA policy statements, program plans, standard operating procedures, and documentation, (3) screening criteria and processes for recommending appropriate levels of NEPA review, and (4) the depth of understanding of DOE and operating contractor staff regarding the NEPA process at NREL.

The assessment addressed areas where DOE has established specific management system requirements; however, detailed evaluation of compliance with specific requirements of Council on Environmental Quality and DOE NEPA Regulations (40 CFR 1508 and 10 CFR 1021 respectively) and the DOE NEPA Order (DOE 5440.1E) was outside the scope of this assessment. The DOE NEPA Regulations apply to any DOE action affecting the quality of the environment of the United States, its territories or possessions. DOE places responsibility for NEPA compliance with the DOE program offices and line management.

The NEPA assessment included interviews and document reviews, as well as input and observations from other Assessment Team members. Interviews were conducted with NREL staff responsible for the NEPA program, finance, facilities, program management, and project leadership. DOE Golden Field Office and DOE Headquarters Office of NEPA Oversight (EH-25) staff were also interviewed. Policies and procedures were reviewed for consistency with DOE NEPA Regulations, DOE 5440.1E and related DOE Orders, memoranda, and guidance.

NREL NEPA documents and NEPA-related documentation provided to the Assessment Team included three Environmental Assessments (EAs): the 1993 Sitewide EA for NREL, the 1992 EA for the Construction and Operation of the Solar Energy Research Facility at NREL, and the 1992 EA for the Relocation of NREL Research Experiments. Also provided to the Team were examples of approved categorical exclusions (CXs) and Annual CXs.

NREL was established in 1991 when the scope of operations of its predecessor, the Solar Energy Research Institute, was expanded. NREL's mission is to develop renewable energy and related technologies and facilitate their commercialization. Activities at NREL are directed through GO and EE. At NREL, NEPA activities are coordinated by the NREL manager of Safety and Security. NEPA oversight is provided by the GO NEPA Compliance Officer and GO Manager. The GO Manager has been delegated authority by EE-1 to make NEPA determinations for actions listed in Subpart D of the DOE NEPA Regulations.

NREL has a NEPA policy and procedures in place. GO reviewed NREL NEPA procedures and concurred in their implementation (subject to modifications addressing GO comments). These procedures are generally consistent with the DOE NEPA Regulations, DOE 5440.1E and DOE Headquarters guidance. NREL's NEPA policy and procedures have been implemented and represent a comprehensive and formal NEPA program.

NREL attempts to ensure NEPA review of each DOE action through comprehensive sitewide NEPA documents, and by placing environmental review controls within the budgetary and work control processes. NEPA review of actions is facilitated through the use of the NREL NEPA Worksheet (NREL-133), NEPA Determination Request (NDR) form (NREL-111) and Construction Project Proposal (CPP) form (NREL-132). All field work proposals (FWPs), work-for-others, subcontracts, cooperative research and development agreements (CRADAs), purchase requisitions, and construction activities, including minor construction activities, receive NEPA review. NREL documents the application of Annual CXs relative to these activities.

Routine maintenance activities as a class of actions (i.e., Annual CX groups 2.2 and 2.3) receive NEPA review from the GO Manager during the Annual CX approval process. However, the individual review called for in the NREL NEPA procedure does not occur. This is the case because routine maintenance activities do not result in the preparation of a Construction Project Proposal form. Currently, this form serves as a trigger for the NREL NEPA review of facilities actions and as documentation of those reviews. While GO has not attempted to verify the appropriateness of NREL's application of routine maintenance Annual CXs, the lack of documentation for these CXs, may limit future GO attempts at verification. The Assessment Team conveyed this situation to NREL personnel during the site visit and NREL staff initiated an analysis of potential corrective actions the same day.

The NREL NEPA Worksheet is prepared by procurement or facilities staff. The worksheet documents NEPA reviews conducted in relation to the application of Annual Categorical Exclusions approved for NREL by the GO Manager. NREL Annual CXs are divided into two groups: those derived from 10 CFR 1021 Subpart D, Appendix A (Appendix A) and those derived from 10 CFR 1021 Subpart D, Appendix B (Appendix B). The application of Annual CXs derived from Appendix A is conducted by NREL procurement staff. NREL NEPA staff provide NEPA training for procurement staff and periodically audit procurement's application of Annual CXs. All Appendix B Annual CXs, Construction Project Proposals and NEPA Determination Requests receive a NEPA review by NREL NEPA staff. The preparation of a Construction Project Proposal results in the application of an Appendix B Annual CX or the preparation of a NEPA Determination Request.

NEPA Determination Requests are forwarded to GO for determination. NREL also provides GO with a monthly listing of those activities conducted under the Appendix B derived Annual CXs. This list, however, does not include routine maintenance activities as the application of these Annual CXs is undocumented. GO does not have procedures for the application of Annual CXs derived from Appendix A or Appendix B. GO does not currently review the application of Appendix A derived Annual CXs, and does not review the application of Appendix B derived Annual CXs beyond the inspection of NREL's monthly report on Annual CX use.

NEPA review and documentation processes at NREL are generally consistent with DOE NEPA Regulations, DOE 5440.1E, and DOE Headquarters guidance. These processes extend to activities conducted at facilities other than NREL. For example, NREL requires offerers to provide environmental information related to proposed activities on subcontracts and CRADAs (NREL-134).

GO does not have a written NEPA policy and does not have approved NEPA procedures. GO's draft NEPA procedures are undergoing internal GO review and development. Limited

formal training has been conducted for some GO staff with NEPA responsibilities. The informal NEPA program at GO, however, is generally consistent with DOE NEPA Regulations, DOE 5440.1E, and DOE Headquarters guidance.

All NREL and GO staff interviewed in conjunction with this environmental management assessment had a clear understanding of NEPA issues, their responsibilities under NEPA, and the need to address NEPA early in the planning process. For example, GO acquired landlord responsibilities for 280 acres of land northwest of the Rocky Flats plant on July 1, 1993, for use in the development and testing of wind and other renewable energy technologies. NREL and GO staff have already initiated planning for the preparation of a sitewide NEPA document.

Other NEPA management systems that are fully developed and implemented at NREL and GO include a comprehensive NEPA recordkeeping system, project planning documents that address NEPA requirements, and a NEPA document tracking system.

To date, the review of NREL activities under NEPA has not resulted in Records of Decision or Findings of No Significant Impact that commit DOE to mitigation actions. Consequently, no Mitigation Action Plan has been developed for NREL activities.

Overall, the NEPA programs at NREL and GO are comprehensive and effective given the small size and limited scope of NREL and GO responsibilities relative to other DOE facilities. The NEPA program at NREL has been formalized, while the NEPA program at GO has not. The NEPA assessment produced no NEPA findings.

3.3.5 Waste Management

3.3.5.1 Overview

The purpose of the waste management portion of the NREL Environmental Management Assessment was to evaluate NREL's waste management program. The assessment evaluated whether or not there was a formal program in place that included formal procedures and plans and documentation of waste management activities. Additionally, the Golden Field Office (GO) management structure and responsibilities were evaluated to determine whether or not GO was providing adequate oversight of NREL's waste management program. NREL's programs for hazardous waste management, waste minimization (including both hazardous and solid waste), underground storage tanks (USTs), solid waste management, and medical waste management were assessed.

This assessment was conducted through the combination of facility tours, employee interviews, and document and file reviews. A representative sample of laboratories in the Denver West Office Park Bldg. 16 and the Field Test Laboratory Building (FTLB) at the South Table Mountain (STM) site were inspected as well as the Joyce Street Facility and the National Wind Technology Center (NWTC). Also, the Medical Clinic in Bldg. 16 was visited. Interviews were conducted with the GO ES&H & Operations Division Director, ES&H staff, and Facilities Oversight staff. NREL personnel who were interviewed included members of the Safety & Security Office (SSO) staff, the Facilities Maintenance Section Manager, and several researchers. SSO employees who were interviewed included the Medical Services Administrator, the Environmental Section Manager, Staff and Associate Environmental Scientists, ES&H Representatives, and an Industrial Hygienist. Major

documents reviewed included waste minimization plans, the Waste Management Plan, procedures for the accumulation and transportation of hazardous waste, UST management procedures, the hazardous waste management training plan, results of previous audits, and corrective actions. Records reviewed included UST monthly monitoring records, hazardous waste manifests and land disposal restriction notifications, accumulation area weekly inspection logs, documentation of compliance inquiries of offsite RCRA disposal facilities, lists of unusual occurrence reports, internal tracking of hazardous waste logs, and medical waste manifests.

NREL is currently generating hazardous waste in four locations: the Denver West Office Park, the STM site, the Joyce Street Facility, the NWTC. NREL has received generator identification numbers (ID numbers) issued by the State of Colorado for each of these locations. Both the FTLB and the Waste Handling Facility are located at the STM site.

The STM site is a small quantity generator (SQG); generating approximately 200 kilograms (kg) per month of hazardous waste. The Denver West Office Park fluctuates between conditionally exempt small quantity generator (CESQG) and SQG status (I-F-1). A SQG is a generator who generates greater than 100 kg but less than 1,000 kg of hazardous waste in a calendar month. A CESQG is a generator that generates less than 100 kg of hazardous waste and less than 1 kg of acutely hazardous waste in a calendar month. Hazardous waste generated from the Denver West Office Park and the STM site consists mostly of waste from laboratory experiments including corrosive waste, ignitable waste, solvent waste, characteristically toxic waste, and discarded commercial chemical products (I-F-2 through I-F-7).

Both the Joyce Street Facility and the NWTC are CESQGs (I-F-1). The only hazardous waste generated at the Joyce Street Facility is the residue from the annual cleaning of the air scrubber (I-F-8 and I-F-9). The NWTC generates rags, gloves, and kimwipes contaminated with solvents (I-F-8).

Hazardous wastes from the Denver West Office Park and the STM site are transported to the Waste Handling Facility. From the time waste is collected from the generators, accumulation times do not exceed 90 days. NREL has a contract with a vendor to lab pack wastes accumulated at the Waste Handling Facility and to transport the wastes to an offsite permitted RCRA facility for incineration. Wastes are manifested separately under each of the Denver West Office Park and STM site ID numbers (I-F-2 and I-F-7). As of this date, NREL has not disposed of hazardous waste from the Joyce Street Facility or the NWTC (I-F-8). Additionally, lead acid batteries are sent offsite for reclamation and used oil is taken to a marketer to be recycled (I-F-7 and I-F-24).

Key NREL documents include the NREL Waste Management Plan (NREL-002); the SSO Safe Operating Procedure (SOP) for Hazardous Waste Collection and Storage at Staging Areas for Bldg. 16, FTLB, and the Waste Handling Facility (NREL-004); and the SSO Desk Procedure 4-007 for Hazardous Waste Transportation (NREL-095); and the SSO Policy and Procedure 4-19 for Waste Management/Waste Minimization (NREL-163). Each time SSO personnel pick up hazardous waste from laboratory satellite accumulation areas (SAAs), they check to see that the lab is accumulating waste in accordance with applicable Colorado hazardous waste regulations and NREL SOPs (NREL-163; I-F-10 and I-F-12). Additionally, the SSO Environmental Safety & Health (ES&H) Representatives conduct monthly inspections of the laboratories (I-F-10, I-F-12 and I-F-22). During inspections they

ensure that waste in the laboratory SAAs is being managed in accordance with Colorado hazardous waste regulations and with NREL SOPs (I-F-22). SSO has a procedure requiring these audits to be conducted, documentation of audit results to be maintained, and resolution and closure of corrective actions (NREL-179).

GO ES&H is informally conducting oversight of NREL's hazardous waste management activities, however, there is no formal program or procedures currently in place (I-F-11). GO ES&H is drafting an auditing procedure that encompasses all of GO's oversight responsibilities (see Finding FP-1).

Solid waste is collected by a vendor and transported to an offsite solid waste disposal facility (I-F-29). NREL is not ensuring that the disposal facility is in compliance with Federal solid waste disposal facility requirements and GO ES&H is not currently conducting oversight of NREL solid waste collection and disposal activities (see Finding WM-2 and FP-1).

In 1982, NREL began a recycling program for aluminum cans and paper. In 1989, the program expanded to include newspaper and glass. In 1992, a Recycling Working Group was established to address additional aspects of recycling (reduce, reuse, recycle, and rebuy). NREL has a waste minimization panel in place and a Chemical Management Process Improvement Team whose activities facilitate waste minimization goals. Employees are informed of NREL's solid waste recycling activities in the Hazardous Waste Management/Minimization Class (NREL-033), which is required for all NREL staff responsible for generating hazardous waste as well as all staff working in areas that generate or store hazardous waste (I-F-10). Other employees are informed of NREL's recycling program through signs near collection receptacles and articles in the weekly newsletter and quarterly publications. NREL is investigating the purchase of recycled paper for their copy machines, the purchase of copy machines with two-sided capabilities, and the purchase of new office equipment that can handle paper with recycled content. As of September 1993, the Recycling Working Group has become an NREL Process Improvement Team that will further evaluate solid waste recycling issues (I-F-25).

Both NREL's Waste Management Plan (NREL-002) and their Waste Minimization and Pollution Prevention Plan (NREL-003) are the key drivers in promoting waste minimization at NREL. Also, employees are trained on waste minimization techniques in the Hazardous Waste Management/Minimization Class (NREL-033). NREL also has one hazardous waste minimization program in place. Separate from the formal waste minimization program is a Chemical Management Process Improvement Team (CMPIT) whose activities facilitate waste minimization goals.

A Waste Minimization Panel has evaluated the feasibility of implementing process waste assessments (PWA) in the laboratories. Due to the dynamic processes in each laboratory, the Waste Minimization Panel determined that PWAs were not an efficient method of conducting waste minimization. Instead, the Waste Minimization Panel determined that the utilization of product substitution, a local waste exchange, SOP reviews, and inventory control held greater potential to minimize waste (I-F-24). Each individual laboratory is responsible for preparation of an SOP that implements waste minimization (NREL-033, NREL-053). In addition, NREL has implemented a program to offer excess laboratory chemicals for redistribution within the laboratories. The Waste Minimization Panel

currently plans to place excess chemical availability information on the NREL Local Area Network (I-F-24).

The CMPIT implemented several mechanisms for waste minimization. One mechanism implemented includes the use of a Chemical/Hazardous Material Request Form (NREL-165) that requires the requester to identify hazardous ingredients in the chemicals being purchased. These forms are reviewed by the SSO to prevent the unnecessary purchase of chemicals requiring special management practices (NREL-025; I-F-23).

NREL only has one underground storage tank (UST), which is located on the north side of the FTLB. The UST is a 1,010 gallon steel UST that contains Number 2 fuel oil for emergency power (NREL-097). The tank is registered with the Colorado State Inspector of Oils (NREL-175). Although this tank is exempt from the release detection requirements, NREL conducts manual tank gauging and annual tank tightness testing as a best management practice (NREL-098). Documentation of these activities are maintained in the SSO Environmental Office (NREL-175).

NREL currently operates a medical clinic in Bldg. 16 for full-time employee introductory, annual, and exit physical examinations, as well as for any occurrences that might require medical attention during working hours (I-F-21). Medical waste generated includes sharps and human blood and body fluids (NREL-154; I-F-21). NREL's Medical Services is responsible for medical waste collection and disposal from the Bldg. 16 clinic. NREL has developed a procedure for the accumulation and disposal of medical waste (NREL-154). This procedure is informally updated annually (I-F-21). NREL has hired a vendor to pick up and transport the medical waste to an offsite facility for incineration. The vendor also supplies the sharps containers, collection boxes, and bags for medical waste (NREL 154; I-F-21). Copies of the transporter manifests are maintained in NREL's files (NREL-182). The clinic was audited by the DOE Chicago Field Office in September 1992 and was also recently audited by DOE Headquarters (I-F-21 and I-F-28). These audits have evaluated the clinic only from an Occupational Safety and Health Act (OSHA) regulatory standpoint (I-F-28). Although, no formal audits of the clinic have been conducted from an environmental standpoint, the GO ES&H personnel periodically visit the clinic to check on OSHA issues and medical waste management (I-F-21 and I-F-28).

As discussed above, the assessment identified several formal and informal mechanisms that enable wastes to be effectively managed at NREL. The assessment found that personnel with waste management responsibilities, including the researchers, were aware of their responsibilities and any implementing guidance and procedures. In the area of hazardous waste management, where there was no formal GO oversight program; GO is aware of this and is in the process of developing a formal program. There is no GO oversight of NREL's solid waste program (see Finding FP-1).

The assessment identified two findings in the waste management technical programs area of environmental protection. These findings address the offsite transportation of hazardous waste and the offsite disposal of solid waste.

3.3.5.2 Findings

WM-1: Offsite Transport of Hazardous Waste

Performance Objective: In addressing hazardous waste transport between facilities in close proximity, the February 26, 1980, Federal Register (45 FR 12723) states "... if hazardous waste is transported upon public highways, the manifest and transportation requirements apply fully." Title 6, Code of Colorado Regulations (CCR) 1007-3, Sections 262.20 and 262.34, requires that a generator who transports hazardous waste for offsite storage must prepare a manifest.

Finding: It is not clear that NREL is accumulating or transporting hazardous wastes in accordance with 6 CCR 1007-3, Sections 262.20 and 262.34, or the established intent of equivalent Federal RCRA regulations as discussed in the Federal Register.

Discussion: The NREL Denver West Office Park generates hazardous wastes in amounts that fluctuate around 100kg/month and the South Table Mountain (STM) site currently generates approximately 200 kilograms of hazardous waste per month (I-F-1). Because their generation rates are between 100 and 1,000 kg/month, the two sites are recognized under 6 CCR 1007-3, Section 262.34, as small quantity generators (SQGs). NREL currently manages the hazardous waste at these facilities by transporting it from the Denver West Office Park and the STM Field Test Laboratory Building (FTLB), where it is generated and initially accumulated, to a centralized hazardous waste "staging area," known as the Waste Handling Facility, at the STM site. In the case of transport from the Denver West Office Park to the Waste Handling Facility, NREL transports the waste on publicly-owned roads. In the case of transport from other STM facilities to the Waste Handling Facility, a DOE-owned road is used on which public access is not controlled (I-A-29).

When transporting hazardous waste in these situations, NREL uses its own vehicles and staff from the Safety and Security Office (SSO) and follows DOT requirements in accordance with an established SSO desk procedure (NREL-095). However, NREL does not use a hazardous waste manifest when transporting to the Waste Handling Facility and NREL has not notified the Colorado Department of Health that they are operating as a hazardous waste transporter. When accumulating waste and transporting it between the various facilities, NREL tracks the total accumulation time and does not allow it to exceed 90 days, far less than the regulatory limits of 180 days and 270 days that apply to SQGs.

Although established EPA policies and interpretations of RCRA regulations and published preamble language generally does not provide for unmanifested waste transport between two generator facilities, the language of RCRA hazardous waste regulations in 40 CFR Parts 260 through 265 does not expressly forbid this practice. In addition, NREL has verbally verified that Colorado Department of Health RCRA interpretations consider the practice acceptable for other campus-type facilities in the State of Colorado similar to NREL (I-A-29). Nevertheless, RCRA requirements in this area are not specific, and NREL currently has no documentation indicating that Colorado Department of Health concurs with NREL's current practices.

In 1991, NREL sent a letter to the Colorado Department of Health requesting clarification on the issues surrounding the offsite transport of the Denver West Office Park hazardous

waste to the STM site (NREL-159). However, at that time the Denver West Office Park was generating less than 100 kg/month. Therefore, the Denver West Office Park was a conditionally exempt small quantity generator (CESQG) and was exempt from RCRA manifesting requirements. The Denver West Office Park currently fluctuates between CESQG and SQG status.

The Colorado Department of Health response to the NREL letter recognized the exempt nature of NREL's Denver West Office Park hazardous waste and indicated that a future change in the generator status of the Denver West Office Park (i.e., an increase in the generation rate above 100 kg/month) would result in the application of additional requirements to NREL waste transport (NREL-160). Since that time, NREL has not clarified the offsite transport issue with Colorado Department of Health either verbally or in writing (I-A-29 and I-A-30).

NREL is currently planning construction of a 24-hour guard facility and a key-card gate at the two ends of the DOE-owned road used to transport hazardous waste from the FTLB to the Waste Handling Facility. When placed into operation, these controls should effectively control public access to this road and resolve the RCRA waste concerns with respect to that transport (I-A-29). However, prior to the assessment, GO and NREL had no plan to address the hazardous waste transportation concerns between the Denver West Office Park and the Waste Handling Facility.

WM-2: Offsite Solid Waste Disposal

Performance Objective: 40 CFR Part 241 requires that Federal agencies using landfills to dispose of their solid waste employ landfills that meet specific standards for landfill design, operation, and maintenance. Article 68 of the contract between DOE and NREL requires NREL to take all measures necessary to comply with all applicable Federal, State, and local environmental protection standards and requirements.

