U.S. Department of Energy Orders Self-Study Program

DOE O 5400.1

GENERAL ENVIRONMENTAL PROTECTION PROGRAM

DOE O 5480.4

ENVIRONMENTAL PROTECTION, SAFETY, AND HEALTH PROTECTION STANDARDS

ALBUQUERQUE OPERATIONS OFFICE

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DOE ORDER 5400.1
GENERAL ENVIRONMENTAL PROTECTION PROGRAM
DOE ORDER 5480.4
ENVIRONMENTAL PROTECTION, SAFETY, AND HEALTH PROTECTION STANDARDS
FAMILIAR LEVEL

OBJECTIVES

Given the Familiar Level of this module and the resources listed below, you will be able to:

1. State the purpose of implementing U.S. Department of Energy (DOE) Orders 5400.1. and 5480.4
2. Define the following terms.
   - Effluent
   - Environemental monitoring
   - Effluent monitoring
   - Environmental surveillance
   - Environmental occurrence
   - Field level exemption
   - Mandatory standards
   - Operations
   - Reference standards
   - Standard
   - Temporary exemption
   - Permanent exemption
3. State the purpose of the annual site environmental report.
4. Describe the conditions under which a field office manager may grant exemptions from mandatory standards.
5. Describe the process by which a contractor can request a permanent exemption from environmental standards.

6. List the type of information required in the environmental programs section of the annual site report.
7. List the reporting units for radiological data.
8. Descrie the contents of a request for a temporary exemption from internal DOE environmental standards.
9. Explain the resolution of conflict between DOE and non-DOE environment, safety, and health (ES&H) standards.
10. Describe a site groundwater protection program.
11. State the objectives of environmental monitoring requirements.
12. List the categories of environmental protection standards.

Note: If you think that you can complete the practice at the end of this level without working through the instructional material and/or the examples, complete the practice now. The course manager will check your work. You will need to complete the practice in this level successfully before taking the criterion test.

RESOURCES

DOE Order 5400.1, General Environmental Protection Program, Change 1, 6/29/90.
DOE Order 5480.4, Environmental Protection, Safety, and Health Protection Standards, Change 4, 1/17/93.

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INTRODUCTION

In this module we will discuss the important elements of DOE Orders 5400.1 and 5480.4. The module is divided into five sections. One each for the four Chapters included in DOE Order 5400.1 plus a section on the information contained in DOE Order 5480.4. The purpose of DOE Order 5400.1 is to establish environmental protection program requirements, authorities, and responsibilities for DOE operations for assuring compliance with applicable Federal, State and local environmental protection laws and regulations, Executive orders, and internal department policies. The Order more specifically defines environmental protection requirements that were established in DOE Order 5480.1B. The purpose of DOE Order 5480.4 is to specify and provide requirements for the application of the mandatory environmental protection, safety, and health standards applicable to all DOE and DOE contractor operations; to provide a listing of reference ES&H standards; and to identify the sources of the mandatory and reference ES&H standards. We have provided examples and a practice in the module to help familiarize you with the material. The practice will help prepare you for the criterion test.

Before continuing, you should obtain a copy of DOE Orders 5400.1 and 5480.4. Copies of the Orders are available on the Los Alamos National Laboratory Website at http://iosun.lanl.gov:1776/htmls/directives.html or through the course manager. Several additional resources are cited in the Preamble, Section 4 of DOE Order 5400.1. Additionally, DOE Order 5480.4 is mostly a listing of available standards and directives related to environmental protection. It is not necessary to obtain copies of these resources. However, you should have access to these resources and be familiar with their contents. You may need to refer to these documents to complete the examples, practice, and criterion test.

SECTION 1 ENVIRONMENTAL PROTECTION STANDARDS

PURPOSE

To provide the mandatory environmental standards that are in effect at DOE operations and to provide procedural guidance for securing an exemption from a standard.

STANDARDS

Environmental protection standards fall into three categories.

- Those imposed by Federal statutes, regulations, and requirements
- Those imposed by State and local statutes, regulations, and requirements which are applicable to DOE
- Those imposed by DOE directives

EXEMPTION PROCEDURES

Requests for exemptions from applicable environmental protection standards are not encouraged. However, in limited cases, programmatic circumstances or operational conditions may warrant such requests in accord with the following procedures.

From Federal, State and Local Regulations

Specific procedures for processing exemptions to standards are contained in Federal, State, and local laws and regulations. To the extent that Federal, State, and local laws and regulations allow for an exemption from any standard, field organizations and Program Senior Officials, as appropriate, are to use applicable administrative and legal procedures to secure approval for any exemption. The Assistant Secretary for Environment, Safety, and Health (EH-1) will provide technical and administrative support to any organization upon request. In the case of generic issues that affect department-wide compliance with environmental standards, EH-1 will coordinate efforts to obtain agreements from the regulatory authority for a DOE-wide exemption. Heads of Field Organizations and PSOs, as appropriate, shall submit to EH-1, the General Counsel, and the appropriate PSOs information copies of all requests to Federal or State agencies for exemptions.

The field organization and PSOs, as appropriate, shall take the lead role in coordinating the exemption request with the appropriate Federal, State, or local agency responsible for the enforcement of the standard for which the exemption is being requested.

After a determination has been made by the appropriate Federal, State, or local agency, the field organization and PSOs, as appropriate, shall notify EH-1, the General Counsel, and the appropriate

PSOs of the disposition of the request.

