



Department of Energy
Washington, DC 20585

APR 22 1986

John J. Linehan
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Mail Stop 623-SS
Silver Spring, MD 20555

Dear Mr. Linehan:

On May 7 and 8, 1986, the NRC and the DOE will meet to discuss the level of detail for the Site Characterization Plan (SCP). The meeting will be held at Forrestal Building in Room 4A-104, beginning at 8:30 A.M. on May 7.

Attached to this letter is an agenda for this meeting and a short discussion prepared as advance material on the level of detail in the SCP. If you have any questions about the agenda or the advance material, please call Carol Hanlon at 252-1224, or me at 252-1238.

Donald H. Alexander

Donald H. Alexander, Chief
Technology Branch
Engineering & Geotechnology
Division
Office of Geologic Repositories

Attachments

cc: R. Stein
C. Hanlon
M. Blanchard
J. Mecca
T. Baillieul
J. Nelson
S. Grodin

WM Record File

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WM Project 1

Docket No. _____

PDR ☒

LPDR _____

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Agenda for the NRC/DOE Meeting
on the Level of Detail in the SCP
May 7 and 8, 1986
Washington, D.C.
Forrestal Building, Room 4A-104.

May 7, 1986

Introduction of Participants and Purpose of Meeting	R. Stein, DOE	8:30 AM
DOE Opening Remarks	D. Alexander, DOE	9:00 AM
NRC Opening Remarks	J. Linehan, NRC	9:15 AM
DOE Presentation	C. Hanlon, DOE	9:30 AM
BREAK/CAUCUS		10:15 AM
NRC Comments	R. Johnson, NRC	10:45 AM
States', Indian Tribes' Comments		11:30 AM
LUNCH/CAUCUS		12:30 PM
Interactive Discussion	All Participants	2:20 PM
BREAK/CAUCUS		3:30 PM
Observations and Identification of Agreements/Actions	All Participants	3:45 PM
Adjourn to Prepare Meeting Summary	DOE/NRC	5:00 PM

May 8, 1986

Reconvene to Finalize Meeting Summary	DOE/NRC	1:00 PM
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ADVANCE MATERIALS FOR
DOE-NRC MEETING
LEVEL OF DETAIL IN THE SCP
May 7-8, 1986

Background

On October 29-30, 1985, the NRC and the DOE met to discuss the content, requirements, and level of detail to be provided in the test plans, analyses, and studies of Section 8.3 of the SCP. The DOE presented its position on this topic through a general outline entitled "Content Requirements for Descriptions of Studies in Chapter 8 of the SCP" and a number of specific examples of the application of the outline. Following the meeting, the NRC provided comments on the information presented at the meeting (letter to D. Alexander from J. Linehan, December 12, 1985), including suggested revisions to the "Content Requirements" outline, and concluded that rigorous use of the revised outline would likely result in the appropriate level of detail in the SCP. In its comments, the NRC noted that it was the DOE's decision on how to best produce the information for the SCP, whether such information be provided entirely within the SCP or by using supporting references.

Since the meeting and receiving the comments from the NRC, the DOE has established its approach to the level of detail to be provided in the SCP itself and the detail which will be provided in supporting documents. By providing an overall description and interpretation of the test program, the DOE will be able to provide a document that will better define and describe the testing needed to characterize the site. The purpose of the May 7-8, 1986 meeting is to present the DOE plans for the level of detail to be provided in the SCP. Key questions to be addressed during the May 7-8 meeting are:

- o To what level of detail will the Chapter 8 of SCP present information related to each of the terms described in the November 8, 1985 letter from D. Alexander (DOE) to J. Linehan (NRC)? (The definitions of terms to be used in Section 8.3 of the SCP are included as Attachment A.)
- o What other documents describing site characterization activities will present information related to these terms?
- o What near-term test descriptions and procedures will be available before or at the time the SCP is released?
- o Will study/test plans contain the information in the December 12, 1985 NRC mark-up of the DOE "Content Requirements" for study plans?