Finding: NREL does not ensure that the independently owned landfill that receives their nonhazardous solid waste meets the guidelines contained in 40 CFR Part 241 for solid waste land disposal facilities. NREL does not document their activities taken to ensure that vendor owned and operated landfill used for disposal of NREL's solid waste is in compliance with the guidelines contained in 40 CFR Part 241.

Discussion: 40 CFR Part 241 provides guidelines for the land disposal of solid waste. Part 241 includes procedures for excluding unacceptable wastes; facility siting and design; aesthetics; operating procedures; daily, intermediate, and final cover; vector control; groundwater and surface water protection; air quality; decomposition gas control; safety; compaction; and recordkeeping. 40 CFR 241.100(c) and (d) state that these guidelines are mandatory for Federal agencies and apply to all solid wastes generated by Federal agencies, regardless of whether the solid waste is processed or disposed on or off Federal property. Where offsite facilities are used, Federal agencies must make effort to use disposal facilities that are in compliance with these guidelines. Because NREL solid waste is disposed of at an offsite landfill, it is NREL's responsibility to ensure that the offsite facility is meeting the requirements of 40 CFR Part 241.

NREL Facilities Branch, Facilities Maintenance Section is responsible for solid waste management activities at the NREL sites. Currently, NREL has a contract with an offsite vendor for collection and disposal of solid waste. The vendor disposes of NREL's solid waste in either one of two landfills. Solid waste is disposed of in either a landfill operated and owned by the vendor or in a landfill that is independently-owned (I-F-32).

NREL personnel last visited the vendor-owned landfill on March 30, 1989, at the time their contract for solid waste collection and disposal was executed (I-F-29). Documentation of the site visit was merely a statement that the facility was visited in March 1989 (NREL-174). However, NREL has been contacting the Colorado Department of Health annually to verify that the vendor's landfill is in compliance with 40 CFR Part 241 requirements. NREL does not document these telephone conversations with the state (I-F-32).

NREL has not visited the independently owned landfill nor have they contacted the state agency responsible for the independently owned landfill to ensure that the landfill is in compliance with the 40 CFR Part 241 regulations. NREL thought that because they have a contract with a vendor and that because the vendor's facilities are in compliance, it was not necessary to follow up on the independent landfill's activities (I-F-32).

Formality of programs further discusses the Golden Field Office's oversight of the solid waste management program of the NREL site (see Finding FP-1).

3.4 FORMALITY OF ENVIRONMENTAL PROGRAMS

3.4.1 Overview

The purpose of the formality of environmental program portion of the environmental management assessment was to determine whether formal systems and procedures are in place to support environmental programs and to ensure the quality and consistency of environmental management operations. The specific focus of this assessment is to analyze the level of formality adopted in establishing management systems that: implement regulations and DOE Orders; evaluate the programs, procedures, and standards appropriate to implement specific environmental programs; evaluate systems to conduct routine oversight activities to identify and prevent recurrence of environmental problems; and, control the collection, reporting, and maintenance of environmental information. The management team assessed the formality of programs employing an approach that takes into account that not all organizations or activities require the same level of formality in the implementation of policies and programs. Inherent in this perspective is the presence of an active process, which considers a flexible approach to implementation based on all risk considerations, being employed in determining the formality with which that policy is implemented. This concept is stated in DOE 5480.19, "Conduct of Operations," and is an implied tenet of DOE 5700.6C, "Quality Assurance." It should be noted that this risk-based approach concept is only applicable to decide the rigor of implementing requirements and is not to be used to eliminate required responsibilities.

Prior to the onsite portion of the assessment, activities included a review of DOE Orders and management-oriented performance evaluation guidance documents, as well as background documents provided by the NREL, GO, and EE organizations, and interviews were conducted with the Office of Management and Resources (EE-60) personnel responsible for environment and quality policy issues that affect the NREL site.

Onsite activities included interviews and discussions with management and staff from NREL and GO, and a continuation of the document review process. In addition, the assessment of the level of formality applied to NREL environmental programs and GO oversight and guidance activities was derived in part from discussions with the other Assessment Team specialists.

Neither NREL nor GO have implemented formal programs that incorporate all the requirements and concepts of the DOE directives on quality assurance (DOE 5700.6C), conduct of operations (DOE 5480.19), or self-assessment activities (Secretary of Energy guidance). These directives define the quality management concepts regarding the formality of operations within DOE operations, and their absence leaves these organizations without a framework for a formal, comprehensive management program that ensures a commitment to increasing quality standards. NREL has identified this as a problem and developed the NREL Management Program (NMP) addressing the three DOE directives within a total quality management framework. This document was recently approved by DOE Headquarters (EE-1), in fulfillment of DOE 5700.6C requirements, and as yet has not been implemented. GO has not taken any definitive steps to address the quality and conduct of operations formality issues.

One of the tenets of DOE 5480.19 and DOE 5700.6C is the need for documented program definition. The NREL Management Guide contains Policies and Procedures (P&P) that

define, for NREL-wide programs, the ES&H policy, training, and the ES&H organization. These P&Ps operate at the Office level but are not comprehensive enough to define operations at the Environmental Section (ES) level. NREL management has identified the need to define programs at the ES level, in their NMP, by requiring the development of Specific Management Plans for all management units. On the other hand, GO has no documentation that defines the scope and depth of their environmental oversight and guidance responsibilities, at this stage in their transition process.

With regard to controlling the procedure writing process, the NREL Management Guide has a P&P that clearly defines the policy, responsibilities, and format for preparing P&P documents, however NREL leaves all lower level procedural needs, content, and format to the middle and lower level managers. To ensure incorporation of environmental concerns into their research operations, NREL has developed a risk assessment P&P that requires the preparation of Safe Operating Procedures with the incorporation of an environmental issue review and Safety and Security Office (SSO) approval. Neither the SSO nor the ES have established formal guidelines to control procedure development, however they do have a standard format for desk and section procedures, which are written on an as-needed basis, and this informal system appears to work well for their size organization.

GO does not have a formal process that controls procedural needs, content, and format. However, they have begun drafting a procedure to address this concern and have established an informal process and rationale for determining the need for procedure development. At this time, GO has no formal procedures that control either their oversight or guidance activity, at this stage in their transition process.

With regard to routine facility inspections, NREL has established a self-assessment audit activity that defines the schedule for ES program review on a three-year cycle. This activity is based on a written SSO desk procedure for conducting of self-assessment activities. SSO also has formally established programs for monitoring laboratory waste management activities and vendor oversight. GO has no formal oversight program in place. GO has contracted to have an oversight program written to include both an audit and corrective action component, however, they have set no date for its completion or implementation. GO feels this is a low priority issue.

NREL utilizes a DOE-developed Safety and Health Plan data base to enter and track, to closure, all issues that have been identified through internal or external assessments. Although this data base has been actively employed for approximately two years, the process has not been formally documented. GO has not developed or adopted a similar mechanism that would ensure continuous improvement. There is a procedure written for all NREL and GO participants in the Tiger Team Assessment Corrective Action Program that works well. However, GO has not made the concepts of this corrective action process universal, and does not track or trend other findings whether internally or externally derived.

The last issue for this section involves recordkeeping and reporting for environmental programs. NREL has developed a P&P that specifically incorporates all DOE record maintenance requirements and describes the roles and responsibilities for record management activities for all NREL management units. This P&P has been adopted by SSO and the audit team did not observe any problems with records maintenance. With regard to reporting, there appears to be no problems with report development, by NREL,

however, it was noted in that timeliness was an issue on required reporting for DOE 5400.1 (see Finding EM-1). GO management states they follow DOE Orders on recordkeeping, however, they do not have any site-specific policy or procedure that controls the way they manage the recordkeeping process. GO has no specific environmental reporting responsibilities.

Two findings were identified in the Formality of Environmental Program section that relate to the development and implementation of quality management programs.

3.4.2 Findings

FP-1: Formal Incorporation of Quality Concepts

Performance Objective: Formal systems and procedures should be in place to manage, evaluate, and improve the quality of environmental activities.

Finding: GO has not defined management programs and procedures that incorporate the quality concepts inherent in the DOE directives for quality assurance, conduct of operations, and self-assessment employed in the management of environmental activities.

Discussion: DOE 5700.6C, "Quality Assurance," and 5480.19, "Conduct of Operations," share the goal of instilling, throughout DOE, a culture with the commitment to achieve an increasing standard of quality. The introduction to DOE 5480.19 states that facilities and organizations operate best when they have "well-defined, effectively administered policies and programs to govern the activities of the operating organization." DOE 5480.19 discusses implementing this concept, in Chapter I of Attachment 1, Guidelines for the Conduct of Operations at DOE Facilities, and states "definitive documentation" should declare the policies that are to be applied to an operation, including: goals and the means to achieve them; controls necessary to implement policies that support facility operations and DOE requirements and guidance; clearly defined roles, responsibilities, and authority for implementing the policies; and clearly understood and accountable interfaces with other groups. DOE 5700.6C requires that quality programs be implemented through a written quality assurance (QA) program.

GO is presently in the formative stages of moving toward a quality management (QM) approach to all its operations which, by definition, will include their environmental guidance and oversight responsibilities (I-C-13 and I-C-16). However, the implementation of a QM program, within GO, that addresses quality assurance concepts is not defined and the timeline for the implementation of a documented program has not been set (I-C-16 and I-C-18). At present, GO does not have a formal program that ensures quality and demonstrates a commitment to increasing quality standards.

The lack of formal implementation of QA concepts has a direct effect on environmental oversight activities. At present, there is no clearly defined and scheduled performance evaluation program of NREL site environmental programs (note: Cost Plus Award Fee activities are scheduled), and there is no universal corrective action activity to ensure the proper and timely correction of all noted nonconformances. The Assessment Team members addressing technical areas observed the lack of activity in the following GO oversight responsibilities:

- There is no established GO program covering the NREL site's environmental activities in compliance with DOE 5482.1B, "Environment, Safety and Health Appraisal Program."
- GO oversight of NREL's application of Annual CXs has been incomplete, and as a result, some activities requiring review, under NREL NEPA procedures, do not receive that review (i.e., Annual CX groups 2.2, and 2.3).

- GO does not provide any oversight, except for contract review, of NREL's solid waste collection and disposal because they view that program as a low risk activity (I-F-14 and I-F-27).

In the area of corrective actions, there is a procedure and an informal work instruction that define activities to track, correct, and close Tiger Team Assessment action plans. This process is working well. However, these documents are not used universally to track and close findings/observations from other internal or external organizational evaluations (I-C-14 and I-C-17). These omissions and inadequacies impact directly on the quality improvement and work processes of NREL personnel. GO has made arrangements with an outside contractor to prepare an audit and corrective action program (I-C-15 and I-C-18). However, there is no detailed statement of work to assess the scope of the work product requested, and no delivery date has been set because GO considers this a low priority issue (I-C-20).

DOE 5480.19, "Conduct of Operations," recognizes self-assessment as one of the "checks and balances needed in an operating program." Although previous, specific DOE self-assessment requirements have been rescinded, the true precepts of self-assessment, as a quality management tool, are embodied in Criteria 3 (Quality Improvement), Criteria 9 (Management Assessment), and Criteria 10 (Independent Assessment) of DOE 5700.6C. Since GO has not implemented DOE 5700.6C and developed an integrated process for self-assessment or defined their new QM program, they have no defined mechanism for evaluating their management performance and incorporating this into a process for continuous improvement.

FP-2: Implementation of Quality Management Programs

Performance Objective: Formal quality programs and procedures, derived from DOE directives, should be implemented to manage, evaluate, and correct environmental activities.

Finding: NREL has not implemented all the quality concepts derived from the DOE directives on Quality Assurance, Conduct of Operations, and Self-Assessment into current environmental management practices.

Discussion: During the past two years, NREL has implemented a quality management approach to their operations with an active continuous process improvement program. However, NREL has operated without formally defined programs in Quality Assurance, Conduct of Operations, and Self-Assessment as required in DOE 5700.6C, DOE 5480.19, and Secretary of Energy Guidance, respectively (I-C-11 and I-C-19).

In June 1993, approval was received from the lead Cognizant Secretarial Official (EE-1) to accept the NREL Management Program (NMP) as the required DOE 5700.6C QA program document (NREL-092). This document was developed to use the 10 criteria of DOE 5700.6C as a framework for the integration and implementation of all DOE directives applicable to NREL into a total management system (I-C-11). The NMP combines the concepts of quality assurance, formality of operations, and self-assessment into a functional management document without creating the redundancy of separate DOE Order-driven programs. To ensure that the DOE requirements are met, NREL has developed: three initial draft procedures for conducting self-assessment activities under the auspices of Criteria 3, 9, and 10 of DOE 5700.6C; and, a draft Conduct of Operations procedure that meets the requirements stated in DOE 5480.19, Section 5.c.

Although developed and approved, NREL management has not formally begun the NMP implementation process (I-C-10, I-C-11, and I-C-19). This implementation process will begin in October 1993 with exposition lectures to all NREL managers. However, (1) no critical path for the implementation process has been determined, (2) no formal milestones for completing training, NMP-required documentation, and integration of the present continuous improvement process have been set, and (3) the conservative estimate for full implementation of the NMP is not expected to be sooner than 12 to 18 months (I-C-11 and I-C-19). Until the NMP is fully implemented, quality and formality concerns will remain unanswered.

3.5 INTERNAL AND EXTERNAL COMMUNICATION

3.5.1 Overview

The purpose of the internal and external communication portion of the environmental management assessment was to evaluate the effectiveness of several aspects of communication within and between NREL and GO as well as external communication between these organizations, the public, DOE Headquarters, and regulatory agencies. The areas of internal communications evaluated included formal and informal communications; communications moving both vertically (top-down) and laterally through the organizations; dissemination of directives; channels to address employee concerns (bottom-up communications, including anonymous channels); working relationships with external oversight organizations and regulators; and provisions to inform and involve the public in NREL environmental issues.

The internal and external communication portion of the assessment was conducted primarily through interviews with staff and line personnel in EE, GO, and NREL to determine whether personnel were effectively transmitting and receiving information appropriate for their identified roles and responsibilities. Key documents reviewed as part of the assessment included position descriptions, meeting agenda, certain correspondence, and other documents associated with communications between GO, NREL, and outside organizations, including EE. The performance objectives considered in this portion of the assessment included those addressing internal and external communication that presented in Section II.EM.5 of the Protocols for Conducting Environmental Management Assessments of DOE Organizations (DOE/EH-0326).

Within NREL, the primary tool for formal communication of environmental requirements is the NREL Management Guide, which sets forth NREL environmental protection policies and procedures for all NREL employees (NREL-050). The document is controlled and is distributed to all managers, who are required to ensure that all employees beneath them in their own line organizations are cognizant of those portions of the guide that apply to them (I-A-9). Revisions to the document are communicated to managers through formal distribution of controlled-copy revisions and informally through monthly meetings of the NREL Management Council, a group of approximately 80 NREL personnel that includes all NREL senior management; office, division, branch, and section managers; and other key personnel.

The NREL Management Council serves as the primary mechanism for sitewide communication of issues from management (top-down) and across the NREL organization (lateral communication). The meeting agenda are established by NREL senior management (including the manager of the Safety and Security Office, the organization for establishing environmental policies and procedures and ensuring environmental compliance), and the meetings consistently include presentations on ES&H issues (I-A-15 and 27). Environmental issues presented in past meetings address employee ES&H training and orientation, occurrence reporting, DOE 5700.6C (Quality Assurance), NEPA procedures, and NREL safe operating procedure development (NREL-180). Presentations in the meetings are typically printed and distributed to attendees to share with group managers and nonsupervisory staff. Key GO staff also attend the NREL Management Council meetings.

Within SSO and the Environmental Section (ES) of SSO, staff meetings are conducted approximately biweekly to discuss and keep personnel apprised of specific ES&H activities and progress (I-A-10 and I-A-15). Staff in ES with environmental protection responsibilities are visible in the laboratories and other facilities operated by the line research organizations, and contact telephone numbers are available to all personnel through training activities and other mechanisms such as internal NREL newsletters.

External communication with the public focuses on NREL research programs, and the environmental protection component of that communication is limited, primarily due to the "clean" reputation of the NREL site (I-A-10 and I-A-17). The primary activity for communication of environmental information is an annual meeting held with local residents surrounding the South Table Mountain site. The meeting addresses both the objectives of NREL research activities as well as the potential effects of those activities and other NREL operations on the surrounding communities. Among the activities addressed in the annual meeting are construction of the Solar Energy Research Facility (SERF) and air releases from certain research projects. Both NREL and GO personnel responsible for ES&H participate in the annual meeting.

Communication with regulatory agencies on environmental compliance issues is closely coordinated between and typically involves both GO and NREL (I-A-10, I-A-19, and I-A-20). Again, due to the clean nature of the NREL site, these communications are limited. Formal correspondence is typically generated by NREL personnel and finalized and sent out by GO.

Formal communication between GO and NREL is conducted through correspondence between the NREL Director and the GO Manager (I-A-18 and I-A-19). NREL and GO personnel in their respective environmental protection organizations typically cooperate in the preparation and response of such correspondence (I-A-10, 15, 19, and 20). These personnel also communicate informally on a day-to-day basis. Except where external requirements or internal procedures dictate specific reporting or other communication, environmental protection personnel in both GO and NREL are expected to use their professional judgement as to whether the other organization should be consulted or advised. Regular meetings between GO and NREL environmental personnel are activity-based, i.e., scheduled for a specific purpose rather than regularly scheduled (I-A-19).

Communication within GO on environmental issues is typically informal. The small number of personnel involved in environmental activities (three to five persons), allows the informal system to function effectively (I-A-19 and I-A-20). Two mechanisms used to track and assign responsibilities include the electronic mail and an incoming correspondence data base log (I-A-19 and I-A-21). Both systems operate on a GO-wide local area network available to all environmental personnel.

Both GO and NREL have mechanisms for addressing employee concerns. NREL has a formal system where employees can anonymously send letters to management and the letters are printed and answered in a quarterly internal publication (I-A-10). GO recently finalized a formal procedure to respond to both GO and NREL employee concerns (NREL-058; I-A-19). These mechanisms are intended to address both ES&H as well as personnel and management issues.

As discussed above, the assessment identified a number of formal and informal mechanisms that provide effective communication within GO and NREL, between them, and with outside organizations, including the regulatory agencies, EE, and the public. The assessment found that personnel with environmental protection, compliance, and management responsibilities were generally aware of their responsibilities and the status of environmental issues that affected their positions. This was recognized consistently within senior management, line organizations with both supervisory and nonsupervisory personnel, and support organizations responsible for ensuring environmental compliance. The assessment identified one communication system, the GO external correspondence tracking system, which was not being used to track and control environmental information. GO is aware of the problem with the tracking system. However, the small size of the GO environmental staff is a key factor that facilitates correspondence tracking even with the lack of effectively implemented tracking system.

The internal and external communication portion of the assessment did not identify any findings.

3.6 STAFF RESOURCES, TRAINING, AND DEVELOPMENT

3.6.1 Overview

The purpose of the staff resources, training, and development portion of the environmental management assessment was to assess the effectiveness of both the formal and informal mechanisms that are in place to: (1) ensure that the staff resources are sufficient to conduct site operations in an environmentally sound manner, (2) identify the training needs and train management and staff on the environmental aspects of their job responsibilities, and (3) provide staff development and career advancement opportunities.

The general approach used in the assessment was to review DOE Orders and guidances, conduct interviews with EE personnel oversight responsibility for NREL, and review applicable NREL and GO background documents prior to arrival onsite. Onsite activities included a review of NREL's and GO's management practices and programs; documentation pertaining to staff resources, training, and development; and conducting interviews with all levels of management and their respective staffs. Interviews included discussions to determine NREL and GO management and staff personnel's understanding of the current staff resources, training, and development needs, as well as the mechanisms in place to ensure that the identification of staff resources and training needs are sufficient to conduct site operations in an environmentally sound manner now and in the future. Additionally, the interviews were conducted to determine if staff development and career advancement opportunities were addressed by management and available to both management and staff. These discussions were used to determine the consistency of the understanding between NREL and GO, the various levels of management within each organization, and their respective staffs. These determinations of understanding and consistency of understanding were used to evaluate the effectiveness of the mechanism used by NREL and GO for staff resources, training, and development activities. The performance objectives considered in this portion of the assessment included those addressing staff resources, training, and development that are presented in Section II.EM.6 of the Protocols for Conducting Environmental Management Assessments of DOE Organizations (DOE/EH-0326).

