LANL 06 TD05

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CERTIFIED MAIL
RETURN RECEIPT REQUESTED

May 5, 2006

Mat Johansen, Groundwater Project Director
Los Alamos Site Office
Department of Energy
528 35th Street, Mail Stop A316
Los Alamos, NM 87544

Dave McInroy
Los Alamos National Laboratory
P.O. Box 1663, Mail Stop M992
Los Alamos, NM 87545

RE: APPROVAL WITH MODIFICATIONS FOR THE "INTERIM MEASURES WORK PLAN FOR CHROMIUM CONTAMINATION IN GROUNDWATER"
LOS ALAMOS NATIONAL LABORATORY
EPA ID #NM0890010515
HWB-LANL-06-009

Dear Messrs. Johansen and McInroy:

The New Mexico Environment Department (NMED) is in receipt of the Department of Energy and University of California (collectively, the Respondents) document titled *"Interim Measures Work Plan for Chromium Contamination in Groundwater"* (Plan) dated March 2006 and referenced by LA-UR-06-1961 (transmitted by letter ER2006-0214 dated March 2005). In December 2005, the Respondents notified the NMED of groundwater detections of chromium above both Safe Drinking Water Act maximum contaminant levels and the New Mexico Water Quality Control Commission groundwater standards (100 and 50 µg/L respectively). The Plan was required by NMED in a letter dated December 29, 2005, issued pursuant to Section VII.B of the March 2005 Order on Consent.

As outlined in the December 29, 2005 NMED letter, a primary goal of this first phase of work is to assess historic hydraulic, geochemical and contaminant data collected from R-28 and other nearby wells to delineate the chromium plume and its potential sources. Subsequent phases of investigation will further delineate potential chromium sources and groundwater contamination as well as lead to a better understanding of groundwater flow regimes in the vicinity of regional aquifer well R-28.

NMED provides the following comments on the Plan.

General Comments

1. The Respondents must include a schedule for the proposed characterization and reporting activities, including report submittal. This information must be submitted with the revised text, tables, and/or figures submitted as replacement pages.

2. The Respondents must provide a separate, labeled CD(s) or DVD(s) containing all referenced reports and data cited in the revised Plan. An itemized list of all references included on the CD(s)/DVD(s) and a cross-reference of electronic file labels to the references must also be provided. This information must be provided in a separate "Historical Investigation Report" submitted concurrently with the Interim Measures Report.

3. Identification of water samples as "filtered" or "non-filtered" must be included in the relevant text, tables and figures when discussing contaminant concentrations or behaviors (e.g., discussion of R-28, R-11, and R-15 data in Section 3.2, p. 4). This information must be submitted with the revised text, tables, and/or figures submitted as replacement pages.

4. A discussion of pumping influences must be provided. Illustrations and data must be presented in figures and tables. Specifically, the work should examine the potential for the chromium plume to migrate to production wells (e.g., O-4, PM-2, and PM-3) with respect to the pumping influences. The discussion and information must be provided in a separate "Historical Investigation Report" submitted concurrently with the Interim Measures Report.

3.2 Present-Day Distribution of Chromium, page 4

5. The Respondents must provide all data used for evaluation of contaminant distributions. Any data not considered or rejected must also be accompanied by a discussion of the reasons for rejection or omission. For example, the quality problems associated with the mid-1970's alluvial groundwater data must be discussed. This information must be provided in a separate "Historical Investigation Report" submitted concurrently with the Interim Measures Report.

6. Similar to Figure 3-1, time series plots for chromium must be provided for the Mortandad and Sandia canyons surface and groundwater systems. Any commingled contaminants or other source indicators (e.g., nitrate, tritium, zinc, potassium, sulfate, and phosphate) must also be plotted and presented. This information must be provided in a separate "Historical Investigation Report" submitted concurrently with the Interim Measures Report.

7. Data collected from core samples collected in the vadose zone in the vicinity of R-28 also must be included in the evaluation. This information must be provided in a separate "Historical Investigation Report" submitted concurrently with the Interim Measures Report.

3.3. Factors Governing Distribution of Chromium, pp. 4 through 7

8. The Respondents must include timeframes and other relevant information associated with changes in operations that may have driven changes in the hydrologic system. For example, the dates and the extent of wetlands through time may be relevant (e.g., the upper Sandia Canyon wetland was not its present size prior to 1950 and grew to its current acreage through continued discharges to the watershed). This information must be provided in a separate "Historical Investigation Report" submitted concurrently with the Interim Measures Report.

