

**Guidance for Establishment
and Implementation of
FIELD SAMPLE
MANAGEMENT PROGRAMS**

**in Support of
EM Environmental Sampling
and Analysis Activities**

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LIST OF ACRONYMS

Acronym	Description
ASP	Analytical Services Program
DOE	Department of Energy
DOT	Department of Transportation
DQO	Data Quality Objective
EM	Office of Environmental Management
EM-20	Office of Compliance and Program Coordination
EM-261	Transportation Management Division
EM-263	Analytical Services Division
EM-30	Office of Waste Management
EM-40	Office of Environmental Restoration
EM-50	Office of Technology Development
EM-60	Office of Facility Transition and Management
FSMP	Field Sample Management Program
IPEP	Integrated Performance Evaluation Program
NRC	Nuclear Regulatory Commission
NSMP	National Sample Management Program
NSTS	National Sample Tracking System
PE	Performance Evaluation
POC	Point of Contact
QA	Quality Assurance
QARD	Quality Assurance Requirements and Description
QC	Quality Control
SAP	Sampling and Analysis Project Plan
SOP	Standard Operating Procedure

1.0 INTRODUCTION

1.1 BACKGROUND

The Department of Energy's (DOE's) Office of Environmental Management (EM) has been tasked with addressing all environmental contamination and waste problems facing the Department. A key element of any waste management or environmental restoration program is physical and chemical data, and an effective and efficient sampling and analysis program is needed to generate credible environmental data. The Analytical Services Division (EM-263) of the Office of Compliance and Program Coordination (EM-20) was created to provide the programmatic direction needed to establish and operate such an EM-wide program [1,2,3].

In very large sampling and analysis operations, systems should be in place to balance supply and demand, set priorities, and maintain sample flow from the field to the laboratory [4,5,6,7,8,9,10,11,12]. In addition, there is a need for the capabilities to project analytical needs and capacities, and to ensure that the generated analytical data are of the quality needed and claimed [4,5,6,7,8,9,10,11,12]. In order to address these needs, a policy on EM sample management has been established [13]. EM-263, in coordination with the Office of Waste Management (EM-30), the Office of Environmental Restoration (EM-40), the Office of Technology Development (EM-50), the Office of Facility Transition and Management (EM-60) and other divisions within EM-20, will establish a National Sample Management Program (NSMP) [14]. In addition, all Operations Offices should ensure that a number of associated tasks be carried out at the local level [1,2,3]. These tasks constitute the Field Sample Management Program (FSMP) and the present document provides guidance on performing these tasks.

1.2 ROLE OF THE FSMP

As the "gatekeeper" between sampling and analysis activities at the local level, the FSMP at each Operations Office should provide coordination and monitoring in all EM projects conducted under the authority of the Operations Office. A major function of the FSMP will be to collect summary information regarding local sampling and analysis activities and communicate the collected information to the NSMP for the National Sample Tracking System (NSTS) [15]. The FSMP is an Operations Office responsibility [1].

A summary of the roles of the NSMP and the FSMPs in the management of the EM sampling and analysis process is provided in Attachment A.

1.3 RELATIONSHIP TO THE ANALYTICAL SERVICES DIVISION

EM-263's strategic plan for operations is detailed in EM's "Analytical Services Program Five-Year Plan" (ASP Plan) [1]. The ASP Plan was created to ensure that all EM operations have the services to cost-effectively generate credible environmental analytical data. Full implementation of the ASP is intended to meet DOE's commitments to Congress and the Inspector General regarding the generation of environmental data [2,16]. The attainment of this goal necessitates that analytical needs, capacities, costs, and performance be tracked at both a local/Operations Office level and a national level. The FSMP at each Operations Office should collect this information and

communicate it to the NSMP. At the same time, it is designed to implement the policies and guidance issued by EM-263 [6,7,8,9,10,11,13,17,18,19].

1.4 RELATIONSHIP TO REGULATORY REQUIREMENTS AND EXISTING PROGRAMS

The sampling, analysis, and data validation activities described in this document are designed to enhance and coordinate the gathering of information in relation to the DOE Order 5700.6C ("Quality Assurance") [5], the EM-Quality Assurance Requirements and Description (EM-QARD) [20], and the guidance supplements to the ASP on Field Sampling and Analysis Aspects, Analytical Laboratory Aspects, Management Assessments, Integrated Performance Evaluation Program, Field Assessment, and Laboratory Assessment [6,7,8,9,10,11]. Guidelines provided in this document are consistent and compatible with existing regulatory and DOE requirements. However, the guidance provided here may not address all of the information-gathering specifications and requirements detailed in the sites' agreements with regulators. To ensure that all specifications, regulations, and DOE requirements for information gathering are met, the Operations Office should consult all applicable regulatory agreements, DOE Orders, and other applicable requirements.

