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Preface

This is Volume 2 of the Lawrence Livermore National Laboratory's (LLNL's) annual *Environmental Report 1994,* prepared for the U.S. Department of Energy. Volume 1, *Environmental Report 1994* (with no volume number designation) is intended to provide all information on LLNL's environmental impact and compliance activities that is of interest to most readers. This second volume, entitled *Environmental Report 1994, Volume 2*, supports Volume 1 summary data and is essentially a detailed data report that provides individual data points, where applicable. Some summary data is also included in Volume 2, and more detailed accounts are given of sample collection and analytical methods.

The two volumes are parallel in their organization to assist with cross-referencing between them. Volume 2 includes information in the six chapters on monitoring of air, surface water, ground water, soil and sediment, vegetation and foodstuff, and environmental radiation, as well as the two chapters on compliance self-monitoring and quality assurance. The other six chapters in Volume 2 contain no additional information.

As in last year's annual report, data are presented in Système International (SI) units. In particular, the primary units used for radiological results are becquerels and sieverts for activity and dose, with curies and rem used secondarily ($1\ \text{Bq} = 2.7 \times 10^{-11}\ \text{Ci}$; $1\ \text{Sv} = 100\ \text{rem}$).

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There is no supplemental data in this chapter.
Please see Volume 1 for details about
Site Overview.

There is no supplemental data in this chapter.
Please see Volume 1 for details about
Compliance Summary

There is no supplemental data in this chapter.
Please see Volume 1 for details about
Environmental Program Information.

4. Air Monitoring

Paula J. Tate

Air Surveillance Sampling Methods

LLNL maintains eight continuously operating, high-volume, air particulate samplers on the Livermore site (**Volume 1, Figure 4-1**), ten in the Livermore Valley (**Volume 1, Figure 4-2**), eight at Site 300, and one in Tracy (**Volume 1, Figure 4-3**). One sampling location, LCCY, was removed in July of 1994 because of vandalism problems. The samplers are positioned to ensure reasonable probability that any significant concentration of particulate effluents from LLNL operations will be detected. Geographical details of particulate sampling locations are outlined in a written procedure that is included in Appendix A of the *Environmental Monitoring Plan* (Tate et al. 1995).

Each air particulate sampler pulls air continuously at a constant rate of 400 liters per minute through a 20.3 cm × 25.4 cm Whatman-41 cellulose filter. The flow is maintained at better than the DOE requirement of ±20% of the nominal flow by using a mass flow controller that adjusts motor speed. These flow rates are verified at regular intervals with a portable field calibration unit. If a sampler fails, it is repaired and then calibrated with a spirometer that itself was calibrated using a unit traceable to the National Institute for Standards and Technology.

An easily dissolvable filter with a low trace-metal background is required for airborne beryllium analyses. Whatman-41 filters provide a balance between such requirements and particulate collection efficiency (Lindeken et al. 1963).

Particulate filters are changed each week at all locations. After each particulate filter is removed from a sampler, it is identified by location, date on, date off, elapsed time, and flow rate, and is given a sample identifier (a four-field code) that accompanies it throughout the analysis. Filters are then placed in glassine envelopes, and the sample information is recorded in a field tracking notebook. After a four-day delay for decay of the radon-thoron daughters, gross alpha and gross beta activities on the filters are determined with a gas flow proportional counter. The gross alpha, gross beta, and beryllium analyses are completed by a contract laboratory.

The analytical laboratory uses ^{241}Am and ^{137}Cs as calibration sources to determine alpha and beta counting efficiencies, respectively. Cross checks using ^{230}Th and ^{90}Sr are also completed periodically. These standards are certified by EPA. Counting-efficiency measurements are made for each set of counted filters. A background count is taken at the beginning of each run and between each set of 20 samples. Records are kept of background and counting-efficiency variations that occur in the counting equipment. The analytical laboratory reports the

actual instrumentation values, including negative results that arise when background measurements are higher than those for the filters.

Monthly composites of filters from each of the Livermore-site perimeter locations (SALV, MESQ, CAFE, MET, VIS, and COW) are placed into individual plastic bags. The six bags are then combined and sealed in a 214-cm^3 aluminum can and are counted for gamma-emitting radionuclides using low-background Ge(Li) detectors. The Site 300 filters are sealed and counted in a similar manner. Following gamma counting, the composited filters from each Livermore-site perimeter location are analyzed by LLNL's Radiation Analytical Sciences laboratory for the presence of ^{239}Pu, ^{235}U, and ^{238}U. The off-site samples from the Livermore Valley are analyzed for ^{239}Pu, and all of the Site 300 samples are composited and analyzed for ^{239}Pu, ^{235}U, and ^{238}U. The filters are ashed and then dissolved in a mixture of nitric acid and hydrochloric and/or hydrofluoric acids. Plutonium and uranium are separated by an ion-exchange process. Each separated element is purified further by ion exchange. Then plutonium is electroplated onto a stainless steel disk and submitted for alpha spectrometry, while uranium solutions are submitted for analysis by mass spectrometry.

Replicate samples are processed to confirm the results obtained from the samplers. In addition, a duplicate quality control (QC) sampler is operated for two months in parallel with the permanent sampler at a given site. The QC filters also are exchanged weekly, and both filter sets are submitted for analysis in the usual manner. After two months, the QC sampler is rotated to another location.

A total volume of approximately 4 million liters of air is sampled at each location each week. The details of air particulate sampling and sample change-out are described in Appendix A of the *Environmental Monitoring Plan* (Tate et al. 1995). Details of high-volume sampler flow calibration are also discussed in a procedure, and details of air sample analysis procedures are outlined in Hall and Edwards (1994).

As outlined in U.S. Department of Energy (1991), gross alpha and gross beta air filter results are used only as trend indicators; specific radionuclide analysis is done for plutonium, uranium, and all gamma emitters. All analytical results are reported as a measured concentration per volume of air, or at the minimum detection limit (MDL) when no activity is detected. In all cases, the MDL is more than adequate for demonstrating compliance with the pertinent regulatory requirements for radionuclides that are present or may be present in the air sample. Particle size distributions are not determined because the estimated effective dose equivalent to the maximally exposed individual is well below the 0.01 mSv (1 mrem) allowable limit.

Beryllium measurements are made on portions of each of the weekly air filters from the Livermore-site perimeter and Site 300 samplers that are composited by sampling location every month. The analytical laboratory adds 40 milliliters of 10% nitric acid to each composite. The solution is heated for 30 minutes and decanted into a separate beaker where more nitric acid is added. This step is repeated two more times and the solution is evaporated to less than 20 milliliters (care is taken to prevent the samples from boiling or baking dry). The samples are diluted to 20 milliliters with deionized water. Quantification is accomplished by graphite furnace atomic absorption.

LLNL also maintains 11 continuously operating airborne tritium samplers on the Livermore site (Volume 1, Figure 4-1) and five samplers in the Livermore Valley (Volume 1, Figure 4-2). Four of the Livermore site locations (B331, B292, B514, and B624) monitor diffuse source emissions. The tritium sample locations are detailed in Appendix B of the *Environmental Monitoring Plan* (Tate et al. 1995). The tritium samplers, operating at a flow rate of 700 milliliters per minute, use silica gel in flasks to collect water vapor. These flasks are changed every two weeks, and the samples are identified by location, date on, date off, elapsed sampling time, and flow rate. The flow rate is the average of the initial and final flow rates, which are measured biweekly with a rotometer that is calibrated once a year. Each sample is given a sample identifier that accompanies it through analysis. Two additional samplers are rotated among the locations at two-month intervals to provide duplicate QC samples. Details of the actual tritium sampling and a description of tritium sampler calibration can be found in Appendix A of the *Environmental Monitoring Plan* (Tate et al. 1995).

Once the samples are taken, the water is separated from the silica gel by freeze-dried vacuum distillation, and the tritium concentration in the water is determined by liquid-scintillation counting. Airborne tritium sample analysis is done by LLNL's Radiation Analytical Sciences laboratory. All analytical results are reported as a measured concentration per unit volume of air flow through the sampling medium. Details of the analytical procedure are described in Hall and Edwards (1994).

Data

Weekly summaries of gross alpha and gross beta data are presented in **Tables 4-1**, **4-2,** and **4-3**. **Tables 4-4** and **4-5** present monthly gamma activity on air filters for the Livermore-site perimeter and Site 300. Monthly plutonium data for each sampling location are shown in **Tables 4-6** through **4-9**. Monthly uranium data for the Livermore-site perimeter and Site 300 are presented in **Tables 4-10 and 4-11**. Biweekly tritium data for sampling locations in the Livermore Valley, Livermore-site perimeter, and diffuse sources are shown in **Tables 4-12**, **4-13**, and **4-14**. **Tables 4-15** and **4-16** present monthly beryllium data for Livermore-site perimeter and Site 300 sampling locations.

The data generally reflect historic data values for these analytes at these locations. A detailed discussion of these results is provided in Volume 1 of this report.

Air Effluent Sampling Methods

LLNL maintains 92 continuously operating radiological sampling systems on air exhausts at eight facilities at the Livermore sites (Volume 1, Table 4-1). These samplers are used to determine actual emissions from operations involving radioactive materials at the facilities and to verify the integrity of emission control systems.

Air samples for particulate emissions are extracted downstream of high efficiency particulate air (HEPA) filters and prior to the discharge point to the atmosphere. In most cases simple filter-type aerosol collection systems are used. However, in some facilities (Buildings 251 and 332) alpha continuous air monitors (CAMs) are used for sampling. In addition to collecting a sample of particles, the CAMs units provide an alarm capability for the facility in the event of a release of alpha activity. Both types of sampling systems, the simple filter-type and alpha alarm monitors, are used to monitor discharge points from Building 332. The air sampling systems in critical facilities would be switched to auxiliary power in the event of a power outage and continue to operate.

The sample filters, either 47- or 100-millimeter-diameter membrane filters, are changed on a weekly or bi-weekly frequency depending on the facility. After sample collection, filters are placed in glassine envelopes; each envelope is tagged with a unique bar code label. Filter samples are logged into the Hazards Control Department (HCD) computer tracking system along with information including location, date on, date off, elapsed time, and flow rate. Filters are submitted to the HCD Radiological Measurements Laboratory (RML) for analysis for gross alpha and beta activity using gas proportional counters. Analysis is delayed for at least four days from sample termination to allow for the decay of naturally-occurring radon daughters. For verification of the operation of the counting system, calibration sources, as well as background samples, are intermixed with the sample filters for analysis. Analytical techniques are consistent with EPA-recommended procedures. Further details of sampling and analysis are discussed in the *Environmental Monitoring Plan* (Tate et al. 1995).

Each stack of the Tritium Facility (Building 331) is monitored for tritium release by both a continuous monitoring alarm system and continuous molecular sieve samplers. The alarmed samplers, Overhoff ion chambers, provide real-time tritium concentration release levels (HT and HTO combined). The sieve samplers, which can discriminate between tritiated water (HTO) vapor and molecular tritium (HT), provide the values used for environmental reporting. Each sieve sampler (unalarmed) is in parallel with an alarmed monitor and consists of two molecular sieves. The first sieve collects tritiated water vapor;

then a palladium-coated catalyst converts molecular tritium to tritiated water and collects the tritiated water on a second sieve. Sieves are exchanged weekly or biweekly. The sieve samples are logged into the HCD computer tracking system and submitted to the HCD Analytical Laboratory. There they are installed into a recovery system for the bake-out of tritiated water vapor and subsequent collection of the water. The retrieved tritium is analyzed by RML for beta activity using scintillation counting techniques.

The need for air effluent monitoring for other discharge points having the potential to release radionuclides to the atmosphere is evaluated on an annual basis according to the 40 CFR 61.93 National Emissions Standards for Hazardous Air Pollutants (NESHAPs) regulatory requirements. For the evaluation, estimates of emissions from individual discharge points are calculated using: (1) measured emissions from discharges having continuous sampling systems, or (2) radionuclide inventories from discharges not having sampling systems. The radionuclide inventory approach uses isotope-specific inventory data along with EPA-accepted release factor for operations and EPA-suggested reduction factors for emission control devices to arrive at the potential release estimates. For 1994, calculated potential emissions for isotopes, including diffuse and point discharges, for the Livermore site are listed in **Table 4-17**. Since dose to individuals is isotope specific, the radionuclides have been ordered by weighting the emissions according to the inhalation committed dose equivalent of the particular isotope. The total calculated emission is estimated to be 5.5 TBq (150 Ci). Calculated emissions for radionuclides used in Site 300 operations are given in Volume 1, Table 4-10.

The need for air-effluent monitoring at an atmospheric discharge point requires that an assessment of dose to the nearest member of the public be made based on the estimated emissions. Dose assessment results due to LLNL radionuclide emissions are discussed in Chapter 12 of Volume 1. Further details of the 1994 evaluation of calculated emissions and dose assessment are published in the *LLNL NESHAPs 1994 Annual Report* (Surano et al. 1995). For 1994, no discharge points at the Livermore site or Site 300 were found to require air-effluent sampling systems beyond those already being sampled.

Table 4-1. Gross alpha and gross beta (Bq/mL) in air particulate samples summarized by week, Livermore Valley, 1994.

Week	Detection Frequency	Median[a]	Interquartile Range	Maximum[a]
Gross alpha				
1/11/94	8/10	7.8×10^{-12}	3.3×10^{-11}	8.8×10^{-11}
1/18/94	5/10	7.9×10^{-13}	2.2×10^{-11}	8.3×10^{-11}
1/25/94	4/9	-3.4×10^{-12}	4.0×10^{-12}	2.8×10^{-11}
2/1/94	4/9	-5.7×10^{-13}	7.4×10^{-12}	7.4×10^{-11}
2/8/94	9/11	3.2×10^{-11}	7.2×10^{-11}	1.8×10^{-10}
2/15/94	10/11	2.8×10^{-11}	3.6×10^{-11}	9.6×10^{-11}
2/22/94	7/10	1.5×10^{-11}	4.3×10^{-11}	7.0×10^{-11}
3/1/94	10/11	9.6×10^{-11}	4.9×10^{-11}	1.4×10^{-10}
3/8/94	4/9	-4.7×10^{-12}	2.5×10^{-11}	6.1×10^{-11}
3/15/94	5/10	-1.8×10^{-12}	4.9×10^{-11}	1.0×10^{-10}
3/22/94	3/10	-2.7×10^{-11}	7.8×10^{-12}	2.7×10^{-11}
3/29/94	8/11	3.5×10^{-11}	4.2×10^{-11}	6.0×10^{-11}
4/5/94	2/11	-3.0×10^{-11}	—[b]	6.8×10^{-11}
4/12/94	3/11	-1.7×10^{-11}	4.3×10^{-13}	2.1×10^{-11}
4/19/94	6/8	3.0×10^{-11}	5.3×10^{-11}	1.0×10^{-10}
4/26/94	3/11	-1.8×10^{-11}	7.5×10^{-13}	6.8×10^{-11}
5/3/94	5/11	-8.7×10^{-12}	1.3×10^{-11}	4.4×10^{-11}
5/10/94	2/8	-7.2×10^{-12}	—[b]	5.7×10^{-11}
5/17/94	8/9	2.9×10^{-11}	3.5×10^{-11}	8.1×10^{-11}
5/24/94	3/11	-2.1×10^{-11}	5.4×10^{-12}	1.3×10^{-10}
5/31/94	5/11	-4.0×10^{-12}	2.6×10^{-11}	8.3×10^{-11}
6/7/94	4/11	-1.8×10^{-11}	5.3×10^{-12}	4.4×10^{-11}
6/14/94	3/11	-2.8×10^{-11}	—[b]	1.8×10^{-11}
6/21/94	3/11	-2.2×10^{-11}	4.8×10^{-12}	7.7×10^{-11}
6/28/94	0/11	-4.4×10^{-11}	—[b]	-2.1×10^{-11}
7/5/94	3/10	-1.6×10^{-11}	1.4×10^{-11}	4.9×10^{-11}
7/12/94	3/9	-2.8×10^{-11}	2.8×10^{-11}	5.6×10^{-11}
7/19/94	8/10	3.3×10^{-11}	4.5×10^{-11}	1.1×10^{-10}
7/26/94	2/9	-2.8×10^{-11}	—[b]	3.9×10^{-11}
8/02/94	2/10	-4.2×10^{-11}	—[b]	2.8×10^{-12}
8/09/94	6/10	1.2×10^{-11}	2.3×10^{-11}	7.6×10^{-11}
8/16/94	6/9	3.0×10^{-11}	4.8×10^{-11}	1.1×10^{-10}
8/23/94	4/10	-8.1×10^{-12}	3.7×10^{-12}	2.8×10^{-11}
8/30/94	1/10	-2.0×10^{-11}	—[b]	2.2×10^{-11}
9/06/94	9/10	2.4×10^{-11}	3.0×10^{-11}	6.7×10^{-11}
9/13/94	6/10	1.7×10^{-11}	2.0×10^{-11}	1.1×10^{-10}

Table 4-1. Gross alpha and gross beta (Bq/mL) in air particulate samples summarized by week, Livermore Valley, 1994.

Week	Detection Frequency	Median[a]	Interquartile Range	Maximum[a]
Gross aplha				
9/20/94	4/10	-2.0×10^{-12}	9.4×10^{-12}	1.3×10^{-10}
9/27/94	4/10	-5.8×10^{-12}	2.0×10^{-11}	3.8×10^{-11}
10/4/94	6/9	1.4×10^{-11}	2.3×10^{-11}	6.8×10^{-11}
10/11/94	5/9	1.5×10^{-11}	2.6×10^{-11}	7.4×10^{-11}
10/18/94	4/10	-2.5×10^{-11}	2.3×10^{-11}	2.8×10^{-11}
10/25/94	1/9	-2.8×10^{-11}	—[b]	2.3×10^{-12}
11/1/94	1/9	-3.7×10^{-11}	—[b]	1.6×10^{-12}
11/8/94	8/10	3.2×10^{-11}	5.0×10^{-11}	7.8×10^{-11}
11/15/94	6/9	2.1×10^{-11}	3.0×10^{-11}	4.7×10^{-11}
11/21/94	5/8	1.2×10^{-11}	5.4×10^{-11}	8.9×10^{-11}
11/29/94	0/9	-3.2×10^{-11}	—[b]	-7.1×10^{-12}
12/6/94	5/10	1.3×10^{-11}	6.3×10^{-11}	9.7×10^{-11}
12/13/94	7/9	3.7×10^{-11}	5.1×10^{-11}	7.0×10^{-11}
12/20/94	4/9	-9.7×10^{-12}	1.5×10^{-11}	1.0×10^{-10}
12/27/94	2/9	-4.1×10^{-11}	—[b]	9.6×10^{-12}
1/3/95	0/9	-4.9×10^{-11}	—[b]	-1.1×10^{-11}
Gross beta				
1/11/94	10/10	5.7×10^{-10}	2.8×10^{-10}	8.0×10^{-10}
1/18/94	10/10	1.4×10^{-9}	6.3×10^{-10}	2.3×10^{-9}
1/25/94	9/9	2.3×10^{-9}	6.2×10^{-10}	2.7×10^{-9}
02/1/94	9/9	8.9×10^{-10}	1.6×10^{-10}	1.3×10^{-9}
2/8/94	11/11	1.4×10^{-9}	2.3×10^{-10}	2.2×10^{-9}
2/15/94	11/11	5.0×10^{-10}	1.5×10^{-10}	7.5×10^{-10}
2/22/94	10/10	3.0×10^{-10}	1.1×10^{-10}	5.1×10^{-10}
3/1/94	11/11	3.9×10^{-10}	1.1×10^{-10}	6.0×10^{-10}
3/8/94	9/9	4.9×10^{-10}	1.8×10^{-10}	6.3×10^{-10}
3/15/94	10/10	5.3×10^{-10}	1.4×10^{-10}	6.6×10^{-10}
3/22/94	10/10	3.7×10^{-10}	1.4×10^{-10}	5.3×10^{-10}
3/29/94	11/11	4.5×10^{-10}	7.9×10^{-11}	5.6×10^{-10}
4/5/94	11/11	4.0×10^{-10}	1.0×10^{-10}	6.6×10^{-10}
4/12/94	11/11	2.4×10^{-10}	9.3×10^{-11}	3.1×10^{-10}
4/19/94	8/8	4.3×10^{-10}	1.3×10^{-10}	6.4×10^{-10}
4/26/94	11/11	2.4×10^{-10}	1.1×10^{-10}	3.1×10^{-10}
5/3/94	11/11	2.6×10^{-10}	7.7×10^{-11}	4.4×10^{-10}
5/10/94	8/8	1.5×10^{-10}	9.6×10^{-11}	2.8×10^{-10}
5/17/94	9/9	2.4×10^{-10}	7.9×10^{-11}	3.9×10^{-10}
5/24/94	11/11	2.1×10^{-10}	1.3×10^{-10}	4.1×10^{-10}

Table 4-1. Gross alpha and gross beta (Bq/mL) in air particulate samples summarized by week, Livermore Valley, 1994.

Week	Detection Frequency	Median[(a)]	Interquartile Range	Maximum[(a)]
Gross beta				
5/31/94	11/11	3.8×10^{-10}	6.8×10^{-11}	4.6×10^{-10}
6/7/94	11/11	1.9×10^{-10}	9.7×10^{-11}	4.4×10^{-10}
6/14/94	11/11	3.2×10^{-10}	1.2×10^{-10}	4.6×10^{-10}
6/21/94	11/11	3.0×10^{-10}	1.1×10^{-10}	4.5×10^{-10}
6/28/94	11/11	4.6×10^{-10}	8.2×10^{-11}	5.4×10^{-10}
7/5/94	10/10	3.0×10^{-10}	5.0×10^{-11}	4.5×10^{-10}
7/12/94	9/9	2.7×10^{-10}	2.4×10^{-10}	6.5×10^{-10}
7/19/94	10/10	4.0×10^{-10}	9.0×10^{-11}	6.7×10^{-10}
7/26/94	9/9	2.0×10^{-10}	4.9×10^{-11}	2.8×10^{-10}
8/2/94	10/10	1.9×10^{-10}	1.7×10^{-10}	3.5×10^{-10}
8/9/94	10/10	2.5×10^{-10}	9.1×10^{-11}	3.5×10^{-10}
8/16/94	9/9	4.1×10^{-10}	1.2×10^{-10}	5.4×10^{-10}
8/23/94	10/10	3.7×10^{-10}	1.2×10^{-10}	5.4×10^{-10}
8/30/94	10/10	4.0×10^{-10}	1.2×10^{-10}	5.3×10^{-10}
9/6/94	10/10	4.3×10^{-10}	1.5×10^{-10}	6.9×10^{-10}
9/13/94	10/10	3.2×10^{-10}	1.2×10^{-10}	3.8×10^{-10}
9/20/94	10/10	8.8×10^{-10}	1.6×10^{-10}	1.1×10^{-9}
9/27/94	10/10	1.0×10^{-9}	1.9×10^{-10}	1.2×10^{-9}
10/4/94	9/9	8.8×10^{-10}	1.7×10^{-10}	1.2×10^{-9}
10/11/94	9/9	1.1×10^{-9}	1.3×10^{-10}	1.5×10^{-9}
10/18/94	10/10	5.5×10^{-10}	9.3×10^{-11}	6.6×10^{-10}
10/25/94	9/9	1.7×10^{-9}	3.7×10^{-10}	3.1×10^{-9}
11/1/94	9/9	5.8×10^{-10}	2.3×10^{-10}	7.5×10^{-10}
11/8/94	10/10	2.6×10^{-10}	1.6×10^{-10}	4.1×10^{-10}
11/15/94	9/9	3.9×10^{-10}	1.6×10^{-10}	4.9×10^{-10}
11/21/94	8/8	2.8×10^{-10}	6.9×10^{-11}	4.9×10^{-10}
11/29/94	9/9	7.2×10^{-10}	1.8×10^{-10}	9.7×10^{-10}
12/06/94	10/10	5.1×10^{-10}	1.1×10^{-10}	8.1×10^{-10}
12/13/94	9/9	4.0×10^{-10}	1.1×10^{-10}	5.6×10^{-10}
12/20/94	9/9	4.7×10^{-10}	1.8×10^{-10}	5.9×10^{-10}
12/27/94	9/9	9.3×10^{-10}	2.4×10^{-10}	1.1×10^{-9}
1/3/95	9/9	9.0×10^{-10}	1.7×10^{-10}	1.2×10^{-9}

a Negative values are not considered detections.

b Interquartile range not calculated. See Chapter 14, Quality Assurance.

Table 4-2. Gross alpha and gross beta (Bq/mL) in air particulate samples summarized by week, Livermore-site perimeter, 1994.

Week	Detection Frequency	Median[a]	Interquartile Range	Maximum[a]
Gross alpha				
1/11/94	4/6	3.0×10^{-11}	5.7×10^{-11}	1.0×10^{-10}
1/18/94	4/6	3.4×10^{-12}	1.4×10^{-11}	7.6×10^{-11}
1/25/94	0/6	-4.6×10^{-11}	—[b]	-3.7×10^{-11}
2/1/94	1/4	-4.8×10^{-11}	—[b]	2.8×10^{-12}
2/8/94	3/4	2.9×10^{-11}	4.2×10^{-11}	9.8×10^{-11}
2/15/94	5/6	7.8×10^{-11}	7.4×10^{-11}	1.1×10^{-10}
2/22/94	3/6	1.5×10^{-11}	5.4×10^{-11}	1.0×10^{-10}
3/1/94	5/5	3.6×10^{-11}	3.4×10^{-11}	1.1×10^{-10}
3/8/94	1/6	-2.1×10^{-11}	—[b]	2.8×10^{-11}
3/15/94	2/5	-6.0×10^{-12}	2.4×10^{-11}	5.3×10^{-11}
3/22/94	1/5	-2.0×10^{-11}	—[b]	4.2×10^{-11}
3/29/94	5/6	3.3×10^{-11}	7.6×10^{-11}	1.3×10^{-10}
4/5/94	3/6	1.3×10^{-11}	5.1×10^{-11}	5.2×10^{-11}
4/12/94	3/6	-8.0×10^{-12}	9.0×10^{-12}	2.8×10^{-11}
4/19/94	4/6	4.3×10^{-11}	8.1×10^{-11}	1.3×10^{-10}
4/26/94	1/6	-1.6×10^{-11}	—[b]	1.6×10^{-11}
5/3/94	1/6	-2.6×10^{-11}	—[b]	4.6×10^{-11}
5/10/94	5/6	1.5×10^{-11}	2.4×10^{-11}	8.1×10^{-11}
5/17/94	4/6	1.7×10^{-11}	4.1×10^{-11}	9.5×10^{-11}
5/24/94	2/6	0	1.3×10^{-11}	5.1×10^{-11}
5/31/94	2/6	-2.4×10^{-11}	4.2×10^{-14}	2.9×10^{-11}
6/7/94	1/5	-3.1×10^{-11}	—[b]	3.8×10^{-11}
6/14/94	3/5	2.9×10^{-11}	4.2×10^{-11}	4.2×10^{-11}
6/21/94	2/6	-1.8×10^{-11}	8.6×10^{-12}	4.0×10^{-11}
6/28/94	2/6	-3.9×10^{-11}	8.8×10^{-12}	2.9×10^{-11}
7/5/94	3/5	1.4×10^{-11}	6.3×10^{-11}	7.4×10^{-11}
7/12/94	4/6	3.2×10^{-11}	5.2×10^{-11}	1.0×10^{-10}
7/19/94	2/5	-1.0×10^{-11}	3.0×10^{-11}	5.9×10^{-11}
7/26/94	3/6	-1.1×10^{-12}	1.9×10^{-11}	7.0×10^{-11}
8/2/94	1/5	-3.6×10^{-11}	—[b]	7.2×10^{-11}
8/9/94	5/6	4.4×10^{-11}	5.5×10^{-11}	1.4×10^{-10}
8/16/94	5/6	2.3×10^{-11}	3.6×10^{-11}	7.9×10^{-11}
8/23/94	2/6	-7.5×10^{-12}	4.3×10^{-12}	9.1×10^{-12}
8/30/94	3/6	-5.2×10^{-12}	1.6×10^{-11}	3.1×10^{-11}
9/6/94	4/6	3.5×10^{-11}	7.9×10^{-11}	1.1×10^{-10}
9/13/94	3/6	3.9×10^{-12}	1.3×10^{-11}	2.7×10^{-11}

Table 4-2. Gross alpha and gross beta (Bq/mL) in air particulate samples summarized by week, Livermore-site Perimeter, 1994.

Week	Detection Frequency	Median[a]	Interquartile Range	Maximum[a]
Gross alpha				
9/20/94	4/6	2.4×10^{-11}	5.0×10^{-11}	1.1×10^{-10}
9/27/94	1/6	-3.4×10^{-11}	—[b]	5.5×10^{-11}
10/4/94	2/6	-1.4×10^{-11}	7.5×10^{-12}	3.8×10^{-11}
10/11/94	2/6	-2.3×10^{-11}	5.5×10^{-12}	4.8×10^{-11}
10/18/94	2/6	-2.3×10^{-11}	8.5×10^{-12}	2.8×10^{-11}
10/25/94	3/5	2.2×10^{-11}	2.7×10^{-11}	2.9×10^{-11}
11/1/94	2/6	-2.2×10^{-11}	1.1×10^{-12}	3.7×10^{-11}
11/08/94	5/6	2.4×10^{-11}	1.7×10^{-11}	4.4×10^{-11}
11/15/94	4/6	1.8×10^{-11}	7.1×10^{-11}	1.0×10^{-10}
11/21/94	4/6	3.0×10^{-11}	5.6×10^{-11}	1.0×10^{-10}
11/29/94	1/6	-2.8×10^{-11}	—[b]	5.5×10^{-12}
12/6/94	3/5	2.8×10^{-11}	3.8×10^{-11}	6.6×10^{-11}
12/13/94	4/6	1.4×10^{-11}	2.3×10^{-11}	5.0×10^{-11}
12/20/94	2/6	-1.1×10^{-11}	4.9×10^{-12}	1.2×10^{-11}
12/27/94	0/6	-4.1×10^{-11}	—[b]	-4.3×10^{-12}
1/3/95	0/6	-5.7×10^{-11}	—[b]	-2.9×10^{-11}
Gross beta				
1/11/94	6/6	6.9×10^{-10}	1.5×10^{-10}	7.7×10^{-10}
1/18/94	6/6	1.7×10^{-9}	2.0×10^{-10}	1.8×10^{-9}
1/25/94	6/6	2.2×10^{-9}	3.9×10^{-10}	3.7×10^{-9}
2/1/94	4/4	1.0×10^{-9}	9.5×10^{-11}	1.1×10^{-9}
2/8/94	4/4	1.7×10^{-9}	2.2×10^{-10}	1.8×10^{-9}
2/15/94	6/6	5.0×10^{-10}	1.2×10^{-10}	8.6×10^{-10}
2/22/94	6/6	3.6×10^{-10}	6.7×10^{-11}	5.0×10^{-10}
3/1/94	5/5	4.2×10^{-10}	1.5×10^{-10}	8.1×10^{-10}
3/8/94	6/6	4.3×10^{-10}	4.6×10^{-11}	6.0×10^{-10}
3/15/94	5/5	5.9×10^{-10}	6.5×10^{-11}	6.7×10^{-10}
3/22/94	5/5	4.5×10^{-10}	6.9×10^{-11}	4.9×10^{-10}
3/29/94	6/6	5.3×10^{-10}	4.5×10^{-11}	6.4×10^{-10}
4/5/94	6/6	4.2×10^{-10}	1.1×10^{-10}	5.7×10^{-10}
4/12/94	6/6	2.8×10^{-10}	7.6×10^{-11}	3.6×10^{-10}
4/19/94	6/6	4.9×10^{-10}	4.6×10^{-11}	5.3×10^{-10}
4/26/94	6/6	2.7×10^{-10}	6.0×10^{-11}	3.1×10^{-10}
5/3/94	6/6	2.6×10^{-10}	9.5×10^{-11}	3.6×10^{-10}
5/10/94	6/6	2.0×10^{-10}	1.5×10^{-10}	3.3×10^{-10}
5/17/94	6/6	3.0×10^{-10}	2.1×10^{-10}	5.4×10^{-10}
5/24/94	5/6	1.9×10^{-10}	7.1×10^{-11}	2.9×10^{-10}

Table 4-2. Gross alpha and gross beta (Bq/mL) in air particulate samples summarized by week, Livermore-site Perimeter, 1994.

Week	Detection Frequency	Median[(a)]	Interquartile Range	Maximum[(a)]
Gross beta				
5/31/94	6/6	4.4×10^{-10}	1.4×10^{-10}	5.1×10^{-10}
6/7/94	5/5	2.3×10^{-10}	1.7×10^{-11}	2.9×10^{-10}
6/14/94	5/5	3.8×10^{-10}	6.8×10^{-11}	4.4×10^{-10}
6/21/94	6/6	2.5×10^{-10}	7.9×10^{-11}	2.9×10^{-10}
6/28/94	6/6	3.7×10^{-10}	2.7×10^{-11}	6.3×10^{-10}
7/05/94	5/5	3.8×10^{-10}	1.4×10^{-10}	4.9×10^{-10}
7/12/94	6/6	2.1×10^{-10}	9.6×10^{-11}	4.0×10^{-10}
7/19/94	5/5	4.7×10^{-10}	1.4×10^{-10}	6.7×10^{-10}
7/26/94	6/6	3.0×10^{-10}	1.8×10^{-10}	3.9×10^{-10}
8/2/94	5/5	1.9×10^{-10}	1.7×10^{-10}	3.8×10^{-10}
8/9/94	6/6	2.2×10^{-10}	1.7×10^{-10}	3.9×10^{-10}
8/16/94	6/6	4.2×10^{-10}	8.2×10^{-11}	5.7×10^{-10}
8/23/94	6/6	5.2×10^{-10}	8.7×10^{-11}	6.8×10^{-10}
8/30/94	6/6	4.6×10^{-10}	1.6×10^{-10}	5.7×10^{-10}
9/6/94	6/6	5.4×10^{-10}	1.3×10^{-10}	6.2×10^{-10}
9/13/94	6/6	4.1×10^{-10}	4.5×10^{-11}	4.6×10^{-10}
9/20/94	6/6	7.9×10^{-10}	2.7×10^{-10}	1.2×10^{-9}
9/27/94	6/6	1.1×10^{-9}	2.3×10^{-10}	1.4×10^{-9}
10/4/94	6/6	8.5×10^{-10}	1.4×10^{-10}	9.9×10^{-10}
10/11/94	6/6	1.3×10^{-9}	8.7×10^{-11}	1.4×10^{-9}
10/18/94	6/6	4.6×10^{-10}	1.8×10^{-11}	5.0×10^{-10}
10/25/94	5/5	1.8×10^{-9}	1.4×10^{-10}	2.1×10^{-9}
11/1/94	6/6	5.1×10^{-10}	1.1×10^{-10}	5.8×10^{-10}
11/8/94	6/6	2.9×10^{-10}	1.2×10^{-10}	5.2×10^{-10}
11/15/94	6/6	4.4×10^{-10}	7.4×10^{-11}	5.8×10^{-10}
11/21/94	6/6	2.7×10^{-10}	3.7×10^{-11}	3.2×10^{-10}
11/29/94	6/6	6.8×10^{-10}	7.5×10^{-11}	7.2×10^{-10}
12/06/94	5/5	6.5×10^{-10}	1.1×10^{-10}	8.7×10^{-10}
12/13/94	6/6	4.1×10^{-10}	1.3×10^{-10}	6.0×10^{-10}
12/20/94	6/6	3.9×10^{-10}	5.3×10^{-11}	5.7×10^{-10}
12/27/94	6/6	8.7×10^{-10}	7.4×10^{-11}	1.1×10^{-9}
1/3/95	6/6	9.6×10^{-10}	8.2×10^{-11}	1.1×10^{-9}

a Negative values are not considered detections.

b Interquartile range not calculated. See Chapter 14, Quality Assurance.

Table 4-3. Gross alpha and gross beta (Bq/mL) in air particulate samples summarized by week, Site 300, 1994.

Week	Detection Frequency	Median[a]	Interquartile Range	Maximum[a]
Gross alpha				
1/10/94	7/8	3.7×10^{-11}	2.6×10^{-11}	7.9×10^{-11}
1/17/94	3/8	-7.2×10^{-12}	3.2×10^{-11}	6.5×10^{-11}
1/24/94	3/9	-9.0×10^{-12}	1.5×10^{-11}	8.6×10^{-11}
1/31/94	6/9	9.1×10^{-12}	4.0×10^{-11}	5.7×10^{-11}
2/7/94	7/9	3.1×10^{-11}	4.7×10^{-11}	1.5×10^{-10}
2/14/94	7/9	1.3×10^{-11}	1.4×10^{-11}	9.3×10^{-11}
2/21/94	4/9	-1.1×10^{-12}	2.7×10^{-11}	7.3×10^{-11}
2/28/94	9/9	3.6×10^{-11}	4.2×10^{-11}	8.9×10^{-11}
3/7/94	4/9	-2.0×10^{-11}	7.4×10^{-12}	9.4×10^{-11}
3/14/94	1/8	-3.0×10^{-11}	—[b]	4.3×10^{-11}
3/21/94	1/8	-2.9×10^{-11}	—[b]	2.6×10^{-11}
3/28/94	4/9	-1.3×10^{-11}	4.0×10^{-11}	1.3×10^{-10}
4/4/94	0/9	-5.6×10^{-11}	—[b]	-4.6×10^{-12}
4/11/94	6/9	4.4×10^{-12}	8.6×10^{-11}	2.9×10^{-11}
4/18/94	5/9	4.9×10^{-13}	1.2×10^{-11}	6.6×10^{-11}
4/25/94	4/9	-5.9×10^{-13}	4.5×10^{-11}	5.9×10^{-11}
5/2/94	4/9	-6.6×10^{-13}	2.5×10^{-11}	6.4×10^{-11}
5/9/94	3/9	-8.5×10^{-12}	5.1×10^{-12}	4.3×10^{-11}
5/16/94	5/9	4.0×10^{-12}	2.7×10^{-11}	6.6×10^{-11}
5/23/94	4/9	-3.3×10^{-12}	2.7×10^{-11}	4.7×10^{-11}
5/30/94	1/9	-3.2×10^{-11}	—[b]	4.0×10^{-11}
6/6/94	3/9	-8.5×10^{-12}	3.3×10^{-12}	9.6×10^{-11}
6/13/94	2/9	-2.1×10^{-11}	—[b]	3.3×10^{-11}
6/20/94	3/9	-2.6×10^{-11}	2.2×10^{-12}	5.7×10^{-11}
6/27/94	0/9	-6.0×10^{-11}	—[b]	-1.0×10^{-11}
07/4/94	2/8	-1.3×10^{-11}	2.1×10^{-12}	4.9×10^{-11}
07/11/94	0/9	-3.8×10^{-11}	—[b]	-7.8×10^{-12}
07/18/94	3/9	-2.0×10^{-11}	5.2×10^{-12}	6.3×10^{-11}
07/25/94	2/9	-5.0×10^{-11}	—[b]	6.7×10^{-11}
08/1/94	2/8	-5.7×10^{-11}	—[b]	4.0×10^{-11}
08/8/94	5/8	1.9×10^{-11}	—[b]	6.2×10^{-11}
08/15/94	6/9	9.2×10^{-12}	3.3×10^{-11}	9.3×10^{-11}
08/22/94	6/9	1.3×10^{-11}	2.8×10^{-11}	6.5×10^{-11}
08/29/94	4/9	-4.0×10^{-12}	2.6×10^{-11}	1.0×10^{-10}
09/5/94	4/9	-1.5×10^{-12}	5.5×10^{-11}	6.0×10^{-11}
09/12/94	7/9	2.8×10^{-11}	4.8×10^{-11}	1.3×10^{-10}

Table 4-3. Gross alpha and gross beta (Bq/mL) in air particulate samples summarized by week, Site 300, 1994.