From Internal DOE Environmental Standards

Procedures for exemptions from standards which are internally imposed as a matter of DOE policy are as follows:

Temporary Exemptions

- Heads of Field Organizations and PSOs, as appropriate, shall submit to EH-1, with copies to the appropriate PSOs, a request for a temporary exemption from DOE mandatory standards. A request for a temporary exemption shall contain the following:
  - A specification of the standard from which the field organization or PSO seeks an exemption;
  - Detailed statements of why the field organization or PSO is unable to comply with the standard;
  - A statement of the steps taken or to be taken to minimize the risk to the public and environment, including the conditions the field organization or PSO shall maintain and the means, methods, operations, and processes which shall be adopted and used;
  - An analysis of the benefits to be gained from the exemption and the negative impact on the program or activity if not granted, compared with the risk posed by conducting the activity under the exemption; and
  - A statement of when the field organization or PSO will be able to comply with the standard and what steps have been and will be taken by the field organization to come into compliance with the standard.
- EH-1 shall review the field organization's or PSO's request within 60 days of receipt of the request. After review and evaluation of the request and recommendations from the appropriate PSO, EH-1 shall approve a temporary exemption if the request establishes that the field organization or PSO:
  - is unable to comply with the standard because of unavailability of funding, professional or technical personnel, materials or equipment, or because necessary construction or alteration of facilities must be completed to comply;

- _ is taking all available steps to provide environment and health protection; and,
- _ has an effective program for coming into compliance with the standard as quickly as possible.

- A temporary exemption may be in effect for the period needed by the field organization or PSO to achieve compliance with the standard, but no longer than 2 years, except that in unusual circumstances a temporary exemption may be renewed for a 1-year period. An application for renewal must be filed and processed. This shall be done at least 90 days before expiration of the temporary exemption.

Permanent Exemptions

In limited cases, EH-1 may approve a permanent exemption if the field organization or PSO has demonstrated that the conditions, practices, means, methods, operations, or processes to be used will provide environment, safety, and health protection that is comparable to that which would prevail if the field organization or PSO had complied with the standard. Heads of Field Organizations or PSOs shall submit to EH-1 any request for a permanent exemption from DOE standards. The request for exemption shall contain all required information. Within 60 days of the receipt of the request, EH-1 shall review and evaluate the request and recommendations from the appropriate PSO.

Field-Level Exemptions

The Head of the Field Organization or PSO may grant field-level exemptions from mandatory standards during the period of time in which the request for a temporary or permanent exemption is being processed by Headquarters. A field level exemption shall be granted where the Head of the Field Organization or PSO has environmental and health risks are acceptably low. The field level exemption is to be effective until a decision on the issuance of an exemption is made by EH-1.

Presidential Exemption.

Any request for a Presidential exemption from applicable pollution control standards shall comply with the procedures prescribed in Section 1-7 of Executive order 12088. The request should be forwarded to EH-1 with copies to the appropriate PSO. Recommendations for Presidential

exemptions will be developed by EH-1, concurred in by the General Counsel and the PSO, and transmitted to the Office of Management and Budget under the Secretary's signature. Presidential exemptions may be requested under the following Acts:

- Clean Air Act, as amended, Section 118(b)
- Clean Water Act, as amended, Section 313(a)
- Safe Drinking Water Act, as amended, Section 1447(b)
- Resource Conservation and Recovery Act, as amended, Section 6001
- Comprehensive Environmental Response, Compensation, and Liability Act, as amended, Section 120(j)(1)
- Noise Control Act, as amended, Section 4(b)(2).

SECTION 2, NOTIFICATION AND REPORTS

To establish requirements for notification and follow-up of environmental occurrences; and, periodic routine reporting of significant environmental protection information. Each DOE facility is unique; thus, notification and reporting requirements shall be determined by the Head of Field Organization on a case-by-case basis, consistent with regulatory requirements and DOE directives.

ANNUAL SITE ENVIRONMENTAL REPORT

Purpose

The purpose of this report is to present summary environmental data so as to characterize site environmental management performance, confirm compliance with environmental standards and requirements, and highlight significant programs and efforts.

Content and Format

Content and format for the annual site environmental report is providedbelow; guidelines and examples are included to illustrate the quality andkind of information required.

Cover and Title pages

The cover and title pages should include the site name, facility, reporting period, reporting

organization, address, and document number.

Table of Contents
The Table of Contents should list sections, locations of figures, texts, appendices, references, etc., in the document.

Introduction
The introduction should include a brief description of the site, its mission, the nature of its primary operations, and activities. A general discussion of environmental features and land and water use, including pertinent demographic information, should be included in this section.

Summary
The summary should provide evaluation and interpretation of the information included in each of the sections contained in the report; the meaning of these data should be explained in the context of applicable environmental standards and requirements. The summary should be written in a manner understandable to the general public. Explanations, as appropriate, should be included for unusual events or releases. A discussion of abnormal occurrences which resulted from or could have impact upon either the program activity or the site, should be included. Population dose estimates and the dose to the maximum exposed individual should be included. The total quantity of radioactivity by radionuclide released as airborne and liquid effluents should be included, along with descriptive information on nonradioactive effluents.

Compliance Summary
This section should review the facility's compliance record. Specific instances of noncompliance should be discussed and a description of corrective actions should be included.

Environmental Program Information

This section should provide a summary of all of a site's environmental activities performed to comply with laws and regulations, to enhance environmental quality, and to improve understanding of the effects of environmental pollutants from site operations. Items to be included are:

- a summary of environmental monitoring performed;
- a listing of environmental permits issued to the site by Federal, state and local regulatory agencies. Include the type of permit, by whom issued, and the expiration date.
- a listing of draft and final environmental impact statements (EIS) and environmental assessments (EA) completed during the year that pertain to site activities; and
- a summary of significant environmental activities at the site.

Environmental Radiological Program Information

This section should provide an accurate description of the environmental radiological monitoring program conducted at each facility.