2.0 PURPOSE

The purpose of this document is to establish the suggested scope of the FSMP activities to be performed under each Operations Office, list the drivers under which the program will operate, define terms, and list references.

NSMP guidance is contained in the document titled "Guidance for Establishment and Implementation of the National Sample Management Program in Support of EM Environmental Sampling and Analysis Activities" [14].

3.0 SCOPE

This guidance will apply only to EM sampling and analysis activities associated with project planning, contracting, laboratory selection, sample collection, sample transportation, laboratory analysis, and data management [6,7,8,9,10,11,12,21].

4.0 DEFINITIONS

- DOE Complex - Department of Energy sites and operations.
- Customer Sample (abbreviated to "Sample" in this document) - material that represents a single spatial and temporal point or material needed for field quality control (QC).
- Sample Analysis (abbreviated to "Analysis" in this document) - the total analytical effort needed to generate data for a given laboratory operation on a single sample.
- NSTS - National Sample Tracking System, a system designed and developed by EM-263 to collect and store information regarding the numbers, costs, and timeliness of sample analyses performed for EM operations [15].

5.0 GUIDELINES

5.1 GENERAL

5.1.1 ORGANIZATIONAL STRUCTURE INFORMATION

Sites within the DOE Complex currently operate under their own site-specific organizational structures according to their differing needs, requirements, and past history; therefore, each Operations Office maintains an organizational structure that may be unique. The policy on EM sample management does not envision the necessity to create a separate office to carry out the FSMP, nor does it specify any organizational structure to be maintained by the Operations Office. Any existing organizational structure that fulfills the functions of the FSMP is acceptable.

5.1.2 FSMP POINT OF CONTACT

The Operations Office should designate one of its staff as a Point of Contact (POC) and identify the organization that will be responsible for ensuring that all guidelines in the FSMP are met. The POC should be responsible for establishing an appropriate organizational structure which will fulfill the tasks in a timely and efficient manner [12]. In addition, the POC should provide or establish a communication link between the FSMP and the NSMP to facilitate the flow of information.

There should be only one POC per Operations Office. The POC should be a Federal employee in the Operations Office, while the remainder of the FSMP organization may or may not be made up of Federal employees [1,22]. Under exceptional circumstances, additional POCs may be designated by the Operations Office with the consent of the NSMP. This may be necessary, for example, if it is practical to establish an FSMP for coordinating sampling and analysis activities conducted for EM-30 and a separate FSMP for coordinating sampling and analysis activities conducted for EM-40.

The POC should be responsible for ensuring that the FSMP guidelines are properly implemented, including the development of an implementation schedule. The POC should also ensure that there is efficient communication between the FSMP and the NSMP to facilitate the flow of information [1,14,15].

5.1.2 ORGANIZATION OF FSMP

A chart of the organizational structure of the FSMP at each Operations Office should be maintained, and a copy and regular updates of the organization chart should be transmitted to the NSMP. Such charts should include all organizations and key personnel involved with sampling, analysis, and data validation, both within the Complex and in the commercial sector [4,12].

5.1.3 IMPLEMENTATION SCHEDULE

Implementation of the guidance established in this document by the Operations Offices should be completed by the end of FY 94. Some items that may be established in later revisions of this document are noted and potential future activities for the FSMP are provided in Attachment B.

5.1.4 ELEMENTS OF FSMP

The FSMP should include the following tasks:

- Establish FSMP operation procedures [1,4,5,12,22];
- Coordinate and/or monitor EM sampling and analysis activities at DOE sites [1,22];
- Identify contractors performing EM sampling and analysis work reported to the Operations Office POC and NSMP [1,21,22];
- Collect and report information requested by the NSMP (e.g., NSTS reports, information on site-specific analytical needs and laboratory capacity, answers to questionnaires on sampling and analysis resources under the Operations Office, etc.) [1,2,14,15]

Additional items may be included in the FSMP if and when other EM-263 policies related to any of the items in this document are established.

5.2 PROJECT PLANNING

This section discusses the various responsibilities of the FSMP that should be developed in the context of existing operations.