Week	Detection Frequency	Median[a]	Interquartile Range	Maximum[a]
Gross alpha				
09/19/94	3/9	-1.2×10^{-11}	1.1×10^{-11}	5.3×10^{-11}
9/26/94	1/8	-4.8×10^{-11}	—[b]	9.5×10^{-11}
10/3/94	3/9	-2.1×10^{-11}	7.0×10^{-12}	2.4×10^{-11}
10/10/94	1/9	-2.5×10^{-11}	—[b]	5.7×10^{-11}
10/17/94	5/8	2.3×10^{-12}	4.6×10^{-11}	7.5×10^{-11}
10/24/94	2/9	-3.3×10^{-11}	—[b]	4.6×10^{-11}
10/31/94	4/8	-9.1×10^{-12}	9.2×10^{-12}	4.4×10^{-11}
11/7/94	3/9	-8.1×10^{-12}	2.8×10^{-12}	2.6×10^{-11}
11/14/94	5/9	1.5×10^{-12}	7.5×10^{-12}	2.7×10^{-11}
11/21/94	0/9	-2.4×10^{-11}	—[b]	-8.5×10^{-12}
11/28/94	2/9	-1.5×10^{-11}	—[b]	5.8×10^{-11}
12/5/94	6/9	1.2×10^{-11}	2.8×10^{-11}	8.5×10^{-11}
12/12/94	5/9	2.4×10^{-12}	2.9×10^{-11}	1.3×10^{-10}
12/19/94	2/7	-2.1×10^{-11}	5.7×10^{-12}	6.9×10^{-11}
12/26/94	0/7	-2.8×10^{-11}	—[b]	-1.6×10^{-11}
01/2/95	1/8	-3.5×10^{-11}	—[b]	7.5×10^{-12}
Gross beta				
1/10/94	8/8	4.1×10^{-10}	2.9×10^{-10}	1.0×10^{-9}
1/17/94	8/8	1.1×10^{-9}	1.1×10^{-10}	1.3×10^{-9}
1/24/94	9/9	2.3×10^{-9}	5.9×10^{-10}	3.1×10^{-9}
1/31/94	9/9	6.1×10^{-10}	5.9×10^{-11}	7.5×10^{-10}
2/7/94	9/9	1.5×10^{-9}	1.1×10^{-10}	2.3×10^{-9}
2/14/94	9/9	3.6×10^{-10}	2.0×10^{-10}	5.3×10^{-10}
2/21/94	9/9	3.9×10^{-10}	5.2×10^{-11}	6.1×10^{-10}
2/28/94	9/9	2.7×10^{-10}	9.5×10^{-11}	3.7×10^{-10}
3/7/94	9/9	3.8×10^{-10}	1.4×10^{-10}	6.8×10^{-10}
3/14/94	8/8	4.8×10^{-10}	1.2×10^{-10}	6.0×10^{-10}
3/21/94	8/8	3.0×10^{-10}	8.5×10^{-11}	3.6×10^{-10}
3/28/94	9/9	3.7×10^{-10}	7.4×10^{-11}	5.6×10^{-10}
4/4/94	9/9	3.1×10^{-10}	1.2×10^{-10}	4.8×10^{-10}
4/11/94	9/9	2.2×10^{-10}	7.3×10^{-11}	3.0×10^{-10}
4/18/94	9/9	4.6×10^{-10}	9.0×10^{-11}	6.3×10^{-10}
4/25/94	9/9	2.2×10^{-10}	5.1×10^{-11}	3.9×10^{-10}
5/2/94	9/9	2.6×10^{-10}	8.8×10^{-11}	3.7×10^{-10}
5/9/94	9/9	1.6×10^{-10}	1.0×10^{-10}	2.9×10^{-10}
5/16/94	9/9	3.5×10^{-10}	1.5×10^{-10}	4.7×10^{-10}
5/23/94	9/9	2.0×10^{-10}	1.1×10^{-10}	3.1×10^{-10}

Table 4-3, Gross alpha and gross beta (Bq/mL) in air particulate samples summarized by week, Site 300, 1994.

Week	Detection Frequency	Median[(a)]	Interquartile Range	Maximum[(a)]
Gross beta				
05/30/94	9/9	4.6×10^{-10}	6.2×10^{-11}	5.4×10^{-10}
6/6/94	9/9	3.5×10^{-10}	7.5×10^{-11}	4.3×10^{-10}
6/13/94	9/9	3.7×10^{-10}	1.4×10^{-10}	5.3×10^{-10}
6/20/94	9/9	3.2×10^{-10}	1.0×10^{-10}	3.9×10^{-10}
6/27/94	9/9	5.0×10^{-10}	1.0×10^{-10}	6.7×10^{-10}
7/4/94	8/8	3.2×10^{-10}	1.6×10^{-10}	5.0×10^{-10}
7/11/94	9/9	4.9×10^{-10}	2.2×10^{-10}	7.0×10^{-10}
7/18/94	9/9	4.9×10^{-10}	3.0×10^{-11}	5.6×10^{-10}
7/25/94	9/9	3.1×10^{-10}	1.7×10^{-10}	4.4×10^{-10}
8/1/94	8/8	4.2×10^{-10}	1.2×10^{-10}	6.5×10^{-10}
8/8/94	8/8	3.4×10^{-10}	1.5×10^{-10}	4.9×10^{-10}
8/15/94	9/9	4.5×10^{-10}	9.9×10^{-11}	5.8×10^{-10}
8/22/94	9/9	6.4×10^{-10}	1.1×10^{-10}	8.2×10^{-10}
8/29/94	9/9	4.0×10^{-10}	9.2×10^{-11}	5.1×10^{-10}
9/5/94	9/9	5.4×10^{-10}	1.3×10^{-10}	8.0×10^{-10}
9/12/94	9/9	3.2×10^{-10}	1.6×10^{-10}	5.2×10^{-10}
9/19/94	9/9	1.0×10^{-9}	1.5×10^{-10}	1.1×10^{-9}
9/26/94	8/8	1.0×10^{-9}	2.7×10^{-10}	1.2×10^{-9}
10/3/94	9/9	8.6×10^{-10}	1.1×10^{-10}	1.2×10^{-9}
10/10/94	9/9	8.3×10^{-10}	4.6×10^{-11}	1.6×10^{-9}
10/17/94	8/8	6.9×10^{-10}	1.5×10^{-10}	8.5×10^{-10}
10/24/94	9/9	1.6×10^{-9}	2.4×10^{-10}	2.0×10^{-9}
10/31/94	8/8	4.9×10^{-10}	1.3×10^{-10}	7.1×10^{-10}
11/7/94	9/9	2.2×10^{-10}	6.7×10^{-11}	6.0×10^{-10}
11/14/94	9/9	2.8×10^{-10}	1.8×10^{-10}	5.1×10^{-10}
11/21/94	9/9	5.3×10^{-10}	1.8×10^{-10}	7.1×10^{-10}
11/28/94	9/9	6.6×10^{-10}	1.6×10^{-10}	1.1×10^{-9}
12/5/94	9/9	4.7×10^{-10}	4.3×10^{-10}	1.3×10^{-9}
12/12/94	9/9	4.1×10^{-10}	1.8×10^{-10}	5.9×10^{-10}
12/19/94	7/7	4.4×10^{-10}	3.3×10^{-10}	1.0×10^{-9}
12/26/94	7/7	5.8×10^{-10}	2.5×10^{-10}	1.5×10^{-9}
01/2/95	8/8	7.1×10^{-10}	2.3×10^{-10}	1.1×10^{-9}

a Negative values are not considered detections.

b Interquartile range not calculated. See Chapter 14, Quality Assurance.

Table 4-4. Gamma activity on air filters, Livermore-site perimeter, 1994.[a]

	(10^{-9} Bq/mL)	(10^{-12} Bq/mL)		
Month	**^{7}Be**	**^{40}K**	**^{137}Cs**	**^{22}Na**
Jan	4.0 ± 0.15	<4.40	<0.24	<0.25
Feb	4.8 ± 0.09	<6.33	<0.24	<0.26
Mar	6.1 ± 0.10	<4.70	<0.17	<0.55
Apr	3.0 ± 0.07	<7.29	<0.22	<0.26
May	3.3 ± 0.07	<9.03	<0.16	<0.24
Jun	4.4 ± 0.07	25.2 ± 12.3	0.48 ± 0.40	0.63 ± 0.40
Jul	3.3 ± 0.06	24.7 ± 16.2	<0.22	<0.22
Aug	5.6 ± 0.10	24.6 ± 6.7	0.40 ± 0.29	0.62 ± 0.36
Sep	5.6 ± 0.09	27.1 ± 15.3	0.48 ± 0.38	<0.22
Oct	5.2 ± 0.14	<6.85	<0.25	<0.27
Nov	4.9 ± 0.09	<5.03	<0.28	<0.27
Dec	4.2 ± 0.10	<5.66	<0.21	<0.23
Median	**4.6**	**<7.07**	**<0.24**	**<0.26**
Interquartile range	**1.45**	**<24.62**	**—[b]**	**—[b]**
Maximum	**6.14**	**27.08**	**0.48**	**0.63**
DCG[c]	**1.5×10^{-3}**	**3.3×10^{-5}**	**1.5×10^{-5}**	**3.7×10^{-5}**
Fraction of DCG	**3.1×10^{-6}**	**$<2.1 \times 10^{-7}$**	**$<1.6 \times 10^{-8}$**	**$<7.0 \times 10^{-9}$**
	(μCi/mL)			
Median	**1.2×10^{-13}**	**$<1.9 \times 10^{-16}$**	**$<6.4 \times 10^{-18}$**	**$<7.0 \times 10^{-18}$**
Interquartile range	**3.9×10^{-14}**	**$<6.7 \times 10^{-16}$**	**—[b]**	**—[b]**
Maximum	**1.7×10^{-13}**	**7.3×10^{-16}**	**1.3×10^{-17}**	**1.7×10^{-17}**
DCG[c]	**4×10^{-8}**	**9×10^{-10}**	**4×10^{-10}**	**1×10^{-9}**

Table 4-4. Gamma activity on air filters, Livermore-site perimeter, 1994[a].

Month	(10^{-12} Bq/mL)		
	^{226}Ra	^{228}Ra	^{228}Th
Jan	<0.53	<0.91	<0.57
Feb	<0.48	<1.03	<0.55
Mar	<0.36	<1.22	<0.66
Apr	<0.48	<1.00	<0.53
May	<0.40	<0.92	<0.50
Jun	<0.39	3.5 ± 1.9	1.2 ± 0.80
Jul	<0.46	2.2 ± 2.0	1.4 ± 0.82
Aug	<0.43	<0.57	<1.34
Sep	1.9 ± 0.93	3.0 ± 2.1	<0.79
Oct	<0.54	<2.51	<0.63
Nov	<0.59	<1.10	<0.97
Dec	<0.43	<0.96	<0.52
Median	**<0.47**	**<1.07**	**<0.64**
Interquartile range	**—[b]**	**—[b]**	**—[b]**
Maximum	**1.85**	**3.52**	**1.39**
DCG[c]	**3.7×10^{-8}**	**1.1×10^{-7}**	**1.5×10^{-9}**
Fraction of DCG	**$<1.3 \times 10^{-5}$**	**$<9.7 \times 10^{-6}$**	**$<4.3 \times 10^{-4}$**
	(μCi/mL)		
Median	**$<1.3 \times 10^{-17}$**	**$<2.9 \times 10^{-17}$**	**$<1.7 \times 10^{-17}$**
Interquartile range	**—[b]**	**—[b]**	**—[b]**
Maximum	**5.0×10^{-17}**	**9.5×10^{-17}**	**3.8×10^{-17}**
DCG[c]	**1×10^{-12}**	**3×10^{-12}**	**4×10^{-14}**

Note: Radionuclide results are reported ±2s. See Chapter 14, Quality Assurance.

a All Livermore-site perimeter samples composited. See Figure 4-1, Volume 1 for sampling locations.

b No measure of dispersion calculated. See Chapter 14, Quality Assurance.

c Derived Concentration Guide.

Table 4-5. Gamma activity on air filters, Site 300, 1994.[a]

Month	(10^{-9} Bq/mL)	(10^{-12} Bq/mL)		
	^{7}Be	^{40}K	^{137}Cs	^{22}Na
Jan	3.89 ± 0.06	7.84 ± 2.59	<0.10	<0.12
Feb	3.81 ± 0.14	<2.76	<0.16	<0.41
Mar	5.77 ± 0.13	<4.33	<0.16	0.78 ± 0.41
Apr	3.50 ± 0.06	<2.64	<0.13	<0.61
May	4.44 ± 0.07	6.96 ± 4.60	<0.10	0.64 ± 0.28
Jun	6.44 ± 0.09	<2.71	<0.14	1.00 ± 0.41
Jul	5.81 ± 0.15	14.2 ± 4.73	0.51 ± 0.25	0.56 ± 0.27
Aug	7.77 ± 0.30	<5.22	0.41 ± 0.35	0.81 ± 0.59
Sept	6.62 ± 0.11	<10.4	0.39 ± 0.25	0.30 ± 0.26
Oct	6.25 ± 0.10	<4.40	<0.17	<0.18
Nov	3.24 ± 0.06	<3.36	<0.14	<0.15
Dec	3.21 ± 0.06	<2.69	<0.13	<0.14
Median	**5.11**	**<4.37**	**<0.15**	**<0.48**
Interquartile range	**2.57**	**—[b]**	**—[b]**	**<0.67**
Maximum	**7.77**	**14.17**	**0.51**	**1.00**
DCG[c]	**1.5×10^{-3}**	**3.3×10^{-5}**	**1.5×10^{-5}**	**3.7×10^{-5}**
Fraction of DCG	**3.4×10^{-6}**	**$<1.3 \times 10^{-7}$**	**$<1.0 \times 10^{-8}$**	**$<1.3 \times 10^{-8}$**
	(μCi/mL)			
Median	**1.4×10^{-13}**	**$<1.2 \times 10^{-16}$**	**$<4.1 \times 10^{-18}$**	**$<1.3 \times 10^{-17}$**
Interquartile range	**6.9×10^{-14}**	**—[b]**	**—[b]**	**$<1.8 \times 10^{-17}$**
Maximum	**2.1×10^{-13}**	**3.8×10^{-16}**	**1.4×10^{-17}**	**2.7×10^{-17}**
DCG[c]	**4×10^{-8}**	**9×10^{-10}**	**4×10^{-10}**	**1×10^{-9}**

Table 4-5. Gamma activity on air filters, Site 300, 1994.[a]

Month	(10^{-12} Bq/mL)		
	^{226}Ra	^{228}Ra	^{228}Th
Jan	<0.31	<0.41	<0.32
Feb	<0.34	<0.61	<0.44
Mar	<0.32	<0.74	<0.46
Apr	<0.35	<0.47	<0.39
May	<0.22	<0.37	<0.28
Jun	<0.27	<0.54	<0.40
Jul	1.06 ± 0.57	1.09 ± 0.64	1.22 ± 0.54
Aug	<0.99	<0.96	<0.57
Sept	1.27 ± 0.80	1.86 ± 1.34	0.88 ± 0.78
Oct	<1.14	<0.69	<0.43
Nov	<0.32	<0.54	<0.33
Dec	<0.27	<0.56	<0.33
Median	**<0.33**	**<0.59**	**<0.41**
Interquartile range	**—[b]**	**—[b]**	**—[b]**
Maximum	**1.27**	**1.86**	**1.22**
DCG[c]	**3.7×10^{-8}**	**1.1×10^{-7}**	**1.5×10^{-9}**
Fraction of DCG	**$<9 \times 10^{-6}$**	**$<5.3 \times 10^{-6}$**	**$<2.8 \times 10^{-4}$**
	(μCi/mL)		
Median	**$<9.0 \times 10^{-18}$**	**$<1.6 \times 10^{-17}$**	**$<1.1 \times 10^{-17}$**
Interquartile range	**—[b]**	**—[b]**	**—[b]**
Maximum	**3.4×10^{-17}**	**5.0×10^{-17}**	**3.3×10^{-17}**
DCG[c]	**1×10^{-12}**	**3×10^{-12}**	**4×10^{-14}**

Note: Radionuclide results are reported ±2s. See Chapter 14, Quality Assurance.

a All Livermore-site perimeter samples composited. See Figure 4-1, Volume 1 for sampling locations.

b No measure of dispersion calculated. See Chapter 14, Quality Assurance.

c Derived Concentration Guide.

Table 4-6. Plutonium-239 activity on air filters (in 10^{-15} Bq/mL), Livermore Valley, 1994.

Month	Sampling Location[a]					
	TANK	ZON7	FCC	HOSP	LWRP	FIRE
Jan	0.84 ± 5.92	–5.92 ± 7.07	6.55 ± 9.29	1.39 ± 9.81	6.25 ± 25.49	–5.51 ± 12.91
Feb	4.96 ± 8.99	1.28 ± 14.84	2.26 ± 15.32	–43.66 ± 65.49	15.91 ± 17.32	1.93 ± 15.80
Mar	3.33 ± 5.59	7.99 ± 7.81	–3.03 ± 10.21	–0.0005 ± 13.06	–3.34 ± 12.10	4.85 ± 17.09
Apr	2.66 ± 10.06	8.62 ± 11.62	–3.62 ± 8.47	–4.37 ± 11.36	1.57 ± 13.17	–6.14 ± 22.53
May	6.88 ± 19.65	1.37 ± 9.32	–2.94 ± 9.14	10.69 ± 20.50	19.87 ± 15.02	–8.88 ± 25.64
Jun	0.98 ± 21.42	14.10 ± 10.58	8.95 ± 11.77	11.84 ± 18.50	65.86 ± 25.64	16.43 ± 29.90
Jul	–0.73 ± 17.54	16.61 ± 15.13	–15.36 ± 33.15	16.84 ± 11.25	–0.0006 ± 19.65	8.47 ± 13.10
Aug	1.45 ± 8.40	10.99 ± 14.62	11.21 ± 14.36	3.12 ± 8.47	34.60 ± 22.20	18.28 ± 23.94
Sep	10.25 ± 18.28	–5.25 ± 17.76	0.41 ± 8.51	5.74 ± 8.14	39.96 ± 16.35	6.36 ± 11.88
Oct	12.91 ± 19.98	12.03 ± 18.32	64.75 ± 63.64	–1.10 ± 26.23	46.99 ± 28.23	29.12 ± 22.79
Nov	8.92 ± 13.80	6.77 ± 7.55	4.03 ± 20.09	6.66 ± 12.69	3.92 ± 10.36	–4.74 ± 13.39
Dec	3.74 ± 26.31	5.74 ± 11.06	–1.73 ± 7.14	3.56 ± 9.58	3.26 ± 10.62	3.59 ± 6.88
Median	**3.53**	**7.38**	**1.33**	**3.34**	**11.08**	**4.22**
IQR[c]	**6.05**	**9.90**	**7.15**	**7.67**	**33.10**	**10.46**
Fraction of DCG[d]	**4.8×10^{-6}**	**1.0×10^{-5}**	**1.8×10^{-6}**	**4.5×10^{-6}**	**1.5×10^{-5}**	**5.7×10^{-6}**
(μCi/mL)						
Median	**9.6×10^{-20}**	**2.0×10^{-19}**	**3.6×10^{-20}**	**9.0×10^{-20}**	**3.0×10^{-19}**	**1.1×10^{-19}**
IQR[c]	**1.6×10^{-19}**	**2.7×10^{-19}**	**1.9×10^{-19}**	**2.1×10^{-19}**	**8.9×10^{-19}**	**2.8×10^{-19}**

Table 4-6. Plutonium-239 activity on air filters (in 10^{-15} Bq/mL), Livermore Valley, 1994.

Month	Sampling Location[a]					
	TFIR	ALTA	ERCH	LCCY	RRCH	PATT
Jan	10.18 ± 11.29	–0.89 ± 5.18	0.81 ± 5.74	–43.29 ± 35.45	5.92 ± 11.40	–8.81 ± 11.54
Feb	15.02 ± 17.87	–1.33 ± 30.82	7.96 ± 12.28	18.50 ± 13.91	–3.41 ± 15.39	–5.00 ± 11.66
Mar	2.63 ± 7.14	–7.55 ± 16.80	1.54 ± 10.43	–1.58 ± 6.51	–7.73 ± 8.66	–2.30 ± 3.26
Apr	4.88 ± 12.25	4.44 ± 8.47	–1.98 ± 8.95	7.44 ± 16.54	2.34 ± 9.55	6.36 ± 15.06
May	–1.66 ± 7.47	4.77 ± 6.73	–8.84 ± 51.80	7.73 ± 14.50	0.0001 ± 6.62	–1.78 ± 7.99
Jun	19.31 ± 26.20	1.27 ± 14.76	11.14 ± 9.84	–10.58 ± 18.69	11.10 ± 13.17	5.96 ± 15.69
Jul	6.40 ± 16.39	20.76 ± 35.11	20.39 ± 27.68	—[b]	9.44 ± 14.39	12.47 ± 13.95
Aug	5.44 ± 10.43	–12.40 ± 16.21	8.21 ± 12.84	—[b]	4.63 ± 7.81	6.48 ± 12.51
Sep	–1.75 ± 7.88	3.00 ± 13.76	0.93 ± 10.84	—[b]	10.58 ± 16.21	–4.03 ± 15.02
Oct	10.84 ± 33.78	43.66 ± 39.22	34.11 ± 32.52	—[b]	11.84 ± 18.32	41.81 ± 28.08
Nov	–0.84 ± 4.92	–2.69 ± 3.81	13.02 ± 15.21	—[b]	–2.23 ± 9.18	34.52 ± 52.54
Dec	7.70 ± 7.18	9.99 ± 11.06	5.33 ± 7.55	—[b]	–3.10 ± 13.51	2.08 ± 9.32
Median	**5.92**	**2.13**	**6.64**	**2.93**	**3.48**	**4.02**
IQR[c]	**8.58**	**6.08**	**10.71**	**7.66**	**9.72**	**7.97**
Fraction of DCG[d]	**8.0×10^{-6}**	**2.9×10^{-6}**	**9.0×10^{-6}**	**4.0×10^{-6}**	**4.7×10^{-6}**	**5.4×10^{-6}**
(μCi/mL)						
Median	**1.6×10^{-19}**	**5.8×10^{-20}**	**1.8×10^{-19}**	**7.9×10^{-20}**	**9.4×10^{-20}**	**1.1×10^{-19}**
IQR[c]	**2.3×10^{-19}**	**1.6×10^{-19}**	**2.9×10^{-19}**	**2.1×10^{-19}**	**2.6×10^{-19}**	**2.2×10^{-19}**

Note: Radionuclide results are reported ±2σ. See Chapter 14, Quality Assurance.

a See Figure 4-2, Volume 1 for sampling locations. Location TFIR is in Tracy.

b No data. See Chapter 14, Quality Assurance.

c Interquartile range.

d Derived Concentration Guide (DCG) = 7.4×10^{-10} Bq/mL for ^{239}Pu activity in air (2×10^{-14} μCi/mL).

Table 4-7. Plutonium activity on air filters (in 10^{-15} Bq/mL), Livermore-site perimeter, 1994.

Month	Sampling Location[a]					
	SALV	MESQ	CAFE	MET	VIS	COW
Jan	18.35 ± 21.94	21.90 ± 20.09	32.41 ± 19.31	19.87 ± 16.69	10.66 ± 15.10	15.61 ± 14.21
Feb	31.08 ± 32.23	23.38 ± 18.76	42.92 ± 33.56	23.53 ± 17.02	31.78 ± 26.71	22.61 ± 19.87
Mar	20.72 ± 17.61	0.72 ± 20.05	29.79 ± 38.11	23.75 ± 19.43	22.46 ± 14.80	17.21 ± 31.34
Apr	19.61 ± 17.24	22.76 ± 15.36	20.87 ± 17.09	12.91 ± 9.69	13.47 ± 13.06	12.03 ± 12.58
May	18.24 ± 15.17	8.81 ± 13.65	32.19 ± 18.24	16.39 ± 14.39	20.17 ± 13.62	14.32 ± 13.36
Jun	8.47 ± 42.55	27.34 ± 26.57	33.71 ± 16.13	16.95 ± 12.17	44.40 ± 38.11	23.94 ± 14.69
Jul	18.83 ± 22.94	25.72 ± 15.17	34.45 ± 16.39	33.08 ± 17.43	39.96 ± 27.12	30.01 ± 16.35
Aug	12.54 ± 24.20	26.27 ± 17.21	338.9 ± 74.37	18.28 ± 36.59	22.16 ± 24.42	48.47 ± 93.24
Sep	32.04 ± 19.28	63.64 ± 30.90	50.32 ± 31.08	50.69 ± 34.74	62.16 ± 34.63	44.03 ± 31.97
Oct	37.37 ± 31.01	34.63 ± 23.79	42.18 ± 30.45	37.74 ± 44.03	22.16 ± 19.09	25.72 ± 21.61
Nov	4.96 ± 9.51	21.35 ± 12.80	13.88 ± 11.32	31.04 ± 13.88	18.80 ± 12.06	16.06 ± 10.58
Dec	17.06 ± 12.73	15.87 ± 11.25	36.70 ± 16.17	14.25 ± 8.95	32.23 ± 12.03	24.53 ± 12.43
Median	**18.59**	**23.07**	**34.08**	**21.70**	**22.31**	**23.27**
IQR[b]	**7.38**	**6.56**	**10.78**	**14.74**	**14.34**	**10.84**
Fraction of DCG[c]	**2.5×10^{-5}**	**3.1×10^{-5}**	**4.6×10^{-5}**	**2.9×10^{-5}**	**3.0×10^{-5}**	**3.1×10^{-5}**
(μCi/mL)						
Median	**5.0×10^{-19}**	**6.2×10^{-19}**	**9.2×10^{-19}**	**5.9×10^{-19}**	**6.0×10^{-19}**	**6.3×10^{-19}**
IQR[b]	**2.0×10^{-19}**	**1.8×10^{-19}**	**2.9×10^{-19}**	**4.0×10^{-19}**	**3.9×10^{-19}**	**2.9×10^{-19}**

Note: Radionuclide results are reported ±2σ. See Chapter 14, Quality Assurance.

a See Figure 4-2, Volume 1 for sampling locations. Location TFIR is in Tracy.

b Interquartile range.

c Derived Concentration Guide (DCG) = 7.4×10^{-10} Bq/mL for ^{239}Pu activity in air (2×10^{-14} μCi/mL).

Table 4-8. Plutonium activity on air filters (in 10^{-15} Bq/mL), diffuse sources.

Month	Location[a]	
	B531	CRED
Jan	34.93 ± 18.72	–0.91 ± 21.05
Feb	40.33 ± 18.46	9.18 ± 12.21
Mar	64.75 ± 21.05	8.29 ± 8.58
Apr	127.7 ± 29.90	19.61 ± 12.80
May	204.2 ± 46.25	38.11 ± 29.42
Jun	521.7 ± 73.26	11.36 ± 17.61
Jul	243.5 ± 50.32	3.33 ± 35.52
Aug	414.4 ± 61.42	20.98 ± 17.43
Sep	458.8 ± 62.16	33.26 ± 14.80
Oct	377.4 ± 113.2	20.65 ± 35.34
Nov	30.30 ± 16.32	–0.74 ± 8.10
Dec	38.85 ± 18.65	8.14 ± 8.51
Median	**166.0**	**10.27**
Interquartile range	**346.7**	**13.79**
Fraction of DCG[b]	**2.2×10^{-4}**	**1.4×10^{-5}**
	(μCi/mL)	
Median	**4.5×10^{-18}**	**2.8×10^{-19}**
Interquartile range	**9.4×10^{-18}**	**3.7×10^{-19}**

Note: Radionuclide results are reported ±2σ; See Chapter 14, Quality Assurance.

a See Figure 4-1, Volume 1 for sampling locations.

b Derived Concentration Guide (DCG) = 7.4×10^{-10} Bq/mL for ^{239}Pu activity in air (2×10^{-14} μCi/mL).

Table 4-9. Plutonium activity on air filters, Site 300, 1994.[a]

Month	(10^{-15} Bq/mL) ^{239}Pu
Jan	0.61 ± 1.03
Feb	2.26 ± 2.70
Mar	2.96 ± 2.50
Apr	6.51 ± 2.39
May	3.31 ± 2.91
Jun	2.72 ± 2.98
Jul	6.99 ± 2.86
Aug	11.80 ± 6.29
Sep	4.29 ± 3.03
Oct	7.62 ± 4.70
Nov	5.66 ± 2.16
Dec	4.33 ± 1.78
Median	**4.31**
Interquartile range	**3.74**
Fraction of DCG[b]	**5.8×10^{-6}**
	(μCi/mL)
Median	**1.2×10^{-19}**
Interquartile range	**1.0×10^{-19}**

Note: Radionuclide results are reported ±2σ. See Chapter 14, Quality Assurance.

a See Figure 4-3, Volume 1 for sampling locations.

b Derived Concentration Guide (DCG) = 7.4×10^{-10} Bq/mL for ^{239}Pu activity in air (2×10^{-14} μCi/mL).

Table 4-10. Uranium activity on air filters, Livermore-site perimeter, 1994.

Location[a]	Month	(10^{-5} μg/m^3) Uranium-238	(10^{-7} μg/m^3) Uranium-235	(10^{-3}) Uranium-235/238
SALV	Jan	3.17	2.32	7.33
	Feb	3.44	4.14	12.0
	Mar	3.56	2.57	7.22
	Apr	3.06	2.57	8.39
	May	3.44	2.56	7.46
	Jun	5.35	5.17	9.68
	Jul	6.32	5.36	8.49
	Aug	8.11	5.95	7.34
	Sep	9.58	7.02	7.33
	Oct	9.78	6.78	6.93
	Nov	1.71	1.24	7.25
	Dec	1.23	0.73	5.96
Median		**3.50**	**3.36**	**7.34**
Interquartile range		**3.63**	**3.01**	**1.17**
Maximum		**9.78**	**7.02**	
Fraction of DCG		**1.2×10^{-4}[b]**	**7.1×10^{-6}[c]**	
MESQ	Jan	4.55	3.31	7.27
	Feb	4.08	2.86	7.02
	Mar	3.81	2.67	6.99
	Apr	3.20	2.15	6.72
	May	3.41	2.38	6.98
	Jun	9.00	6.93	7.70
	Jul	5.79	4.57	7.90
	Aug	5.98	4.42	7.39
	Sep	7.85	5.78	7.37
	Oct	8.54	5.94	6.96
	Nov	3.98	3.02	7.58
	Dec	1.47	0.94	6.36
Median		**4.32**	**3.17**	**7.15**
Interquartile range		**2.74**	**2.28**	**0.46**
Maximum		**9.00**	**6.93**	
Fraction of DCG		**1.4×10^{-4}[b]**	**6.7×10^{-6}[c]**	

Table 4-10. Uranium activity on air filters, Livermore-site perimeter, 1994.

Location[a]	Month	(10^{-5} μg/m^3) Uranium-238	(10^{-7} μg/m^3) Uranium-235	(10^{-3}) Uranium-235/238
CAFE	Jan	5.13	3.71	7.24
	Feb	5.75	4.04	7.03
	Mar	5.14	3.58	6.97
	Apr	3.71	2.60	7.00
	May	4.88	3.49	7.15
	Jun	6.54	5.36	8.20
	Jul	7.88	6.07	7.70
	Aug	9.05	6.44	7.11
	Sep	11.6	8.39	7.24
	Oct	8.37	5.90	7.04
	Nov	2.26	1.68	7.46
	Dec	1.83	1.17	6.42
Median		**5.45**	**3.88**	**7.13**
Interquartile range		**3.42**	**2.68**	**0.27**
Maximum		**11.6**	**8.39**	
Fraction of DCG		**1.8×10^{-4}[b]**	**8.2×10^{-6}[c]**	
MET	Jan	3.31	2.39	7.22
	Feb	2.97	2.07	6.99
	Mar	3.99	2.81	7.03
	Apr	2.91	1.93	6.63
	May	3.02	2.18	7.22
	Jun	4.56	4.24	9.28
	Jul	6.11	4.58	7.50
	Aug	6.63	4.59	6.93
	Sep	8.05	7.03	8.74
	Oct	8.86	6.29	7.10
	Nov	1.70	1.29	7.57
	Dec	1.31	0.75	5.69
Median		**3.65**	**2.60**	**7.16**
Interquartile range		**3.29**	**2.55**	**0.54**
Maximum		**8.86**	**7.03**	
Fraction of DCG		**1.2×10^{-4}[b]**	**5.5×10^{-6}[c]**	

Table 4-10. Uranium activity on air filters, Livermore-site perimeter, 1994.

Location[a]	Month	(10^{-5} μg/m^3) Uranium-238	(10^{-7} μg/m^3) Uranium-235	(10^{-3}) Uranium-235/238
VIS	Jan	3.25	2.36	7.28
	Feb	3.30	2.42	7.32
	Mar	3.12	2.24	7.17
	Apr	2.82	2.02	7.16
	May	2.80	2.06	7.36
	Jun	3.82	3.06	8.00
	Jul	4.22	3.12	7.41
	Aug	5.21	3.70	7.10
	Sep	7.09	5.50	7.76
	Oct	7.96	5.64	7.08
	Nov	2.86	2.09	7.33
	Dec	1.08	0.73	6.76
Median		**3.28**	**2.39**	**7.30**
Interquartile range		**1.62**	**1.18**	**0.23**
Maximum		**7.96**	**5.64**	
Fraction of DCG		**1.1×10^{-4}[b]**	**5.1×10^{-6}[c]**	
COW	Jan	4.31	3.18	7.40
	Feb	4.23	3.00	7.08
	Mar	5.42	3.97	7.33
	Apr	3.55	2.48	6.97
	May	4.70	3.46	7.37
	Jun	7.93	5.54	6.99
	Jul	6.76	5.07	7.50
	Aug	8.30	6.07	7.32
	Sep	10.3	7.31	7.11
	Oct	10.8	7.64	7.06
	Nov	1.91	1.49	7.81
	Dec	1.42	0.89	6.26
Median		**5.06**	**3.72**	**7.22**
Interquartile range		**3.96**	**2.80**	**0.34**
Maximum		**10.80**	**7.64**	
Fraction of DCG		**1.7×10^{-4}[b]**	**7.9×10^{-6}[c]**	

a See Figure 4-1, Volume 1 for sampling locations.

b Derived Concentration Guide (DCG) = 0.3μg/m^3 for ^{238}U activity in air.

c Derived Concentration Guide = 0.047 μg/m^3 for ^{235}U activity in air.

Table 4-11. Uranium activity on air filters, Site 300, 1994.

Location	Month	(10^{-5} μg/m^3) Uranium-238	(10^{-7} μg/m^3) Uranium-235	(10^{-3}) Uranium-235/238
Site 300[a]	Jan	2.60	1.82	7.02
	Feb	2.65	1.86	7.00
	Mar	2.41	1.71	7.12
	Apr	5.16	2.82	5.46
	May	3.68	2.26	6.12
	Jun	4.51	3.01	6.66
	Jul	6.43	4.35	6.77
	Aug	6.31	4.33	6.86
	Sep	8.15	21.0	25.8
	Sep[b]	9.70	6.73	6.94
	Oct	50.0	15.2	3.04
	Oct[b]	49.2	14.8	3.01
	Nov	1.59	1.04	6.51
	Dec	12.4	2.98	2.40
Median		**4.84**	**2.90**	**6.72**
Interquartile range		**4.61**	**2.49**	**1.00**
Maximum		**50.0**	**21.0**	
Fraction of DCG		**1.6×10^{-4}[c]**	**6.2×10^{-6}[d]**	

a Composite of all Site 300 samples. See Figure 4-3, Volume 1 for sample locations.

b Reanalysis requested because of unusual results.

c Derived Concentration Guide (DCG) = 0.3μg/m^3 for ^{238}U activity in air.

d Derived Concentration Guide = 0.047 μg/m^3 for ^{235}U activity in air.

Table 4-12. Tritium in air (in 10^{-9} Bq/mL), Livermore Valley, 1994.

Month	Sampling Location[a]					
	ZON7	ALTA	LCCY	FIRE	XRDS	VET
Jan	40.0 ± 12.2	21.8 ± 10.1	32.1 ± 10.7	50.0 ± 18.1	60.7 ± 15.2	126.9 ± 17.9
	59.6 ± 15.1	15.2 ± 11.2	19.8 ± 13.6	26.5 ± 13.2	34.7 ± 16.0	89.2 ± 15.4
Feb	23.3 ± 12.1	28.7 ± 16.5	14.7 ± 11.4	26.3 ± 11.4	—[b]	65.1 ± 15.0
	26.8 ± 14.7	<15.4 ± 15.4	16.1 ± 10.8	<16.2 ± 16.2	<17.9 ± 17.9	40.0 ± 12.3
Mar	<14.6 ± 14.6	<13.7 ± 13.7	<13.8 ± 13.8	<15.2 ± 15.2	<18.5 ± 18.5	36.5 ± 19.5
	20.5 ± 12.6	13.5 ± 12.0	15.0 ± 12.5	16.1 ± 12.5	<12.5 ± 12.5	26.3 ± 14.0
Apr	55.5 ± 13.9	—[b]	16.4 ± 12.5	<14.1 ± 14.1	22.7 ± 12.9	29.9 ± 16.0
	52.9 ± 15.5	20.0 ± 15.0	18.2 ± 11.6	18.2 ± 13.5	36.6 ± 15.8	44.0 ± 15.8
May	33.7 ± 16.2	<16.1 ± 16.1	—[b]	—[b]	<12.8 ± 12.8	—[b]
	31.9 ± 15.8	<12.4 ± 12.4	—[b]	<14.4 ± 14.4	17.2 ± 14.4	<13.7 ± 13.7
Jun	44.8 ± 12.9	—[b]	—[b]	—[b]	29.0 ± 11.7	—[b]
	31.3 ± 12.8	<10.2 ± 10.2	—[b]	<11.7 ± 11.7	<10.4 ± 10.4	<13.1 ± 13.1
	52.2 ± 12.1	16.7 ± 10.2	—[b]	<11.1 ± 11.1	18.1 ± 10.5	16.5 ± 11.2
Jul	50.0 ± 15.3	14.0 ± 11.7	—[b]	<15.2 ± 15.2	15.6 ± 11.2	<13.8 ± 13.8
	39.2 ± 15.4	<11.7 ± 11.7	—[b]	<12.4 ± 12.4	20.5 ± 11.7	<12.5 ± 12.5
Aug	48.1 ± 15.4	14.7 ± 12.5	—[b]	<14.8 ± 14.8	<10.5 ± 10.5	<13.3 ± 13.3
	51.4 ± 12.5	19.6 ± 10.6	—[b]	<11.4 ± 11.4	12.4 ± 8.8	<10.4 ± 10.4
Sept	43.7 ± 15.1	<12.7 ± 12.7	—[b]	<14.0 ± 14.0	<11.8 ± 11.8	<12.3 ± 12.3
	109.9 ± 16.7	19.4 ± 12.7	—[b]	<14.0 ± 14.0	60.3 ± 13.8	19.1 ± 12.8
Oct	88.4 ± 18.0	29.5 ± 15.5	—[b]	20.9 ± 13.9	79.9 ± 15.5	56.6 ± 14.8
	47.7 ± 12.7	19.8 ± 10.3	—[b]	23.9 ± 12.9	23.6 ± 9.8	44.4 ± 12.4
Nov	36.1 ± 13.6	13.7 ± 11.7	—[b]	23.1 ± 13.9	14.7 ± 11.0	33.7 ± 13.1
	25.6 ± 17.8	<20.9 ± 20.9	—[b]	<14.2 ± 14.2	20.9 ± 14.9	101.4 ± 19.1
Dec	28.6 ± 12.1	<14.4 ± 14.4	—[b]	13.7 ± 10.8	15.1 ± 11.5	49.6 ± 11.0
	103.2 ± 18.9	30.7 ± 14.8	—[b]	48.1 ± 12.6	60.7 ± 14.4	81.0 ± 14.3
	76.6 ± 15.4	15.4 ± 12.9	—[b]	55.5 ± 13.1	69.2 ± 13.5	142.5 ± 15.0
Median[c]	**44.2**	**<15.4**	**16.3**	**<15.2**	**<18.5**	**35.1**
IQR[d]	**21.3**	**—[e]**	**3.6**	**<23.3**	**<34.7**	**<58.7**
Fraction of DCG[f]	**1.2×10^{-5}**	**$<4.2 \times 10^{-6}$**	**4.4×10^{-6}**	**$<4.1 \times 10^{-6}$**	**$<5.0 \times 10^{-6}$**	**9.5×10^{-6}**
Dose (mSv)[g]	**9.5×10^{-6}**	**3.3×10^{-6}**	**3.5×10^{-6}**	**3.3×10^{-6}**	**4.0×10^{-6}**	**7.5×10^{-6}**
			(μCi/mL)			
Median	**1.2×10^{-12}**	**$<4.2 \times 10^{-13}$**	**4.4×10^{-13}**	**$<4.1 \times 10^{-13}$**	**$<5.0 \times 10^{-13}$**	**9.5×10^{-13}**
IQR[d]	**5.8×10^{-13}**	**—[e]**	**9.9×10^{-14}**	**$<6.3 \times 10^{-13}$**	**$<9.4 \times 10^{-13}$**	**$<1.6 \times 10^{-12}$**
Dose (mrem)[g]	**9.5×10^{-4}**	**3.3×10^{-4}**	**3.5×10^{-4}**	**3.3×10^{-4}**	**4.0×10^{-4}**	**7.5×10^{-4}**

Note: Radionuclide results are reported ±2σ. See Chapter 14, Quality Assurance.

a See Figure 4-2, Volume 1 for sampling locations.

b No data. See Chapter 14, Quality Assurance.

c Livermore Valley overall median = 20.9×10^{-9} Bq/mL.

d Interquartile range.

e No measure of dispersion calculated. See Chapter 14, Quality Assurance.

f Derived Concentration Guide (DCG) = 3.7×10^{-3} Bq/mL (1×10^{-7} μCi/mL).

g This dose is the effective dose equivalent.

