IDAHO DEPARTMENT
OF HEALTH AND WELFARE

DIVISION OF
ENVIRONMENTAL QUALITY

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Philip E. Batt, Governor

October 5, 1995

Ms. Lisa Green, Director
Environmental Restoration Program
U.S. Department of Energy
Idaho Operations Office
850 Energy Drive
Idaho Falls, ID 83401-1563

RE: Post-Record of Decision Monitoring for the Test Reactor Area Perched Water System Operable Unit 2-12, Second Annual Technical Memorandum

The Idaho Department of Health and Welfare, Division of Environmental Quality (IDHW/DEQ) has reviewed the above-referenced document dated August 1995 and has provided the enclosed comments. Should you have any questions regarding these comments, please contact me at your earliest convenience. My telephone number is (208) 373-0260.

Sincerely,

E. Jean Underwood

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WAG 2 Manager
Remediation Bureau

EJU/jc trap-rod

cc: Nolan Jensen, DOE-ID
Wayne Pierre, EPA Region X
Dean Nygard, DEQ-Boise
Dave Hovland, DEQ-Boise
Clyde Cody, DEQ-Boise
Shawn Rosenberger, DEQ-IF

Enclosure

General Comments

1. The 20 additional USGS wells (as first noted in Section 1.3) should be listed and described in the next annual technical memorandum in a manner similar to that presented for the OU 2-12 monitoring wells (Pages 4 and 5). Information from these 20 wells were incorporated into many figures in the text. Well descriptions, including total depth, screened or open hole interval, depth to water, reference elevation, etc., should have been provided in the appendices. Although the information may be contained elsewhere, the technical memorandum document should have the ability to "stand alone" for information integral to evaluating the text. In the interim, please provide a listing of the 20 USGS wells along with the appropriate well description/construction information.

2. Figures 11, 12, and 13 contain many discrepancies. Also, information provided on these figures does not always concur with information provided in Appendix A (Groundwater Level and Elevation Data). Examples of such include the following:

   - The Figure 12 legend does not indicate the meaning of the square symbols next to PW-12, USGS-54, and PW-11.

   - There is no data listed for April 1995 in Appendix A for USGS-53, -55, and -56. However, these wells are represented by values on the contour map (Figure 12) for that period.

   - On Figure 12, well PW-11 is represented by a head elevation of 4,804.5 feet, but in Appendix A the value provided for 4/7/95 is 4,806.37 feet. Other similar discrepancies for Figure 12 are related to PW-12, USGS-53, -54, -55, and -56, all of which show head values different from those listed in Appendix A.

   Contouring is poorly executed on Figures 11, 12, 17, and 18. On Figure 12, the 4850-foot contour is contoured through well USGS-55 with a head of 4,852.5 feet and almost contours through USGS-68 which has an elevation of 4863.8 feet. Well USGS-53 is well within the area enclosed by the 4,850-foot contour, yet shows an elevation of 4,849.4 feet. On Figure 12, USGS-68 (el. 4,861.8) is not enclosed by the 4,860-foot contour. Also, as in the examples above, there are discrepancies in Figures 17 and 18 between the elevation information provided in Appendix A and the elevation (or lack thereof) presented in the figures.

3. In addition to Figure 2, an isopach (thickness) map of the DPWS should have been constructed, if possible. This would provide a indication of relative thicknesses of the DPWS above the interbed layer. The DPWS head elevations in Appendix A indicate DPWS thicknesses of 80-90 feet which is exceptionally thick for such a localized body of perched water. Such an isopach map should be included in the next annual technical memorandum submittal.

4. In regards to the "bubble" diagrams provided in the text (Figures 19-30), subjective contouring of the values would have been preferable and is recommended for the next annual technical memorandum submittal. Contouring is considered a better graphical representation of the contaminant concentrations and allows for more ready interpretation of the direction of contaminant migration in relation to the known regional groundwater flow direction of the SRPA. The recommended solution would be to contour the data on full page maps with the data points labeled as to well number and concentration. In addition, confusion arises from the legends for these figures which show the area of a circle in relation to specific concentrations, yet some results (OU 2-12 data) are depicted as different size squares.

5. The contaminant trend analysis (Section 5.0) which employs the use of tolerance limit calculations (upper tolerance limit (UTL) and regression analysis), as applied to concentration-time plots for select contaminants of concern, appears to be in compliance with the guidelines set forth in the June 1993 Post-ROD Monitoring Plan.

   However, the construction on the appropriate COC concentration-time plots of the regression line and the accompanying parallel UTL causes some concern. The UTL is usually calculated as one concentration value. The parallel UTL line represents multiple UTL values. The text does not contain an explanation of this method, or rationale for its use. Please provide an explanation for this methodology.

   Also, there appear to be discrepancies noted between some concentration-time plots in Appendix C of the June 1994 Post-ROD Monitoring Technical Memorandum, and the equivalent plots in Appendix D of the August 1995 Post-ROD Monitoring Technical Memorandum. For example, for the chromium plots (1994 vs. 1995) for well USGS-54, the 1/11/94 value (19 ug/L) is plotted too low on the 1995 plot. For the tritium plots for well USGS-55, the 1995 UTL appears to be too low. Based on the pre- and post-ROD results displayed on the 1994 plot, the recalculated UTL should have been approximately 371 pCi/ml, not the estimated 120 pCi/ml as shown on the 1995 plot. The addition of four new data points should not have lowered the UTL an estimated 330 pCi/ml. This same apparent discrepancy was noted on the equivalent plots for well USGS-58 tritium results. The 1995 recalculated UTL appears too low, based on the addition of only two more data points. In addition, trend analysis was performed on

the data and displayed on the 1995 plot, in conjunction with a parallel UTL, a completely different representation from that displayed in the 1994 plot where trend analysis was not completed on the data. Please verify all concentration-time plots as necessary.