9. The Respondents discussed that adsorption of chromium (III) onto "colloids, minerals and solid organic matter" immobilize trivalent chromium. However, these fine, suspended particles often facilitate contaminant transport as the attached contaminants may move with groundwater flow. The Respondents must consider this possibility, and collect data to test this hypothesis. Results of the colloid investigation must be documented in the Interim Measures Report.

10. Identify the date that the Sanitary Wastewater Consolidation project initiated discharges to upper Sandia Canyon. If available, provide the specific volumes of discharge from each process discharging to the possible source canyons by year and document any volume changes or possible chemistry changes through time. This information must be provided in a separate "Historical Investigation Report" submitted concurrently with the Interim Measures Report.

11. The Respondents discussed releases from TAs-03, -48 and –55 as consisting of "lesser volumes" of water. The Respondents must clarify what "lesser volumes" mean. "Lesser volumes" may not be the only criterion used to eliminate possible source terms. This clarification must be submitted with the revised text, tables, and/or figures submitted as replacement pages.

12. Provide the depths of water bearing zones relative to the ground surface when discussing the regional aquifer and the extent of the intermediate-perched aquifers. This information must be submitted with the revised text, tables, and/or figures submitted as replacement pages.

13. The Respondents discussed two conceptual models of the regional aquifer. One model depicts capture zones from water-supply wells extending to the water table strongly influencing groundwater flow directions. The other model assumes that the top of the regional aquifer does not respond to pumping (i.e., drawdown) of the presumably deeper portions of the aquifer via water-supply wells and has little effect on the water table. In the second model, the overall "shape" of the water table is governed by the localized "spatial (and temporal)" distribution of recharge. It is NMED's opinion that the models are not necessarily mutually exclusive: either one, both, or a combination including other scenarios may exist. The aerial extent of the Pajarito Plateau is large and the hydrostratigraphic complexity suggests that any single model may not be characteristic of the hydrogeologic system. The Respondents must clearly identify how implementation of the Plan will further refine the conceptual and mathematical models of the regional aquifer adjacent to this area. In order to better understand the hydrogeologic system that govern groundwater flow and fate and transport of contaminants, the Respondents must continue

to evaluate all available water-level data and water-balance information and so that expensive, deep regional wells may be better sited during the second phase of investigation. This information must be submitted with the revised text, tables, and figures submitted as replacement pages.

14. The Respondents must submit, within thirty days of receipt of this letter, a separate work plan, with the sole objective of delineating the vertical extent of contamination in the regional aquifer near the location of well R-28. Although the source and ultimate fate and transport of the chromium is poorly defined, further investigation of the known "plume," particularly its vertical extent, can be accomplished at this time and is not directly related other ongoing work of delineation of the source(s). Drilling a well to define vertical extent will not only provide information regarding the vertical distribution of contamination at this location, but will also supply valuable information regarding the uncertainties regarding the two conceptual models of the regional aquifer discussed previously at this location. It may also provide valuable information concerning protection of the PM-3 municipal supply well. The results of this investigation must be included in the Interim Measures Report.

NMED expects any pumping test and zonal sampling proposed for municipal supply well, PM-3, to be completed prior to the drilling of the required well sited adjacent to R-28. The results of this investigation may help guide the construction of the new R-well and must be included in the Interim Measures Report.

4.2.2 Alluvial Groundwater Loss in Lower Sandia Canyon

15. Provide a general construction diagram for the piezometers proposed for lower Sandia Canyon. This information must be submitted with the revised text, tables, and/or figures submitted as replacement pages.

4.3 Installation of Core Holes in Lower Sandia Canyon, p.9

16. This section indicates that "one well" or a site may be earmarked for a future intermediate well if sufficient perched water is found. The Plan must include contingencies to complete wells in boreholes that encounter perched water. Important groundwater quality information would be gained by doing so. This information must be submitted with the revised text, tables, and/or figures submitted as replacement pages.

17. If characterization boreholes are advanced to depths within a few hundred feet of the top of the regional aquifer, the Respondents must consider advancing the borehole to the regional aquifer and completing a nested, single- or multiple-screen well in that location. This information must be submitted with the revised text, tables, and/or figures submitted as replacement pages.