5.2.1 DATA QUALITY OBJECTIVE (DQO) VERIFICATION

The process of establishing DQOs is an important planning tool in EM's ASP, has been applied successfully in cleanup of environmental waste, and is endorsed by the Environmental Protection Agency (EPA) [23]. A variety of activities and programs are being developed by EM-263 to prepare for the full-scale implementation of DQOs. In the present document, no specific guidelines are set with respect to FSMP responsibility for DQOs. However, as guidance, training, and technical support for applying DQOs are supplied by EM-263, guidelines for DQOs will also be established.

5.2.2 CONTRACTING

EM-263 is responsible for all EM operations having access to the recommended environmental sampling and analysis services required. To that end, the FSMP should ensure that adequate analytical capacity has been contracted based on available needs projections. An EM-263 guidance document is being developed which contains a model contract, streamlining the contracting process by which commercial laboratories may participate in the EM analytical services program [2,16,21].

The FSMP should ensure that all contracting for analytical services from fixed laboratories associated with activities conducted for the Operations Office is coordinated by the FSMP. In acquiring analytical services for its EM clients, the FSMP is responsible for contracting with laboratories in accordance with appropriate EM policies, guidance, DOE Orders, and all other applicable regulations. [21].

5.2.3 SAMPLING AND ANALYSIS PROJECT PLANS

The FSMP should verify the existence of field sampling and analysis project plans (SAPs) [1,6,7,8,9,10,11]. The FSMP can provide guidance and technical support in SAP preparation. In addition, it is recommended that the FSMP participate in the planning process when possible [1,12]. Specific instruction in this area will be provided when the appropriate guidance is developed by EM-263.

5.2.4 LABORATORY SELECTION

The selection of contract laboratories to perform analysis plays a critical role in ensuring that the generated data are of the quality needed and claimed [2,17,21]. In this regard, the FSMP should establish criteria and procedures to verify that samples are sent only to approved laboratories in good standing [1,9]. Past and pre-award audits, past performance, and performance evaluation (PE) sample scores should be considered as useful indicators of the performance of a laboratory [9,11,21].

In choosing a laboratory, the following should be taken into account: on-site audit findings, laboratory performance assessment, site-specific regulatory compliance requirements, radiation level of the sample, laboratory's license limit, laboratory's available capability and capacity, and cost [4,5,16,17,21,24]. The FSMP should report to the NSMP on contracts with laboratories upon request.

5.3 SAMPLE COLLECTION

Upon completion and approval of a project plan, specific technical field procedures should be prescribed to collect data of suitable accuracy and precision [6,7,8,9,10,11]. The FSMP should examine the SAP for project-specific analytical guidelines and maintain this data for incorporation into site-specific needs projections [12]. Specifications in this area will be provided in guidance developed by EM-263.

During collection of samples for analysis, the FSMP should also track and collect the information necessary to generate data elements of the National Sample Tracking System (NSTS). Data elements of the NSTS should be reported to the NSMP (See Section 5.7.2) [1,14,15].

5.4 SAMPLE TRANSPORTATION

5.4.1 RADIATION SCREENING OF SAMPLES

After the samples have been collected, radiation screening should be performed before they can be shipped for analysis [25]. Prior knowledge or previous data from that collection point may be used. The FSMP should establish procedures to verify that radiation screening is performed and radiation information is collected for the following purposes:

1. Health and Safety Requirements. Health and Safety requirements for commercial laboratories that receive radioactive samples are specified in the laboratory's Nuclear Regulatory Commission (NRC) license, or state license as applicable. EM-263 is formulating a draft Health and Safety policy for EM's role and responsibilities concerning laboratories

analyzing EM samples [18]. Knowledge and verification of the radiation level of a sample, together with historical information about possible radioactive and hazardous contaminants, is needed to provide a sample profile that will be used to define the necessary health and safety precautions in accordance with the appropriate regulations [21,26].

2. Department of Transportation (DOT) Requirements. To package and transport a sample properly, the hazard class of the sample has to be determined. Knowledge of the level and the type of radioactivity of the samples is used to determine the DOT classification: limited quantity, type A, or type B radioactivity. Each classification has its own specific packaging and shipping requirements [27,28].
3. Notification of Laboratories Receiving Samples. Communication with the commercial laboratories should be established prior to shipment, to ensure that samples with a given level of radioactivity will be accepted by the receiving laboratories. The FSMP should not be held responsible for monitoring total on-site activity levels of the laboratories [21].