- Radioactive Effluent Data
  Effluent data for radionuclides should be summarized. The nuclides of concern and the total number of curies in airborne and liquid effluents released to the offsite environment should be included in the portion of the report dealing with air and water monitoring, respectively. In instances where liquid effluents released to different receiving streams result in separate routes of potential exposure, the radioactivity discharged to each receiving stream should be identified. For purposes of reporting radiological effluent data, gross radioactivity measurements are unacceptable, unless specified by applicable federal, state, or local regulations.
- Environmental Sampling for Radioactivity
  Include a brief description of each of the media sampled as part of the monitoring program or as part of a special study. The type and frequency of sampling and the methods of analysis should be presented. Individual data points are not required, but tables, graphs, or text which clearly and accurately present the overall monitoring results should be provided. A map showing the location of monitoring stations and sampling points also should be included. As a general rule, data should be presented for radioactivity in media for which

there are applicable standards or other meaningful bases for interpreting the results. Interpretation should be made, where appropriate, of how the environmental levels compare to relevant parameters such as background radioactivity, and applicable effluent or environmental standards.

- Reporting Potential Dose to the Public
  The environmental report should contain an assessment of the potential radiation exposure to the public that could have resulted from site operations during the calendar year. The assessment should be as accurate and realistic as possible. The modeling and calculation methodology used in the dose assessment should be included or referenced. A comparison of results with applicable standards and relevant parameters also should be included.
- Reporting Units
  The following units should be used in reporting radiological data:
  - Air. uCi/ml (for tritium, report in pCi/ml; for uranium and thorium, also include pg/ml).
  - Sediment. uCi/g or pCi/g dry weight. Specify sample depth and method of obtaining dry weight. For uranium and thorium, also include ug/g dry or wet weight, where possible. For tritium, the concentration may be expressed in uCi/ml of moisture content in unit volume of wet samples.
  - Food and Vegetation. uCi/g or pCi/g dry weight. Specify percent moisture and method of obtaining dry weight. For tritium, the concentration may be expressed in uCi/ml of moisture content in unit volume of wet samples
  - Milk. uCi/ml.
  - Penetrating Radiation. mrem/yr.
  - Soil. Three possible reporting units: (a) uCi/ml (or pCi/ml). Specify sample depth or profile depth. For tritium, the concentration may be expressed in uCi/ml of soil moisture; (b) uCi/g (or pCi/g) dry weight. Specify sample depth and method of obtaining dry weight; (c) For uranium and thorium, also include ug/g dry or wet weight.
  - Water. uCi/ml.

Environmental Non-Radiological Program Information

This section should provide an accurate description of the environmental non-radiological monitoring program conducted at each facility. For facilities that do not need to monitor non-radiological pollution, a Not Applicable response is sufficient.

- Effluent Data.
  Effluent monitoring data should be summarized. Pollutants of concern and discharge volumes in airborne and liquid effluents released to the environment should be included in the portion of the report dealing with air and water monitoring, respectively.
- Environmental Sampling for Non-Radiological Pollution
  Include a brief description of each of the media sampled as part of the monitoring program or as part of a special study. The type and frequency of sampling and the methods of analysis should be presented. Individual data points are not required, but tables, graphs, or text which clearly and accurately present the overall monitoring results should be provided. A map showing the location of monitoring stations and sampling points also should be included. As a general rule, data should be presented for which there are applicable standards or other meaningful bases for interpreting the results. Interpretation should be made, where appropriate, of how the environmental levels compare to relevant parameters such as background levels, and applicable effluent or environmental standards.
- Reporting Units
  In reporting non-radiological data, units should agree with those specified by the analytical methods. Where applicable, reporting units should agree with the units specified on permits issued under regulatory programs.

Groundwater Protection

The groundwater protection program should be summarized, including a review of the monitoring program that describes the number of wells, sampling method, sampling frequency, analyses performed and a summary of results. There also should be a summary of the hydrogeology of the site, major aquifers, movement of groundwater, potential sources of groundwater pollution, and uses of groundwater in the vicinity of the site.

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Quality Assurance

A quality assurance section should summarize the measures taken to ensure the quality of monitoring data. The overall program, including sampling, analysis, and data management, should be described for both radioactive and nonradioactive effluent and environmental monitoring. A summary of results from participation in interlaboratory cross-check programs should be included, listing site results and expected results.

References

A section should list applicable references and other documents cited in the body of the report.

Distribution List

A standard distribution list of those persons or organizations receiving copies of the report should be included.

Note: You do not have to do Example 1 on the following pages, but it is a good time to check your skill and knowledge of the information covered. You may do the Example 1 or go to Section 2.

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EXAMPLE 1

Using the Familiar level of this module and the resources, complete the following exercises.

1. State the three categories of environmental protection standards.

2. State the purpose of the annual site environmental report.

3. List four items that should be included in the environmental program information section of the annual site environmental report.

Note: When you are finished, compare your answers to those contained in the Example 1 Self-Check. When you are satisfied with your answers, go to the Section 3.

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EXAMPLE 1 SELF-CHECK

1. State the three categories of environmental protection standards.
   - Those imposed by Federal statutes, regulations, and requirements
   - Those imposed by State and local statutes, regulations, and requirements which are applicable to DOE
   - Those imposed by DOE directives

2. State the purpose of the annual site environmental report.
   To present summary environmental data to characterize site environmental management performance, confirm compliance with environmental standards and requrirements, and highlight significant programs and efforts.

3. List four items that should be included in the environmental program information section of the annual site environmental report.
   - A summary of environmental monitoring performed.
   - A listing of environmental permits issued to the site by Federal, state and local regulatory agencies.
   - A listing of draft and final EISs and EAs completed during the year that pertain to site activities.
   - A summary of significant environmental activities at the site.

SECTION 3, ENVIRONMENTAL PROTECTION PROGRAM PLAN

PURPOSE

This Chapter establishes requirements for DOE operations to develop and implement specific program plans for each facility or group of facilities for which they are responsible. The Office of Fossil Energy shall be responsible for developing these plans for operations under its direct cognizance.