Table 4-13. Tritium in air (in 10^{-9} Bq/mL), Livermore-site perimeter, 1994.

	Sampling Location[a]						
	SALV	**MESQ**	**CAFE**	**MET**	**VIS**	**COW**	**POOL**
Jan	66.6 ± 11.0	108.0 ± 15.7	106.2 ± 14.1	67.3 ± 12.7	46.6 ± 11.3	45.5 ± 13.1	239.4 ± 18.2
	85.1 ± 10.6	115.4 ± 15.7	175.0 ± 16.8	67.0 ± 12.9	104.0 ± 16.2	75.9 ± 14.0	198.3 ± 16.5
Feb	—[b]	102.9 ± 17.0	120.6 ± 16.3	43.7 ± 12.7	55.9 ± 13.9	52.5 ± 14.3	203.5 ± 17.7
	55.9 ± 13.2	67.0 ± 15.9	116.2 ± 15.8	56.6 ± 17.1	74.0 ± 16.8	59.6 ± 16.8	164.7 ± 21.7
Mar	79.6 ± 18.0	45.9 ± 18.7	133.6 ± 20.4	42.9 ± 19.6	62.9 ± 20.4	41.1 ± 18.1	186.5 ± 20.3
	69.9 ± 9.2	51.8 ± 12.6	89.2 ± 12.4	17.4 ± 10.3	54.0 ± 12.0	34.7 ± 10.6	156.5 ± 13.6
Apr	279.0 ± 27.1	59.2 ± 15.9	94.7 ± 16.0	40.3 ± 15.3	101.8 ± 17.5	71.4 ± 16.1	152.4 ± 17.4
	236.1 ± 23.8	41.8 ± 13.7	121.7 ± 15.9	34.9 ± 14.2	112.5 ± 17.7	73.6 ± 17.0	151.7 ± 16.5
May	—[b]	<13.9 ± 13.9	22.7 ± 11.4	<13.4 ± 13.4	47.7 ± 17.6	36.7 ± 14.7	37.4 ± 10.9
	125.1 ± 21.3	<13.7 ± 13.7	21.4 ± 13.2	<14.7 ± 14.7	60.3 ± 17.1	31.7 ± 14.0	78.1 ± 16.2
Jun	132.1 ± 19.5	—[b]	35.0 ± 12.4	<11.2 ± 11.2	104.3 ± 16.9	52.2 ± 13.3	63.3 ± 12.8
	118.8 ± 17.3	16.2 ± 12.5	29.7 ± 13.1	19.5 ± 13.2	55.1 ± 15.0	27.8 ± 13.0	102.5 ± 15.2
	114.7 ± 17.0	<12.6 ± 12.6	42.2 ± 12.0	12.0 ± 11.2	101.4 ± 14.6	36.3 ± 11.7	72.2 ± 13.2
Jul	82.9 ± 19.9	<12.7 ± 12.7	28.3 ± 15.3	<12.8 ± 12.8	42.9 ± 15.0	<14.2 ± 14.2	25.9 ± 13.9
	72.9 ± 20.6	<15.1 ± 15.1	36.2 ± 15.7	18.2 ± 15.1	98.1 ± 18.9	41.4 ± 15.7	90.7 ± 17.2
Aug	57.0 ± 11.6	18.6 ± 13.3	36.9 ± 14.0	23.8 ± 13.1	145.8 ± 17.2	81.4 ± 15.5	111.0 ± 16.2
	106.9 ± 17.4	20.7 ± 13.4	53.7 ± 13.0	38.5 ± 13.4	139.5 ± 17.0	82.5 ± 14.2	87.7 ± 14.4
Sept	71.0 ± 19.1	<13.9 ± 13.9	48.1 ± 16.2	<15.0 ± 15.0	119.1 ± 18.6	58.1 ± 16.1	102.1 ± 17.3
	257.5 ± 23.7	21.2 ± 16.9	49.2 ± 15.6	32.2 ± 15.5	166.1 ± 19.3	113.2 ± 17.7	133.6 ± 17.6
Oct	204.2 ± 26.8	38.9 ± 15.1	108.0 ± 20.5	20.0 ± 18.2	128.0 ± 22.4	65.9 ± 19.1	168.7 ± 19.4
	126.9 ± 18.1	67.7 ± 15.0	116.6 ± 16.9	57.7 ± 14.9	84.7 ± 15.3	—[b]	161.0 ± 15.6
Nov	174.6 ± 21.0	73.6 ± 17.3	94.7 ± 15.7	46.6 ± 15.1	73.6 ± 16.4	57.7 ± 14.7	160.2 ± 18.3
	140.6 ± 21.7	43.3 ± 15.1	102.1 ± 15.5	18.4 ± 15.2	57.7 ± 16.9	29.0 ± 16.7	190.9 ± 17.9
Dec	113.2 ± 17.5	54.0 ± 13.5	81.8 ± 12.8	27.0 ± 10.5	52.9 ± 13.1	28.1 ± 10.8	131.4 ± 14.6
	283.1 ± 23.5	104.3 ± 14.2	160.6 ± 16.9	105.5 ± 16.7	178.3 ± 18.7	114.7 ± 17.5	186.5 ± 18.3
	225.7 ± 19.6	103.2 ± 14.2	129.9 ± 14.4	73.6 ± 13.6	102.5 ± 14.7	64.4 ± 12.2	—[b]
Median[c]	**116.7**	**43.3**	**91.9**	**29.6**	**91.4**	**52.5**	**151.7**
IQR[d]	**100.0**	**51.5**	**78.3**	**28.3**	**54.1**	**35.2**	**78.1**
Fraction of DCG[e]	**3.2×10^{-5}**	**1.2×10^{-5}**	**2.5×10^{-5}**	**8.0×10^{-6}**	**2.5×10^{-5}**	**1.4×10^{-5}**	**4.1×10^{-5}**
Dose (mSv)[f]	**2.5×10^{-5}**	**9.3×10^{-6}**	**2.0×10^{-5}**	**6.4×10^{-6}**	**2.0×10^{-5}**	**1.1×10^{-5}**	**3.3×10^{-5}**
				(μCi/mL)			
Median[c]	**3.2×10^{-12}**	**1.2×10^{-12}**	**2.5×10^{-12}**	**8.0×10^{-13}**	**2.5×10^{-12}**	**1.4×10^{-12}**	**4.1×10^{-12}**
IQR[d]	**2.7×10^{-12}**	**1.4×10^{-12}**	**2.1×10^{-12}**	**7.6×10^{-13}**	**1.5×10^{-12}**	**9.5×10^{-13}**	**2.1×10^{-12}**
Dose (mrem)[f]	**2.5×10^{-3}**	**9.3×10^{-4}**	**2.0×10^{-3}**	**6.4×10^{-4}**	**2.0×10^{-3}**	**1.1×10^{-3}**	**3.3×10^{-3}**

Note: Radionuclide results are reported ±2σ. See Chapter 14, Quality Assurance.

a See Figure 4-2, Volume 1 for sampling locations.

b No data. See Chapter 14, Quality Assurance.

c Livermore-site perimeter overall median = 59.9×10^{-9} Bq/mL.

d Interquartile range.

e Derived Concentration Guide (DCG) = 3.7×10^{-3} Bq/mL (1×10^{-7} μCi/mL).

f This dose is the effective dose equivalent.

Table 4-14. Tritium in air (in 10^{-9} Bq/mL), locations near diffuse sources, 1994.

	Sampling Location[a]			
	B292	**B331**	**B514**	**B624**
Jan	555.0 ± 26.6	141.7 ± 14.2	137.3 ± 14.4	270.5 ± 9.7
	529.1 ± 23.8	357.4 ± 27.5	193.5 ± 16.1	1380.1 ± 35.9
Feb	458.8 ± 28.4	220.5 ± 17.9	148.4 ± 16.5	666.0 ± 24.6
	303.0 ± 22.4	274.9 ± 19.8	119.1 ± 14.3	832.5 ± 30.0
Mar	271.2 ± 24.1	285.6 ± 22.0	140.6 ± 18.8	851.0 ± 33.2
	185.4 ± 14.6	256.8 ± 16.2	78.4 ± 11.5	651.2 ± 23.4
Apr	—[b]	451.4 ± 23.9	126.2 ± 16.0	906.5 ± 32.6
	—[b]	555.0 ± 25.5	141.3 ± 16.3	651.2 ± 26.7
May	67.3 ± 22.0	747.4 ± 31.4	41.1 ± 13.4	395.9 ± 22.6
	46.6 ± 13.7	865.8 ± 32.9	42.9 ± 13.9	357.4 ± 23.6
Jun	—[b]	1576.2 ± 37.8	64.0 ± 12.9	499.5 ± 22.5
	—[b]	1013.8 ± 31.4	59.6 ± 12.1	407.0 ± 19.1
	92.9 ± 15.0	880.6 ± 29.1	82.5 ± 13.1	514.3 ± 22.1
Jul	33.4 ± 14.5	1110.0 ± 36.6	37.7 ± 15.6	425.5 ± 23.8
	64.8 ± 15.9	732.6 ± 30.0	77.3 ± 16.6	312.7 ± 21.3
Aug	62.9 ± 14.8	643.8 ± 25.8	92.9 ± 15.8	625.3 ± 27.5
	96.9 ± 14.6	551.3 ± 23.2	134.7 ± 15.1	777.0 ± 25.6
Sept	92.1 ± 15.5	540.2 ± 25.9	73.3 ± 15.5	691.9 ± 28.4
	134.7 ± 18.0	614.2 ± 28.3	128.8 ± 15.3	851.0 ± 30.6
Oct	219.4 ± 20.8	1272.8 ± 42.0	214.2 ± 20.8	736.3 ± 32.4
	323.4 ± 22.3	1158.1 ± 31.3	143.6 ± 15.1	832.5 ± 28.3
Nov	272.0 ± 27.5	1139.6 ± 33.0	141.0 ± 16.5	987.9 ± 31.6
	326.3 ± 22.5	562.4 ± 24.7	<10.0	614.2 ± 28.3
Dec	322.3 ± 20.0	762.2 ± 28.2	105.1 ± 12.6	518.0 ± 24.3
	355.2 ± 24.2	1217.3 ± 39.0	163.9 ± 13.9	—[b]
	259.4 ± 18.7	1091.5 ± 31.7	193.1 ± 15.8	551.3 ± 22.1
Median[c]	**239.4**	**688.2**	**122.7**	**651.2**
IQR[d]	**230.8**	**598.5**	**67.0**	**333.0**
Fraction of DCG[e]	**6.5×10^{-5}**	**1.9×10^{-4}**	**3.3×10^{-5}**	**1.8×10^{-4}**
Dose (mSv)[f]	**5.1×10^{-5}**	**1.5×10^{-4}**	**2.6×10^{-5}**	**1.4×10^{-4}**
	(μCi/mL)			
Median[c]	**6.5×10^{-12}**	**1.9×10^{-11}**	**3.3×10^{-12}**	**1.8×10^{-11}**
IQR[d]	**6.2×10^{-12}**	**1.6×10^{-11}**	**1.8×10^{-12}**	**9.0×10^{-12}**
Dose (mrem)[f]	**5.1×10^{-3}**	**1.5×10^{-2}**	**2.6×10^{-3}**	**1.4×10^{-2}**

Note: Radionuclide results are reported ±2σ. See Chapter 14, Quality Assurance.

a See Figure 4-2, Volume 1 for sampling locations.

b No data. See Chapter 14, Quality Assurance.

c Diffuse source overall median = 323.4×10^{-9} Bq/mL.

d Interquartile range.

e Derived Concentration Guide (DCG) = 3.7×10^{-3} Bq/mL (1×10^{-7} μCi/mL).

f This dose is the effective dose equivalent.

Table 4-15. Beryllium on air filters (in pg/m^3), Livermore-site perimeters, 1994.

Month	Sampling Location[a]					
	SALV	MESQ	CAFE	MET	VIS	COW
Jan	<5.1	1.9	2.5	4.2	3.2	3.2
Feb	3.6	3.7	4.4	1.8	1.9	3.0
Mar	4.7	5.4	9.6	4.7	3.7	7.1
Apr	3.3	3.4	5.2	3.2	2.7	5.7
May	3.4	3.7	4.5	3.2	2.8	5.9
Jun	14.5	14.9	10.9	7.7	8.0	11.3
Jul	13.3	10.7	13.4	11.2	8.5	12.4
Aug	13.9	10.2	15.4	11.4	8.9	15.0
Sep	12.0	11.9	9.2	11.1	9.8	14.4
Oct	11.7	11.6	17.1	12.6	10.8	17.4
Nov	4.1	4.4	6.4	4.4	3.7	5.5
Dec	1.9	2.4	2.5	2.1	1.4	2.5
Median[b]	**<4.9**	**4.9**	**7.8**	**4.6**	**3.7**	**6.5**
IQR[c]	**<12.3**	**7.3**	**7.0**	**7.9**	**5.8**	**8.0**

Note: The monthly ambient concentration guide (ACG) set by the Bay Area Air Quality Management District (BAAQMD) is 10,000 pg/m^3. To determine the fraction each value is of the monthly standard, divide the reported value for the month by 10,000; e.g., 15.0 ÷ 10,000 = 0.0015.

a See Figure 4-1, Volume 1 for sampling locations.

b Livermore-site perimeter overall annual median is 5.5 pg/m^3.

c Interquartile range.

Table 4-16. Beryllium in air filters (in pg/m^3), Site 300, 1994.

Month	Sampling Location[a]								
	EOBS	**ECP**	**WCP**	**LIN**	**GOLF**	**TFIR**	**NPS**	**WOBS**	**801E**
Jan	<5.1	<5.1	0.1	<5.1	1.7	1.7	<5.1	<5.1	0.7
Feb	2.7	1.9	2.4	2.1	4.1	5.1	1.3	1.3	1.9
Mar	4.5	4.1	4.4	6.8	8.1	10.9	3.7	4.3	6.1
Apr	4.8	3.7	4.3	4.7	4.4	8.4	3.8	5.0	10.3
May	3.9	3.7	4.8	6.1	4.5	5.1	2.7	3.7	7.0
Jun	7.9	9.7	10.8	10.9	8.0	14.3	5.3	0.2	5.3
Jul	10.7	10.3	14.1	12.2	13.6	17.7	10.1	11.1	17.5
Aug	9.0	10.4	11.8	11.5	12.9	20.1	8.5	11.3	27.7
Sep	10.1	9.9	12.0	18.4	16.7	2.3	9.6	7.8	21.8
Oct	4.7	8.9	11.5	10.7	12.8	24.1	10.5	10.8	19.8
Nov	4.8	3.7	4.3	3.9	5.2	10.1	3.0	3.2	3.9
Dec	1.5	0.7	0.9	1.1	1.6	3.2	0.7	7.4	1.0
Median[b]	**<4.8**	**<4.6**	**4.6**	**6.4**	**6.6**	**9.2**	**<4.4**	**<5.0**	**6.5**
IQR[c]	**<8.2**	**<9.8**	**7.8**	**<11.1**	**8.5**	**10.5**	**<8.8**	**<8.5**	**14.7**

Note: The monthly ACG set by the BAAQMD is 10,000 pg/m^3. To determine the fraction each value is of the monthly standard, divide the reported value for the month by 10,000; e.g., 15.0 ÷10,000 = 0.0015.

a See Figure 4-1, Volume 1 for sampling locations.

b Site 300 overall annual median is 5.1 pg/m^3.

c Interquartile range.

Table 4-17. Calculated radioactive air emissions from the Livermore site for 1994. Radionuclides have been ordered by weighting the emissions according to the inhalation dose rate conversion factor for the isotope.

Radionuclide	Calculated Emissions[a] (Bq)	Relative to ^{3}H (HTO)[b]
H-3 (HTO)[c]	2.99×10^{12}	1.00
U-238	1.16×10^{6}	3.61×10^{-1}
Am-241	1.16×10^{5}	1.67×10^{-1}
U-234	3.17×10^{5}	1.11×10^{-1}
U-235	4.84×10^{4}	1.57×10^{-2}
Gross alpha[d]	1.14×10^{4}	1.03×10^{-2}
N-13	1.63×10^{11}	8.50×10^{-3}
Ni-63	1.07×10^{9}	6.50×10^{-3}
Th-228	9.62×10^{3}	6.49×10^{-3}
Th-232	4.81×10^{3}	4.62×10^{-3}
Cm-244	2.20×10^{3}	1.67×10^{-3}
O-15	8.51×10^{10}	1.42×10^{-3}
Pu-239	1.22×10^{3}	1.10×10^{-3}
Cm-243	7.77×10^{2}	7.40×10^{-4}
U-233	1.18×10^{3}	4.19×10^{-4}
P-32	1.99×10^{7}	3.19×10^{-4}
Ra-226	6.29×10^{3}	1.48×10^{-4}
H-3 (HT)[c]	2.23×10^{12}	2.99×10^{-5}
Sr-90	1.30×10^{4}	7.65×10^{-6}
Gross beta[d]	1.14×10^{4}	6.71×10^{-6}
Ce-144	3.43×10^{3}	3.41×10^{-6}
Cs-137	3.88×10^{4}	3.18×10^{-6}
Zr-95	7.77×10^{4}	2.96×10^{-6}
K-40	8.63×10^{4}	2.92×10^{-6}
P-33	1.53×10^{5}	2.45×10^{-6}
Pu-242	2.31	1.99×10^{-6}
Co-60	2.82×10^{3}	1.63×10^{-6}
Ra-228	2.37×10^{2}	1.54×10^{-6}
Cm-248	1.91×10^{-1}	1.03×10^{-6}
Bi-214	2.89×10^{4}	8.90×10^{-7}
Pu-238	1.01	8.53×10^{-7}
Pb-214	2.89×10^{4}	6.64×10^{-7}
Am-243	3.92×10^{-1}	5.63×10^{-7}
S-35	6.44×10^{5}	5.07×10^{-7}
Np-237	2.60×10^{-1}	3.37×10^{-7}
Ru-106	2.15×10^{2}	2.71×10^{-7}
Po-218	2.89×10^{4}	2.33×10^{-7}
U-237	1.92×10^{4}	1.92×10^{-7}
Pa-231	1.11×10^{-1}	1.42×10^{-7}
Eu-154	1.41×10^{2}	1.07×10^{-7}
I-131	5.92×10^{2}	5.17×10^{-8}
I-125	7.40×10^{2}	4.73×10^{-8}
Y-91	3.15×10^{2}	4.10×10^{-8}
Np-239	5.55×10^{3}	3.99×10^{-8}
Ce-141	1.63×10^{3}	3.95×10^{-8}
Nb-95	1.61×10^{3}	2.53×10^{-8}
Eu-155	2.11×10^{2}	2.34×10^{-8}
Sb-124	3.11×10^{2}	2.11×10^{-8}
Mn-54	1.13×10^{3}	2.03×10^{-8}
Pu-240	2.22×10^{-2}	2.01×10^{-8}
Ag-110m	4.81×10^{1}	1.02×10^{-8}
Cs-134	8.03×10^{1}	9.59×10^{-9}
Pu-244	1.11×10^{-2}	9.48×10^{-9}
Bi-207	2.96×10^{2}	9.12×10^{-9}
Sb-125	2.81×10^{2}	9.02×10^{-9}
Cf-252	2.14×10^{-2}	8.80×10^{-9}
Co-58	2.85×10^{2}	8.29×10^{-9}
Pm-147	7.45×10^{1}	7.70×10^{-9}
Y-88	5.07×10^{1}	6.61×10^{-9}
Eu-152	8.88	5.27×10^{-9}
Mo-99	4.44×10^{2}	5.16×10^{-9}
Hf-181	1.48×10^{2}	5.15×10^{-9}
Nd-147	2.48×10^{2}	4.60×10^{-9}
Sc-46	5.18×10^{1}	4.11×10^{-9}
Pu-236	1.67×10^{-2}	3.88×10^{-9}
C-14	1.12×10^{5}	3.63×10^{-9}
Zn-65	5.18×10^{1}	2.81×10^{-9}
Fe-59	8.51×10^{1}	2.78×10^{-9}

Table 4-17. Calculated radioactive air emissions from the Livermore site for 1994. Radionuclides have been ordered by weighting the emissions according to the inhalation dose rate conversion factor for the isotope.

Radionuclide	Calculated Emissions[a] (Bq)	Relative to ^{3}H (HTO)[b]
Co-57	8.17×10^{1}	1.97×10^{-9}
Na-22	7.40×10^{1}	1.61×10^{-9}
Cs-136	5.18×10^{1}	9.92×10^{-10}
Ru-103	3.37×10^{1}	8.15×10^{-10}
Ba-140	5.55×10^{1}	6.13×10^{-10}
Y-90	1.81×10^{1}	4.52×10^{-10}
Th-230	4.51×10^{-4}	3.01×10^{-10}
Te-132	1.11×10^{1}	2.37×10^{-10}
Ce-139	2.22×10^{-1}	2.20×10^{-10}
U-236	3.24×10^{-4}	1.07×10^{-10}
U-232	3.70×10^{-5}	4.71×10^{-11}
Tb-160	6.66×10^{-1}	4.48×10^{-11}
Pa-233	8.88×10^{-1}	2.27×10^{-11}
La-140	1.11	1.61×10^{-11}
Sn-113	2.59×10^{-1}	7.69×10^{-12}
I-129	2.22×10^{-3}	1.02×10^{-12}
Ba-133	1.48×10^{-5}	3.57×10^{-16}
Hg-203	1.70×10^{-12}	2.63×10^{-23}
Total	5.47×10^{12}	

a Calculated emissions are estimates made according to the National Emmision Standards for Hazardous Air Pollutants 40 CFR 61.93 except those noted as measured. Values are considered conservative.

b The importance of the emissions (as weighted by the dose rate conversion factor) relative to H-3 (HTO) emission.

c Includes measured emissions.

d Gross alpha and gross beta activity are reported in inventories where specific isotopic content is unknown.

There is no supplemental data in this chapter.
Please see Volume 1 for details about
Sewage Monitoring.

6. Surface Water Monitoring

Erich Brandstetter
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Introduction

Lawrence Livermore National Laboratory performs surface water monitoring at the Livermore site, in surrounding regions of the Livermore Valley, and at Site 300 and vicinity in the nearby Altamont Hills. At the first two locales, LLNL monitors reservoirs and ponds, the LLNL swimming pool, rainfall, tap water, and storm water runoff. Water samples are analyzed for radionuclides and a wide range of nonradioactive constituents. At Site 300 and vicinity, surface water monitoring encompasses rainfall and storm water runoff. In addition, a spring is monitored at Site 300, but results for the spring are reported in Chapter 7, Routine Ground Water Monitoring, because the spring water is more representative of its ground water source than it is of surface water. These water samples are analyzed for radionuclides, explosives, total organic carbon, total organic halides, total suspended solids, conductivity, and pH. Volume 1, Chapter 6 includes summary data tables and a detailed discussion and analysis of the data. This chapter presents the complete dataset for 1994, including a summary of analyses requested in storm water samples and a summary of constituents for which analyses were conducted but which were never detected.

Surface Water Methods

Surface and drinking water near the Livermore site and in the Livermore Valley are sampled according to procedures EMP-W-L and EMP-W-S. LLNL technicians use a tethered pail to collect water samples from surface sources; other locations are sampled directly from the outfall. Samples for tritium analysis are collected in 500-milliliter, argon-flushed glass containers; those for other radiological analyses are collected in acidified 1000-milliliter polyethylene bottles.

The on-site swimming pool and drinking water source (POOL and TAP) are sampled, as described above, for gross alpha, gross beta, and tritium. POOL is sampled monthly, and TAP is sampled quarterly.

Rainfall Methods

Detailed descriptions of station locations are given in EMS Procedure EMP-RA-L. Rainfall sampling and sample tracking protocols are described in EMS Procedure EMP-RA-S. Essentially, rainfall is collected in stainless steel buckets mounted about 1 meter above the ground. Samples are decanted into 500-milliliter argon-flushed flint-glass bottles fitted with glass stoppers.

Storm Water Methods

Procedures EMP-RO-L and EM7P-RO-S describe storm water sampling procedures and locations. LLNL technicians collect storm water samples for nonradiological analysis directly into sample bottles for storm water runoff grab samples. Samples analyzed for tritium are collected in 250-milliliter, argon-flushed glass containers; samples for gross alpha and gross beta measurements are collected in 1,000-milliliter polyethylene bottles.

Table 6-1. Radioactivity in surface and drinking waters (in Bq/L), Livermore Valley, 1994.

Location	Date	Tritium	Gross Alpha	Gross Beta
DEL	1Q	0.710 ± 0.129	0.017 ± 0.017	0.141 ± 0.012
	2Q	0.696 ± 0.097	0.017 ± 0.003	1.580 ± 0.019
	3Q	1.003 ± 0.147	0.199 ± 0.040	0.152 ± 0.022
	4Q	0.636 ± 0.122	0.019 ± 0.010	0.071 ± 0.008
ZON7	1Q	1.051 ± 0.137	0.030 ± 0.017	0.111 ± 0.013
	2Q	0.677 ± 0.105	0.019 ± 0.003	0.103 ± 0.010
	3Q	0.929 ± 0.143	0.073 ± 0.024	0.118 ± 0.020
	4Q	0.770 ± 0.117	0.095 ± 0.011	0.107 ± 0.008
DUCK	1Q	2.028 ± 0.166	0.027 ± 0.011	0.152 ± 0.020
	2Q	2.076 ± 0.149	0.082 ± 0.061	6.068 ± 0.074[a]
				0.017 ± 0.081
	3Q	1.869 ± 0.181	0.013 ± 0.059	0.196 ± 0.085
	4Q	1.450 ± 0.155	0.149 ± 0.064	0.311 ± 0.046
CAL	1Q	0.570 ± 0.121	0.022 ± 0.014	0.215 ± 0.012
	2Q	0.503 ± 0.108	0.003 ± 0.002	0.067 ± 0.009
	3Q	0.740 ± 0.133	–0.004 ± 0.082	0.066 ± 0.018
	4Q	0.629 ± 0.104	0.002 ± 0.007	0.014 ± 0.007
ALAG	1Q	2.364 ± 0.192	0.095 ± 0.018	0.076 ± 0.012
	2Q	1.961 ± 0.159	0.026 ± 0.003	0.172 ± 0.010
	3Q	1.380 ± 0.156	0.048 ± 0.027	0.076 ± 0.017
	4Q	1.795 ± 0.147	–0.121 ± 0.034	0.078 ± 0.013
SHAD	1Q	2.671 ± 0.195	0.057 ± 0.019	0.119 ± 0.013
	2Q	2.653 ± 0.178	0.011 ± 0.003	0.111 ± 0.010
	3Q	2.982 ± 0.209	0.303 ± 0.051	0.197 ± 0.028
	4Q	2.342 ± 0.183	0.134 ± 0.015	0.125 ± 0.011
TAP	1Q	0.710 ± 0.126	0.060 ± 0.014	0.127 ± 0.011
	2Q	0.507 ± 0.119	0.007 ± 0.003	0.031 ± 0.009
	3Q	0.855 ± 0.138	0.023 ± 0.009	0.033 ± 0.014
	4Q	0.762 ± 0.098	0.043 ± 0.005	2.209 ± 0.018[a]
				0.021 ± 0.011
GAS	1Q	1.136 ± 0.137	0.022 ± 0.011	0.085 ± 0.011
	2Q	1.332 ± 0.149	0.012 ± 0.003	0.152 ± 0.010
	3Q	1.395 ± 0.155	0.119 ± 0.028	0.081 ± 0.017
	4Q	0.414 ± 0.803	0.126 ± 0.013	0.070 ± 0.008
PALM	1Q	0.836 ± 0.124	0.007 ± 0.012	0.079 ± 0.011
	2Q	0.666 ± 0.105	–0.009 ± 0.012	10.027 ± 0.037[a]
				0.106 ± 0.023
	3Q	0.958 ± 0.140	0.078 ± 0.024	0.077 ± 0.017
	4Q	0.755 ± 0.100	0.033 ± 0.009	0.080 ± 0.008

Table 6-1. Radioactivity in surface and drinking waters (in Bq/L), Livermore Valley, 1994.

Location	Date	Tritium	Gross Alpha	Gross Beta
BELL	1Q	1.328 ± 0.151	–0.003 ± 0.015	0.090 ± 0.011
	2Q	0.666 ± 0.121	0.015 ± 0.003	0.214 ± 0.011
	3Q	0.747 ± 0.111	0.055 ± 0.025	0.106 ± 0.020
	4Q	0.755 ± 0.097	0.048 ± 0.009	0.108 ± 0.008
ORCH	1Q	0.736 ± 0.138	0.132 ± 0.022	0.120 ± 0.013
	2Q	0.751 ± 0.098	0.007 ± 0.003	0.062 ± 0.010
	3Q	0.566 ± 0.122	0.266 ± 0.078	0.223 ± 0.047
	4Q	0.444 ± 0.091	0.153 ± 0.020	0.101 ± 0.016
POOL	1Q1	3.626 ± 1.980	0.033 ± 0.020	0.140 ± 0.013
	1Q2	5.217 ± 1.993	0.005 ± 0.018	0.211 ± 0.014
	1Q3	4.736 ± 1.880	0.015 ± 0.032	0.131 ± 0.027
	2Q1	5.476 ± 2.245	–0.033 ± 0.002	0.183 ± 0.010
	2Q2	3.182 ± 1.715	–0.033 ± 0.015	0.020 ± 0.032
	2Q3	3.326 ± 1.750	–0.047 ± 0.070	0.110 ± 0.046
	3Q1	4.292 ± 1.807	0.284 ± 0.080	0.235 ± 0.046
	3Q2	3.674 ± 1.844	0.078 ± 0.072	0.152 ± 0.051
	3Q3	4.810 ± 2.371	0.142 ± 0.049	0.326 ± 0.048
	4Q1	5.217 ± 1.800	0.295 ± 0.036	0.238 ± 0.025
	4Q2	5.957 ± 2.590	–0.038 ± 0.163	0.265 ± 0.074
	4Q3	3.360 ± 1.547	0.027 ± 0.037	0.279 ± 0.037

Note: Values in parentheses ( ) are recounts of same planchette.

[a] Recounts were performed for gross beta activities at locations DUCK, TAP, and PALM only.

Table 6-2. Radioactivity in storm water runoff (in Bq/L) at Livermore site, 1994.

Location	Date	Tritium	Gross Alpha	Gross Beta
ALPE	Jan 24	3.522 ± 1.927	0.327 ± 0.113	0.537 ± 0.052
	Apr 25	3.959 ± 2.249	0.063 ± 0.006	0.154 ± 0.020
	Nov 5	2.357 ± 1.845	0.072 ± 0.044	0.160 ± 0.045
ASS2	Jan 24	1.839 ± 1.839	0.070 ± 0.009	0.192 ± 0.011
	Apr 25	2.168 ± 2.168	0.026 ± 0.005	0.044 ± 0.020
	Nov 5	17.945 ± 2.333	0.030 ± 0.027	0.041 ± 0.034
ASW	Jan 24	2.627 ± 1.902	0.081 ± 0.011	0.222 ± 0.012
	Apr 25	2.139 ± 2.139	0.040 ± 0.006	0.137 ± 0.019
	Nov 5	25.530 ± 2.527	0.024 ± 0.027	0.121 ± 0.043
CDB	Jan 24	17.501 ± 2.328	0.142 ± 0.012	0.221 ± 0.011
	Apr 25	8.880 ± 2.415	0.042 ± 0.006	0.323 ± 0.019
	Nov 5	2.142 ± 1.825	0.074 ± 0.035	0.089 ± 0.036
GRNE	Jan 24	3.667 ± 1.929	0.226 ± 0.022	0.326 ± 0.014
	Apr 25	2.135 ± 2.135	0.226 ± 0.010	0.844 ± 0.022
	Nov 5	1.809 ± 1.809	8.362 ± 2.294	6.623 ± 1.184
WPDC	Jan 24	12.247 ± 2.180	0.147 ± 0.014	0.256 ± 0.012
	Feb 7	7.733 ± 1.848	0.069 ± 0.031	0.289 ± 0.022
	Apr 25	2.646 ± 2.201	0.159 ± 0.009	0.433 ± 0.022
	Nov 5	4.107 ± 1.897	0.078 ± 0.035	0.142 ± 0.040

Table 6-3. Tritium in rain (in Bq/L), Livermore site and Livermore Valley, 1994.

Sampling Location	Jan 25	Mar 25	Apr 11	Apr 26	May 9	Nov 7	Median
On-Site							
B343	32.7 ± 2.7	18.1 ± 2.3	38.5 ± 3.2	24.2 ± 2.5	44.0 ± 2.6	3.4 ± 1.8	28.5
CDB	14.0 ± 2.2	8.1 ± 2.0	22.0 ± 2.7	19.4 ± 2.7	22.4 ± 2.2	1.8 ± 1.8	16.7
B291	14.8 ± 2.2	14.5 ± 2.2	18.6 ± 2.6	15.6 ± 2.3	13.7 ± 2.2	1.8 ± 1.8	14.6
VIS	7.4 ± 2.1	7.9 ± 2.0	10.8 ± 2.4	7.2 ± 2.0	6.0 ± 1.7	1.8 ± 1.8	7.3
SALV	12.7 ± 2.2	30.4 ± 2.6	9.6 ± 2.1	53.7 ± 3.2	11.8 ± 1.9	1.8 ± 1.8	12.2
MET	2.4 ± 2.4	1.7 ± 1.7	3.1 ± 2.2	1.8 ± 1.8	1.5 ± 1.5	1.7 ± 1.7	1.8
COW	6.0 ± 2.0	1.8 ± 1.8	9.0 ± 2.4	3.6 ± 1.9	5.4 ± 1.7	1.7 ± 1.7	4.5
Off-Site							
ESAN	8.6 ± 2.0	91.0 ± 3.8	20.3 ± 2.7	14.7 ± 2.6	7.8 ± 1.8	1.9 ± 1.9	11.7
AQUE	7.3 ± 2.0	—[a]	13.8 ± 2.5	13.5 ± 2.2	—[a]	1.7 ± 1.7	10.4
ZON7	2.3 ± 1.9	3.4 ± 1.9	3.4 ± 2.2	7.4 ± 2.0	5.1 ± 1.7	1.8 ± 1.8	3.4
SLST	1.8 ± 1.8	1.8 ± 1.8	1.7 ± 1.7	1.7 ± 1.7	1.5 ± 1.5	1.8 ± 1.8	1.8
VET	—[b]	—[b]	—[b]	—[b]	—[b]	19.4 ± 2.4	—[c]

a Rain collected at this location was not sufficient to produce a sample.

b Location VET was added towards the end of the year; therefore, data are only available for November 7.

c Because there is only one data point the median is not listed.

Table 6-4. Storm water runoff, nonradioactive parameters, Livermore site, 1994.

Parameters	Storm Date	ASS2	ASW	CDB	GRNE	ALPE	WPDC
Metals and Minerals (mg/L)							
Alkalinity, total (as $CaCO_3$)	1/24/94	14	21	12	38	290	27
	4/25/94	9.5	9.5	8.5	36	9.5	11
	11/5/94	8.5	17	6.6	30	16.	13
Aluminum	1/24/94	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	4/25/94	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	11/5/94	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	11/5/94					0.078[(a)]	
Arsenic	1/24/94	<0.002	<0.002	<0.002	0.0026	0.0055	0.0026
	4/25/94	0.0025	<0.002	0.074	0.0098	<0.002	<0.002
	11/5/94	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Barium	1/24/94	<0.05	<0.05	<0.05	0.055	0.084	<0.05
	4/25/94	0.062	0.066	0.12	0.66	0.077	0.22
	11/5/94	<0.025	0.028	<0.025	<0.025	0.034	<0.025
Beryllium	1/24/94	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	4/25/94	0.00053	<0.0005	0.0012	0.0031	<0.0005	<0.0005
	11/5/94	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Bicarbonate alkalinity (as $CaCO_3$)	1/24/94	14	21	12	38	290	27
	4/25/94	9.5	9.5	8.5	36	9.5	11
	11/5/94	8.5	17	6.6	30	16	13
Cadmium	1/24/94	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00052
	4/25/94	0.0011	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	11/5/94	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Calcium	1/24/94	4	5.6	4.1	14	62	7.1
	4/25/94	3.8	4.9	5.4	11	6.9	5.1
	11/5/94	3.3	5	3.3	12	7.6	4.5
	11/5/94					5.4[(a)]	
Chemical oxygen demand	1/24/94	42	53	60		100	64
	4/25/94	24	41	37	47	110	53
	11/5/94	36	43	43	36	45	43
Chloride	1/24/94	1.2	1.5	1.8	18	380	3.5
	4/25/94	6.5	7.6	7.2	18	7.8	7.8
	4/25/94	6.5	7.6	7.2	18	10	7.8
	11/5/94	1.1	2.1	1.8	12	3.3	4
	11/5/94	1.1	2.1	1.8	12	3.3	4
Chromium	1/24/94	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	4/25/94	<0.01	0.012	0.023	0.079	0.015	0.037
	11/5/94	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	1/24/94	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	4/25/94	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	11/5/94	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	11/5/94					0.023[(a)]	
Fluoride	1/24/94	<0.05	<0.05	<0.05	0.12	1.2	0.053
	4/25/94	<0.05	<0.05	<0.05	0.13	0.057	0.051
	11/5/94	<0.05	0.051	<0.05	0.2	0.057	0.057

Table 6-4. Storm water runoff, nonradioactive parameters, Livermore site, 1994.

Parameters	Storm Date	ASS2	ASW	CDB	GRNE	ALPE	WPDC
Metals and Minerals (continued)							
Hardness, total (as $CaCO_3$)	1/24/94	13	19	15	53	90	26
	4/25/94	13	17	19	41	26	19
	11/5/94	11	18	12	45	30	17
Iron	1/24/94	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	4/25/94	<0.1	<0.1	0.12	<0.1	<0.1	<0.1
	11/5/94	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	11/5/94					<0.1[(a)]	
Lead	1/24/94	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
	4/25/94	0.017	0.013	0.0051	0.016	0.017	0.0039
	11/5/94	<0.002	<0.002	<0.002	<0.002	0.0034	<0.002
Magnesium	1/24/94	0.81	1.3	1.1	4.3	33	2.1
	4/25/94	0.8	1.1	1.3	3.2	2.2	1.5
	11/5/94	0.63	1.4	0.85	3.7	2.6	1.3
	11/5/94					1.5[(a)]	
Manganese	1/24/94	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
	4/25/94	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
	11/5/94	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
	11/5/94					0.024[(a)]	
Mercury	1/24/94	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	4/25/94	0.00021	0.00023	<0.0002	<0.0002	<0.0002	<0.0002
	11/5/94	<0.0002	<0.0002	<0.0002	0.00022	<0.0002	<0.0002
Nickel	1/24/94	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	4/25/94	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	11/5/94	<0.005	<0.005	<0.005	0.0054	0.0069	0.0053
	11/5/94	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	11/5/94					<0.02[(a)]	
Nitrate (as N)	1/24/94	<0.5	<0.5	<0.5	4.7	2.2	1.2
	4/25/94	<0.5	<0.5	0.7	5.6	2.9	0.6
	11/5/94	<0.5	0.63	0.65	4.1	4.1	0.9
	11/5/94	<0.5	0.63	0.65	4.1	4.1	0.9
	1/24/94	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	11/5/94	<0.5	<0.5	<0.5	0.58	<0.5	0.8
Oil and grease	1/24/94	5.4	6.4	<5	<5	<5	<5
	4/25/94	<5	<5	<5	<5	<5	<5
	11/5/94	<5	<5	7.6	6.9	6	<5
Ortho-phosphate	11/5/94	<0.5	0.54	<0.5	<0.5	<0.5	<0.5
potassium	1/24/94	1.3	2	1.4	2.2	7.8	1.6
	4/25/94	1.6	1.9	1.9	1.2	1.5	1.7
	11/5/94	1.5	2.8	1.7	3.3	3	2
	11/5/94					3.1[(a)]	
Selenium	1/24/94	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
	4/25/94	<0.002	<0.002	0.015	<0.002	<0.002	<0.002
	11/5/94	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002

Table 6-4. Storm water runoff, nonradioactive parameters, Livermore site, 1994.