Discussions

The hierarchal terms to be used in the SCP, have been defined in the November 8, 1985 D. Alexander (DOE) letter to J. Linehan (NRC). The terms, defined in Attachment A, are:

<u>Hierarchal Terms</u>	<u>Level of Detail</u>	<u>Planning Document</u>
Program (generic) Program (specific) Investigation	Higher Level	SCP

Study Test, Analysis Procedure	Lower Level	Study Plans Test Procedures

The SCP will contain a complete discussion of the information associated with the higher-level terms, and a summary discussion of the information associated with the lower-level terms, by relying on other documents that will be referred to as "study plans" and "test procedures". Specifically, the SCP will provide an extensive discussion of the programs (both generic and specific) and investigations to be conducted during site characterization. The level of detail provided for programs and investigations will be consistent among SCPs. Studies, analyses, and tests will be described in matrix or table format in the SCP. Subsequently, details of the studies, analyses, and tests will be presented in the study plans. Applicable test procedures will be referenced if available. The DOE will adopt standard procedures if applicable, but it is expected that some standard test procedures will have to be modified for site specific tests and in some cases new test procedures will have to be developed. Modifications and development of new test procedures will be provided in test procedures that will be issued in project technical reports.

The site characterization program will be described in the SCP, as required by the NHPA, and in periodic progress reports issued every six months during site characterization. The SCP will be supported by separate documents consisting of references, study plans, and test procedures. Although details of studies, tests, and analyses will not be presented in the SCP, they will be presented in study plans that will be referenced by periodic progress reports throughout site characterization. Therefore, no changes are needed in Section 8.3 of the Annotated Outline (AO) to reflect a change in the level of detail to be presented in the SCP.

Study plans for exploratory shaft testing as appropriate will be provided for review at the same time as the SCP. It is DOE's intention to provide study plans at the same time as the SCP for all site characterization testing to be conducted within one year of the issuance of the SCP. In cases where such study plans are not available at the same time as the SCP, a schedule for their completion will be provided in Section 8.5 of the SCP. Procedures for individual tests will be available for information at least

30 days before the test is initiated. These test procedures will contain a level of detail consistent with standard procedures applied to a given technical area and will identify each of the technical steps to be carried out during the test. The test procedures will indicate the specific steps that will be taken for quality assurance purposes.

The "Content Requirements" document for studies has been modified to accommodate the information requested by the NRC in the December 12, 1985 letter from Linehan to Alexander (NRC markup of DOE Content Requirements of Studies in Chapter 8 of the SCP), with the exception of one point concerning alternatives. The revised "Content Requirements for Descriptions of Studies" is included as Attachment B. The advantages and limitations of the various alternative test and analysis methods will be discussed in the supporting references. However, the advantages and limitations of the various alternative test numbers, locations, durations and timing, and will not be discussed because all tests selected will be evaluated to assure that the resulting data will be adequate for meeting the objectives of the test.

In addition, the DOE has written "Content Requirements For Descriptions of Investigations in Chapter 8 of the SCP" (Attachment C). Both "Content Requirements" descriptions (Attachments B and C) serve as an expansion of information listed in Table 2 of the AO and are consistent with Section 8.3 of the AO. It should be noted that both "Content Requirements" documents do not prescribe a format for presenting the required information, either in the SCP or in study plans. In the SCP, the information of Attachment C will be formatted according to the AO. A common format has not been established for the study plans. A comparison chart is provided (Attachment D) showing the modifications to the "Content Requirements" that have been made in going from the studies level to the investigations level.

DEFINITIONS OF TERMS TO BE USED
IN SECTION 8.3 OF THE SCP

The following terms are defined to assure consistency in the development of Section 8.3 of the SCP. In the "Summary of NRC/DOE Meeting on the Site Characterization Plans Section 8.3, October 29-30, 1985" DOE agreed to provide NRC with definitions of the following terms: program, investigation, study, test, analysis, experiment, test method, and procedure by Friday, November 8, 1985. In addition, DOE agreed to correlate the defined terms with those used in the project specific examples presented at the October 29-30 meeting to facilitate NRC review (Figure 1). The number of hierarchical terms used in an SCP will vary, depending on the approach used by a given project in the development of 8.3 of the SCP. However, the level of detail will always be at least to the study level as specified in the DOE guidance on "Content Requirements for Descriptions of Studies in Chapter 8 of the SCP."

