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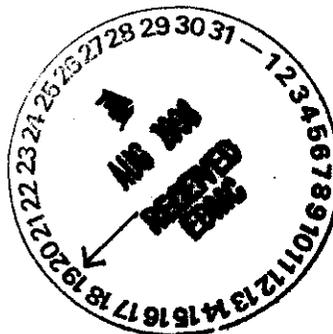
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AUG 13 1998

Mr. Steve M. Alexander  
Perimeter Areas Section Manager  
Nuclear Waste Program  
State of Washington  
Department of Ecology  
1315 W. 4<sup>th</sup> Avenue  
Kennewick, Washington 99336

Mr. Douglas R. Sherwood  
Hanford Project Manager  
U.S. Environmental Protection Agency  
712 Swift Blvd., Suite 5  
Richland, Washington 99352



Dear Messrs. Alexander and Sherwood:

QUARTERLY RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)  
GROUNDWATER MONITORING DATA FOR THE PERIOD OCTOBER 1, 1997,  
THROUGH DECEMBER 31, 1997

The RCRA groundwater chemistry and water level data for the period October 1, 1997, through December 31, 1997, have been verified and evaluated. The data are publicly available in electronic form in 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. This quarterly report is late in being issued due to a recently discovered internal procedural error.

Thirteen RCRA sites were sampled during the reporting quarter (Attachment 1). Sampled sites include 5 monitored under indicator evaluation programs, 6 monitored under groundwater quality assessment programs, and 2 monitored under a final status compliance program.

#### Comparison 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 1324-N/NA site in September. Two sets of quadruplicate samples were collected in January 1998 and were sent to separate laboratories for analysis. Results from both laboratories confirmed the initial exceedance. A letter of notification is being sent to the State of Washington Department of Ecology (Ecology) separately. An assessment plan will be prepared and submitted within 15 days of Ecology's receipt of the letter of notification. The specific contaminants contributing to the elevated TOC are not known. There is no record of organic constituents being disposed of at 1324-N/NA. Other waste sites nearby are potential sources of organic contaminants. This will be investigated during the assessment program.

As previously reported, the critical mean for TOC was exceeded in one downgradient well at the 1325-N facility in August. This result was much higher than previous trends. Verification sampling indicated that the August result was erroneous, and the site remains in detection monitoring.

A downgradient well monitored for the 216-A-29 Ditch exceeded the critical mean for TOC in samples collected during the fourth quarter of 1997. The reported values were not in line with historical trends. The well will be resampled to verify or refute the result.

Contamination indicator parameters in downgradient wells were below the critical mean values for all other sites monitored under indicator evaluation requirements that were sampled during the 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). The fall 1997 sampling event at 183-H under the compliance program was postponed until February, in an agreement with Ecology. A revised postclosure plan and a corrective action groundwater monitoring plan were then incorporated into modification C of the Hanford Site RCRA Permit, effective in February 1998. Corrective action is deferred to the 100-HR-1 and 100-HR-3 Operable Units, under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Although the compliance monitoring program had not officially begun in the October-December 1997 quarter, the corrective action network was sampled in November to avoid a long data gap and to coordinate with CERCLA sampling.

The 300 Area Process Trenches exceeded final-status concentration limits for 1,2-cis-dichloroethylene, trichloroethylene, and uranium in the past. A modified Closure/Post-Closure Plan and Corrective Action Groundwater Monitoring Plan have been submitted to Ecology. 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. The network was sampled under the compliance program in December 1997 (first of four independent samples). The remaining three independent samples may not be required if Ecology approves implementation of the corrective action monitoring plan.

### Status of Assessment Programs

**Single-Shell Tanks WMA B-BX-BY:** A draft phase I assessment report was submitted to the U.S. Department of Energy (DOE) for review in December 1997 with the conclusion that the WMA has affected groundwater quality. The assessment program continued, with samples collected during the fourth quarter of 1997. A phase II assessment plan is being prepared.

Total uranium in well 299-E33-41 spiked sharply to 81.3  $\mu\text{g/L}$  on November 20, 1997, then dropped to 23  $\mu\text{g/L}$  just two weeks later. This trend is similar to the technetium-99 peak in this well in August 1997. It appears that the uranium in this well is related to the same event that caused the increase in technetium-99, but the uranium is traveling more slowly. This well is sampled monthly so the breakthrough curve is well defined.

Technetium-99 is increasing on the west side of the WMA. Technetium-99 in well 299-E33-43 increased from 49.5 pCi/L on August 6, 1997, to 569 pCi/L on November 20, 1997. The latter value is being rechecked at the laboratory.