Parameters	Storm Date	ASS2	ASW	CDB	GRNE	ALPE	WPDC
Metals and Minerals (continued)							
Sodium	1/24/94	3.2	3.4	3.4	16	390	5.9
	4/25/94	4.5	4.8	4.9	16	8.9	6.1
	11/5/94	1.9	2.8	2.4	16	5.2	4.7
	11/5/94					2.4[(a)]	
Sulfate	1/24/94	2.5	2.6	3.1	12	320	3.4
	4/25/94	1.6	2.2	2.8	13	3.1	3.1
	4/25/94	1.6	2.2	2.8	13	4.3	3.1
	11/5/94	1.1	2.4	1.9	7	3.8	3.3
	11/5/94	1.1	2.4	1.9	7	3.8	3.3
Total dissolved solids	1/24/94	36	57	40	160	1,500	44
	4/25/94	35	44	88	140	82	55
	11/5/94	34	49	39	150	79	57
Total organic carbon	1/24/94	6	11	10	11	29	10
	4/25/94	8	10	11	8	11	11
	11/5/94	11	13	13	9	15	13
Total suspended solids	1/24/94	65	34	90	230	89	95
	4/25/94	34	31	91	530	120	470
	11/5/94	39	8	37	4,200	33	210
Zinc	1/24/94	0.056	<0.05	0.084	<0.05	<0.05	<0.05
	4/25/94	0.07	0.066	0.096	<0.05	<0.05	0.081
	11/5/94	0.22	0.085	0.14	<0.05	<0.05	0.12
	11/6/94					0.12[(a)]	
General Indicator Parameters							
pH (units)	1/24/94	6.9	6.8	6.6	7.4	8.3	7.2
	4/25/94	6.8	6.7	6.6	7.8	6.7	7
	11/5/94	6.2	6.1	6	7.2	6.4	6.4
Specific conductance (µmhos/cm)	1/24/94	37	54	41	180	2,200	71
	4/25/94	45	56	55	160	86	60
	11/5/94	34	56	39	150	94	63
EPA Method 615 (Âg/L)							
2,4,5-TP (Silvex)	1/24/94	<0.2	<0.2	<0.2	<0.2	0.51	<0.2
	4/25/94	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	11/5/94	<100	<100	<100	<100	<100	<100
2,4-D	1/24/94	<1	1	<1	19	46	<1
	4/25/94	<1	3	<1	6	72	<1
	11/5/94	<500	<500	<500	<500	<500	<500
EPA Method 624 (Âg/L)							
1,2-Dichloroethane	1/24/94	<1	1	<1	2	<1	<1
	4/25/94	<1	<1	<1	<1	<1	<1
	11/5/94	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	1/24/94	<1	<1	<1	<1	<1	<1
	4/25/94	<1	<1	<1	<1	<1	<1
	11/5/94	4	<1	<1	2	<1	<1

Table 6-4. Storm water runoff, nonradioactive parameters, Livermore site, 1994.

Parameters	Storm Date	ASS2	ASW	CDB	GRNE	ALPE	WPDC
EPA Method 624 (continued)							
2-Butanone	1/24/94	<10	27	<10	<10	<10	<10
	4/25/94	<40	<40	<40	<40	<40	<40
	11/5/94	<40	<40	<40	<40	<40	<40
Acetone	1/24/94	370	200	<10	<10	<10	<10
	4/25/94	<40	<40	40	<40	<40	<40
	11/5/94	<40	<40	<40	<40	<40	<40
Trichloroethene	1/24/94	<0.5	<0.5	0.9	<0.5	<0.5	<0.5
	4/25/94	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	11/5/94	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
EPA Method 625 (Âg/L)							
Bis(2-ethylhexyl)phthalate	1/24/94	<10	<10	<10	<10	<10	<10
	4/25/94	<10	<10	<10	<10	<10	17
	11/5/94	<10	<10	<10	<10	<10	<10

[a] Duplicate results obtained for ALPE location.

Table 6-5. Storm water runoff, nonradioactive parameters, Livermore site, 1994. Summary of nondetects.

Parameters	No. of Samples	Max. Detection Limit
Metals and Minerals (mg/L)		
Antimony	3	<0.06
Bromide	6	<0.5
Carbonate alkalinity (as $CaCO_3$)	21	<1
Gasoline fingerprint	2	<50
Hexavalent chromium	2	<0.01
Hydroxide alkalinity (as $CaCO_3$)	21	<1
Silver	21	<0.01
Surfactant	21	<0.5
Thallium	3	<0.005
EPA Method 504 (mg/L)		
Ethylene dibromide	3	<0.0001
EPA Method 601 (μg/L)		
1,1,1-Trichloroethane	3	<0.5
1,1,2,2-Tetrachloroethane	3	<0.5
1,1,2-Trichloroethane	3	<0.5
1,1-Dichloroethane	3	<0.5
1,1-Dichloroethene	3	<0.5
1,2-Dichlorobenzene	3	<0.5
1,2-Dichloroethene (total)	3	<0.5
1,2-Dichloropropane	3	<0.5
1,3-Dichlorobenzene	3	<0.5
1,4-Dichlorobenzene	3	<0.5
2-Chloroethylvinylether	3	<0.5
Bromodichloromethane	3	<0.5
Bromoform	3	<0.5
Bromomethane	3	<0.5
Carbon tetrachloride	3	<0.5
Chlorobenzene	3	<0.5
Chloroethane	3	<0.5
Chloroform	3	<0.5
Chloromethane	3	<0.5
Dibromochloromethane	3	<0.5
Dichlorodifluoromethane	3	<0.5
Freon-113	3	<0.5
Methylene chloride	3	<0.5
Tetrachloroethene	3	<0.5
Trichloroethene	3	<0.5
Trichlorofluoromethane	3	<0.5
Vinyl chloride	3	<0.5
cis-1,3-Dichloropropene	3	<0.5
trans-1,3-Dichloropropene	3	<0.5
EPA Method 602 (μg/L)		
1,2-Dichlorobenzene	1	<0.3
1,3-Dichlorobenzene	1	<0.3
1,4-Dichlorobenzene	1	<0.3
Benzene	1	<0.3
Chlorobenzene	1	<0.3
Ethylbenzene	1	<0.3
Toluene	1	<0.3
Total xylene isomers	1	<0.6
EPA Method 608 (μg/L)		
Aldrin	18	<0.05
BHC, alpha isomer	18	<0.05
BHC, beta isomer	18	<0.05
BHC, delta isomer	18	<0.05
BHC, gamma isomer (Lindane)	18	<0.05
Chlordane	18	<0.05
Dieldrin	18	<0.1
Endosulfan I	18	<0.05
Endosulfan II	18	<0.1
Endosulfan sulfate	18	<0.1
Endrin	18	<0.1
Endrin aldehyde	18	<0.1
Heptachlor	18	<0.05
Heptachlor epoxide	18	<0.05
Methoxychlor	18	<0.5
Toxaphene	18	<1
p,p'-DDD	18	<1
p,p'-DDE	18	<1
p,p'-DDT	18	<1

Parameters	No. of Samples	Max. Detection Limit
EPA Method 610 (μg/L)		
Acenaphthene	2	<0.4
Acenaphthylene	2	<0.4
Anthracene	2	<0.2
Benzo(a)anthracene	2	<0.1
Benzo(a)pyrene	2	<0.1
Benzo(b)fluoranthene	2	<0.1
Benzo(g,h,i)perylene	2	<0.1
Benzo(k)fluoranthene	2	<0.04
Chrysene	2	<0.2
Dibenzo(a,h)anthracene	2	<0.2
Fluoranthene	2	<0.4
Fluorene	2	<0.2
Indeno(1,2,3-c,d)pyrene	2	<0.2
Naphthalene	2	<1
Phenanthrene	2	<0.2
Pyrene	2	<0.2
EPA Method 615 (μg/L)		
2,4,5-T	18	<100
4-(2,4-Dichlorophenoxy)butyric acid	18	<1,000
Dalapon	18	<5,000
Dicamba	18	<100
Dichloroprop	18	<1,000
Dinoseb	18	<100
MCPA	18	<10,000
MCPP	18	<10,000
EPA Method 624 (μg/L)		
1,1,1-Trichloroethane	18	<1
1,1,2,2-Tetrachloroethane	18	<1
1,1,2-Trichloroethane	18	<1
1,1-Dichloroethane	18	<1
1,1-Dichloroethene	18	<1
1,2-Dichlorobenzene	18	<1
1,2-Dichloroethene (total)	18	<1
1,2-Dichloropropane	18	<1
1,4-Dichlorobenzene	18	<1
2-Chloroethylvinylether	18	<40
2-Hexanone	18	<10
4-Methyl-2-pentanone	18	<10

Parameters	No. of Samples	Max. Detection Limit
Benzene	18	<1
Bromodichloromethane	18	<1
Bromoform	18	<1
Bromomethane	18	<2
Carbon disulfide	18	<1
Carbon tetrachloride	18	<1
Chlorobenzene	18	<1
Chloroethane	18	<2
Chloroform	18	<1
Chloromethane	18	<2
Dibromochloromethane	18	<1
Dibromomethane	18	<1
Dichlorodifluoromethane	18	<2
Ethylbenzene	18	<1
Freon-113	18	<1
Methylene chloride	18	<1
Styrene	18	<1
Tetrachloroethene	18	<1
Toluene	18	<1
Total xylene isomers	18	<2
Trichlorofluoromethane	18	<1
Vinyl acetate	18	<10
Vinyl chloride	18	<2
cis-1,3-Dichloropropene	18	<1
trans-1,3-Dichloropropene	18	<1
EPA Method 625 (ug/L)		
1,2,4-Trichlorobenzene	21	<10
1,2-Dichlorobenzene	21	<10
1,3-Dichlorobenzene	21	<10
1,4-Dichlorobenzene	21	<10
2,4,5-Trichlorophenol	21	<10
2,4,6-Trichlorophenol	21	<10
2,4-Dichlorophenol	21	<10
2,4-Dimethylphenol	21	<10
2,4-Dinitrophenol	21	<50
2,4-Dinitrotoluene	21	<10
2,6-Dinitrotoluene	21	<10
2-Chloronaphthalene	21	<10
2-Chlorophenol	21	<10

Parameters	No. of Samples	Max. Detection Limit
2-Methyl phenol	21	<10
2-Methyl-4,6-dinitrophenol	21	<50
2-Methylnaphthalene	21	<10
2-Nitroaniline	21	<50
2-Nitrophenol	21	<10
3,3'-Dichlorobenzidine	21	<20
3-Nitroaniline	21	<50
4-Bromophenylphenylether	21	<10
4-Chloro-3-methylphenol	21	<20
4-Chloroaniline	21	<20
4-Chlorophenylphenylether	21	<10
4-Nitroaniline	21	<50
4-Nitrophenol	21	<50
Acenaphthene	21	<10
Acenaphthylene	21	<10
Anthracene	21	<10
Benzo(a)anthracene	21	<10
Benzo(a)pyrene	21	<10
Benzo(b)fluoranthene	21	<10
Benzo(g,h,i)perylene	21	<10
Benzo(k)fluoranthene	21	<10
Benzoic acid	21	<50
Benzyl slcohol	21	<20
Bis(2-chloroethoxy)methane	21	<10
Bis(2-chloroethyl)ether	21	<1
Bis(2-chloroisopropyl)ether	21	<10

Parameters	No. of Samples	Max. Detection Limit
Butylbenzylphthalate	21	<10
Chrysene	21	<10
Di-n-butylphthalate	21	<10
Di-n-octylphthalate	21	<10
Dibenzo(a,h)anthracene	21	<10
Dibenzofuran	21	<10
Diethylphthalate	21	<10
Dimethylphthalate	21	<10
Fluoranthene	21	<10
Fluorene	21	<10
Hexachlorobenzene	21	<10
Hexachlorobutadiene	21	<10
Hexachlorocyclopentadiene	21	<10
Hexachloroethane	21	<10
Indeno(1,2,3-c,d)pyrene	21	<10
Isophorone	21	<10
N-Nitrosodi-n-propylamine	21	<10
N-Nitrosodiphenylamine	21	<10
Naphthalene	21	<10
Nitrobenzene	21	<10
Pentachlorophenol	21	<50
Phenanthrene	21	<10
Phenol	21	<10
Pyrene	21	<10
m- and p-Cresol	21	<10

7. Routine Ground Water Monitoring

Eric Christofferson

Methods

Ground water sampling follows the established procedures EMP-GW-S, and EMP-QA-BOT (Tate et al. 1995). These procedures describe the methods that were used to collect the ground water samples for analysis. EMP-GW-S further describes requirements for special sampling techniques, and other analyte-specific information for all analytes routinely sampled in ground water. Special sampling techniques apply to different wells depending on if they are fitted with submersible pumps, must be bailed, or if they contain Barcad devices that use pressurized nitrogen gas to extract water samples.

Typically, wells were purged of standing water before sampling took place. Special care was taken to prevent accidental contamination of ground water samples. Technologists wore disposable gloves during the sampling process. All sampling equipment was maintained so that it did not contaminate the water sample. Equipment used in different wells, such as pH meter probes and depth-to-water gages, were cleaned with deionized water after each use to prevent cross-well contamination. Field blank and equipment blank samples were taken and were analyzed to test the cleanliness of the sampling methods. The types of sample containers used and the chemicals (mostly acids) used for sample preservation were selected using Procedure EMP-QA-BOT. Most of the analytical measurements were performed for LLNL by contract laboratories. Exceptions were water table elevation, water temperature, and tritium activity. **Tables 7-1** and **7-2** list the standard EPA methods used to measure the various inorganic, organic, and radioactive constituents of concern and their typical lowest reporting limits.

Livermore Valley Wells

Water samples for tritium analysis were collected in 500-milliliter, argon-flushed, flint-glass bottles fitted with glass stoppers. LLNL made measurements using a liquid scintillation counting method with a detection limit of about 1.85 Bq/L (50 pCi/L). Samples with expected tritium activities below this detection limit were concentrated by as much as fifty times using a method of electrolytic enrichment, resulting in a detection limit of 0.037 Bq/L (1 pCi/L). Four 50-minute counting intervals were used for all sample measurements. Results from this sampling are presented in **Table 7-3** and are discussed in detail in Volume 1, Chapter 7.

Site 300 Pit 1 and Pit 7 Areas

Compliance ground water monitoring of Pits 1 and 7 during 1994 was conducted according to permit Waste Discharge Requirement (WDR) No. 93-100 issued by the Central Valley Regional Water Quality Contol Board (RWQCB) in 1993, and according to a post-Resource Conservation and Recovery Act (RCRA) closure monitoring plan. The WDR No. 93-100 permit for Pits 1 and 7 requires measurements of "constituents of concern," including radioisotopes, which are identified as having been disposed of in Pit 1 or in Pit 7. Table 7-1 lists the constituents of concern and their prescribed limits which, if exceeded, require that the Central Valley RWQCB be notified within seven days of the finding. The concentration limits for several new constituents of concern (labeled to be determined, TBD, in **Table 7-4**) have been statistically determined from 12 monthly measurements made over a one-year period that ended in September 1994. However, these results have not yet been approved by the Central Valley RWQCB and, therefore, have not been presented in **Table 7-4**.

Pit 1 ground water samples were analyzed for constituents fulfilling the requirements of WDR No. 93-100 and a post-RCRA closure monitoring plan. Measurements were performed for water-table elevation; total dissolved solids (TDS); specific conductance; temperature; pH; metals; high-explosive compounds HMX and RDX; general minerals; total organic carbon (TOC); total organic halides (TOX); radioactivity (gross alpha and gross beta); radioisotopes of hydrogen (tritium), uranium, and thorium; herbicides and pesticides (EPA Methods 615 and 608); purgeable organic compounds (EPA Method 624); and extractable organic compounds (EPA Method 625). Results for 1994 Pit 1 sampling are presented in **Table 7-5**, Parts 1 to 4, and are discussed in Volume 1, Chapter 7.

Pit 7 ground water samples were also analyzed for constituents fulfilling the requirements of WDR No. 93-100 and the post-RCRA closure monitoring plan. Measurements were performed for water-table elevation; TDS; specific conductance; temperature; pH; metals; radioisotopes of hydrogen (tritium), radium, uranium, and thorium; high-explosive compounds HMX and RDX; and a wide range of organic compounds. See **Table 7-6** for results for Pit 7 sampling.

High Explosives Process Area

As required by the WDR No. 85-188 permit, ground water samples were collected quarterly during 1994 from the five compliance monitoring wells in the B-817 high explosives (HE) Process Area. Samples from the four deeper wells completed in the Neroly upper blue sandstone formation were analyzed for metals, minerals, TOC, TOX, pH, specific conductance, high-explosive compounds (RDX, HMX, and TNT), volatile organic compounds (VOCs), and tritium. Samples from the shallow well W-817-03A were analyzed for VOCs, high-explosive compounds, and tritium. See **Table 7-7** for results of HE Process Area sampling.

Pit 2

Samples from the Barcad-fitted multiple completions were taken quarterly during 1994 and were analyzed for various metals; radioactivity (gross alpha and gross beta); tritium, radium (^{226}Ra), and uranium (^{234}U, ^{235}U, and ^{238}U). The results are presented in **Table 7-8**.

Pit 9

Three Pit 9 surveillance monitoring wells were sampled and analyzed once during 1994 for general contaminant indicator parameters, general minerals, metals, radioactivity, radioisotopes, and a wide range of organic compounds, including pesticides and herbicides. An additional well, K9-04, was sampled and analyzed for radioactivity. See **Table 7-9** for the sampling results.

Elk Ravine Drainage Area

Ground water samples from all wells were analyzed for various metals, including beryllium (except NC2-07), radioactivity (gross alpha and gross beta), tritium activity, and VOCs (EPA Method 601). Samples from wells K7-07, NC7-61, and NC7-69 were additionally analyzed for uranium isotopes (^{234}U, ^{235}U, and ^{238}U). Samples from wells K2-04D, K2-04S, and K2-01C were additionally analyzed for nitrogen compounds. The results for Elk Ravine drainage area sampling are presented in **Table 7-10**.

Pit 6

Pit 6 surveillance monitoring wells were sampled twice (semiannually) during 1994. Ground water samples were analyzed for metals; general minerals; organic compounds, including VOCs (EPA Method 601), herbicides (EPA Method 615), and pesticides (EPA Method 608); the general parameters pH, specific conductivity, TOC, and TOX; radioactivity (gross alpha and gross beta); tritium, radium (^{226}Ra), and uranium (^{234}U, ^{235}U, and ^{238}U). See **Table 7-11** for the sampling results.

Well 20

Quarterly samples taken from this drinking water production well during 1994 were analyzed for the metals beryllium, chromium, copper, and lead; for gross alpha and gross beta radioactivity; and for tritium activity. Monthly well samples were also taken and were analyzed for VOCs using EPA Method 502.2 or 524.2. Results of Well 20 sampling are presented in **Table 7-12**.

Off-Site Water-Supply Wells

Six of twelve off-site supply wells were sampled quarterly during 1994. Of these, CARNRW1 and CON2 were tested for VOCs only (EPA Method 601), while CARNRW2, CDF1, CON1, and GALLO1 were tested for a large suite of inorganic and organic constituents. The remaining six wells—MUL1, MUL2, STN, VIE1, VIE2, and W-35A-04—were sampled once during 1994 and tested

for a large suite of inorganic and organic compounds. All wells, except CARNRW1 and CON2, were tested at least once during 1994 for high-explosive compounds (HMX, RDX, and TNT), radioactivity (gross alpha and gross beta), and tritium activity. See **Table 7-13** for the results of off-site water-supply well sampling.

Off-Site Spring GEOCRK

The GEOCRK spring, located downstream from Site 300 in the Corral Hollow Creek channel, was sampled during the first, second, and fourth quarters of 1994. Samples were analyzed gross alpha, gross beta, and tritium activity. The spring was dry during the third quarter. See **Table 7-13** for the results of off-site Spring GEOCRK.

Table 7-1. List of ground water analyses showing inorganic constituent, EPA, or other standard measurement method used, and typical lower limit of detection reported by analytical laboratory.

Constituent	Method	Reporting Limit
Metals and Minerals (mg/L)		
All alkalinities	EPA 310.1	1
Aluminum	EPA 200.7	0.02
Ammonia nitrogen (as N)	EPA 350.3	0.03
Antimony	EPA 200.7	0.06
Arsenic	EPA 206.2	0.002
Barium	EPA 200.7	0.05
Beryllium	EPA 210.2	0.0005
Cadmium	EPA 213.2	0.0005
Calcium	EPA 200.7	0.5
Chloride	EPA 325.3	1
Chromium	EPA 218.2	0.010
Cobalt	EPA 200.7	0.025
Copper	EPA 200.7	0.05
Fluoride	EPA 340.2	0.1
Hardness, total (as $CaCO_3$)	EPA 2320B	1
Iron	EPA 200.7	0.1
Lead	EPA 239.2	0.002
Magnesium	EPA 200.7	0.5
Manganese	EPA 200.7	0.03
Mercury	EPA 245.1	0.0002
Molybdenum	EPA 200.7	0.05
Nickel	EPA 249.2	0.005
Nitrate (as N)	EPA 353.2	0.1
Potassium	EPA 200.7	1
Selenium	EPA 270.2	0.002
Silver	EPA 272.2	0.010
Sodium	EPA 200.7	1
Sulfate	EPA 300.0	1
Surfactants	EPA 425.1	0.5
Thallium	EPA 279.2	0.005
Total dissolved solids	EPA 160.1	1
Total Kjeldahl nitrogen	EPA 351.4	0.2
Total suspended solids	EPA 160.2	1

Table 7-1. List of ground water analyses showing inorganic constituent, EPA, or other standard measurement method used, and typical lower limit of detection reported by analytical laboratory.

Constituent	Method	Reporting Limit
Metals and Minerals (mg/L) (continued)		
Vanadium	EPA 6010	0.05
Zinc	EPA 200.7	0.02
Phenolics (mg/L)		
Phenolics	EPA 420.1	0.005
General Indicator Parameters		
pH, units	EPA 150.1	none
Specific conductance (μmhos/cm)	EPA 120.1	1
Total organic carbon (mg/L)	EPA 415.1	0.5
Total organic halides (mg/L)	EPA 9020	0.01
Explosive Compounds (μg/L)		
HMX	HPLC	20
RDX	HPLC	30
TNT	HPLC	30
Radioactivity (Bq/L)		
Gross alpha	EPA 900	0.06
Gross beta	EPA 900	0.05
Radioisotopes (Bq/L)		
Radium-226	EPA 903	0.00303
Thorium-228	U-NAS-NS-3050	0.009
Thorium-232	U-NAS-NS-3050	0.006
Tritium	LLNL-RAS-011	0.05
Uranium-234	U-NAS-NS-3050	0.004
Uranium-235	U-NAS-NS-3050	0.003
Uranium-238	U-NAS-NS-3050	0.004

Table 7-2. List of ground water analyses showing EPA Method, organic constituent, and typical lower limit of detection reported by analytical laboratory.

Constituent	Reporting Limit (μg/L)
EPA Method 502.2	
1,1,1,2-Tetrachloroethane	0.2
1,1,1-Trichloroethane	0.2
1,1,2,2-Tetrachloroethane	0.2
1,1,2-Trichloroethane	0.2
1,1-Dichloroethane	0.2
1,1-Dichloroethene	0.2
1,1-Dichloropropene	0.2
1,2,3-Trichlorobenzene	0.2
1,2,3-Trichloropropane	0.2
1,2,4-Trichlorobenzene	0.2
1,2,4-Trimethylbenzene	0.2
1,2-Dichlorobenzene	0.2
1,2-Dichloroethane	0.2
1,2-Dichloropropane	0.2
1,3,5-Trimethylbenzene	0.2
1,3-Dichlorobenzene	0.2
1,3-Dichloropropane	0.2
1,4-Dichlorobenzene	0.2
2,2-Dichloropropane	0.2
2-Chlorotoluene	0.2
4-Chlorotoluene	0.2
Benzene	0.2
Bromobenzene	0.2
Bromochloromethane	0.2
Bromodichloromethane	0.2
Bromoform	0.2
Bromomethane	0.2
Carbon tetrachloride	0.2
Chlorobenzene	0.2
Chloroethane	0.2
Chloroform	0.2
Chloromethane	0.2
cis-1,2-Dichloroethene	0.2
cis-1,3-Dichloropropene	0.5
Dibromochloromethane	0.2
Dibromomethane	0.2
Dichlorodifluoromethane	0.2
Ethylbenzene	0.2
Freon-113	0.2
Hexachlorobutadiene	0.2
Isopropylbenzene	0.2
m- and p-Xylene isomers	0.2
Methylene chloride	0.2
n-Butylbenzene	0.2
n-Propylbenzene	0.2
Naphthalene	0.2
o-Xylene	0.2
Isopropyl toluene	0.2
sec-Butylbenzene	0.2
Styrene	0.2
tert-Butylbenzene	0.2
Tetrachloroethene	0.2
Toluene	0.2
trans-1,2-Dichloroethene	0.2
trans-1,3-Dichloropropene	0.2
Trichloroethene	0.2
Trichlorofluoromethane	0.2
Vinyl chloride	0.2
EPA Method 524.2	
1,1,1,2-Tetrachloroethane	1
1,1,1-Trichloroethane	1
1,1,2,2-Tetrachloroethane	1
1,1,2-Trichloroethane	1
1,1-Dichloroethane	1

Table 7-2. List of ground water analyses showing EPA Method, organic constituent, and typical lower limit of detection reported by analytical laboratory.

Constituent	Reporting Limit (μg/L)
EPA Method 524.2 (continued)	
1,1-Dichloroethene	1
1,1-Dichloropropene	1
1,2,3-Trichlorobenzene	1
1,2,3-Trichloropropane	1
1,2,4-Trichlorobenzene	1
1,2,4-Trimethylbenzene	1
1,2-Dibromo-3-chloropropane	2
1,2-Dichlorobenzene	1
1,2-Dichloroethane	1
1,2-Dichloropropane	1
1,3,5-Trimethylbenzene	1
1,3-Dichlorobenzene	1
1,3-Dichloropropane	1
1,4-Dichlorobenzene	1
2-Chlorotoluene	1
4-Chlorotoluene	1
Benzene	1
Bromobenzene	1
Bromodichloromethane	1
Bromoform	1
Bromomethane	2
Carbon tetrachloride	1
Chlorobenzene	1
Chloroethane	2
Chloroform	1
Chloromethane	2
cis-1,2-Dichloroethene	1
cis-1,3-Dichloropropene	1
Dibromochloromethane	1
Dibromomethane	1
Dichlorodifluoromethane	2
Ethylbenzene	1
Ethylene dibromide	1
Freon-113	1
Hexachlorobutadiene	1
Isopropylbenzene	1
m- and p-Xylene isomers	1
Methylene chloride	1
n-Butylbenzene	1
n-Propylbenzene	1
Naphthalene	1
o-Xylene	1
Isopropyl toluene	1
sec-Butylbenzene	1
Styrene	1
tert-Butylbenzene	1
Tetrachloroethene	1
Toluene	1
trans-1,2-Dichloroethene	1
trans-1,3-Dichloropropene	1
Trichloroethene	0.5
Trichlorofluoromethane	1
Vinyl chloride	2
EPA Method 601	
1,1,1-Trichloroethane	0.5
1,1,2,2-Tetrachloroethane	0.5
1,1,2-Trichloroethane	0.5
1,1-Dichloroethane	0.5
1,1-Dichloroethene	0.5
1,2-Dichlorobenzene	0.5
1,2-Dichloroethane	0.5
1,2-Dichloroethene (total)	0.5
1,2-Dichloropropane	0.5
1,3-Dichlorobenzene	0.5

Table 7-2. List of ground water analyses showing EPA Method, organic constituent, and typical lower limit of detection reported by analytical laboratory.

Constituent	Reporting Limit (μg/L)
EPA Method 602 (continued)	
1,4-Dichlorobenzene	0.5
2-Chloroethylvinylether	0.5
Bromodichloromethane	0.5
Bromoform	0.5
Bromomethane	0.5
Carbon tetrachloride	0.5
Chlorobenzene	0.5
Chloroethane	0.5
Chloroform	0.5
Chloromethane	0.5
cis-1,3-Dichloropropene	0.5
Dibromochloromethane	0.5
Dichlorodifluoromethane	0.5
Freon-113	0.5
Methylene chloride	0.5
Tetrachloroethene	0.5
trans-1,3-Dichloropropene	0.5
Trichloroethene	0.5
Trichlorofluoromethane	0.5
Vinyl chloride	0.5
1,2-Dichlorobenzene	0.5
EPA Method 602	
1,3-Dichlorobenzene	0.3
1,4-Dichlorobenzene	0.3
Benzene	0.4
Chlorobenzene	0.3
Ethylbenzene	0.3
m- and p-Xylene isomers	0.4
o-Xylene	0.4
Toluene	0.3
Total xylene isomers	0.4

Constituent	Reporting Limit (μg/L)
EPA Method 608	
Aldrin	0.05
BHC, alpha isomer	0.05
BHC, beta isomer	0.05
BHC, delta isomer	0.05
BHC, gamma isomer (Lindane)	0.05
Chlordane	0.5
Dieldrin	0.1
Endosulfan I	0.05
Endosulfan II	0.1
Endosulfan sulfate	0.1
Endrin	0.1
Endrin aldehyde	0.1
Heptachlor	0.05
Heptachlor epoxide	0.05
Methoxychlor	0.5
4,4'-DDD	0.1
4,4'-DDE	0.1
4,4'-DDT	0.1
Toxaphene	1
EPA Method 615	
2,4,5-T	0.5
2,4,5-TP (Silvex)	0.2
2,4-D	1
2,4-Dichlorophenoxy acetic acid	2
Dalapon	2
Dicamba	1
Dichloroprop	2
Dinoseb	1
MCPA	250
MCPP	250

Table 7-2. List of ground water analyses showing EPA Method, organic constituent, and typical lower limit of detection reported by analytical laboratory.

Constituent	Reporting Limit (μg/L)
EPA Method 624	
1,1,1-Trichloroethane	1
1,1,2,2-Tetrachloroethane	1
1,1,2-Trichloroethane	1
1,1-Dichloroethane	1
1,1-Dichloroethene	1
1,2-Dichlorobenzene	1
1,2-Dichloroethane	1
1,2-Dichloroethene (total)	1
1,2-Dichloropropane	1
1,3-Dichlorobenzene	1
1,4-Dichlorobenzene	1
2-Butanone	10
2-Chloroethylvinylether	10
2-Hexanone	10
4-Methyl-2-pentanone	10
Acetone	10
Benzene	1
Bromodichloromethane	1
Bromoform	1
Bromomethane	2
Carbon disulfide	1
Carbon tetrachloride	1
Chlorobenzene	1
Chloroethane	2
Chloroform	1
Chloromethane	2
cis-1,3-Dichloropropene	1
Dibromochloromethane	1
Dibromomethane	1
Dichlorodifluoromethane	2
Ethylbenzene	1

Constituent	Reporting Limit (μg/L)
Freon-113	1
Methylene chloride	1
Styrene	1
Tetrachloroethene	1
Toluene	1
Total xylene isomers	2
trans-1,3-Dichloropropene	1
Trichloroethene	0.5
Trichlorofluoromethane	1
Vinyl acetate	10
Vinyl chloride	2
EPA Method 625	
1,2,4-Trichlorobenzene	10
1,2-Dichlorobenzene	10
1,3-Dichlorobenzene	10
1,4-Dichlorobenzene	10
2,4,5-Trichlorophenol	10
2,4,6-Trichlorophenol	10
2,4-Dichlorophenol	10
2,4-Dimethylphenol	10
2,4-Dinitrophenol	50
2,4-Dinitrotoluene	10
2,6-Dinitrotoluene	10
2-Chloronaphthalene	10
2-Chlorophenol	10
2-Methylphenol	10
2-Methyl-4,6-dinitrophenol	50
2-Methylnaphthalene	10
2-Nitroaniline	50
2-Nitrophenol	10
3,3'-Dichlorobenzidine	20
3-Nitroaniline	50

Table 7-2. List of ground water analyses showing EPA Method, organic constituent, and typical lower limit of detection reported by analytical laboratory.

Constituent	Reporting Limit (μg/L)
EPA Method 625 (continued)	
4-Bromophenylphenylether	10
4-Chloro-3-methylphenol	20
4-Chloroaniline	20
4-Chlorophenylphenylether	10
4-Nitroaniline	50
4-Nitrophenol	50
Acenaphthene	10
Acenaphthylene	10
Anthracene	10
Benzo(a)anthracene	10
Benzo(a)pyrene	10
Benzo(b)fluoranthene	10
Benzo(g,h,i)perylene	10
Benzo(k)fluoranthene	10
Benzoic acid	50
Benzyl alcohol	20
Bis(2-chloroethoxy)methane	10
Bis(2-chloroisopropyl)ether	10
Bis(2-ethylhexyl)phthalate	10
Butylbenzylphthalate	10
Chrysene	10
Di-n-butylphthalate	10

Constituent	Reporting Limit (μg/L)
Di-n-octylphthalate	10
Dibenzo(a,h)anthracene	10
Dibenzofuran	10
Diethylphthalate	10
Dimethylphthalate	10
Fluoranthene	10
Fluorene	10
Hexachlorobenzene	10
Hexachlorobutadiene	10
Hexachlorocyclopentadiene	10
Hexachloroethane	10
Indeno(1,2,3-c,d)pyrene	10
Isophorone	10
m- and p-Cresol	10
N-Nitrosodi-n-propylamine	10
N-Nitrosodiphenylamine	10
Naphthalene	10
Nitrobenzene	10
Pentachlorophenol	50
Phenanthrene	10
Phenol	10
Pyrene	10

Table 7-3. Tritium activity in Livermore Valley wells (in Bq/L), 1994.

Well ID	Activity	% of MCL
LWRP		
1H3	0.43 ± 0.09	0.06
1P2	3.50 ± 0.20	0.47
1P3	0.57 ± 0.11	0.08
1R2	1.79 ± 0.15	0.24
2R1	3.56 ± 0.17	0.48
7C2	2.68 ± 0.17	0.36
11B1	15.69 ± 0.50	2.12
12A2	3.51 ± 0.17	0.47
12D2	6.22 ± 0.24	0.84
12G1	4.96 ± 0.20	0.67
mean	**4.29**	**0.58**
std. dev.	4.39	
Livermore		
7P3	0.06 ± 0.06	0.01
8F1	1.25 ± 0.13	0.17
8P1	1.69 ± 0.13	0.23
9Q1	1.14 ± 0.14	0.15
16B1	0.77 ± 0.13	0.10
mean	**0.98**	**0.13**
std. dev.	0.61	
Pleasanton		
9M2	0.88 ± 0.15	0.12
004	1.14 ± 0.14	0.15
16L5	1.08 ± 0.15	0.15
16L7	1.62 ± 0.17	0.22
17D2	0.09 ± 0.09	0.01
18A1	0.28 ± 0.13	0.04
mean	**0.85**	**0.11**
std. dev.	0.57	

Table 7-4. Constituents of concern and concentration limits, Pits 1 and 7.

Constituent of Concern	Pit 1 Concentration Limit	Pit 7 Concentration Limit
Metals (mg/L)		
Arsenic	0.02	TBD[a]
Barium	0.05	0.09
Beryllium	0.0005	0.0005
Cadmium	0.0005	TBD[a]
Cobalt	TBD[a]	TBD[a]
Copper	0.07	TBD[a]
Lead	0.009	0.002
Nickel	0.10	TBD[a]
Vanadium	0.09	0.05
Zinc	0.06	TBD[a]
Radioisotopes (Bq/L)		
Radium-226	0.037 (1.0 pCi/L)	TBD[a]
Tritium	18.5 (500 pCi/L)	3.17 (85.7 pCi/L)
Uranium-234	0.23 (6.3 pCi/L)	0.078 (2.1 pCi/L)
Uranium-235	0.007 (0.2 pCi/L)	0.0037 (0.1 pCi/L)
Uranium-238	0.10 (2.76 pCi/L)	0.059 (1.6 pCi/L)
Thorium-228	TBD[a]	TBD[a]
Thorium-232	TBD[a]	TBD[a]
High Explosives (μg/L)		
HMX	26	TBD[a]
RDX	30	TBD[a]

[a] TBD = To be determined. Concentration limit (CL) to be statistically determined from12 monthly measurements beginning October 1993 due to insufficient or nonexistent historical data on which to base CL.

Table 7-5 (Quarter 1). Pit 1 first quarter 1994 data.

Parameters	Sample Date	Location							
		K–01C	K1–02B	K1–03	K1–04	K1–05	K1–07	K1–08	K1–09
Field Measurements									
Water temperature (°C)	1/20/94	21.9	20.8	21.8	20.9	21.4	18.7	20.	20.8
Water table elevation (ft)	1/20/94	971.52	969.23	967.25	963.67	957.36	966.28	966.04	963.38
Metals and Minerals (mg/L)									
Arsenic (CL = 0.02)	1/31/94	0.012	0.01	0.013	0.01	0.013	0.013	0.016	0.016
	2/8/94	0.019	0.018	0.02	0.017	0.021	0.02	0.021	0.019
	2/14/94	0.016	0.014	0.016	0.015	0.02	0.017	0.029	0.026
	2/23/94	0.013	0.011	0.035	0.014	0.017	0.015	0.016	0.015
	3/30/94			0.016					
	4/11/94			0.016					
	5/4/94	0.013	0.012	0.014	0.011	0.013	0.012	0.014	0.013
Barium (CL = 0.05)	1/31/94	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Beryllium (CL = 0.005)	1/31/94	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Cadmium (CL = 0.005)	1/31/94	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Calcium	1/31/94	44	50	41	41	34	36	36	34
Chromium	1/31/94	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Cobalt (CL to be determined)	1/20/94	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	1/31/94	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	3/1/94	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Copper (CL = 0.07)	4/11/94	0.032	0.010	< 0.010	< 0.010	0.022	< 0.010	< 0.010	< 0.010
Lead (CL = 0.009)	1/31/94	0.0029	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Magnesium	1/31/94	17	22	16	15	17	17	16	16
Mercury	1/31/94	0.00042	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Nickel CL = 0.10)	1/31/94	0.0052	0.0085	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Selenium	1/31/94	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Silver	1/31/94	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Total dissolved solids (TDS)	1/31/94	340	410	310	300	340	340	340	340
	2/8/94	360	420	330	360	350	360	330	350
	2/14/94	340	410	340	340	330	340	360	350
	2/23/94	370	460	380	390	370	380	380	370
Vanadium (C.L. = 0.09)	1/31/94	0.066	0.059	0.053	< 0.05	0.074	0.079	0.07	0.064
Zinc (C.L. = 0.06)	4/11/94	0.027	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
General Indicator Parameters									
pH (units)	1/31/94	7.6	7.5	7.5	7.6	7.6	7.6	7.6	7.6
	2/8/94	7.4	7.4	7.4	7.5	7.5	7.5	7.5	7.5
	2/14/94	7.5	7.4	7.5	7.5	7.5	7.5	7.6	7.5
	2/23/94	7.6	7.5	7.6	7.7	7.7	7.7	7.7	7.7
Specific conductance	1/31/94	450	550	440	460	410	460	460	450
(μmho/cm)	2/8/94	470	540	440	470	440	440	460	440
	2/14/94	490	590	470	490	470	480	480	480
	2/23/94	490	590	470	490	470	480	490	480
Explosive compounds (μg/L)									
HMX (CL = 26)	1/31/94	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
RDX (CL = 30)	1/31/94	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30
TNT	1/31/94	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30

Table 7-5 (Quarter 1). Pit 1 first quarter 1994 data.

Parameters	Sample Date	Location K–01C	K1–02B	K1–03	K1–04	K1–05	K1–07	K1–08	K1–09
Radioisotopes (Bq/L)									
Radium–226 (CL = 0.037)	1/31/94	0.021 ± 0.0026	0.019 ± 0.0026	0.020 ± 0.0026	0.018 ± 0.0026	0.020 ± 0.0026	0.018 ± 0.0030	0.018 ± 0.0026	0.017 ± 0.0022
Thorium–228 (CL to be determined)	1/20/94	0.0041 ± 0.0048	0.0022 ± 0.0041	– 0.041 ± 0.19	*	*	0.0048 ± 0.0048	– 0.064 ± 0.054	0.0030 ± 0.0037
	1/31/94	0.0041 ± 0.0030	0.011 ± 0.0056	– 0.0089 ± 0.013	0.015 ± 0.0037	0.0052 ± 0.0030	0.028 ± 0.022	0.017 ± 0.011	0.011 ± 0.0048
	3/1/94	0.011 ± 0.014	0.0059 ± 0.0074	0.0081 ± 0.0081	0.0019 ± 0.0056	– 0.0030** ± 0.0052	0.0030** ± 0.0063	– 0.0011** ± 0.0041	0.052 ± 0.010
						0.10** ± 0.025	0.028** ± 0.010	0.0037** ± 0.022	
Thorium–232 (CL to be determined)	1/20/94	0.010 ± 0.0056	0.012 ± 0.0048	– 0.060 ± 0.22	*	*	0.0085 ± 0.0041	0.0093 ± 0.024	0.010 ± 0.0044
	1/31/94	0.0015 ± 0.0015	0.0026 ± 0.0022	– 0.00037 ± 0.0030	0.0033 ± 0.0019	0.003 ± 0.0019	0.0026 ± 0.0070	0.0044 ± 0.0056	0.014 ± 0.0044
	3/1/94	0.013 ± 0.010	0.0019 ± 0.0037	– 0.0022 ± 0.0030	0.023 ± 0.0093	0.0063 ** ± 0.0063	0.0048** ± 0.0048	0.0019** ± 0.0033	0.16 ± 0.017
						0.50 ** ± 0.052	0.093** ± 0.017	0.0022** ± 0.0081	
Tritium (CL = 18.5)	1/31/94	6.7 ± 1.8	118 ± 4.2	5.9 ± 1.8	1.5 ± 1.5	1.6 ± 1.6	1.5 ± 1.5	1.6 ± 1.6	1.6 ± 1.6
Uranium–234 (CL = 0.233)	1/31/94	0.16 ± 0.0063	0.081 ± 0.0059	0.048 ± 0.026	0.063 ± 0.0052	0.051 ± 0.0044	0.054 ± 0.0052	0.048 ± 0.0033	0.043 ± 0.0041
Uranium–235 (CL = 0.007)	1/31/94	0.0052 ± 0.0011	0.0037 ± 0.0015	0.0059 ± 0.0096	0.0081 ± 0.0019	0.0048 ± 0.0019	0.0078 ± 0.0022	0.0019 ± 0.00074	0.0015 ± 0.00074
Uranium–238 (CL = 0.102)	1/31/94	0.101 ± 0.0048	0.038 ± 0.0041	0.052 ± 0.027	0.033 ± 0.0037	0.025 ± 0.0030	0.034 ± 0.0041	0.025 ± 0.0022	0.029 ± 0.0033

* Sample lost—container emptied during transit to analytical laboratory.
** Matrix interference.