Program (Generic): the term "program" is used in the annotated outline (AO) to refer to the third level elements in the outline, e.g.,

- 8.3.1 Site Program
- 8.3.2 Repository Program
- 8.3.3 Seal System Program
- 8.3.4 Waste Package Program
- 8.3.5 Performance Assessment Program

Program (Specific): the term "program" is also to be applied to the fourth level elements in Section 8.3 of the AO. At the 4 digit level the term refers to two or more related investigations. Therefore, within the context of 8.3:

- 8.3.1.1 Geology
- 8.3.1.3 Hydrology
- 8.3.1.4 Geochemistry
- 8.3.1.5 Climatology

etc. are referred to as specific programs.

Investigation - the term "investigation" is to be used in Section 8.3 of the AO to refer to: (1) the first major subdivision of a specific program, and 2) is comprised of two or more related studies. The "Hydrology Program" (8.3.1.3) may include several major investigations with very different objectives. For example:

Paleohydrologic Investigations to establish nature and rates of hydrologic processes operating within the Quaternary;

Surface Hydrology Investigations with multiple objectives including: quantification of ground water consumption and use, assessment of potential for foreseeable human activities such as ground-water withdrawal, extensive irrigation, or construction of large scale surfaces water impoundments.

Study - the term "study" is to be used in Section 8.3 to refer to a combination of tests and analyses which deal with a single or several related objectives within a given area of study. The presentation of a study will follow the DOE guidance in "Content Requirements for Descriptions of Studies in Chapter 8 of the SCP" with the additions agreed to between DOE/NRC in the October 29-30 meeting minutes on Section 8.3

Analysis - is used here to refer to an assessment of test results through calculations, modeling or technical judgement.

Tests - the term "test" is to be used in Section 8.3 of the AO to refer to a combination of procedures which are used for the identification, measurement, or evaluation of a quality, characteristic, or property of a material or system that produces data or information through one or more experiments (test results).

Procedure - describes the detailed stepwise process which specifies how a test will actually be conducted (e.g. ASTM standards).

Experiment - operations that are carried out under controlled conditions as specified in applicable procedures to establish characteristics or values of the quality, characteristic, or property of a material or system being examined.

DOE CONTENT REQUIREMENTS FOR DESCRIPTIONS OF STUDIES
IN STUDY PLANS

The test program presented in Chapter 8 of the SCP will be subdivided into a hierarchy of increasing detail. The SCP test program hierarchy will include (in increasing detail): generic program; specific program; investigation; study; tests and analyses; and test procedures. Details for studies and tests and analyses, listed in Chapter 8 of the SCP, will be presented in study plans. Study plans will be separate from the SCP proper and will be issued periodically throughout site characterization. Individual test procedures will be referenced in the study plans.

The following outline describes the information on studies, tests and analyses that will be presented in the study plans. A study may involve a single test or a set of tests and analyses, as appropriate. The tests include those measurements of physical parameters, or observations of physical phenomena, that are performed in the field or in the laboratory. Test activities include preparation of procedures, test set-up, conduct of the test, data acquisition, and data reduction. The analyses include those calculations or other evaluations needed to assess site characteristics and support design activities.

The items listed in the outline will be addressed for studies and tests and analyses to the extent that each item applies. Not all items will be applicable in all studies.

I. Purpose and Objectives of Studies:

- o Describe the information that will be obtained in this study. Briefly discuss how this information will be used; and
- o Provide the rationale and justification for the information to be obtained by the study. It can be justified by: 1.) a performance goal and a confidence level in that goal (developed via the performance allocation process and results that will be described elsewhere in the SCP); 2.) a design goal and a confidence level in that goal (design goals beyond those related to performance issues); 3.) a direct Federal, State, and other regulatory requirements for specific studies. Where relevant performance or design goals actually apply at a higher level than the study (e.g. where the goals apply to a group of studies), describe the relationship between this study and that higher level goal.

II. Rationale for Selected Study:

- o Provide the rationale and justification for the selected tests and analyses (including standard tests). Indicate the alternative test and analytical methods from which they were

selected, including options for type of test, instrumentation, data collection and recording, and alternative analytical approaches. Describe the advantages and limitations of the various options; and

- o Describe the constraints that exist for the study, and explain how these constraints affect selection of test methods and analytical approaches. Factors to be considered include:
 - Potential impacts on the site from testing;
 - Whether the study needs to simulate repository conditions;
 - Required accuracy and precision of parameters to be measured with test instrumentation;
 - Limits of analytical methods that will use the information from the tests;
 - Capability of analytical methods to support the study; and
 - Time required versus time available to complete the study.