The four major aspects covered by the protocols identified above are environmental staffing, position descriptions and performance evaluations, environmental training programs, and staff development opportunities. Current and future staff resource needs are evaluated during the annual budgeting process (I-B-1 through I-B-13), through short-, mid-, and long-range planning activities (NREL-028 and NREL-120; I-B-5, 6, 12, and 13), and during the preparation of environmental plans and management documents (NREL-001, 002, 003, 005, and 082). The budgeting process involves staff at all levels of the NREL and GO organizations and is reviewed by EE. Planning activities and the preparation of environmental plans and management documents also involve staff at all levels of both the NREL and GO organizations. Therefore, staff and management that can identify staffing needs and evaluate these needs and effect changes are adequately involved in these processes. Position descriptions are prepared by managers for staff and include discussions on duties, including the environmental aspects; knowledge required for the position; the supervisory controls of and governing the position; guidelines to be used in performing duties; and job performance evaluation factors (NREL-176, NREL-177, NREL-178). Performance evaluations are performed by line managers on at least an annual basis (NREL-050; I-B-3 through I-B-13). Staff training needs and development

opportunities are identified and documented by the cognizant line manager and are reviewed and updated at least annually, usually during the performance evaluation process (NREL-050; I-B-3 through I-B-13). Training identified by line managers is administered through either the onsite training organization or contracted training courses or services. An example of staff development at NREL is succession planning. Staff development opportunities are generally also discussed during the performance evaluation process. In particular, NREL performs succession planning to assess the adequacy of the current staff to fill key positions should the need arise. If an inadequacy is identified, a plan is developed to correct the inadequacy. NREL and GO staff interviewed indicated that current staffing was adequate and that staffing issues were sufficiently reviewed on a periodic basis (I-B-1 through I-B-14). Interviews also indicated that management attention to training and development needs was adequate.

Based on the documents reviewed and the interviews conducted, the mechanisms used by NREL and GO to assess current and identify future staff resources and training and development needs in order to conduct site operations in an environmentally sound manner are adequate and effective. NREL's and GO's management practices and programs are based on total quality management (TQM) principles, which include applying a flexible risk-based approach to the level of formality (e.g., documentation requirements) associated with the application of quality assurance, conduct of operations, and self-assessment concepts to various activities. This approach has been applied to mean that all programs and activities are considered formal under the requirements of the NREL and GO management practices and programs, with the level of formality commensurate with the complexity and risk associated with the specific program or activity. However, the adequacy of the levels of formality of these mechanisms could not be assessed under the current status of the documentation and implementation of their management practices and programs. NREL has a documented management program, but has not implemented the program. GO has not documented their management practices. The findings associated with the formality of programs are discussed in Section 3.4 of this report, Formality of Environmental Programs. These findings do not effect the overall staff resources, training, and development assessment.

The staff resources, training, and development portion of the NREL Environmental Management Assessment did not identify any findings.

3.7 PROGRAM EVALUATION, REPORTING, AND CORRECTIVE ACTION

3.7.1 Overview

The usual approach taken in performing the program evaluation, reporting, and corrective action portion of the environmental management assessment is to focus on analyzing the management and operations contractor (i.e., MRI's NREL operations) and the DOE Field organization's (i.e., GO) Self-Assessment Programs, the program evaluation efforts associated with DOE 5482.1B, "Environment, Safety, and Health Appraisal Program," and formal corrective action activities. In investigating the condition of the NREL and GO evaluation, reporting, and corrective action programs/processes, it became evident that their status was more appropriately discussed under the "bigger picture" issue of formality of environmental programs. The discussion of current status for these programs/process and the associated findings are found in Section 3.4, Formality of Environmental Programs, of this report.

3.8 ENVIRONMENTAL PLANNING AND RISK MANAGEMENT

3.8.1 Overview

The purpose of the environmental planning and risk management portion of the environmental management assessment was to assess the effectiveness of both the formal and informal mechanisms in place to conduct environmental planning and risk assessment to ensure that environmental hazards and resource needs are adequately identified and planned for so that NREL's and GO's environmental goals can be met. Additionally, the assessment was conducted to determine the effectiveness with which environmental planning is integrated with the planning for other organizational functions and that environmental protection receives equal priority and weight as research activities.

The general approach used in the assessment was to review DOE Orders and guidances, conduct interviews with EE personnel with oversight responsibility for NREL, and review applicable NREL and GO background documents prior to arrival onsite. Onsite activities included a review of NREL's and GO's management practices and programs; documentation pertaining to environmental planning and risk management; and conducting interviews with all levels of management and their respective staffs. Interviews included discussions to determine NREL and GO management and staff personnel's understanding of the mechanisms in place for conducting environmental planning and risk management activities. Additionally, the interviews were conducted to determine if environmental planning is integrated with planning for other organizational functions and that in the planning and budget process environmental protection receives equal priority and weight as research activities. These interviews were used to determine the consistency of the understanding between NREL and GO, the various levels of management within each organization, and their respective staffs. The level of understanding was used to evaluate the effectiveness of the mechanisms used by NREL and GO staff for environmental planning and risk assessment activities. The performance objectives considered in this portion of the assessment included those addressing environmental planning and risk management, which are presented in Section II.EM.8 of the Protocols for Conducting Environmental Management Assessments of DOE Organizations (DOE/EH-0326).

The major aspects covered by the protocols identified above are environmental planning and budgeting and risk management. Environmental planning and budgeting is performed in three different ways: through long-range planning that has a horizon of 20 years at NREL (I-B-5); mid-range planning that encompasses 5 years (NREL-120; I-B-5), and short-range planning that is generally reviewed or conducted annually (NREL-005, 028, 082, and 086; I-B-3 through I-B-13). The short range planning activities include development or review of environmental plans and management documents. Based on the documents reviewed and the interviews conducted during this assessment, environmental planning is given the same priority and weight as research activities and includes both short- and long-term planning. Additionally, environmental protection considerations are included in the planning process for all organizational functions (I-B-3 through I-B-13). Environmental planning is also an integral part of the budget process. NREL and GO activities are periodically reviewed to identify and manage environmental risks. Additionally, all new activities that may effect the environment are reviewed by environmental staff to ensure that potential environmental risks are identified and sound environmental practices are incorporated in the conduct of site operations (NREL-050).

Risk management is conducted both formally and informally at the NREL site. A process for systematically evaluating all facilities and operations to identify environmental hazards is documented in NREL procedure number 4-4, Risk Assessment (NREL-053). This process is applicable to planned, existing, and unplanned hazards and is a continuous process. Additionally, risk is evaluated through routine meetings (e.g., Management Council and Executive Committee meetings) and reporting (e.g., weekly and biweekly reports) to management (I-B-3 through I-B-13). Both NREL and GO have an informal policy that gives the following priority to conflicting workloads: (1) regulatory requirements, (2) DOE Order requirements, followed by (3) all other work.

Based on the documents reviewed and the interviews conducted, the mechanisms used by NREL and GO to perform environmental planning and risk management activities in order to ensure that site operations are conducted in an environmentally sound manner are adequate and effective. NREL's and GO's management practices and programs are based on total quality management principles, which include applying a flexible risk-based approach to the level of formality (e.g., documentation requirements) associated with the application of quality assurance, conduct of operations, and self-assessment concepts to various activities. Therefore, all programs and activities are considered formal under the requirements of the NREL and GO management practices and programs, with the level of formality commensurate with the complexity and risk associated with the specific program or activity. However, the adequacy of the levels of formality of these mechanisms could not be assessed under the current status of the documentation and implementation of their management practices and programs. NREL has a documented management program, but has not implemented the program. GO has not documented their management practices. The findings associated with the formality of programs are discussed in Section 3.4 of this report, Formality of Environmental Programs. These findings do not effect the overall environmental planning and risk management assessment.

The environmental planning and risk management portion of the NREL Environmental Management Assessment did not identify any findings.

APPENDIX A

BIOGRAPHICAL SKETCHES OF ASSESSMENT TEAM

APPENDIX A:

BIOGRAPHICAL SKETCHES OF THE ASSESSMENT TEAM

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

AREA OF RESP: Team Leader

ASSOCIATION: U.S. Department of Energy

EXPERIENCE: 18 Years

- U.S. Department of Energy, Office of Environmental Audit
 - Environmental Engineer. Provides guidance, direction, and assistance to a multidisciplinary group of professionals performing environmental surveys, Tiger Team Assessments, and environmental audits of DOE facilities.
 - Served as Special Assistant for the Paducah Tiger Team Assessment; Team Leader for the Fernald Environmental Management Assessment, the National Institute for Petroleum and Energy Research Tiger Team Assessment, and the Component Development and Integration Facility and Coal-Fired Flow Facility Environmental Audits; Deputy Environmental Subteam Leader for the Brookhaven National Laboratory, Princeton Plasma Physics Laboratory, Solar Energy Research Institute, and Morgantown Energy Technology Center Tiger Team Assessments; and Deputy Team Leader for the Bonneville and Western Power Administration Environmental Audits.
- Federal Energy Regulatory Commission, Office of Hydropower Licensing
 - Civil Engineer. Directed safety and design assessments of energy projects and ensured operational and design compliance with environmental requirements.
- Anne Arundel County Department of Public Works
 - Civil Engineer. Managed projects associated with water quality planning and surface and groundwater hydrology.

EDUCATION: Graduate Studies in Civil Engineering, University of Maryland
B.S., Agricultural Engineering, University of Maryland

OTHER: Registered Professional Engineer, Maryland, Virginia, and District of Columbia

NAME: Ching-San Huang, Ph.D., P.E.

AREA OF RESP: Deputy Team Leader

ASSOCIATION: U.S. Department of Energy

EXPERIENCE: 23 Years

- U.S. Department of Energy, Office of Environmental Audit
 - Deputy Team Leader. Responsible for providing guidance, direction, and assistance to a multidisciplinary group of professionals performing environmental audits and Tiger Team Assessments at DOE facilities.
- U.S. Department of Defense
 - U.S. Army Environmental Hygiene Agency. Served as Sub-Program Manager in the area of hazardous waste minimization (HAZMIN), and multidisciplinary team leader for environmental audits; also conducted special studies, medical waste management, hazardous waste sampling, and personnel training.
 - U.S. Army HQ V Corps. As Environmental Branch Chief, supervised engineers engaged in engineering and consultation services with responsibility to plan, program, coordinate, and administer the environmental and sanitary missions in water, wastewater, solid/hazardous wastes, air pollution, and groundwater pollution.
 - U.S. Air Force. Worked as Project Manager in preparing statement of work, program plan, budgets, contractor proposal evaluation, and contractor selection. Oversaw other engineers and scientists and contractors in conducting environmental impact statements (EISs), studies, design, troubleshooting, and analyses.
- Clinton Bogert Associates
 - Senior Staff Engineer. Supervised water/wastewater and solid waste treatment process design, detailed design, pilot plant studies, cost-effective analyses, cost estimate, specifications preparation, solid waste management plans, and 201 Facility Plans.
- Metcalf & Eddy, Inc.
 - Work covered water/wastewater and solid waste treatment process design/detailed design and research, including reaction kinetics derivation, process parameter and process selection, pilot plant studies, treatment unit design and hardware selection, plant layouts, and technical report writing.

EDUCATION: Ph.D., Environmental Engineering, SUNY at Buffalo, NY
M.S., Civil Engineering, Cheng Kung University, Taiwan
B.S., Civil Engineering, Cheng Kung University, Taiwan

NAME: Donald C. Habib

AREA OF RESP: Organizational Structure; Internal and External Communications

ASSOCIATION: Brown & Root Environmental

EXPERIENCE: 11 Years

- **Brown & Root Environmental**

- Principal Engineer. Performs a broad range of regulatory compliance and waste management related projects, including assessments and audits. Served as a waste management or RCRA specialist on assessments/audits of approximately 20 facilities in the last six years, including seven DOE Tiger Team Assessments as well as other DOE assessments and other government and commercial/industrial facility assessments.
- RCRA experience includes audits and assessments, developing permit applications, performing regulatory impact analyses, developing and providing regulatory training, reviewing RFI work plans and similar documents, and performing RFAs and RFIs.
- Mixed waste experience includes assisting in DOE Federal Facility Compliance Act mixed waste treatment planning, assisting in the preparation of the DOE-wide LDR Case-by-Case Extension Application for Radioactive Mixed Wastes, performing compliance studies for mixed wastes, and other projects for DOE's Offices of Environmental Audit, Environmental Compliance, Environmental Guidance, and Environmental Restoration and Waste Management.
- Other radioactive waste management experience includes projects for several commercial nuclear power plants, including studies and engineering projects on radioactive waste solidification and volume reduction systems and shallow land burial facilities.
- Currently providing technical support to DOE's Uranium Enrichment Program, providing oversight to DOE's two UE facilities in Paducah, Kentucky, and Piketon, Ohio, on waste management and compliance issues.

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

NAME: Ernest C. Harr Jr.

AREA OF RESP: Environmental Commitment; Staff Resources, Training, and Development; Environmental Planning and Risk Management;

ASSOCIATION: Brown & Root Environmental

EXPERIENCE: 15 Years

- Brown & Root Environmental
 - Manager, Compliance Assurance Department. Responsible for the direction and oversight of a staff of environmental media and regulatory technical specialists. Served as Radiation, Environmental Monitoring, and Soils/Sediments/Biota Specialist on Environmental Surveys, Tiger Team Assessments, and Progress Assessments of the Idaho National Engineering Laboratory, Oak Ridge National Laboratory, Laboratory for Energy-Related Health Research, Lawrence Berkeley Laboratory, Stanford Linear Accelerator Center, Ames Laboratory, Princeton Plasma Physics Laboratory, Fernald Environmental Management Project, Mound Plant, Brookhaven National Laboratory, Hanford Site, and Pantex Plant. Served as air and environmental monitoring specialist on the Environmental Baseline Audit of the Coal-Fired Flow Facility. Participated in the development of audit checklists for the U.S. Department of Energy (DOE) Headquarters Environmental Audit Program and DOE Tiger Team trends analysis. Participated in the development of the Self-Assessment Program and Quality Assurance Program for Environmental Restoration (EM) DOE Headquarters (HQ) and the Naval Petroleum and Oil Shale Reserves and their management and operating contractor.
- U.S. Department of Energy, Office of Environmental Oversight (EM-22)
 - Environmental Protection Specialist. Assessed the technical adequacy as well as the quality assurance aspects of environmental management programs/projects. Areas of review included program/project objectives, methodology and/or process for achieving objectives, technical validity of methodology/process, application of appropriate quality assurance principles, recordkeeping practices, and auditability of the program/project. Served as lead auditor for EM DOE Headquarters and Field Office audits. Participated in the execution of the National Environmental Policy Act (NEPA) Compliance Officer (NCO) function with EM for waste management activities. Served as chairperson for the DOE Order 5820.2A, Radioactive Waste Management, revision team.

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

OTHER: NOA-1 Lead Auditor, 1992
Registered Environmental Assessor, State of California, 1992

NAME: Gregory T. Haugan, Jr.

AREA OF RESP: Technical Editor

ASSOCIATION: META, Inc.

EXPERIENCE: 9 Years

- META, Inc.
 - Technical Editor. Provided technical editing support to DOE during the National Institute for Petroleum and Energy Research Tiger Team Assessment, the Y12 Plant ES&H Progress Assessment, the Morgantown Energy Technology Center ES&H Progress Assessment, and the Waste Isolation Pilot Plant Environmental Management Assessment.
 - Information Management Specialist. Participated in 16 Tiger Team Assessments managing a team responsible for onsite administrative support, report production, and technical editing. Team member on seven ES&H Progress Assessments providing administrative support, onsite report production and technical editing.
- UDI Contractors, Inc.
 - Project Manager and Administrator. Supervised field operations and managed office administration for a construction management firm. Initiated the corporate safety program and monitored OSHA compliance.
- GLH Inc.
 - Program Analyst. Specialized in research, report writing, and project management software for an information resources management consulting firm.

EDUCATION: Graduate Studies, General Administration,
University of Maryland
B.A., General Studies, University of Maryland

NAME: Kara Levinson

AREA OF RESP: Waste Management

ASSOCIATION: Brown & Root Environmental

EXPERIENCE: 9 Years

- **Brown & Root Environmental**
 - Waste Management and Inactive Waste Site Technical Specialist participating in the DOE Self-Assessment of the Strategic Petroleum Reserve.
 - Waste Management Specialist for the Environmental Subteam during the Tiger Team Assessment of Lawrence Berkeley Laboratory.
 - Waste Management and Air Specialist for the DOT environmental compliance audit at the U.S. Merchant Marine Academy.
 - Participated in several air emission surveys for the Army and the Navy including the Naval Air Warfare Center, Aircraft Division (NAWC-AD), Lakehurst, New Jersey; NAWC-AD, Trenton, New Jersey; the Naval Ships Parts Control Center, Mechanicsburg, Pennsylvania; and Fort Rucker Army Base near Dothan, Alabama.
- **Other Environmental Experience**
 - Includes working as an information specialist on the U.S. Environmental Protection Agency's Resource Conservation and Recovery Act (RCRA)/Superfund Hotline where a comprehensive understanding of the RCRA, underground storage tank (UST), and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)/Superfund Amendments and Reauthorization Act (SARA) regulations and statutes was gained.
 - Coordinated a team of legal and technical professionals assigned to oversee potential responsible party funded remedial investigation/feasibility studies at hazardous waste sites throughout the State of New Jersey.

EDUCATION: B.S., Civil Engineering, University of Pittsburgh

NAME: Mark Notich
AREA OF RESP: Group Coordinator
ASSOCIATION: Brown & Root Environmental
EXPERIENCE: 15 Years

- Brown & Root Environmental
 - Environment Subteam Coordinator on Tiger Team Assessments at the Y-12 Plant, Pinellas Plant, Hanford Site, and Lawrence Berkeley Laboratory. Responsible for the technical and administrative management of contractor personnel on the Environmental Subteam. Served as a Special Assistant to the Environment Subteam Leader for the Tiger Team Assessment at the Morgantown Energy Technology Center.
 - Environmental Monitoring and Quality Assurance technical specialist for DOE ES&H Progress Assessments at Brookhaven National Laboratory and the Pantex Plant.
 - Quality Assurance/Toxic Substances Control Act (QA/TSCA) technical specialist for Tiger Team Assessments at the Rocky Flats Plant and the Feed Materials Production Center. Also served as a QA/TSCA technical specialist for the Environmental Audit of the Bonneville Power Authority Ross Complex.
 - Served as QA/TSCA Technical Specialist for the DOE HQ Environmental Surveys at Argonne National Laboratory, Oak Ridge National Laboratory, the Morgantown Energy Technology Center, the Pittsburgh Energy Technology Center, and the Naval Petroleum Reserves in California.

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

NAME: David G. Olson
AREA OF RESP: Environmental Monitoring
ASSOCIATION: Brown & Root Environmental
EXPERIENCE: 29 Years

- Brown & Root Environmental
 - Supervisor of the Environmental Laboratory for the EPA Emergency Environmental Response Unit. BRE staff Environmental Scientist, DOE Site Survey and Compliance Assessment; and Oak Ridge Y-12 Plant, Kansas City Plant, Pinellas Plant, Hanford Site, Princeton Plasma Physics, and Oak Ridge National Laboratory Tiger Team Specialist; TSCA/FIFRA/QA specialist in DOE pre-Tiger Team self-assessment of the Strategic Petroleum Reserve, New Orleans; Quality Assurance Specialist, Fernald Environmental Management Project Environmental Management Assessment and Sandia Albuquerque self-assessment programs; Toxic and Chemical Materials/Environmental Monitoring QA Specialist for the Inhalation Toxicology Research Institute self-assessment. Toxic and Chemical Materials Specialist in the regulatory compliance audit of the United States Merchant Marine Academy.
- Swindell Dressler Corporation
 - Environmental Analytical Chemist. Supervisor of water and waste water analysis laboratory. Audited client laboratories for conformance with analytical methodology quality assurance requirements. Audited client air/water sampling protocols and sample-taking for conformance with EPA and state regulations.
- U.S. Army Chemical Research Center
 - Physical Chemist Assistant, UV spectrophotometer methodology development.

EDUCATION: B.S., Chemistry, Duquesne University

NAME: William E. Schramm

AREA OF RESP: National Environmental Policy Act

ASSOCIATION: Oak Ridge National Laboratory

EXPERIENCE: 13 Years

- Oak Ridge National Laboratory, Environmental Sciences Division
 - Research Associate. Integrated Resource Management, Environmental Assessment, Ecological Economics. Provides technical assistance on NEPA related issues to the U.S. Department of Energy, Office of NEPA Oversight, and to other Federal agencies. Participated in Tiger Team Assessments of the Solar Energy Research Institute, Los Alamos National Laboratory, Stanford Linear Accelerator Center, Naval Petroleum Reserves in California, Ames Laboratory, the National Institute of Petroleum Energy Research, and Fermilab; and an Environmental Management Assessment at the Waste Isolation Pilot Plant, Carlsbad, NM.
- Martin Marietta Energy Systems, Hazardous Waste Remedial Actions Program
 - Project Manager. Environmental evaluation and restoration. Directed remedial actions and environmental studies under CERCLA, RCRA, and CWA. Investigations included assessments of contamination levels and types, and the feasibility of alternative remediation approaches at 16 Department of Defense facilities in 14 states.
- University of Texas at Austin, Texas Bureau of Economic Geology
 - Research Associate. Investigated geologic and economic feasibility of alternative methods of enhanced oil and gas recovery. Developed estimates of the state's remaining gas reserves.
- Ocean Drilling and Exploration Company
 - Senior Staff Geologist. Supervised exploration and development team activities for several company oil and gas properties.
- Union Oil Company of California
 - Geologist. Oversight of field development activities on 10 company oil and gas fields.