5.4.2 PACKAGING

The FSMP should establish procedures to verify that:

- Samples are packaged in shipping containers in compliance with DOT regulations and in good condition [28]; and
- All sample containers are labelled with a unique DOE identifier [29].

5.4.3 SHIPPING

The following activities should be carried out under the auspices of the FSMP in coordination with the EM Transportation Management Division (EM-261) and local transportation management offices dealing with shipment of samples for analysis [30]:

- Verification that the receiving laboratory is aware of the impending arrival of samples and that receipt of any radioactive samples is not expected to exceed its license limit [21,30];
- Identification of transporters that are qualified to carry hazardous and/or radioactive materials under all the applicable regulations. Only qualified carriers may be used [31];
- Completion of all necessary paperwork. All shipping containers should be shipped with completed shipping documents, chain-of-custody forms, and custody seals [30,32,33];
- Labelling of shipping containers according to DOT regulations [29]; and
- Maintenance of communication with the laboratories to verify that samples have been received in the proper condition such that analyses can be performed to produce data of the appropriate quality [21,30,33].

When samples are shipped for analysis, the FSMP should collect and track information necessary to generate data elements for the NSTS [1,14,15].

5.5 LABORATORY ANALYSIS

5.5.1 ANALYTICAL METHODS

The FSMP should establish procedures to verify that regulator-approved methods are used for sample analysis and for analytical monitoring information necessary to generate data elements for the NSTS [15,21].

5.5.2 LABORATORY-GENERATED WASTE AND UNUSED SAMPLES

The FSMP should verify that all contracted laboratories have a laboratory-generated waste management policy and comply with DOE Orders, EM policy, and all applicable regulations [19]. A written policy and procedures should be in place and followed for the disposition of any unused samples that are returned to the Operations Office or any other designated receiving organization [19,33]. Specific guidelines will be established in the future.

5.6 RECEIPT OF ANALYTICAL DATA

5.6.1 DATA VERIFICATION

The FSMP should develop a protocol, specific to the site and the contract used, for the performance of data verification (or contract compliance screening). When analytical data are received from the laboratories, contract compliance screening should be performed according to the developed protocol to ensure that all standards have been met as specified in the contract [21]. Specific guidance will be established in the future.

5.6.2 DATA VALIDATION

Data validation is essential to establish the quality of the analytical data. The FSMP should ensure that data validation is performed properly to meet the requirements of the previously established DQOs. The procedures of data validation will be developed by EM-263 and specified in the future.

After the analytical data have been accepted, the FSMP should establish protocols to ensure that information necessary to generate data elements of the NSTS is collected and tracked. This includes information about data verification and data validation, as well as other appropriate information [15].

5.6.3 DATA QUALITY ASSESSMENT

Data quality assessment is essential for establishing the useability of the analytical data. The FSMP should have the responsibility of ensuring that data quality assessment is performed properly [4,5,6,7,8,9,10,11]. The procedures of data quality assessment will be developed by EM-263 and specified in the future.

5.7 RECORDS MANAGEMENT AND REPORTING

5.7.1 RECORDS MANAGEMENT

According to the statutory definition of "records"[34], all analytical data will be considered "Government records," and as such, must be maintained, managed, and disposed in accordance with the applicable regulations. The FSMP should verify the existence of protocols to ensure that such activities are carried out. Records should be managed in compliance with any requirements stipulated in a local inter-agency agreement applicable to the facility [35,36,37].

5.7.2 INFORMATION REPORTING

Information tracked and collected in the course of the sample management process, as described above, is used to produce data elements for the NSTS. The FSMP should manage and coordinate the reporting of all the data elements of the NSTS to the NSMP according to the schedule and in the format specified by the NSMP [14,15,38].