III. Description of Tests and Analyses:

- o Since studies are comprised of tests and analyses, provide for each type of test:
 - Describe the general approach that will be used in the test. Describe key parameters that will be measured in the test and the experimental conditions under which the test will be conducted. Indicate the number of tests and their locations (e.g. spatial location relative to the site, exploratory shaft facility elements, repository layout, stratigraphic units, depth, and test location);
 - Summarize the test methods. Reference any standard procedures (e.g., ASTM, API) to be used. If any of the procedures to be used are not standard, or if a standard procedure will be modified, summarize the steps of the test, how it will be modified, and reference the technical procedures that will be followed during the test. If procedures are not yet available, indicate when they will be available. Indicate the level of quality assurance and reference the applicable specific QA requirements that will be applied to the test;
 - Specify the tolerance, accuracy, and precision required in the test, where appropriate;

- Indicate the range of expected results of the test and the basis for those expected results;
 - List the equipment required for the test and describe briefly any such equipment that is special;
 - Describe techniques to be used for data reduction and analysis of the results;
 - Discuss the representativeness of the test including why the test results are considered representative of future conditions or the spatial variability of existing conditions. Also indicate limitations and uncertainties that will apply to the use of the results; and
 - Provide illustrations such as maps and cross sections to show the locations of tests and schematic layouts of tests.
- o For each type of Analysis:
- State the purpose of the analysis, indicating the testing or design activity being supported. Indicate what conditions or environments will be evaluated and any sensitivity or uncertainty analyses that will be performed. Discuss the relationship of the analysis to the set performance goals and confidence levels;
 - Describe the methods of analysis, including any analytical expressions and numerical models that will be employed;
 - Reference the technical procedures document that will be followed during the analysis. If procedures are not yet available, indicate when they will be available. Indicate the level of quality assurance that will be applied to the analysis and reference the applicable QA requirements;
 - Identify the data input requirements of the analysis;
 - Describe the expected output and accuracy of the analysis; and
 - Describe the representativeness of the analytical approach (e.g., with respect to spatial variability of existing conditions and future conditions) and indicate limitations and uncertainties that will apply to the results.

IV. Application of Results:

- o Briefly discuss where the results from the study will be used for the support of other studies (performance assessment, design, and characterization studies);

- o For performance assessment uses, refer to specific performance assessment analyses (described in Section 8.3.5 of the SCP) which will use the information produced from the studies described above, and refer to any use of the results for model validation;
- o For design uses, refer to, or describe, where the information from the study described above will be used in construction equipment design and development and engineering system design and development (e.g., waste package, repository engineered barriers, and shafts and borehole seals); and
- o For characterization uses, refer to, or describe, where the information from the study described above will be used in planning other characterization activities.

V. Schedule and Milestones:

- o Provide the durations of and interrelationships among the principal activities associated with conducting the study (e.g., preparation of test procedures, test set-ups, testing, data analyses, preparation of reports), and indicate the key milestones including decision points associated with the study activities;
- o Describe the timing of this study relative to other studies and other program activities that will affect, or will be affected by, the schedule for completion of the subject study; and
- o Dates for activities or milestones, including durations and interrelationships, for the study plans will be provided. These should reference the master schedules provided in Section 8.5. of the SCP.

Attachment C

DOE CONTENT REQUIREMENTS FOR DESCRIPTIONS OF INVESTIGATIONS IN CHAPTER 8.3 OF THE SITE CHARACTERIZATION PLANS

The test program presented in Chapter 8.3 of the Site Characterization Plans (SCPs) will be subdivided into a hierarchy of increasing detail. The SCP test program hierarchy will include (in increasing detail): generic program; specific program; investigation; study; and test and analysis. Generic programs, specific programs, and investigations will be described in Chapter 8.3 of the SCP. Details for studies, tests, and analyses will be presented in study plans separate from the SCP (see Attachment B).

The following outline describes the content requirements for investigations that will be presented in Chapter 8.3 of the SCP. An investigation may involve a single study or a set of studies, as appropriate.

