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Mr. Douglas R. Sherwood
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Dear Messrs. Alexander and Sherwood:

QUARTERLY RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) GROUNDWATER MONITORING DATA FOR THE PERIOD APRIL 1, 1997, THROUGH JUNE 30, 1997

- References: (1) RL ltr. to Steve M. Alexander, Ecology, and Douglas R. Sherwood, EPA, from M. J. Furman "Quarterly Resource Conservation and Recovery Act (RCRA) Groundwater Monitoring Data for the Period January 1, 1997, through March 31, 1997." dtd. August 13, 1997.
- (2) RL ltr. to Moses N. Jaraysi, Ecology, from James E. Rasmussen, RL, and M. C. Hughes, BHI, "Transmittal of DOE/RL-93-73, 300 Area Process Trenches Modified Closure/Post-Closure Plan, Revision 2." dtd. September 12, 1997.

The RCRA groundwater chemistry and water level data for the period April 1, 1997, through June 30, 1997, have been verified and evaluated. The data is publicly available in electronic form on the Hanford Environmental Information System (HEIS) database. The electronic availability of the data and the summary provided below fulfill the reporting requirements of WAC 173-303 (and by reference, 40 CFR 265.94). Verification of data included a completion check (requested analyses were received), quality control checks (field blanks, field duplicates, and blind samples), and project scientist evaluation.

Approximately 10 percent of the data from samples collected during the April 1997 through June 1997 quarter had not been received from the laboratory when data evaluation was completed. The late received data will be evaluated next quarter.

Fifteen RCRA units were sampled during the reporting quarter (see attachment). These included seven of the RCRA units monitored under indicator evaluation programs, six sites monitored under groundwater quality assessment programs, and two sites monitored under a final status compliance program.

053279Comparison to Concentration Limits

Contamination indicator parameter data (pH, specific conductance, total organic halogen [TOX], and total organic carbon [TOC]) from downgradient wells were compared to background values at sites monitored under interim-status, indicator evaluation requirements, as described in 40 CFR 265.93. TOC exceeded its critical mean in one downgradient well at the 216-S-10 pond and crib. However, as noted in Reference 1, there are concerns over the precision and accuracy of TOC data. The TOC value in the 216-S-10 well is inconsistent with the historical trend, and verification sampling has been postponed until the laboratory has corrected their TOC analysis procedure.

Contamination indicator parameters in downgradient wells were below the critical mean values for all other indicator evaluation sites sampled during the April 1997 through June 1997 quarter. Hence, there is no indication that these sites are impacting groundwater quality.

Two RCRA sites at Hanford, the 183-H Solar Evaporation Basins and the 300 Area Process Trenches, are monitored under final-status programs (WAC 173-303-645). Results of the spring 1997 sampling event for the 183-H Basins (four independent samples collected March 1997 through June 1997) were analyzed. Concentration limits were exceeded for chromium, nitrate, and uranium in some of the downgradient wells. Similar exceedances were reported to State of Washington Department of Ecology (Ecology) in the past. A revised Post-Closure Plan and a Corrective Action Groundwater Monitoring Plan have been completed for incorporation into the next modification of the Hanford Site RCRA Permit, scheduled for December 1997. Corrective action is deferred to the 100-HR-1 and 100-HR-3 Operable Units, under the Comprehensive Environmental Response, Compensation, and Liability Act.

Concentration limits were exceeded in the 300 Area Process Trenches wells during a previous reporting period. A modified Closure/Post-Closure Plan and Corrective Action Groundwater Monitoring Plan have been submitted to Ecology (Reference 2). The changes in monitoring will be implemented on the effective date of a modification to the Hanford Site RCRA Permit (currently scheduled for December 1998), or earlier, if approved by Ecology.

Status of Assessment Programs

SINGLE-SHELL TANKS WASTE MANAGEMENT AREA (WMA) B-BX-BY: This WMA remains in Phase 1 of its assessment monitoring program. Although specific conductance in well 299-E33-32 has remained below the critical mean of 365.7 $\mu\text{S}/\text{cm}$ for three sampling periods, technetium-99, and nitrate exceeded the maximum contaminant level (MCL) or interim drinking water standard (DWS) in well 299-E33-41 in February 1997. The sudden, extreme change in technetium-99, coupled with an inconsistent ratio of technetium-99 to gross beta, rendered the data questionable. Laboratory re-analysis confirmed the sudden increases seen in February 1997. However, May 1997 values for well 299-E33-41 declined to 1996 levels, except for gross beta, which rose to 2630 pCi/L, and is a suspected error. The sample was reanalyzed for gross beta with a result of

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1670 pCi/L, still significantly higher than the corresponding technetium-99 value of 481 pCi/L. This analytical procedure problem is under investigation.

