



Environmental Management System Description

NATIONAL RENEWABLE ENERGY LABORATORY

August 2005

**Operated for the U.S. Department of Energy by Midwest Research Institute •
Battelle**

NREL Environmental Management System Description

Title: Environmental Management System Description	Procedure No: ES&H Office Desk Procedure
Supports Policy: 6-2 Environmental Management	Effective Date: August 5, 2005

Table of Contents

	Page
1. INTRODUCTION	4
1.1. Environmental Management System	4
2. ENVIRONMENTAL POLICY	6
3. EMS PLANNING	8
3.1. Environmental Aspects	8
3.2. Legal and Other Environmental Requirements.....	8
3.3. Objectives, Targets and Environmental Management Programs.....	9
4. IMPLEMENTATION AND OPERATION	11
4.1. Resources, Roles, Responsibility and Authority.....	11
4.2. Implementation	12
4.3. Resource Allocation/Budgets and Funding:	13
4.4. Competence, Training and Awareness	14
4.5. Communication.....	15
4.6. EMS Documentation.....	16
4.7. Document Control.....	16
4.8. Operational Control	17
4.9. Emergency Preparedness and Response	18
5. CHECKING AND CORRECTIVE ACTION	19
5.1. Monitoring and Measurement.....	19
5.2. Evaluation of Compliance.....	19
5.3. Non-Conformance and Corrective and Preventive Action	20
5.4. Records	20
5.5. Environmental Management System Assessment	21
6. MANAGEMENT REVIEW	22
7. APPENDICES	23
APPENDIX A: NREL Significant Environmental Aspects - EMS.....	24
APPENDIX B: Aspects/Impacts Matrix.....	25
APPENDIX C: EMS Aspects & Impacts Identification Procedure.....	26
APPENDIX D: EMS Processes and Procedures	29
APPENDIX E: EMS Procedure to Achieve Objectives & Targets	30
APPENDIX F: EMS Procedure for Communication.....	31
APPENDIX G: EMS Procedure for Document Control.....	32
APPENDIX H: EMS Procedure for Monitoring/Measuring	33
APPENDIX I: EMS Procedure for Records Management	34

APPENDIX J: EMS Procedure Identifying & Monitoring Legal & Other Requirements 35

1. INTRODUCTION

The National Renewable Energy Laboratory (NREL) is a U.S. Department of Energy (DOE) national laboratory, and conducts research primarily for DOE's Office of Energy Efficiency and Renewable Energy (EERE). The Midwest Research Institute and Battelle operate NREL under the oversight of the DOE Golden Field Office (GO). NREL is the nation's premier laboratory for renewable energy research and development and a leading laboratory for energy efficiency research, with programs in wind energy, solar energy, plant and waste-derived fuels and chemicals, energy efficiency in buildings, geothermal energy, advanced vehicle design, and hydrogen infrastructure and fuel cells.

NREL facilities occupy five separate locations in Jefferson County, Colorado, near the city of Denver. The five facilities are the Denver West Office Park (DWOP), the South Table Mountain site (STM), the Joyce Street Facility (JSF), the National Wind Technology Center (NWTC), and the Renewable Fuels and Lubricants Research Laboratory (ReFUEL). The DWOP and STM sites are approximately 2 miles (3.2 km) east of Golden and 12 miles (19.3 km) west of central Denver. The NWTC is located near the intersection of Highways 93 and 128, between Boulder and Golden, and is approximately 15 miles (24.2 km) north of the STM site. It is adjacent to the DOE Rocky Flats Environmental Technology Site. The JSF is located at 6800 Joyce Street, approximately 5.5 miles (8.9 km) north of the DWOP and STM sites. The ReFUEL Facility is located with the Regional Transportation District (RTD) District Shops and Operation Center (DSOC) located at 1900 31st Street, Denver, about 12 miles east of the STM and DWOP sites.

The STM and NWTC sites are the two main sites where research operations are conducted. The DWOP is leased space used primarily for administrative functions and limited research activities. The JSF is also a leased space that is currently used for storage. The ReFUEL Facility is a leased facility that consists of a small shop complex housed within the RTD/DSOC facility. NREL performs engine-testing activities pertaining to fuels and lubricants at the site.

Additional information about NREL's operations, including NREL's Annual Environmental Performance Report, can be found on NREL's internet website at <http://www.nrel.gov/>.

1.1. Environmental Management System

This Environmental Management System (EMS) Description describes the systematic processes that guide NREL's activities to implement environmental requirements, implement environmental management practices to fulfill NREL's environmental stewardship obligations, and to encourage the achievement of continuous improvement. NREL's EMS conforms to the International Standards for

Environmental Management Systems described by ISO 14001:1996(E). It also meets the criteria of Executive Order 13148, *Greening the Government Through Leadership in Environmental Management*, and DOE Order 450.1, *Environmental Protection Program*, that require Federal facilities to implement EMS's.

The International Standard methodology is based on Plan-Do-Check-Act and is described as follows:

- Plan: Establish the objectives and processes necessary to deliver results in accordance with the organization's environmental policy.
- Do: Implement the processes.
- Check: Monitor and measure processes against environmental policy, objectives, and targets, legal and other requirements and report the results.
- Act: Take actions to continually improve the performance of the environmental management system.