I. Purpose and Objectives of Investigations:

- o Describe the information that will be obtained in this investigation. Briefly discuss how this information will be used; and
- o Provide the rationale and justification for the information to be obtained by the investigation. It can be justified by: 1.) a performance goal and a confidence level in that goal (developed via the performance allocation process and results that will be described elsewhere in the SCP); 2.) a design goal and a confidence level in that goal (design goals beyond those related to performance issues); 3.) a direct Federal, State, and other regulatory requirements for specific studies. Where relevant performance or design goals actually apply at a higher level than the investigation (e.g. where the goals apply to a group of investigations), describe the relationship between this investigation and that higher level goal.

II. Rationale for Selected Investigation:

- o Provide the rationale and technical basis for why the investigation will be conducted. Identify relevant technical issues;
- o Describe the constraints that exist for the investigation, and explain how these constraints affect selection of studies; and
- o Discuss the strategy, including how the planned studies, tests and analyses will be collectively used, for resolving the relevant technical issues.

III. Description of Studies:

- o Since investigations are comprised of one or more studies, for each study:
 - State the objectives of the study, incorporating the tests and analyses that make up the study;
 - Indicate if the study is to provide information for the development of conceptual models (e.g., the collection of water level data will provide input to the development of the conceptual and numerical ground-water flow models);
 - Indicate if the study is being performed to guide the development of subsequent characterization, performance assessment and/or design activities (e.g., simulations with ground-water flow models will be performed to determine where additional drilling will be required);
 - List the tests, the test methods to be used, the data/parameters that are to be collected an/or evaluated for each test, the locations and numbers of tests and the technical procedures that will be used for the test. Reference the study plans, as appropriate; and
 - For each analysis that the study will support, list the method of analysis and the information that will result from the analysis.

IV. Application of Results:

- o Briefly discuss where the results from the investigation will be used for the support of other investigations (performance assessment, design, and characterization investigations);
- o For performance assessment uses, refer to specific performance assessment studies (described in Section 8.3.5 of the SCP) which will use the information produced from the studies described above, and refer to any use of the results for model validation;
- o For design uses, refer to, or describe, where the information from the studies described above will be used in construction equipment design and development and engineering system design and development (e.g., waste package, repository engineered barriers, and shafts and borehole seals); and
- o For characterization uses, refer to, or describe, where the information from the studies described above will be used in planning other characterization activities.

V. Schedule and Milestones:

- o List in tabular form, major milestones which will result from the studies that comprise the investigation. Proposed titles, expected delivery dates, and milestones are to be included;
- o Present the schedule for the studies supporting the investigation, providing beginning and end dates for tests and analyses, or groups thereof; and
- o Show the interrelationships and sequencing of the tests, analyses, or groups, with particular attention to those that will affect or be affected by the scheduled completion of other activities. Dependencies on data derived from other investigations should also be indicated on the schedule as well as the major milestones. A simple PERT chart should be used to illustrate these relationships.

Attachment D

Comparison of Content Requirements for Description
of Investigation and Studies

	<u>Studies</u>	<u>Investigation</u>
I. Purpose and Objectives	Rationale for collection of data and information	Rationale for information need
II. Planned Studies, Tests, Analyses <u>Study</u>	<p>Detailed Constraints for tests and analyses:</p> <ul style="list-style-type: none">- potential impacts- repository conditions- accuracy/precision- limits of analytical methods- capability of method to support study- time requirements- scale of test <p>Detailed Rationale and Justification:</p> <ul style="list-style-type: none">- Alternative tests- Number, location, duration, timing	General Objective of Study
<u>Tests and Analyses</u>	<p>For each type of test:</p> <ul style="list-style-type: none">- general test approach- ID of key parameters- location and number- methods to be used- summarize nonstandard procedures- reference standard discussion of procedures- level of QA- specify tolerance, accuracy, precision- indicate range of expected results- equipment requirements- data reduction techniques- representativeness of test- provide illustration	<p>For each type of test:</p> <ul style="list-style-type: none">- list name of test- list methods- list data parameters- list location/number of tests- list analyses

Studies

For each type of analysis:

- purpose
- conditions and environment to be evaluated
- discuss uncertainty
- describe method of analysis
- identify data requirements
- describe expected output
- describe representatives of analytical approach

Investigation

For each type of analysis:

- list method of analysis
- list type of data required (input)
- list resulting information (output)

III Application of Results

Greater detail

IV Schedules and Milestones

Includes milestones
at test level
in detail

Includes milestones
at study level
in detail
(tests and analyses can
be aggregated)