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- 1 -

Mr. O. L. Olson
Director
Basalt Waste Isolation Division
U.S. Department of Energy
P.O. Box 550
Richland, WA 99352

Dear Mr. Olson:

Pursuant to your request dated December 23, 1985, please find enclosed a signed copy of the Summary Meeting Minutes for the December 9-10, 1985 U.S. Department of Energy/U. S. Nuclear Regulatory Commission Hydrology Consultation Meeting. We look forward to receiving the complete meeting report package in the near future.

Sincerely,

Original signed by.

John J. Linehan, Section Leader
Repository Projects Branch
Division of Waste Management
Office of Nuclear Material Safety
and Safeguards

Enclosure:
Summary Meeting Minutes

WM Record File
101.2

WM Project 10
Docket No.
PDR ✓
LPDR ✓

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MEETING REPORT
DEPARTMENT OF ENERGY/NUCLEAR REGULATORY COMMISSION MEETING
ON THE BASALT WASTE ISOLATION PROJECT
LARGE-SCALE HYDRAULIC STRESS TESTING PRE-TEST CONSULTATION

DATE/LOCATION OF MEETING

December 9-10, 1985, Richland, Washington

ATTENDEES/ORGANIZATIONAL AFFILIATION

See Attachment 1.

BACKGROUND

The Department of Energy (DOE) and its prime contractor, Rockwell Hanford Operations (Rockwell), met to facilitate consultation with the Nuclear Regulatory Commission (NRC) staff and consultants relative to the Basalt Waste Isolation Project (BWIP) Rocky Coulee Large-Scale Hydraulic Stress (LHS) test. The agenda for this meeting is contained in Attachment 2. Lively and candid two-way discussions occurred. The discussions were limited to LHS testing and related activities. The meeting was open to the public.

The DOE presented information (Attachment 3) on the current and planned activities relative to planned Rocky Coulee tests at RRL-2B, including activities affecting schedule and status of the LHS test Quality Assurance (QA) program. Additional information was presented on the potentiometric surfaces as they exist in the area defined by test wells DC-19, DC-20, and DC-22.

OBSERVATIONS

Nuclear Regulatory Commission

1. Aspects of DOE's proposed hydrologic testing program are not consistent with the strategy set forth in NRC's BWIP Site Technical Position (STP) 1.1. This observation is based on the following:

   A. With respect to Stage I of STP 1.1, DOE stated that hydrologic baseline has not yet been adequately established to enable determination of pre-emplacement groundwater travel time. The STP 1.1 and subsequent DOE/NRC agreements state that baseline should be established prior to initiation of Stage II. Therefore, a technical consensus that DOE has characterized hydrologic baseline, as stipulated by STP 1.1 prior to Stage II, has not been accomplished at this time.

   B. The intent of Stage II was to create, if possible, a perturbation on a repository scale of the magnitude similar to the stress likely to be imposed on the system by a repository. The initial LHS test proposed by DOE does not satisfy the scope of testing set forth in Stage II of STP 1.1 because:

      - The test has not been designed to characterize far-field hydrologic boundaries and hydraulic continuity.

      - The test is not likely to be large enough to support development and calibration of models of repository performance.

- o The test will not likely characterize hydraulic parameters on scales significant to overall repository performance.

2. Recognizing that DOE is pursuing an approach to hydrologic characterization that is different, although not necessarily less valid, than that described in STP 1.1, DOE needs to describe and justify this new approach to demonstrate it will likely develop necessary information for licensing. Development and implementation of a new strategy or any significant modifications of an agreed-upon strategy requires prior consultation with NRC.

3. Without knowledge of DOE's overall strategy for hydrologic characterization, NRC cannot assess whether it would be prudent for DOE to initiate LHS testing of the Rocky Coulee flow top. Taking DOE's stated objectives for this test as given, NRC makes the following observations:

   A. The test's ability to identify and evaluate boundary conditions and hydraulic continuity on the scale of the controlled area appears to be limited by the reduced scale of the test, potential perturbations to hydraulic heads caused by activities associated with the test (e.g., tracer injection), as well as other activities (e.g., exploratory shaft construction), anticipated brevity of the test, and the expected hydraulic characteristics of the Rocky Coulee flow top.