All information required to conform to the above standards is in this Description, either directly or by reference. Referenced documents include the Environmental Management Policy, environmental programs, and environmental procedures.

This EMS is applicable to all functions within NREL.

2. ENVIRONMENTAL POLICY

The purpose of the EMS is to ensure systematic approaches to managing environmental issues and full implementation of the environmental policy. The environmental policy is the foundation of commitments made by NREL's executive management to implement and improve NREL's environmental program. As a federal facility, NREL recognizes that this policy augments the Declaration of National Environmental Policy stated in the National Environmental Policy Act (NEPA) of 1969, which reads as follows:

Title I, Section 101 [42 USC 4331]

- (a) The Congress, recognizing the profound impact of man's activity on the interrelations of all components of the natural environment, particularly the profound influences of population growth, high-density urbanization, industrial expansion, resource exploitation, and new and expanding technological advances and recognizing further the critical importance of restoring and maintaining environmental quality to the overall welfare and development of man, declares that it is the continuing policy of the Federal Government, in cooperation with State and local governments, and other concerned public and private organizations, to use all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans.
- (b) In order to carry out the policy set forth in this Act, it is the continuing responsibility of the Federal Government to use all practicable means, consistent with other essential considerations of national policy, to improve and coordinate Federal plans, functions, programs, and resources to the end that the Nation may—
 - (1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
 - (2) assure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings;
 - (3) attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences;
 - (4) preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an

- environment which supports diversity and variety of individual choice;
 - (5) achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities; and
 - (6) enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.
- (c) The Congress recognizes that each person should enjoy a healthful environment and that each person has a responsibility to contribute to the preservation and enhancement of the environment.

The NREL environmental policy is located in NREL Policy 6-2, *Environmental Management Policy*, and forms a component of NREL's sustainability policy, located in NREL Policy 2-7, *Sustainable NREL*. All employees are expected to be aware of and comply with the spirit as well as the letter of the environmental policy. The policy development process may be found in Laboratory-level procedure 1-1.1 Policies, Procedures, and Forms Management and ISO 14001.

2.1 SCOPE

The Scope of NREL's Environmental Management System includes activities and operations at the five separate NREL locations in Jefferson County, Colorado near the city of Denver. The five facilities are the Denver West Office Park (DWOP), the South Table Mountain site (STM), the Joyce Street Facility (JSF), the National Wind Technology Center (NWTC), and the Renewable Fuels and Lubricants Research Laboratory (ReFUEL). The DWOP and STM sites are approximately 2 miles (3.2 km) east of Golden and 12 miles (19.3 km) west of central Denver. The NWTC is located near the intersection of Highways 93 and 128, between Boulder and Golden, and is approximately 15 miles (24.2 km) north of the STM site. It is adjacent to the DOE Rocky Flats Environmental Technology Site. The JSF is located at 6800 Joyce Street, approximately 5.5 miles (8.9 km) north of the DWOP and STM sites. The ReFUEL Facility is located with the Regional Transportation District (RTD) District Shops and Operation Center (DSOC) located at 1900 31st Street, Denver, about 12 miles east of the STM and DWOP sites.

3. EMS PLANNING

This section outlines the process for identifying environmental aspects, legal and other requirements, establishing objectives and targets, and establishing environmental management programs. Systematic planning, integrated execution, and evaluation of programs for public health, environmental protection, and pollution prevention are requirements of DOE Order 450.1, *Environmental Protection Program* and ISO14001.

3.1. Environmental Aspects

Environmental aspects are the elements of NREL's activities, products and services that can interact with or have an impact upon the environment, such as the energy use or solid waste generation. The procedure for identifying and evaluating environmental aspects and impacts associated with NREL's operations is described below. The identified aspects associated with operations and activities at NREL are listed in Appendix A in the *Aspects and Impacts Matrix*. This Appendix B identifies NREL's significant environmental aspects. As an ongoing element of the EMS, NREL's environmental management staff, in coordination with other functional managers and staff (e.g. Sustainable NREL, Site Operations, research groups), are responsible for reviewing the environmental aspects following the procedure. This review is conducted on a biannual basis, or more frequently if significant changes in activities occur or for increased continuous improvement efforts.

3.2. Legal and Other Environmental Requirements

A list of requirements has been developed, and is located in Attachment 4, Applicable Laws and Regulations, and Attachment 5, Operating and Administrative Requirements, of NREL's Prime Contract. (The Prime Contract is the Midwest Research Institute's contract with the U.S. Department of Energy for the management and operation of the National Renewable Energy Laboratory.) The list of requirements identifies:

- Federal laws, regulations, and implementing requirements/regulations promulgated by DOE and other Federal agencies.
- Executive Orders issued by the President of the United States.
- DOE requirements, including policies, notices, orders, manuals, guides, technical standards and other guidance.
- State and local requirements by reference.