IMPLEMENTATION PLAN

Each field organization shall prepare a plan for implementing the requirements of this Order. An implementation plan shall be prepared for each facility or group of facilities, the purpose of which is to provide management direction, including assignment of responsibilities and authorities, to ensure that all DOE facilities are operated and managed in a manner that will protect, maintain, and, where necessary, restore environmental quality, minimize potential threats to the environment and the public health, and comply with environmental regulations and DOE policies. Specifically, the implementation plan shall:

- provide environmental protection goals and objectives for the organization, and identify strategies and timetables for attaining them;
- provide an overall framework for the design and implementation of an environmental protection program for each DOE facility; and
- assign responsibilities for complying with requirements under all Federal, state and local environmental laws and/or regulations for all DOE facilities.

LONG RANGE ENVIRONMENTAL PROTECTION PLAN

As an element of its long range ES&H planning, each field organization shall develop a long range environmental protection plan that comprehensively defines specific environmental objectives and the means and schedules for attaining objectives and completing programs and projects at each facility or group of facilities. Information contained in this plan will be integrated into the appropriate PSO planning, support environmental program budget requests, and provide the basis for comprehensive PSO environmental long range planning. The plan will serve as a mechanism for Headquarters and field organizations to coordinate strategies for addressing environmental needs.

The plan shall:

- identify requirements,
- compare operations against requirements to identify needs,
- establish strategies for meeting identified needs,
- identify activities required to implement the strategies, and
- identify needed resources and develop a schedule to accomplish those activities.

SPECIAL PROGRAM PLANNING REQUIREMENTS

In addition to other program requirements and documentation required in this Order, each Head of Field organization shall prepare a separate plan of sufficient scope and detail to reflect program significance, as appropriate, for each of the following activities: groundwater protection, waste minimization and pollution prevention.

Groundwater Protection Management Program

A Groundwater Protection Management Program should include the following:

- documentation of the groundwater regime with respect to quantity and quality
- design and implementation of a groundwater monitoring program to support resource management and comply with applicable environmental laws and regulations;
- a management program for groundwater protection and remediation, including specific Safe Drinking Water Act, Resource Conservation and Recovery Act and CERCLA actions;
- a summary and identification of areas that may be contaminated with hazardous substances;
- strategies for controlling sources of these contaminants
- a remedial action program that is part of the site CERCLA program required by DOE 5400.4;
- decontamination and decommissioning, and other remedial programs contained in DOE directives.

Plans, permits, and other technical documents such as those associated with compliance with the SDWA, RCRA, and CERCLA may be used in whole or in part to satisfy this requirement. This plan shall be completed no later than 18 months after the effective date of this Order. The plan shall be reviewed annually and updated every 3 years.

Waste Minimization Program

A Waste Minimization Program that will contain goals for minimizing the volume and toxicity of all wastes that are generated, with annual reductions if programmatic requirements allow. Changes in waste quantity, volume and toxicity that are achieved shall be compared with quantities generated in the previous year. The proposed methods of treatment, storage, and disposal that accomplish waste minimization that are technically and economically practicable shall be reported as appropriate. Waste minimization plans required by specific legislation, such as RCRA, shall be included as a part of this program plan. The plan shall be reviewed annually and updated every 3 years.

Pollution Prevention Awareness Program

A Pollution Prevention Awareness Program that shall be specifically identified in his or her environmental protection statement. All mission statements and project plans shall recognize a requirement for pollution prevention, where appropriate. The documented program, including elements for employee awareness through specific training, special awareness campaigns, and incentives and award programs shall be implemented. This plan shall be completed no later than 12 months after the effective date of this Order. The plan shall be reviewed annually and updated every 3 years.

SECTION 4, ENVIRONMENTAL MONITORING REQUIREMENTS

PURPOSE

This Chapter contains requirements and guidance for environmental monitoring programs concerned with:

- measuring and monitoring effluents from DOE operations, and
- surveillance through measurement, monitoring, and calculation of the effects of those operations on the environment and public health.

The objectives of the monitoring programs are to:

- demonstrate compliance with legal and regulatory requirements imposed by applicable Federal, State and local agencies;
- confirm adherence to DOE environmental protection policies; and support environmental management decisions.

A critical element of monitoring is quality assurance and verification. Each DOE facility is unique; therefore, the need and levels of effort for monitoring programs shall be determined by the appropriate field organization on a case-by-case basis, consistent with regulatory requirements, DOE directives, and the degree of environmental assurance that activities at the particular site require. Monitoring requirements for radioactivity are contained in DOE Orders in the 5400 series dealing with radiation protection of the public and the environment.

ENVIRONMENTAL MONITORING PLANS

A written environmental monitoring plan shall be prepared for each site, facility, or process that uses, generates, releases, or manages significant pollutants or hazardous materials. The plan shall contain the rationale and design criteria for the monitoring program, extent and frequency of monitoring and measurements, procedures for laboratory analyses, quality assurance requirements, program implementation procedures, and direction for the preparation and disposition of reports. The plan shall be approved by the appropriate Head of Field Organization, or his or her designee. The plan shall be reviewed annually and updated as needed. The plan shall identify and discuss two major activities, effluent monitoring, and environmental surveillance. The plan shall reflect the importance of monitoring as a critical element of an effective environmental protection program. The plan shall be reviewed annually and updated every 3 years.

ENVIRONMENTAL MONITORING - GENERAL REQUIREMENTS

Effluent monitoring shall be conducted at all DOE sites to satisfy the following program objectives:

- Verify compliance with applicable Federal, State, and local effluent regulations and DOE Orders.
- Determine compliance with commitments made in EISs, EAs, or other official documents.
- Evaluate the effectiveness of effluent treatment and control.
- Identify potential environmental problems and evaluate the need for remedial actions or mitigation measures.
- Support permit revision and/or reissuance.
- Detect, characterize, and report unplanned releases.