   B. The test's ability to assess the representativeness of hydraulic parameters determined previously in single-hole tests is limited to those parameters determined in the vicinity of the RRL-2B cluster because the test only encompasses that portion of the hydrogeologic system.

   C. The test's ability to characterize horizontal transmissivity, storage coefficient, and vertical hydraulic conductivity is limited to the vicinity of the RRL-2 cluster by the small scale of the test. Because of the scale and the small number of nearby monitoring facilities, the test's ability to characterize anisotropy and heterogeneity of hydraulic parameters is limited.

4. Contrary to DOE's presentation, NRC considers that the provisions of Criterion XI of 10 CFR Part 50, Appendix B (e.g., establishment of acceptance criteria for testing), are applicable to BWIP LHS testing. Criterion XI calls for test procedures to identify acceptance criteria for collection of raw data to allow the testing team to determine how the test should be conducted. In this application, acceptance criteria for test procedures need not explicitly address performance goals for the site subsystem. These goals are more appropriately evaluated using performance assessment methodologies. More detailed guidance on the application of Criterion XI is provided in the NRC staff's QA Review Plan.

5. Performance goals for components of the natural system should be established as a basis for development of integrated plans for site characterization. This establishment of goals is consistent with recent DOE-NRC agreements reached at a meeting on performance allocation in September 1985.

6. Implementation of a QA Plan consistent with criteria in Appendix B of 10 CFR Part 50 pertinent to LHS testing is necessary. Because LHS testing is intended to provide information necessary for licensing, DOE should develop and implement comprehensive QA plans for the LHS testing. The NRC requested that design documents and QA and technical procedures for the first LHS test be made available to NRC for review far enough in advance of the start of the test to allow adequate time for review and timely consideration by DOE of any NRC comments.

7. The NRC consultation/review steps, as agreed at the May 1985, BWIP hydrology meeting, should be added to DOE's strategy for hydrology testing of the BWIP site prior to each DOE decision step.

8. Because critical information was only provided to NRC two working days prior to the start of the meeting, NRC will provide additional comments on the LHS testing plan and recent hydraulic head data subsequent to review of this information.

Department of Energy

1. The DOE recognizes that the BWIP hydrology program does not follow the specific steps for hydrologic characterization as described by STP 1.1. The BWIP hydrology program has evolved in response to increasing knowledge about the site and to program technical reviews by internal and external reviewers. However, DOE believes many of the features contained within STP 1.1 are appropriate for hydrologic characterization and, as such, are incorporated within the BWIP hydrology program.

   The first major departure from STP 1.1 is that DOE has found that piezometric monitoring without stress testing is insufficient for the purposes of defining the conceptual hydrology model. This process is iterative, requiring a longer period of time and more monitoring facilities than initially envisioned.

   The second major departure from STP 1.1 is that the first stress test planned in the Grande Ronde (Rocky Coulee) will not assess flow field boundary conditions. The objectives inherent within the logic of STP 1.1 can, however, be accomplished through a phased testing program sequenced differently than outlined in STP 1.1.

   In light of the evolved nature of the BWIP hydrologic investigation program, and considering that DOE has not presented to the NRC a well-defined, overall, updated hydrologic investigation strategy, DOE will revisit the subject with the NRC.

2. The DOE presented to NRC, as specified in STP 1.1, the mature LHS test plans, appurtenant baseline information and QA status for the Rocky Coulee LHS test that is scehduled for early 1986.

3. The DOE requested that NRC forward comments on the test plan document as soon as feasible.

4. The NRC verbally presented a list of concerns relative to the LHS Test Plan at the start of the meeting, most of which were discussed during the meeting.

5. A defensible baseline for testing did exist prior to DC-23 and RRL-14 disturbances. A baseline for testing purposes will be reestablished prior to testing.

6. The DOE will review the monitoring program in light of recent drilling disturbances and LHS tests to determine appropriate monitoring frequencies and locations.

