IDAHO DEPARTMENT
OF HEALTH AND WELFARE

DIVISION OF
ENVIRONMENTAL QUALITY

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DOCUMENT NO. 5364

Cecil D. Andrus, Governor

July 12, 1993

Mr. Don Macdonald
Environmental Restoration & Waste Management
U.S. Department of Energy
Idaho Operations Office
785 DOE Place
Idaho Falls, Idaho 83402

Re: Review Comments for *WAG 7 Groundwater Pathway Draft, Track 2 Summary Report*, OU 7-06, April 1993, (EGG-ER-10731)

Dear Mr. Macdonald:

The Idaho Department of Health and Welfare, Division of Environmental Quality (IDHW/DEQ), has reviewed the Track 2 Summary Report for Operable Unit (OU) 7-06 at the Radioactive Waste Management Complex (RWMC) and is submitting the enclosed comments. IDHW/DEQ received the report on May 24, 1993.

IDHW/DEQ agrees with the recommendation of continued groundwater and vadose zone monitoring. However, we recommend that a conference call be arranged during DOE's comment resolution period to discuss the proposed additional groundwater monitoring well. The weeks of July 26 or August 2 are preferable to IDHW/DEQ.

If you have any questions regarding the comments, please contact me at (208) 334-5860.

Sincerely,

Dean Nygard
Federal Facilities Section Manager
Remediation Bureau

Enclosure

cc: Shawn Rosenberger, DEQ-IF, w/encl.
Patti Cleary, DOE-ID, w/encl.
M.J. Nearman, EPA Region X, w/encl.
Carol Strong, Geotech, wo/encl.

REVIEW COMMENTS
WAG 7 GROUNDWATER PATHWAY DRAFT OU 7-06
TRACK 2 SUMMARY REPORT

GENERAL COMMENTS

1) IDHW/DEQ recommends that the corehole (C1A) should be incorporated into the sampling network to define vertical gradients and evaluate water quality at greater depths in the aquifer. This data may be particularly valuable for comparison with data from M4D. Also, please include the location of C1A on your location maps.

2) As noted in the specific comments, several areas of the report would benefit from additional data evaluation. Furthermore, an additional monitoring well southeast of the RWMC appears to be necessary to define the configuration of the carbon tetrachloride plume (see Figures 24 and 25). IDHW/DEQ would like to discuss this during DOE's comment resolution period. The weeks of July 26 or August 2 are preferable to IDHW/DEQ.

3) Recommend expanding the title of the report to include the operable unit number and the location (e.g. the Radioactive Waste Management Complex at the INEL). This will ensure that the report can be readily referenced when it is placed in the Administrative Record.

SPECIFIC COMMENTS

1) Page 3, Paragraph 1 -

Add Vigil (1989) to the reference list.

2) Page 3, Paragraph 2 -

Please list the specific radionuclides which were detected along the northern boundary of the RWMC. Also list the concentrations at which they were detected.

3) Page 3, Paragraph 3 -

Change "State of Idaho" to Idaho Dept. of Health and Welfare.

4) Page 3, Paragraph 5 -

See comment #3.

5) Page 4, Paragraph 2 -

The text references Table 1 for the waste inventory in the SDA; however, Table 1 contains a list of contaminants. Recommend deleting the reference to Table 1 or including inventory data for the SDA.

6) Page 7, Figure 2 -

Volatile organic compounds (e.g. carbon tetrachloride) have been detected in the ground water at the RWMC. Therefore, the conceptual site model should address inhalation via the ground water pathway because the ground water is currently used for showering at the RWMC. This pathway would also be valid under the future resident scenario.

7) Page 12, Figure 4 -

It appears that the pump is installed inside a second casing inside the 6 inch casing and that the annular space between these casings is filled with bentonite or silica sand. It is not logical to construct a well with vapor port monitoring and pumping well access to be completed inside another casing. The figure should be relabeled or redrawn.

8) Page 14, Paragraph 4

Please label the Big Southern Butte and Axial rift zones on Figure 7.

9) Page 18, Paragraph 5 -

The cross section of the Hell's Half Acre flow to illustrate variability in interbed thickness is a useful exercise; however, it should be noted that this flow is approximately 4000 years old. In contrast, it is estimated that the interbeds were deposited over periods of 10^4 to 10^5 years (page 18), thus allowing for greater periods of chemical and physical erosion than the Hell's Half Acre flow has undergone. The net effect would be decreased relief on the basalt underlying the interbeds.

10) Page 19, Figure 8 -

Typographical error: The distance between C1 and C1A should be 34 feet, not 34 inches.

11) Page 26, Section 3.2.2.5 -
Please expand the discussion on stochastic modeling to include the geostatistical procedures used, how the stochastic distribution equations were developed, and which modeling technique was used to derive Figures 10-13.

12) Page 26, Section 3.2.3 -

The discussion on analytical data for samples collected from the interbeds should be expanded to include, at a minimum, a statistical summary of the results (range, mean) and how background levels were established.