Effluent monitoring shall comply with applicable regulations and shall be conducted to provide representative measurements of the quantities and concentrations of pollutants in liquid and airborne discharges, and solid wastes. The effluent monitoring program should include the following elements.

- *Monitoring Stations*. Effluents from on-site waste treatment or disposal systems shall be monitored according to applicable regulations. Influents to on-site waste treatment or disposal systems should be monitored as needed.
- *Sampling*. Sample collection programs shall reflect specific facility needs. Type and frequency of sampling shall be adequate to characterize effluent streams.
- *Sample Analysis*. Standard analyses shall be used to analyze samples whenever such methods are required by regulatory programs. Exemptions due to analytical problems or for nonroutine analyses may be employed after receiving approval from the appropriate regulatory agency. Analyses not required by regulations may be conducted as determined by site-specific conditions.
- *Monitoring Data Recordkeeping*. Auditable records shall be established according to the requirements of DOE 5700.6B. b. Environmental Surveillance. Environmental surveillance shall be conducted to monitor the effects, if any, of DOE activities on onsite and offsite environmental and natural resources. An environmental surveillance screening program shall be undertaken at DOE sites to determine the need for a permanent surveillance program.

Environmental surveillance shall be designed to satisfy one or more of the following program objectives:

- Verify compliance with applicable environmental laws and regulations.
- Verify compliance with environmental commitments made in EISs, EAs, safety analysis reports, or other official DOE documents.
- Characterize and define trends in the physical, chemical and biological condition of environmental media.
- Establish baselines of environmental quality.
- Provide a continuing assessment of pollution abatement programs;.
- Identify and quantify new or existing environmental quality problems.

Environmental surveillance programs and components should be determined on a site-specific basis by the field organization. Programs should reflect facility characteristics, applicable regulations, hazard potential, quantities and concentrations of materials released, the extent and use of affected air, land, and water, and specific local public interest or concern. Surveillance programs are likely to include one or more of the following:

- monitoring stations
- sampling and analysis
- monitoring data recordkeeping.

METEOROLOGICAL MONITORING PROGRAM

Representative meteorological data are required at DOE facilities to support environmental monitoring activities. This information is essential to characterize atmospheric transport and diffusion conditions in the vicinity of the DOE facility and to represent other meteorological conditions that are important to environmental surveillance activities such as air quality and radiation monitoring. A meteorological information/monitoring program shall be developed as a specific element of all environmental monitoring plans. The program shall identify types of meteorological information required to support all environmental protection activities and the regulations applicable to assessing impacts of airborne releases.

Representative meteorological information shall be available at or in the vicinity of DOE facilities to:

- provide data to characterize atmospheric transport, diffusion conditions, and other climatic conditions of importance in the vicinity of the DOE facility for assessments of the impacts of airborne releases on public health and safety;
- provide data to characterize conditions important to environmental surveillance activities such as air quality and radiation monitoring;
- provide data to confirm compliance with and implementation of applicable regulations and DOE Orders; and
- provide a consistent data base upon which decisions can be made concerning airborne releases and appropriate control activities.

RADIOLOGICAL MONITORING

Requirements for the environmental monitoring of radioactive materials are to be found in DOE Orders in the 5400 series dealing with radiation protection of the public and the environment.

NON-RADIOLOGICAL MONITORING

Air Monitoring - Emissions

Design of air quality monitoring programs should be undertaken with a thorough understanding of the complete framework of air quality management.

Where applicable, DOE facilities shall comply with monitoring requirements including monitoring of fossil fuel combustion sources and associated test methods.

Large permanent facilities or modification to such facilities may require a prevention of significant deterioration permit before construction. In addition to pre- and post-operational emission testing, the permit process may require up to a year of meteorological and ambient air quality monitoring. Siting of monitoring stations requires the use of atmospheric dispersion modeling to locate areas of expected maximum offsite impact. The rules also identify specific reference methods and equivalent method analyses which shall be used for the program.

Air Monitoring - Environmental Surveillance

Ambient air quality monitoring programs should be designed to accomplish the following:

- Establish background concentration levels of pertinent chemical species.
- Determine the highest concentrations of the pertinent pollutant species expected to occur in the vicinity of DOE operations.
- Determine representative pollutant concentrations at areas where public health and other concerns should be considered
- Evaluate the effects of emissions on ambient levels of pertinent contaminants.

Where possible, background data should be gathered from existing State and local air Mmnitoring stations which must be provided for in a State's implementation plan. Design considerations for siting any supplementary air quality monitoring stations should include emissions, meteorology and climatology, topography, and geography.

Water Monitoring - Effluents

The EPA has promulgated regulations for monitoring liquid effluent discharges. In the National Pollutant Discharge Elimination System (NPDES) the EPA Administrator, or States with approved programs, after opportunity for public hearing, issues permits that control and limit the discharge of any pollutant to the waters of the United States.

NPDES permits contain specific and legally enforceable effluent limitations and self-monitoring requirements for flow measurement and sampling.

In addition to rules promulgated under the Clean Water Act, DOE facilities shall satisfy monitoring requirements called for under the Resource Conservation and Recovery Act (RCRA), as amended, since under RCRA, a solid waste can be a liquid. Under RCRA, it shall first be determined if a waste is hazardous. If a waste is determined to be hazardous, the applicable regulations in 40 CFR Parts 260 through 280 shall be implemented.

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Water Monitoring - Environmental Surveillance

Ambient water quality monitoring should be conducted through a network of fixed stations from which data will establish well-defined histories of the physical, biological, and chemical conditions of local bodies of water and sediments. The data obtained from this network should be coordinated with other monitoring activities. Water quality data may be obtained from existing State and local monitoring stations.