EDUCATION: PhD. Program, Ecology, University of Tennessee
M.B.A., Natural Resource Management, University of
Texas-Austin
M.S., Geology, Louisiana State University
B.S., Geology, Rensselaer Polytechnic Institute

NAME: Helen C. Walters

AREA OF RESP: Administration

ASSOCIATION: META, Inc.

EXPERIENCE: 25 Years

- **META, Inc.**
 - Administrator. Provided administrative support for U.S. Department of Energy (DOE) on 10 Tiger Team Assessments, 5 Environmental Audits and 4 Environmental Management Audits. Provided administrative support for final Tiger Team and Environmental Audits and Environmental Management Assessment reports.
 - Provided support for production of the Self-Assessment Training course for the Office of Special Projects (EH-5).
 - Provided support for production of the Seminar on Radiological Concepts training course for the Office of Environmental Audit (EH-24).
 - Assisted in production of the draft Administrative Support Procedures and Guidance for the Office of Environmental Audit.
- **Cate & Associates, Chartered**
 - Administrator. Served as Executive Assistant with administrative responsibilities for filing estate accounting in excess of \$125,000 to the Commissioner of Accounts; liaison with attorneys and the courts with regards to these accounts; and handled accounts receivable and payable.
- **National Council of Farmer Cooperatives**
 - Administrator. Responsible for administration of financial and human resources for a staff of 13 professional and 13 support staff. Duties in the area of finance included the preparation and oversight of an annual operating budget of \$2.5 million with reporting responsibility to a committee composed of board members. Duties in the area of human resources included hiring and training of all support staff, and developing and coordinating employee benefits packages. Responsible for accommodating 65 employees in newly constructed, 17,000-square-foot office space.

EDUCATION: B.S., Business, Kent State

NAME: David M. Wunsch

AREA OF RESP: Program Evaluation, Reporting, and Corrective Action; Formality of Environmental Programs; Environmental Protection Programs

ASSOCIATION: Brown & Root Environmental

EXPERIENCE: 14 Years

- Brown & Root Environmental
 - Environmental Subteam Contractor Coordinator, Quality Assurance (QA) Specialist, Toxic and Chemical Materials Specialist, or Special Assistant on six DOE Tiger Team Assessments and the Nevada Test Site ES&H Progress Assessment.
 - Contractor Coordinator and QA/Management Specialist on nine DOE environmental audits and appraisals.
 - Technical Specialist on a variety of DOE QA and Self-Assessment (SA) tasks including development of QA/SA programs, plans, and implementing procedures.
 - Plan, manage, and conduct environmental, management, and laboratory quality control assessments and audits of government and commercial facilities.
- EA Engineering, Science, and Technology, Inc.
 - Manager of Analytical Services. Responsible for the daily operations of an environmental chemistry laboratory of 41 people including budgeting, planning, scheduling, and personnel actions. Coordination of QA compliance activities for laboratory participation in: seven state certification programs; approvals from four Department of Defense environmental programs; and the EPA Contract Laboratory Program.
- University of Maryland Medical School
 - Laboratory Supervisor. Responsible for managing a biomedical research and clinical laboratory of 10 staff and graduate students including daily operations, Quality Assurance/Quality Control, laboratory safety, and medical and radiological waste management.

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

OTHER: Member of ASQC and NY Academy of Sciences
Certified NQA-1 Lead Auditor

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APPENDIX B

ASSESSMENT PLAN

**Plan for the
DOE Environmental Management Assessment
of the
National Renewable Energy Laboratory
(NREL)
Golden, Colorado**

**U.S. Department of Energy
Office of Environmental Audit**

September 14 - 24, 1993

TABLE OF CONTENTS

1.0	Introduction	1
2.0	Environmental Management Assessment Implementation	3
2.1	Pre-Assessment Activities	3
2.2	Onsite Activities and Reports	3
2.3	Post-Site Activities	4
3.0	Organizational Structure	5
3.1	Issue Identification	5
3.2	Records Required	6
4.0	Environmental Commitment	7
4.1	Issue Identification	7
4.2	Records Required	8
5.0	Environmental Protection Programs	9
5.1	Issue Identification	10
5.2	Records Required	11
5.3	Environmental Monitoring	11
5.4	Issue Identification	11
5.5	Records Required	12
5.6	National Environmental Policy Act	13
5.7	Issue Identification	13
5.8	Records Required	14
5.9	Waste Management	14
5.10	Issue Identification	14
5.11	Records Required	15
6.0	Formality of Environmental Programs	17
6.1	Issue Identification	17
6.2	Records Required	17
7.0	Internal and External Communication	19
7.1	Issue Identification	19
7.2	Records Required	20
8.0	Staff Resources, Training, and Development	21
8.1	Issue Identification	21
8.2	Records Required	23
9.0	Program Evaluation, Reporting, and Corrective Action	24
9.1	Issue Identification	24
9.2	Records Required	24
10.0	Environmental Planning and Risk Management	26
10.1	Issue Identification	26
10.2	Records Required	27
Attachment A	Assessment Team Schedule of Onsite Activities	30

PLAN FOR THE DOE ENVIRONMENTAL MANAGEMENT ASSESSMENT OF THE NATIONAL RENEWABLE ENERGY LABORATORY

1.0 INTRODUCTION

The DOE Environmental Audit Program is carried out by the Office of Environmental Audit (EH-24) within the Office of Environment, Safety and Health (EH). The program was created in 1985 with a goal to provide a continuing program of internal, independent oversight of line management's environmental performance, in support of DOE's broader goal of achieving full compliance and excellence in the environmental area. The objectives of the program in achieving this goal include:

- Conducting comprehensive, baseline environmental audits of facilities that were not addressed in the Environmental Survey and are not expected to receive Tiger Team Assessments;
- Conducting assessments of environmental management within line programs, including adequacy of self-assessment programs;
- Conducting a continuing program of field/technical re-audits of major and other DOE facilities;
- Conducting focused, special issue reviews to assess high priority issues at a particular site, or which cut across site and program lines; and
- Supporting line management self-assessment programs through continuing updates and automation of audit protocols, training, and other mechanisms of transferring the special auditing expertise of EH-24 to the field.

The evaluation of the National Renewable Energy Laboratory (NREL) during the period of September 14 through September 24, 1993 will be an Environmental Management Assessment with a Programmatic Assessment done in the Environmental Monitoring Quality Assurance, Hazardous Waste Management, and National Environmental Policy Act (NEPA) program areas. It will evaluate the effectiveness of environmental management programs established by DOE line organizations and their support contractors. The assessments are conducted in accordance with the DOE Environmental Assessment Program Guidance (January 1992) and Protocols for Conducting Environmental Management Assessments of DOE Organizations (DOE/EH-0326).

From an organizational perspective, the scope of the assessment will include environmental management issues at the Office of Energy Efficiency and Renewable Energy (EE), the Golden Field Office (GO), and NREL contractor organizations. The assessment team will focus on line management's performance in developing and implementing environmental management systems and programs, consistent with DOE expectations for environmental excellence.

From a functional perspective, the scope of the Environmental Management Assessment is comprehensive in that it covers a full range of relevant management systems. This includes:

- Organizational Structure;
- Environmental Commitment;
- Environmental Protection Programs;
- Formality of Environmental Programs;
- Internal and External Communication;
- Staff Resources, Training, and Development;
- Program Evaluation, Reporting, and Corrective Action; and
- Environmental Planning and Risk Management.

Issues such as the design and effectiveness of environmental self-assessment programs, implementation of policy and procedures, occurrence reporting, and use of performance indicators will receive special attention.

The Programmatic Assessments will focus on three disciplines: environmental monitoring, hazardous waste management systems and operations, and National Environmental Policy Act (NEPA). These areas were determined after a review of the NREL Tiger Team Assessment Report and discussions with EE, GO, and NREL management. The results of the programmatic assessments of these disciplines will be included in the Environmental Protection Programs portion of the Environmental Management Assessment.

2.0 ENVIRONMENTAL MANAGEMENT ASSESSMENT IMPLEMENTATION

The NREL Environmental Management Assessment will be conducted by a team consisting of a Team Leader and Deputy Team Leader from the Office of Environmental Audit (EH-24) and a Group Coordinator and management systems and technical/support specialists from Brown and Root Environmental (BRE) and Oak Ridge National Laboratory (ORNL). The administrative support will be provided by Maria Elena Toraño Associates, Inc. (META). The names and assignments are listed below:

Robert Crowley	DOE	Team Leader
Ching-San Huang	DOE	Deputy Team Leader
Mark Notich	BRE	Group Coordinator
David Wunsch	BRE	Program Evaluation, Reporting, and Corrective Action Formality of Environmental Programs Environmental Protection Programs
Ernest Harr	BRE	Staff Resources, Training, and Development Environmental Planning and Risk Management Environmental Commitment
Don Habib	BRE	Organizational Structure Internal and External Communication
David Olson	BRE	Environmental Monitoring Technical Specialist
Kara Levinson	BRE	Waste Management Technical Specialist
William Schramm	ORNL	NEPA Technical Specialist
Helen Walters	META	Administrative Support
Gregory Haugan	META	Technical Editing/Administrative Support

2.1 PRE-ASSESSMENT ACTIVITIES

Pre-assessment activities for the NREL Environmental Management Assessment included the issuance of an introduction and information request memorandum, a site visit, and initial review of documentation which was sent to the assessment team by NREL and GO as a result of the information request memorandum.

The pre-assessment site visit was conducted on July 20 and July 21, 1993, by the DOE Team Leader and Deputy Team Leader and the Group Coordinator from BRE. The purpose of the pre-assessment visit was to brief site personnel on the purpose and scope of the Environmental Management Assessment, to become familiar with NREL and its operations and environmental protection programs, through a series of briefings from NREL managers, to review information being supplied by NREL, to request additional information, and to coordinate activities for the upcoming assessment.

Interviews with EE managers, with responsibility for oversight of NREL activities, will be conducted on September 8 and 9, 1993. The purpose of these interviews is to facilitate an understanding of EE's activity with respect to effective environmental management and oversight of NREL.

2.2 ONSITE ACTIVITIES AND REPORTS

The onsite activities for the Environmental Management Assessment will begin September 14 and continue through September 24, 1993. Onsite activities will include file/record

reviews and interviews with site management and staff (including both DOE and NREL personnel), field inspections, review of selected facilities, site operations, and various media sampling events. Activities may also include interviews with regulatory agencies if necessary.

The agenda for the assessment (including a preliminary interview schedule) is shown in Attachment A. The interview schedule reflects the assessment team's best attempt to identify relevant personnel to be interviewed. Based on past experience, these schedules will change as additional information is gathered by the assessment team members and based on availability of site personnel. Modifications to the interview schedule, or other elements of the agenda, will be coordinated with the designated DOE and NREL contacts.

During the assessment, the team will conduct daily debriefing sessions with NREL, GO, and EE management to review progress and concerns to date. A factual accuracy review of all findings will begin during the second week of the assessment. On or about September 24, 1993, a closeout briefing will be conducted at the conclusion of the onsite portion of the assessment. A summary of the results of the assessment, including key findings, will be presented by the Team Leader at that time. Also at the closeout, a draft assessment report will be provided to EE, GO, and NREL for review and comment.

2.3 POST-SITE ACTIVITIES

Following the onsite activities, EE, GO, and NREL will have the opportunity to submit final comments on the draft assessment report. After reviewing these comments, EH-24 will issue a final report.

3.0 ORGANIZATIONAL STRUCTURE

3.1 ISSUE IDENTIFICATION

The Environmental Management Assessment activities for Performance Objectives Criteria (POC) EM.1, "Organizational Structure," will include evaluating the environmental management organizations of EE, GO, and NREL to determine how they are consistent with the overall organization structure and whether they are characterized by clear lines of authority, well defined roles and responsibilities, and adequate independence and management support. In particular, the assessment will evaluate the following aspects of organizations with responsibilities for NREL:

- Clarity in lines of responsibility, authority, and accountability (RAA);
- Consistency of environmental management organizational structure with larger organizational structures at NREL;
- Authority, stature, and accountability, of environmental managers;
- Responsibility loading of environmental managers;
- Definitions and understanding of personnel reporting relationships, roles, responsibilities, and accountabilities;

The general approach to the assessment will include a review of documentation regarding organizational structure and interviews with EE, GO, and NREL management and staff. Areas of particular interest will include:

- Clarity of lines of authority within and among EE, GO, and NREL, and the effectiveness of the existing organizational structure on environmental management performance;
- Clarity of roles and responsibilities of NREL contractor organizations (MRI and MACTEC), and the effect of their roles on environmental management performance;
- The correspondence between the functional reporting arrangements for environmental management and those that are shown on organization charts;
- The degree to which authority for environmental protection decisionmaking is assigned to the organizational levels that can provide the most timely and appropriate response;
- The definition and understanding of functional relationships between environmental support groups and line units;
- The degree of separation between responsibilities for the implementation and oversight of environmental policies/programs; and

- The existence of management systems and procedures to promote environmental responsibility and maintain accountability.

3.2 RECORDS REQUIRED

In addition to those documents reviewed prior to the assessment, the following records will be examined at NREL:

- Formal and informal documents and correspondence that address organizational RAA for environmental protection programs;
- Position descriptions for DOE and contractor environmental, management, and line organization personnel;
- Formal measures of job performance;
- Descriptions of any environmental recognition, award, or incentive programs; and
- Environmental planning documents.

4.0 ENVIRONMENTAL COMMITMENT

4.1 ISSUE IDENTIFICATION

The Environmental Management Assessment activities for Performance Objectives Criteria (POC) EM.2, "Environmental Commitment," will review and evaluate the organization's commitment to achieving environmental excellence. The assessment team will evaluate whether NREL demonstrates a positive attitude and proactive approach to environmental management. Some key indications of environmental commitment that will be evaluated are the following:

- Top management support and commitment;
- Awareness/motivation related to environmental management;
- Acceptance of environmental compliance/performance responsibility;
- Formal environmental policies that address specific environmental concerns; and
- Formal/informal support systems.

The general approach to the assessment will include a review of documentation related to environmental management and interviews with management and line operation staff. Areas of particular interest will include:

- Existence and organizational understanding of formal policy statement on the environment, safety, and health above mission, and that delineates NREL's environmental goals, and how they are to be met;
- How widely this policy statement is distributed;
- Top management statements of commitment to environmental excellence by managers at all levels;
- Formal statements of commitment to environmental excellence by managers at all levels;
- Evidence in interviews of a general understanding and acceptance of the importance of environmental protection, and a sense of "ownership" of environmental protection;
- Top management encouragement and acceptance of input on environmental issues from employees; and
- Inclusion of environmental issues in routine senior management meetings.

4.2 RECORDS REQUIRED

In addition to those documents reviewed prior to the assessment, the following records will be examined at NREL:

- Additional, issue-specific policies addressing more focused environmental concerns;
- Senior management statements of support for environmental management effort that are included in an annual report, speeches, internal newsletters, and other documents;
- Descriptions of environmental programs/projects;
- Accounts of employee or organization involvement in, or work with, environmental task forces, environmental professional associations, or local community organizations;
- Examples of environmental reports requested of environmental support staff by senior management and line management; and
- Formal statements of commitment to environmental excellence by managers at any level.

5.0 ENVIRONMENTAL PROTECTION PROGRAMS

The Environmental Management Assessment activities for Performance Objective (PO) EM.3, "Environmental Protection Programs," will evaluate whether NREL has the environmental programs in place to ensure compliance with Federal, state, and local environmental laws and regulations. Further, the assessment will determine if the site provides for timely and correct implementation of those DOE Orders and Secretary of Energy Notices (SENs) designed to protect the environment. The emphasis of the review will be on determining whether effective and comprehensive programs are in place and whether there is sufficient planning, oversight, and staff training regarding these programs. This review will evaluate the extent to which NREL has developed and implemented specific environmental protection programs and plans which, if properly managed, would help maintain compliance and reduce NREL's potential future legal and financial liabilities.

Based on a review of pre-assessment information provided to the Assessment Team, the key issues that will be addressed are the requirements of the following:

- Long-range environmental protection plan;
- Hazardous waste management programs;
- Waste minimization and pollution prevention awareness programs;
- Environmental monitoring programs;
- Groundwater protection management program;
- RCRA emergency response plans;
- Quality assurance programs;
- Contractor oversight; and,
- Tracking, permitting, and recordkeeping systems.

A programmatic assessment of hazardous waste management, environmental monitoring, and NEPA programs will be conducted by team specialists in conjunction with the management portion of the assessment. However, the primary responsibility of these specialists will be to support the management assessment of the NREL quality assurance in environmental protection programs.

The quality assurance (QA) management portion of the Environmental Protection Program Assessment will evaluate the site's adherence to environmental quality assurance requirements and accepted industry practices and standards of performance. This evaluation will be performed by assessing NREL quality assurance operations in both management and specific environmental protection technical areas. The review will include an assessment of the QA organization and structure development by MRI and GO that allow the requirements of Federal and state regulations, requirements, and guidelines; Executive Orders; and DOE policies and procedures to be achieved. QA activities will be

specifically evaluated in accordance with DOE 5400.1 and DOE 5700.6C, "Quality Assurance," as well as accepted industry practices and standards of performance.

This evaluation will focus on the programmatic application of quality requirements and will include a detailed review of the organizational structure, document and record control procedures, audit and assessment review activities, as well as the findings, tracking, permitting, inventory, and corrective action system. Qualification and control of subcontracted environmental sampling and analysis services will be a key technical area of this assessment.

During the assessment, the QA management specialist will utilize the inputs from all specialists to ensure that potential quality assurance problems, related to environmental programs, are identified. Primary contacts are expected to be the QA representatives and personnel responsible for environmental monitoring activities.

The environmental monitoring and waste management portion of the Environmental Protection Program Assessment will include reviews of all activities, buildings, and facilities, that involve waste handling, storage, treatment, and disposal as well as all site environmental monitoring programs. The NEPA portion will include a review of the programmatic aspects of NEPA compliance at the site. The environmental protection programs at NREL will be assessed to determine compliance with the Federal and state regulations, requirements, and guidelines; DOE Orders and other DOE guidance documents regarding environmental protection; and, accepted industry practices and standards of performance. In addition to an assessment of environmental compliance issues, the team will evaluate how well the required programs are being integrated into the site activities.

5.1 ISSUE IDENTIFICATION

The general approach used in conducting the assessment of environmental protection programs will consist of interviews with DOE-EE/GO personnel, NREL employees, and subcontract personnel responsible for environmental program development and implementation and review of documentation supporting those programs. Areas of particular interest will include:

- Understanding applicable regulatory requirements;
- Responsibilities for program development and implementation;
- Identification and regular monitoring of emission sources;
- Documentation of an environmental surveillance screening program;
- Prevention and minimization of environmental releases;
- Emergency response provisions;
- Recordkeeping and reporting;
- Training and requirements; and

- Oversight and review of programs.

In addition to interviews and document review, the specialists supporting the assessment of environmental protection programs will also conduct inspections and reviews of selected NREL facilities which will entail observations of various site operations and field sampling activities.

5.2 RECORDS REQUIRED

In addition to those documents reviewed prior to the assessment, the following records will be examined at NREL:

- Environmental protection program plans required by DOE 5400.1;
- Environmental monitoring and surveillance plans and reports;
- Source and emission inventories for air and water pollution control;
- Emergency response and remedial action plans;
- Environmental incident reporting procedures;
- Preventive maintenance and inspection procedures;
- Reports to management or regulatory agencies; and
- Other records as determined onsite.

Additional records will be reviewed as part of the technical assessment. These will include documents not yet reviewed or received (e.g., classified documents, individual files).

5.3 ENVIRONMENTAL MONITORING

5.4 ISSUE IDENTIFICATION

The environmental monitoring portion of the assessment will evaluate current sampling and analysis procedures performed at NREL by contractors and subcontractors. In addition, laboratories conducting analyses and NREL environmental samples, will be evaluated to ensure that they are generating scientifically valid and defensible data. Technical operations in the field will be observed to verify sample acquisition and transfer practices. Standard operating procedures for sampling and analysis will be reviewed to ensure proper implementation and conformance with accepted practices. Elements of the environmental monitoring QA/QC program that will be reviewed include records management, the control of subcontractors, personnel training, and chain-of-custody procedures. Internal quality assurance auditing and assessment practices will be examined. Quality assurance programs and procedures of offsite laboratories subcontracted by NREL will be included in the assessment. In addition, the effectiveness of the Golden Field Office (GO) oversight of the environmental monitoring program will be assessed. The following issues will be specifically reviewed:

- Implementation of documented QA practices;
- Design of the quality assurance organization;
- Implementation of QA into non-operational areas, such as:
 - Procurement (e.g., analytical laboratory services, environmental support services, monitoring equipment); and
 - Training program management (e.g., selection criteria, training records);
- QA qualification and oversight of offsite analytical laboratories;
- Environmental monitoring programs (e.g., liquid and air effluents, surveillance, and meteorological monitoring);
- Document and record control procedures;
- Data validation;
- Audit, assessment, and review activities, as well as the findings tracking system and corrective action system.