13) Page 28, Paragraph 1 -

Preferential flow in the aquifer may not be the only explanation for the distribution of carbon tetrachloride in ground water. The plume configuration in Figure 24 may be a remnant of the flooding of spreading areas in the mid 1980's. Well 88 exhibited anomalistically high water levels during this period, suggesting local recharge from the spreading areas. In addition, the flow regime near the RWMC was to the east when the water was being diverted to the spreading areas, which also suggests local recharge from the spreading areas. Consequently, much of the contamination in the ground water may have been transported to the aquifer, from the vapor plume in the vadose zone, during this recharge event.

14) Page 30, Paragraph 2 -

Add Bargelt et al (1992) to the reference list.

15) Page 31, Table 3 -

The transmissivity presented for USGS well 88 is 600 ft^2/day. Ackerman (1991) estimated the transmissivity of USGS 88 is 13 ft^2/day. This discrepancy should be evaluated. Also, this table uses incorrect units in the last column. The proper unit for transmissivity is ft^2/day, not ft^3/day.

16) Page 31, paragraph 1 -

The reference to a zone of low transmissivity is somewhat suspect because Ackerman (1991) cites a transmissivity of 220,000 ft^2/day at USGS well 120. This well appears to be

about 2,000 feet south of USGS 88. The scale of the low transmissivity zone apparently must fit within these bounds, if it exists. Please explain.

17) Page 33, Figure 15 -

The peak water levels for wells 88 and 89 are not shown on this figure. Recommend expanding the scale to show the peaks.

18) Page 36, Figure 18 -

Please include water level data values on the contour map. It is not clear whether data from all of the wells shown were used to construct this map or how well the data fit the contours. Also, USGS 120 is included in the apparent groundwater mound shown on the figure, despite the fact that this well has a very high transmissivity. This suggests that the conceptual model (i.e. isolated zone due to dike swarm) requires more data to verify, as pointed out elsewhere in the report.

19) Page 38, Figure 20 -

Typographical error: The "S" wells are labeled as "5".

20) Page 40, Figure 21 -

List the units on the y-axis.

21) Page 44, Figure 23 -

This figure is not consistent with the previously presented water table contour maps. The conceptual model presented in this figure suggests the presence of a very steep hydraulic gradient which the maps do not reflect.

22) Page 45, Paragraph 2 -

It would be useful to compare the analytical results from well 88 (when available from the USGS) to the data from M4D to determine if the water chemistry is similar in both wells. This information may support the conclusion that both wells are in a isolated zone.

23) Page 47, Paragraph 3 -

It is not clear what is meant by the phrase "M3S...is recharged upgradient from other wells". Would it be more correct to state that M3S is completed in a localized zone which is recharged upgradient?

24) Page 48, Paragraph 3 -

This paragraph needs further development. It is inconsistent to assume that there are hydrogeologic barriers that prevent the movement of ground water and therefore the dissipation of heads and still assume that there can be sufficient transport to move organic compounds in the ground water toward the northeast and against the regional flow. It seems probable that flow in the regional system would swamp contaminant movement impacted by flow from the mounding area in the vicinity of USGS 88. Also, horizontal migration of vapor would also explain contamination in the upgradient wells.

25) Page 48, Paragraph 4 -

Mann (1986) found that water levels increase with depth in the Snake River Plain aquifer. Well M4D is screened at a greater depth than the surrounding wells, therefore, the fact that water levels in M4D are higher does not necessarily imply that M4D is located in a isolated zone of the aquifer.

26) Page 49, Paragraph 5 -

Indicate the specific radionuclides and respective concentrations which were detected in the samples collected from the interbeds in 1986-1987.

27) Page 50, Section 4.1.2 -

Expand the discussion of the sampling program to include the time-frame over which samples were collected, frequency of sampling, target analytes, analytical results, and detection limits. Also, clarify why one well located inside the perimeter of the Idaho Chemical Processing Plant was selected as a "background" well.

28) Page 50, paragraph 4 -

This paragraph refers to the interbed acting as a "major pathway for the organic vapor migration". Is this accurate or does the interbed retard vapor movement? Please clarify.

29) Page 56, Paragraph 1 -

Please clarify if there are any known or suspected sources of contamination upgradient of well M7S which may account for the carbon tetrachloride.

30) Page 64, Paragraph 3 -

Certain metals and radionuclides are considered "hazardous substances" under CERCLA, therefore the statement that all analyses for hazardous constituents were "no detect" should be clarified. See comment #12.

31) Page 64, Paragraph 4 -

a) Table 7 erroneously states that analytical results for gross alpha and gross beta were "non-detects". The analytical results in Appendix C indicate that gross alpha concentrations ranged from 2.1 to 12 pCi/l and gross beta was detected at 2.6 to 35 pCi/l. It is worth noting that concentrations of gross alpha and gross beta are consistently higher in the downgradient wells. This should be discussed in the text, and evaluated when determining data gaps and also the analyte list for continued sampling.

b) The detection of tritium in wells M3S and M7S does not "verify the southern extent of contamination". To verify the extent of a plume, a non-detect is required to bound the outer limit of the plume.