Analysis of data collected from a fixed station monitoring network should support:

- characterizing and defining trends in the physical, chemical, and biological condition of surface waters;
- establishing baselines of water quality;
- assessing water pollution control programs;
- identifying new water quality problems; and
- detecting, characterizing, and reporting unplanned releases and their effects on water quality.

Monitoring networks should be operated and maintained uniformly. Receiving water characteristics will determine the location of stations. A reconnaissance survey might be sufficient in siting stations. Under complex circumstances, mathematical models could be needed to select stations sites.

Monitoring programs are best served by fixed station networks. However, a network of effluent monitoring and selected mobile monitoring stations could satisfy the needs at some facilities.

Surface water sampling performed at fixed monitoring stations will characterize physical and chemical properties of the water column and sediments, and biological species in the water column and benthos. Types of sampling performed should depend upon local conditions and the variability of stream characteristics and water quality.

The monitoring frequency at a fixed network station is a function of the variability of the chemical, physical, and biological conditions of the water body. Data collected shall be representative of the variations in water quality and changes in pollutant loads. Varying sampling frequencies could be required to accurately reflect seasonal changes, variable pollution sources, time of water travel

between stations, and tidal and diurnal variation

Ambient water quality monitoring serves to confirm compliance with the Clean Water Act. An understanding of the Water Quality Management process implemented by EPA, the States, interstate agencies, and area-wide, local and regional planning organizations is essential to the design of a water quality monitoring program.

GROUNDWATER MONITORING PROGRAM.
Groundwater that is or could be affected by DOE activities shall be monitored to determine and document the effects of operations on groundwater quality and quantity and to demonstrate compliance with DOE requirements and applicable Federal, State, and local laws and regulations.

A groundwater monitoring plan shall be developed as a specific element of all environmental monitoring plans. The plan shall identify all DOE requirements and regulations applicable to groundwater protection and include monitoring strategy. The elements of the groundwater monitoring program shall be specified as shall the rationale or purpose for selecting these elements.

Groundwater monitoring programs shall be conducted on-site and in the vicinity of DOE facilities to:

- obtain data for the purpose of determining baseline conditions of groundwater quality and quantity,
- demonstrate compliance with and implementation of all applicable regulations and DOE Orders,
- provide data to permit the early detection of groundwater pollution or contamination,
- provide a reporting mechanism for detected groundwater pollution or contamination,
- identify existing and potential groundwater contamination sources and to maintain surveillance of these sources;, and
- provide data upon which decisions can be made concerning land disposal practices and the management and protection of groundwater resources.

QUALITY ASSURANCE AND DATA VERIFICATION

Quality Assurance.

The quality assurance program shall include the following:

- organizational responsibility
- program design
- procedures
- field quality control
- laboratory quality control
- human factors
- recordkeeping
- chain-of-custody procedures
- audits
- performance reporting
- independent data verification

Laboratory Certification

DOE and DOE contractor laboratories shall confirm the need and apply for any certification requirements with appropriate Federal, State or local agencies. Where DOE operations secure the support of outside contractor laboratories, this work shall be conducted by appropriately certified laboratories.

DOE Laboratory Quality Assessment Program for Radioactive Material

All DOE and contractor laboratories that conduct analytical work in support of DOE environmental radiological monitoring programs for radioactive materials shall participate in the DOE interlaboratory quality assurance program coordinated by the DOE Environmental Measurements Laboratory, New York, New York. Guidelines and procedures for this program shall be issued annually by EH-1.

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Independent Data Verification

EH-1, in consultation with the appropriate PSO and field organization shall develop an independent data verification programs as a part of environmental monitoring programs at DOE facilities.

SECTION 5, DOE ORDER 5480.4

DOE Order 5480.4 is primarily a listing of ES&H standards and the sources of those standards. In this section of the module we will concentrate on the applicability of the Order and the definitions that it contains. The remainder of the Order serves as a reference for environmental protection standards. You should be familiar with its contents, although it will not be covered in this module.

APPLICABILITY

This Order applies to departmental elements and DOE contractor organizations that are subject to the mandatory ES&H standards of this Order, as well as non-DOE legally required ES&H standards which are not included in this Order. For example, where a DOE contractor is also a Nuclear Regulatory Commission licensee, the DOE contractual relationship does not exempt the contractor from compliance with the Nuclear Regulatory Commission license or ES&H regulations. Similarly, where DOE contractors are tenants on a Department of Defense installation and a host-tenant agreement has been executed, the DOE contractual relationship does not provide exemption from the ES&H standards required by the host. In such cases, both DOE and non-DOE ES&H requirements must be met.

This Order also applies to departmental elements and DOE contractor organizations at DOE-owned reactor plants that are prototype reactor plants for design and development of naval reactor plants, and which are concommitantly used for training of operators for naval nuclear propulsion plants. Since organizations at these plants have certain unique requirements because of their military application, all of them and their supporting laboratory facilities are under the cognizance of the Deputy Assistant Secretary for Naval Reactors, NE-60, who jointly serves as the Director of the Naval Nuclear Program, U.S. Navy. Accordingly, the Deputy Assistant Secretary for Naval Reactors is responsible for ensuring that adequate standards are applied for emergency

preparedness, environmental protection, nuclear safety, and health protection for organizations at naval reactor prototype plants and supporting laboratory facilities owned by DOE.

In instances where DOE and non-DOE ES&H standards are applicable and mandatory and there are conflicts between such standards, the ES&H standards providing greater protection shall govern. Similarly, where there are conflicts between the mandatory ES&H standards of this Order, or between those of this Order and other DOE Orders or requirements, the mandatory ES&H standards or requirements providing the greater protection shall govern.