Table 7-5 (Quarter 2). Pit 1 second quarter 1994 data.

Parameters	Sample Date	Location							
		K1–01C	K1–02B	K1–03	K1–04	K1–05	K1–07	K1–08	K1–09
Field Measurements									
Water temperature (°C)	5/4/94	19.9	20.6	20.9	20.2	21.4	21.	21.4	21.1
Water table elevation (ft)	4/11/94	971.22	968.98	967.07	963.42	957.31	966.13	965.82	963.18
Metals and Minerals (mg/L)									
Aluminum	5/4/94	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Arsenic (CL = 0.02)	5/4/94	0.013	0.012	0.014	0.011	0.013	0.012	0.014	0.013
	4/11/94					0.027			
	5/10/94	0.013	0.014	0.016	0.013	0.017	0.015	0.016	0.015
	5/17/94	0.018	0.017	0.02	0.017	0.021	0.02	0.02	0.02
	5/25/94	0.012	0.012	0.013	0.012	0.013	0.014	0.014	0.014
Barium (CL = 0.05)	5/4/94	< 0.025	< 0.025	< 0.025	< 0.025	0.026	< 0.025	0.029	0.027
Beryllium (CL = 0.0005)	5/4/94	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Bicarbonate alk (as $CaCO_3$)	5/4/94	140	140	140	140	70	130	120	120
Cadmium (CL = 0.0005)	5/4/94	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Calcium	5/4/94	45	52	46	46	37	38	38	38
Chloride	5/4/94	35	63	31	33	37	34	42	35
Chromium	5/4/94	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Cobalt (CL to be determined)	4/11/94	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	5/4/94	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025
	5/31/94	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025
Copper (CL = 0.07)	5/4/94	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluoride	5/4/94	0.37	0.34	0.31	0.41	0.51	0.49	0.5	0.49
Hardness, total (as $CaCO_3$)	5/4/94	180	220	180	180	160	160	160	160
Iron	5/4/94	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Lead (CL = 0.009)	5/4/94	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Magnesium	5/4/94	17	23	17	17	17	17	17	17
Manganese	5/4/94	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Mercury	5/4/94	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Nickel (CL = 0.10)	5/4/94	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nitrate (as N)	5/4/94	11	9	9	7	12	10	10	11
Potassium	5/4/94	3	3	3	3	3	3	3	3
Selenium	5/4/94	0.0038	0.0034	0.0041	0.0045	0.003	0.0033	0.0038	0.0038
Silver	5/4/94	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Sodium	5/4/94	33	39	32	37	38	38	39	38
Sulfate	5/4/94	50	69	39	51	46	42	72	50
Surfactant	5/4/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Total alkalinity (as $CaCO_3$)	5/4/94	140	140	140	140	70	130	120	120
Total dissolved solids (TDS)	5/4/94	600	660	540	570	510	540	550	520
	5/10/94	390	470	390	180	380	360	380	370
	5/17/94	350	410	340	340	340	300	350	330
	5/25/94	340	440	340	340	350	330	370	370
Vanadium (CL = 0.09)	5/4/94	0.061	0.055	0.051	0.033	0.073	0.081	0.07	0.068
Zinc (C.L. = 0.06)	5/4/94	0.082	0.066	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07
		0.074	0.06						
	6/17/94	0.049	0.024						
	6/24/94	0.047	< 0.02						
General Indicator Parameters									
pH (units)	5/4/94	7.2	7.3	7.4	7.4	7.4	7.4	7.6	7.5
	5/10/94	7.3	7.3	7.4	7.4	7.4	7.7	7.7	7.5
	5/17/94	7.5	7.4	7.4	7.5	7.5	7.6	7.5	7.5
	5/25/94	7.3	7.3	7.4	7.4	7.4	7.5	7.5	7.5

Table 7-5 (Quarter 2). Pit 1 second quarter 1994 data.

Parameters	Sample Date	Location K1–01C	K1–02B	K1–03	K1–04	K1–05	K1–07	K1–08	K1–09
Specific conductance (μmhos/cm)	5/4/94	460	550	440	470	450	450	460	450
	5/10/94	480	580	470	500	460	470	480	470
	5/17/94	480	580	460	480	460	460	480	470
	5/25/94	450	540	440	450	440	440	450	450
Total organic carbon (mg/L)	5/4/94	< 1	< 1	< 1	< 1	8	5	9	5
Total organic halides (mg/L)	5/4/94	0.063	0.014	0.05	0.024	0.017	0.012	0.021	0.029
Explosive Compounds (μg/L)									
HMX (CL =26)	5/4/94	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
RDX (CL = 30)	5/4/94	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30
TNT	5/4/94	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30
Radioactivity (Bq/L)									
Gross alpha	6/4/94	0.097 ± 0.0085	0.0096 ± 0.0052	−0.0019 ± 0.0044	0.017 ± 0.0044	0.020 ± 0.0048	0.019 ± 0.0052	0.0085 ± 0.0037	0.0037 ± 0.0044
Gross beta	6/4/94	0.11 ± 0.018	0.095 ± 0.016	0.068 ± 0.015	0.12 ± 0.017	0.12 ± 0.015	0.045 ± 0.016	0.070 ± 0.014	0.070 ± 0.015
Radioisotopes (Bq/L)									
Radium−226 (CL = 0.037)	5/4/94	0.0070 ± 0.0015	0.0074 ± 0.0015	0.0037 ± 0.0011	0.0037 ± 0.0011	0.0052 ± 0.0015	0.0044 ± 0.0015	0.0078 ± 0.0015	0.0059 ± 0.0015
Thorium−228 (CL to be determined)	4/11/94	0.0033 ± 0.0044	0.30 * ± 0.73	0.0063 ± 0.0037	−0.0015 ± 0.0019	−0.0041 ± 0.0056	0.0022 ± 0.0033	0.00015 ± 0.0019	−0.011 ± 0.0044
			0.0015 * ± 0.016						
	5/4/94	0.026 ± 0.0074	0.035 ± 0.011	0.043 ± 0.0085	−0.0037 ± 0.0059	−0.0030 ± 0.0056	0.030 ± 0.010	0.057 ± 0.0096	−0.025 ± 0.011
	5/31/94	−0.00074 ± 0.0022	−0.00007 ± 0.0036	−0.0033 ± 0.0033	−0.010 ± 0.0067	−0.0037 ± 0.0022	0.0093 ± 0.0056	0.0048 ± 0.0033	0.0089 ± 0.0056
Thorium−232 (CL to be determined)	4/11/94	0.0026 ± 0.0026	0.16 * ± 0.33	0.0026 ± 0.0022	0.0052 ± 0.0033	0.0037 ± 0.0037	−0.0011 ± 0.0015	−0.00074 ± 0.010	−0.0030 ± 0.0022
			−0.00074 * ± 0.010						
	5/4/94	−0.023 ± 0.0070	0.014 ± 0.0085	−0.0030 ± 0.0030	0.0081 ± 0.0085	−0.0011 ± 0.0037	0.0026 ± 0.0030	0.0033 ± 0.0030	0.0089 ± 0.0056
	5/31/94	0.0015 ± 0.0015	0.0081 ± 0.0052	0.0019 ± 0.0048	0.068 ± 0.020	0.00074 ± 0.0026	0.0015 ± 0.0022	0.0041 ± 0.0026	0.0019 ± 0.0019
Tritium (CL = 18.5)	5/4/94	5.1 ± 1.7	100 ± 3.6	5.5 ± 1.7	1.5 ± 1.5	1.5 ± 1.5	1.4 ± 1.4	1.4 ± 1.4	1.4 ± 1.4

Table 7-5 (Quarter 2). Pit 1 second quarter 1994 data.

Parameters	Sample Date	Location							
		K1–01C	K1–02B	K1–03	K1–04	K1–05	K1–07	K1–08	K1–09
Uranium–234 (CL.= 0.23)	5/4/94	0.22 ± 0.0081	0.061 ± 0.0048	0.038 ± 0.0041	0.052 ± 0.0070	0.054 ± 0.0041	0.073 ± 0.0059	0.050 ± 0.0052	0.047 ± 0.0037
Uranium–235 (CL = 0.0074)	5/4/94	0.0074 ± 0.0015	0.00037 ± 0.0026	–0.0011 ± 0.0022	0.0011 ± 0.0044	0.0022 ± 0.0019	0.0019 ± 0.0015	0.0019 ± 0.0011	0.0022 ± 0.0011
Uranium–238 (CL = 0.10)	5/4/94	0.13 ± 0.0063	0.044 ± 0.0044	0.022 ± 0.0033	0.031 ± 0.0063	0.026 ± 0.0033	0.028 ± 0.0037	0.024 ± 0.0033	0.022 ± 0.0026

* Matrix interference

Table 7-5 (Quarter 3). Pit 1 third quarter 1994 data.

Parameters	Sample Date	Location K1–01C	K1–02B	K1–03	K1–04	K1–05	K1–07	K1–08	K1–09
Field Measurements									
Water temperature (°C)	7/12/94	21.9	21.6	22.9	22.8	22.5	21.5	21.5	10.6
Water table elevation (ft)	7/12/94	970.96	968.85	967.2	963.41	957.26	966.01	965.64	963.08
Metals and Minerals (mg/L)									
Aluminum	8/3/94	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Arsenic (CL = 0.02)	8/3/94	0.013	0.012	0.014	0.012	0.015	0.014	0.016	0.015
	8/9/94	0.01	0.0099	0.012	0.0091	0.013	0.012	0.012	0.012
	8/15/94	0.012	0.011	0.012	0.011	0.015	0.014	0.014	0.014
	8/22/94	0.013	0.012	0.014	0.012	0.014	0.014	0.015	0.014
Barium (CL = 0.05)	8/3/94	< 0.025	< 0.025	< 0.025	< 0.025	0.026	< 0.025	0.031	0.03
Beryllium (CL = 0.0005)	8/3/94	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Bicarbonate alk (as $CaCO_3$)	8/3/94	150	140	140	150	120	140	130	130
Cadmium (CL = 0.0005)	8/3/94	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Calcium	8/3/94	49	54	46	46	38	40	40	40
Chloride	8/3/94	34	51	33	32	34	33	34	33
Chromium	8/3/94	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Cobalt	7/12/94	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025
(CL to be determined)	8/3/94	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	9/1/94	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Copper (CL = 0.07)	8/3/94	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluoride	8/3/94	0.36	0.33	0.31	0.4	0.49	0.47	0.48	0.47
Hardness, total (as $CaCO_3$)	8/3/94	200	230	180	180	170	170	170	170
Iron	8/3/94	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Lead (CL = 0.009)	8/3/94	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Magnesium	8/3/94	18	23	17	17	18	18	18	18
Manganese	8/3/94	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Mercury	8/3/94	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Nickel (CL = 0.10)	8/3/94	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nitrate (as N)	8/3/94	6.7	6.6	6.3	4.5	7.7	7.1	7.4	7.6
Potassium	8/3/94	3	3	2.9	3.3	2.8	3	3.1	3
Selenium	8/3/94	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Silver	8/3/94	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Sodium	8/3/94	39	39	33	38	40	40	40	40
Sulfate	8/3/94	34	62	34	46	38	34	45	41
Surfactant	8/3/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Total alkalinity (as $CaCO_3$)	8/3/94	150	140	140	150	120	140	130	130
Total dissolved solids (TDS)	8/3/94	350	320	350	320	370	340	390	320
	8/9/94	360	430	360	340	360	260	360	340
	8/15/94	370	430	360	370	370	340	370	360
	8/22/94	330	410	350	350	330	370	350	390
Vanadium (C.L= 0.09)	8/3/94	0.061	0.052	< 0.05	< 0.05	0.069	0.072	0.063	0.062
Zinc (CL = 0.06)	8/3/94	0.086	0.022	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
	8/3/94	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
General Indicator Parameters									
pH (units)	8/3/94	7.6	7.6	7.6	7.6	7.6	7.6	7.7	7.6
	8/9/94	7.5	7.5	7.4	7.6	7.6	7.6	7.6	7.6
	8/15/94	7.3	7.3	7.5	7.4	7.4	7.4	7.5	7.5
	8/22/94	7.4	7.4	7.5	7.7	7.6	7.6	7.6	7.5

Table 7-5 (Quarter 3). Pit 1 third quarter 1994 data.

Parameters	Sample Date	Location K1–01C	K1–02B	K1–03	K1–04	K1–05	K1–07	K1–08	K1–09
Specific conductance (μmho/cm)	8/3/94	500	590	480	490	480	480	490	500
	8/9/94	520	640	500	520	500	500	520	510
	8/15/94	510	640	500	520	510	510	520	520
	8/22/94	520	630	510	510	500	500	520	520
Explosive Compounds (μg/L)									
HMX (CL =26)	8/3/94	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
RDX (CL = 30)	8/3/94	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30
TNT	8/3/94	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30
Radioisotopes (Bq/L)									
Radioisotopes (Bq/L)									
Radium–226	8/3/94	0.0074 ± 0.0019	0.0019 ± 0.0015	0.0022 ± 0.0015	0.0200 ± ±0.018	0.0059 ± 0.0019	0.0026 ± 0.0015	0.0048 ± 0.0015	0.0015 ± 0.0019
Thorium–228	7/12/94	0.0278 ± 0.0074	– 0.0067 ± 0.0033	0.0019 ± 0.0022	0.0015 ± 0.0015	¯ 0.0037 ± 0.0022	0.0048 ± 0.0044	0.0052 ± 0.0059	0.0007 ± 0.0022
	8/3/94	0.0030 ± 0.0111	0.0048 ± 0.0059	0.0100 ± 0.0048	0.0007 ± 0.0041	0.0007 ± 0.0033	-0.0044 ± 0.0037	0.0019 ± 0.0148	0.0870 ± 0.0370
	9/1/94	0.0030 ± 0.0026	0.0070 ± 0.0044	–0.0011 ± 0.0011	0.0015 ± 0.0015	0.0089 ± 0.0041	0.0022 ± 0.0022	0.0104 ± 0.0070	0.0030 ± 0.0056
							0.0000 0.0089		
Thorium–232	7/12/94	0.0007 ± 0.0015	– 0.0007 ± 0.0015	0.0000 ± 0.0019	– 0.0004 ± 0.0007	– 0.0026 ± 0.0019	0.0007 ± 0.0030	– 0.0015 ± 0.0033	– 0.0001 ± 0.0004
	8/3/94	0.0030 ± 0.0063	0.0044 ± 0.0059	0.0033 ± 0.0030	0.0022 ± 0.0037	– 0.0004 ± 0.0008	– 0.0041 ± 0.0022	0.0026 ± 0.0118	0.0096 ± 0.0107
	9/1/94	0.0081 ± 0.0033	0.0003 ± 0.0020	0.0003 ± 0.0006	0.0015 ± 0.0015	0.0137 ± 0.0052	0.0019 ± 0.0019	0.0104 ± 0.0056	0.0081 ± 0.0059
	9/20/94						0.0044* ± 0.0037		
Tritium	8/3/94	7.10 ± 1.74	113.96 ± 3.99	5.44 ± 1.14	– 1.50 ± 1.41	– 0.20 ± 1.47	0.22 ± 1.49	0.78 ± 1.51	– 2.10 ± 1.39
Uranium–234	8/3/94	0.1395 ± 0.0059	0.0918 ± 0.0052	0.0396 ± 0.0030	0.0514 ± 0.0044	0.0537 ± 0.0041	0.0703 ± 0.0052	0.0514 ± 0.0037	0.0466 ± 0.0041
Uranium–235	8/3/94	0.0078 ± 0.0015	0.0107 ± 0.0019	0.0011 ± 0.0007	0.0015 ± 0.0015	0.0037 ± 0.0022	0.0011 ± 0.0011	0.0022 ± 0.0007	0.0022 ± 0.0011
Uranium–238	8/3/94	0.0877 ± 0.0044	0.0448 ± 0.0037	0.0181 ± 0.0019	0.0322 ± 0.0037	0.0241 ± 0.0033	0.0274 ± 0.0033	0.0248 ± 0.0026	0.0170 ± 0.0026

* Additional sample for thorium analysis taken for statistical purposes.

Table 7-5 (Quarter 4). Pit 1 fourth quarter 1994 data.

Parameters	Sample Date	Location							
		K1–01C	K1–02B	K1–03	K1–04	K1–05	K1–07	K1–08	K1–09
Field Measurements									
Water temperature (°C)	10/13/94	20.3	20.6	21.2	21.4	21.1	20.6	20.8	20.3
Water table elevation (ft)	10/13/94	971.0	968.8	966.9	963.3	957.3	965.9	965.5	962.9
Metals and Minerals (mg/L)									
Aluminum	10/13/94	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Ammonia nitrogen (as N)	10/13/94	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.21	< 0.1
Arsenic (CL = 0.02)	10/13/94	0.016	0.015	0.017	0.014	0.018	0.017	0.018	0.017
	11/01/94	0.014	0.015	< 0.002	0.014	0.017	0.016	0.017	0.016
	11/08/94	0.012	0.011	0.013	0.01	0.013	0.014	0.014	0.012
	11/14/94	0.013	0.012	0.013	0.011	0.014	0.014	0.015	0.013
Barium (CL= 0.05)	10/13/94	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025
Beryllium (CL = 0.0005)	10/13/94	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Bicarbonate alk. (as $CaCO_3$)	10/13/94	150	140	140	140	130	130	130	130
Cadmium (CL = 0.0005)	10/13/94	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Calcium	10/13/94	47	55	47	47	39	41	42	41
Chloride	10/13/94	38	58	37	35	37	34	38	37
Chromium	10/13/94	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Cobalt (CL to be determined)	10/13/94	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Copper (CL = 0.07)	10/13/94	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluoride	10/13/94	0.38	0.35	0.33	0.42	0.5	0.47	0.5	0.49
Hardness, total (as $CaCO_3$)	10/13/94	190	230	190	190	170	180	180	180
Iron	10/13/94	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Lead (CL = 0.009)	10/13/94	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Magnesium	10/13/94	18	23	17	17	18	18	18	18
Manganese	10/13/94	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Mercury	10/13/94	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Nickel (CL = 0.10)	10/13/94	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nitrate (as N)	10/13/94	7.7	8.4	6.3	5.4	8.6	7.4	8.1	8.8
Nitrite (as N)	10/13/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Potassium	10/13/94	3.2	3.1	3.	3.3	2.9	2.9	3.1	3.
Selenium	10/13/94	0.0026	0.0022	0.0021	0.0026	0.0024	< 0.002	< 0.002	< 0.002
Sodium	10/13/94	35	42	35	40	41	41	42	42
Sulfate	10/13/94	48	77	51	58	54	45	59	52
Surfactant	10/13/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Total alkalinity (as $CaCO_3$)	10/13/94	150	140	140	140	130	130	130	130
Total dissolved solids (TDS)	10/13/94	310	400	310	350	320	320	350	340
	11/01/94	350	400	280	340	340	320	330	320
	11/08/94	370	450	340	380	370	340	350	370
	11/14/94	330	380	310	320	300	310	320	340
Vanadium (CL = 0.09)	10/13/94	0.063	0.053	< 0.05	< 0.05	0.069	0.073	0.062	0.061
Zinc (CL = 0.06)	10/13/94	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
General Indicator Parameters									
pH (units)	10/13/94	7.2	7.2	7.2	7.3	7.3	7.4	7.4	7.4
	11/01/94	7.0	7.3	7.2	7.2	7.3	7.3	7.3	7.3
	11/08/94	7.0	7.0	7.1	7.2	7.2	7.4	7.4	7.3
	11/14/94	7.3	7.2	7.2	7.2	7.3	7.3	7.3	7.3
Specific conductance	10/13/94	650	430	520	420	550	410	420	450
(μmho/cm)	11/01/94	470	600	470	480	470	470	490	480
	11/08/94	500	620	480	500	500	490	510	520
	11/14/94	530	630	510	530	510	510	520	520
Total organic carbon (mg/L)	10/13/94	4	1	2	5	1	< 1	6	2
Total organic halides (mg/L)	10/13/94	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.019	0.025

Table 7-5 (Quarter 4). Pit 1 fourth quarter 1994 data.

Parameters	Sample Date	Location							
		K1–01C	K1–02B	K1–03	K1–04	K1–05	K1–07	K1–08	K1–09
EPA Method 624 (µg/L)									
1,1,1–Trichloroethane	10/13/94	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2,2–Tetrachloroethane		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2–Trichloroethane		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1–Dichloroethane		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1–Dichloroethene		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2–Dichlorobenzene		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2–Dichloroethane		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2–Dichloroethene (total)		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2–Dichloropropane		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3–Dichlorobenzene		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,4–Dichlorobenzene		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2–Butanone		< 40	< 40	< 40	< 40	< 40	< 40	< 40	< 40
2–Chloroethylvinylether		< 40	< 40	< 40	< 40	< 40	< 40	< 40	< 40
2–Hexanone		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
4–Methyl–2–pentanone		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Acetone		< 40	< 40	< 40	< 40	< 40	< 40	< 40	< 40
Benzene		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromodichloromethane		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane		< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Carbon disulfide		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon tetrachloride		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloroethane		< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Chloroform		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloromethane		< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dibromochloromethane		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dibromomethane		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichlorodifluoromethane		< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Ethylbenzene		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Freon–113		< 1	< 1	< 1	< 1	11	< 1	37	66
Methylene chloride		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Styrene		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Tetrachloroethene		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Toluene		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Total xylene isomers		< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Trichloroethene		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Vinyl acetate		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Vinyl chloride		< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
cis–1,3–Dichloropropene		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
trans–1,3–Dichloropropene		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
EPA Method 625 (µg/L)	10/13/94								
1,2,4–Trichlorobenzene		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
1,2–Dichlorobenzene		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
1,3–Dichlorobenzene		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
1,4–Dichlorobenzene		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2,4,5–Trichlorophenol		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2,4,6–Trichlorophenol		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2,4–Dichlorophenol		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2,4–Dimethylphenol		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2,4–Dinitrophenol		< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
2,4–Dinitrotoluene		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2,6–Dinitrotoluene		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10

Table 7-5 (Quarter 4). Pit 1 fourth quarter 1994 data.

Parameters	Sample Date	Location							
		K1–01C	K1–02B	K1–03	K1–04	K1–05	K1–07	K1–08	K1–09
2–Chloronaphthalene		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2–Chlorophenol		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2–Methyl phenol		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2–Methyl–4,6–dinitrophenol		< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
2–Methylnaphthalene		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2–Nitroaniline		< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
2–Nitrophenol		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
3,3'–Dichlorobenzidine		< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
3–Nitroaniline		< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
4–Bromophenylphenylether		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
4–Chloro–3–methylphenol		< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
4–Chloroaniline		< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
4–Chlorophenylphenylether		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
4–Nitroaniline		< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
4–Nitrophenol		< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
Acenaphthene		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Acenaphthylene		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Anthracene		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Benzo(a)anthracene		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Benzo(a)pyrene		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Benzo(b)fluoranthene		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Benzo(g,h,i)perylene		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Benzo(k)fluoranthene		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Benzoic Acid		< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
Benzyl Alcohol		< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Bis(2–chloroethoxy)methane		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Bis(2–chloroethyl)ether		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Bis(2–chloroisopropyl)ether		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Bis(2–ethylhexyl)phthalate		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Butylbenzylphthalate		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Chrysene		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Di–n–butylphthalate		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Di–n–octylphthalate		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Dibenzo(a,h)anthracene		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Dibenzofuran		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Diethylphthalate		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Dimethylphthalate		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Fluoranthene		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Fluorene		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Hexachlorobenzene		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Hexachlorobutadiene		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Hexachlorocyclopentadiene		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Hexachloroethane		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Indeno(1,2,3–c,d)pyrene		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Isophorone		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
N–Nitrosodi–n–propylamine		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
N–Nitrosodiphenylamine		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Naphthalene		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Nitrobenzene		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Pentachlorophenol		< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
Phenanthrene		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Phenol		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Pyrene		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
m– and p– Cresol		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10

Table 7-5 (Quarter 4). Pit 1 fourth quarter 1994 data.

Parameters	Sample Date	Location							
		K1–01C	K1–02B	K1–03	K1–04	K1–05	K1–07	K1–08	K1–09
EPA Method 608 (µg/L)									
Aldrin	10/13/94	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
BHC, alpha isomer		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
BHC, beta isomer		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
BHC, delta isomer		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
BHC, gamma isomer (Lindane)		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Chlordane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dieldrin		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Endosulfan I		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan II		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Endosulfan sulfate		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Endrin		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Endrin aldehyde		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Heptachlor		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor epoxide		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Methoxychlor		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Toxaphene		< 1.	< 1.	< 1.	< 1.	< 1.	< 1.	< 1.	< 1.
p,p'–DDD		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
p,p'–DDE		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
p,p'–DDT		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
EPA Method 615 (µg/L)									
2,4,5–T	10/13/94	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2,4,5–TP (Silvex)		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2,4–D		< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
4–(2,4–Dichlorophenoxy) butyric acid		< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100
Dalapon		< 500	< 500	< 500	< 500	< 500	< 500	< 500	< 500
Dicamba		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Dichloroprop		< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100
Dinoseb		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
MCPA		< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
MCPP		< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Explosive Compounds (µg/L)									
HMX (C.L. = 26)	10/13/94	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
RDX (C.L. = 30)	10/13/94	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30
Radioactivity (Bq/L)									
Gross alpha (MCL = 0.555)	10/13/94	0.32 ± 0.016	0.34 ± 0.020	0.22 ± 0.015	0.043 ± 0.011	0.0052 ± 0.011	0.035 ± 0.011	0.0070 ± 0.017	0.0078 ± 0.010
Gross beta (MCL = 1.85)	10/13/94	0.19 ± 0.0089	0.19 ± 0.010	0.15 ± 0.0085	0.15 ± 0.0085	0.10 ± 0.0085	0.075 ± 0.0089	0.054 ± 0.016	0.035 ± 0.0081

Table 7-5 (Quarter 4). Pit 1 fourth quarter 1994 data.

Parameters	Sample Date	Location							
		K1–01C	K1–02B	K1–03	K1–04	K1–05	K1–07	K1–08	K1–09
Radioisotopes (Bq/L)									
Radium–226 (CL = 0.037)	10/13/94	0.0011 ± 0.0019	0.0037 ± 0.0030	0.0015 ± 0.0015	–0.0056 ± 0.0033	0.0030 ± 0.0022	0.0019 ± 0.0019	0.0022 ± 0.0019	0.0059 ± 0.0022
Thorium–228 (CL to be determined)	10/13/94	0.0044 ± 0.0048	0.0033 ± 0.0081	0.0003 ± 0.0033	0.0037 ± 0.0048	0.0048 ± 0.0048	–0.0015 ± 0.0015	0.0007 ± 0.0022	0.0011 ± 0.0019
Thorium–232 (CL to be determined)	10/13/94	0.0011 ± 0.0022	0.0081 ± 0.011	0.0070 ± 0.0070	0.0033 ± 0.0041	0.0011 ± 0.0022	0.0011 ± 0.0037	0.0011 ± 0.0022	0.00015 ± 0.00093
Tritium (CL = 18.5)	10/13/94	9.5 ± 1.9	123 ± 4.2	8.1 ± 1.9	0.2 ± 1.6	1.3 ± 1.6	1.0 ± 1.6	0.1 ± 1.6	1.9 ± 1.7
Uranium–234 (CL = 0.230)	10/13/94	0.069 ± 0.037	0.053 ± 0.015	0.025 ± 0.0081	0.036 ± 0.023	0.053 ± 0.027	0.046 ± 0.029	0.042 ± 0.030	0.062 ± 0.013
Uranium–235 (CL = 0.007)	10/13/94	–0.0019 ± 0.0030	0.009 ± 0.0056	0.000 ± 0.000	–0.0015 ± 0.0022	0.0067 ± 0.010	0.000 ± 0.000	0.000 ± 0.000	0.011 ± 0.005
Uranium–238 (CL = 0.102)	10/13/94	0.044 ± 0.028	0.033 ± 0.011	0.016 ± 0.0063	0.016 ± 0.015	0.023 ± 0.017	0.025 ± 0.021	0.019 ± 0.019	0.031 ± 0.008

Table 7-6 (Quarter 1). Pit 7 Complex first quarter 1994 data.

Parameters	Sample Date	Location K7–01	K7–03	K7–06	K7–09	K7–10	NC7–25	NC7–26	NC7–47	NC7–48
Field Measurements										
Water temperature (°C)	1/26/94	21.6	18.6	16.7	18.3			17.9		
Water table elevation (ft)	1/26/94	1,292.92	1,313.69	1,388.3	1,296.87	1,305.11	1,300.07	1,258.77	1,205.26	1,345.67
Metals and Minerals (mg/L)										
Arsenic (CL to be determined)	1/26/94	0.01	< 0.005	0.012	< 0.005	< 0.005	0.0071	< 0.005	0.017	0.01
	2/2/94	0.0098	0.0023	0.018	< 0.002	0.0079	0.0088	0.0021	0.014	0.0095
	3/2/94	0.0095	0.0072	0.011	< 0.002	0.0028	0.0064	0.013	0.024	0.0072
Barium (CL = 0.09)	2/2/94	0.17	0.067	0.077	< 0.05	< 0.05	0.056	< 0.05	< 0.05	0.14
Beryllium (CL = 0.0005)	2/2/94	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Cadmium (CL to be determined)	1/26/94	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.0006	< 0.0005	0.001	0.0013
	2/2/94	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
	3/2/94	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Cobalt (CL to be determined)	1/26/94	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	2/2/94	< 0.025	< 0.025	< 0.05	< 0.025	< 0.05	< 0.05	< 0.025	< 0.05	< 0.05
	3/2/94	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Copper (CL to be determined)	1/26/94	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	2/2/94	< 0.01	0.062	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	3/2/94	< 0.01	0.095	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Lead (CL = 0.002)	2/2/94	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.0034	< 0.002
	3/15/94								< 0.002	
	3/22/94								< 0.002	
Nickel (CL to be determined)	1/26/94	0.01	< 0.005	< 0.005	< 0.005	< 0.005	0.0059	< 0.005	< 0.005	0.02
	2/2/94	< 0.005	0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.012
	3/2/94	< 0.005	0.0088	< 0.005	< 0.005	0.0056	0.0063	< 0.005	< 0.005	0.0074
Total dissolved solids	2/2/94	430	390	260	480	630	520	370	330	510
	2/9/94	430	380	280	470	640	530	400	360	500
	2/15/94	300	370	310	500	630	550	400	370	440
	2/23/94	420	410	280	490	670	540	390	380	470
Vanadium (CL = 0.05)	2/2/94	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.054	< 0.05
	3/15/94								0.061	
	3/22/94								0.059	
Zinc (CL to be determined)	1/26/94	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.079
	2/2/94	< 0.02	0.028	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
	3/2/94	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.056
General Indicator Parameters										
pH (units)	2/2/94	7.2	7.3	7.3	8.0	7.5	7.8	7.6	7.8	7.0
	2/9/94	7.1	7.3	7.4	7.8	7.5	7.4	7.4	7.8	6.9
	2/15/94	7.1	7.2	7.4	7.9	7.4	7.3	7.5	7.9	6.8
	2/23/94	7.4	7.8	7.5	8.0	7.4	7.4	7.5	7.9	6.9
Specific conductance	2/2/94	550	560	390	610	800	750	540	510	700
(μmho/cm)	2/9/94	520	500	350	590	840	780	490	530	610
	2/15/94	530	520	250	610	740	700	500	470	580
	2/23/94	600	600	400	700	810	770	570	520	680
EPA Method 601 (μg/L)										
1,1,1–Trichloroethane	2/2/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1,2,2–Tetrachloroethane	2/2/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1,2–Trichloroethane	2/2/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1–Dichloroethane	2/2/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1–Dichloroethene	2/2/94	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2–Dichlorobenzene	2/2/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2–Dichloroethane	2/2/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2–Dichloroethene (total)	2/2/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2–Dichloropropane	2/2/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,3–Dichlorobenzene	2/2/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,4–Dichlorobenzene	2/2/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
2–Chloroethylvinylether	2/2/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Table 7-6 (Quarter 1). Pit 7 Complex first quarter 1994 data.

Parameters	Sample Date	Location K7–01	K7–03	K7–06	K7–09	K7–10	NC7–25	NC7–26	NC7–47	NC7–48
Bromodichloromethane	2/2/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromoform	2/2/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromomethane	2/2/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Carbon tetrachloride	2/2/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chlorobenzene	2/2/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroethane	2/2/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroform	2/2/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloromethane	2/2/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
cis–1,3–Dichloropropene	2/2/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibromochloromethane	2/2/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorodifluoromethane	2/2/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Freon–113	2/2/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methylene chloride	2/2/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethene	2/2/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
trans–1,3–Dichloropropene	2/2/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethene	2/2/94	3.1	2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane	2/2/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.8
Vinyl chloride	2/2/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Explosive Compounds (µg/L)										
HMX (CL to be determined)	1/26/94	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
	2/2/94	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
	3/2/94	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
RDX (CL to be determined)	1/26/94	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30
	2/2/94	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30
	3/2/94	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30
TNT	1/26/94	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30
	2/2/94	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30
	3/2/94	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30
Radioisotopes (Bq/L)										
Radium–226	1/26/94	0.067	0.021	0.018	0.017	0.017	0.020	0.028	0.019	0.015
(CL to be determined)		± 0.0048	± 0.0026	± 0.0026	± 0.0022	± 0.0026	± 0.0026	± 0.0033	± 0.0030	± 0.0030
	2/2/94	0.036	0.019	0.023	0.014	0.014	0.028	0.023	0.0074	0.028
		± 0.0048	± 0.0026	± 0.0030	± 0.0022	± 0.0026	± 0.0033	± 0.0033	± 0.0019	± 0.0033
	3/2/94	0.035	0.021	0.049	0.020	0.022	0.048	0.022	0.015	0.036
		± 0.0041	± 0.0030	± 0.0044	0.0030	± 0.0030	± 0.0044	± 0.0030	± 0.0026	± 0.0037
Thorium–228	1/26/94	0.0026	⁻ 0.0033	0.00037	⁻ 0.0015	0.0033	0.0048	0.0015	⁻ 0.010	0.0081
(CL to be determined)		± 0.0074	± 0.014	± 0.0067	± 0.016	± 0.016	± 0.010	± 0.0081	± 0.012	± 0.0089
	2/2/94	0.012	0.0033	0.0033	0.024	0.014	0.0085	0.059	0.011	0.016
		± 0.011	± 0.0093	± 0.0067	± 0.034	± 0.018	± 0.011	± 0.048	± 0.0044	± 0.014
	3/2/94	0.026*	0.0056*	0.021*	⁻ 0.0070*	–0.0044	0.011	⁻ 0.0015*	0.0041	0.0074
		± 0.0085	± 0.0048	± 0.0081	± 0.0048	± 0.0041	± 0.016	± 0.0048	± 0.0070	± 0.0059
		0.048*	0.038*	0.0041*	0.17*			0.0063*		
		± 0.024	± 0.074	± 0.010	± 0.45			± 0.0059		
Thorium–232	1/26/94	0.00074	⁻ 0.00037	0.0048	⁻ 0.0011	0.0015	0.0100	–0.00074	0.0033	0.00074
(CL to be determined)		± 0.0044	± 0.0026	± 0.0070	± 0.0044	± 0.0074	± 0.013	± 0.0026	± 0.0078	± 0.0037
	2/2/94	0.0015	⁻ 0.00026	0.016	0.0044	0.015	⁻ 0.00074	0.026	⁻ 0.00033	0.016
		± 0.0037	± 0.0019	± 0.0093	± 0.015	± 0.017	± 0.0059	± 0.033	± 0.0017	± 0.013
	3/2/94	0.054*	0.0030*	0.0089*	0.010*	0.012	⁻ 0.0022	0.0022*	⁻ 0.0011	0.017
		± 0.011	± 0.0033	± 0.0052	± 0.0052	± 0.0078	± 0.0041	± 0.0033	± 0.0048	± 0.0078
		0.032*	⁻ 0.0033*	0.010*	⁻ 0.026*			0.0085*		
		± 0.017	± 0.011	± 0.0085	± 0.10			± 0.0052		

Table 7-6 (Quarter 1). Pit 7 Complex first quarter 1994 data.

Parameters	Sample Date	Location								
		K7–01	K7–03	K7–06	K7–09	K7–10	NC7–25	NC7–26	NC7–47	NC7–48
Tritium (CL = 3.17)	2/2/94	1206 ± 17	4958 ± 25	1.7 ± 1.7	1.6 ± 1.6	4.7 ± 1.9	9472 ± 47	49 ± 3.0	3.4 ± 1.8	2.5 ± 1.8
Uranium–234 (CL = 0.078)	2/2/94	0.24 ± 0.0093	0.085 ± 0.0052	0.045 ± 0.0048	0.011 ± 0.0019	0.020 ± 0.0026	0.47 ± 0.012	0.014 ± 0.0026	0.057 ± 0.0044	0.16 ± 0.0056
Uranium–235 (CL = 0.004)	2/2/94	0.013 ± 0.0022	0.018 ± 0.0026	0.0059 ± 0.0019	0.00074 ± 0.00074	0.0026 ± 0.0011	0.014 ± 0.0022	0.00074 ± 0.00074	0.0037 ± 0.0011	0.011 ± 0.0015
Uranium–238 (CL = 0.059)	2/2/94	0.21 ± 0.0085	0.080 ± 0.0048	0.026 ± 0.0041	0.0037 ± 0.0011	0.012 ± 0.0022	0.40 ± 0.011	0.0070 ± 0.0019	0.035 ± 0.0033	0.48 ± 0.011

* Matrix interference

Table 7-6 (Quarter 2). Pit 7 Complex second quarter 1994 data.

