

SEP 27 1991

MEMORANDUM FOR: Joseph Holonich, Acting Director
Repository Licensing and Quality Assurance
Project Directorate
Division of High-Level Waste Management

FROM: Margaret Federline, Branch Chief
Hydrology and Systems Performance Branch
Division of High-Level Waste Management

SUBJECT: PHASE I REVIEW OF STUDY PLAN FOR CHARACTERIZATION OF
THE YUCCA MOUNTAIN SITE SATURATED-ZONE GROUNDWATER FLOW
SYSTEM (STUDY PLAN 8.3.1.2.3.1, REVISION 0)
[PPSAS 411431, TACS L60186]

As requested, we have completed the Phase I review of the Study Plan for Characterization of the Yucca Mountain Site Saturated-Zone Groundwater Flow System (See enclosure). This review was conducted using the Review Plan for NRC Staff Review of DOE Study Plans Revision 1 (December 6, 1990).

This study is part of investigation 8.3.1.2.3, which is intended to provide a description of the saturated zone hydrologic system at the site. The objectives of this study are (1) to determine the internal and external boundary conditions that can be applied to the site saturated zone model and (2) to determine the groundwater flow magnitudes and directions at the site. At least seven major investigations directly depend on data from this study. In particular, the study of saturated-zone hydrologic synthesis and modeling will be largely based on the results of characterizing the site groundwater flow system.

The subject study plan consists of six activities: (1) Solitario Canyon fault study in the saturated zone; (2) site potentiometric-level evaluation; (3) analysis of single- and multiple-well hydraulic stress tests; (4) multiple-well interference testing; (5) testing of the C-well complex with conservative tracers; and (6) well testing with conservative tracers throughout the site. Also, two additional activities are part of the site saturated-zone groundwater characterization. These activities, which will be performed by Los Alamos National Laboratory (LANL), are: (1) testing of the C-well complex with reactive tracers; and (2) well testing with reactive tracers throughout the site. The DOE previously submitted a separate study plan for the first of these two additional activities. The NRC staff did a Phase I review for this activity. One result of that review was a recommendation that a detailed review be performed of the planned testing with reactive tracers, but only after receipt of documentation for the other activities under this study. A copy of that review is included in the enclosure.

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While our review did not identify any "objection" level concern, we noted that there is considerable potential for interferences between tests, especially given the large number of hydrologic and tracer tests planned at multi-well sites like the C-hole cluster. These tests will need to be carefully coordinated because many investigators will be using the C-hole site. These include investigators from both the USGS and LANL. The NRC staff identifies this potential for interferences as well as the large amount of work that is planned for this cluster of wells as a "comment" because they may significantly disrupt characterization schedules which could then have an impact on licensing. In order to make progress towards closure of this "comment," it is recommended that, as soon as practicable, the DOE provide a timeline that shows all proposed work activities under the site saturated zone investigations. This timeline should include durations and start and finishing dates for all activities. If it is not yet possible to include actual start dates, then a detailed timeline should be prepared that clearly shows the relative starting times and durations for all related tests, including the reactive tracer testing. Such a timeline could be an appropriate subject for a DOE/NRC technical interaction on planned saturated-zone activities. Investigators from both the USGS and LANL should attend in order for the NRC to learn how the many activities planned at the C-hole cluster will be performed and coordinated.

In addition it should be noted that the previous NRC review of the LANL study plan on reactive tracer testing found that detailed procedures for the field experiments task did not yet exist. These were all listed as nonstandard procedures in a "TBD" status. As stated in that study plan, LANL is planning to develop these procedures based on those to be developed by the USGS for its conservative tracer experiments. Progress towards closure of the "comment" should include information about how the development of procedures is being coordinated. Also, the DOE should clarify the classification of procedures. The proposed procedures for the LANL field experiments task are all listed as "nonstandard," while all of the procedures in the subject study plan are listed as "standard".

Further, there is also concern that, although the study plan describes general relationships between this and other studies, there is no explicit discussion of an overall program of iterative performance assessment, or discussion of the timing of this study relative to such a program. This kind of assessment is a systematic, iterative approach to identifying the information and analyses needed to support a license application. Such an approach was recommended in NRC's SCA Comment #1.

Finally, we also found the submittal of the study plan to be somewhat deficient because some references have not been provided to NRC. We request copies of those references that may not be readily available, and may request additional listed references to support future reviews or technical exchanges (see enclosure for requested references).

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In summary, the principal conclusions of this review are: (1) the study plan is a candidate for detailed technical review based on its direct relationship to the performance issues of groundwater travel time and total systems performance; (2) the study plan directly relates to two NRC open items; and (3) a "comment" level concern has been identified with respect to the potential for disruption of characterization schedules that could result in a significant adverse effect on licensing.

However, having identified the need for a detailed technical review, we note that 17 technical procedures remain to be documented. They are now listed as either "TBD" (to be determined) or "Needed". These undocumented procedures include key work activities at the site, including the drilling and coring of wells, equipment calibration, and methods for conducting cross-hole hydraulic tests, large-scale pumping tests, and tracer tests. It is recommended that a detailed technical review not be performed until these important procedures are completed by DOE. The schedule for completing these procedures should be requested from the DOE, along with the schedule for completing procedures under the reactive tracer study.

The review was conducted by Neil Coleman of the Hydrologic Transport Section, who can be reached on ext. 20530.

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Enclosures: *(in the shelf)*
As stated

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*calculated in QA items
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Concurring in PA related items.

OFC : HLHP *W* : HLHP *W* : HLPD *W* : HLHP *W* : HLHP *W* :

NAME: NColeman/nc/cj : DBrooks *W* : JConway *W* : SCoplan : MFederline :

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