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HSWA 95

LANL HSWA GENERAL 95

January 23, 1995

Mr. David Neleigh, Chief (6H-PN)
New Mexico Federal Facilities Section
Hazardous Waste Management Division
U.S. Environmental Protection Agency
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202-2733

VXI

Re: Fiscal Year 1995 RCRA Work Grant Program Element #10: Los Alamos National Laboratory (LANL) Site-Wide Hydrogeologic Evaluation - Progress Report on Water Level Maps for LANL

Dear Mr. Neleigh:

Please find enclosed a copy of the New Mexico Environment Department (NMED) Hazardous and Radioactive Materials Bureau's (HRMB) technical review of LANL's December 27, 1994 submittal of Water Level Maps for LANL. HRMB has reviewed this data as a part of the comprehensive literature review for the Work Grant commitment currently being conducted by RCRA technical staff.

Major deficiencies were found in the technical approach employed in the development of the above referenced data package. HRMB would like to discuss this issue further in the forum of a technical meeting with EPA. Thank you for your attention to this matter. If you should have any questions please contact either Ms. Teri Davis or Ms. Susan Hoines of my staff at (505) 827-4308.

Sincerely,

Ronald Kern, RCRA Technical Compliance Program Manager
Hazardous and Radioactive Materials Bureau

Enclosure

cc: Benito Garcia, Bureau Chief
Barbara Hoditschek, RCRA Permitting Program Manager
Teri Davis, RCRA Technical Program
Susan Hoines, RCRA Technical Program
File LANL RED 95

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New Mexico Environment Department Hazardous and Radioactive Material Bureau response to DOE deliverable, dated December 27, 1994, to EPA on "Water-Level Maps for Los Alamos National Laboratory (LANL)":

1. Narrative entitled "Piezometric Maps for LANL".

Comment #

1 With regards to the statement, "These water level data were obtained from test wells, production wells during non-pumping periods, and from springs that penetrate into the main aquifer", how is it differentiated that the springs are discharging from the main aquifer and not from perched zone of saturations? [1]Griggs (1964) notes that, "Some of the perched water is discharged by springs from these overlying rocks in the mountain and plateau areas and along White Rock Canyon". Springs 4A, 6, and 9A all discharge hundreds of feet above the surface of the Rio Grande. The river is believed to represent the surface of the top of the "main" aquifer through this stretch of the Rio Grande ([2]Cushman, 1965). The assumption or assertion that the above referenced springs discharge from the main aquifer is suspect.

2 According to the above-referenced document, the ground water elevation data obtained from supply wells "represent vertically averaged 'static' water levels over long screened intervals within the main aquifer". It is generally not accepted practice to contour such data. The test wells (TWs) are screened over short intervals (10 feet) presumably at the top of aquifer whereas the production wells are screened over much greater lengths (1500-2500 feet) starting typically hundreds of feet below the presumed top of the main aquifer. Compiling such data will probably give a misrepresentative picture of the hydraulic head distribution within the aquifer(s). In addition, it is unknown what wells in the area were pumping during the measurements of the static water levels. In short, Los Alamos is using questionably obtained data from different depths of an aquifer system to represent the hydraulic head of the uppermost surface of one aquifer.

3 The reasoning for including ground water elevation data from well H-19 is inadequate: "..1949 water level measurement from test well H-19 was used in

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[1] Griggs, Roy L., 1964, Geology and Ground-Water Resources of the Los Alamos Area, New Mexico , Geological Survey Water-Supply paper 1753, 107 pp.

[2]Cushman, R.L., 1965, An Evaluation of Aquifer and Well Characteristics of Municipal Well Fields in Los Alamos and Guaje Canyons, Near Los Alamos, New Mexico, Geological Survey Water-Supply paper 1753, 50 pp.

Figure 1 because water levels in test well TW-4 located approximately one-half mile to the east, had not changed significantly in the last 45 years." Assuming this statement is true, then a change of seven feet in the ground water level must also be considered not significant, because this is the magnitude of change in well TW-4 from the time it was drilled to 1993. Data from 45 years ago cannot be mixed with recent data to develop a meaningful potentiometric map. The use of 1949 data for water-level measurements during December 1994 is not accepted practice. This data point should not be used.