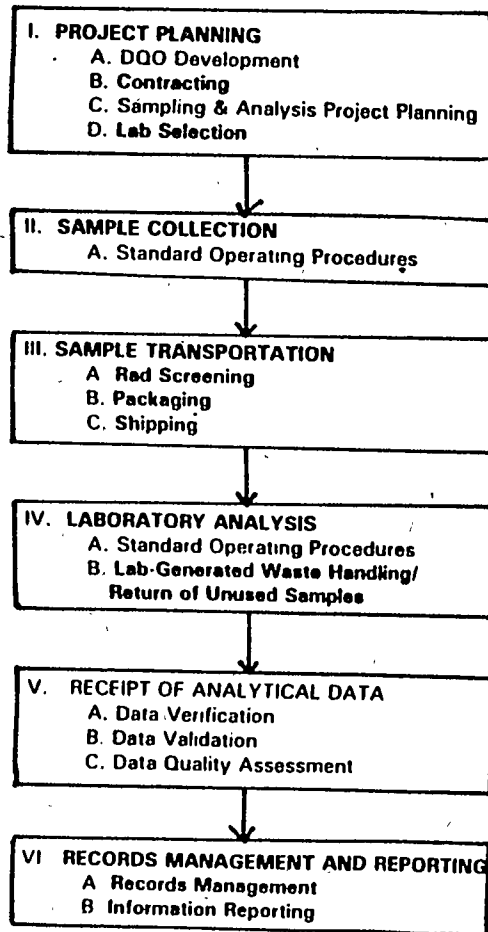
6.0 FUTURE FSMP ACTIVITIES

As the program develops, the scope of FSMP activities is expected to change. Some potential areas of program development that are currently being considered are given in Attachment B.

7.0 ATTACHMENTS

- A. Roles of FSMP and NSMP in the Management of the EM Sampling and Analysis Process
- B. Potential Future FSMP Activities
- C. References

MANAGEMENT OF EM SAMPLING & ANALYSIS PROCESS



**RESPONSIBILITIES OF FSMP AND NSMP IN THE
MANAGEMENT OF THE EM SAMPLING AND ANALYSIS PROCESS**

	FSMP (current responsibilities)	FSMP (potential future responsibilities)	NSMP
IA.		IA. Verify that proper DQOs for the projects have been established.	
IB.	IB. Verify that analytical capacity has been contracted for anticipated sampling needs following appropriate DOE policies.	IB. Verify that analytical capacity has been contracted for anticipated sampling needs following guidelines provided by EM-263.	
IC.		IC. Verify existence of QA project plan/sampling and analysis plans.	
ID.	ID. Maintain database on contracts with laboratories and ensure that samples are sent only to labs in good standing.	ID. Ensure that samples are sent only to laboratories in good standing based on performance assessment (PE samples, past performance, audit) and health and safety assessment.	Collect information from the FSMPs and make summary sampling and analysis information available as necessary
IIA.		IIA. Monitor that sampling is conducted in full accordance with QA project plan/sampling & analysis plans, and standard operating procedures.	
IIIA.	IIIA. Verify that radiation screening has been conducted or historical information is used to determine that laboratory license limits have not been exceeded.	IIIA.	Monitor trends in EM sampling & analysis activities
IIIB.	IIIB. Verify that samples have been packaged in compliance with appropriate regulations	IIIB.	
IIIC.	IIIC. Verify that samples have been shipped in compliance with appropriate regulations.	IIIC.	
IVA.	IVA. Monitor analytical methods used for conducting sample analyses.	IVA.	
IVB.	IVB. Verify that laboratory-generated waste and unused samples are managed.	IVB. Verify that laboratory-generated waste and unused samples are managed according to the appropriate DOE policies.	
VA.		VA. Verify performance of data verification.	Maintain central repository for information on: - numbers of samples and analyses - costs of analyses - turnaround times
VB.		VB. Verify that data validation is performed.	
VC.		VC. Verify that data submitted are of the quality claimed and required, and are useable.	
VIA.	VIA. Verify that records are maintained, managed and disposed of in full accordance with appropriate regulations.	VIA.	
VIB.	VIB. Track data on numbers and types of samples and analyses, costs of analyses, and turnaround times for all sampling and analysis activities	VIB.	

ATTACHMENT B: POTENTIAL FUTURE FSMP ACTIVITIES

When the FSMP has been properly implemented at each Operations Office to perform the functions described above, EM-263 may consider expanding the FSMP to include additional responsibilities and duties. These additional responsibilities and duties would be designed to refine the existing FSMP, provide better, more efficient management of the ASP, and implement new EM guidance and policies.

The new responsibilities and duties may include but would not be limited to:

- Participation in project planning [12];
- Provision of quality assurance (QA) oversight for sample collection, sample preservation and adherence to plan during collection of samples [4,5,6,7,8,9,10,11];
- Interpretation of analytical results [1,2];
- Participation in scoping meetings for Federal Facility Agreement activities [3,12,22]; and
- Integration of the automated data handling systems at all sites to ensure the centralized access to analytical data and to facilitate interaction between the FSMP staff and the on-site contractors [1,37].