32) Page 65, Paragraph 2 -

The significance of the statement that "None of the rinsates indicated radionuclide concentrations above INEL background soils" is unclear. The discussion should be expanded to state what impact, if any, the results of the rinsate blanks have on data quality (e.g. determine if field sampling or cleaning procedures result in cross contamination). To determine if the field blanks were contaminated, the analytical results

must be compared to analyses of the water source used to prepare the blanks. Also, please clarify if the rinsates were from soil or ground-water sampling equipment.

33) Page 65, Paragraph 3 -

The text should list the relative percent difference determined from the duplicate samples.

34) Page 67, Table 9 -

a) It appears that column three, labeled "at MCL", refers to the "carcinogenic risk at the MCL" and column four, also labeled "at MCL", refers to the "Hazard Index at the MCL". This should be clarified in the column heading.

b) Column six, labeled "HI", appears to list the "Concentration at which the HI = 1". This should be clarified.

35) Page 69, first bullet -

The bullet refers to the existence of a recharge mound. The phrase "recharge mound" usually applies to the application of water near surface at a rate that exceeds the normal recharge rate which causes the water table to rise beneath the application point or area. However, the report attributes the disparity in water levels to a zone of lower transmissivity, possibly a dike swarm. If the latter conceptual model is valid then the disparity in water levels is really a remnant head created by the lower transmissivity and not by a difference in recharge rates. In this case, the remnant head may be the result of both differential recharge and lower transmissivity. That possibility should be conveyed more clearly in the summary.

36) Page 71, Paragraph 1 -

Indicate the analyte list for the proposed water samples.

37) Page 71, Paragraph 3 -

The reference to 40 CFR 265.91 is unclear, as IDHW/DEQ is not aware of any RCRA permit applications for units located within the Subsurface Disposal Area. If the text is referring to units in the Transuranic Storage Area, this should be

clarified. Please note IDHW/DEQ review of this document was conducted under the Federal Facilities Agreement/Consent Order.

38) Appendix A, End of Well Reports

Numerous blanks appear in the report for USGS 118. More complete data should be provided, if it is available.

39) Appendix D, Pages 10 & 11, Figures 5 & 6 -

The drawdown values increase and then decrease shortly after pumping started. This response is not conducive to analysis, as pointed out in the report. This drawdown response may be caused by the lack of a check value at the pump. Is the pump operating at a higher rate of discharge until the riser pipe is filled which then reduces to the stated rate of discharge when the total dynamic head is stabilized?

40) Appendix D, Page 12, Figure 7 -

The scale shown on the Y axis of the figure is mislabeled. The values jump from 0 to 0.5 to 0.15. Also, no explanation is presented for the irregularity of the drawdown data. Several sharp spikes appear in this drawdown plot which is inconsistent with accepted pumping responses if a constant rate of discharge is assumed. It appears that the step-like decrease in water level (see also Figure 8) may be related to the sensitivity of the transducer.

41) Appendix D, Pages 15 to 20 and A-4 to A-9, and A-12 to A-16 -

Additional analysis is needed of the data for wells M4D and 88. The relative vertical hydraulic conductivity of the basalts should be investigated because of the differences evident between the open intervals of the pumping well and the observation well. These wells are not open to the same interval; in fact, there is a reported difference of 176 feet. The lag in response of the water levels may be caused in part by the vertical hydraulic conductivity being lower than the horizontal hydraulic conductivity.

42) Appendix F, Carbon Tetrachloride Plume Maps, 1987 to 1992 -

a) The figures should be labeled to identify whether the plume is vapor phase or aqueous phase as both phases are discussed in the text. The figures do not stand alone as presented.

b) The disparity between interpretations of the plume geometry should be discussed. These figures present the plume as two separate plumes, as a large plume, and as a dual plume with one member having a twin lobe shape. The disparity in the interpreted shape(s) requires additional effort as the areal extent of the plume affects the volume of basalts impacted by this contaminant. Also, any possible remediation requires more definite plume boundary definition.

43) Appendix G -

This sampling and analysis plan does not include the revised pages mailed to IHDW/DEQ on June 1, 1992. Please add these pages.

References

Ackerman, D.J., 1991, Transmissivity of the Snake River Plain aquifer at the Idaho National Engineering Laboratory, Idaho, USGS Water-Resources Investigations Report 91-4058, 35 p.

Mann, L.J., 1986, Hydraulic properties of rock units and chemical quality of water for INEL-1; A 10,365-foot deep test hole drilled at the Idaho National Engineering Laboratory, Idaho, USGS Water-Resources Investigations Report 86-4020, 23 p.