7. The DOE presented to NRC the status of the QA program relative to the Rocky Coulee LHS test. The BWIP is proceeding with the QA program consistent with the intent of the test and STP 1.1. The LHS test program will be conducted in accordance with a "LHS Test Program Control Manual" and the manual will incorporate the following features:

   A. The purpose of the test is to provide data required to rigorously quantify the groundwater flow system to support evaluations of site performance against regulatory requirements.

   B. Confidence goals for meeting regulatory requirements will be established to guide identification of data needs and determination of when the data needs have been met.

   C. Criteria from Appendix B of 10 CFR 50 will be implemented as appropriate to the data collection activities required to describe the site for the above purpose.

   D. A process and criteria for making test control decisions will be provided.

8. The DOE will provide to NRC a report relative to recent integrity testing activities at wells supporting the first LHS test.

9. The DOE will consider the possibility of a Cohassett vesicular zone test as stated in the draft test plan document.

10. The DOE will evaluate potential interference between tracer injection and the conduct of hydraulic tests to develop appropriate contingencies.

11. The DOE will investigate the use of tracejector logging to boreholes.

12. The DOE will monitor pressure response to packer inflation in dense interior piezometer tubes to evaluate the potential for piezometer lag.

State of Washington

None.

Yakima Indian Nation

Verbal comments relative to this meeting were received from a technical representative to the Yakima Indian Nation. The DOE requested that the comments be forwarded within two weeks for timely review and possible incorporation into the test planning.

Confederated Tribes of the Umatilla Indian Reservation

None.

Nez Perce Tribe

None.

AGREEMENTS

1. The DOE and NRC agreed prior to the start of the meeting that DOE's viewgraph regarding state/tribal participation might be misleading in that although the meeting was between NRC and DOE, states and tribes had the right to participate.

2. The DOE and NRC agreed that a draft of the Readiness Review Plan for the first LHS test will be provided to the NRC for timely review. In addition, NRC indicated a willingness to participate in the readiness review.

W. H. Dahlem — 12/16/85

D. H. Dahlem
Department of Energy-Richland Operations Office — Date

John Linehan — 1/8/86

J. Linehan
Nuclear Regulatory Commission — Date

SUMMARY MEETING NOTES
DOE/NRC MEETING ON THE BWIP LARGE-SCALE
HYDRAULIC STRESS TESTING PRE-TEST CONSULTATION
RICHLAND, WASHINGTON
DECEMBER 9-10, 1985

BACKGROUND

The Department of Energy (DOE) and its prime contractor, Rockwell Hanford Operations (Rockwell), met to facilitate consultation with the Nuclear Regulatory Commission (NRC) staff and consultants relative to the Basalt Waste Isolation Project (BWIP) Rocky Coulee Large-Scale Hydraulic Stress (LHS) test. The agenda for this meeting is contained in Attachment 1. Lively and candid two-way discussions occurred. The discussions were limited to LHS testing and related activities. The attendees are listed in Attachment 2. The meeting was open to the public.

The DOE presented information (Attachment 3) on the current and planned activities relative to planned Rocky Coulee tests at RRL-2B including activities affecting schedule and status of the LHS test Quality Assurance (QA) program. Additional information was presented on the potentiometric surfaces as they exist in the area defined by test wells DC-19, DC-20 and DC-22.

Verbal comments relative to this meeting were received from a technical representative to Yakima Indian Nation. The DOE requested that the comments be forwarded within two weeks for timely review and possible incorporation into the test planning. ~~The DOE comments are listed in Attachment 4 and NRC comments are listed in Attachment 5~~.

OBSERVATIONS

NRC

INSERT (1)

DOE

INSERT (2)
State of Washington
~~Yakima Indian Nation~~

Confederated Tribes of the Umatilla Indian Reservation
None.

Nez Perce Tribe
None.

AGREEMENTS

1. (NRC #7)

2. (NRC #10)

for DHD 12/11/85
~~M. Thompson for DH Date~~
Department of Energy

for JL
J. LINEHAN
Nuclear Regulatory Commission
12/11/85
Date

NRC OBSERVATIONS

1. Aspects of DOE's proposed hydrologic testing program are not consistent with the strategy set forth in NRC's BWIP Site Technical Position 1.1. This observation is based on the following:

   A. With respect to Stage I of STP 1.1, DOE stated that hydrologic baseline has not yet been adequately established to enable determination of pre-emplacement groundwater travel time. STP 1.1 and subsequent DOE/NRC agreements state that baseline should be established prior to initiation of Stage II. Therefore, a technical consensus that DOE has characterized hydrologic baseline, as stipulated by STP 1.1 prior to Stage II, has not been accomplished at this time.