5.5 RECORDS REQUIRED

- QA/QC manuals and implementing procedures for the environmental monitoring and surveillance programs;
- Environmental documents or contractual agreements for off-site analytical and laboratory and environmental services;
- QA/QC audits of environmental sampling and analysis at NREL;
- QA/QC audits of off-site analytical laboratories under contract to NREL;
- Results of internal precision and accuracy studies of environmental analysis;
- Training records management (e.g., for sampling technicians, laboratory staff, and the various environmental programs);
- Environmental sample integrity at NREL;
- Standard operating procedures for environmental activities;
- Records management procedures at NREL; and
- Environmental monitoring compliance at the NREL.

Additional documentation supporting the above programs will also be reviewed.

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5.6 NATIONAL ENVIRONMENTAL POLICY ACT

5.7 ISSUE IDENTIFICATION

Environmental Management Assessment activities for Performance Objective and Criteria (POC) EM.3-I, Environmental Protection Programs (NEPA portion), will investigate the National Renewable Energy Laboratory's (NREL) development and implementation of a National Environmental Policy Act (NEPA) program capable of ensuring compliance and supporting progress towards environmental excellence. The Environmental Protection Programs discipline focuses not only on environmental management system characteristics but on system implementation (i.e., actual vs. intended characteristics) by evaluating/verifying program existence, quality and effectiveness.

The scope of the NEPA assessment is designed to gain a broad understanding and awareness of DOE and operating contractor systems for NEPA compliance in order to describe the range of issues and problems that may exist. A detailed evaluation of compliance with specific requirements of the Council of Environmental Quality (CEQ) and DOE NEPA regulations and the DOE NEPA Order is outside the scope of the assessment. However, the assessment will address areas where DOE has established specific management system requirements, such as definition and documentation of the NEPA program organization and structure, and will include a review of the DOE and operating contractor activities for adherence to best management practices (BMPs). BMPs are procedures that enhance overall compliance when specific requirements do not exist or do not apply.

The Assessment approach involves the review of DOE and operating contractor NEPA procedures, documentation and operations, and will include interviews, as appropriate, with NREL staff responsible for NEPA procedures and the NEPA review process; NREL project and program managers, the legal and public relations staff and the classification officer; and others as the need arises. Specific activities within the NEPA portion of the Environmental Protection Programs discipline include:

- The review of policy statements, program plans, and standard operating procedures for consistency with the DOE NEPA Regulations (10 CFR 1021), DOE 5440.1E and related DOE Headquarters Orders, memoranda and guidance;
- Interviews with DOE and operating contractor personnel to determine the depth of understanding and compliance with DOE NEPA procedures;
- The review of previous NEPA audits and action plans (where applicable) to determine progress toward resolution of findings; and,
- The review of screening criteria and the process used to recommend and determine appropriate levels of NEPA documentation for every proposed actions.

5.8 RECORDS REQUIRED

As part of the NEPA assessment, documents and files in the following categories that were not previously obtained as part of the pre-visit document request (documents not previously identified) will be reviewed during the assessment:

- Any facility-specific or Office of Energy Efficiency and Renewable Energy (EE) NEPA guidance or policies;
- Any correspondence or guidance which refers to delegation of authority to make NEPA determinations;
- State of local "NEPA-type" statutes or regulations;
- Mitigation reports available for EAs and EISs;
- Printout from a database which tracks NEPA documents (if such a database exists); and
- Corrective Action Plans (NEPA portion) from previous assessments.

5.9 WASTE MANAGEMENT

5.10 ISSUE IDENTIFICATION

This portion of the assessment will evaluate the management of solid and hazardous wastes including accumulation, labeling, characterization, transportation and disposal, with respect to the requirements of DOE Orders, Federal and state regulations, and best management practices. In addition, this portion of the audit will evaluate the operation, management, and closure of regulated underground storage tanks (USTs) with respect to applicable RCRA regulations.

Specific issues to be investigated include, but are not limited to, the following:

- Characterization of wastes with respect to hazardous constituents are being conducted according to NREL's Waste Management Plan;
- Waste segregation systems and controls;
- Manifesting, recordkeeping, and tracking of wastes are being conducted in accordance with applicable regulations and NREL's Hazardous Waste Management Plan;
- Satellite accumulation and less-than-90-day and 180-day storage areas for hazardous wastes are being managed in accordance with Federal, state, and NREL requirements;
- Oversight of accumulation, transfer, and storage areas are conducted in accordance with both NREL's Hazardous Waste Management Plan and with waste management policies and procedures;

- All packaging, labeling, marking, placarding, and transportation of hazardous waste is in accordance with the NREL's Hazardous Material Transportation Manual and with NREL's Hazardous Waste Transportation Procedures;
- Evaluations of offsite commercial treatment, storage, disposal, and recycling vendors and facilities is being achieved;
- Waste minimization and pollution prevention activities and plans including conducting process waste assessments to identify, screen, and analyze options to reduce the generation of waste are in place and are being implemented;
- Training of hazardous waste handlers, generators, and other personnel;
- Hazardous waste notifications;
- NREL Emergency Preparedness Plan and emergency response;
- Recordkeeping practices pertaining to waste management and underground storage tanks;
- Procurement of materials with a minimum recycled content; and
- Allocation of funding for the waste management program.

5.11 RECORDS REQUIRED

Documents and files to be reviewed as part of the assessment will include, but will not be limited to, the following:

- Written policies and procedures relating to waste management activities including waste management plans, waste minimization plans, pollution prevention plans, internal procedures, and other guidance documents;
- Waste generation and characterization documentation;
- Waste storage, treatment, and disposal records;
- Regulatory exclusions, waivers, reports, plans, agreements, or other submittals related to waste management activities;
- Emergency response and cleanup procedures and records including any unusual occurrence reporting documentation;
- Any inspection reports or notices of violation from the state or the U.S. Environmental Protection Agency (EPA) related to hazardous waste management activities;
- Any internal audits or assessments of NREL's waste management program;

- Waste management training records;
- Manifests from the last three years and any land disposal restriction notifications;
- Any liability audits that have been conducted for off-site commercial waste treatment, storage, disposal, recycling or transportation facilities or contractors;
- UST registration, leak detection, monthly monitoring, maintenance, upgrading, and permanent closure records; and
- Records documenting requests for funding of the waste management program.

6.0 FORMALITY OF ENVIRONMENTAL PROGRAMS

6.1 ISSUE IDENTIFICATION

The Environmental Management Assessment activities for Performance Objective (PO) EM.4, "Formality of Environmental Programs," will be evaluated along with the management systems for ensuring environmental compliance. This discipline focuses on the formality of management systems and controls in place at NREL that assure day-to-day compliance of environmental operations. These systems include environmental regulatory tracking and translation, procedures and guidelines for implementing NREL's environmental protection policies and programs, routine facility inspections, and recordkeeping and reporting.

The general approach to the assessment will include interviews with DOE and NREL personnel responsible for environmental policy development and implementation; and, selected subcontractors, who provide services in accordance with implementing site environmental policies. A review of documentation supporting environmental programs will be conducted. Areas of particular interest will include:

- Formality of the methods establishment to ensure field organizations are provided with sufficient guidance for compliance with new regulations or policies;
- Process used in developing and issuing formal standards and procedures to ensure implementation of environmental protection programs, and their periodic review and updating;
- Procedures established by research and engineering departments to ensure that activities that might impact the environment contain sufficient environmental protection sections;
- Programs for routine site and equipment inspections/ compliance checks, protocols for completing maintenance and repairs identified during routine inspections, and tracking inspections for noticeable trends;
- Policies and procedures for controlled documentation and environmental record retention;

6.2 RECORDS REQUIRED

The assessment will include review of key documents supporting environmental programs prior to and during the site visit. Documents of particular interest include:

- Project and site office written procedures for the implementation of environmental protection programs;
- Long-range environmental protection plans;
- Regulatory tracking system and guidance documents;

- Recordkeeping and document control procedures;
- Examples of environmental records and reports;
- Documentation and records of environmental performance;
- Maintenance and construction standard operating procedures;
- Site and equipment inspection logs and records, including corrective action measures;
- Incident reports;
- Contractor guidance and oversight on environmental issues; and
- Other records as determined onsite.

7.0 INTERNAL AND EXTERNAL COMMUNICATION

7.1 ISSUE IDENTIFICATION

The Environmental Management Assessment activities for Performance Objectives Criteria (POC) EM.5, "Internal and External Communication," will determine whether formal and informal channels of communication are effective in emphasizing management commitment to environmental protection; promoting awareness and support of environmental policies and programs throughout the organization; and providing information to external organizations, such as regulatory agencies, environmental groups, and the community. The review will focus on the modes of communication used and their effectiveness. Key aspects of NREL communication that will be addressed include the following:

Internal Communication

- Extent, effectiveness, and timeliness of NREL's communication of environmental policies, standards, guidance, and performance to employees;
- Lateral communication of environmental protection practices and best management practices across DOE and contractor departments, divisions, and office organizations;
- Mechanisms for "bottom-up" communications of environmental concerns;
- Clarity and timeliness of directives and guidance that communicate environmental policies and guidelines to all personnel;
- Overall understanding of environmental policies and requirements throughout NREL; and
- Employee awareness of personal environmental responsibilities, and management systems to promote that awareness.

External Communication

- Working relationships with external oversight organizations and regulators;
- Frequent and timely formal communication of environmental risks and protection efforts to external organizations;
- Provision for external parties to be involved in key decisions related to environmental protection;
- Responsiveness to environmental concerns expressed by external parties; and
- External recognition of NREL's commitment to environmental protection.

The general approach to the assessment will include interviews with NREL personnel responsible for environmental policy and program communication, as well as affected personnel (management and staff). As appropriate, interviews will also be conducted with selected external parties (regulatory agencies, environmental interest groups, and representatives of the local community). The assessment will also include a review of documentation supporting internal and external communication programs.

The scope of internal communication programs is interpreted widely, and is viewed as including staff meetings, memoranda, management reports, task forces, training programs, newsletters, speeches, and other relevant forms of communication. Given this wide scope, and the overlap with other assessment functional areas, communication with other team members will be routine and extensive.

7.2 RECORDS REQUIRED

In addition to those documents reviewed prior to the assessment, the following records will be examined at NREL:

- Procedures and records of EE, GO, and NREL communications of policies and other directives;
- Samples of relevant management reports and staff meeting minutes;
- Forms and guidelines for internal anonymous reporting of environmental issues;
- Guidance documents for interpretation and implementation of environmental regulations and policies;
- Internal NREL newsletters that communicate and promote environmental awareness;
- Press releases relating to environmental activities and programs;
- Documentation of strategies or approaches to communicate with regulators on environmental compliance issues;
- Documentation of information and awareness programs for affected external parties; and
- Other records as determined onsite.

8.0 STAFF RESOURCES, TRAINING, AND DEVELOPMENT

8.1 ISSUE IDENTIFICATION

The Environmental Management Assessment for Performance Objectives Criteria (POC) EM.6, "Staff Resources, Training, and Development," will involve a review and analysis of EE, GO, and NREL operations to verify that staff resources are sufficient to develop and implement environmental protection programs; that all personnel have received environmental protection training commensurate with their job responsibilities; and that professional development opportunities for environmental staff are equal to those of their peers in non-environmental positions. Specifically, the assessment will verify the following:

Resources

- Environmental support group and/or line management staffing levels are sufficient to achieve the environmental performance goals of EE, GO, and NREL;
- Environmental managers and support personnel have the relevant background and training to carry out their responsibilities;
- Staffing support for environmental protection activities is provided in a timely, responsive manner;
- A system is in place to identify both short-term and long-term environmental staffing and resource requirements; and
- Appropriate job descriptions are established and maintained for environmental positions;

Training

- Environmental training programs are defined in a set of controlled documents (e.g., organizational policy statements or training manuals);
- There is a process to evaluate and establish environmental training needs;
- Environmental training programs are supported by appropriate materials and qualified instructors;
- There is a formal process to ensure that training programs provide adequate coverage of DOE Orders, Federal and state regulations, and internal policies and procedures;
- Environmental protection training is included in new employee and contractor orientation training;
- There are adequate training facilities and physical resources;

- Training activities are documented and the recordkeeping system is auditable; and
- There is a process for the periodic evaluation of the effectiveness of the training program;

Development

- DOE and NREL provide career opportunities and advancement for environmental staff;
- Environmental performance criteria are included in job descriptions and performance appraisals and personnel are held accountable for meeting environmental goals; and
- Environmental support staff are encouraged to develop management, supervisory and other and professional skills.

The general approach to the assessment will include interviews with EE, GO, and NREL personnel regarding staff resources, training, and development, as well as a review of relevant and available documentation.

- Personnel have appropriate technical experience and background to develop and implement a groundwater protection management plan;
- Adequate procedures exist for the selection of staff from the wage pool for specific projects, including procedures for ensuring adequate staffing during high demand periods;
- Adequate and timely procedures exist for approval of training plans;
- Environmental staffing resources are sufficient from a quantitative and qualitative perspective to develop and implement a General Environmental Protection Program consistent with DOE 5400.1;
- Environmental staffing resources are sufficient from a quantitative and qualitative perspective to develop and implement a formal ESH&S internal appraisal and self-assessment program;
- NREL has allocated sufficient staff to develop and implement standards for environmental training;
- The facility has adequate training facilities;
- NREL has trained personnel in asbestos management issues, including procedures for asbestos identification, inspection, collection, and disposal;
- Officials responsible for implementation of spill prevention control and countermeasure activities are adequately trained for these responsibilities;

- Personnel have the necessary training to develop and implement a quality assurance plan for NREL's environmental monitoring and analytical programs;
- Personnel have been trained in any new policy and procedures associated with the Office of Environment, Safety, Health, and Security (ESH&S).

8.2 RECORDS REQUIRED

In addition to those documents supplied prior to the assessment, the following records will be examined at NREL:

Resources

- Documented requests for additional environmental staff;
- Hiring plans for environmental staff;
- A sample of resumes or "171" forms for selected environmental staff and other staff with some environmental responsibilities; and
- A sample of job descriptions and performance criteria for key line management and operating personnel, not necessarily environmental staff;

Training

- Training program manuals and other materials (written and audiovisual);
- Documentation of training courses;
- Training records for a sample of environmental support personnel, their "line peers", and non environmental personnel;
- A sample of resumes from environmental trainers;
- Written material on the formal orientation program for new hires and contractors;

Development

- Individual professional development plans;
- Written criteria/procedures for conducting performance appraisals of staff at all levels;
- Copies of actual performance appraisals for relevant environmental staff; and
- Copies of any guidelines or criteria for any formal or informal staff recognition awards programs.

9.0 PROGRAM EVALUATION, REPORTING, AND CORRECTIVE ACTION

9.1 ISSUE IDENTIFICATION

The assessment activities for Performance Objective (PO) EM.7, "Program Evaluation, Reporting, and Corrective Action," will assess whether NREL associated organizations have systems that effectively evaluate environmental protection activities, implement corrective actions, and report environmental concerns in a comprehensive manner. One distinct area of review will be the evaluation of the self-appraisal/assessment programs. The approach of the assessment will include interviews with NREL, GO, and EE personnel responsible for environmental programs, and in depth reviews of pertinent site documentation.

Based on a review of the information provided to the Assessment Team, the key issues that will be addressed include the following:

- Design of the NREL and DOE self-assessment, audit, and appraisal programs, including objectives, scope, approach, organization, scope, and resources;
- Authority, responsibility, and accountability for environmental program implementation;
- Process for establishing appropriate performance objectives and criteria for environmental programs;
- Roles and responsibilities for tracking performance indicators;
- Selection, training, and functional independence of performance evaluation teams;
- Scheduling and budgeting of assessments, audits, and appraisals;
- Integration of corrective action and verification programs with issue/occurrence reporting procedures;
- Efforts to conduct root cause analysis;
- Process for identification and dissemination of lessons learned across NREL; and
- Budget allocations for addressing approved corrective actions.

9.2 RECORDS REQUIRED

In addition to those documents reviewed prior to the assessment, the following documentation will be examined at NREL:

- Description of the programs, procedures, and responsibility;
- Audit and appraisal reports;

- **Corrective action plans;**
- **Program budget allocation;**
- **Follow-up and trends analysis reports;**
- **Auditor training records; and**
- **Other documentation as determined onsite.**

10.0 ENVIRONMENTAL PLANNING AND RISK MANAGEMENT

10.1 ISSUE IDENTIFICATION

The Environmental Management Assessment activities for Performance Objectives Criteria (POC) EE.8, "Environmental Planning and Risk Management," will include evaluating the effectiveness of project-wide environmental planning activities. The scope of the planning portion of the assessment will include environmental activities as well as more standard business planning activities, such as budgeting, priority setting, and allocation of resources. Short- and long-term planning will be addressed. In addition to planning, this portion of the assessment will evaluate the adequacy of systems designed to identify environmental hazards and to minimize and control environmental risks.

The assessment will evaluate the organization's systems for environmental planning which address budgeting and priority-setting for the allocation of available funds. Planning for environmental remediation and protection will be evaluated to determine if it is integrated across the organization in order to ensure the availability of sufficient resources to achieve environmental performance goals. Both short- and long-term planning will be addressed. Environmental planning and guidance at EE will also be assessed.

The assessment will also evaluate the facility's systems for identifying environmental hazards, assessing the environmental risks associated with the hazards, establishing criteria for risk acceptability, and addressing the risks. The emphasis of the review will be to determine whether the site has adequately identified and quantified environmental risks to make informed management decisions on proper measures needed to minimize and control risks. Issues that will be considered include risk management program design and approach, and management involvement in the processes used by the site.

Based on a review of information provided to the Assessment Team, the key issues that will be addressed include the following:

Environmental Planning

- Prioritization mechanisms for allocation of short- and long-term funds;
- Adequacy of funding for environmental remediation and protection activities;
- Adequacy of pollution control technologies; and
- Control and oversight of purchased materials, equipment, and services.

Risk Management

- Risk management program design, approach, and procedures;
- Program responsibility and implementation;
- Issues identification;
- Levels of management involvement; and

- Review of capital expenditures and projects for environmental risk evaluation.

The general approach to the assessment will include interviews with EE, GO, and NREL personnel responsible for environmental planning and risk management, and documentation supporting these programs. Areas of particular interest include the following:

Environmental Planning

- The mechanisms of resource allocation and priority setting, and the extent to which actual resource allocation is consistent with environmental objectives;
- Adequacy and timing of resources allocated to environmental remediation and protection functions;
- Extent of GO and EE guidance and oversight; and
- Responsibilities for implementing environmental planning activities;

Risk Management

- NREL's systems to identify environmental risks;
- Responsibilities for implementing risk management activities;
- Risk management prioritization criteria;
- Extent of GO and EE guidance and oversight;
- A management policy of looking beyond compliance; and
- Methods of assuring that NREL is employing the best available technologies for environmental risk management.

10.2 RECORDS REQUIRED

In addition to those documents reviewed prior to the assessment, the following documentation will be reviewed at NREL:

Environmental Planning

- Description, if any, of the mechanics of the budgeting process;
- Description of any programs, policies, and/or procedures for tracking current trends in pollution control technologies and for selecting technologies;
- Short- and long-term operating plans; and
- Other records as determined onsite.

Risk Management

- Risk management plans and implementing procedures;
- Description of risk management criteria and guidance;
- Risk assessment reports;
- Environmental risk tracking and trending reports; and
- Other records as determined onsite.