**Single-Shell Tanks WMA S-SX:** The phase I groundwater quality assessment for this unit was completed during the report period with the conclusion that WMA S-SX is contributing to groundwater contamination. Accordingly, a phase II assessment plan is in preparation. The current status of the groundwater investigation, including results of sampling conducted at the extended borehole adjacent to tank SX-109 (41-09-39), was presented to the expert panel, regulators, and stakeholders in March 1998.

Except for tritium, exceedances in the downgradient RCRA groundwater monitoring wells during the report period were limited to one well (299-W22-46). Technetium-99 in this well declined from a maximum of 5000 pCi/L in May 1997 to 3580 in November 1997.

Tritium was above the drinking water standard in both upgradient and downgradient wells. The highest concentration (263,000 pCi/L) during the report period occurred in upgradient well 299-W23-14, located on the west side of the SX tank farm. Concentrations above the drinking water standard were also observed in downgradient well 299-W23-15 (24,700 pCi/L) and 299-W22-46 (60,700 pCi/L).

An upward trend for technetium-99 is observed in non-RCRA well 299-W23-1, located in the S tank farm. The value for this reporting period exceeded the 900-pCi/L drinking water standard. Confirmation sampling was conducted in January 1998 with a result of 2700 pCi/L. Dedicated pumps were ordered for this well and two other non-RCRA wells in WMA S-SX to evaluate the nature of this occurrence.

In the last quarterly data review (July through September 1997) a high gross alpha activity (202 pCi/L) was observed at well 299-W23-45. The result was considered suspect and further investigation showed it to be a decimal error. The value has been corrected in the database (~20 pCi/L).

**Single-Shell Tanks WMA T and WMA TX-TY:** The water level in WMA T downgradient well 299-W10-15 dropped too low for sampling and non-RCRA well 299-W10-19 was sampled as a replacement. The water level in WMA T downgradient well 299-W11-27 dropped too low for effective use of a sampling pump and it was sampled through bailing and the use of a Kabis sampler. WMA TX-TY upgradient well 299-W15-22 and downgradient well 299-W10-18 could not be sampled this quarter and were sampled through bailing and use of a Kabis sampler in February 1998.

Technetium-99 in WMA T downgradient well 299-W11-27 continued to decrease, dropping to 15,200 pCi/L compared to a high of 21,700 pCi/L in February 1997, and specific conductance fell slightly to 1063  $\mu\text{S}/\text{cm}$ . This value for specific conductance was below the critical mean for the site (1,175  $\mu\text{S}/\text{cm}$ ). The reported gross alpha was 93.3 pCi/L, much higher than previous samples. Reanalysis of the sample yielded a value of 66.3 pCi/L, consistent with the initial value. This sample had high turbidity (454 NTU) and it was uncertain whether the high gross alpha was a result of constituents in solution or associated with particulates. Analysis of both filtered and unfiltered samples for chemical uranium, the most likely alpha emitter, yielded concentrations of 2.84  $\mu\text{g}/\text{L}$  and 6.46  $\mu\text{g}/\text{L}$ , respectively, which are not high enough to explain the reported gross alpha activities.

Reported technetium-99 activity in well 299-W11-23, a non-RCRA well located approximately 30 m east of 299-W11-27, rose to 1260 pCi/L in November 1997 and 1940 pCi/L in February 1998. This increase in technetium-99 was accompanied by an increase in nitrate, chromium, and calcium, possibly indicating that the contaminant plume detected in well 299-W11-27 has reached well 299-W11-23.

Available data for WMA-TX-TY downgradient well 299-W10-17 indicated 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 off. Specific conductance in this well was 815  $\mu\text{S}/\text{cm}$  in November 1997, above the critical mean for the site (668  $\mu\text{S}/\text{cm}$ ).

**216-U-12 Crib:** Long-term concentration trends of specific conductance and nitrate are gradually declining. During the reporting period, results for nitrate, the principal constituent causing elevated specific conductance, were 108,000, 213,360, and 42,075  $\mu\text{g}/\text{L}$  for wells 699-36-70A, 299-W22-41, and 299-W22-42, respectively. Technetium-99 (a contaminant-tracking constituent associated with the site) remained slightly elevated above background in 299-W22-41 and 699-36-70A, and dropped in well 299-W22-42 (consistent with nitrate and specific conductance trends for the wells). Tritium, a regional contaminant (not from the crib) remained elevated above the 20,000-pCi/L DWS in well 699-36-70A (105,000 pCi/L), and in well 299-W22-42 (37,800 pCi/L).

AUG 13 1998

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Other Monitoring Changes

Upgradient monitoring well 299-E34-7 at Low-Level Waste Management Area 2 had a dramatic increase in conductivity in May 1997. The upward trend continued at a lower rate in November 1997, but the value exceeded the critical mean. The increase appears to be primarily the result of an increase in sulfate, with a slight increase in other anions as well. Other wells in the area do not show similar increase in sulfate. As this is an upgradient well, assessment monitoring is not required, but the trend will be followed.