Parameters	Sample Date	Location K7–01	K7–03	K7–06	K7–09	K7–10	NC7–25	NC7–26	NC7–47	NC7–48
Field Measurements										
Water temperature (°C)	4/11/94	20.5	24.3	20.3	22.2	**	**	20.9	**	**
Water table elevation (ft)	4/11/94	1292.54	1313.49	1387.95	1296.87	1305.66	1300.13	1257.87	1205.38	1346.28
Metals and Minerals (mg/L)										
Arsenic (CL to be determined)	4/11/94	0.012	0.0042	0.019	< 0.002	0.0035	0.0067	0.0025	0.015	0.0081
	5/3/94	0.01	0.003	0.012	< 0.002	< 0.002	0.0045	0.009	0.014	0.009
	6/1/94	0.01	0.0022	0.018	< 0.002	0.0025	0.0063	0.0021	0.015	0.0072
Barium (CL = 0.09)	5/3/94	0.17	0.072	0.064	< 0.025	0.027	0.053	< 0.025	< 0.025	0.17
Beryllium (CL = 0.0005)	5/3/94	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Cadmium (CL to be determined)	4/11/94	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
	5/3/94	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
	6/1/94	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.00071	< 0.0005	< 0.0005	0.00077	< 0.0005
Cobalt (CL to be determined)	4/11/94	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	5/3/94	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025
	6/1/94	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025
Copper (CL to be determined)	4/11/94	< 0.01	0.05	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	5/3/94	0.01	0.062	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	6/1/94	< 0.01	0.15	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Lead (CL = 0.002)	5/3/94	< 0.002	0.0024	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
	6/15/94		< 0.002							
	6/22/94		< 0.002							
Nickel (CL to be determined)	4/11/94	< 0.005	0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	5/3/94	< 0.005	0.014	< 0.005	< 0.005	0.016	0.016	< 0.005	0.014	0.038
	6/1/94	< 0.005	0.016	< 0.005	< 0.005	0.037	0.022	< 0.005	0.012	0.052
Total dissolved solids	5/3/94	460	440	300	490	760	650	410	450	530
	5/11/94	440	410	250	480	640	520	400	360	460
	5/19/94	450	430	320	510	640	530	480	350	480
	5/24/94	430	400	300	480	640	530	410	350	470
Vanadium (CL = 0.05)	5/3/94	< 0.02	< 0.02	0.022	< 0.02	< 0.02	< 0.02	< 0.02	0.05	0.024
Zinc (CL to be determined)	4/11/94	< 0.02	0.028	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
	5/3/94	< 0.02	0.033	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.022
	6/1/94	< 0.02	0.08	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
General Indicator Parameters										
pH (units)	5/3/94	7.2	7.2	7.5	7.8	7.4	7.3	7.6	7.8	6.8
	5/11/94	7.2	7.4	7.6	7.7	7.5	7.5	7.6	8.0	7.8
	5/19/94	7.4	7.3	7.4	7.8	7.6	7.5	7.5	7.9	6.9
	5/24/94	7.0	7.2	7.6	7.8	7.8	7.4	7.6	7.9	7.0
Specific conductance	5/3/94	560	560	390	650	830	750	530	490	670
(μmhos/cm)	5/11/94	590	580	400	660	820	780	560	520	600
	5/19/94	610	600	400	680	820	780	550	500	660
	5/24/94	550	530	380	650	780	640	500	490	630
EPA Method 601 (μg/L)										
1,1,1–Trichloroethane	5/3/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1,2,2–Tetrachloroethane	5/3/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1,2–Trichloroethane	5/3/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1–Dichloroethane	5/3/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1–Dichloroethene	5/3/94	0.7	0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2–Dichlorobenzene	5/3/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2–Dichloroethane	5/3/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2–Dichloroethene (total)	5/3/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2–Dichloropropane	5/3/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,3–Dichlorobenzene	5/3/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,4–Dichlorobenzene	5/3/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
2–Chloroethylvinylether	5/3/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Table 7-6 (Quarter 2). Pit 7 Complex second quarter 1994 data.

Parameters	Sample Date	Location K7–01	K7–03	K7–06	K7–09	K7–10	NC7–25	NC7–26	NC7–47	NC7–48
Bromodichloromethane	5/3/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromoform	5/3/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromomethane	5/3/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Carbon tetrachloride	5/3/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chlorobenzene	5/3/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroethane	5/3/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroform	5/3/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloromethane	5/3/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
cis–1,3–Dichloropropene	5/3/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibromochloromethane	5/3/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorodifluoromethane	5/3/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Freon–113	5/3/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methylene chloride	5/3/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethene	5/3/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
trans–1,3–Dichloropropene	5/3/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethene	5/3/94	3.1	2.9	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane	5/3/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	1.4
Vinyl chloride	5/3/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Explosive Compounds (µg/L)										
HMX (CL to be determined)	4/11/94	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
	5/3/94	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
	6/1/94	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
RDX (CL to be determined)	4/11/94	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30
	5/3/94	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30
	6/1/94	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30
TNT	4/11/94	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30
	5/3/94	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30
	6/1/94	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30
Radioisotopes (Bq/L)										
Radium–226	4/11/94	0.027	–0.00074	0.035	0.0015	0.00074	0.012	0.016	–0.0052	0.0048
(CL to be determined)		± 0.0067	± 0.0052	± 0.0067	± 0.0056	± 0.0052	± 0.0059	± 0.0059	± 0.0052	± 0.0056
	5/3/94	0.031	0.0052	0.014	0.0022	0.0041	0.014	0.0093	0.0026	0.022
		± 0.0026	± 0.0015	± 0.0019	±0.0007	± 0.0019	± 0.0026	± 0.0015	± 0.0011	± 0.0033
	6/1/94	0.040	0.0059	0.010	0.0015	0.0041	0.016	0.011	0.0019	0.019
		± 0.0030	± 0.0015	± 0.0019	± 0.0015	± 0.0015	± 0.0019	± 0.0022	± 0.0011	± 0.0022
Thorium–228	4/11/94	–0.0074	–0.0059	–0.014	0.0033	0.0026	0.00033	0.0037	0.022 *	–0.47
(CL to be determined)		± 0.0067	± 0.0078	± 0.0074	± 0.0041	± 0.0070	± 0.0056	± 0.0041	± 0.67	± 0.26
									0.025 *	
									± 0.021	
	5/3/94	0.0022	–0.0011	0.0085	0.034	0.024	0.040	0.027	0.032	0.037
		± 0.0037	± 0.0015	± 0.0052	± 0.0081	± 0.011	± 0.010	± 0.012	± 0.0089	± 0.0085
	6/1/94	–0.0026	0.0033	0.0011	–0.0011	0.0026	–0.0019	–0.0015	–0.00026	–0.0030
		± 0.0037	± 0.0052	± 0.0037	± 0.0033	± 0.0037	± 0.0037	± 0.0030	± 0.0039	± 0.0030
Thorium–232	4/11/94	0.00074	0.0074	–0.0019	0.0011	0.0037	0.0081	–0.00022	0.16 *	–0.046
(CL to be determined)		± 0.0063	± 0.0063	± 0.0044	± 0.0026	± 0.0037	± 0.0063	± 0.0034	± 0.33	± 0.062
									0.023 *	
									± 0.021	
	5/3/94	0.00074	0.0011	0.0033	–0.0026	0.0074	0.0041	–0.0011	–0.00037	0.0011
		± 0.0030	± 0.0019	± 0.0030	± 0.0067	± 0.0085	± 0.0059	± 0.0059	± 0.0052	± 0.0030
	6/1/94	–0.00074	0.013	0.0052	0.0015	–0.0033	0.0011	0.0026	–0.0044	0.013
		± 0.0011	± 0.0070	± 0.0041	± 0.0026	± 0.0022	± 0.0048	± 0.0037	± 0.0033	± 0.0063
Tritium (CL = 3.17)	5/3/94	1143	4921	1.5	1.5	1.5	9139	90	1.5	2.6
		± 11	± 25	± 1.5	± 1.5	± 1.5	± 37	± 11	± 1.5	± 1.6

Table 7-6 (Quarter 2). Pit 7 Complex second quarter 1994 data.

Parameters	Sample Date	Location								
		K7–01	K7–03	K7–06	K7–09	K7–10	NC7–25	NC7–26	NC7–47	NC7–48
Uranium–234 (CL = 0.078)	5/3/94	0.27 ± 0.012	0.079 ± 0.0044	0.037 ± 0.0041	0.014 ± 0.0026	0.015 ± 0.0033	0.50 ± 0.011	0.010 ± 0.0037	0.070 ± 0.0067	0.14 ± 0.0063
Uranium–235 (CL = 0.004)	5/3/94	0.010 ± 0.0022	0.0041 ± 0.0011	0.0019 ± 0.00074	–0.00026 ± 0.0015	0.00074 ± 0.0011	0.020 ± 0.0022	0.0056 ± 0.0026	0.0022 ± 0.0022	0.0096 ± 0.0026
Uranium–238 (CL = 0.059)	5/3/94	0.26 ± 0.011	0.072 ± 0.0044	0.025 ± 0.0033	0.0052 ± 0.0022	0.011 ± 0.0022	0.43 ± 0.011	0.010 ± 0.0033	0.028 ± 0.0056	0.40 ± 0.011

* Matrix interference
** Temperature not taken

Table 7-6 (Quarter 3). Pit 7 Complex third quarter 1994 data.

Parameters	Sample Date	Location K7–01	K7–03	K7–06	K7–09	K7–10	NC7–25	NC7–26	NC7–47	NC7–48
Field Measurements										
Water temperature (°C)	8/5/94	23.4	25.4	23.4	22.3	21.1	20.7	23.	20.7	
Water table elevation (ft)	8/5/94	1,292.05	1,312.71	1,387.25	1,296.77	1,305.31	1,299.82	1,257.67	1,215.41	1,345.15
Metals and Minerals (mg/L)										
Aluminum	8/11/94	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	8/17/94	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Arsenic (CL to be determined)	7/18/94	0.0071	0.0024	0.014	< 0.002	< 0.002	0.0044	< 0.002	0.01	0.0062
	8/5/94	0.011	0.0023	0.012	< 0.002	0.0021	0.0058	0.0021	0.013	0.0058
	9/1/94	0.01	0.0032	0.011	< 0.002	0.0047	0.0065	0.0033	0.014	0.0087
Barium (CL = 0.09)	8/5/94	0.16	0.064	0.057	< 0.025	0.028	0.059	< 0.025	0.044	0.14
Beryllium (CL = 0.0005)	8/5/94	< 0.0005	< 0.0005	< 0.0005	< 0.0005			< 0.0005		< 0.0005
Bicarbonate alk (as $CaCO_3$)	8/11/94	220	140	140	140	180	270	170	130	290
	8/17/94	210	210	140	130	170	270	160	130	270
Cadmium	7/18/94	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
(CL to be determined)	8/5/94	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
	9/1/94	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Calcium	8/11/94	60	64	42	76	130	72	73	46	82
	8/17/94	60	70	43	71	110	64	63	40	70
Carbonate alk (as $CaCO_3$)	8/11/94	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
	8/17/94	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloride	8/11/94	41	46	27	22	21	75	33	51	45
	8/17/94	37	48	27	20	19	77	32	54	44
Cobalt (CL to be determined)	7/18/94	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025
	8/5/94	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025
	9/1/94	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025
Copper (CL to be determined)	7/18/94	0.012	0.1	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.018
	8/5/94	0.015	0.047	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	8/11/94	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	8/17/94	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	9/1/94	0.015	0.1	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoride	8/11/94	0.5	0.39	0.47	0.18	0.19	0.7	0.29	0.64	0.27
	8/17/94	0.48	0.34	0.45	0.17	0.18	0.7	0.29	0.63	0.27
Hardness, total (as $CaCO_3$)	8/11/94	250	230	160	280	460	310	270	190	300
	8/17/94	250	260	160	270	410	280	240	170	270
Hydroxide alk (as $CaCO_3$)	8/11/94	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
	8/17/94	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Iron	8/11/94	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	8/17/94	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Lead (CL = 0.002)	8/5/94	0.0025	< 0.002	< 0.002	0.0034	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
	9/1/94	< 0.002			< 0.002					
	9/16/94	< 0.002			< 0.002					
Magnesium	8/11/94	24	17	13	23	34	31	22	19	24
	8/17/94	24	20	13	22	32	30	21	18	22
Manganese	8/11/94	0.042	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
	8/17/94	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nickel (CL to be determined)	7/18/94	< 0.005	0.006	< 0.005	< 0.005	< 0.005	0.0051	< 0.005	< 0.005	0.062
	8/5/94	< 0.005	0.0055	< 0.005	< 0.005	0.0065	< 0.005	< 0.005	< 0.005	0.015
	8/11/94	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	8/17/94	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	9/1/94	< 0.005	0.016	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.0099
Nitrate (as N)	8/11/94	11	5	2	< 1	< 1	6	< 1	13	5
	8/17/94	11	7	2	< 1	< 1	7	< 1	14	5
Potassium	8/11/94	3	3	2	7	5	3	3	4	2
	8/17/94	2	3	2	8	6	3	3	3	2
Sodium	8/11/94	43	36	31	55	30	74	34	48	49
	8/17/94	41	35	30	54	30	75	34	48	49
Sulfate	8/11/94	36	41	41	210	210	52	100	30	39
	8/17/94	35	41	46	220	300	53	100	34	41

Table 7-6 (Quarter 3). Pit 7 Complex third quarter 1994 data.

Parameters	Sample Date	Location K7–01	K7–03	K7–06	K7–09	K7–10	NC7–25	NC7–26	NC7–47	NC7–48
Surfactant	8/11/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	8/17/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Total alkalinity (as $CaCO_3$)	8/11/94	220	140	140	140	180	270	170	130	290
	8/17/94	210	210	140	130	170	270	160	130	270
Total dissolved solids (TDS)	8/5/94	420	370	230	470	660	570	320	360	500
	8/11/94	440	400	300	510	650	530	420	380	480
	8/17/94	450	430	300	500	650	560	420	360	490
	8/22/94	420	400	300	480	620	530	400	350	470
Vanadium (CL = 0.05)	8/5/94	< 0.02	< 0.02	< 0.02	< 0.02	< 0.05	< 0.05	< 0.02	0.062	< 0.05
Zinc (CL to be determined)	7/18/94	< 0.02	0.035	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
	8/5/94	< 0.02	0.02	< 0.02	< 0.02	< 0.02	0.02	< 0.02	0.027	0.024
	8/11/94	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	8/17/94	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	9/1/94	< 0.02	0.023	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.027
General Indicator Parameters										
pH (units)	8/5/94	7.8	7.1	7.4	7.1	7.4	7.3	7.4	7.7	6.9
	8/11/94	7.2	7.3	7.5	7.7	7.5	7.3	7.6	7.9	6.8
	8/17/94	7.4	7.3	7.6	7.9	7.6	7.5	7.8	8.0	7.1
	8/22/94	6.9	7.3	7.3	7.6	7.4	7.4	7.3	7.9	6.8
Specific conductance	8/5/94	690	590	410	600	870	340	580	550	660
(μmhos/cm)	8/11/94	580	530	390	660	820	810	540	520	680
	8/17/94	550	540	380	640	760	760	480	510	630
	8/22/94	610	610	410	690	870	820	580	560	670
EPA Method 601 (μg/L)	8/5/94									
1,1,1–Trichloroethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1,2,2–Tetrachloroethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1,2–Trichloroethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1–Dichloroethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1–Dichloroethene		0.73	0.72	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2–Dichlorobenzene		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2–Dichloroethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2–Dichloroethene (total)		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2–Dichloropropane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,3–Dichlorobenzene		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,4–Dichlorobenzene		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
2–Chloroethylvinylether		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromodichloromethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromoform		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromomethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Carbon tetrachloride		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chlorobenzene		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroform		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloromethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibromochloromethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorodifluoromethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Freon–113		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methylene chloride		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethene		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethene		3.9	3.3	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	1
Vinyl chloride		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
cis–1,3–Dichloropropene		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
trans–1,3–Dichloropropene		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Explosive Compounds (μg/L)										
HMX (CL to be determined)	7/18/94	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
	8/5/94	< 20		< 20	< 20	< 20	< 20	< 20	< 20	< 20
	9/1/94	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20

Table 7-6 (Quarter 3). Pit 7 Complex third quarter 1994 data.

Parameters	Sample Date	Location K7–01	K7–03	K7–06	K7–09	K7–10	NC7–25	NC7–26	NC7–47	NC7–48
RDX (CL to be determined)	7/18/94	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30
	8/5/94	< 30		< 30	< 30	< 30	< 30	< 30	< 30	< 30
	9/1/94	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30
TNT	7/18/94	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30
	8/5/94	< 30		< 30	< 30	< 30	< 30	< 30	< 30	< 30
	9/1/94	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30
Radioisotopes (Bq/L)										
Radium–226	7/18/94	0.041	0.013	0.019	0.0033	0.0019	0.016	0.014	0.0045	0.017
(CL to be determined)		± 0.0030	± 0.0019	± 0.0022	± 0.0019	± 0.0019	± 0.0026	± 0.0019	± 0.0015	± 0.0022
	8/5/94	0.035	0.0052	0.010	0.0030	0.0033	0.014	0.011	0.0037	0.018
		± 0.0041	± 0.0015	± 0.0022	± 0.0019	± 0.0015	± 0.0026	± 0.0026	± 0.0015	± 0.0030
	9/1/94	0.032	0.0074	0.011	0.0033	0.0059	0.019	0.017	0.00011	0.012
		± 0.0037	± 0.0019	± 0.0022	± 0.0015	± 0.0019	± 0.0030	± 0.0026	± 0.0014	± 0.0026
Thorium–228	7/18/94	0.0011	–0.0044	0.00037	–0.00074	–0.0019	–0.0030	0.0089	0.00074	–0.0063
(CL to be determined)		± 0.0033	± 0.0059	± 0.0033	± 0.0033	± 0.0041	± 0.0048	± 0.0041	± 0.0037	± 0.0037
	8/5/94	0.0037	0.015	–0.0096	0.014	0.010	–0.00074	0.0048	0.0026	0.016
		± 0.0033	± 0.0093	± 0.013	± 0.015	± 0.016	± 0.0093	± 0.0026	± 0.0033	± 0.012
	9/1/94	0.015	0.0011	0.0033	0.0030	0.015	0.0033	0.0041	–0.20	–0.070
		± 0.0067	± 0.0030	± 0.0022	± 0.020	± 0.0078	± 0.0033	± 0.0030	± 0.79	± 0.041
	9/20/94			–0.030*						0.026*
				± 0.016						± 0.010
Thorium–232	7/18/94	0.0048	0.0030	0.0022	0.0019	0.0011	0.00074	0.0041	0.0037	–0.0030
(CL to be determined)		± 0.0044	± 0.0067	± 0.0037	± 0.0033	± 0.0037	± 0.0041	± 0.0022	± 0.0030	± 0.0030
	8/5/94	0.0030	0.0059	–0.013	0.0026	–0.0015	0.0044	0.0033	0.0015	0.0085
		± 0.0022	± 0.0052	± 0.0074	± 0.0081	± 0.0033	± 0.0067	± 0.0022	± 0.0015	± 0.0070
	9/1/94	0.016	–0.0011	–0.00033	–0.0052	0.00037	0.0096	0.021	0.61	–0.032
		± 0.0067	± 0.0019	± 0.00059	± 0.010	± 0.0037	± 0.0044	± 0.0059	± 0.85	± 0.033
	9/20/94			–0.00052*						0.017*
				± 0.013						± 0.0074
Tritium (CL = 3.17)	8/5/94	1206	5106	–0.1	0.7	0.3	10027	47	1.4	1.8
		± 12	± 26	± 1.7	± 1.7	± 1.6	± 50	± 2.9	± 1.7	± 1.7
Uranium–234 (CL = 0.078)	8/5/94	0.26	0.085	0.039	0.015	0.018	0.49	0.0015	0.059	0.10
		± 0.0070	± 0.0044	± 0.0037	± 0.0019	± 0.0022	± 0.011	± 0.0015	± 0.0037	± 0.0052
Uranium–235 (CL = 0.004)	8/5/94	0.010	0.0033	0.0015	0.0022	0.0011	0.016	0.00022	0.0015	0.0078
		± 0.0019	± 0.0015	± 0.0011	± 0.0007	± 0.0007	± 0.0022	± 0.00063	± 0.00074	± 0.0015
Uranium–238 (CL = 0.059)	8/5/94	0.23	0.085	0.020	0.0063	0.0096	0.40	0.0059	0.031	0.28
		± 0.0067	± 0.0044	± 0.0026	± 0.0011	± 0.0015	± 0.011	± 0.0015	± 0.0026	± 0.0085

* Additional sample for thorium analysis taken for statistical purposes.

Table 7-6 (Quarter 4). Pit 7 Complex fourth quarter 1994 data.

Parameters	Sample Date	Location K7–01	K7–03	K7–06	K7–09	K7–10	NC7–25	NC7–26	NC7–47	NC7–48
Field Measurements										
Water temperature (°C)	10/10/94	21	22.7	20.1	20.4			21.4		
Water table elevation (ft)	10/10/94	1292.0	1312.8	1387.7	1296.5	1308.0	1299.8	1257.6	1205.5	1345.6
Metals and Minerals (mg/L)										
Arsenic (CL to be determined)	10/10/94	0.0092	< 0.002	0.016	< 0.002	0.003	0.0058	0.0026	0.014	0.010
Barium (CL = 0.09)	10/10/94	0.16	0.057	0.062	< 0.05	< 0.05	0.053	< 0.05	< 0.05	0.054
Beryllium (CL = 0.0005)	10/10/94	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Cadmium (CL to be determined)	10/10/94	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Cobalt (CL to be determined)	10/10/94	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Copper (CL to be determined)	10/10/94	0.01	0.09	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Lead (CL = 0.002)	10/10/94	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Nickel (CL to be determined)	10/10/94	< 0.005	0.015	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Total dissolved solids (TDS)	10/10/94	440	440	310	500	680	550	410	340	460
	11/02/94	440	390	280	480	660	540	400	360	490
	11/08/94	430	400	290	480	610	520	380	350	340
	11/15/94	400	320	240	410	620	470	320	310	400
Vanadium (CL = 0.05)	10/10/94	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.056	0.091
	12/02/94									0.12
Zinc (CL to be determined)	10/10/94	< 0.02	0.046	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
General Indicator Parameters										
pH (Units)	10/10/94	6.9	7.1	7.3	7.7	7.3	7.1	7.3	7.6	7.1
	11/08/94	7.3	7.3	7.5	7.7	7.4	7.3	7.5	7.9	9.7
	11/15/94	7.0	7.3	7.4	7.7	7.4	7.1	7.4	7.9	7.0
Specific Conductance	10/10/94	600	630	420	710	930	840	570	560	790
(μmhos/cm)	11/02/94	620	580	420	700	920	840	580	550	680
	11/08/94	650	650	440	740	910	860	610	570	520
	11/15/94	620	610	420	710	850	830	600	530	620
EPA Method 601 (μg/L)										
1,1,1–Trichloroethane	10/10/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1,2,2–Tetrachloroethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1,2–Trichloroethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1–Dichloroethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1–Dichloroethene		0.85	0.87	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2–Dichlorobenzene		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2–Dichloroethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2–Dichloroethene (total)		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2–Dichloropropane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,3–Dichlorobenzene		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,4–Dichlorobenzene		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
2–Chloroethylvinylether		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromodichloromethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromoform		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromomethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Carbon tetrachloride		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chlorobenzene		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroform		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloromethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibromochloromethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorodifluoromethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Freon–113		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methylene chloride		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Table 7-6 (Quarter 4). Pit 7 Complex fourth quarter 1994 data.

Parameters	Sample Date	Location								
		K7–01	K7–03	K7–06	K7–09	K7–10	NC7–25	NC7–26	NC7–47	NC7–48
Tetrachloroethene		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethene		3.9	3.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.94
Vinyl chloride		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
cis–1,3–Dichloropropene		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
trans–1,3–Dichloropropene		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Explosive Compounds (μg/L)										
HMX (CL to be determined)	10/11/94	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
RDX (CL to be determined)	10/11/94	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30
Radioisotopes (Bq/L)										
Radium–226	10/11/94	0.038	0.0096	0.0167	0.0074	0.0052	0.013	0.0033	0.0022	0.010
(CL to be determined)		± 0.0056	± 0.0030	± 0.0033	± 0.0022	± 0.0022	± 0.0030	± 0.0030	± 0.0022	± 0.0026
Thorium–228	10/11/94	0.0048	0.0059	0.0019	0.0070	0.0096	⁻ 0.00037	0.00074	0.0085	0.0037
(CL to be determined)		± 0.0059	± 0.0067	± 0.0048	± 0.0067	± 0.0074	± 0.00074	± 0.0026	± 0.0081	± 0.0059
Thorium–232	10/11/94	0.0089	0.0081	0.0026	0.0015	⁻ –0.00019	0.000	⁻ 0.00037	0.000	0.0041
(CL to be determined)		± 0.0074	± 0.0074	± 0.0048	± 0.0026	± 0.00022	± 0.000	± 0.00074	± 0.000	± 0.0059
Tritium (CL = 3.17)	10/11/94	1150	4920	⁻ 0.43	⁻ 0.70	41	9880	49	⁻ 0.50	9.6
		± 12	± 25	± 1.6	± 1.6	± 2.8	± 128	± 2.9	± 1.5	± 2.0
Uranium–234 (CL = 0.078)	10/11/94	0.089	0.070	0.038	0.062	0.019	0.29	0.000	0.014	0.026
		± 0.023	± 0.0037	± 0.027	± 0.013	± 0.014	± 0.085	± 0.000	± 0.013	± 0.019
Uranium–235 (CL = 0.0037)	10/11/94	0.0037	⁻ 0.0011	0.000	0.011	0.0000	0.0041	0.0048	0.000	0.0041
		± 0.0041	± 0.0019	± 0.000	± 0.005	± 0.0063	± 0.0081	± 0.0096	± 0.000	± 0.0078
Uranium–238 (CL = 0.059)	10/11/94	0.43	0.096	0.020	0.031	0.0078	0.26	0.012	0.016	0.044
		± 0.081	± 0.043	± 0.019	± 0.008	± 0.0093	± 0.077	± 0.014	± 0.014	± 0.025

Table 7-7 (Quarter 1). B–817 HE Process Area first quarter 1994 data.

Parameters	Sample Date	Location				
		W–817–01	W–817–02	W–817–03	W–817–04*	W–817–03A
Metals and Minerals, mg/L						
Antimony	1/12/94	0.013	0.016	0.01	< 0.005	
Arsenic	1/12/94	0.053	0.063	0.06	0.062	
	1/19/94	0.05	0.052	0.044	0.051	
	1/26/94	0.034	0.052	0.052	0.056	
	2/2/94	0.05	0.055	0.055	0.057	
Barium	1/12/94	< 0.05	< 0.05	< 0.05	< 0.05	
Beryllium	1/12/94	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
	1/19/94	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
	1/26/94	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
	2/2/94	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
Bicarbonate alkalinity (as $CaCO_3$)	1/12/94	250	230	250	240	
Total alkalinity (as $CaCO_3$)	1/12/94	250	230	250	240	
Cadmium	1/12/94	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
Calcium	1/12/94	13	33	18	19	
Chloride	1/12/94	130	240	180	200	
Chromium	1/12/94	0.0025	0.0015	0.0029	0.0035	
	1/19/94	0.002	< 0.001	0.0026	0.0027	
	1/26/94	0.0016	0.0011	0.0022	0.0023	
	2/2/94	0.002	0.0011	0.0019	0.0023	
Cobalt	1/12/94	< 0.05	< 0.05	< 0.05	< 0.05	
Copper	1/12/94	< 0.05	< 0.05	< 0.05	< 0.05	
Fluoride	1/12/94	1	0.98	1.3	1.3	
Iron	1/12/94	< 0.1	0.23	< 0.1	< 0.1	
Lead	1/12/94	< 0.002	< 0.002	< 0.002	< 0.002	
	1/19/94	< 0.002	< 0.002	< 0.002	< 0.002	
	1/26/94	< 0.002	< 0.002	< 0.002	< 0.002	
	2/2/94	< 0.002	< 0.002	< 0.002	< 0.002	
Magnesium	1/12/94	5.6	16	9	9.7	
Manganese	1/12/94	< 0.03	< 0.03	< 0.03	< 0.03	
Mercury	1/12/94	< 0.0002	< 0.0002	< 0.0002	< 0.0002	
Molybdenum	1/12/94	0.025	0.042	0.037	0.039	
Nickel	1/12/94	< 0.1	< 0.1	< 0.1	< 0.1	
Nitrate (as N)	1/12/94	9.2	20	20	24	
Nitrite (as N)	1/12/94	< 0.1	< 0.1	< 0.1	< 0.1	
Potassium	1/12/94	8.6	12	9	9.8	
Selenium	1/12/94	0.03	0.08	0.029	0.025	
	1/19/94	0.037	0.082	0.029	0.025	
	1/26/94	0.018	0.032	0.015	0.012	
	2/2/94	0.039	0.065	0.029	0.023	

Table 7-7 (Quarter 1). B–817 HE Process Area first quarter 1994 data.

Parameters	Sample Date	Location				
		W–817–01	W–817–02	W–817–03	W–817–04*	W–817–03A
Silver	1/12/94	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
	1/19/94	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
	1/26/94	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
	2/2/94	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
Sodium	1/12/94	250	390	290	360	
Sulfate	1/12/94	100	320	170	200	
Thallium	1/12/94	< 0.001	0.0011	< 0.001	< 0.001	
Total dissolved solids (TDS)	1/12/94	830	1,400	1,000	1,200	
Vanadium	1/12/94	0.12	0.12	0.12	0.12	
Zinc	1/12/94	< 0.05	< 0.05	< 0.05	< 0.05	
General Indicator Parameters						
pH, units	1/12/94	8.2	7.9	7.9	8.1	
	1/19/94	8.0	7.8	7.9	8.0	
	1/26/94	8.0	7.8	7.9	8.0	
	2/2/94	8.1	7.8	8.0	8.1	
Specific conductance (μmhos/cm)	1/12/94	1,170	1,950	1,490	1,620	
	1/19/94	1,130	1,850	1,450	1,540	
	1/26/94	1,180	1,930	1,490	1,630	
	2/2/94	1,100	1,800	1,410	1,400	
Total organic carbon (mg/L)	1/12/94	1.0	< 1.	1.0	1.0	
	1/19/94	5.5	2.5	2.6	5.3	
	1/26/94	3.0	1.0	1.0	1.0	
	2/2/94	1.0	1.0	5.0	5.0	
Total organic halides (mg/L)	1/12/94	0.034	0.022	0.033	0.034	
	1/19/94	0.032	0.033	0.031	0.03	
	1/26/94	0.03	0.019	0.028	0.017	
	2/2/94	0.037	0.022	0.036	0.032	
EPA Method 601 (μg/L)						
1,1,1–Trichloroethane	1/12/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1,2,2–Tetrachloroethane	1/12/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1,2–Trichloroethane	1/12/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1–Dichloroethane	1/12/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1–Dichloroethene	1/12/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2–Dichlorobenzene	1/12/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2–Dichloroethane	1/12/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2–Dichloroethene (total)	1/12/94	< 0.5	< 0.5	< 0.5	< 0.5	1.7
1,2–Dichloropropane	1/12/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,3–Dichlorobenzene	1/12/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,4–Dichlorobenzene	1/12/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
2–Chloroethylvinylether	1/12/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Table 7-7 (Quarter 1). B–817 HE Process Area first quarter 1994 data.

Parameters	Sample Date	Location				
		W–817–01	W–817–02	W–817–03	W–817–04*	W–817–03A
Bromodichloromethane	1/12/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromoform	1/12/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromomethane	1/12/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Carbon tetrachloride	1/12/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chlorobenzene	1/12/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroethane	1/12/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroform	1/12/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloromethane	1/12/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
cis–1,3–Dichloropropene	1/12/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibromochloromethane	1/12/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorodifluoromethane	1/12/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Freon 113	1/12/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methylene chloride	1/12/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethene	1/12/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
trans–1,3–Dichloropropene	1/12/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethene	1/12/94	< 0.5	< 0.5	12	9.2	42
Trichlorofluoromethane	1/12/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Vinyl chloride	1/12/94	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Explosive compounds (μg/L)						
HMX	1/12/94	< 20	< 20	< 20	< 20	< 20
	1/19/94	< 20	< 20	< 20	< 20	
	1/26/94	< 20	< 20	< 20	< 20	
	2/2/94	< 20	< 20	< 20	< 20	
RDX	1/12/94	101	< 30	< 30	< 30	< 30
	1/19/94	66	< 30	< 30	< 30	
	1/26/94	99	< 30	< 30	< 30	
	2/2/94	93	< 30	< 30	< 30	
TNT	1/12/94	< 30	< 30	< 30	< 30	< 30
	1/19/94	< 30	< 30	< 30	< 30	
	1/26/94	< 30	< 30	< 30	< 30	
	2/2/94	< 30	< 30	< 30	< 30	
Radioisotopes (Bq/L)						
Tritium	1/12/94	1.61 ± 1.61	1.56 ± 1.56	1.60 ± 1.60	1.59 ± 1.59	1.57 ± 1.57

* See Table D-3 for W-817-04 duplicate data.

Table 7-7 (Quarter 2). B–817 HE Process Area second quarter 1994 data.

Parameters	Sample Date	Location				
		W–817–01	W–817–02	W–817–03	W–817–03A*	W–817–04
Metals and Minerals (mg/L)						
Aluminum	4/5/94	< 0.2	< 0.2	< 0.2		< 0.2
Antimony	4/5/94	< 0.005	< 0.005	< 0.005		0.0078
Arsenic	4/5/94	0.05	0.057	0.054		0.056
	4/11/94	0.048	0.066	0.062		0.066
	4/19/94	0.047	0.056	0.052		0.057
	4/27/94	0.058	0.053	0.052		0.06
Barium	4/5/94	< 0.05	< 0.05	< 0.05		< 0.05
Beryllium	4/5/94	< 0.0005	< 0.0005	< 0.0005		< 0.0005
	4/11/94	< 0.0005	< 0.0005	< 0.0005		< 0.0005
	4/19/94	< 0.0005	< 0.0005	< 0.0005		< 0.0005
	4/27/94	< 0.0005	< 0.0005	< 0.0005		< 0.0005
Bicarbonate alk (as $CaCO_3$)	4/5/94	250	230	250		250
Cadmium	4/5/94	< 0.0005	< 0.0005	< 0.0005		< 0.0005
Calcium	4/5/94	16	38	23		23
Carbonate alk (as $CaCO_3$)	4/5/94	< 1	< 1	< 1		< 1
Chloride	4/5/94	150	280	210		220
Chromium	4/5/94	0.0019	0.0018	0.0025		0.0026
	4/11/94	< 0.01	< 0.01	< 0.01		< 0.01
	4/19/94	< 0.01	< 0.01	< 0.01		< 0.01
	4/27/94	< 0.01	< 0.01	< 0.01		< 0.01
Cobalt	4/5/94	< 0.05	< 0.05	< 0.05		< 0.05
Copper	4/5/94	< 0.05	< 0.05	< 0.05		< 0.05
Fluoride	4/5/94	0.93	0.95	1.2		1.2
Hardness, total (as $CaCO_3$)	4/5/94	67	170	97		98
Hydroxide alk (as $CaCO_3$)	4/5/94	< 1	< 1	< 1		< 1
Iron	4/5/94	< 0.1	< 0.1	< 0.1		< 0.1
Lead	4/5/94	< 0.002	< 0.002	< 0.002		< 0.002
	4/11/94	< 0.002	< 0.002	< 0.002		< 0.002
	4/19/94	< 0.002	< 0.002	< 0.002		< 0.002
	4/27/94	< 0.002	< 0.002	< 0.002		< 0.002
Magnesium	4/5/94	6.5	18.	9.7		9.8
Manganese	4/5/94	< 0.03	< 0.03	< 0.03		< 0.03
Mercury	4/5/94	< 0.0002	< 0.0002	< 0.0002		< 0.0002
Molybdenum	4/5/94	< 0.05	< 0.05	< 0.05		0.06
Nickel	4/5/94	< 0.1	< 0.1	< 0.1		< 0.1
Nitrate (as N)	4/5/94	21	25	23		23
Nitrite (as N)	4/5/94	< 5	< 5	< 5		< 1
Potassium	4/5/94	10	14	11		11
Selenium	4/5/94	0.032	0.065	0.026		0.025
	4/11/94	0.039	0.063	0.029		0.024
	4/19/94	0.027	0.054	0.023		0.019
	4/27/94	0.049	0.09	0.03		0.025

Table 7-7 (Quarter 2). B–817 HE Process Area second quarter 1994 data.

Parameters	Sample Date	Location				
		W–817–01	W–817–02	W–817–03	W–817–03A*	W–817–04
Silver	4/5/94	< 0.0005	< 0.0005	< 0.0005		< 0.0005
	4/11/94	< 0.0005	< 0.0005	< 0.0005		< 0.0005
	4/19/94	< 0.001	< 0.001	< 0.001		< 0.001
	4/27/94	< 0.001	< 0.001	< 0.001		< 0.001
Sodium	4/5/94	280	410	320		350
Sulfate	4/5/94	120	370	200		260
Surfactant	4/5/94	< 0.5	< 0.5	< 0.5		< 0.5
Thallium	4/5/94	< 0.005	< 0.005	< 0.005		< 0.005
Total alkalinity (as $CaCO_3$)	4/5/94	250	230	250		250
Total dissolved solids (TDS)	4/5/94	850	1,400	1,000		1,200
Vanadium	4/5/94	0.13	0.12	0.12		0.11
Zinc	4/5/94	< 0.05	< 0.05	< 0.05		< 0.05
General Indicator Parameters						
pH (units)	4/5/94	7.7	7.8	7.8		7.9
	4/11/94	7.9	7.7	7.8		7.9
	4/19/94	7.9	7.8	7.9		7.9
	4/27/94	7.8	7.8	7.9		7.9
Specific conductance (μmhos/cm)	4/5/94	1,200	1,970	1,500		1,630
	4/11/94	1,140	1,910	1,430		1,590
	4/19/94	1,160	1,950	1,510		1,580
	4/27/94	1,450	1,980	1,550		1,640
Total organic carbon (mg/L)	4/5/94	1	< 1	1		1
	4/11/94	4	4	1		1
	4/19/94	4	1	< 1		1
	4/27/94	5	6	9		1
Total organic halides (mg/L)	4/5/94	0.04	0.026	0.037		0.031
	4/11/94	0.066	0.053	0.072		0.075
	4/19/94	0.1	0.067	0.21		0.062
	4/27/94	0.21	0.16	0.22		0.19
EPA Method 601 (μg/L)	4/5/94					
1,1,1–Trichloroethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1,2,2–Tetrachloroethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1,2–Trichloroethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1–Dichloroethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1–Dichloroethene		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2–Dichlorobenzene		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2–Dichloroethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2–Dichloroethene (total)		< 0.5	< 0.5	< 0.5	2.7	< 0.5
1,2–Dichloropropane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,3–Dichlorobenzene		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,4–Dichlorobenzene		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Table 7-7 (Quarter 2). B–817 HE Process Area second quarter 1994 data.

Parameters	Sample Date	Location				
		W–817–01	W–817–02	W–817–03	W–817–03A*	W–817–04
2–Chloroethylvinylether		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromodichloromethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromoform		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromomethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Carbon tetrachloride		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chlorobenzene		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroform		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloromethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
cis–1,3–Dichloropropene		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibromochloromethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorodifluoromethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Freon–113		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methylene chloride		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethene		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
trans–1,3–Dichloropropene		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethene		< 0.5	< 0.5	12.	35.	10.
Trichlorofluoromethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Vinyl chloride		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Explosive compounds (μg/L)						
HMX	4/5/94	< 20	< 20	< 20	< 20	< 20
	4/11/94	< 20	< 20	< 20		< 20
	4/19/94	< 20	< 20	< 20		< 20
	4/27/94	< 20	< 20	< 20		< 20
RDX	4/5/94	85	< 30	< 30	< 30	< 30
	4/11/94	102	< 30	< 30		< 30
	4/19/94	113	< 30	< 30		< 30
	4/27/94	81	< 30	< 30		< 30
TNT	4/5/94	< 30	< 30	< 30	< 30	< 30
	4/11/94	< 30	< 30	< 30		< 30
	4/19/94	< 30	< 30	< 30		< 30
	4/27/94	< 30	< 30	< 30		< 30
Radioisotopes (Bq/L)						
Tritium	4/5/94	1.7	1.7	1.7	1.7	1.7
		± 1.7	± 1.7	± 1.7	± 1.7	± 1.7

* Only analyses for VOCs, HE compounds, and tritium required by monitoring plan.

Table 7-7 (Quarter 3). B–817 HE Process Area third quarter 1994 data.

Parameters	Sample Date	Locations				
		W–817–01	W–817–02	W–817–03*	W–817–04	W–817–03A
Metals and Minerals (mg/L)						
Aluminum	7/13/94	< 0.2	< 0.2	< 0.2	< 0.2	
Antimony	7/13/94	< 0.005	< 0.005	< 0.005	< 0.005	
Arsenic	7/13/94	0.049	0.059	0.053	0.058	
	7/27/94	0.047	0.054	0.053	0.055	
	8/2/94	0.046	0.052	0.049	0.052	
	8/11/94	0.045	0.054	0.052	0.054	
Barium	7/13/94	< 0.025	< 0.025	< 0.025	< 0.025	
Beryllium	7/13/94	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
	7/27/94	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
	8/2/94	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
	8/11/94	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
Bicarbonate alkalinity (as $CaCO_3$)	7/13/94	240	230	240	240	
Cadmium	7/13/94	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
Calcium	7/13/94	14	35	20	21	
Carbonate alkalinity (as $CaCO_3$)	7/13/94	< 1	< 1	< 1	< 1	
Chloride	7/13/94	150	290	210	230	
Chromium	7/13/94	0.0033	0.0022	0.0032	0.0034	
	7/27/94	< 0.01	< 0.01	< 0.01	< 0.01	
	8/2/94	< 0.01	< 0.01	< 0.01	< 0.01	
	8/11/94	< 0.01	< 0.01	< 0.01	< 0.01	
Cobalt	7/13/94	< 0.05	< 0.05	< 0.05	< 0.05	
Copper	7/13/94	< 0.05	< 0.05	< 0.05	< 0.05	
Fluoride	7/13/94	1.1	0.94	1.3	1.1	
Hardness, total (as $CaCO_3$)	7/13/94	58	160	90	93	
Hydroxide alkalinity (as $CaCO_3$)	7/13/94	< 1	< 1	< 1	< 1	
Iron	7/13/94	0.13	0.14	< 0.1	< 0.1	
Lead	7/13/94	< 0.002	< 0.002	< 0.002	< 0.002	
	7/27/94	< 0.002	< 0.002	< 0.002	< 0.002	
	8/2/94	< 0.002	< 0.002	< 0.002	< 0.002	
	8/11/94	< 0.002	< 0.002	< 0.002	< 0.002	
Magnesium	7/13/94	5.7	17.	9.7	9.8	
Manganese	7/13/94	< 0.03	< 0.03	< 0.03	< 0.03	
Mercury	7/13/94	< 0.0002	< 0.0002	< 0.0002	< 0.0002	
Molybdenum	7/13/94	< 0.05	< 0.05	< 0.05	< 0.05	
Nickel	7/13/94	< 0.1	< 0.1	< 0.1	< 0.1	
Nitrate (as N)	7/13/94	20	22	22	23	
Nitrite (as N)	7/13/94	< 0.5	< 0.5	< 0.5	< 0.5	
Potassium	7/13/94	10	14	10	11	
Selenium	7/13/94	0.028	0.057	0.024	0.021	
	7/27/94	0.021	0.033	0.015	0.014	
	8/2/94	0.032	0.059	0.025	0.022	
	8/11/94	0.035	0.072	0.032	0.026	

Table 7-7 (Quarter 3). B–817 HE Process Area third quarter 1994 data.