APPENDIX C

SCHEDULE OF ONSITE ACTIVITIES

APPENDIX C:

SCHEDULE OF ONSITE ACTIVITIES

Week 1	Mon 9/13/93	Tue 9/14/93	Wed 9/15/93	Thu 9/16/93	Fri 9/17/93	Sun 9/19/93
Team Schedule am	Travel	7:30 am Badging Opening Inbriefs	Interviews	7:30 am Daily Debrief with Site Interviews	7:30 am Daily Debrief with Site Interviews	Develop draft findings
pm	Travel	Interviews 5:00 pm Team Meeting	Interviews 5:00 pm Team Meeting	Interviews 5:00 pm Team Meeting	Interviews 4:00 pm Team Meeting 6:00 Team meeting at the hotel. One liner discussion	Develop draft findings
Week 2	Mon 9/20/93	Tue 9/21/93	Wed 9/22/93	Thu 9/23/93	Fri 9/24/93	Sat 9/25/93
Team Schedule am	Followup interviews Draft sections and overviews preparation	8:00 EM Findings and Overview FAR Package to Site 11:00 EM Factual Accuracy Review	9:00 NEPA Factual Accuracy Review	10:00 WM Factual Accuracy Review Develop Section 2.0 Summary and Executive Summary	Develop closeout presentation slides	Revisions (If necessary)
pm	Draft sections and overviews preparation Preparation of Factual Accuracy Review (FAR) Packages	4:00 NEPA and Environmental Management Findings and Overviews to site	1:00 Environmental Management Sections Factual Accuracy Review 4:00 WM Findings and Overview to site	9:00 WM Factual Accuracy Review Finalization of all report sections	12:00 Report to Site for reproduction Develop closeout presentation slides	Revisions (If necessary)
Week 3	Mon 9/27/93					
Team Schedule am	Closeout Date Travel					

SCHEDULE OF ONSITE ACTIVITIES (Continued)

Week 1	Mon 9/13/93	Tue 9/14/93	Wed 9/15/93	Thu 9/16/93	Fri 9/17/93	Sun 9/19/93
D. Habib am Organizational Structure Internal and External Communication		Interviews Opening Inbriefs	Interviews D. Amidaneau, NREL w/M. Notich W. Ives, GO	Interviews P. Kearns, GO J. Baker, GO D. Turner, GO D. Barnicz, MACTEC	Followup interviews as needed S. O'Connell, B. Miller, NREL C. Powers, GO	
pm	Travel	Interviews S. Kaminky, MACTEC Tour L. Sample, NREL	Interviews S. Deb, NREL W. Griffing, NREL M. Bodnarczuk, NREL R. Noun, NREL	Followup interviews and document review J. Beck, GO C. Phoebe, GO	Interviews D. Sunderman, NREL J. Baker, GO	
Week 2	Mon 9/20/93	Tue 9/21/93	Wed 9/22/93	Thu 9/23/93	Fri 9/24/93	Sat 9/25/93
D. Habib am	Complete draft findings	Complete draft findings	Draft sections to site	Incorporation of site comments into report Finalize report sections		
pm	Complete draft findings	Prepare sections for Factual Accuracy Review	Factual Accuracy Review	Prepare closeout input	Travel date	

SCHEDULE OF ONSITE ACTIVITIES (Continued)

Week 1		Mon 9/13/93	Tue 9/14/93	Wed 9/15/93	Thu 9/16/93	Fri 9/17/93	Sun 9/19/93
E. Harr	am		Opening Inbrief	Document review	Interviews M. Bodnarczuk, NREL w/D. Wunsch M. Uhrlaub, EE	Interviews P. Kearns, GO J. Baker, GO w/D. Wunsch	Draft sections development
Staff Resources, Training and Development							
Environmental Planning and Risk Management							
Environmental Commitment							
	pm	Travel	Document review	Interviews B. Griffing, NREL D. Amidaneau, NREL R. Noun, NREL L. Sample, NREL w/D. Wunsch	Interviews D. Turner, GO Document Review	Interviews D. Sunderman, NREL w/D. Wunsch C. Phoebe, GO	Draft sections development
Week 2		Mon 9/20/93	Tue 9/21/93	Wed 9/22/93	Thu 9/23/93	Fri 9/24/93	Sat 9/25/93
E. Harr	am	Complete draft findings	Prepare sections for Factual Accuracy Review	Finalize report sections	Incorporation of site comments into report		
	pm	Prepare sections for Factual Accuracy Review	Draft sections to site	Factual Accuracy Reviews	Prepare closeout input	Travel date	

SCHEDULE OF ONSITE ACTIVITIES (Continued)

Week 1	Mon 9/13/93	Tue 9/14/93	Wed 9/15/93	Thu 9/16/93	Fri 9/17/93	Sun 9/19/93
D. Wunsch am Program Evaluation, Reporting, and Corrective Action Formality of Environmental Programs Environmental Protection Programs		Opening Inbriefs	Interviews B. Griffing, NREL D. Amidaneau, NREL D. Fowler, NREL	Interviews M. Bodnarczuk, NREL K. Linton, GO M. Uhrlaub, EE J. Beck, GO	Interviews P. Kearns, GO M. Jordan, NREL J. Baker, GO	Draft findings development
pm	Travel	Interviews	Interviews G. Collette, GO K. Harness, GO L. Sample, NREL w/E. Harr	Interviews D. Turner, GO	Document review D. Sunderman, NREL	Draft findings development
Week 2	Mon 9/20/93	Tue 9/21/93	Wed 9/22/93	Thu 9/23/93	Fri 9/24/93	Sat 9/25/93
D. Wunsch am	Complete draft findings	Prepare sections for Factual Accuracy Review	Finalize report sections	Incorporation of site comments into report Finalize report sections		
pm	Prepare sections for Factual Accuracy Review	Draft sections to site	Factual Accuracy Review	Prepare closeout input	Travel date	

SCHEDULE OF ONSITE ACTIVITIES (Continued)

Week 1		Mon 9/13/93	Tue 9/14/93	Wed 9/15/93	Thu 9/16/93	Fri 9/17/93	Sun 9/19/93
D. Olson	am		Opening Inbriefs	Site Tour with M. Jordan, NREL	Interviews	Followup interviews as needed	Develop draft findings
Environmental Monitoring				Interviews M. Jordan, NREL D. Turner, GO Observe PM-10 Sampling	Observe wastewater sampling M. Bodnarczuk, NREL M. Jordan, NREL	J. Baker, GO D. Turner, GO M. Jordan, NREL	
	pm	Travel	Document Reviews	Interviews D. Amidaneau, NREL Document review	Followup interviews as needed Document review	Document review	Develop draft findings
Week 2		Mon 9/20/93	Tue 9/21/93	Wed 9/22/93	Thu 9/23/93	Fri 9/24/93	Sat 9/25/93
D. Olson	am	Complete draft findings	Draft sections to site for Factual Accuracy Reviews	Travel			
	pm	Prepare sections for Factual Accuracy Review	Factual Accuracy Review Incorporation of site comments into report				

SCHEDULE OF ONSITE ACTIVITIES (Continued)

Week 1	Mon 9/13/93	Tue 9/14/93	Wed 9/15/93	Thu 9/16/93	Fri 9/17/93	Sun 9/19/93
W. Schramm am National Environmental Policy Act		Opening Inbriefs	Interviews D. Turner, GO J. Hahn, GO G. Honold, NREL	Interviews Document review	Followup interviews as needed J. Meeker, GO J. Baker, GO D. Blanchfield, GO	Develop draft findings
pm	Travel	Interviews B. Marshall, NREL L. Sample NREL	Interviews Dallas Martin, NREL R. Noun, NREL D. Amidaneau, NREL	Interviews P. Kearns, GO J. Schaffer, NREL Document review	Followup interviews as needed D. Tanolini, NREL Document review	Develop draft findings
Week 2	Mon 9/20/93	Tue 9/21/93	Wed 9/22/93	Thu 9/23/93	Fri 9/24/93	Sat 9/25/93
W. Schramm am	Complete draft findings	Prepare section for Factual Accuracy Review	Factual Accuracy Review	Finalize report sections		
pm	Prepare sections for Factual Accuracy Review	Draft sections to site	Incorporation of site comments into report Finalize report sections	Prepare closeout input	Travel date	

SCHEDULE OF ONSITE ACTIVITIES (Continued)

Week 1		Mon 9/13/93	Tue 9/14/93	Wed 9/15/93	Thu 9/16/93	Fri 9/17/93	Sun 9/19/93
K. Levinson	am		Opening Inbrief	Tour of STM facilities (FTLB, Hazardous Waste Storage Building)	Interviews J. Eickhoff, S. O'Connell, NREL D. Turner, GO D. Amidaneau, NREL M. Jordan, NREL	Interviews Waste Min Panel, CMPIT, Solid Waste Group D. Stewart, NREL J. Baker, GO J. Beck, GO	
	pm	Travel	Waste Management Briefing Tour of Building 16 (Labs and Room 115 Staging Area)	Tour of NTWC Tour of Joyce Street Facility	Interviews G. Collette, GO Tours of Additional Bldg. 16 Labs J. Cambridge, NREL J. Donley, M. Sowder, NREL	Interviews W. Rabb, NREL Document review list w/S. O'Connell J. Eickhoff, NREL	
Week 2		Mon 9/20/93	Tue 9/21/93	Wed 9/22/93	Thu 9/23/93	Fri 9/24/93	Sat 9/25/93
K. Levinson	am	Complete draft findings	Prepare sections for Factual Accuracy Review	Prepare sections for Factual Accuracy Review	Factual Accuracy Review		
	pm	Prepare sections for Factual Accuracy Review	Prepare sections for Factual Accuracy Review	Draft sections to site	Incorporation of site comments into report Prepare closeout input	Travel date	

APPENDIX D

LIST OF SITE DOCUMENTS REVIEWED BY THE ASSESSMENT TEAM

APPENDIX D:**LIST OF SITE DOCUMENTS REVIEWED BY THE ASSESSMENT TEAM**

Document #	Title/Description	Author	Organization	Recipient	Document Date
NREL-001	NREL Environmental Section Quality Assurance Plan	M. Jordan	NREL, Environmental Section	NREL	3/22/93
NREL-002	NREL Waste Management Plan	S. O'Connell	NREL, Environmental Section	NREL	5/21/93
NREL-003	NREL Waste Minimization and Pollution Prevention Plan	S. O'Connell	NREL, Environmental Section	Not indicated	4/21/92
NREL-004	Safe Operating Procedure - Hazardous Waste Collection and Storage at Staging Areas for Building 16, FTLB, and the Waste Handling Facility	S. O'Connell	SSO	NREL	5/3/93
NREL-005	Environmental Monitoring Plan	J. Baker, GO W. Griffing, NREL M. Jordan, NREL	SERI	DOE	3/25/91
NREL-006	EPIP - National Wind Technology Center	M. Jordan	NREL, Environmental Section	NREL	7/12/93
NREL-007	EPIP - South Table Mountain Site, Denver West Office Park, Joyce Street Facility	M. Jordan	NREL, Environmental Section	NREL	6/22/93
NREL-008	NREL Roles and Responsibilities - Environmental Personnel	Not indicated	NREL	Not indicated	Not indicated
NREL-009	NREL Management Program	G. Nuss, M. Bodnarczuk	NREL	NREL	6/93
NREL-010	NREL Policy and Procedure for Conduct of Operations	Not indicated	Management Assessment Office	NREL	Not indicated
NREL-011	Summary of Programs Designed to Communicate Environmental Issues and Systems For Update of Environmental Regulations	Not indicated	Not indicated	Not indicated	Not indicated

LIST OF SITE DOCUMENTS REVIEWED BY THE ASSESSMENT TEAM (Continued)

Document #	Title/Description	Author	Organization	Recipient	Document Date
NREL-012	NREL Spill Prevention Plan	S. O'Connell	NREL	GO	4/6/92
NREL-013	System for Distribution of DOE Order, Directives, and Guidance	Lucy	GO	Debbie	8/4/93
NREL-014	DOE Roles and Responsibilities/Biographies	Not indicated	GO	Not indicated	Various
NREL-015	Golden Field Office External Affairs Activities Document	GO	GO	Not indicated	2/22/93
NREL-016	CPAF Criteria and Evaluation for October 1, 1992 - March 31, 1993	P. Kearns	GO	J. Kersten, GO	6/11/93
NREL-017	CPAF Criteria and Evaluation for April 1, 1993 - September 30, 1993	P. Kearns	GO	D. Sunderman, NREL	3/31/93
NREL-018	Self Assessment Documents - (a) Corrective Action Plan, (b) Flowchart of Closure Process, (c) Copy of Guidance Received from EE-64	(a) ES&H, (b) Not indicated, (c) T. Kurkowski	(a) GO, (b) Not indicated, (c) EE-64	(a) EH, (b) Not indicated, (c) P. Kearns	(a) 7/5/91, (b) Not indicated, (c) 10/11/91
NREL-019	Most Current Management/Functional Appraisal Report Conducted by Chicago Field Office (Report, Corrective Action Plan, and Status Report)	ES&H Division	CH	NREL	9/24/92
NREL-020	ES&H Policy Statement and Draft Environmental Policy Statement	GO	GO	NREL	9/14/93
NREL-021	NREL Site Environmental Report for Calendar Year 1992	SSO	NREL	GO	9/93
NREL-022	Contract Between DOE and MRI (with notation of Environmental Section)	P. Kearns	GO	MRI	9/14/88
NREL-023	1991 Tiger Team Assessment of SERI	DOE	EH-5	DOE	8/91
NREL-024	Corrective Action Plan (Environmental Section Only)	Not indicated	Not indicated	Not indicated	Not indicated
NREL-025	Waste Minimization Using Teams	Not indicated	Not indicated	Not indicated	Not indicated
NREL-026	Environmental Protection Audit	Not indicated	NREL	NREL	10/92-11/92
NREL-027	Memo re: Changes to Format and Approval Process of Safe Operating Procedures	W. Griffing	NREL, SSO	Distribution	6/22/92
NREL-028	Environmental Long Range Plan	Not indicated	SERI	DOE	5/90

LIST OF SITE DOCUMENTS REVIEWED BY THE ASSESSMENT TEAM (Continued)

Document #	Title/Description	Author	Organization	Recipient	Document Date
NREL-029	Slides of NREL NEPA Training	Not indicated	Not indicated	Not indicated	Not indicated
NREL-030	Instructions to Preparers of the NEPA Determination Request Form at NREL	Not indicated	Not indicated	Not indicated	Not indicated
NREL-031	Blank NEPA Determination Request Form	Not indicated	Not indicated	Not indicated	Not indicated
NREL-032	Training History and Related Information for NREL SSO Staff	Not indicated	NREL, SSO	File	Various
NREL-033	Hazardous Waste Management/Minimization Class	J. Eickhoff	NREL	NREL	Not indicated
NREL-034	NREL Waste Management Program Audit	MRI Technical Review Group	MRI	NREL	12/28/92
NREL-035	Transition Steering Committee Overheads	Not indicated	GO	GO	2/26/93 and 5/6/93
NREL-036	Baseline Surface Water Monitoring Program	Not Indicated	Applied Environmental Consulting, Inc.	NREL	3/92
NREL-037	Wastewater Monitoring Program - Field Test Laboratory and Buildings 15 and 16	Not Indicated	Applied Environmental Consulting, Inc.	NREL	3/92
NREL-038	PM-10 Air Monitoring Plan	Not indicated	Not indicated	Not indicated	Not indicated
NREL-039	Desk Procedures - Environmental Section	Not indicated	Not indicated	Not indicated	Not indicated
NREL-040	Emergency Preparedness Manual #035	D. Stewart	NREL	NREL	2/1/93
NREL-041	Phase I Environmental Audit Report - Office/Warehouse Building at 6800 Joyce Street Arvada, Colorado	Not indicated	Applied Environmental Consulting, Inc.	NREL	9/91
NREL-042	Phase I Environmental Audit Report - 15485 West 44th Ave., Suite B	Not indicated	Applied Environmental Consulting, Inc.	NREL	9/91
NREL-043	Golden Field Office Draft NEPA Procedures and Briefing Overheads	Not indicated	Not indicated	Not indicated	Not indicated
NREL-044	Transition Team Criteria for Determining When Policies and Procedures are Required	Not indicated	Not indicated	Not indicated	Not indicated

LIST OF SITE DOCUMENTS REVIEWED BY THE ASSESSMENT TEAM (Continued)

Document #	Title/Description	Author	Organization	Recipient	Document Date
NREL-045	Partial Listing of SOPs For GO	Not indicated	GO	Not indicated	9/17/93
NREL-046	STM Topographic Map	Not indicated	Not indicated	Not indicated	Not indicated
NREL-047	Application of Appendix B Annual Categorical Exclusions	Not indicated	Not indicated	Not indicated	1993
NREL-048	2 CCR 401, 402, 403, 404, 406, 407, 408, 409, 410	Not indicated	State of Colorado	Various	Various
NREL-049	5 CCR 1001, 1002, 1003, 1007	Not indicated	State of Colorado	Various	Various
NREL-050	NREL Management Guide	Not indicated	NREL	NREL	Rev. 9/10/93
NREL-051	Procedure 4-7: Environmental Permitting	Not indicated	NREL, SSO	NREL	8/6/93
NREL-052	Procedure 4-5: ES&H Training	Not indicated	NREL, ES&H Section	NREL	7/31/90
NREL-053	Procedure 4-4: Risk Assessment	Not indicated	NREL, SSO	NREL	8/6/93
NREL-054	Procedure 4-2: ES&H Organization	Not indicated	NREL, SSO	NREL	8/6/93
NREL-055	Procedure 4-1: Environment, Safety, and Health (ES&H)	Not indicated	NREL, SSO	NREL	7/14/93
NREL-056	Procedure 1-1: Policies and Procedures System	Not indicated	NREL, Director's Office	NREL	2/8/91
NREL-057	GO Standard Operating Procedure: Procedures to Eliminate Imminent Danger Exposures to Federal and Contractor Employees, and the Public (Draft)	Not indicated	GO	GO	Not indicated
NREL-058	GO Standard Operating Procedure: Procedures for Handling Employee Notices of Unsafe or Unhealthful Working Conditions	Not indicated	GO	GO	Not indicated
NREL-059	Monthly Status Report for the National Renewable Energy Laboratory - 1 June 1993 to 30 June 1993	Not indicated	NREL	GO	7/93
NREL-060	Position Description - Safety and Occupational Health Manager	Not indicated	GO	J. Beck	Not indicated
NREL-061	Position Description - Director, ES&H Operations Division	Not indicated	GO	J. Baker	Not indicated

LIST OF SITE DOCUMENTS REVIEWED BY THE ASSESSMENT TEAM (Continued)

Document #	Title/Description	Author	Organization	Recipient	Document Date
NREL-062	Position Description - Cooperative Education Student (Physical Science)	Not indicated	GO	K. Linton	Not indicated
NREL-063	Mission and Function Statement - NREL Area Office	Not indicated	GO	EE	Not indicated
NREL-064	Mission and Function Statement - Environment, Safety, and Health and Operations Division	Not indicated	NREL	GO	Not indicated
NREL-065	Organization Chart - Office of Energy Efficiency and Renewable Energy	Not indicated	EE	Various	6/93
NREL-066	Organization Chart - Golden Field Office	Not indicated	GO	Various	Not indicated
NREL-067	Organization Chart - NREL	Not indicated	NREL	Various	4/93
NREL-068	SSO Desk Procedure 1-002: Review of Safe Operating Procedures	W. Griffing	NREL, SSO	NREL	Rev. 7/27/93
NREL-069	Procedure: Tiger Team Closeout Verification	Not indicated	GO	Not indicated	Not indicated
NREL-070	DOE Orders and Notices and Secretary of Energy Notices (SENs) Applicable for Implementation Under Contract No. DE-AC02-83CH10093	Not indicated	Not indicated	Not indicated	10/8/92
NREL-071	SSO Desk Procedure 1-001: Conducting Self-Assessments	W. Griffing	NREL, SSO	NREL	5/20/92
NREL-072	Management Assessment Office (MAO) Independent Assessment Procedure IAP-1	Not indicated	Management Assessment Office	Not indicated	Not indicated
NREL-073	Management Assessment Office (MAO) Procedure for the Production, Transmittal, and Maintenance of Independent Assessment Reports IAP-2	Not indicated	Management Assessment Office	Not indicated	Rev. 0 3/26/93
NREL-074	Management Assessment Office (MAO) Procedure for the Disposition of Independent Assessment Results IAP-3	Not indicated	Management Assessment Office	Not indicated	Rev. 0 3/26/93
NREL-075	Paper: A Conceptual Framework for Using DOE 5700.6C and the Other DOE Orders as an Integrated Management System; the Fermilab Experience - Presented at the 19th Annual ASQC National Energy and Environmental Quality Division Conference	M. Bodnarczuk	NREL	Conference Attendees	6/92

LIST OF SITE DOCUMENTS REVIEWED BY THE ASSESSMENT TEAM (Continued)

Document #	Title/Description	Author	Organization	Recipient	Document Date
NREL-076	Letter re: Environmental Liability Arising From Offsite Research and Development Efforts	G. Walach	Not indicated	R. Scott, EM-20	6/28/91
NREL-077	Memorandum re: Environment, Safety, and Health Policy Statement	J. Davis	CE-1	Distribution	3/8/91
NREL-078	Memorandum re: Generic Performance Standards for Performance Management System (GM) Employees	W. Key	CE-62	Deputy Assistant Secretaries, et al.	3/19/91
NREL-079	ISFP Appraisal by DOE/CH, September 14-24, 1992, Corrective Action Plan Update--June 1, 1993; and NREL and GO transmittal letters	D. Sunderman	NREL	GO and CH	6/1/93
NREL-080	Memorandum re: Incorporating Departmental Goals and Objectives into Performance Standards	J. Watkins	S-1	Heads of Departmental Elements	9/21/90
NREL-081	Memorandum re: Generic Performance Standards for Senior Executive Service (SES) Staff	W. Key	CE-62	Distribution	11/19/90
NREL-082	Environmental Implementation Plan for the Golden Field Office (Draft) and transmittal memorandum	O. Lawrence	EE-64	T. Kurkowski, EE-64	4/29/93
NREL-083	Operating Procedure: Closure of Tiger Team Assessment (TTA) Corrective Action Plans, and transmittal letter	J. Davis	CE-1	P. Kearns, GO	8/18/92
NREL-084	Policy Statement: Use of Unawarded Fee at the Solar Energy Research Institute	J. Davis	CE-1	NREL	5/20/91
NREL-085	Adapting EH's Progress Assessment Methodology as a Strategy and Implementation Plan for Environmental Management Assistance Visits (Draft)	O. Lawrence	EE-64	NREL	5/19/93
NREL-086	Environmental Requirements Document, and transmittal letter	F. Stewart	EE-1	Distribution	Not indicated
NREL-087	Safe Operating Procedure Format	Not indicated	NREL	NREL	Not indicated
NREL-088	MOU with NREL Maintenance/Facilities for PCB Management	B. Buehler	NREL, Supply Services	S. O'Connell	11/16/92
NREL-089	MOU with NREL Property Management for PCB Management	B. Buehler	NREL, Supply Services	Property Management	11/16/92