Information sources for legal and other requirements to be used by environmental management, staff, and other employees include:

- Federal Register
- Code of Federal Regulations
- Regulatory information and updating sources
- State regulatory agencies
- Regulatory training seminars and workshops
- EPA and other agency newsletters
- DOE's Office of Environment, Safety and Health (DOE-EH)
- Environmental regulation clearinghouses
- Trade and business publications

3.3. Objectives, Targets and Environmental Management Programs

One of the major functions of the EMS planning process is to monitor and improve environmental performance. This is accomplished by developing written objectives and targets that are to be achieved by the EMS and establishing programs that provide the processes to achieve the objectives and targets. ISO 14001 defines the following terms:

- **Environmental objective:** an overall environmental goal, arising from the environmental policy, that an organization sets itself to achieve.
- **Environmental target:** a detailed performance requirement that arises from the environmental objectives that needs to be set and met in order to achieve the objective.
- **Environmental management programs:** address how the organization will achieve its environmental objectives. The programs should include schedules, resources and responsibilities for attaining the objectives and targets.

Objectives and targets are documented in the Sustainable NREL Master Plan and the NREL One Year Plan. The NREL One-Year Plan is developed for the Laboratory as a whole, and is used to translate the Laboratory mission, as defined in the Five-Year Plan, into specific work tasks. A related Annual Operating Plan is developed for each internal organization (e.g., centers, offices, and technology programs) to define their mission, scope of work, schedule requirements, initiatives, and set of performance objectives and performance indicators for each fiscal year. Environmental management program information is documented in

these Annual Operating Plans. The Annual Operating Plans address the organization structure, funding estimates, facility needs, and other resources needed to accomplish the performance objectives and meet customer expectations.

Development, review and update of the objectives, targets, and associated environmental management programs are conducted in accordance with Procedure 2-1.1, NREL Integrated Safety Management Implementing Program, Section VI.B.4, Laboratory Management Systems - Planning.

In addition, the Environment, Safety, and Health (ES&H) Office staff conducts annual planning, in coordination with Sustainable NREL staff, in which the previous year's environmental management programs are evaluated for completion and to determine whether or not the desired objective was achieved. New objectives, targets and environmental management programs are set based on meeting the commitments in the environmental policy; assessment findings and trends; legal and other requirements; significant aspects; feasibility evaluations; views of interested parties; NREL's strategic and annual performance plans; and NREL's financial, operational, and business requirements. Progress towards accomplishment of the goals is monitored at informal monthly meetings with the Department of Energy's Golden Field Office (DOE-GO) and more formal semi-annual meetings between NREL and DOE-GO.

4. IMPLEMENTATION AND OPERATION

This section outlines how NREL's Environmental Policy is implemented.

4.1. Resources, Roles, Responsibility and Authority

Roles and responsibilities for implementing NREL's EMS are assigned in NREL Policies 2-1, Integrated Safety Management; 6-1, Environment, Safety, and Health; and 6-2, Environmental Management.

NREL's Laboratory Director is the senior official charged with setting environment, safety, and health policy; providing resources; and having overall responsibility for environmental compliance. Executive management is also charged with participating in setting policy, providing resources, and establishing acceptable levels of risk and ES&H performance objectives. Senior managers are responsible for incorporating ES&H requirements into their organizations' strategic and operational planning, and for overseeing the incorporation of ES&H activities into the daily activities of their workers. Line managers are ultimately responsible for ES&H for workers in their organization. Workers are responsible for complying with NREL's policy on ES&H, and incorporating ES&H concepts and processes in planning and conduct of their work.

The ES&H Office Director and staff maintain the procedures and implementing programs appropriate for the hazards presented by Laboratory operations. The ES&H Office environmental staff members also serve as subject matter experts in the various environmental areas and provide assistance to NREL research and operations staff. They are also charged with participating in developing objectives, and monitoring compliance with environmental requirements. The Sustainable NREL Program staff establish plans for achieving objectives in the areas of energy use, water use, greenhouse gas emissions reduction, and alternative fuel use. Tracking performance progress is done by ES&H Office environmental staff and Sustainable NREL staff.

The ES&H staff are charged with ensuring EMS requirements are established, implemented, and maintained in accordance with recognized standards. They periodically analyze the performance of the EMS and make progress reports and recommendations for improvement to management, as described in the monitoring and measurement section of this document.

4.2. Implementation

NREL's environmental activities are primarily implemented through the environmental management policy and environmental programs. The policy defines roles and responsibilities, and the programs describe requirements and procedures for implementing the many disciplines of environmental protection and compliance. Requirements include legal and other environmental requirements, best management practices, performance commitments, training, and record keeping. The programs also include standard operating procedures and guidelines and recommendations for implementation. Programs have been completed in the following areas:

1. Sustainable NREL (includes Pollution Prevention)
2. Materials Management
 - Spill Prevention, Control, and Countermeasures (for applicable sites)
 - Spill Prevention Control Plan for Lab Operations
 - Storm Water Pollution Prevention
 - Groundwater Protection
 - Air Quality Protection
 - Waste Management & Minimization
 - Aboveground Storage Tank Management
 - Weed Management
 - Drinking Water
 - Radioactive Waste Disposal
 - Particulate Emissions Control for Construction
3. Ozone Depleting Substances Management
4. Environmental Impacts
 - National Environmental Policy Act Implementation
 - Cultural Resource Protection
5. Compliance
 - Environmental Permitting and Notification
 - Necessary and Sufficient Standards
6. Resource Protection
 - Drinking Water
 - Weed Management
7. Emergency Response Team