4.4 Installation of Alluvial Wells in Lower Sandia Canyon

18. Provide a general well construction diagram for the proposed alluvial wells in lower Sandia Canyon. This information must be submitted with the revised text, tables, and/or figures submitted as replacement pages.

19. Provide rationale for conducting only two rounds of groundwater sampling at locations related to this Plan and a schedule for submittal of a comprehensive groundwater monitoring report. This information must be submitted with the revised text, tables, and/or figures submitted as replacement pages.

20. The parameters measured in the field must include oxidation-reduction potential (also pertains to Section 5.2.2.2, Collection of Water Samples from a Completed Alluvial Well). This information must be submitted with the revised text, tables, and/or figures submitted as replacement pages.

4.7 Background Chromium Concentrations in Groundwater

21. Provide the justification for additional chromium background sampling. Also, provide a list of the locations and the rationale for their inclusion as proposed background sampling locations. The Respondents have provided a groundwater background document to the NMED for review. Background concentrations of total chromium appear to range between 3 and 5 µg/L. Recent sampling results indicate that most of the chromium observed in both filtered and unfiltered samples is in the hexavalent form. Since information is already available regarding the relative ratios between hexavalent and trivalent chromium, the need for additional background investigations is questionable. This information must be submitted with the revised text, tables, and figures submitted as replacement pages.

5.0 Investigation Methods

22. The Respondents must provide copies of the cited quality management plan and applicable quality assurance procedures. These documents should be included in the required CD(s)/DVD(s) as cited references. This information must be provided in the Interim Measures Report.

5.1.1 through 5.1.4

23. These sections provide general descriptions of the various drilling methods to be used, but do not include the criteria for utilization of specific methods during this investigation. The Respondents must provide a description of how these methods will be selected and used based on site-specific conditions encountered during this investigation. This information must be submitted with the revised text, tables, and/or figures submitted as replacement pages.

5.2.2 Core

24. The Respondents discussed that "portions of the core will be removed for analysis." Please provide the criteria proposed to select samples from both recent and archived cores for analysis. This information must be submitted with the revised text, tables, and figures submitted as replacement pages.

5.3 Borehole Geophysics

25. This section provides a general description of the various geophysical techniques to be used, but does not include a description of how these methods will be selected (including selection criteria) and used for this investigation. In addition, the Respondents must utilize an outside contractor to significantly expand the tools available for collecting valuable information from each hole. This information must be submitted with the revised text, tables, and/or figures submitted as replacement pages.

Figure 2-1 Locations of Sandia, Los Alamos and Mortandad canyons

26. There are wells missing from the figures (MCOI-4, MCOBT-4.4 and MCOBT-8.5). Municipal supply wells PM-2 and –5 must also be depicted in a figure. This information may be submitted with the revised text, tables, and/or figures submitted as replacement pages.

In summary, the Respondents must provide the following:

- Revised text, tables and/or figures in the form of replacement pages within 90 days of receipt of this approval with modifications.
- Two hard copies and one electronic (searchable PDF) copy of the updated document, including a table that cross references all changes to the document, concurrently with the replacement pages.
- The work plan for delineation of the vertical extent of contamination in the regional aquifer adjacent to R-28 (comment 14) within thirty days of receipt of this letter.
- Information presented in the Interim Measures Report due no later than November 30, 2005.
- An "historical investigation report" incorporating all the required information, where indicated in this letter, concurrent with the Interim Measures Report.
- A Phase II Investigation Work Plan for a subsequent phase of work must be submitted separately, no later than December 30, 2006.

In order to expedite the implementation of the Interim Measure Work Plan, NMED expects the work to commence immediately. Details of the replacement text, historical investigation report, and required work plans may be discussed with NMED prior to submittal of the individual documents.

Failure to implement the modifications and respond within the timeframe allotted will automatically rescind the approval.

Should you have any questions, please contact John Young of my staff at (505) 428-2538.

Sincerely,

James P. Bearzi
Chief
Hazardous Waste Bureau

JPB:jy

cc: J. Young, NMED HWB
D. Cobrain, NMED HWB
H. Shen, NMED HWB
S. Yanicak, NMED DOE OB, MS J993
L. King, EPA 6PD-N
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file: Reading and LANL General [Groundwater, Sandia and Mortandad Canyons]