4 Assuming that all of the 1993 data are acceptable, Figure 1., LANL Main Aquifer Piezometric Surface for 31 December 1993, is incorrect. There are no data points to support the 6300, 6200, and 6100 ft. contour lines. Even if the 1949 data point was included, the 6300 ft. contour line would still be unsubstantiated as well as anything southwest of well H-19. Well PM-3 has a ground water elevation of 5869 ft and is placed between the 5700 ft and 5800 ft contours. Additionally, Well G-2 has a ground water elevation of 5697 ft, yet it is placed midway between the 5700 ft and 5800 ft contours. Similarly, well O-1 which has a ground water elevation of 5692 ft and well G-1A which has a ground water elevation of 5699 ft are placed between the 5700 ft and 5800 ft contours. Contours must fit the data.

5 The above-referenced document refers to test well TW-2 as being completed in an intermediate perched aquifer. TW-2 is a main aquifer well and TW-2A is a perched-intermediate depth well at the same location according to 1966 U.S.G.S. well records. Well TW-2 has a total depth of 834 ft and is screened at 767.8 ft - 824 ft. Furthermore, if TW-2 was a perched aquifer well, it would be unacceptable to include ground water elevation data from a well completed in a shallow perched aquifer in the potentiometric map of the deeper "main" aquifer.

6 It is noted in the reference document that the contour lines have not changed much in the southwestern part of the map between 1949 and 1993. This is one of the boldest assertions within this document since there are no data in that region to confirm this assertion. It is not accepted practice to contour data where data do not exist. The statement, "It is apparent that piezometric contour lines in the western and southern portions of the Lab are much closer to their original pre-development positions", can not be made due to lack of control points. To draw conclusions from such data is unreasonable and probably meaningless.

7 The observation drawn from the LA-2 pumping test that the cones of depression can be areally extensive and numerically significant", should be applied to the drafting of the Water Level Maps for Los Alamos. The maps presented do not depict the cones of depression surrounding the production wells at LANL. The need exists to have observation wells installed to adequately characterize these cones of depression to adequately understand the direction of ground-water flow within the main aquifer beneath LANL.

8 The statement, "Depth-to-water in the main aquifer decreases from about 1200 feet along the western margin of the Laboratory, to about 600 feet at the eastern margin", is misrepresentative. The depth to water in the main aquifer approaches to nearly zero along the southeastern portion of the Lab near the Rio Grande (Cushman, 1965). Additionally, well SHB-3 at TA-16 (western portion of Lab)recently encountered ground water at 800 feet below land surface.

Also, as noted by Griggs (1964), "most of the perched water slowly percolates downward to the main zone of saturation in the undifferentiated unit" of the Santa Fe Group. The distance between perched zones of saturation and the "main" aquifer may approach zero as the two zones of saturation potentially commingle near the river.

9 The statement, "Water within the main aquifer is under artesian conditions", may not apply to the entire stretch of river bordering the Lab. As noted by Griggs (1964, p.95), "The permeability of the materials comprising the undifferentiated unit of the Santa Fe Group is not uniform, and the more permeable beds yield water readily to wells are imperfectly connected. As a result, the pressure head in the unit varies with vertical and lateral distances."

10 The statement, "and under water table conditions in the western and central portions of the Plateau", is not consistent with recent drilling data. Well SHB-3 located at TA-16 (western portion of the Lab) encountered water under pressure (confined or semi-confined conditions), at a depth much shallower than expected for the main aquifer.

11 The statement, "According to Figure 1, the recharge area for the main aquifer is located along the western perimeter of the LAB", is too general. LANL does make a reasonable first guess type hypothesis regarding recharge to the main aquifer, then later assumes it to be fact. It is reasonable to hypothesize that the main aquifer is recharged by the western most boundary of Los Alamos Lab.

However, this hypothesis does not prove that recharge cannot occur from the Pajarito Plateau or from stream channel deposits. LANL's assertion that the main aquifer is only recharged by the western most boundary of the lab is an unproven hypothesis.

12 Wells TW-1 and TW-2 are mis-labelled in the document and should read TW-1A and TW-2A respectively.