The following details are given for constituents of interest:

- Specific conductance: Although values have dropped below the critical mean (365.7 $\mu\text{S}/\text{cm}$) in wells 299-E33-32 and 299-E33-41, they have risen to 377 S/cm in downgradient well 299-E33-31.
- Technetium-99 in well 299-E33-41 declined from 5740 pCi/L in February 1997 to 481 pCi/L in May 1997. Conductivity and nitrate also follow this trend. Technetium-99 and gross beta values are under review, as noted above. Technetium-99 is also increasing in downgradient wells 299-E33-31, -E33-32, and BE33-42.
- Total uranium is elevated above local background in wells in the original monitoring network, ranging from 8.11 (299-E33-41) to 44.5 $\mu\text{g}/\text{L}$ (299-E33-38). Several assessment wells also show elevated uranium. In only one assessment well (299-E33-13) are there enough data to determine an increasing trend.
- Sodium has increased since technetium-99 began to rise in February 1997. This is an anomalous increase for the area, and distinguishes the contaminant source at well 299-E33-41 as being unique and relatively local.

SINGLE-SHELL TANKS WMA S-SX: Phase 1 of the assessment program has been completed and a report on its results will be transmitted separately. Phase 1 of the assessment program indicates that this WMA continues to impact groundwater, and Phase 2 will further delineate the nature, extent, and sources or causes of contamination. The following constituents exceeded MCLs or DWSs during the April 1997 through June 1997 quarter:

- Nitrate (as N) and technetium-99 show increasing trends in well 299-W22-46. Current values are 11.8 mg/L and 5020 pCi/L, respectively. Chromium is also increasing, but is below the MCL.
- Tritium exceeded the 20,000 pCi/L DWS in three wells. The highest value was 177,000 pCi/L in an upgradient well; exceedances are attributed to an upgradient source.
- Carbon tetrachloride was reported at 40 $\mu\text{g}/\text{L}$ in well 299-W23-15. This value is a suspected error and is being reviewed.
- Gross alpha was reported at 75.8 pCi/L in upgradient well 299-W23-13. This value is a suspected error and is being reviewed.

SINGLE-SHELL TANKS WMA'S T AND TX-TY: Available data from WMA-T downgradient well 299-W10-15 indicate no significant changes in chemistry or radionuclide concentrations. Water levels in the well dropped too low for sampling after

the April 1997 through June 1997 quarter. Technetium-99 and specific conductance in downgradient well 299-W11-27 continued to decrease, dropping to 18.900 pCi/L and 1115 μ S/cm, respectively. This value for specific conductance is below the critical mean for the site (1175 μ S/cm).

Available data for WMA-TX-TY downgradient well 299-W10-17 indicate no significant changes in chemistry or radionuclide concentrations since the last sampling. The decreasing trend in contaminant concentrations in downgradient well 299-W14-12, evident since 1995, appears to have leveled. Specific conductance in this well was 785 μ S/cm in May 1997, above the critical mean for the site (668 μ S/cm).

The following constituents exceeded MCL or interim DWS during the April 1997 through June 1997 quarter:

- Technetium-99 was reported at 18.900 pCi/L in well 299-W11-27.
- Tritium exceeded the 20,000 pCi/L DWS in five wells, including the upgradient well for WMA T. The highest value was 62,900 pCi/L in well 299-W14-12.
- Iodine-129 (DWS of 1 pCi/L) was reported at 3.06 pCi/L in well 299-W14-12.
- Nitrate (as N) exceeded the 10 mg/L MCL in six wells, including the upgradient well for WMA TX-TY. The highest value was 43 mg/L in well 299-W14-12.
- Carbon tetrachloride was reported at 170 μ g/L in well 299-W11-28, and is attributed to an upgradient source.
- Trichloroethylene was observed at 11 μ g/L in well 299-W11-28, and is attributed to an upgradient source.

216-B-3 POND: The "Results of RCRA Groundwater Quality Assessment at the 216-B-3 Pond Facility" was issued in June 1997. Comprehensive chemical analysis of groundwater samples from 1994 through 1996 revealed one compound, tris (2-chloroethyl) phosphate (TRIS2CH), that may have contributed to elevated TOX concentrations. No compound was identified as a contributor to TOC. Detailed evaluations of TOX, TOC, and TRIS2CH, and comparison of occurrences of these parameters lead to the conclusions that: (1) with few exceptions, these constituents occur at low concentrations below or near limits of quantitation; (2) it is not known whether the low concentrations of TRIS2CH represent a contaminant originating from the facility, or if it is a product of well construction; and (3) given the low and diminishing concentrations of TOX, TOC, and TRIS2CH, no further investigation into the occurrence of these constituents is warranted. Background critical mean values for upgradient/downgradient comparisons will be recalculated and monitoring will return to an indicator-parameter-evaluation program.