Procedures, in the form of desk procedures or Safe Operating Procedures, have been developed in the following areas:

1. EMS Assessment
2. Environmental Incident/Occurrence Notification

3. Pesticide Application

4.3. Resource Allocation/Budgets and Funding:

Environmental protection and compliance is considered crucial to effective and responsible operations, and an essential component of NREL's mission. Therefore, funding for environmental protection and compliance activities is generally provided out of the Laboratory's overhead budget. Project-specific environmental protection and compliance activities are sometimes funded from individual project budgets. NREL receives annual appropriations to finance most operations from a number of separate programs of the Department of Energy Office of Energy Efficiency and Renewable Energy. Any significant or major environmental funding need would be obtained through the annual planning, programming and budget appropriation process.

4.4. Competence, Training and Awareness

Environmental training requirements are outlined in Federal, state and DOE regulations. The NREL ES&H Office specifies NREL environmental training requirements, based on workers job activities, in environmental programs. The NREL environmental training requirements incorporate regulatory mandated requirements, as well as other training requirements that are outlined in international standards or deemed to be needed to achieve the appropriate level of environmental protection and compliance. Many of these training requirements are reflected in individual employees' Required Training Plans that are developed by the worker and their supervisor based on their specific job activities.

All new NREL workers (including full and part-time permanent staff, contractors, students, and post-doctoral workers) are given an ES&H Orientation that includes information on the EMS and all workers' individual responsibility for environmental protection. Additional training is provided to workers based on their RTP and job activities. Training records are maintained by the NREL Human Resources Office, which also tracks training completion rates.

Assuring staff complete required environmental training is the responsibility of the line manager. Training is provided by environmental staff or by off-site vendors. Form F1008, *Required Training Plan*, outlines the required training for each functional group within NREL. At the minimum, employees receive training that includes the following:

- Awareness of the EMS and the importance of conformance with the Environmental Policy, legal and other requirements.
- The potential environmental impacts of individual work activities and means to minimize those impacts.
- Individual roles and responsibilities in achieving conformance with compliance requirements, and with the requirements of the EMS.
- The potential consequences of not meeting compliance and EMS requirements.

All new employees receive training on EMS and compliance requirements. Environmental staff receive training as defined in their Required Training Plans and performance evaluations, based on regulatory requirements and best practices, potential for enhancement of capabilities, and personal development goals.

4.5. Communication

The NREL ES&H Office Director and the ES&H environmental staff have the primary responsibility for communicating information on environmental matters to workers within NREL, as well as communication with regulatory agencies. The environmental staff or the ES&H Office Director communicate information relative to the EMS to senior management, other functional managers, employees, and external stakeholders and customers. For communication with the general public, the External and Stakeholder Relations Office Director and staff are the primary point of contact for disseminating information on the environmental activities at NREL, with input from the ES&H Office.

Inquiries about NREL's environmental activities may come in via e-mail or telephone, and are directed to NREL's External and Stakeholder Relations Manager, who responds via telephone and/or e-mail. An annual community meeting is held at the NREL campus that is open to any interested member of the public. NREL also holds regular meetings for community leaders, such as mayors, county commissioners, and city council members. Questions are answered and any concerns are addressed at those meetings as much as possible; additional follow-up is conducted as necessary.

A newsletter is mailed periodically to area residents, businesses, and other interested stakeholders. An annual community meeting is held at the NREL campus that is open to any interested member of the public. NREL also holds regular meetings for community leaders, such as mayors, county commissioners, and city council members. NREL participates in Jefferson County Planning processes regarding local land use. NREL staff also participate in civic leader groups, such as serving as Chamber of Commerce Board members and governing committee members.

NEPA reviews and document preparation have environmental staff assigned as project managers who, in coordination with DOE-GO staff and often with the assistance of subcontractors, interact with the public and other interested parties.

NREL's annual Environmental Performance Report (meets the requirements for the DOE Annual Site Environmental Report) outlines the accomplishments and issues of NREL's environmental program for the calendar year. The report is available to all employees and the public via posting on the Sustainable NREL website and placement in the public reading room at the NREL Visitor's Center. The report is distributed to the DOE Golden Field Office, who in turn distributes it to DOE managers and other interested stakeholders.

NREL communicates incidents and occurrences to NREL management, DOE, and state and local agencies, as required, using procedural methods established in DOE Order 231.1A, *Environment, Safety, and Health Reporting*, and DOE Manual 231.1-2, *Occurrence Reporting and Processing Operations Information*, NREL Policy 6-6, *Risk Assessment*, and ES&H Program 6-6.3, *Incident Reporting, Investigation, and Trending*, and ES&H Office Desk Procedure, *Environmental Incident/Occurrence Notification*.

4.6. EMS Documentation

The EMS Description describes the various pieces of NREL's EMS. It also describes the relationships between the documents and where the documentation can be found. NREL's EMS documentation includes:

- Environmental Policy
- EMS Description (this document)
- EMS Processes and Procedures (listed in Appendix C)
- Environmental Programs and tiered documents and procedures
- Environmental Records

A list of environmental programs, and the text of most programs, is accessible to staff on the NREL intranet ES&H web page. The content of remaining programs are provided to staff upon request by the responsible ES&H staff member. The maintenance and management of the EMS Description is the responsibility of the environmental staff. It is reviewed periodically and updated as needed.