Quality Control

Results of the RCRA Quality Control program for the October through December 1997, quarter will be discussed in detail in the Annual Report for fiscal year 1998. Highlights are summarized in Attachment 2. Quality control data that are not available in HEIS are available in electronic form upon request. The quality control program indicated that the data were acceptable for use in the statistical comparisons discussed above.

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

Attachments

cc w/attachs:

M. J. Hartman, PNNL

S. Leja, Ecology

S. P. Luttrell, PNNL

R. M. Smith, PNNL

Table 1. Status of RCRA Sites, October-December 1997.

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

LERF = Liquid Effluent Retention Facility

LLBG = Low-Level Burial Grounds

NRDWL = Nonradioactive Dangerous Waste Landfill

SST = Single-Shell Tanks

WMA = Waste Management Area

<sup>1</sup> TOC exceedance in September 1997 confirmed in January 1998.

<sup>2</sup> Exceedance occurred in upgradient well. No assessment required.

<sup>3</sup> U-12 Crib, PUREX Crib, SST WMA B-BX-BY, SST WMA S-SX, SST WMA T, SST WMA TX-TY.

### Quality Control Results, October through December 1997

**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 8898 RCRA results, 90.2% of the results were considered valid for the October through December 1997 quarter. The suspect data may be useful for general interpretive use but should not be used to make regulatory decisions.

**Field QC data.** A total of 333 duplicate pairs were analyzed during the quarter. Five sets of quantifiable duplicate results had a relative percent difference greater than  $\pm 20\%$ . The flagged sets were for potassium, vanadium, tetrachloroethylene, 1,1,1-trichloroethane, and 1,2-dichloroethane. All of the results were close to acceptable limits (relative percent differences ranged from 20.5 to 27.6%), even for the low-concentration organic pairs. No further action is planned.

A total of 481 field blanks collected during the 4th quarter of 1997 were analyzed. Forty-six of those results were outside of the QC limits for field blanks. The majority of flagged results were for ICP metals, but results were also flagged for TDS, anions, methylene chloride, chloroform, 4,6-dinitro-2-methyl phenol, total organic halides, and gross beta. Groundwater results that are associated with the high field blanks are flagged in the database. ICP metals in field blank results have been a recurring problem, as discussed in previous reports. It has been determined that the problem is probably not due to actual blank contamination. A possible explanation currently being investigated is that the calculated laboratory detection limits for some metals are too low.

**Blind samples.** Blind samples were forwarded to the primary analytical laboratory in November. Well matrix samples were spiked with known concentrations of cyanide, chromium, nitrate, fluoride, carbon tetrachloride, chloroform, trichloroethylene, Co-60, Cs-137, 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 Tc-99 and nitrate. A set of samples spiked with 2,4,6-trichlorophenol was forwarded to QES for analysis of TOX. Another set of samples was spiked with a mixture of volatile organics (carbon tetrachloride, chloroform, and trichloroethylene) for TOX analysis. Samples for TOC analysis, spiked with potassium phthalate, were also sent to the labs. The results for the TOX samples spiked with the volatile organic mixture were lower than expected. A request for data review will be submitted to the laboratory for those results. The cyanide results were out of limits, as they have been consistently for the last year. When the next set of blinds is prepared in May, a verification analysis of the cyanide blind samples will be conducted in-house. Overall, the gross beta samples that were spiked with Tc-99 had reasonable recoveries (a recovery ranging from 20-25% was considered acceptable). One sample did have a low recovery (4%). An RDR will be submitted for that sample. All other blind results were acceptable.

The primary analytical laboratory participates in the U.S. Environmental Protection Agency (EPA) Water Supply/Water Pollution (WS/WP) Programs. The EPA distributes standard water samples as blind samples to participating laboratories. These samples contain specific organic and inorganic analytes at concentrations unknown to the participating laboratories. After analysis, results are submitted to the EPA and regression equations are used to determine acceptance and warning limits. The results of these studies independently verify the level of laboratory performance and are expressed as a percentage of EPA acceptable results. Results from the EPA WP studies were received for samples analyzed in November 1997. The percentage of EPA acceptable results was high for both sets of data, indicating excellent performance overall for the samples analyzed. Results were unacceptable once each for alkalinity, orthophosphate, kjeldahl nitrogen, Arochlor 1232, Arochlor 1248, ethylbenzene, and non-filterable residue. Most of these constituents are not of interest for the RCRA project.

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. All of the results for the October through December quarter were within control limits.