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216-U-12 CRIB: The "Results of RCRA Groundwater Quality Assessment Program at the 216-U-12 Crib" was released in May 1997. The elevated specific conductance was attributed to nitrate and calcium. Technetium-99 is also elevated. The source of the nitrate and technetium-99 is the 216-U-12 Crib. Ecology and the U.S. Environmental Protection Agency have determined in the interim remedial measures for the 200-UP-1 Operable Unit that nitrate will not be remediated until practical treatment options are available. The site must remain in assessment monitoring because of continuing elevated levels of nitrate and technetium-99. However, the objective of monitoring will focus on determining how the flux of contaminants out of the vadose zone into groundwater is changing.

During the April 1997 through June 1997 quarter, the following constituents exceeded MCLs, interim DWS or critical mean values:

- Specific conductance exceeded the 437 S/cm critical mean in wells 699-36-70A and 299-W22-41.
- Nitrate (as N) exceeded the 10 mg/L MCL in three downgradient wells. The highest value was 61.1 mg/L in well 299-W22-41.
- Iodine-129 exceeded the 1 pCi/L DWS in two downgradient wells. The highest value was 12.3 pCi/L in well 699-36-70A, and is attributed to an upgradient source.
- Tritium exceeded the 20,000 pCi/L DWS in two wells, and is attributed to an upgradient source.

Other Monitoring Changes

Specific conductance increased sharply in downgradient well 299-E34-7 at Low-Level WMA 2, to 938 μ S/cm. This value is below the critical mean, but is much higher than the historical trend (about 400 μ S/cm). Similar increases were observed in calcium, magnesium, nitrate, sulfate, and chloride.

Quality Control (QC)

Results of the RCRA QC program for the April 1997 through June 1997 quarter will be discussed in detail in the Annual Report for fiscal year 1997. Highlights are summarized in the attachment. Quality control data that are not available in HEIS are available in electronic form upon request. The QC program indicated that, with the exception of TOC, the data were acceptable for use in the statistical comparisons discussed above.

Messrs. Alexander and Sherwood

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The information contained in this letter is submitted to Ecology in accordance with WAC 173-303-400 and WAC 173-303-645. If you have questions about this quarterly data transmittal, please contact me at 373-9630.

Sincerely,



M. J. Furman, Project Manager
Groundwater Project

GWP:MJF

Attachment

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Table 1. Status of RCRA Sites, April-June, 1997.

Site	Sampled Apr-Jun 1997	Statistical exceedance
Indicator Evaluation Sites [40 CFR 265.93(b)] (sampled semiannually)		
100-D Ponds	No	Not applicable
1301-N Facility	No	Not applicable
1325-N Facility	No	Not applicable
1324-N/NA Site	No	Not applicable
A-29 Ditch	Yes	No
A-36B Crib	Yes	No
A-10 Crib	Yes	No
B-63 Trench	Yes	No
S-10 Pond and Crib	Yes	Yes ¹
LERF	No	Not applicable
LLBG WMA 1	Yes	No
LLBG WMA 2	Yes	No
LLBG WMA 3	No	Not applicable
LLBG WMA 4	No	Not applicable
SST WMA A-AX	No	Not applicable
SST WMA C	No	Not applicable
SST WMA U	No	Not applicable
NRDWL	No	Not applicable
Groundwater Quality Assessment Sites [40 CFR 265.93(d)] (sampled quarterly)		
Six sites ¹	X	Not required
Final Status Sites (WAC 173-303-645)		
300 Area Process Trenches	X	Yes ²
183-H Basins	X	Yes ¹

LLBG = Low-Level Burial Grounds

¹ B-Pond, U-12 Crib, SST WMA B-BX-BY, SST WMA S-SX, SST WMA T, SST WMA TX-TY.

² Site has been proposed for corrective action in the Hanford Site RCRA Permit Modification.

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SST = Single-Shell Tanks
WMA = Waste Management Area

Attachment: Quality control results, April through June, 1997.

Laboratory Audit. An assessment of the analytical services laboratory was conducted by Hanford's Integrated Contractor Assessment Team on August 11 through 13, 1997. The purpose of the assessment was to evaluate the continued readiness of vendor to analyze and process samples for the Hanford site as specified in the Statement of Work.

The assessment scope was based on the analytical and Quality Assurance (QA) requirements for the vendor for sample analyses as stated in the contract. The primary area of focus was the implementation of QA Program and compliance to their technical operating procedures. The Assessment Team identified 12 findings and four observations that required corrective action responses from the vendor.