DEFINITIONS

Mandatory Standards

Those standards of this Order adopted by DOE that define the minimum requirements that DOE and its contractors must comply with to the extent they apply to the activities being conducted.

Operations

Those activities funded by DOE for which DOE has responsibility for environmental protection, safety, and health protection.

Permanent Exemption

A release from a mandatory standard of this Order. Such exemptions are not time-specified.

Reference Standards

Those guides or standards of this Order adopted by DOE that DOE and its contractors should consider for guidance, as applicable, in addition to the mandatory standards.

Standard

A specified set of rules or conditions concerned with: the class of components; delineation of procedures; definition of terms; specifications of materials, performance, design, or operations; or measures of quality in describing materials, products, systems, services or practices. Standards may be specified as mandatory or reference.

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Temporary Exemption

A short-term release from a mandatory standard of this Order. Such exemptions shall not exceed 1 year, except that in unusual cases a renewal may be granted, not to exceed an additional year.

Note: You do not have to do Example 2 on the following page, but it is a good time to check your skill and knowledge of the information covered. You may do the Example 2 or go directly to the practice.

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EXAMPLE 2

1. State five requirements for a long-range environmental protection plan.

2. State four objectives for performing preoperational monitoring.

3. State the purpose of a meteorological monitoring program.

Note: When you are finished, compare your answers to those contained in the Example 2 Self-Check. When you are satisfied with your answers, go on to the practice.

EXAMPLE 2 SELF-CHECK

1. State five requirements of a long-range environmental protection plan.
   - Identify requirements.
   - Compare operations against requirements to identify needs.
   - Establish strategies for meeting identified needs.
   - Identify activities required to implement the strategies.
   - Identify needed resources and develop a schedule to accomplish those activities.

2. State four objectives for performing preoperational monitoring.
   - Characterize existing physical, chemical, and biological conditions that could be affected.
   - Establish background levels of radioactive and chemical components.
   - Characterize pertinent environmental and ecologic parameters.
   - Identify potential pathways for human exposure or environmental impact as a basis for determining the nature and extent of the subsequent routine operational and emergency effluent monitoring and environmental surveillance programs

3. State the purpose of a meteorological monitoring program.
   Characterize atmospheric transport and diffusion conditions in the vicinity of the DOE facility and to represent other meteorological conditions that are important to environmental surveillance activities such as air quality and radiation monitoring.

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PRACTICE

This practice is required if your proficiency is to be verified at the familiar or general level. This practice will prepare you for the criterion test that will be required if your proficiency is to be verified at the general level. You will need to refer to the Orders to answer the questions in the practice correctly. The practice and criterion test will also challenge additional skills that you have acquired in other formal and on-the-job training.

PRACTICE

1. Define the following terms.
   Effluent

   Effluent monitoring

   Environmental occurrence

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2. Describe three conditions in which an organization may obtain a temporary exemption to the requirements of DOE Order 5400.1.

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3. State the purpose of the annual site environmental report..

4. State three requirements of an implementation plan for DOE Order 5400.1.

5. State the qualification requirements for DOE accident investigation board membership.

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DOE ORDER 5400.1
GENERAL ENVIRONMENTAL PROTECTION PROGRAM
DOE ORDER 5480.4
ENVIRONMENTAL PROTECTION, SAFETY. AND HEALTH PROTECTION STANDARDS
GENERAL LEVEL

OBJECTIVES

Given the Familiar Level of this module, and a scenario, you will be able to perform the following:

1. List the key elements you would look for in the contractor's action plan to correct the situation described in the scenario; and

2. State which requirements, sections, or elements of U.S. Department of Energy (DOE) Order 5400.1 or 5480.4 apply to the situation described in the scenario.

Note: If you think that you can complete the practice at the end of this level without working through the instructional material and/or the examples, complete the practice now. The course manager will check your work. You will need to complete the practice in this level successfully before taking the criterion test.

RESOURCES

DOE Orders Self-Study Program, DOE Order 5400.1 & 5480.4, Familiar Level, 7/24/98.
DOE Order 5400.1, General Environmental Protection Plan, Change 1, 6/29/90.
DOE Order 5480.4, Environmental Protection, Safety, and Health Protection Standards, Change 4, 1/7/93.

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INTRODUCTION

The Familiar Level of this module introduced the purpose and scope of DOE Orders 5400.1 and 5480.4. Several requirements and guidelines associated with the Orders were discussed. In the General Level of this module, students are asked to apply the information contained in the Familiar Level and the Orders, to a scenario related to the Order. Please refer to the resources listed on the previous page to make your analysis and answer the questions. You are not required to complete the example. However, doing so will help prepare you for the practice and criterion test.

Note: You do not have to do the example on the following page, but it is a good time to check your skill and knowledge of the information covered. You may do the example or go on to the practice.

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EXAMPLE SCENARIO

Please review the following scenario, and then answer these questions.

1. Is the contractor's action plan correct? If not, state what should have been done.
2. Were the correct DOE documents or requirements cited? If not, state the correct documents or requirements.

SCENARIO
During a baseline compliance assessment an assessment team determined that Acme Laboratory, a DOE facility, has not operated any meteorological monitoring equipment since 1978 and has not developed a meteorological monitoring program to provide current meteorological information. The draft Acme environmental monitoring plan proposes to use historical Acme data and current data from the local airport, but it does not propose to perform an analysis of data quality or representativeness. Acme has used the airport meteorological data in AIRDOS modeling to calculate effective dose equivalents for its demonstration of compliance with 40 CFR 61,Subpart H. However, Acme has no reasonably current assessment of the quality and representativeness of this data or whether monitoring data would meet current requirements and environmental needs more appropriately. However, it should be noted that for air quality permitting needs, the State department of natural resources accepted the airport data as adequate and representative for the air quality impact analysis of the new power plant. No formal arrangement has been made by Acme to obtain real-time data to monitor plumes from accidental releases or fires involving hazardous materials.