4.7. Document Control

Efforts are continuously being made to make electronic media the primary method of distribution and control of EMS documentation. There are still records that exist only in hard copy (e.g. chlorine monitoring logs for NWTC drinking water system). These hard copy records are maintained in the ES&H Office files, and retained indefinitely. A convenience copy of some electronic records is also made for the ES&H files (e.g. NEPA environmental reviews and determinations).

The most recent versions of the Environmental Management Policy, environmental programs, and other Laboratory level documentation (e.g. forms) are housed on NREL's intranet. Notification of the availability of new or revised

Laboratory level procedures (environmental management policy and environmental programs) is accomplished through NREL’s internal electronic mail system. The most current version of the EMS Description is in paper format; copies are limited to ES&H environmental staff. It is the intention of environmental staff to put the EMS Description on the NREL intranet by the end of 2005. Copies of EMS documents furnished to external entities are not controlled. The Laboratory Requirements Management group manages the revision and review process for Laboratory-level procedures and documents; this group also distributes revisions of these procedures and documents. EMS documents include a heading indicating the document title, effective date, authorizing policy, and procedure number (if applicable).

The ES&H Office environmental staff is responsible for upkeep of the EMS information on the ES&H website.

Detailed procedures and responsibilities concerning the creation and modification of Laboratory-level EMS-related documents are in NREL Policy 1-1, *Requirements Management*, and Laboratory-level Procedure 1-1.1, *Policies, Procedures, and Forms Management*. This procedure assures documents are adequately reviewed, revised, controlled and kept current as well as outlining the approval process.

4.8. Operational Control

NREL conducts numerous operations that, without established documented procedures and controls, could lead to deviations from the environmental policy, regulations, other requirements, or lead to environmental impacts. Operational control documents are established and managed by NREL as summarized below:

Operational Control Document	Management Method
Laboratory-Level Procedures	Prepare new or update existing as needed from aspect analysis, audit findings, incident investigation results, and employee suggestion.
Safe Operating Procedures (SOPs) for research and operations activities posing more than routine risks	ES&H staff conduct periodic reviews of SOPs in conjunction with the SOP owner; ES&H provides guidance on the content of the update to verify that procedures for environmental protection are properly addressed.
Written spill control procedures (SPCC Plans)	Environmental staff prepares and updates plans in accordance with current regulations.
Environmental Programs	Environmental staff prepares and updates programs in

	coordination with affected functional groups.
Construction and other procurement specifications	Environmental staff review standard and individual specifications routinely to ensure contractors conduct environmental activities as required.
Other environmental guidance documents	Environmental staff prepare other types of guidance, often in the form of e-mails, for topics that are unique to project-specific situations. This guidance is based on regulations, risk assessment, audit feedback, best management practices, and other applicable requirements.
Risk Assessment (RA) documents (Safe Work Permits, Readiness Verifications, etc.)	Risk Assessment is conducted prior to the start of each new operations and research activity at NREL. The risk assessment processes address potential risks in the areas of environmental protection, safety, and health. Project-specific controls are outlined in the RA documents.
Facility Inspection reports	ES&H staff, in conjunction with Site Operations and research staff, conduct periodic facility inspections to assess whether applicable regulations and requirements are met.

4.9. Emergency Preparedness and Response

A description of credible emergencies at NREL that may require emergency preparedness and response procedures is outlined in the NREL Emergency Management Manual.

The following procedures are in place to respond to emergency situations and to prevent or mitigate associated environmental impacts:

- Procedures prescribed in each of NREL’s spill prevention, control and countermeasures (SPCC) plans in place at facilities where oil spills could potentially harm the environment.
- NREL’s implementation of DOE Order 231.1, *Environment, Safety and Health Reporting* guides reporting procedures and evaluations to determine causes and preventive measures.
- NREL ES&H Program 8-4.1, *Emergency Response Team*.

Regular review and revision of SPCC plans occurs on the required regulatory schedule. Review and revision of ES&H and Security programs are on a schedule, as outlined in the NREL Policy 1-1, Requirements Management Policy and Laboratory-level Procedure 1-1.1.

5. CHECKING AND CORRECTIVE ACTION

This section outlines the processes and operational controls that are used to measure and monitor NREL's environmental management system for effectiveness.

5.1. *Monitoring and Measurement*

Permits and environmental programs outline monitoring and measurement of activities that have environmental impacts. Methods of monitoring and measurement employed at NREL include some of the following:

- Monitoring environmental performance and progress toward objectives and targets;
- Monitoring mitigation commitments (i.e. wildlife, cultural resources, etc.);
- Reports and tracking of regulated materials purchases and use;
- Tracking and reporting of hazardous waste collection and disposal;
- Tracking and reporting of pollution prevention data;
- Tracking and reporting of affirmative procurement data;
- NEPA documents tracking and reporting;
- Assessment of EMS and its components;
- Monitoring energy and water use
- Laboratory analysis of any suspected contamination (e.g. contaminated soil from a spill);

Procedures are also in place to periodically evaluate compliance with relevant environmental requirements, through periodic compliance assessments and assessments of programs or program components (Section 4.2).