Parameters	Sample Date	Locations				
		W–817–01	W–817–02	W–817–03*	W–817–04	W–817–03A
Silver	7/13/94	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
	7/27/94	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
	8/2/94	< 0.01	< 0.01	< 0.01	< 0.01	
	8/11/94	< 0.001	< 0.001	< 0.001	< 0.001	
Sodium	7/13/94	270	430	340	370	
Sulfate	7/13/94	120	350	190	240	
Surfactant	7/13/94	< 0.5	< 0.5	< 0.5	< 0.5	
Thallium	7/13/94	< 0.001	< 0.001	< 0.001	< 0.001	
Total organic carbon (TOC)	7/13/94	< 1	2	1	2	
	7/24/94	< 1	< 1	< 1	< 1	
	8/2/94	7	2	< 1	2	
	8/11/94	2	4	7	3	
Total organic halides (TOX)	7/13/94	0.41	1.2	0.98	0.063	
	7/27/94	0.36	1.7	0.97	1.4	
	8/2/94	0.95	1.1	0.48	0.1	
	8/11/94	0.029	< 0.01	0.021	0.014	
Total alkalinity (as $CaCO_3$)	7/13/94	240	230	240	240	
Total dissolved solids (TDS)	7/13/94	850	1,410	1,080	1,180	
Vanadium	7/13/94	0.13	0.13	0.12	0.11	
Zinc	7/13/94	< 0.05	< 0.05	< 0.05	< 0.05	
General Indicator Parameters						
pH (units)	7/13/94	7.9	7.8	7.8	7.9	
	7/27/94	8.1	7.8	8.0	8.0	
	8/2/94	8.0	7.8	7.9	8.0	
	8/11/94	8.1	7.9	8.0	8.0	
Specific conductance (μmhos/cm)	7/13/94	1,130	1,870	1,420	1,580	
	7/27/94	1,100	1,770	1,390	1,480	
	8/2/94	1,150	1,930	1,510	1,660	
	8/11/94	1,310	2,210	1,680	1,780	
EPA Method 601 (μg/L)	7/13/94					
1,1,1–Trichloroethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1,2,2–Tetrachloroethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1,2–Trichloroethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1–Dichloroethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1–Dichloroethene		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2–Dichlorobenzene		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2–Dichloroethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2–Dichloroethene (total)		< 0.5	< 0.5	< 0.5	< 0.5	2.5
1,2–Dichloropropane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,3–Dichlorobenzene		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,4–Dichlorobenzene		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Table 7-7 (Quarter 3). B–817 HE Process Area third quarter 1994 data.

Parameters	Sample Date	Locations				
		W–817–01	W–817–02	W–817–03*	W–817–04	W–817–03A
2–Chloroethylvinylether		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromodichloromethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromoform		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromomethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Carbon tetrachloride		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chlorobenzene		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroform		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloromethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
cis–1,3–Dichloropropene		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibromochloromethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorodifluoromethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Freon–113		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methylene chloride		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethene		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
trans–1,3–Dichloropropene		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethene		< 0.5	< 0.5	13	9.8	35
Trichlorofluoromethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Vinyl chloride		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Explosive Compounds (μg/L)						
HMX	7/13/94	< 20	< 20	< 20	< 20	< 20
	7/27/94	< 20	< 20	< 20	< 20	
	8/2/94	< 20	< 20	< 20	< 20	
	8/11/94	< 20	< 20	< 20	< 20	
RDX	7/13/94	74	< 30	< 30	< 30	< 30
	7/27/94	64	< 30	< 30	< 30	
	8/2/94	65	< 30	< 30	< 30	
	8/11/94	94	< 30	< 30	< 30	
TNT	7/13/94	< 30	< 30	< 30	< 30	< 30
	7/27/94	< 30	< 30	< 30	< 30	
	8/2/94	< 30	< 30	< 30	< 30	
	8/11/94	< 30	< 30	< 30	< 30	
Radioisotopes (Bq/L)						
Tritium	7/13/94	0.5	−0.4	−0.6	−0.9	0.8
		± 1.7	± 1.7	± 1.6	± 1.6	± 1.7

* See Table D-3 for W-817-03 duplicate data

Table 7-7 (Quarter 4). B–817 HE Process Area fourth quarter 1994 data.

Parameters	Sample Date	Location				
		W–817–01	W–817–02	W–817–03	W–817–04	W–817–3A
Metals and Minerals (mg/L)						
Aluminum	10/10/94	< 0.2	< 0.2	< 0.2	< 0.2	
Antimony	10/10/94	0.01	< 0.01	< 0.01	< 0.01	
Arsenic (MCL = 0.050)	10/10/94	0.055	0.062	0.061	0.064	
	10/17/94	0.044	0.050	0.058	0.064	
	10/24/94	0.045	0.053	0.053	0.059	
	11/01/94	0.049	0.057	0.057	0.064	
Barium	10/10/94	< 0.05	< 0.05	< 0.05	< 0.05	
Beryllium	10/10/94	< 0.001	< 0.001	< 0.001	< 0.001	
	10/17/94	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
	10/24/94	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
	11/01/94	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
Bicarbonate alk (as $CaCO_3$)	10/10/94	250	230	220	210	
Cadmium	10/10/94	< 0.001	< 0.001	< 0.001	< 0.001	
Calcium	10/10/94	14	37	21	22	
Chloride	10/10/94	150	280	200	220	
Chromium	10/10/94	0.0017	0.0012	0.002	0.0023	
	10/17/94	0.0021	0.0019	0.0023	0.0026	
	10/24/94	0.0018	0.0016	0.0026	0.0025	
	11/01/94	0.0024	0.0035	0.0021	0.0036	
Cobalt	10/10/94	< 0.05	< 0.05	< 0.05	< 0.05	
Copper	10/10/94	< 0.05	< 0.05	< 0.05	< 0.05	
Fluoride	10/10/94	0.75	0.66	0.94	0.92	
Hardness, total (as $CaCO_3$)	10/10/94	57	170	92	95	
Iron	10/10/94	< 0.1	< 0.1	< 0.1	< 0.1	
Lead	10/10/94	< 0.005	< 0.005	< 0.005	< 0.005	
	10/17/94	< 0.002	< 0.002	< 0.002	< 0.002	
	10/24/94	< 0.002	< 0.002	< 0.002	< 0.002	
	11/01/94	0.0022	< 0.002	< 0.002	0.0021	
Magnesium	10/10/94	5.3	18.	9.6	9.7	
Manganese	10/10/94	< 0.03	< 0.03	< 0.03	< 0.03	
Mercury	10/10/94	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
Molybdenum	10/10/94	< 0.05	< 0.05	< 0.05	< 0.05	
Nickel	10/10/94	< 0.1	< 0.1	< 0.1	< 0.1	
Nitrate (MCL = 10; as N)	10/10/94	20	21	21	22	
Nitrite (as N)	10/10/94	< 0.5	< 0.5	< 0.5	< 0.5	
Potassium	10/10/94	9.4	14.	11.	11.	
Selenium (MCL = 0.010)	10/10/94	0.030	0.042	0.020	0.016	
	10/17/94	0.029	0.094	0.031	0.028	
	10/24/94	0.031	0.060	0.027	0.023	
	11/01/94	0.028	0.047	0.022	0.019	

Table 7-7 (Quarter 4). B–817 HE Process Area fourth quarter 1994 data.

Parameters	Sample Date	Location				
		W–817–01	W–817–02	W–817–03	W–817–04	W–817–3A
Silver	10/10/94	< 0.001	< 0.001	< 0.001	< 0.001	
	10/17/94	< 0.001	< 0.001	< 0.001	< 0.001	
	10/24/94	< 0.001	< 0.001	< 0.001	< 0.001	
	11/01/94	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
Sodium	10/10/94	290	470	350	410	
Sulfate	10/10/94	120	370	190	240	
Surfactant	10/10/94	< 0.5	< 0.5	< 0.5	< 0.5	
Thallium	10/10/94	< 0.005	< 0.005	< 0.005	< 0.005	
Total Alkalinity (as $CaCO_3$)	10/10/94	250	230	220	210	
Total dissolved solids (TDS)	10/10/94	890	1,400	1,100	1,100	
Vanadium	10/10/94	0.13	0.13	0.12	0.12	
Zinc	10/10/94	< 0.05	< 0.05	< 0.05	< 0.05	
General Indicator Parameters						
pH (units)	10/10/94	7.9	7.9	7.8	7.9	
	10/17/94	8.0	7.7	7.8	7.9	
	10/24/94	7.7	7.7	7.7	7.9	
	11/01/94	8.0	7.8	7.8	7.9	
Specific conductance (μmhos/cm)	10/10/94	1,260	2,060	1,570	1,710	
	10/17/94	1,300	2,180	1,660	1,750	
	10/24/94	1,210	2,050	1,610	1,690	
	11/01/94	1,240	2,090	1,600	1,670	
Total organic carbon (mg/L)	10/10/94	< 1	7	2	2	
	10/17/94	17	17	15	3	
	10/24/94	1	2	58	1	
	11/01/94	3	2	2	2	
Total organic halides (mg/L)	10/10/94	0.025	0.021	0.014	0.02	
	10/17/94	1.2	0.55	0.23	0.15	
	10/24/94	0.27	0.41	0.2	0.13	
	11/01/94	0.053	0.053	0.043	0.052	
EPA Method 601 (μg/L)	10/10/94					
1,1,1–Trichloroethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1,2,2–Tetrachloroethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1,2–Trichloroethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1–Dichloroethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1–Dichloroethene		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2–Dichlorobenzene		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2–Dichloroethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2–Dichloroethene (total)		< 0.5	< 0.5	< 0.5	< 0.5	2.1
1,2–Dichloropropane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,3–Dichlorobenzene		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,4–Dichlorobenzene		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
2–Chloroethylvinylether		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Table 7-7 (Quarter 4). B–817 HE Process Area fourth quarter 1994 data.

Parameters	Sample Date	Location				
		W–817–01	W–817–02	W–817–03	W–817–04	W–817–3A
Bromodichloromethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromoform		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromomethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Carbon tetrachloride		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chlorobenzene		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroform		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloromethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibromochloromethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorodifluoromethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Freon–113		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methylene chloride		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethene		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethene		< 0.5	< 0.5	11.0	8.4	19.0
Trichlorofluoromethane		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Vinyl chloride		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
cis–1,3–Dichloropropene		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
trans–1,3–Dichloropropene		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Explosive Compounds (μg/L)						
HMX	10/17/94	15	< 20	< 20	< 20	< 20
RDX	10/17/94	99	< 30	< 30	< 30	< 30
Radioisotopes (Bq/L)						
Tritium	10/10/94	–0.5	1.0	–0.3	1.3	–1.6
		± 1.6	± 1.7	± 1.6	± 1.7	± 1.6

* See Table D–3 for W–817–02 duplicate data.

Table 7-8 (Part 1). Pit 2 ground water data for 1994.

Parameter	Well				Well		
	K1-01A	K1-01B	K1-02A	K2-01A	K2-01B	K2-02A	K2-02B
Metals and Minerals (mg/L)							
Arsenic	0.0052	0.013	0.018	< 0.002	0.033	0.068	< 0.002
	0.0036	0.011	0.014	< 0.002	0.028	0.014	< 0.002
Barium	< 0.05	0.054	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	0.026	0.05	0.037	< 0.025	< 0.025	< 0.025	< 0.025
	< 0.025	0.053	0.041	< 0.025	< 0.025	< 0.025	< 0.025
	< 0.025	0.048	0.039	< 0.025	< 0.025	< 0.025	< 0.025
Beryllium	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Cadmium			< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Chromium	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Iron	< 0.1	0.13	< 0.1	< 0.1	0.11	0.11	0.12
	< 0.1	0.14	0.11	0.13	0.12	0.13	0.13
Lead	< 0.002	< 0.002	< 0.002	< 0.002	0.0022	< 0.002	< 0.002
	< 0.002	< 0.002	0.0021	< 0.002	< 0.002	< 0.002	< 0.002
	< 0.002	< 0.002	< 0.002	< 0.002	0.0037	< 0.002	< 0.002
	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Manganese	0.041	0.059	0.036	< 0.03	< 0.03	< 0.03	< 0.03
	< 0.03	0.059	0.038	< 0.03	< 0.03	< 0.03	< 0.03
Mercury	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Nickel	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Selenium	0.0046	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.0022
	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Silver	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Vanadium	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

Table 7-8 (Part 2). Pit 2 ground water data for 1994 (radioactivity).

Parameter	Well						
	K1-01A	K1-01B	K1-02A	K2-01A	K2-01B	K2-02A	K2-02B
Radioactivity (Bq/L)							
Gross alpha	0.124 ± 0.021	0.033 ± 0.011	0.073 ± 0.018	0.055 ± 0.018	0.190 ± 0.021	0.277 ± 0.025	0.026 ± 0.013
	0.026 ± 0.003	0.004 ± 0.003	0.009 ± 0.003	0.049 ± 0.004	0.047 ± 0.004	0.045 ± 0.004	-0.015 ± 0.003
	0.058 ± 0.016	0.027 ± 0.018	0.094 ± 0.020	0.057 ± 0.025	0.477 ± 0.030	0.218 ± 0.022	-0.003 ± 0.014
	-0.002 ± 0.009	-0.012 ± 0.091	-0.103 ± 0.043	-0.103 ± 0.048	0.157 ± 0.041	0.182 ± 0.038	-0.030 ± 0.037
Gross beta	0.235 ± 0.014	0.136 ± 0.010	0.162 ± 0.011	0.204 ± 0.011	0.246 ± 0.013	0.206 ± 0.015	0.141 ± 0.012
	0.198 ± 0.011	0.094 ± 0.010	0.089 ± 0.010	0.132 ± 0.010	0.141 ± 0.010	0.138 ± 0.010	0.079 ± 0.009
	0.167 ± 0.012	0.115 ± 0.012	0.177 ± 0.012	0.151 ± 0.013	0.331 ± 0.013	0.226 ± 0.013	0.084 ± 0.012
	0.164 ± 0.027	0.134 ± 0.024	0.081 ± 0.025	0.159 ± 0.029	0.180 ± 0.027	0.175 ± 0.027	0.135 ± 0.026
Radioisotopes (Bq/L)							
Radium-226	0.038 ± 0.004	0.014 ± 0.003	0.043 ± 0.004	0.016 ± 0.003	0.013 ± 0.003	0.012 ± 0.003	0.019 ± 0.003
	0.023 ± 0.003	0.001 ± 0.001	0.003 ± 0.001	0.007 ± 0.002	0.005 ± 0.002	0.004 ± 0.001	0.003 ± 0.001
	0.012 ± 0.004	0.114 ± 0.007	0.002 ± 0.002	0.021 ± 0.004	-0.002 ± 0.002	0.005 ± 0.001	0.006 ± 0.002
	0.015 ± 0.011	0.004 ± 0.007	0.013 ± 0.011	0.015 ± 0.009	0.017 ± 0.014	0.012 ± 0.013	0.000 ± 0.009
Tritium	2.0 ± 2.0	2.1 ± 2.1	1.9 ± 1.9	2.035 ± 2.035	4.403 ± 2.175	2.1 ± 2.1	2.0 ± 2.0
		1.5 ± 1.5	1.5 ± 1.5	1.6 ± 1.6	5.328 ± 1.790	1.6 ± 1.6	1.6 ± 1.6
	1.432 ± 1.432	1.439 ± 1.439	1.691 ± 1.691	1.635 ± 1.635	7.104 ± 1.911	1.639 ± 1.639	1.709 ± 1.709
	1.8 ± 1.8	1.8 ± 1.8	1.7 ± 1.7	1.7 ± 1.7	8.473 ± 2.076	1.7 ± 1.7	1.8 ± 1.8
Uranium-234	0.033 ± 0.003	0.004 ± 0.001	0.174 ± 0.007	0.012 ± 0.002	0.128 ± 0.007	0.037 ± 0.003	0.005 ± 0.002
	0.032 ± 0.005	0.006 ± 0.004	0.028 ± 0.004	-0.025 ± 0.004	0.142 ± 0.008	0.180 ± 0.008	0.004 ± 0.003
	0.006 ± 0.002	-0.007 ± 0.002	0.021 ± 0.002	0.012 ± 0.002	0.116 ± 0.005	0.165 ± 0.006	0.005 ± 0.001
	0.007 ± 0.003	0.021 ± 0.006	0.060 ± 0.012	0.010 ± 0.004	0.101 ± 0.020	0.173 ± 0.029	0.003 ± 0.002
Uranium-235	0.003 ± 0.001	0.001 ± 0.001	0.009 ± 0.001	0.004 ± 0.001	0.011 ± 0.002	0.030 ± 0.001	0.004 ± 0.001
	0.005 ± 0.002	0.001 ± 0.002	-0.003 ± 0.003	-0.038 ± 0.004	0.003 ± 0.003	0.002 ± 0.002	0.002 ± 0.002
	0.001 ± 0.001	-0.006 ± 0.001	0.001 ± 0.001	0.004 ± 0.001	0.003 ± 0.001	0.003 ± 0.001	0.003 ± 0.001
	0.003 ± 0.002	0.003 ± 0.002	0.011 ± 0.004	0.003 ± 0.002	0.006 ± 0.004	0.008 ± 0.003	0.001 ± 0.002
Uranium-238	0.019 ± 0.002	0.005 ± 0.001	0.047 ± 0.004	0.006 ± 0.001	0.084 ± 0.005	0.016 ± 0.002	0.003 ± 0.002
	0.012 ± 0.004	0.001 ± 0.001	0.022 ± 0.004	-0.040 ± 0.004	0.097 ± 0.007	0.039 ± 0.004	0.001 ± 0.001
	0.003 ± 0.001	-0.007 ± 0.001	0.015 ± 0.002	0.009 ± 0.001	0.078 ± 0.004	0.037 ± 0.003	0.002 ± 0.001
	0.002 ± 0.002	0.020 ± 0.006	0.032 ± 0.007	0.007 ± 0.003	0.078 ± 0.016	0.038 ± 0.009	0.002 ± 0.002

Table 7-9. Pit 9 ground water data for 1994.

Parameter	Well			
	K9–01	K9–02	K9–03	K9–04
Metals and Minerals (mg/L)				
Aluminum	< 0.2	< 0.2	< 0.2	
Ammonia nitrogen (as N)	1.1	0.77	1.	
Bicarbonate alk (as $CaCO_3$)	150	200	160	
Calcium	79	65	90	
Carbonate alk (as $CaCO_3$)	< 1	< 1	< 1	
Chloride	130	160	140	
Copper	< 0.05	< 0.05	< 0.05	
Fluoride	0.29	0.37	0.3	
Hardness, total (as $CaCO_3$)	320	290	370	
Hydroxide alk (as $CaCO_3$)	< 1	< 1	< 1	
Iron	< 0.1	< 0.1	< 0.1	
Magnesium	31	31	36	
Manganese	0.075	0.044	0.053	
Nickel	< 0.1	< 0.1	< 0.1	
Nitrate (as N)	< 0.5	< 0.5	< 0.5	
Nitrite (as N)	< 0.5	< 0.5	< 0.5	
Potassium	7.3	11	8.8	
Sodium	260	280	290	
Sulfate	560	490	610	
Surfactant	< 0.5	< 0.5	< 0.5	
Total alkalinity (as $CaCO_3$)	150	200	160	
Total dissolved solids (TDS)	1,280	1,210	1,330	
Zinc	< 0.05	< 0.05	< 0.05	
General Indicator Parameters				
pH (units)	7.7	7.8	7.7	
Specific conductance (μmhos/cm)	1,710	1,630	1,720	
Total organic carbon (mg/L)	< 1	3	< 1	
EPA Method 624 (μg/L)				
1,1,1–Trichloroethane	< 1	< 1	< 1	
1,1,2,2–Tetrachloroethane	< 1	< 1	< 1	
1,1,2–Trichloroethane	< 1	< 1	< 1	
1,1–Dichloroethane	< 1	< 1	< 1	
1,1–Dichloroethene	< 1	< 1	< 1	
1,2–Dichlorobenzene	< 1	< 1	< 1	
1,2–Dichloroethane	< 1	< 1	< 1	
1,2–Dichloroethene (total)	< 1	< 1	< 1	
1,2–Dichloropropane	< 1	< 1	< 1	
1,3–Dichlorobenzene	< 1	< 1	< 1	
1,4–Dichlorobenzene	< 1	< 1	< 1	

Table 7-9. Pit 9 ground water data for 1994.

Parameter	Well			
	K9–01	K9–02	K9–03	K9–04
2–Butanone	< 40	< 40	< 40	
2–Chloroethylvinylether	< 40	< 40	< 40	
2–Hexanone	< 10	< 10	< 10	
4–Methyl–2–pentanone	< 10	< 10	< 10	
Acetone	< 40	< 40	< 40	
Benzene	< 1	< 1	< 1	
Bromodichloromethane	< 1	< 1	< 1	
Bromoform	< 1	< 1	< 1	
Bromomethane	< 2	< 2	< 2	
Carbon disulfide	< 1	< 1	< 1	
Carbon tetrachloride	< 1	< 1	< 1	
Chlorobenzene	< 1	< 1	< 1	
Chloroethane	< 2	< 2	< 2	
Chloroform	< 1	< 1	< 1	
Chloromethane	< 2	< 2	< 2	
Dibromochloromethane	< 1	< 1	< 1	
Dibromomethane	< 1	< 1	< 1	
Dichlorodifluoromethane	< 2	< 2	< 2	
Ethylbenzene	< 1	< 1	< 1	
Freon–113	< 1	< 1	< 1	
Methylene chloride	< 1	< 1	< 1	
Styrene	< 1	< 1	< 1	
Tetrachloroethene	< 1	< 1	< 1	
Toluene	< 1	< 1	< 1	
Total xylene isomers	< 2	< 2	< 2	
Trichloroethene	< 0.5	< 0.5	< 0.5	
Trichlorofluoromethane	< 1	< 1	< 1	
Vinyl acetate	< 10	< 10	< 10	
Vinyl chloride	< 2	< 2	< 2	
cis–1,3–Dichloropropene	< 1	< 1	< 1	
trans–1,3–Dichloropropene	< 1	< 1	< 1	
Explosive Compounds (μg/L)				
HMX	< 20	< 20	< 20	
RDX	< 30	< 30	< 30	
TNT	< 30	< 30	< 30	
Radioactivity (Bq/L)				
Gross alpha	–0.0629 ± 0.0311	0.01924 ± 0.0322	–0.02257 ± 0.0322	
Gross beta	0.08473 ± 0.0326	0.3145 ± 0.0333	0.2294 ± 0.0311	

Table 7-9. Pit 9 ground water data for 1994.

Parameter	Well			
	K9–01	K9–02	K9–03	K9–04
Radiosotopes (Bq/L)				
Radium–226	0.01073 ± 0.0022	0.00481 ± 0.0019	0.00629 ± 0.0022	
Tritium	1.2 ± 1.15	1.5 ± 1.5	1.5 ± 1.5	
Uranium–234	0.00481 ± 0.0011	0.02701 ± 0.0022	0.01887 ± 0.0030	0.01295 ± 0.0030
Uranium–235	0.00074 ± 0.0007	0.00148 ± 0.0007	–0.00074 ± 0.0007	0 ± 0.0007
Uranium–238	0.00222 ± 0.0011	0.00666 ± 0.0015	0.00481 ± 0.0019	0.0074 ± 0.0022

Table 7-10 (Part 1). Elk Ravine Drainage Area ground water data for 1994.

Parameter	Well				
	NC7-61	NC7-69	K2-04D	K2-04S	K2-01C
Metals and Minerals (mg/L)					
Ammonia nitrogen (as N)			< 0.1	< 0.1	0.1
			< 0.1	< 0.1	< 0.1
			< 0.1	< 0.1	< 0.1
			< 0.1	< 0.1	< 0.1
Beryllium	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Chromium	< 0.01	< 0.01			
	< 0.01	< 0.01			
	< 0.01	< 0.01			
	< 0.01	< 0.01			
Copper	< 0.01	< 0.01			
	< 0.01	< 0.01			
	< 0.01	< 0.01			
	< 0.01	< 0.01			
Lead	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Nitrate (as N)			15	15	8.1
			8.6	13	5.2
			7.2	9.1	4.1
			5	9.5	< 5
Nitrite (as N)			< 0.1	< 0.1	< 0.1
			< 5	< 5	< 0.5
			< 0.5	< 0.5	< 0.5
			< 5	< 5	< 5
Total Kjeldahl nitrogen			< 0.2	< 0.2	< 0.2
			< 0.2	< 0.2	0.24
			< 0.5	1.5	< 0.5
			< 0.5	< 0.5	< 0.5
EPA Method 601 (μg/L)					
1,1,1-Trichloroethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1,2,2-Tetrachloroethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Table 7-10 (Part 1). Elk Ravine Drainage Area ground water data for 1994.

Parameter	Well				
	WELL01	NC2-12D	NC2-11D	812CRK	NC2-07
Metals and Minerals (mg/L)					
Ammonia nitrogen (as N)					
Beryllium	< 0.0005	< 0.0005	< 0.0005	< 0.0005	
	< 0.0005		< 0.0005	< 0.0005	
	< 0.0005		< 0.0005	< 0.0005	
			< 0.0005	< 0.0005	
Chromium	< 0.01	< 0.01	< 0.01	< 0.01	
	< 0.01		< 0.01	< 0.01	
	< 0.01		< 0.01	< 0.01	
			< 0.01	< 0.01	
Copper	< 0.01	< 0.01	< 0.01	< 0.01	
	< 0.01		< 0.01	< 0.01	
	< 0.01		< 0.01	< 0.01	
			< 0.01	< 0.01	
Lead	< 0.002	< 0.002	< 0.002	< 0.002	
	< 0.002		< 0.002	< 0.002	
	< 0.002		< 0.002	< 0.002	
			< 0.002	< 0.002	
Nitrate (as N)					
Nitrite (as N)					
Total Kjeldahl nitrogen					
EPA Method 601 (μg/L)					
1,1,1-Trichloroethane	< 0.5	< 0.5	< 0.5		< 0.5
	< 0.5		< 0.5		
			< 0.5		< 0.5
			< 0.5		< 0.5
1,1,2,2-Tetrachloroethane	< 0.5	< 0.5	< 0.5		< 0.5
	< 0.5		< 0.5		
			< 0.5		< 0.5
			< 0.5		< 0.5

Table 7-10 (Part 1). Elk Ravine Drainage Area ground water data for 1994.

Parameter	Well				
	NC7-61	NC7-69	K2-04D	K2-04S	K2-01C
1,1,2-Trichloroethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1-Dichloroethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1-Dichloroethene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2-Dichlorobenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2-Dichloroethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2-Dichloroethene (total)	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2-Dichloropropane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,3-Dichlorobenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,4-Dichlorobenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
2-Chloroethylvinylether	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Table 7-10 (Part 1). Elk Ravine Drainage Area ground water data for 1994.

Parameter	Well				
	WELL01	NC2-12D	NC2-11D	812CRK	NC2-07
1,1,2-Trichloroethane	< 0.5	< 0.5	< 0.5		< 0.5
	< 0.5		< 0.5		
			< 0.5		< 0.5
			< 0.5		< 0.5
1,1-Dichloroethane	< 0.5	< 0.5	< 0.5		< 0.5
	< 0.5		< 0.5		
			< 0.5		< 0.5
			< 0.5		< 0.5
1,1-Dichloroethene	< 0.5	< 0.5	< 0.5		< 0.5
	< 0.5		< 0.5		
			< 0.5		< 0.5
			< 0.5		< 0.5
1,2-Dichlorobenzene	< 0.5	< 0.5	< 0.5		< 0.5
	< 0.5		< 0.5		
			< 0.5		< 0.5
			< 0.5		< 0.5
1,2-Dichloroethane	< 0.5	< 0.5	< 0.5		< 0.5
	< 0.5		< 0.5		
			< 0.5		< 0.5
			< 0.5		< 0.5
1,2-Dichloroethene (total)	< 0.5	< 0.5	< 0.5		< 0.5
	< 0.5		< 0.5		
			< 0.5		< 0.5
			< 0.5		< 0.5
1,2-Dichloropropane	< 0.5	< 0.5	< 0.5		< 0.5
	< 0.5		< 0.5		
			< 0.5		< 0.5
			< 0.5		< 0.5
1,3-Dichlorobenzene	< 0.5	< 0.5	< 0.5		< 0.5
	< 0.5		< 0.5		
			< 0.5		< 0.5
			< 0.5		< 0.5
1,4-Dichlorobenzene	< 0.5	< 0.5	< 0.5		< 0.5
	< 0.5		< 0.5		
			< 0.5		< 0.5
			< 0.5		< 0.5
2-Chloroethylvinylether	< 0.5	< 0.5	< 0.5		< 0.5
	< 0.5		< 0.5		
			< 0.5		< 0.5
			< 0.5		< 0.5

Table 7-10 (Part 1). Elk Ravine Drainage Area ground water data for 1994.

Parameter	Well				
	NC7-61	NC7-69	K2-04D	K2-04S	K2-01C
Bromodichloromethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromoform	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromomethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Carbon tetrachloride	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chlorobenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroform	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloromethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibromochloromethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorodifluoromethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Freon-113	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Table 7-10 (Part 1). Elk Ravine Drainage Area ground water data for 1994.

Parameter	Well				
	WELL01	NC2-12D	NC2-11D	812CRK	NC2-07
Bromodichloromethane	< 0.5	< 0.5	< 0.5		< 0.5
	< 0.5		< 0.5		
			< 0.5		< 0.5
			< 0.5		< 0.5
Bromoform	< 0.5	< 0.5	< 0.5		< 0.5
	< 0.5		< 0.5		
			< 0.5		< 0.5
			< 0.5		< 0.5
Bromomethane	< 0.5	< 0.5	< 0.5		< 0.5
	< 0.5		< 0.5		
			< 0.5		< 0.5
			< 0.5		< 0.5
Carbon tetrachloride	< 0.5	< 0.5	< 0.5		< 0.5
	< 0.5		< 0.5		
			< 0.5		< 0.5
			< 0.5		< 0.5
Chlorobenzene	< 0.5	< 0.5	< 0.5		< 0.5
	< 0.5		< 0.5		
			< 0.5		< 0.5
			< 0.5		< 0.5
Chloroethane	< 0.5	< 0.5	< 0.5		< 0.5
	< 0.5		< 0.5		
			< 0.5		< 0.5
			< 0.5		< 0.5
Chloroform	< 0.5	< 0.5	< 0.5		< 0.5
	< 0.5		< 0.5		
			< 0.5		< 0.5
			< 0.5		< 0.5
Chloromethane	< 0.5	< 0.5	< 0.5		< 0.5
	< 0.5		< 0.5		
			< 0.5		< 0.5
			< 0.5		< 0.5
Dibromochloromethane	< 0.5	< 0.5	< 0.5		< 0.5
	< 0.5		< 0.5		
			< 0.5		< 0.5
			< 0.5		< 0.5
Dichlorodifluoromethane	< 0.5	< 0.5	< 0.5		< 0.5
	< 0.5		< 0.5		
			< 0.5		< 0.5
			< 0.5		< 0.5
Freon-113	< 0.5	< 0.5	< 0.5		< 0.5
	0.5		< 0.5		
			< 0.5		< 0.5
			< 0.5		< 0.5

Table 7-10 (Part 1). Elk Ravine Drainage Area ground water data for 1994.

Parameter	Well				
	NC7-61	NC7-69	K2-04D	K2-04S	K2-01C
Methylene chloride	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Vinyl chloride	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
cis-1,3-Dichloropropene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
trans-1,3-Dichloropropene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Table 7-10 (Part 1). Elk Ravine Drainage Area ground water data for 1994.

Parameter	Well				
	WELL01	NC2-12D	NC2-11D	812CRK	NC2-07
Methylene chloride	< 0.5	< 0.5	< 0.5		< 0.5
	< 0.5		< 0.5		
			< 0.5		< 0.5
			< 0.5		< 0.5
Tetrachloroethene	< 0.5	< 0.5	< 0.5		< 0.5
	< 0.5		< 0.5		
			< 0.5		< 0.5
			< 0.5		< 0.5
Trichloroethene	< 0.5	< 0.5	< 0.5		< 0.5
	< 0.5		< 0.5		
			< 0.5		< 0.5
			< 0.5		< 0.5
Trichlorofluoromethane	< 0.5	< 0.5	< 0.5		< 0.5
	< 0.5		< 0.5		
			< 0.5		< 0.5
			< 0.5		< 0.5
Vinyl chloride	< 0.5	< 0.5	< 0.5		< 0.5
	< 0.5		< 0.5		
			< 0.5		< 0.5
			< 0.5		< 0.5
cis-1,3-Dichloropropene	< 0.5	< 0.5	< 0.5		< 0.5
	< 0.5		< 0.5		
			< 0.5		< 0.5
			< 0.5		< 0.5
trans-1,3-Dichloropropene	< 0.5	< 0.5	< 0.5		< 0.5
	< 0.5		< 0.5		
			< 0.5		< 0.5
			< 0.5		< 0.5

Table 7-10 (Part 2). Elk Ravine Drainage Area ground water data for 1994 (radioactivity).

	Well				
	NC7-61	**NC7-69**	**K2-04D**	**K2-04S**	**K2-01C**
Radioactivity (Bq/L)					
Gross alpha	0.17 ± 0.0226	0.10 ± 0.0192	0.11 ± 0.0196	0.26 ± 0.0322	0.77 ± 0.0518
	0.22 ± 0.0607	0.18 ± 0.0551	0.14 ± 0.0440	0.08 ± 0.0337	0.72 ± 0.1258
	0.10 ± 0.0274	–0.06 ± 0.0152		0.33 ± 0.0433	0.97 ± 0.0851
	0.05 ± 0.0274	0.07 ± 0.0196	0.10 ± 0.0137	0.06 ± 0.0152	0.49 ± 0.0370
Gross beta	0.23 ± 0.0122	0.19 ± 0.0130	0.15 ± 0.0111	0.26 ± 0.0178	0.52 ± 0.0222
	0.26 ± 0.0363	0.32 ± 0.0448	0.15 ± 0.0289	0.15 ± 0.0270	0.51 ± 0.0666
	0.16 ± 0.0204	0.11 ± 0.0137		0.29 ± 0.0252	0.37 ± 0.0370
	0.27 ± 0.0196	0.18 ± 0.0148	0.12 ± 0.0096	0.09 ± 0.0100	0.43 ± 0.0222
Radioisotopes (BQ/L)					
Tritium	7511 ± 225	0.12 ± 0.11	399.6 ± 7.6	1047.1 ± 12.6	241.2 ± 5.8
	7696 ± 31	0.17 ± 0.17	388.5 ± 7.4	995.3 ± 11.9	70.3 ± 3.51
	7770 ± 39	0.16 ± 0.10	355.9 ± 6.8	584.6 ± 8.77	135.4 ± 4.5
Recount	7252 ± 29	0.11 ± 0.11	313.8 ± 6.6	510.6 ± 8.17	143.6 ± 4.6
Uranium-234	0.17 ± 0.0089	0.02 ± 0.0026			0.54 ± 0.04
	0.17 ± 0.0059	0.01 ± 0.0019			
Recount	0.19 ± 0.0237	0.00 ± 0.0030			
	0.15 ± 0.0056	0.00 ± 0.0011			
	0.17 ± 0.0418	0.01 ± 0.0044			
Uranium-235	0.02 ± 0.0033	0.01 ± 0.0015			0.03 ± 0.01
	0.01 ± 0.0015	0.00 ± 0.0004			
Recount	0.02 ± 0.0085	0.00 ± 0.0022			
	0.00 ± 0.0011	0.00 ± 0.0004			
	0.01 ± 0.0096	0.00 ± 0.0022			
Uranium-238	0.16 ± 0.0085	0.01 ± 0.0022			0.44 ± 0.03
	0.15 ± 0.0056	0.01 ± 0.0015			
Recount	0.13 ± 0.0200	0.00 ± 0.0011			
	0.12 ± 0.0052	0.00 ± 0.0007			
	0.13 ± 0.0333	0.00 ± 0.0037			

Table 7-10 (Part 2). Elk Ravine Drainage Area ground water data for 1994 (radioactivity).

	Well				
	WELL01	**NC2-12D**	**NC2-11D**	**812CRK**	**NC2-07**
Radioactivity (Bq/L)					
Gross alpha	0.11 ± 0.0189		0.08 ± 0.0178	0.12 ± 0.0241	0.44 ± 0.0370
	0.09 ± 0.0463		0.12 ± 0.0451	0.16 ± 0.0525	
	0.11 ± 0.0263		0.12 ± 0.0292	-0.04 ± 0.0340	0.38 ± 0.0444
			0.21 ± 0.0252	0.16 ± 0.0340	0.13 ± 0.0204
					0.40 ± 0.1147
Gross beta	0.16 ± 0.0118		0.34 ± 0.0137	0.15 ± 0.0133	0.36 ± 0.0181
	0.16 ± 0.0296		0.19 ± 0.0296	0.27 ± 0.0385	
	0.12 ± 0.0192		0.19 ± 0.0185	0.11 ± 0.0181	0.39 ± 0.0222
			0.24 ± 0.0141	0.26 ± 0.0167	0.15 ± 0.0126
					0.30 ± 0.0559
Radioisotopes (BQ/L)					
Tritium	271.95 ± 6.25	141.71 ±4.6764	84.73 ± 3.64	0.36 ± 0.1058	1.64 ± 1.64
	287.12 ± 6.32		91.02 ± 3.82	0.19 ± 0.11	
	294.89 ± 6.19		90.6 ± 3.7	0.28 ± 0.11	1.68 ± 1.68
			84.36 ± 3.71	0.16 ± 0.11	1.73 ± 1.73
Uranium-234					
Uranium-235					
Uranium-238					

Table 7-11 (Part 1). Pit 6 ground water data for 1994.

Parameter	Well					
	K6–01	K6–03	K6–04	EP6–07	EP6–08	EP6–09
Metals and Minerals (mg/L)						
Aluminum	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Ammonia nitrogen (as N)	< 0.1	0.14	< 0.1	0.21	< 0.1	< 0.1
	< 0.05	0.24	< 0.05	0.22	< 0.05	< 0.05
Arsenic	0.021	0.024	0.019	0.026	0.022	0.018
	0.019	0.024	0.02	0.025	0.02	0.017
Barium	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	0.032	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025
Beryllium	0.0005	0.0006	< 0.0005	< 0.0005	< 0.0005	< 0.0005
	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Bicarbonate alk (as $CaCO_3$)	180	170	170	230	190	190
	180	180	170	180	180	190
Cadmium	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Calcium	77	58	47	56	55	64
	88	61	56	60	57	66
Carbonate alk (as $CaCO_3$)	< 1	< 1	< 1	< 1	< 1	< 1
	< 1	< 1	< 1	< 1	< 1	< 1
Chloride	130	85	75	81	87	110
	120	85	74	82	90	110
Chromium	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Copper	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluoride	0.42	0.52	0.5	0.52	0.43	0.46
	0.4	0.52	0.5	0.51	0.43	0.47
Hardness, total (as $CaCO_3$)	320	270	210	260	250	280
	360	270	240	270	250	280
Hydroxide alk (as $CaCO_3$)	< 1	< 1	< 1	< 1	< 1	< 1
	< 1	< 1	< 1	< 1	< 1	< 1
Iron	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Lead	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Magnesium	32	30	22	29	27	30
	33	29	24	28	25	27
Manganese	0.057	0.063	< 0.03	0.13	< 0.03	< 0.03
	0.077	0.078	< 0.03	0.14	< 0.03	< 0.03
Mercury	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002

Table 7-11 (Part 1). Pit 6 ground water data for 1994.