   B. The intent of Stage II was to create, if possible, a perturbation on a repository scale of the magnitude similar to the stress likely to be imposed on the system by a repository. The initial LHS test proposed by DOE does not satisfy the scope of testing set forth in Stage II of STP 1.1 because:

      1. The test has not been designed to characterize far-field hydrologic boundaries and hydraulic continuity.

      2. The test is not likely to be large enough to support development and calibration of models of repository performance.

      3. The test will not likely characterize hydraulic parameters on scales significant to overall repository performance.

2. Recognizing that DOE is pursuing an approach to hydrologic characterization that is different, although not necessarily less valid, than that described in STP 1.1, DOE needs to describe and justify this new approach to demonstrate it will likely develop necessary information for licensing. Development and implementation of a new strategy or any significant

modifications of an agreed-upon strategy requires prior consultation with NRC.

3. Without knowledge of DOE's overall strategy for hydrologic characterization, NRC cannot assess whether it would be prudent for DOE to initiate LHS testing of the Rocky Coulee flow top. Taking DOE's stated objectives for this test as a given, NRC makes the following observations:

A. The test's ability to identify and evaluate boundary conditions and hydraulic continuity on the scale of the controlled area appears to be limited by the reduced scale of the test, potential perturbations to hydraulic heads caused by activities associated with the test (e.g., tracer injection) as well as other activities (e.g., exploratory shaft construction), anticipated brevity of the test, and the expected hydraulic characteristics of the Rocky Coulee flow top.

B. The test's ability to assess the representativeness of hydraulic parameters determined previously in single-hole tests is limited to those parameters determined in the vicinity of the RRL-2B cluster because the test only encompasses that portion of the hydrogeologic system.

C. The test's ability to characterize horizontal transmissivity, storage coefficient, and vertical hydraulic conductivity is limited to the vicinity of the RRL-2 cluster by the small scale of the test. Because of the scale and the small number of nearby monitoring facilities, the test's ability to characterize anisotropy and heterogeneity of hydraulic parameters is limited.

4. Contrary to DOE's presentation, NRC considers that the provisions of Criterion XI of 10 CFR Part 50, Appendix B (e.g., establishment of acceptance criteria for testing) are applicable to BWIP LHS testing. Criterion XI calls for test procedures to identify acceptance criteria for collection of raw data to allow the testing team to determine how the test should be conducted. In this application, acceptance criteria for test procedures need not explicitly address performance goals for the site subsystem. These goals are more appropriately evaluated using performance assessment methodologies. More detailed guidance on the application of Criterion XI is provided in the NRC staff's QA Review Plan.

5. Performance goals for components of the natural system should be

established as a basis for development of integrated plans for site characterization. This establishment of goals is consistent with recent DOE-NRC agreements reached at a meeting on performance allocation in September 1985.

6. Implementation of a QA plan consistent with criteria in Appendix B of 10 CFR Part 50 pertinent to LHS testing is necessary. Because LHS testing is intended to provide information necessary for licensing, DOE should develop and implement comprehensive QA plans for the LHS testing. NRC requested that design documents and QA and technical procedures for the first LHS test be made available to NRC for review far enough in advance of the start of the test to allow adequate time for review and timely consideration by DOE of any NRC comments.

7. DOE and NRC agreed prior to the start of the meeting that DOE's viewgraph regarding state/tribal participation might be misleading in that although the meeting was between NRC and DOE, states and tribes had the right to participate.

8. The NRC consultation/review steps, as agreed at the May 1985 BWIP hydrology meeting, should be added to DOE's strategy for hydrologic testing of the BWIP site prior to each DOE decision step.

9. Because critical information was only provided to NRC two working days prior to the start of the meeting, NRC will provide additional comments on the LHS testing plan and recent hydraulic head data subsequent to review of this information.