Specific Comments

1. **Page 6, first paragraph:** Item 4 indicates the USGS perched water data will "define the pattern of waste migration in the SRPA aquifer". Please provide a brief explanation for how this will be accomplished.

2. **Page 12, second paragraph:** First, it should be stated in this paragraph that all waste waters being discharged to the various ponds are assumed to infiltrate to the subsurface. It is inferred from the information provided that evaporation is not being taking into consideration. Second, the sum of infiltrating waters from the information provided is 210.1M gallons. Eighty-five percent of this (representing the discharges to the Cold Waste Pond) is 178.6M gallons, not 158M gallons as stated in the text.

3. **Page 13, last paragraph:** The conclusion cited: "These data suggest that water flow through the DPWS is not symmetrical; a larger fraction of water disposed to the CWP flows **through** the southeast portion than the northwest portion of the DPWS" is not necessarily an accurate statement for the following reasons. All the wells identified in the text are monitoring the DPWS. The only way to judge whether flow was greatest **through** the southeast portion of the DWPS would be to measure a response in a SRPA well screened in the vicinity of the aquifer beneath the southeast portion of the DWPS. The greater head response in wells USGS-60 and -69 may indicate a tighter zone where downward flow through the DWPS is locally inhibited thus resulting in greater head response as downward infiltrating waters are slowed. Also, wells USGS-60 and -69 are closest to the source (CWP) where the head response would be expected to be greatest (nearest the source). The highest DPWS elevation heads (see Figures 11 and 12) still appear to be maintained in the vicinity of the southeast corner of the TRA, northwest of the CWP.

4. **Page 16, first full paragraph:** It is not made clear in the explanation concerning well USGS-66 how the more recent water level data gathered after the 1994 recompletion of the well was incorporated into a 1991 groundwater elevation map. An explanation should be provided for how the value was "adjusted". With all the other data available for the 1991 DPWS contour map, it seems that this particular anomalous value should just not be contoured as opposed to changing to a new value to fit the rest of the data.

5. **Page 20, last paragraph (Section 4.2):** The discussion concerning the water levels in USGS-65 should incorporate a x-section showing the sedimentary layer that is postulated to be inhibiting vertical migration in this portion of the aquifer, and should show the depth of completion in relation to the TRA-6 well completion which is stated to reflect "truer" aquifer conditions. The sedimentary layer could actually be a minor perching layer found immediately above the aquifer, briefly inhibiting downward migration into the aquifer. In a basalt aquifer where fracture flow is the dominant mode of mixing and transport within the aquifer, a sedimentary layer should have proportionately less influence on well head elevations the further the sedimentary layer lies from the top of the aquifer.

6. **Page 23, first paragraph:** Figures 17 and 18 appear to demonstrate the regional NE-SW flow direction of the SRPA beneath the INEL. However, the different heads of the wells utilized for these maps probably demonstrate the local hydraulic gradient of this portion of the SRPA, and any marked anomalies in well heads are probably due to local variations in aquifer conditions and the local gradient. This is in contrast to the conclusion reached in the text that "differences result from regional recharge patterns". The map area is too small in areal extent to really demonstrate regional recharge patterns.

7. **Pages 30-31, Figures 19-21:** In Figure 19, well PW-10 appears (in the bubble graph) to demonstrate tritium concentrations of at least a few hundred thousand pCi/L in the fall or winter of 1991. Sampling of this well was apparently discontinued as it is absent from Figures 20 and 21. A brief explanation should be provided for discontinuance of sampling well PW-10.

8. **Pages 31-32, Figures 22-24:** These figures do not appear to demonstrate an increasing trend in tritium concentrations in well USGS-58 as stated in the first paragraph of Section 6.3 (page 29). Rather, the figures appear to demonstrate decreasing concentrations. In addition, the data is presented as a "square" bubble in Figure 23 which is difficult to compare in a consistent manner with the "round" bubbles in the other figures.

9. **Pages 36-39, Section 7:** The statements in this section, and the comparisons of the predicted trends for each contaminant of concern, as compared to the monitoring results (analytical results), appear to be accurate. Note that for cadmium, the "round 3" sample cited as having a concentration of 2.5 ug/L appears to actually be in the second round (see Appendix C).

10. **Page 42, Section 9.1:** The choice of TRA-8 for downgradient monitoring of TRA-7 and USGS-65 appears reasonable. However, based on Figures 4 and 17, well TRA-8 is not necessarily downgradient of TRA-7 (more cross-gradient) and may be in a less than optimum position considering the prominence of fracture flow in the SRPA.

11. **Page 42, Section 9.2:** Based on the modeling simulation to the year 2115 (page 39), and the fact the hydrologic regime of the SRPA may be in for a period of change due to at least a temporal change in the status of the drought that has occurred in the vicinity of the INEL the last few years, the on-going quarterly sampling of the DPWS and semi-annual sampling of the SRPA wells should continue as prescribed in the post-ROD monitoring plan. Additional data points are needed to confirm or contradict present trends.