LIST OF SITE DOCUMENTS REVIEWED BY THE ASSESSMENT TEAM (Continued)

Document #	Title/Description	Author	Organization	Recipient	Document Date
NREL-090	Memorandum re: Guidance on ES&H Issues in Award Fee Plans - package of current guidance documents	T. Kurkowski	CE-64	P. Kearns, GO	10/11/91
NREL-091	SERI Self-Assessment Program Document	D. Sunderman	SERI	DOE	4/5/91
NREL-092	Memorandum re: Approval of the NREL management Program Quality Assurance Document	R. San Martin	EE-1	P. Kearns	6/11/93
NREL-093	Letter re: Approval of the NREL Management Program Quality Assurance Document	P. Kearns	GO	D. Sunderman, NREL	7/15/93
NREL-094	Letter re: NREL Management Program Quality Assurance Document	P. Kearns	GO	R. San Martin, EE-1	5/14/93
NREL-095	SSO Desk Procedure 4-007: Hazardous Waste Transportation Procedures	Not indicated	SSO	NREL	Rev. 5/21/93
NREL-096	SSO Desk Procedure 4-001: Permit Tracking	W. Griffing	NREL, SSO	NREL	5/14/92
NREL-097	SSO Desk Procedure 4-002: Underground Storage Tank Measurement Procedure	W. Griffing	NREL, SSO	NREL	6/29/92
NREL-098	SSO Desk Procedure 4-003: Underground Storage Tank Management	W. Griffing	NREL, SSO	NREL	6/29/92
NREL-099	Evaluation of Underground Storage Tank For Emergency Generator Usage	D. Amidaneau, M. Jordan, NREL	NREL	NREL	5/25/92
NREL-100	SSO Desk Procedure 4-004: National Environmental Policy Act (NEPA) Compliance	D. Amidaneau	NREL	NREL	8/24/92
NREL-101	SSO Desk Procedure 4-005: Accidental Discharge Notification Procedure	D. Amidaneau	NREL	NREL	9/1/92
NREL-102	SSO Desk Procedure 4-006: PCB Management	D. Amidaneau	NREL	NREL	11/30/92
NREL-103	Memorandum re: Review of the Environmental Compliance Summary for the 1992 Site Environmental Report for the National Renewable Energy Laboratory (NREL)	R. Natoli	EH-222	J. Baker, GO	8/9/93

LIST OF SITE DOCUMENTS REVIEWED BY THE ASSESSMENT TEAM (Continued)

Document #	Title/Description	Author	Organization	Recipient	Document Date
NREL-104	Memorandum re: Final Guidance for the Preparation of Annual Site Environmental Reports for Calendar Year 1992	K. Taimi	EH-22	Distribution	3/3/93
NREL-105	Site Environmental Report for Calendar Year 1991	Not indicated	NREL	GO	12/92
NREL-106	Sampling and Analysis Quality Assurance Program Plan	Not indicated	Applied Environmental consulting, Inc.	SERI	10/9/90
NREL-107	Delegation of Authority to Make NEPA Section D Determinations	J. Davis	CE-1	P. Kearns	6/25/91
NREL-108	Designation of NEPA Compliance Officer (NCO) for Golden Field Office (GO)	P. Kearns	GO	D. Turner	5/27/93
NREL-109	Implementation of NEPA at NREL (presentation overheads)	D. Amidaneau	NREL	Not indicated	Not indicated
NREL-110	Golden Field Office NEPA Program Implementation (presentation overheads)	D. Turner	GO	Not indicated	7/93
NREL-111	NEPA Determination Request (NDR) Form	Not indicated	GO	Not indicated	2/16/93
NREL-112	Instructions to Preparer of NDR Form	Not indicated	GO	Not indicated	Not indicated
NREL-113	Draft NEPA GO Internal Process (Project Managers)	Not indicated	GO	Not indicated	Not indicated
NREL-114	Draft NEPA GO Internal Process (NCO)	Not indicated	Not indicated	Not indicated	Not indicated
NREL-115	Draft of Tiger Team Action Plans Nos. AP 027 and AP 063	Not indicated	GO	Not indicated	1/18/92
NREL-116	Draft EE NEPA Requirements Document	Not indicated	EE	Not indicated	Not indicated
NREL-117	Environmental Assessment for Relocation of NREL Research Experiments (DOE/EA-0619)	Not indicated	NREL	DOE	6/92
NREL-118	Environmental Assessment for the Construction and Operations of the Solar Energy Research Facility at the National Renewable Energy Laboratory, Golden, Colorado (DOE/EA-0620)	Not indicated	NREL	DOE	1/14/92
NREL-119	EE NEPA Requirements Document (RD) and NEPA Implementation Plan (NIP) Implementation Schedule	Not indicated	EE-64	EE and GO	Not indicated

LIST OF SITE DOCUMENTS REVIEWED BY THE ASSESSMENT TEAM (Continued)

Document #	Title/Description	Author	Organization	Recipient	Document Date
NREL-120	NREL Institutional Plan FY 1992 - FY 1997	Not indicated	NREL	GO	Not indicated
NREL-121	Instructions to Preparers of the NEPA Determination Request Form at the National Renewable Energy Laboratory (Revision Level 1)	D. Amidaneau	NREL	NREL	4/16/93
NREL-122	Model CRADA for Discussion Purposes Only	Not indicated	Not indicated	Not indicated	Not indicated
NREL-123	Field Work Proposal/Agreement (FWP) SERI Area Office Routing Sheet: Growth and Properties of Novel Ordered Semiconductor Alloys	Not indicated	Not indicated	Not indicated	Not indicated
NREL-124	FWP: Buildings Sector Support	Not indicated	Not indicated	Not indicated	Not indicated
NREL-125	FWP: OIT/NREL Adhesives Program	Not indicated	Not indicated	Not indicated	Not indicated
NREL-126	Conceptual Design Report: NREL Thermal I Test Facility	Not indicated	RNL Design	NREL	4/9/93
NREL-127	Revised Conceptual Design Report for the Outdoor Test Facility	Not indicated	James D. Copeland Architects, Inc.; Burnes & McDonnell Consulting Engineers	NREL	8/92
NREL-128	Facility Evaluation and Conceptual Design Report: National Wind Technology Center - Renovations to Building 251 and Site Improvements	Not indicated	RNL Design	NREL	Not indicated
NREL-129	Golden Field Office NEPA Worksheet	GO	Not indicated	NREL	Not indicated
NREL-130	NEPA Determination Request (NDR) Form: Demonstrate Economic Benefits of a Biphasic Turbine in a Geothermal Application	Not indicated	Not indicated	EE-1	Not indicated
NREL-131	Financial Assistance Pre-Award Information Sheet	Not indicated	Not indicated	Not indicated	4/90
NREL-132	Procedure for Approval of Projects that Involve Construction	NREL	Technical Services Division	NREL	8/14/92
NREL-133	Procedure 4-15: Implementation of NEPA	NREL	SSO	NREL	9/10/93

LIST OF SITE DOCUMENTS REVIEWED BY THE ASSESSMENT TEAM (Continued)

Document #	Title/Description	Author	Organization	Recipient	Document Date
NREL-134	Enclosure - National Environmental Policy Act Requirements: NREL Questionnaire on Environmental Information Required of Offerers	Not indicated	Not indicated	Not indicated	Not indicated
NREL-135	FWP Review Form	Not indicated	NREL	Not indicated	Not indicated
NREL-136	Review for WFOs Projects at NREL	Not indicated	NREL	Not indicated	Not indicated
NREL-137	Environmental Critique: Geothermal Proposals	Not indicated	Not indicated	Not indicated	Not indicated
NREL-138	Cooperative Agreement Between DOE and Southern California Edison for the Solar Two Project, Appendix C	Not indicated	GO	Not indicated	Not indicated
NREL-139	Solicitation for Cooperative Agreement Applications: Demonstration of Economic Benefits of Improved Electrical Power Generating Systems for Geothermal Applications	Not indicated	GO	J. Meeker	9/30/92
NREL-140	Solicitation for Cooperative Agreement Applications: Superconductivity Partnership Initiative	Not indicated	GO	J. Meeker	1/19/93
NREL-141	1993 NEPA Determination Log	Not indicated	Not indicated	Not indicated	9/15/93
NREL-142	1992 NEPA Determinations	Not indicated	Not indicated	Not indicated	Not indicated
NREL-143	Interoffice Memorandum re: Memorandum of Understanding	B. Buehler	NREL, Supply Services	S. O'Connell	11/16/92
NREL-144	ERD and EIP Implementation Schedule	Not indicated	NREL	NREL	Not indicated
NREL-145	Individual Employee Training Plan, Emp. 2504	D. Amidaneau	NREL	Not indicated	1/5/93
NREL-146	Training History and Employee Training Plan (Various)	NREL	SSO	NREL	7/7/93
NREL-147	Environmental Protection Appraisal Report Performed at NREL by CH on September 14-24, 1992, and transmittal letters	P. Kearns	ES&H Division	P. Kearns, GO	2/9/93
NREL-148	Staff Development Catalog	Training Services	NREL	NREL Staff	Fall 1993
NREL-149	Incident/Occurrence Report Worksheet	Not indicated	NREL	Not indicated	7/93
NREL-150	Individual Employee Training Plan, Emp 2791	D. Amidaneau	NREL	Not indicated	5/20/93

LIST OF SITE DOCUMENTS REVIEWED BY THE ASSESSMENT TEAM (Continued)

Document #	Title/Description	Author	Organization	Recipient	Document Date
NREL-151	Individual Employee Training Plan, Emp 261	D. Amidaneau	NREL	Not indicated	3/10/93
NREL-152	Individual Employee Training Plan, Emp. 2498	W. Griffing	NREL	Not indicated	1/7/93
NREL-153	Individual Employee Training Plan, Emp. 2346	D. Amidaneau	NREL	Not indicated	1/5/93
NREL-154	Infectious Waste Management Plan	Not indicated	Colorado Medical Waste, Inc.	NREL	9/1/93
NREL-155	Letter re: Establishment of Golden Field Office	P. Kearns	GO	R. Edwards, EG&G Idaho	8/10/93
NREL-156	Letter re: Unusual Occurrence	P. Kearns	GO	R. San Martin, EE-1	7/23/93
NREL-157	Letter re: ORPS Designees for the Golden Field Office	P. Kearns	GO	F. Volpe	9/16/93
NREL-158	Site Inspection Form	Not indicated	NREL, SSO	NREL	Not indicated
NREL-159	Letter re: Waste Handling at the Solar Energy Research Institute	D. Sunderman	NREL	G. Baughman, CDH	4/23/91
NREL-160	Letter re: Response to 4/23/91 letter to G. Baughman	F. Dowsett	CDH	D. Sunderman, NREL	6/21/91
NREL-161	Inter-Office Memorandum re: Schedule for Pilot Process Waste Assessment	M. Jenkes	NREL	S. O'Connell	1/29/93
NREL-162	Listing: NREL's Current Recycling Efforts	Not indicated	NREL	NREL	9/30/92
NREL-163	Procedure 4-19: Waste Management/Minimization	Not indicated	NREL	NREL	8/6/93
NREL-164	Interoffice Memorandum re: NREL Recycling Program Recommendation, and attached proposal by Radical Concepts, Inc.	D. Mooney	NREL Recycling Group	Not indicated	Not indicated
NREL-165	Purchase Request: Chemical/Hazardous Material Request Form	Not indicated	Not indicated	Not indicated	Not indicated
NREL-166	Risk Assessment Policy & Procedure # 4-4 Attachment	Not indicated	NREL	Not indicated	Not indicated
NREL-167	Position Description, Environmental Engineer	GO	GO	D. Turner	6/3/93

LIST OF SITE DOCUMENTS REVIEWED BY THE ASSESSMENT TEAM (Continued)

Document #	Title/Description	Author	Organization	Recipient	Document Date
NREL-168	DOE Reportable Occurrences Per DOE 5000.3B for NREL, Sept. 1, 1990 - August 31, 1993	Not indicated	Not indicated	Not indicated	9/93
NREL-169	Infectious Waste Management Procedure	Not indicated	Not indicated	Not indicated	Not indicated
NREL-170	Inter-Office Memorandum re: Purchase Request No. 112083 - Medical Waste Disposal	W. Griffing	NREL	E. Green, Office Manager Procurement	4/12/91
NREL-171	FY 1994 Field Budget Process - Project Data Sheets, National Wind Technology Center Expansion	Not indicated	DOE	GO	3/1/93
NREL-172	FY 1995 Field Budget Process - Project Data Sheets, Renewable Fuels and Chemicals Facility	Not indicated	DOE	GO	3/15/93
NREL-173	FY 1995 Field Budget Process - Project Data Sheets, Research Support Building	Not indicated	DOE	GO	3/12/93
NREL-174	Documentation of BFI Landfill Visit	W. Rabb	NREL, Facilities	NREL	3/30/89
NREL-175	UST Files	Not indicated	NREL	Not indicated	Various
NREL-176	Position Description - Environmental Section Manager	NREL	SSO	Not indicated	2/93
NREL-177	Position Description - Staff Environmental Scientist	NREL	SSO	Not indicated	3/93
NREL-178	Position Description - Associate Environmental Scientist	NREL	SSO	Not indicated	3/93
NREL-179	ES&H Documentation & Corrective Action Documents of Monthly Audit Inspections	NREL	Not indicated	Not indicated	Various
NREL-180	NREL File, Management Council Meeting Minutes and Presentations	Not indicated	NREL	Not indicated	10/92 - 7/93
NREL-181	GO File, All Hands Staff Meeting Minutes and Presentations	Not indicated	GO	Not indicated	7/92 - 7/93
NREL-182	Medical Waste Files	NREL	Not indicated	Not indicated	Various
NREL-183	Memo with attached response re: Audit Program Statement of Work	Roger	Los Alamos Technical Associates	J. Baker, GO	5/18/93

LIST OF SITE DOCUMENTS REVIEWED BY THE ASSESSMENT TEAM (Continued)

Document #	Title/Description	Author	Organization	Recipient	Document Date
NREL-184	Transmittal Letter re: DOE-CH Environmental Protection Implementation Plan (EPIP)	P. Kearns	GO	D. Sunderman, NREL	3/6/91
NREL-185	Transmittal Letter re: DOE-CH Environment, Safety, and Health Division (ESHD) Comments on the Draft EPIP for SERI	P. Kearns	GO	D. Sunderman, NREL	11/28/90
NREL-186	Letter re: Update of the Environmental Protection Implementation Plan for SERI	P. Kearns	GO	D. Sunderman, NREL	10/16/90
NREL-187	Transmittal Letter re: Implementation of DOE Order 5400.1, "General Environmental Protection Program" Guidance	P. Kearns	GO	H. Hubbard, SERI	9/1/89
NREL-188	Letter re: Department of Energy (DOE) Order 5400.1A, "General Environmental Protection Program"	P. Kearns	GO	D. Sunderman, NREL	9/8/91
NREL-189	Transmittal Letter re: DOE Order 5400.1 - Long Range Environmental Protection Plan for the Solar Energy Research Institute (SERI) Guidance	T. Crawford	SAO	R. Stokes, SERI	6/18/90
NREL-190	Letter re: Long-Range Environment, Safety, and Health (ESH) Plan for the Solar Energy Research Institute (SERI)	P. Kearns	GO	H. Hubbard, SERI	6/8/88
NREL-191	Letter re: Environmental Monitoring Plan (EMP) for the Solar Energy Research Institute (SERI)	P. Kearns	GO	D. Sunderman, SERI	11/30/90
NREL-192	Letter re: Waste Minimization Plan for the National Renewable Energy Laboratory (NREL) Guidance	P. Kearns	GO	D. Sunderman, NREL	3/18/92
NREL-193	Letter re: Preparation of Annual Site Environmental Reports for Calendar Year 1992 Guidance	P. Kearns	GO	D. Sunderman, NREL	4/7/93
NREL-194	Letter re: CY 1991 Site Environmental Report (SER) Guidance (92JB1249)	P. Kearns	GO	D. Sunderman, NREL	3/18/92
NREL-195	Letter re: DOE-HQ Guidance for Preparation of the Annual Site Environmental Report (ASER)	P. Kearns	GO	D. Sunderman, NREL	3/6/91
NREL-196	Letter re: Radioactive Waste Disposal (Ref. #931674)	Not indicated	NREL	P. Kearns, GO	8/12/93

LIST OF SITE DOCUMENTS REVIEWED BY THE ASSESSMENT TEAM (Continued)

Document #	Title/Description	Author	Organization	Recipient	Document Date
NREL-197	Letter re: Request for Approval or Alternative Method to Demonstrate Compliance with Radionuclides NESHAP	I. Dickstein	EPA Region VIII	T. Crawford, SAO	8/27/90
NREL-198	Transmittal Letter re: Calendar Year (CY) 1991 Site Environmental Report for the U.S. Department of Energy's National Renewable Energy Laboratory	P. Kearns	GO	R. Berube, EH-20	4/13/93
NREL-199	Transmittal Letter re: Site Environmental Report for Calendar Year 1991	D. Sunderman	NREL	P. Kearns, GO	8/14/92
NREL-200	FAX Letter re: Reviewer Comments for the Annual (1991) Site Environmental Compliance Summaries	C. Jacob	EH-22	J. Baker, GO	8/4/92
NREL-201	Letter re: Draft Compliance Summary the National Renewable Energy Laboratory's Annual Site Environmental Report, in response to Letter EH-22 to Field, February 13, 1992	P. Kearns	GO	W. Key, CE-60	5/4/92
NREL-202	Letter re: Comments on Draft Site Environmental Report for Calendar Year 1992	P. Kearns	GO	D. Sunderman, NREL	9/7/93
NREL-203	Transmittal Letter re: Draft Site Environmental Report, 1992 (Ref#931734)	D. Sunderman	NREL	P. Kearns, GO	8/27/93
NREL-204	Letter re: Site Environmental Report Compliance Summary for Calendar Year 1992	C. Phoebe	GO	T. Kurkowski, CE-64	4/23/93
NREL-205	Transmittal Letter re: CY 1990 Site Environmental Report for the National Renewable Energy Laboratory (NREL)	P. Kearns	GO	J. Davis, CE-1	12/20/91
NREL-206	Letter re: Department of Energy (DOE) Comments on the Solar Energy Research Institute's (SERI) Environmental Report	P. Kearns	GO	D. Sunderman, NREL	6/14/91
NREL-207	Letter re: Site Environmental Report (SER) for Calendar Year (CY) 1990 Comments	B. Fritz	CH	P. Kearns, GO	6/5/91
NREL-208	Letter re: Review of the Solar Energy Research Institute's (SERI) Draft "CY 1990 Site Environmental Report" and "Environmental Monitoring Plan"	P. Kearns	GO	M. Flannigan, ES&H Division	5/3/91

LIST OF SITE DOCUMENTS REVIEWED BY THE ASSESSMENT TEAM (Continued)

Document #	Title/Description	Author	Organization	Recipient	Document Date
NREL-209	Sitewide Environmental Assessment for the National Renewable Energy Laboratory Golden, Colorado DOE/EA-0850	Not indicated	NREL	GO	5/4/93
NREL-210	Environmental Assessment for the Biomass Gasifier Facility (BGF)	Not indicated	The Pacific International Center for High Technology Research	NREL	9/92
NREL-211	Letter re: Adoption of the EA and FONSI for the BGF Demonstration Project at Maui, Hawaii (DOE/EA-0849)	P. Brush	DOE HQ	R. San Martin, CE	Not indicated
NREL-212	DOE NEPA Document Tracking System - Alpha4 Database -- User's Guide	Not indicated	CE-64	Not indicated	Not indicated

APPENDIX E

LIST OF CONTACTS/INTERVIEWS CONDUCTED BY THE ASSESSMENT TEAM

APPENDIX E:

LIST OF CONTACTS/INTERVIEWS CONDUCTED BY THE ASSESSMENT TEAM

Ref. #	Date	Auditor	Organization	Position	Topic
D. Habib - Organizational Structure: Internal and External Communications					
I-A-1	9/2/93	D. Habib	EE-64	Division Director	Communications and organizational structure
I-A-2	9/9/93	D. Habib	EE-64	Environmental Biologist	Communications and organizational structure
I-A-3	9/9/93	D. Habib	EE-64	Quality Assurance Specialist	Communications and organizational structure
I-A-4	9/9/93	D. Habib	EE-232	Program Manager	Communications and organizational structure
I-A-5	9/14/93	D. Habib	EE-22, Division of Waste Material Management	ES&H Coordinator	Communications and organizational structure
I-A-6	9/14/93	D. Habib	MACTEC	Project Control Specialist	Communications and organizational structure
I-A-7	9/14/93	D. Habib	NREL, PV Device Development Branch	Senior Scientist	Waste management in laboratory
I-A-8	9/14/93	D. Habib	NREL, Basic Sciences Division	Research Technician	Waste management in laboratory
I-A-9	9/14/93	D. Habib	NREL, Operations and Assessment Division	Associate Director	Communications and organizational structure
I-A-10	9/15/93	D. Habib	NREL, Environmental Section	Manager	Communications and organizational structure
I-A-11	9/15/93	D. Habib	GO, Transportation Section	Operations Specialist	FWP development
I-A-12	9/15/93	D. Habib	EE-64	Environmental Biologist	EE Environmental Requirements Document
I-A-13	9/15/93	D. Habib	NREL, Operations and Assessment Division	Associate Director	Communications and organizational structure
I-A-14	9/15/93	D. Habib	NREL, Basic Sciences Division	Director	Communications and organizational structure

LIST OF CONTACTS/INTERVIEWS CONDUCTED BY THE ASSESSMENT TEAM (continued)

Ref. #	Date	Auditor	Organization	Position	Topic
I-A-15	9/15/93	D. Habib	NREL, Safety & Security Office	Manager	Communications and organizational structure
I-A-16	9/15/93	D. Habib	NREL, Management Assessment Office	Senior Quality Assurance Engineer	Communications and organizational structure
I-A-17	9/15/93	D. Habib	NREL, Planning and External Relations	Assistant Director	External communications
I-A-18	9/16/93	D. Habib	GO	Acting Manager	Communications and organizational structure
I-A-19	9/16/93	D. Habib	GO, ES&H & Operations Division	Director	Communications and organizational structure
I-A-20	9/16/93	D. Habib	GO, ES&H & Operations Division	Environmental Engineer	Communications and organizational structure
I-A-21	9/16/93	D. Habib	MACTEC	Control Clerk	Correspondence tracking
I-A-22	9/16/93	D. Habib	GO, ES&H & Operations Division	Safety and Operational Health Manager	Tiger Team finding closeout
I-A-23	9/16/93	D. Habib	GO, Administrative Division	Director	Correspondence tracking
I-A-24	9/17/93	D. Habib	NREL, Environmental Section	Associate Environmental Scientist	Waste minimization
I-A-25	9/17/93	D. Habib	NREL, Technical Communications Section	Associate Technical Communicator	Waste minimization
I-A-26	9/17/93	D. Habib	GO	External Affairs Officer	External communications
I-A-27	9/17/93	D. Habib	NREL	Director	Management Council
I-A-28	9/17/93	D. Habib	GO, ES&H & Operations Division	Director	Management Council
I-A-29	9/20/93	D. Habib	NREL, SSO	Manager	Management Council
I-A-30	9/20/93	D. Habib	GO, ES&H & Operations Division	Director	Solid waste collection contract
I-A-31	9/20/93	D. Habib	NREL, Purchasing Section	Procurement Coordinator	Solid waste collection contract

LIST OF CONTACTS/INTERVIEWS CONDUCTED BY THE ASSESSMENT TEAM (continued)

Ref. #	Date	Auditor	Organization	Position	Topic
E. Harr - Environmental Commitment: Staff Resources, Training, and Development; and Risk Management					
I-B-1	9/2/93	E. Harr	EE-64	Director, Facilities and Systems Coordination Division	Mechanisms used to convey environmental commitment to staff, identify staff resource needs, identify and perform staff training needs/programs, identify and implement staff development needs/programs, conduct environmental planning and risk management activities
I-B-2	9/9/93	E. Harr	EE-64	Environmental Biologist	Mechanisms used to convey environmental commitment to staff, identify staff resource needs, identify and perform staff training needs/programs, identify and implement staff development needs/programs, conduct environmental planning and risk management activities
I-B-3	9/15/93	E. Harr	NREL, Safety and Security Office	Manager	Mechanisms used to convey environmental commitment to staff, identify staff resource needs, identify and perform staff training needs/programs, identify and implement staff development needs/programs, conduct environmental planning and risk management activities
I-B-4	9/15/93	E. Harr	NREL, Environmental Section	Manager	Mechanisms used to convey environmental commitment to staff, identify staff resource needs, identify and perform staff training needs/programs, identify and implement staff development needs/programs, conduct environmental planning and risk management activities
I-B-5	9/15/93	E. Harr	NREL, Planning and External Relations	Assistant Director	Mechanisms used to conduct environmental planning and risk management activities

LIST OF CONTACTS/INTERVIEWS CONDUCTED BY THE ASSESSMENT TEAM (continued)

Ref. #	Date	Auditor	Organization	Position	Topic
I-B-6	9/15/93	E. Harr	NREL, Operations and Assessment	Associate Director	Mechanisms used to identify staff resource needs, identify and perform staff training needs/programs, identify and implement staff development needs/programs
I-B-7	9/16/93	E. Harr	NREL, Management Assessment Office	Senior Quality Assurance Engineer	Anticipated role and effect of the NREL Management Program on conveying environmental commitment to staff, identifying staff resource needs, identifying and performing staff training needs/programs, identifying and implementing staff development needs/programs, conducting environmental planning and risk management activities
I-B-8	9/16/93	E. Harr	EE-60, Office of Management and Resources	Director	Mechanisms used to convey environmental commitment to staff, identify staff resource needs, identify and perform staff training needs/programs, identify and implement staff development needs/programs, conduct environmental planning and risk management activities
I-B-9	9/16/93	E. Harr	GO, ES&H & Operations Division	Environmental Engineer	Mechanisms used to convey environmental commitment to staff, identify staff resource needs, identify and perform staff training needs/programs, identify and implement staff development needs/programs, conduct environmental planning and risk management activities
I-B-10	9/16/93	E. Harr	NREL, Operations and Assessment Division	Associate Director	Succession planning

LIST OF CONTACTS/INTERVIEWS CONDUCTED BY THE ASSESSMENT TEAM (continued)

Ref. #	Date	Auditor	Organization	Position	Topic
I-B-11	9/17/93	E. Harr	GO	Acting Manager	Mechanisms used to convey environmental commitment to staff, identify staff resource needs, identify and perform staff training needs/programs, identify and implement staff development needs/programs, conduct environmental planning and risk management activities
I-B-12	9/17/93	E. Harr	GO, ES&H, Operations Division	Director	Mechanisms used to convey environmental commitment to staff, identify staff resource needs, identify and perform staff training needs/programs, identify and implement staff development needs/programs, conduct environmental planning and risk management activities
I-B-13	9/17/93	E. Harr	NREL	Director	Mechanisms used to convey environmental commitment to staff, identify staff resource needs, identify and perform staff training needs/programs, identify and implement staff development needs/programs, conduct environmental planning and risk management activities
I-B-14	9/17/93	E. Harr	GO, Administrative Division	Director	Accountability Rule
D. Wunsch - Program Evaluation, Reporting, and Corrective Action: Formality of Environmental Programs and Environmental Protection Programs					
I-C-1	9/2/93	D. Wunsch	EE, Facilities and Systems Coordination Division	Director	Environmental oversight and guidance to GO and NREL
I-C-2	9/8/93	D. Wunsch	EE, Office of Management & Resources	Staff Accountant	Self-assessment activities and guidance
I-C-3	9/9/93	D. Wunsch	EE, Facilities and Systems Coordination Division	Environmental Biologist	Environmental oversight and guidance to GO and NREL

LIST OF CONTACTS/INTERVIEWS CONDUCTED BY THE ASSESSMENT TEAM (continued)

Ref. #	Date	Auditor	Organization	Position	Topic
I-C-4	9/3/93	D. Wunsch	EE, Facilities and Systems Coordination Division	Quality Assurance Specialist	Quality assurance oversight activities and guidance
I-C-5	9/15/93	D. Wunsch	NREL, Safety & Security Office	Manager	Management of environmental operations
I-C-6	9/15/93	D. Wunsch	NREL, Environmental Section	Manager	Formality and performance evaluation in environmental operations
I-C-7	9/15/93	D. Wunsch	NREL, Safety & Security Office	Senior ES&H Assistant	Coordination of safe operating procedures
I-C-8	9/15/93	D. Wunsch	GO, Facilities Oversight	Facilities Engineer	Quality assurance activities and oversight
I-C-9	9/15/93	D. Wunsch	GO, Facilities Oversight	Safety & Health Technician	Conduct of operations and the facility representative program
I-C-10	9/15/93	D. Wunsch	NREL, Operations & Assessment Division	Associate Director	Quality management and implementation of "NREL Management Program"
I-C-11	9/16/93	D. Wunsch	NREL, Management Assessment Office	Senior Quality Assurance Engineer	Quality management concepts and the implementation of "NREL Management Program"
I-C-12	9/16/93	D. Wunsch	GO, ES&H & Operations Division	Physical Science Technician	Formality in GO environmental activities
I-C-13	9/16/93	D. Wunsch	EE, Office of Management & Resources	Deputy Assistant Secretary	Quality management concepts at EE and GO interactions
I-C-14	9/16/93	D. Wunsch	NREL, Management Assessment Office	Principal Facilities Engineer	Corrective actions activities at GO and NREL
			GO, ES&H & Operations Division	Safety & Occupational Health Manager	
I-C-15	9/16/93	D. Wunsch	GO, ES&H & Operations Division	Environmental Engineer	Formality of environmental activities at GO
I-C-16	9/17/93	D. Wunsch	GO	Manager	Formality and performance evaluation within GO operations
I-C-17	9/17/93	D. Wunsch	NREL, Environment Section	Staff Environmental Scientist	Corrective action activities

LIST OF CONTACTS/INTERVIEWS CONDUCTED BY THE ASSESSMENT TEAM (continued)

Ref. #	Date	Auditor	Organization	Position	Topic
I-C-18	9/17/93	D. Wunsch	GO, ES&H & Operations Division	Director	Formality and performance evaluation within GO operations
I-C-19	9/17/93	D. Wunsch	NREL	Director	Formality and performance evaluation within NREL operations
I-C-20	9/20/93	D. Wunsch	GO, ES&H & Operations Division	Director	GO contracted oversight program
D. Olson - Environmental Monitoring					
I-D-1	9/15/93	D. Olson	NREL, Environmental Section	Staff Environmental Scientist	Environmental monitoring; sample points; Quality Assurance Plan
I-D-2	9/15/93	D. Olson	DO, ES&H Operations Division	Environmental Engineer	Oversight of NREL environmental monitoring program
I-D-3	9/15/93	D. Olson	NREL, Environmental Section	Manager	Environmental monitoring; DOE GO interface
I-D-4	9/16/93	D. Olson	NREL, Environmental Section	Staff Environmental Scientist	Environmental monitoring; wastewater sampling; DOE 5400.1 documents
I-D-5	9/16/93	D. Olson	NREL, Management Assessment Office	Senior Quality Assurance Engineer	Implementation of NREL Management Program document
I-D-6	9/17/93	D. Olson	GO, ES&H & Operations Division	Director	5400.1 document distribution
I-D-7	9/17/93	D. Olson	GO, ES&H & Operations Division	Environmental Engineer	5400.1 document distribution
I-D-8	9/17/93	D. Olson	NREL, Environmental Section	Staff Environmental Scientist	Groundwater monitoring program
W. Schramm - National Environmental Policy Act					
I-E-1	9/14/93	W. Schramm	NREL, Research	Associate Director	NEPA in research activities
I-E-2	9/14/93	W. Schramm	NREL, Operations	Associate Director	NEPA in operations
I-E-3	9/15/93	W. Schramm	GO, NEPA	Compliance Officer	GO NEPA activities

LIST OF CONTACTS/INTERVIEWS CONDUCTED BY THE ASSESSMENT TEAM (continued)

Ref. #	Date	Auditor	Organization	Position	Topic
I-E-4	9/15/93	W. Schramm	GO	Project Manager	NEPA on DOE Grants and Cooperative Agreements
I-E-5	9/15/93	W. Schramm	NREL, Subcontracts Section	Manager	NEPA on NREL Subcontracts
I-E-6	9/15/93	W. Schramm	NREL, Technology Transfer	Manager	NEPA on CRADAs
I-E-7	9/15/93	W. Schramm	NREL, Planning and External Relations	Assistant Director	NEPA and strategic planning
			NREL, Environmental Section	Manager	NREL NEPA activities
I-E-8	9/16/93	W. Schramm	GO	Manager	GO NEPA activities
I-E-9	9/16/93	W. Schramm	NREL, Facilities Branch	Manager	NEPA on Construction and Maintenance activities
I-E-10	9/16/93	W. Schramm	GO, NEPA	Compliance Officer	Hawaii Gasification Project
			GO	Project Engineer	
I-E-11	9/17/93	W. Schramm	GO	Contract Specialist	NEPA on DOE Grants and Cooperative Agreements
I-E-12	9/17/93	W. Schramm	GO, ES&H & Operations Division	Director	GO NEPA activities
I-E-13	9/17/93	W. Schramm	GO, Technology Development Division	Director	NEPA on DOE Grants and Cooperative Agreements
I-E-14	9/17/93	W. Schramm	NREL	Facilities Engineering	Conceptual design reports
I-E-15	9/20/93	W. Schramm	GO, ES&H & Operations Division	NCO	Project planning documents
I-E-16	9/20/93	W. Schramm	NREL, SSO	Manager	NEPA in planning documents
I-E-17	9/21/93	W. Schramm	EH-25	Section Leader	NEPA issues

LIST OF CONTACTS/INTERVIEWS CONDUCTED BY THE ASSESSMENT TEAM (continued)

Ref. #	Date	Auditor	Organization	Position	Topic
K. Levinson - Waste Management					
I-F-1	9/14/93	K. Levinson	NREL, Environmental Section	Associate Environmental Scientist	Hazardous waste management overview
I-F-2	9/14/93	K. Levinson	GO, ES&H & Operations Division NREL, Environmental Section	Environmental Engineer Associate Environmental Scientist	Tour of Bldg. 16 labs and Room 115 waste staging area
I-F-3	9/14/93	K. Levinson	NREL, PV Device Development Branch	Senior Scientist	Hazardous waste accumulation areas
I-F-4	9/14/93	K. Levinson	NREL, Materials Sciences Branch	Research Technician	Hazardous waste accumulation areas
I-F-5	9/15/93	K. Levinson	NREL, Chemical Technologies Research Branch	Senior Chemist	Hazardous waste accumulation areas
I-F-6	9/15/93	K. Levinson	NREL, Applied Biological Sciences Branch	Associate Analytical Chemist	Hazardous waste accumulation areas
I-F-7	9/15/93	K. Levinson	NREL, Environmental Section	Associate Environmental Scientist	Tour of South Table Mountain FTLB and WHF
I-F-8	9/15/93	K. Levinson	GO, ES&H NREL, Environmental Section	Environmental Engineer Associate Environmental Scientist	Tour of NWTC and Joyce Street Warehouse
I-F-9	9/15/93	K. Levinson	NREL, Materials Sciences Branch	Research Technician	Flushing of scrubber
I-F-10	9/16/93	K. Levinson	NREL, Environmental Section	Associate Environmental Scientist	Hazardous waste issues
I-F-11	9/16/93	K. Levinson	GO, ES&H & Operations Division	Environmental Engineer	GO's hazardous waste program
I-F-12	9/16/93	K. Levinson	NREL, Environmental Section	Manager	NREL's hazardous waste program
I-F-13	9/16/93	K. Levinson	NREL, Environmental Section	Staff Environmental Scientist	Hazardous waste and UST issues

LIST OF CONTACTS/INTERVIEWS CONDUCTED BY THE ASSESSMENT TEAM (continued)

Ref. #	Date	Auditor	Organization	Position	Topic
I-F-14	9/16/93	K. Levinson	GO, Facilities Oversight	Facilities Engineer	Solid waste and NWTC transition
I-F-15	9/16/93	K. Levinson	NREL, Environmental Section GO, ES&H & Operations Division	Associate Environmental Scientist Environmental Engineer	Tour of additional Bldg. 16 labs
I-F-16	9/16/93	K. Levinson	NREL, PV Device Development Branch	Staff Scientist	Hazardous waste accumulation areas
I-F-17	9/16/93	K. Levinson	NREL, Photoconversion Branch	Postdoctoral Research Associate	Hazardous waste accumulation areas
I-F-18	9/16/93	K. Levinson	NREL, Measurement and Characterization Branch	Staff Microscopist	Hazardous waste accumulation areas
I-F-19	9/16/93	K. Levinson	NREL, Materials Science Branch NREL, Materials Sciences Branch NREL, Materials Sciences Branch	Visiting Professional Senior Scientist Research Technician	Hazardous waste accumulation areas
I-F-20	9/16/93	K. Levinson	NREL, PV Device Development Branch	Principal Scientist	Hazardous waste accumulation areas
I-F-21	9/16/93	K. Levinson	NREL, Medical Services	Administrator	Medical waste
I-F-22	9/16/93	K. Levinson	NREL, Safety & Health Services	ES&H Representative	ES&H monthly lab audits
I-F-23	9/17/93	K. Levinson	NREL, Environmental Section	Associate Environmental Scientist	Waste minimization
I-F-24	9/17/93	K. Levinson	NREL, Applied Research Branch	Master Electronic Technician	Waste minimization and NWTC transition
I-F-25	9/17/93	K. Levinson	NREL, Technical Communications Section	Associate Technical Communicator	Waste minimization
I-F-26	9/17/93	K. Levinson	NREL, Safety & Health Services	Industrial Safety Engineer	Unusual occurrence reporting

LIST OF CONTACTS/INTERVIEWS CONDUCTED BY THE ASSESSMENT TEAM (continued)

Ref. #	Date	Auditor	Organization	Position	Topic
I-F-27	9/17/93	K. Levinson	GO, ES&H & Operations Division	Director	Oversight activities
I-F-28	9/17/93	K. Levinson	GO, ES&H & Operations Division	Safety & Occupational Health Manager	Unusual occurrence reporting and medical waste
I-F-29	9/17/93	K. Levinson	NREL, Facilities Maintenance Section	Manager	Solid waste
I-F-30	9/17/93	K. Levinson	NREL, Environmental Section	Associate Environmental Scientist	Environmental file and document review
I-F-31	9/20/93	K. Levinson	GO, ES&H & Operations Division	Safety & Occupational Health Manager	Medical waste
I-F-32	9/21/93	K. Levinson	NREL, Facilities Maintenance Section	Manager	Solid waste

APPENDIX F

GLOSSARY OF ACRONYMS AND ABBREVIATIONS

APPENDIX F:

GLOSSARY OF ACRONYMS AND ABBREVIATIONS

Acronym	Definition
ALARA	As Low As Reasonably Achievable
ASER	Annual Site Environmental Report
CCR	Code of Colorado Regulations
CEQ	Council on Environmental Quality
CH	DOE Chicago Field Office
CMPIT	Chemical Management Process Improvement Team
CRADA	Cooperative Research And Development Agreement
CSO	Cognizant Secretarial Official
CX	Categorical Exclusion
DOE*	U.S. Department of Energy
EC	Environmental Commitment
EE	DOE Office of Energy Efficiency and Renewable Energy
EH	DOE Office of Environment, Safety and Health
EH-24	DOE Office of Environmental Audit
EP	Environmental Protection Programs
EPA*	U.S. Environment Protection Agency
EPIP	Environmental Protection Implementation Plan
ES	Environmental Section
ES&H	Environment, Safety, and Health
FP	Formality of Environmental Programs
FTLB	Field Test Laboratory Building
FWP	Field Work Proposal
GO	DOE Golden Field Office
IC	Internal and External Communication
NEPA*	National Environmental Policy Act

* Indicates acronym is not defined or spelled out after the first usage in the body of the report.

GLOSSARY OF ACRONYMS AND ABBREVIATIONS (continued)

Acronym	Definition
NESHAP	National Emission Standards for Hazardous Air Pollutants
NREL	National Renewable Energy Laboratory
NWTC	National Wind Technology Center
OS	Organizational Structure
OSHA	Occupational Safety and Health Act
PE	Program Evaluation, Reporting, and Corrective Action
PWA	process waste assessment
QA	Quality Assurance
RCRA	Resource Conservation and Recovery Act
RM	Environmental Planning and Risk Management
SARA	Superfund Amendment and Reauthorization Act
SERF	Solar Energy Research Facility
SOP	Safe Operating Procedure
SQG	Small Quantity Generator
SR	Staff Resources, Training, and Development
STM	South Table Mountain
TQM	Total Quality Management

* Indicates acronym is not defined or spelled out after the first usage in the body of the report.

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