5.2. *Evaluation of Compliance*

Assessments and inspections are conducted at NREL facilities to evaluate compliance with established standards. The EMS Assessment Procedure outlines the processes and procedures followed for conducting assessments. Types of evaluations included in the program plan are:

- EMS Assessments – assessments of NREL's environmental management system conducted by a cross-disciplinary team on a biannual cycle.

- Compliance Assessments – assessments of NREL’s environmental programs or components of programs conducted by a cross-disciplinary team.
- Third Party (External) Assessments and Evaluations– conducted by external regulatory agencies or by external subject matter experts.

ES&H environmental staff are responsible for initiating and coordinating these assessments, as described in the procedure. The results of these assessments are forwarded to NREL executive management and the DOE-GO. A corrective action plan is developed, and corrective actions are prioritized and implemented according to a schedule.

The Annual Site Environmental Report submitted to DOE summarizes the status of environmental issues at NREL, including projects, permits, assessments, reviews, and EMS implementation.

5.3. *Non-Conformance and Corrective and Preventive Action*

The EMS Assessment Procedure outlines the processes and procedures followed for evaluating and responding to findings, and preparing corrective actions. The appropriate research, operations, or environmental staff are assigned responsibility for implementing a corrective action.

The ES&H environmental scientist or engineer with overall responsibility for the area that was assessed is also responsible for tracking and trending findings and corrective actions in their program areas. The environmental staff, in coordination with the assessment team and management, as appropriate, have responsibility for determining appropriate corrective actions.

5.4. *Records*

Records are kept to meet and demonstrate regulatory compliance, and to show conformance with NREL’s EMS.

The NREL EMS Procedure for Records Management is attached as Appendix E. Training records shall be maintained by the NREL Human Resources Office. All other environmental records shall be maintained by the ES&H Office.

5.5. Environmental Management System Assessment

Once every two years (or sooner if necessary), the environmental staff convene an assessment team to evaluate comments and inputs received regarding the EMS. They conduct an EMS assessment by developing assessment criteria, scope, methods, reporting format, and schedule, according to the EMS Assessment Procedure. The EMS review evaluates the level of implementation and operational effectiveness of procedures, programs, and controls, and evaluates progress made on objectives and targets. The ES&H Office Director, in conjunction with the environmental scientist/engineer responsible for the overall EMS, coordinates the report distribution to executive management, other managers, DOE, and any other stakeholders.

Periodically, the Department of Energy Golden Field Office conducts surveillances of NREL's EMS. Every three to five years, an external team or an external EMS auditing consultant, conducts an assessment of NREL's EMS using ISO 14001, NEPT, and other applicable standards as the review standard. The evaluation includes measures of how effectively NREL is implementing EMS procedures, programs, controls and progress made on objectives and targets. The report is submitted to NREL's ES&H Office.

The ES&H Office Director and environmental staff evaluate the assessment results, summarize areas for improvement, and prepare plans and strategies for implementing relevant improvements. The assessment report, summary of improvement areas, and the plans and strategies are presented to the senior managers by the ES&H Office Director. Changes and updates to the EMS will be directed by the environmental staff and incorporated into the EMS upon approval of the ES&H Office Director.

6. MANAGEMENT REVIEW

Executive management reviews the EMS annually to ensure its continuing suitability, adequacy, and effectiveness. This review is conducted either via a review of the EMS Assessment or via a summary progress report that is prepared by the ES&H environmental staff. Either the EMS Assessment or the summary progress report is presented to executive management by the ES&H Office Director, with support as needed from environmental staff. This process informs top management of the state of the EMS, and allows for management feedback regarding possible need for changes to policy, objectives, and other elements of the EMS. Executive management evaluates the EMS to verify that the EMS continues its:

- Suitability to NREL's mission, culture and strategic plan.
- Adequacy in fulfilling applicable requirements.
- Effectiveness in managing and improving environmental performance.

If a summary progress report is used as the vehicle for management review, it describes how performance has met the criteria of the environmental policy statement, overall progress of environmental performance, successful and unsuccessful programs, the level of achievement toward meeting objectives and targets, and recommendations for improvements to the EMS. Sources of information include: the Annual Site Environmental Report; status of environmental management programs; status of environmental commitments in NREL's One Year Plan, NEPT commitments, and other Sustainable NREL goals; results of prior EMS assessments; communication from internal and external sources; status of corrective actions; follow-up actions from previous management reviews; and other relevant documents.

Following management review, any comments provided by management for improvement to the EMS are incorporated into any other corrective action plan being developed.