ATTACHMENT C: REFERENCES

1. EM Analytical Services Program Five-Year Plan, January 29, 1992.
2. IG-0293 Audit of Testing Laboratory Support to the Environmental Survey Program, December 21, 1990.
3. DOE/S-00097P, Environmental Restoration and Waste Management Five-Year Plan Fiscal Years 1994-1998.
4. ASME NQA-1-1989 Edition, Quality Assurance Program Requirements for Nuclear Facilities, March 31, 1990.
5. DOE Order 5700.6C, Quality Assurance of August 21, 1991.
6. Quality Assurance Guidance for Sampling in Support of EM Environmental Sampling and Analysis Activities, September 29, 1993.
7. Quality Assurance Guidance for Analytical Laboratories in Support of EM Environmental Sampling and Analysis Activities, September 29, 1993.
8. Quality Assurance Guidance for Management Assessment in Support of EM Environmental Sampling and Analysis Activities, September 29, 1993.
9. Quality Assurance Guidance for the Integrated Performance Evaluation Program in Support of EM Environmental Sampling and Analysis Activities, September 29, 1993.
10. Quality Assurance Guidance for Field Sampling and Measurement Assessment Plates in Support of EM Environmental Sampling and Analysis Activities, September 29, 1993.
11. Quality Assurance Guidance for Laboratory Assessment Plates in Support of EM Environmental Sampling and Analysis Activities, September 29, 1993.
12. DOE Order 4700.1, Project Management of March 6, 1987.
13. DOE Policy on EM Sample Management (to be issued with this document).
14. EM-263 Guidance for Establishment and Implementation of a National Sample Management Program in Support of EM Environmental Sampling and Analysis Activities (to be issued with this document).
15. EM-263 National Sample Tracking System, Version 1.0, October 15, 1993.
16. IG-0295 Cost of Environmental Survey Testing, August 12, 1991.
17. DOE Policy on The Distribution of Radioactive Environmental Samples to Commercial Analytical Laboratories - Sample Split Between Commercial and the Department of Energy Laboratories.
18. DOE Policy on Radiological Safety at Commercial Analytical Laboratories Receiving Department of Energy Radioactive Environmental Samples, (draft in preparation).

19. DOE Policy on *The Management of Mixed Wastes Generated by Commercial Analytical Laboratories During the Analysis of Radioactive and Mixed Waste Environmental Samples*, (draft in preparation).
20. *EM Quality Assurance Requirements and Description*, Rev. 0, October 1991.
21. *EM-263 Model Contract for Acquiring Chemical Analytical Services from the Commercial Sector* (draft in preparation).
22. *EM-50 Management Policies and Requirements Doc.*, Rev. 0, May 1992.
23. EPA Superfund OSWER Directive #9242 6-08, December 5, 1990.
24. DOE Order 2250.1C, *Cost and Schedule Control System Criteria* of December 21, 1988; DOE Order 5700.2C, *Analysis and Cost Estimating* of June 12, 1992.
25. 49CFR, Section 172.20, Subpart C, *Shipping Papers*, July 1, 1991.
26. 40CFR, Section 261, Subpart A, *Identification and Listing of Hazardous Waste*, July 1, 1991.
27. 49CFR, Section 173.1, Subpart A, *General*, July 1, 1991.
28. 49CFR, Section 173.21, Subpart B, *Preparation of Hazardous Materials for Transportation*, July 1, 1991.
29. 49CFR, Section 172.4, Subpart E, *Labelling*, July 1, 1991.
30. DOE Order 1540.1A, *Materials Transportation and Traffic Management* of July 8, 1992.
31. DOE Order 5480.3D, *Nuclear Reactor Safety Design Criteria* of January 19, 1993.
32. DOE Order 1540.2, *Hazardous Material Packaging for Transport - Administrative Procedures* of September 30, 1986.
33. DOE Order 5820.2A, *Radioactive Waste Management* of September 26, 1988.
34. 44 USC, Section 3301, *Definition of Records*, January 3, 1989.
35. DOE Order 1324.2A, *Records Disposition* of September 13, 1988.
36. DOE Order 1324.5A, *Records Management Program* of April 30, 1992.
37. DOE Order 1324.6, *Automated Office Electronic Recordkeeping* of July 8, 1987.
38. DOE Order 1430.1C, *Management of Scientific and Technical Information* of February 27, 1992.