The focus of the assessment for the groundwater program was the implementation of the TOX, TOC, and anions procedures. No significant deficiencies were found in the conduct of analyses for TOC, TOX, and anions. In general, the analysts appeared to be adequately trained, and the appropriate procedures were followed.

Total Organic Carbon. During the last two quarters an apparent high bias and poor precision of TOC data has been observed. The vendor laboratory has implemented some changes in their TOC instrument calibration to address this problem. These changes took effect July 22, 1997, so the data for the April through June quarter are still considered suspect.

Technetium-99 and Gross Beta. Anomalies were noted in some technetium-99 and/or gross beta data received in recent quarters. Values out of trend with historical data and unexpected technetium-99/gross beta ratios were noted for sites such as SST WMA B-BX-BY. Blind samples spiked with technetium-99 will be submitted to the vendor in November to help evaluate the problem.

Completeness: Completeness of data is determined by dividing the number of results that have not been rejected or flagged as suspect because of associated QC concerns by the total number of results received during the quarter. Greater than 90% completeness is considered acceptable. Out of a total of 7992 RCRA results, 93% of the results were considered valid for the April through June, 1997 quarter, with none of the data rejected, and 7% flagged as suspect. The suspect data may be useful for general interpretive use but should not be used to make regulatory decisions.

Field QC data: Results of field duplicate pairs were evaluated to determine if they were within 20% relative percent difference. During the April through June, 1997 quarter, two of 411 duplicate pairs were outside this range. The flagged sets were for 1,1,1-Trichloroethane and Total Organic Halides.

A total of 694 field blanks collected during the quarter were analyzed. Sixty-two of those results

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were outside of the QC limits for field blanks (twice the method detection limit for most constituents) . The majority of flagged results were for metals analyzed by the inductively coupled plasma (ICP) method; however results were also flagged for total dissolved solids, anions, chloroform, methylene chloride, bis (2-ethylhexyl) phthalate, cyanide, and tritium. PNNL is reviewing the criteria of evaluating ICP metals blank contamination. The levels of potential blank contamination for these constituents are much lower than the concentrations naturally found in Hanford groundwater, so the potential effect on data use is negligible. Groundwater results that are associated with the high field blanks are flagged in the database.

Laboratory QC data

In June, 1997 triplicate blind samples were submitted to the laboratory. Well matrix samples were spiked with known concentrations of cyanide, chromium, nitrate, fluoride, carbon tetrachloride, chloroform, trichloroethylene, Co-60, Cs-137, I-129, Sr-90, Tc-99, Pu-239, U-238, and tritium. Samples for gross alpha analysis were spiked with Pu-239 and samples for gross beta analysis were spiked with Sr-90. Two sets of samples were forwarded to the laboratory for analysis of TOX. Those samples were spiked with 2,4,6-Trichlorophenol and the volatile organic compound mixture (carbon tetrachloride, chloroform, and trichloroethylene). A set of TOC samples was also sent to the lab, spiked with potassium phthalate. Due to a laboratory error, the iodine-129 samples were not analyzed. Results that are problematic include those for gross beta, nitrate, TOC, and TOX. The blind spike service provider is investigating the calculations from the blind sample preparation for gross beta. After that investigation is complete, requests for data review will be submitted to the laboratory for the nitrate, gross beta, and TOX samples. The TOC samples were analyzed prior to procedure changes at the laboratory that may improve the accuracy (reduce high bias) and precision of TOC measurements. All other results are within acceptable limits, although two fluoride results were slightly high. The laboratory will be informed of the results from this set of blind samples and a response will be requested. PNNL submitted follow-up blind samples in August.

The *Environmental Monitoring and Systems Laboratory* sends out gamma, iodine-131, gross alpha, gross beta, tritium, radium, strontium, and uranium samples in a water matrix on a semi-annual basis to laboratories participating in the intercomparison program. Plutonium samples are sent out annually. Control limits are at 3 normalized standard deviations above and below the known value. Lab performance during the April through June quarter was generally good; only the results for Co-60, Cs-134, and Cs-137 were outside of the control limits.

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Department of Energy Quality Assessment Program--Control limits established by the Environmental Measurements Laboratory are based on historic data distributions from data collected by the EML from 1982 to 1992. Acceptable results should fall within the 15th and 85th percentile of the cumulative normalized distribution. The main analytical laboratory analyzed water samples for Am-241, Co-60, Cs-137, gross alpha, gross beta, tritium, Mn-54, Pu-238, Pu-239, Sr-90, U-234, U-238, and total uranium. All results were acceptable except those for Co-60 and Mn-54.

¹ TOC exceeded critical mean, but data are under review. Not in trend with historical data.