7. APPENDICES

- A. NREL Significant Environmental Aspects
- B. Aspects/Impacts Matrix
- C. EMS Aspects & Impacts Identification Procedure
- D. EMS Processes and Procedures
- E. EMS Procedure to Achieve Objectives & Targets
- F. EMS Procedure for Communication
- G. EMS Procedure for Document control
- H. EMS Procedure for Monitoring/Measuring
- I. EMS Procedure for Records Management
- J. EMS Procedure for Identifying & Monitoring Legal & Other Requirements

APPENDIX A: NREL Significant Environmental Aspects - EMS

1. Energy use/Energy efficiency
2. Hazardous waste generation & management
3. Impacts to land
4. Air emissions
5. Solid waste generation & disposal
6. Water use (buildings)
7. Materials/natural resource use
8. Impacts to wildlife & habitat
9. Impact on communities (traffic)
10. Transportation

APPENDIX B: Aspects/Impacts Matrix

(Excel spreadsheet)

APPENDIX C: EMS Aspects & Impacts Identification Procedure

General Rules

- Use a matrix to perform the analysis of aspects and impacts.
- For each activity, product, or service at NREL, select the applicable aspects from the master environmental aspects list that follows.
- Develop the appropriate impact for each environmental aspect selected.
- Assign the appropriate significance criteria associated with each aspect and impact.
- Rank each aspect and impact by anticipated frequency and severity, using the criteria below and considering the particular significance criteria assigned, to develop the potential risk associated with each aspect/impact.
- Those items ranked in the “High” category for environmental risk are considered potentially significant aspects/impacts.

Master Environmental Aspects List:

1. Emissions to air
2. Releases to surface water
3. Wastewater releases
4. Accidental releases
5. Solid waste generation and management
6. Hazardous waste generation and management
7. Source reduction, reuse, or recycling
8. Purchase of Environmentally Preferable Products (EPP)
9. Energy Use
10. On-site energy generation using renewable sources, and use of energy efficiency technologies
11. Water Use
12. Use of raw materials and other natural resources
13. Impacts to land, including restoration
14. Impacts to wildlife or vegetation, including habitat impacts and preservation
15. Impacts to groundwater
16. Impact on communities (e.g. traffic, noise, vibration, odor, visual appearance, etc.), including benefits
17. Transportation issues (for goods, services, and employees)
18. Cultural resource impact and/or preservation

Criteria for Evaluating the Significance of Environmental Aspects of NREL's Activities:

1. Information about the condition of the environment
2. Data on material and energy inputs, discharges, wastes and emissions in terms of risk – risk of potential environmental damage
3. Views of interested parties – e.g. employees, neighbors (positive and/or negative)
4. Activities that are regulated – permitted activities or otherwise regulated
5. Other Requirements – e.g. DOE and Executive Orders
6. Design, development, manufacturing, distribution, servicing, use, re-use, recycling, and disposal of NREL's products – product life cycle
7. Activities with the environmental costs
8. Activities with environmental benefits
9. NREL and/or DOE management requirement
10. Need for additional data collection
11. Best Management Practices
12. Sustainable NREL voluntary commitment
13. Safety, health, and/or security considerations

Consider normal operating conditions, start-up, shutdown, and reasonably foreseeable emergency conditions.

Method for Ranking Risks/Benefits:

Frequency:

Category Potential Frequency of Occurrence

1. Rare
2. Occasional or intermittent
3. Often (e.g. daily)
4. Continuous

Severity:

Category Potential Severity of Occurrence

1. Minimal environmental consequence or minimal volume (refers to discharges/emission)
2. Noticeable environmental consequence or moderate volume
3. Considerable environmental consequence or substantial volume
4. Severe environmental consequence or very large volume

Risk Ranking Matrix:

Frequency

4	VL	M	H	H	
3	VL	L	M	H	
2	VL	VL	L	M	
1	VL	VL	VL	L	
	1	2	3	4	Consequence

Significant Aspects = High risk ranking

APPENDIX D: EMS Processes and Procedures

Processes:

Environmental Policy (in Environmental Management Policy document)
Aspects and Impacts Matrix
List of Legal Requirements (Necessary and Sufficient Standards)
Environmental Objectives, Targets (in Sustainable NREL Master Plan)
Environmental Programs
Required Training Plan

EMS Procedures:

Aspects and Impacts Identification Procedure
Procedure to Achieve Objectives & Targets
Communication
Document Control
Monitoring/Measuring
Records Management

APPENDIX E: EMS Procedure to Achieve Objectives & Targets

Sustainable NREL and the ES&S Office collaborate to develop appropriate environmental objectives and targets. These may be in the areas of energy, water, materials use, materials re-use, environmental impact analysis, or other environmental area. The goals may include laboratory-wide goals or may pertain to specific groups at NREL. The DOE Golden Field Office also participates in the dialogue to help shape appropriate environmental objectives and targets.

Environmental goals are reviewed annually as part of the Sustainable NREL Master Plan revision and as part of development of the NREL One-Year Plan.

APPENDIX F: EMS Procedure for Communication

Identification and Response to Community Concerns:

Concerns may be brought to NREL's attention in a number of ways. Concerns or inquiries coming in via e-mail or telephone are directed to NREL's External and Stakeholder Relations Manager, who responds via telephone and/or e-mail. An annual community meeting is held at the NREL campus that is open to any interested member of the public. NREL also holds regular meetings for community leaders, such as mayors, county commissioners, and city council members. Concerns are addressed at those meetings as much as possible; additional follow-up is conducted as necessary.