10. DOE and NRC agreed that a draft of the readiness review plan for the first LHS test will be provided to the NRC for timely review. In addition, NRC indicated a willingness to participate in the readiness review.

* 7 & 10 under Agreements

INSERT (2)

⇒ o Insert A

~~DRAFT~~ - DEPARTMENT OF ENERGY ~~OBSERVATIONS~~

2 ø DOE ~~The BWIP~~ presented to the NRC, as specified in STP 1.1, the nature of ~~nature~~ LHS test plans, appurtenent baseline information and QA status for the Rocky Coulee LHS test that are scheduled for early 1986.

3 ø ~~The~~ DOE requested that NRC forward comments on the test plan document ~~within 2 weeks~~ as soon as feasable.

4 ø ~~The~~ NRC verbally presented a list of concerns relative to the LHS Test plan at the start of the meeting, most of which were discussed during the meeting.

5 ø A defensible baseline for testing did exist prior to DC-23 and RRL-14 disturbances. A baseline for testing purposes will be re-established prior to testing.

6 ø DOE ~~The BWIP~~ will review the monitoring program in light of recent drilling disturbances and LHS tests to determine appropriate monitoring frequencies and locations.

7 ø DOE ~~The BWIP~~ presented to NRC the status of the QA program relative to the Rocky Coulee LHS test. The BWIP is proceeding with the QA program consistent with the intent of the test and STP 1.1. o The LHS Test program will be conducted in accordance with the "LHS Test Program Control Manual" and the manual will incorporate the following features:

a The purpose of the test is to provide data required to rigorously quantify the groundwater flow system to support evaluations of site performance against regulatory requirements.

b Confidence goals for meeting regulatory requirements will be established to guide identification of data needs and determination of when the data needs have been met.

c Criteria from Appendix B of 10 CFR 50 will be implemented as appropriate to the data collection activities required to describe the site for the above purpose.

d A process and criteria for making test control decisions will be provided.

8 ø DOE ~~The BWIP~~ will provide to NRC an ~~integrity~~ report relative to recent integrity testing activities at wells supporting the first LHS test.

9 ø DOE ~~The BWIP~~ will consider the possibility of a Cohassett vesicular zone test as stated in draft test plan document.

10 ø DOE ~~The BWIP~~ will evaluate potential interference between tracer injection and the conduct of hydraulic tests to develop appropriate contingencies.

11 ø DOE ~~The BWIP~~ will investigate the use of tracejector logging to boreholes.

12 ø DOE ~~The BWIP~~ will monitor pressure response to packer inflation in dense interior piezometer tubes to evaluate the potential for piezometer lag.

Insert A

1.0 DOE recognizes that the BWIP hydrology program does not follow the specific steps for hydrologic characterization as ~~envisioned by the authors of~~ described by STP 1.1. The BWIP hydrology program has evolved in response to increasing knowledge about the site and to program technical reviews by internal and external reviewers. However, DOE believes many of the features contained within STP 1.1 are appropriate for hydrologic characterization and as such are incorporated within the BWIP hydrology program.

The first major departure ~~to~~ from STP 1.1 is that DOE has found that piezometric monitoring without stress testing is insufficient for the purposes of defining the conceptual hydrology model. This process is ~~an~~ iterative ~~process~~, requiring a longer period of time and more monitoring facilities than initially envisioned. ~~by DOE and the authors of STP 1.1. As part of the iterative process, information from stress testing has been found to be necessary.~~

~~The second major departure to STP 1.1 is that a stress test in the Grande Ronde above the repository to assess flow field boundary conditions is probably not feasible due to low transmissivities~~. The objectives inherent within the logic of STP 1.1 can, however, be accomplished through a ~~progressive~~ phased testing program sequenced differently than outlined in STP 1.1.

In light of the evolved nature of the BWIP hydrologic investigation program, and considering that DOE ~~BWIP~~ has not ~~completely~~ presented to the NRC a well-defined, overall, updated hydrologic investigation strategy, DOE will revisit the subject with the NRC.

The second major departure from STP 1.1 is that the first stress test planned in the Grande Ronde (Rocky Coulee) ~~Rocky Coulee stress test~~ will not assess flow field boundary conditions.