Actions taken by the contractor.
Acme management contends that the meteorological data from the airport is sufficient to meet to comply with state and local requirements. The company is contesting the need to develop a site-specific meteorological monitoring plan.

Requirements that apply to this scenario
A meteorological information/monitoring program shall be developed as a specific element of all

environmental monitoring plans. The program shall identify types of meteorological information required to support all environmental protection activities and the regulations applicable to assessing impacts of airborne releases. The elements of the program shall be specified and the rationale or purpose for selecting those elements documented. (DOE Order 5400.1, Chapter IV, paragraph 6.a.)

Take some time to review the example scenario and the actions the contractor took or did not take to correct the situation. Then decide if the contractor's actions were complete and correct. Finally, determine if the requirements cited were complete and correct.

Write your answers below and then compare your answer to the one contained in the example self-check.

EXAMPLE SELF-CHECK

Your answer does not have to match the following exactly. You may have added more corrective actions or cited other requirements from the Order that apply. To be considered correct, your answer must include at least the following.

The actions taken by the contractor were not appropriate. Acme is required to develop a meterological monitoring plan for the facility. DOE facilities are required to establish a meteorological monitoring program that is appropriate to the activities at the site. Some sites may choose to establish a meteorological program that makes use of meteorological measurements obtained from off-site sources. However, to be acceptable the data must be representative of conditions at the DOE facility and provide statistically valid, hourly data consistent with on-site monitoring requirements.

The requirements cited were appropriate.

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PRACTICE

This practice is required if your proficiency is to be verified at the General Level. The practice will prepare you for the criterion test. You will need to refer to the Order to answer the questions in the practice correctly. The practice and criterion test will also challenge additional analytical skills that you have acquired in other formal and on-the-job training.

Please review the following scenario and answer the following questions.

1. Was the situation handled correctly? If not, what should have been done?
2. Was the list of requirements, sections, and elements complete and correct? If not, state the correct or omitted requirements.

SCENARIO

Contaminated storm water was released from two storm-water retention ponds (Ponds #2 and #3). Pond #2 released water intermittently during the time period between February 15, 1995, and March 15, 1995. As of March 15, 1995, releases from Pond #2 have ceased, and inflow from the on-site waste treatment area has been temporarily diverted to Pond #3. Pond #3 released water only once from some time after business hours on February 14 to 7:00 a.m. on February 16, 1995. Pond #2 is on the south side of the facility and is a small pond (capacity 212,000 gallons with 3 feet of freeboard) intended to collect contaminated run-off from the on-site waste treatment facility. Pond #3 is east of the facility on private property, and is a large pond (current maximum capacity 4,900,000 gallons to spillway elevation) intended to collect contaminated run-off from the area.

Pond #2 discharged through the overflow weir into a creek. The pond discharged at less than the design storm event capacity because the run-off area into the pond is greater than the design run-off area. This results from the inability to complete ditches that would have diverted run-off away from Pond #2. These ditches could not be constructed because of boggy conditions and seepage. Pond #3 discharge occurred through two 6-inch diameter pipes on the north side of the pond that were intended to be connected into a future waste water treatment plant. The water was released onto a clean (uncontaminated) area adjoining the site. It is unlikely that any of this discharged water reached the creek. The water discharging from the pipe and in the pond was tested and found to

exceed established limits.

Written notifications were made by the facility to the Environmental Protection Agency (EPA) and the State on March 17, 1995, and on March 28, 1995. The EPA responded with a Notice of Assessment of and Demand for Stipulated Penalties letter on May 8, 1995. A Notice of Violation was issued by on May 16, 1995.

An investigation of the situation revealed the following.

- The discharge from Pond #2 was caused by inattention to the level of water in the pond, resulting in discharge through the overflow weir to the creek. The release from Pond #3 was due to human error; the drain pipes that were to connect Pond #3 to the Wastewater Treatment Plant had been left unplugged.
- A higher than normal amount of precipitation during the time period contributed to the discharge from Pond #2.
- The root cause was the lack of an overall management plan (including contingency planning) that ensured control of site conditions during a time of little or no field activity.
- Although the design and plan for site control had been completed, some portions of the plan were not completed in the field because the direction of the program was being reassessed. It was not clear whether an on-site repository would be built or whether the contaminated materials would be trucked to a different site.

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Actions taken by the contractor

- The run-off area to Pond #2 was decreased by diverting run-off water into on-site ditches that discharge into Pond #3.
- The overflow weir was plugged.
- A system of pumps was set up to pump water from Pond #2 into Pond #3 to maintain Pond #2 below discharge levels.
- A culvert system was installed to divert all Pond #2 discharges into Pond #3.
- The two 6-inch diameter discharge pipes were plugged, which increased the holding capacity of Pond #3 and prevented additional releases.
- Contamination surveys of the clean area the water reached were completed.
- A diversion from Pond #2 to Pond #3 using the culvert system that carries water from the south side of the creek to Pond #3 was constructed.
- Accelerated the installation and initiation of operation of the Waste- water Treatment Plant to lower the water level in Pond #3.
- Raised the spillway elevation of Pond #3 approximately one foot to increase the holding capacity of the pond.

Requirements that apply to this scenario

This was a violation of State EPA regulations. DOE Orders 5400.1 and 5480.4 do not apply.

Take some time to review the scenario and the actions the contractor took or did not take to correct the situation. Then decide if the contractor's actions were complete and correct. Finally, determine if the requirements, sections, or elements of DOE Order 5400.1 and 5480.4 cited in the scenario were correct.

Write your answers on the next page and then bring the completed practice to the course manager for review.

Write your answers here.

Note: The course manager will check your practice and verify your success at the General Level. When you have successfully completed this practice, the course manager will give you the criterion test.