Informing Community Members about NREL's Environmental Performance and other Important EMS-Related Matters:

An annual environmental report is prepared and posted on NREL's website and placed in the DOE public reading room on the DOE Golden Field Office Website. A newsletter is mailed periodically to area residents, businesses, and other interested stakeholders. An annual community meeting is held at the NREL campus that is open to any interested member of the public. NREL also holds regular meetings for community leaders, such as mayors, county commissioners, and city council members. NREL participates in Jefferson County Planning processes regarding local land use. NREL staff also participates in civic leader groups, such as serving as Chamber of Commerce Board members and governing committee members.

Internal Communication with NREL Staff:

Information relevant to NREL staff is posted on the ES&S Office intranet website. In addition, e-mail communication to appropriate distribution lists, including NREL Global e-mails is used when needed. Meetings with individual groups may also be convened to disseminate information.

APPENDIX G: EMS Procedure for Document Control

Documents shall be maintained and updated in accordance with the NREL Requirements Management Policy 1-1 and the Policies, Procedures, and Forms Management Procedure 1-1.1. Environmental management policies and programs shall establish procedures and responsibilities for implementing those procedures.

Location:

All documents will reside either on the NREL Intranet or in the ES&S Office files.

Review and Update

Periodic review, revision, and approval of policies and procedures shall be in accordance with Policy 1-1 and Procedure 1-1.1, referenced above.

Current Version

The most current version of NREL Environmental Management System policies and programs is the version that is posted on the NREL Intranet by NREL's Requirements Management group. For those environmental programs and desk procedure documents that are not posted on the NREL Intranet, the most current version is maintained in the environmental files in the ES&S Office.

Obsolete Documents

Outdated policies and procedures shall be removed from the NREL Intranet and replaced with the current version.

APPENDIX H: EMS Procedure for Monitoring/Measuring

Monitoring and measurement is normally conducted to assess environmental performance and to compare with past measurements to evaluate performance improvement. Therefore, characteristics related to NREL's environmental objectives and targets are measures. Examples of characteristics that could be measured include:

- Total energy use
- Percent of energy that is generated by renewable sources
- Total water use
- Water savings generated from implementation of a Best Management Practice (BMP)
- Total hazardous/regulated/special waste generated
- Hazardous/regulated/special waste generated as a function of research activity (i.e. normalized on the basis of research activity)
- Environmental monitoring data, such as ground water quality
- Quantity of materials that are recycled
- Air emissions calculated based on energy use
- Air emissions calculated based on vehicle use

All of the characteristics above are not measures on a continuous basis. The characteristics measured in any given year are based on the environmental goals and objectives for that year.

Results are reported in the Annual Environmental Performance Report that is posted on the NREL Intranet. Some of the results are also summarized in the Sustainability Report.

APPENDIX I: EMS Procedure for Records Management

EMS policies and procedures shall be revised according to the NREL Requirements Management Policy 1-1; the Policies, Procedures, and Forms Management Procedure 1-1.1; and the EMS Document Control Procedure. All other environmental records shall be maintained indefinitely.

Records shall be legible, identifiable, and traceable to the activity, product, or service involved. Records shall be stored and maintained so as to be readily retrievable and protected against damage, deterioration or loss. Records to be retained indefinitely include, but are not limited to:

- permits
- compliance documentation
- monitoring data
- waste tracking and disposal data (excluding solid waste)
- storm water erosion and sediment control plans
- inspection records
- records of spills and corrective actions
- assessments and corrective actions
- training records

Training records shall be maintained by the NREL Human Resources Office. All other environmental records shall be maintained by the ES&H Office.

APPENDIX J: EMS Procedure Identifying & Monitoring Legal & Other Requirements

ES&H Subject Matter Experts continuously monitor for additions or changes to applicable regulations and other requirements in their areas of responsibility. Monitoring methods include, but are not limited to:

- Participating in ES&H forums and list servers which regularly send out announcements on changes in the regulatory world;
- Attending professional workshops, conferences and seminars;
- Membership in national and local professional organizations; or
- Reading professional journals.
- Reviewing the web-based BNA (Bureau of National Affairs) *Environmental Reporter*
- Periodic review of the Federal Register on-line for proposed and final regulation changes
- Review of hard-copy updates provided by subscription service for proposed and final regulations of the State of Colorado – routed to each staff member
- ESH&Q Office reviews the list of Necessary and Sufficient Standards annually to determine which statutes, regulations, DOE Orders, Executive Orders apply to lab activities.
- Local regulations are reviewed as necessary when lab staff request information or consultation on proposed or changing activities.

Other ways that changes to regulatory requirements may be identified include:

- Notification from DOE/GO;
- Incident trending identifies a need for additional regulatory control; or
- The hazard level of some activity increases and warrants a new level of control.
- Notification by NREL Requirements Management group of DOE Orders for review and comment.

ESH&Q staff are encouraged to maintain a record of those dates that regulations are reviewed to ensure this activity is occurring at an acceptable interval.

For legal requirements that must be addressed immediately, ESH&Q staff are to notify affected parties and implement measures to address deficiencies. For non-immediate changes, ESH&Q staff are to incorporate changes to programs, procedures and policies at the next scheduled revision date.