Parameter	Well					
	K6–01	K6–03	K6–04	EP6–07	EP6–08	EP6–09
Nickel	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nitrate (as N)	< 0.5	< 0.5	1.4	< 0.5	< 0.5	0.98
	< 0.5	< 0.5	1.7	< 0.5	< 0.5	1.4
Nitrite (as N)	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Phenolics	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Potassium	6.9	8.4	6.8	7.8	10.	9.5
	8.4	8.3	8.4	7.8	8.9	8.8
Selenium	< 0.002	< 0.002	0.0029	< 0.002	0.0036	0.0039
	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Silver	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Sodium	100	120	72	110	140	140
	130	110	96	110	120	120
Sulfate	300	220	170	210	200	210
	310	230	180	220	210	220
Surfactant	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Total alkalinity (as $CaCO_3$)	180	170	170	230	190	190
	180	180	170	180	180	190
Total dissolved solids	880	690	620	720	680	750
	870	670	560	630	640	620
Total Kjeldahl nitrogen	< 0.2	0.38	< 0.2	0.28	0.31	< 0.2
	< 0.5	1.	< 0.5	< 0.5	< 0.5	< 0.5
Total suspended solids	< 1	3	1	< 1	< 1	< 1
	1	< 1	< 1	< 1	< 1	< 1
Vanadium	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Zinc	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
General Indicator Parameters.						
pH (units)	7.5	7.4	7.6	7.6	7.6	7.8
	7.6	7.7	7.9	7.8	7.7	7.8
Specific conductance (umhos/cm)	1,100	870	760	860	880	940
	1,170	900	860	960	970	1,050
Total organic carbon (mg/L)	< 1	2	1	< 1	< 1	7
	4	3	2	1	1	< 1
Total organic halides (mg/L)	0.01	0.014	< 0.01	0.01	0.014	0.023
	0.52	0.25	0.28	0.23	0.57	0.21

Table 7-11 (Part 1). Pit 6 ground water data for 1994.

Parameter	Well					
	K6–01	K6–03	K6–04	EP6–07	EP6–08	EP6–09
EPA Method 601 (µg/L)						
1,1,1–Trichloroethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1,2,2–Tetrachloroethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1,2–Trichloroethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1–Dichloroethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1–Dichloroethene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2–Dichlorobenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2–Dichloroethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2–Dichloroethene (total)	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2–Dichloropropane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,3–Dichlorobenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,4–Dichlorobenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
2–Chloroethylvinylether	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromodichloromethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromoform	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromomethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Carbon tetrachloride	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chlorobenzene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroform	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloromethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibromochloromethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Table 7-11 (Part 1). Pit 6 ground water data for 1994.

Parameter	Well					
	K6–01	K6–03	K6–04	EP6–07	EP6–08	EP6–09
Dichlorodifluoromethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Freon–113	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methylene chloride	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	7.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	9.1
Trichlorofluoromethane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Vinyl chloride	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
cis–1,3–Dichloropropene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
trans–1,3–Dichloropropene	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
EPA Method 608 (μg/L)						
Aldrin	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
BHC, alpha isomer	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
BHC, beta isomer	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
BHC, delta isomer	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
BHC, gamma isomer (Lindane)	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Chlordane	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dieldrin	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Endosulfan I	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan II	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Endosulfan sulfate	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Endrin	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

Table 7-11 (Part 1). Pit 6 ground water data for 1994.

Parameter	Well					
	K6–01	K6–03	K6–04	EP6–07	EP6–08	EP6–09
Endrin aldehyde	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Heptachlor	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor epoxide	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Methoxychlor	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Toxaphene	< 1	< 1	< 1	< 1	< 1	< 1
	< 1	< 1	< 1	< 1	< 1	< 1
p,p'–DDD	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
p,p'–DDE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
p,p'–DDT	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
EPA Method 615 μg/L)						
2,4,5–T	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	< 10	< 10	< 10	< 10	< 10	< 10
2,4,5–TP (Silvex)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	< 10	< 10	< 10	< 10	< 10	< 10
2,4–D	< 1	< 1	< 1	< 1	< 1	< 1
	< 50	< 50	< 50	< 50	< 50	< 50
4–(2,4–Dichlorophenoxy)butyric acid	< 2	< 2	< 2	< 2	< 2	< 2
	< 100	< 100	< 100	< 100	< 100	< 100
Dalapon	< 2	< 2	< 2	< 2	< 2	< 2
	< 500	< 500	< 500	< 500	< 500	< 500
Dicamba	< 1	< 1	< 1	< 1	< 1	< 1
	< 10	< 10	< 10	< 10	< 10	< 10
Dichloroprop	< 2	< 2	< 2	< 2	< 2	< 2
	< 100	< 100	< 100	< 100	< 100	< 100
Dinoseb	< 1	< 1	< 1	< 1	< 1	< 1
	< 10	< 10	< 10	< 10	< 10	< 10
MCPA	< 250	< 250	< 250	< 250	< 250	< 250
	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
MCPP	< 250	< 250	< 250	< 250	< 250	< 250
	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000

Table 7-11 (Part 1). Pit 6 ground water data for 1994.

Parameter	Well					
	K6–01	K6–03	K6–04	EP6–07	EP6–08	EP6–09
Explosive Compounds (μg/L)						
HMX	< 20	< 20	< 20	< 20	< 20	< 20
	< 20	< 20	< 20	< 20	< 20	< 20
RDX	< 30	< 30	< 30	< 30	< 30	< 30
	< 30	< 30	< 30	< 30	< 30	< 30
TNT	< 30	< 30	< 30	< 30	< 30	< 30
	< 30	< 30	< 30	< 30	< 30	< 30

Table 7-11 (Part 2). Pit 6 ground water data for 1994 (radioactivity).

Parameter	Well		
	K6-01	K6-03	K6-04
Radioactivity (Bq/L)			
Gross alpha	0.4329 ± 0.0481	0.10582 ± 0.0207	0.12543 ± 0.0204
	0.05735 ± 0.0218	–0.03293 ± 0.0211	0.04736 ± 0.0178
Gross beta	0.3774 ± 0.0222	0.3737 ± 0.0148	0.30784 ± 0.0141
	0.30081 ± 0.0222	0.28009 ± 0.0207	0.333 ± 0.0204
Radioisotopes (Bq/L)			
Tritium	1.55 ± 1.55	1.56 ± 1.56	1.57 ± 1.57
	1.43 ± 1.43	1.51 ± 1.51	1.51 ± 1.51
Radium-226	0.01924 ± 0.0026	0.01443 ± 0.0022	0.01591 ± 0.0026
	0.00148 ± 0.0015	0.00481 ± 0.0019	0.00444 ± 0.0015
Uranium-234	0.0481 ± 0.0041	0.00999 ± 0.0022	0.02516 ± 0.0026
	0.02553 ± 0.0022	0.01591 ± 0.0019	0.0333 ± 0.0033
Uranium-235	0.00925 ± 0.0019	0.00111 ± 0.0007	0.00185 ± 0.0007
	0.00185 ± 0.0011	0.00148 ± 0.0052	0.00222 ± 0.0019
Uranium-238	0.03293 ± 0.0033	0.00999 ± 0.0022	0.02368 ± 0.0022
	0.01369 ± 0.0019	0.01221 ± 0.0015	0.02072 ± 0.0030

Parameter	Well		
	EP6-07	EP6-08	EP6-09
Radioactivity (Bq/L)			
Gross alpha	0.03441 ± 0.0178	0.13727 ± 0.0248	0.05772 ± 0.0192
	0.07474 ± 0.0207	0. ± 0.0329	0.10101 ± 0.0318
Gross beta	0.23754 ± 0.0130	0.35372 ± 0.0155	0.31524 ± 0.0155
	0.25641 ± 0.0204	0.29933 ± 0.0229	0.3811 ± 0.0222
Radioisotopes (Bq/L)			
Tritium	1.5651 ± 1.5651	1.5614 ± 1.5614	1.5244 ± 1.5244
	1.5059 ± 1.5059	1.4837 ± 1.4837	1.6021 ± 1.6021
Radium-226	0.01517 ± 0.0022	0.01036 ± 0.0022	0.01406 ± 0.0022
	0.00074 ± 0.0015	0.00148 ± 0.0011	0.00074 ± 0.0011
Uranium-234	0.01258 ± 0.0030	0.0259 ± 0.0026	0.04107 ± 0.0030
	0.0148 ± 0.0026	0.02812 ± 0.0037	0.04699 ± 0.0044
Uranium-235	0.0037 ± 0.0015	0.00074 ± 0.0007	–0.00022 ± 0.0006
	0.00185 ± 0.0015	–0.00111 ± 0.0007	0.00518 ± 0.0026
Uranium-238	0.01332 ± 0.0030	0.01887 ± 0.0022	0.03182 ± 0.0026
	0.00888 ± 0.0019	0.01813 ± 0.0022	0.04107 ± 0.0041

Table 7-12. Well 20 water analyses.

Parameter	Result
Metals and Minerals (mg/L)	
Beryllium	< 0.0005
	< 0.0005
	< 0.0005
	< 0.0005
Chromium	< 0.01
	< 0.01
	< 0.01
	< 0.01
Copper	< 0.01
	< 0.01
	< 0.01
	< 0.01
Lead	< 0.002
	< 0.002
	< 0.002
	< 0.002
EPA Method 502.2 (μg/L)	
1,1,1,2-Tetrachloroethane	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
1,1,1-Trichloroethane	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
1,1,2,2-Tetrachloroethane	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2

Parameter	Result
1,1,2-Trichloroethane	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
1,1-Dichloroethane	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
1,1-Dichloroethene	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
1,1-Dichloropropene	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
1,2,3-Trichlorobenzene	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2

Table 7-12. Well 20 water analyses.

Parameter	Result
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
1,2,3-Trichloropropane	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
1,2,4-Trichlorobenzene	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
1,2,4-Trimethylbenzene	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
1,2-Dichlorobenzene	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2

Parameter	Result
1,2-Dichloroethane	2.5
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
1,2-Dichloropropane	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
1,3,5-Trimethylbenzene	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
1,3-Dichlorobenzene	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
1,3-Dichloropropane	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2

Table 7-12. Well 20 water analyses.

Parameter	Result
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
1,4-Dichlorobenzene	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
2,2-Dichloropropane	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
2-Chlorotoluene	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
4-Chlorotoluene	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2

Parameter	Result
Benzene	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
Bromobenzene	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
Bromochloromethane	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
Bromodichloromethane	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
Bromoform	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2

Table 7-12. Well 20 water analyses.

Parameter	Result
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
Bromomethane	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
Carbon tetrachloride	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
Chlorobenzene	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
Chloroethane	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2

Parameter	Result
Chloroform	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
Chloromethane	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.5
	< 0.2
Dibromochloromethane	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
Dibromomethane	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
Dichlorodifluoromethane	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2

Table 7-12. Well 20 water analyses.

Parameter	Result
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
Ethylbenzene	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
Freon-113	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
Hexachlorobutadiene	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
Isopropylbenzene	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
Methylene chloride	0.7

Parameter	Result
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
Naphthalene	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
Styrene	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
Tetrachloroethene	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
Toluene	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2

Table 7-12. Well 20 water analyses.

Parameter	Result
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
Trichloroethene	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
Trichlorofluoromethane	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
Vinyl chloride	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
cis-1,2-Dichloroethene	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
cis-1,3-Dichloropropene	< 0.2

Parameter	Result
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
m- and p-Xylene Isomers	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
n-Butylbenzene	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
n-Propylbenzene	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
o-Xylene	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2

Table 7-12. Well 20 water analyses.

Parameter	Result
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
p-Isopropyl toluene	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
sec-Butylbenzene	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
tert-Butylbenzene	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
trans-1,2-Dichloroethene	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2

Parameter	Result
trans-1,3-Dichloropropene	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
	< 0.2
EPA Method 524.2 (ug/L)	
1,1,1,2-Tetrachloroethane	< 1
1,1,1-Trichloroethane	< 1
1,1,2,2-Tetrachloroethane	< 1
1,1,2-Trichloroethane	< 1
1,1-Dichloroethane	< 1
1,1-Dichloroethene	< 1
1,1-Dichloropropene	< 1
1,2,3-Trichlorobenzene	< 1
1,2,3-Trichloropropane	< 1
1,2,4-Trichlorobenzene	< 1
1,2,4-Trimethylbenzene	< 1
1,2-Dibromo-3-chloropropane	< 2
1,2-Dichlorobenzene	< 1
1,2-Dichloroethane	< 1
1,2-Dichloropropane	< 1
1,3,5-Trimethylbenzene	< 1
1,3-Dichlorobenzene	< 1
1,3-Dichloropropane	< 1
1,4-Dichlorobenzene	< 1
2-Chlorotoluene	< 1
4-Chlorotoluene	< 1
Benzene	< 1
Bromobenzene	< 1
Bromodichloromethane	< 1
Bromoform	< 1
Bromomethane	< 2
Carbon tetrachloride	< 1
Chlorobenzene	< 1
Chloroethane	< 2
Chloroform	< 1
Chloromethane	< 2
Dibromochloromethane	< 1
Dibromomethane	< 1

Table 7-12. Well 20 water analyses.

Parameter	Result
Dichlorodifluoromethane	< 2
Ethylbenzene	< 1
Ethylene Dibromide	< 1
Freon 113	< 1
Hexachlorobutadiene	< 1
Isopropylbenzene	< 1
Methylene chloride	< 1
Naphthalene	< 1
Styrene	< 1
Tetrachloroethene	< 1
Toluene	< 1
Trichloroethene	< 0.5
Trichlorofluoromethane	< 1
Vinyl chloride	< 2
cis-1,2-Dichloroethene	< 1
cis-1,3-Dichloropropene	< 1
m- and p-Xylene Isomers	< 1
n-Butylbenzene	< 1
n-Propylbenzene	< 1
o-Xylene	< 1

Parameter	Result
p-Isopropyl toluene	< 1
sec-Butylbenzene	< 1
tert-Butylbenzene	< 1
trans-1,2-Dichloroethene	< 1
trans-1,3-Dichloropropene	< 1
Radioactivity (Bq/L)	
Gross alpha	0.027 ± 0.013
	0.007 ± 0.007
	–0.014 ± 0.034
	0.255 ± 0.031
Gross beta	0.223 ± 0.013
	0.268 ± 0.059
	0.178 ± 0.027
	0.330 ± 0.022
Radioisotopes (Bq/L)	
Tritium	0.144 ± 0.114
	0.061 ± 0.061
	0.102 ± 0.102
	0.094 ± 0.094

Table 7-13 (Part 1). Off–site ground water data for 1994.

Parameter	Well				
	STN	CARNRW2	CDF1	CON1	GALLO1
Metals and Minerals (mg/L)					
Aluminum	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Arsenic	< 0.002	0.0028	0.0027	< 0.002	0.0028
Barium	0.027	0.055	0.051	< 0.05	0.053
Beryllium	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
		< 0.0005	< 0.0005	< 0.0005	< 0.0005
		< 0.0005	< 0.0005	< 0.0005	< 0.0005
		< 0.0005	< 0.0005	< 0.0005	< 0.0005
Bicarbonate alk (as $CaCO_3$)	270	210	250	180	240
Cadmium	< 0.0005	0.003	< 0.0005	< 0.0005	< 0.0005
Calcium	160	25	93	47	5
Carbonate alk (as $CaCO_3$)	< 1	< 1	< 1	< 1	< 1
Chloride	160	100	110	160	130
Chromium	< 0.01	< 0.01	< 0.01	< 0.01	< 0.001
		< 0.01	< 0.01	< 0.01	< 0.01
		< 0.01	< 0.01	< 0.01	< 0.01
		< 0.01	< 0.01	< 0.01	0.014
Copper	0.055	< 0.01	< 0.01	< 0.01	< 0.01
	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
		< 0.01	< 0.06	< 0.06	< 0.01
		0.05	< 0.01	< 0.01	< 0.01
		< 0.01			< 0.06
Fluoride	0.35	0.34	0.38	0.49	0.87
Hardness, total (as $CaCO_3$)	660	83	370	140	16
Hydroxide alk (as $CaCO_3$)	< 1.	< 1.	< 1.	< 1.	< 1.
Iron	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Lead	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
		0.0024	< 0.002	< 0.002	< 0.002
		< 0.002	< 0.002	< 0.002	< 0.002
		< 0.002	< 0.002	< 0.002	< 0.002
Magnesium	75	5	33	7	1
Manganese	0.04	< 0.03	< 0.03	0.13	< 0.03
Mercury	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Nickel	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nitrate (as N)	< 0.5	< 0.5	3	< 0.5	< 0.5
Phenolics	0.002	0.001	0.002	0.001	< 0.01
Potassium	5.4	9.7	7.2	9.4	3.3
Selenium	< 0.002	< 0.002	0.0031	< 0.002	< 0.002
Silver	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.05
Sodium	200	210	170	400	270
Sulfate	680	220	310	630	200
Surfactant	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Total alkalinity (as $CaCO_3$)	270	210	250	180	240

Table 7-13 (Part 1). Off–site ground water data for 1994.

Parameter	Well				
	M L1	M L2	VIE1	VIE2	W–35A–04
Metals and Minerals (mg/L)					
Aluminum	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Arsenic	0.005	< 0.002	0.016	0.0029	0.0028
Barium	0.065	< 0.025	0.058	0.16	0.041
Beryllium	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Bicarbonate alk (as $CaCO_3$)	190	150	210	270	250
Cadmium	< 0.005	< 0.005	< 0.0005	< 0.0005	< 0.0005
Calcium	70	140	35	150	100
Carbonate alk (as $CaCO_3$)	< 1	< 1	27	< 1	< 1
Chloride	43	65	93	90	110
Chromium			< 0.01	< 0.01	< 0.01
Copper	< 0.06	< 0.06	< 0.052	< 0.05	< 0.01
				0.014	0.056
Fluoride	0.93	0.93	0.79	0.82	0.45
Hardness, total (as $CaCO_3$)	290	510	180	450	440
Hydroxide alk (as $CaCO_3$)	< 1.	< 1.	< 1.	< 1.	< 1.
Iron	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Lead	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Magnesium	27	40	22	19	45
Manganese	< 0.03	0.77	< 0.03	< 0.03	< 0.03
Mercury	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Nickel	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nitrate (as N)	1.1	3	< 0.5	5.2	4.3
Phenolics	0.001	0.002	< 0.01	< 0.01	< 0.01
Potassium	6.4	6.7	11	3	5
Selenium	0.0037	0.006	0.0032	< 0.002	0.0027
Silver	< 0.001	< 0.001	< 0.05	< 0.05	< 0.05
Sodium	64	98	130	76	150
Sulfate	170	370	110	210	370
Surfactant	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Total alkalinity (as $CaCO_3$)	190	150	240	270	250

Table 7-13 (Part 1). Off–site ground water data for 1994.

Parameter	Well				
	STN	CARNRW2	CDF1	CON1	GALLO1
Metals and Minerals (mg/L)					
Total dissolved solids	1,500	760	920	1,450	810
Zinc	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
General Indicator Parameters					
pH (units)	7.6	8	7.6	8.2	8.5
Specific Conductance (μmhos/cm)	1,900.	1,080.	1,290.	2,010.	1,240.
EPA Method 502.2 (μg/L)					
1,1,1,2–Tetrachloroethane	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,1,1–Trichloroethane	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,1,2,2–Tetrachloroethane	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,1,2–Trichloroethane	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,1–Dichloroethane	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,1–Dichloroethene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,1–Dichloropropene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,2,3–Trichlorobenzene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,2,3–Trichloropropane	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,2,4–Trichlorobenzene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,2,4–Trimethylbenzene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,2–Dichlorobenzene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,2–Dichloroethane	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,2–Dichloropropane	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,3,5–Trimethylbenzene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,3–Dichlorobenzene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,3–Dichloropropane	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,4–Dichlorobenzene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
2,2–Dichloropropane	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
2–Chlorotoluene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
4–Chlorotoluene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Benzene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Bromobenzene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Bromochloromethane	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Bromodichloromethane	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Bromoform	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Bromomethane	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Carbon tetrachloride	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chlorobenzene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chloroethane	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chloroform	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chloromethane	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dibromochloromethane	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dibromomethane	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dichlorodifluoromethane	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2

Table 7-13 (Part 1). Off–site ground water data for 1994.

Parameter	Well				
	M L1	M L2	VIE1	VIE2	W–35A–04
Metals and Minerals (mg/L)					
Total dissolved solids	540	870	620	750	1,000
Zinc	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
General Indicator Parameters					
pH (units)	7.5	7	9	7.3	7.7
Specific Conductance (μmhos/cm)	800.	1,200.	880.	1,090.	1,450.
EPA Method 502.2 (μg/L)					
1,1,1,2–Tetrachloroethane	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,1,1–Trichloroethane	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,1,2,2–Tetrachloroethane	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,1,2–Trichloroethane	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,1–Dichloroethane	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,1–Dichloroethene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,1–Dichloropropene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,2,3–Trichlorobenzene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,2,3–Trichloropropane	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,2,4–Trichlorobenzene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,2,4–Trimethylbenzene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,2–Dichlorobenzene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,2–Dichloroethane	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,2–Dichloropropane	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,3,5–Trimethylbenzene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,3–Dichlorobenzene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,3–Dichloropropane	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,4–Dichlorobenzene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
2,2–Dichloropropane	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
2–Chlorotoluene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
4–Chlorotoluene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Benzene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Bromobenzene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Bromochloromethane	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Bromodichloromethane	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Bromoform	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Bromomethane	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Carbon tetrachloride	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chlorobenzene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chloroethane	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chloroform	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chloromethane	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dibromochloromethane	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dibromomethane	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dichlorodifluoromethane	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2

Table 7-13 (Part 1). Off–site ground water data for 1994.

Parameter	Well				
	STN	CARNRW2	CDF1	CON1	GALLO1
EPA Method 502.2 (μg/L)					
Ethylbenzene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Freon–113	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Hexachlorobutadiene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Isopropylbenzene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Methylene chloride	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Naphthalene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Styrene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Tetrachloroethene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Toluene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Trichloroethene	< 0.2	< 0.2	< 0.2	< 0.2	**0.4**
Trichlorofluoromethane	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vinyl chloride	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
cis–1,2–Dichloroethene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
cis–1,3–Dichloropropene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
m– and p–Xylene Isomers	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
n–Butylbenzene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
n–Propylbenzene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
o–Xylene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
p–Isopropyl toluene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
sec–Butylbenzene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
tert–Butylbenzene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
trans–1,2–Dichloroethene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
trans–1,3–Dichloropropene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
EPA Method 608 (μg/L)					
Aldrin		< 0.05	< 0.05	< 0.05	
BHC, alpha isomer		< 0.05	< 0.05	< 0.05	
BHC, beta isomer		< 0.05	< 0.05	< 0.05	
BHC, delta isomer		< 0.05	< 0.05	< 0.05	
BHC, gamma isomer (Lindane)	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Chlordane		< 0.5	< 0.5	< 0.5	
Dieldrin		< 0.1	< 0.1	< 0.1	
Endosulfan I		< 0.05	< 0.05	< 0.05	
Endosulfan II		< 0.1	< 0.1	< 0.1	
Endosulfan sulfate		< 0.1	< 0.1	< 0.1	
Endrin	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Endrin aldehyde		< 0.1	< 0.1	< 0.1	
Heptachlor		< 0.05	< 0.05	< 0.05	
Heptachlor epoxide		< 0.05	< 0.05	< 0.05	
Methoxychlor	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Toxaphene	< 1	< 1	< 1	< 1	< 1
p,p'–DDD		< 0.1	< 0.1	< 0.1	

Table 7-13 (Part 1). Off–site ground water data for 1994.

Parameter	Well				
	M L1	M L2	VIE1	VIE2	W–35A–04
EPA Method 502.2 (μg/L)					
Ethylbenzene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Freon–113	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Hexachlorobutadiene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Isopropylbenzene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Methylene chloride	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Naphthalene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Styrene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Tetrachloroethene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Toluene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Trichloroethene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Trichlorofluoromethane	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Vinyl chloride	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
cis–1,2–Dichloroethene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
cis–1,3–Dichloropropene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
m– and p–Xylene Isomers	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
n–Butylbenzene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
n–Propylbenzene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
o–Xylene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
p–Isopropyl toluene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
sec–Butylbenzene	< 0.2	< 0.2	< 0.3	< 0.2	< 0.2
tert–Butylbenzene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
trans–1,2–Dichloroethene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
trans–1,3–Dichloropropene	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
EPA Method 608 (μg/L)					
Aldrin					
BHC, alpha isomer					
BHC, beta isomer					
BHC, delta isomer					
BHC, gamma isomer (Lindane)	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Chlordane					
Dieldrin					
Endosulfan I					
Endosulfan II					
Endosulfan sulfate					
Endrin	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Endrin aldehyde					
Heptachlor					
Heptachlor epoxide					
Methoxychlor	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Toxaphene	< 1	< 1	< 1	< 1	< 1
p,p'–DDD					

Table 7-13 (Part 1). Off–site ground water data for 1994.

Parameter	Well				
	STN	CARNRW2	CDF1	CON1	GALLO1
EPA Method 608 (μg/L)					
p,p'–DDE		< 0.1	< 0.1	< 0.1	
p,p'–DDT		< 0.1	< 0.1	< 0.1	
EPA Method 615 (μg/L)					
2,4,5–T	< 10	< 10	< 10	< 10	< 10
2,4,5–TP (Silvex)	< 10	< 10	< 10	< 10	< 10
2,4–D	< 50	< 50	< 50	< 50	< 50
4–(2,4–Dichlorophenoxy)butyric acid	< 100	< 100	< 100	< 100	< 100
Dalapon	< 500	< 500	< 500	< 500	< 500
Dicamba	< 10	< 10	< 10	< 10	< 10
Dichloroprop	< 100	< 100	< 100	< 100	< 100
Dinoseb	< 10	< 10	< 10	< 10	< 10
MCPA	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
MCPP	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Explosive Compounds μg/L)					
HMX	< 20	< 20	< 20	< 20	< 20
RDX	< 30	< 30	< 30	< 30	< 30
TNT	< 30	< 30	< 30	< 30	< 30

Table 7-13 (Part 1). Off–site ground water data for 1994.

Parameter	Well				
	M L1	M L2	VIE1	VIE2	W–35A–04
EPA Method 608 (μg/L)					
p,p'–DDE					
p,p'–DDT					
EPA Method 615 (μg/L)					
2,4,5–T	< 10	< 10	< 10	< 10	< 10
2,4,5–TP (Silvex)	< 10	< 10	< 10	< 10	< 10
2,4–D	< 50	< 50	< 50	< 50	< 50
4–(2,4–Dichlorophenoxy)butyric acid	< 100	< 100	< 100	< 100	< 100
Dalapon	< 500	< 500	< 500	< 500	< 500
Dicamba	< 10	< 10	< 10	< 10	< 10
Dichloroprop	< 100	< 100	< 100	< 100	< 100
Dinoseb	< 10	< 10	< 10	< 10	< 10
MCPA	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
MCPP	< 1,000	< 1,000	< 1,000	< 1,000	< 1,000
Explosive Compounds μg/L)					
HMX	< 20	< 20	< 20	< 20	< 20
RDX	< 30	< 30	< 30	< 30	< 30
TNT	< 30	< 30	< 30	< 30	< 30

Table 7-13 (Part 2). Off–site ground water data for 1994 (radioactivity).

Parameter	Well					
	STN	CARNRW2	CDF1	CON1	GALLO1	GEOCRK
Radioactivity (Bq/L)						
Gross alpha		−0.006 ± 0.014	0.025 ± 0.013	−0.020 ± 0.046	0.038 ± 0.028	0.056 ± 0.043
	1.430 ± 0.40[a]	−0.050 ± 0.068	0.094 ± 0.074	0.027 ± 0.009	0.041 ± 0.061	0.086 ± 0.013
	1.000 ± 0.40	0.096 ± 0.030	0.185 ± 0.059	0.407 ± 0.081	−0.240 ± 0.254	
	0.673 ± 0.020	−0.009 ± 0.022	−0.009 ± 0.027	−0.001 ± 0.057	−2.100 ± 0.630	0.166 ± 0.069
Gross beta		0.136 ± 0.012	0.227 ± 0.012	0.411 ± 0.033	4.050 ± 0.640	0.227 ±0.032
	0.451 ± 0.444	0.291 ± 0.058	0.316 ± 0.060	0.396 ± 0.010	4.100 ± 1.33	0.236 ±0.097
	1.106 ± 0.285	0.327 ± 0.024	0.252 ± 0.034	0.781 ± 0.044	0.066 ± 0.047	
	1.140 ± 0.529	0.300 ± 0.020	0.220 ± 0.021	0.374 ± 0.059	0.094 ± 0.022	0.290 ±0.053
Radioisotopes (Bq/L)						
Tritium	0.477 ± 0.129	0.092 ± 0.089	0.322 ± 0.133	0.202 ± 0.104	0.131 ± 0.131	1.014 ±0.150
		0.236 ± 0.236	0.294 ± 0.124	0.108 ± 0.108	0.091 ± 0.091	2.190 ±0.215
		0.071 ± 0.071	0.944 ± 0.138	0.110 ± 0.094	0.071 ± 0.071	
		0.070 ± 0.070	0.1 ± 0.1	0.105 ± 0.105	0.101 ± 0.101	0.777 ±0.133

Parameter	Well					
		MUL1	MUL2	VIE1	VIE2	W–35A–04
Radioactivity (Bq/L)						
Gross alpha		0.159 ± 0.018	0.090 ± 0.023	0.18 ± 0.69	0.253 ± 0.030	0.216 ± 0.027
Gross beta		0.233 ± 0.012	0.208 ± 0.020	0.481 ± 0.060	0.218 ± 0.022	0.198 ± 0.026
Radioisotopes (Bq/L)						
Tritiumm		0.1 ± 0.1	0.108 ± 0.018	0.081 ± 0.074	0.810 ± 0.178	0.585 ± 0.092

[a] Using mass spectroscopy methods, LLNL has determined that the primary source of the gross alpha activity is natural uranium (0.9 Bq/L or 24 pCi/L).

Numbers shown are means of routine and duplicate samples taken on the sparate dates during 1994.

8. Ground Water Protection Management Program

There is no supplemental data in this chapter.
Please see Volume 1 for details about
Ground Water Protection Management Program.

9. Soil and Sediment Monitoring

Gretchen M. Gallegos

Soil Methods

Prior to 1988, soil samples were collected at sites selected at random from Livermore Valley locations previously sampled for a 1971–1972 study. That earlier study was conducted to determine background concentrations of radionuclides in area soils. In 1988, Livermore Valley surveillance soil sampling locations were chosen to coincide with air sampling locations or to give coverage to areas with contaminants from past incidents or of other special concern. In 1991, five additional soil sampling locations associated with air sampling locations were established. The 1994 Livermore site soil samples were collected from the same locations as those in 1991 to 1993. The 1994 Site 300 soil samples were collected from the same 14 sampling locations as in 1990 to 1993. The use of constant sampling locations from year to year allows more meaningful trending of data.

Sampling locations at areas with known or suspected contaminants were monitored to delimit the extent of the contaminants and to track the contaminants from year to year. For example, six soil sampling locations were located near the Livermore Water Reclamation Plant (LWRP) to monitor soils that contain slightly elevated plutonium levels originating from a 1967 accidental release to the sewer.

Soil sampling is conducted according to written, standardized procedures contained in the *Environmental Monitoring Plan* (Tate et al. 1995). Samples are collected from undisturbed areas near the permanent sampling location marker. These areas generally are level, free of rocks, and are unsheltered by trees or buildings. The sampling technician chooses two 1-meter squares from which to collect the sample and records how far away and in what direction from the permanent marker the sample is collected. Each sample is a composite consisting of 10 subsamples that are collected with a 8.25-centimeter-diameter stainless steel core sampler at the four corners and the center of each square. All subsamples are collected from the top 5 centimeters of soil because surface deposition from the air is the primary pathway for potential contamination.

Quality assurance (QA) samples are submitted with each batch of soil samples. Two identical samples are collected and, at locations chosen for duplicate sampling, adjacent cores are collected from the corners and center of the sampling squares. Separate composites of 10 cores each are made, and the duplicate samples are identified with unique sample identifier codes.

Samples are delivered on the day of collection to LLNL's Radiation Analytical Sciences (RAS) laboratory for analyses. Soil samples are dried, ground, sieved,

and blended. The plutonium content of a sample aliquot is determined by alpha spectroscopy (Hall and Edwards 1994). Other sample aliquots (300 grams) are analyzed for more than 150 radionuclides by gamma spectroscopy, using a high-purity germanium (HPGe) detector (Hall and Edwards 1994). The 10-gram subsamples for beryllium analyses are sent to a contract analytical laboratory and are analyzed by graphite-furnace atomic absorption spectroscopy. Chain-of-custody procedures are followed throughout the sampling, delivery, and analytical processes.

Sediment Methods

Samples of recent sediment are collected annually from drainages at and around the Livermore site after the cessation of spring runoff. For 1994, samples were analyzed for radionuclides and beryllium. The analytical results from five years of sediment sampling for heavy metals and organic compounds did not yield sufficient evidence of contamination to warrant further yearly sampling for these materials (Tate et al. 1995). LLNL staff will continue to consider the need for sediment sampling for heavy metal and organic compounds.

Sediment was sampled from six Livermore-site drainages, but location WPDC could not be sampled because of the heavy flow of water over the sampling location. The sediment sampling locations coincide with storm water runoff sampling locations so it would be possible to compare the sampling results from these two media.

A culvert, bridge, or other permanent marker serves as a reference point for each sampling location. Ten subsamples, 5-centimeters deep, are collected at 1-meter intervals along a transect of the arroyo or drainage channel. The sample collection technicians record how far away and in what direction from the permanent marker the samples are actually collected. As with soils samples, QA samples are submitted with each batch of sediment samples.

Samples are delivered on the same day to LLNL's RAS laboratory for analysis. For samples collected for tritium analyses, RAS uses freeze-drying techniques to recover water from the samples and determines the tritium content of the water by liquid-scintillation counting. The plutonium content of a sample aliquot is determined by alpha spectroscopy. Other sample aliquots are analyzed for more than 150 radionuclides using gamma spectroscopy as described above for soil samples. The radioanalytical methods employed by the RAS laboratory enable detection of concentrations at levels far more sensitive than regulatory limits. Chain-of-custody procedures are followed throughout the sampling, delivery, and analytical processes.

Data

Table 9-1 presents the analytical data for radionuclides and beryllium for soils and sediments samples collected in 1994. The data generally reflect historic data values for these analytes at these locations. A detailed discussion of these results is provided in Volume 1 of this report.

Table 9-1. Radionuclides and beryllium in soils and sediments, 1994.

	Plutonium-239 10^{-3} Bq/dry g	Cobalt-60 [a] 10^{-3} Bq/dry g	Cesium-137 10^{-3} Bq/dry g	Potassium-40 Bq/dry g	Thorium-232[b] μg/dry g
Livermore Valley					
L-ALTA-SO	0.55 ± 0.026	(a)	4.6 ± 0.25	0.581 ± 0.016	8.4 ± 0.32
L-CAFE-SO	0.55 ± 0.026	(a)	3.3 ± 0.25	0.451 ± 0.012	5.7 ± 0.22
L-COW-SO	0.047 ± 0.005	(a)	2.8 ± 0.28	0.529 ± 0.012	7.3 ± 0.16
L-ERCH-SO	0.17 ± 0.010	(a)	3.5 ± 0.16	0.361 ± 0.009	6.3 ± 0.21
L-FCC-SO	0.083 ± 0.007	(a)	3.2 ± 0.25	0.400 ± 0.010	5.7 ± 0.15
L-HOSP-SO	0.070 ± 0.006	(a)	2.5 ± 0.32	0.533 ± 0.018	6.4 ± 0.18
L-MESQ-SO	0.027 ± 0.004	(a)	0.83 ± 0.23	0.492 ± 0.013	7.4 ± 0.19
L-MET-SO	0.093 ± 0.007	(a)	1.7 ± 0.27	0.599 ± 0.035	7.4 ± 0.22
L-NEP-SO	0.084 ± 0.007	(a)	3.1 ± 0.26	0.537 ± 0.014	5.9 ± 0.15
L-PATT-SO	0.019 ± 0.003	(a)	0.89 ± 0.21	0.562 ± 0.022	8.0 ± 0.26
L-RRCH-SO	0.27 ± 0.014	(a)	10 ± 0.39	0.418 ± 0.010	6.1 ± 0.13
L-SALV-SO	0.24 ± 0.014	(a)	2.7 ± 0.27	0.400 ± 0.011	7.5 ± 0.19
L-TANK-SO	0.003 ± 0.001	(a)	<0.09	0.459 ± 0.011	3.9 ± 0.11
L-VIS-SO	0.64 ± 0.028	(a)	6.1 ± 0.21	0.422 ± 0.013	6.5 ± 0.26
L-ZON7-SO	0.22 ± 0.013	(a)	3.9 ± 0.28	0.440 ± 0.013	7.2 ± 0.20
Median	**0.09**		**3.1**	**0.459**	**6.5**
Interquartile Range	**0.20**		**1.6**	**0.115**	**1.4**
Livermore Water Reclamation Plant Soils					
L-WRP1-SO	6.0 ± 0.209	<0.10	4.9 ± 0.37	0.448 ± 0.012	7.7 ± 0.25
L-WRP2-SO	13 ± 0.437	0.38 ± 0.18	5.3 ± 0.28	0.455 ± 0.016	7.2 ± 0.19
L-WRP3-SO	2.9 ± 0.100	<0.07	2.4 ± 0.16	0.426 ± 0.014	6.5 ± 0.30
L-WRP4-SO	0.83 ± 0.032	<0.07	1.1 ± 0.21	0.366 ± 0.012	6.1 ± 0.26
L-WRP5-SO	38 ± 1.291	0.50 ± 0.18	5.9 ± 0.29	0.400 ± 0.012	6.6 ± 0.22
L-WRP6-SO	0.59 ± 0.025	<0.10	0.49 ± 0.27	0.429 ± 0.011	7.1 ± 0.16
Median	**4.4**	**<0.10**	**3.6**	**0.427**	**6.8**
Interquartile Range	**9.6**	**—[g]**	**3.8**	**0.037**	**0.6**
Livermore Sediments[h]					
L-ALPE-SD	0.11 ± 0.008	(a)	1.5 ± 0.29	0.385 ± 0.012	5.5 ± 0.16
L-ASS2-SD	0.003 ± 0.001	(a)	<0.080	0.481 ± 0.014	8.4 ± 0.25
L-ASW-SD	0.04 ± 0.004	(a)	0.65 ± 0.13	0.492 ± 0.013	4.8 ± 0.18
L-CDB1-SD	1.8 ± 0.068	(a)	1.2 ± 0.27	0.488 ± 0.014	7.2 ± 0.27
L-ESB-SD	2.1 ± 0.080	(a)	0.68 ± 0.22	0.418 ± 0.012	5.7 ± 0.16
L-GRNE-SD	0.08 ± 0.006	(a)	1.4 ± 0.18	0.481 ± 0.013	6.1 ± 0.25
Median	**0.10**		**0.93**	**0.481**	**5.9**
Interquartile Range	**1.3**		**0.67**	**0.053**	**1.3**

Table 9-1. Radionuclides and beryllium in soils and sediments, 1994 (continued).

	Uranium-235[c] µg/dry g	Uranium-238[d] µg/dry g	Tritium[e] Bq/L	Beryllium[f] mg/kg
Livermore Valley				
L-ALTA-SO	0.023 ± 0.017	2.7 ± 2.0	—[e]	1.2
L-CAFE-SO	0.028 ± 0.021	<1.3	—[e]	0.47
L-COW-SO	0.024 ± 0.017	<2.8	—[e]	0.45
L-ERCH-SO	0.025 ± 0.018	1.5 ± 0.9	—[e]	0.33
L-FCC-SO	<0.010	<1.3	—[e]	0.58
L-HOSP-SO	<0.016	<0.4	—[e]	0.63
L-MESQ-SO	0.026 ± 0.017	3.6 ± 2.2	—[e]	0.71
L-MET-SO	0.026 ± 0.020	<2.3	—[e]	0.46
L-NEP-SO	<0.010	<2.1	—[e]	0.49
L-PATT-SO	0.028 ± 0.019	2.2 ± 1.8	—[e]	0.78
L-RRCH-SO	0.023 ± 0.017	<1.7	—[e]	0.76
L-SALV-SO	0.031 ± 0.022	3.8 ± 2.4	—[e]	0.5
L-TANK-SO	0.012 ± 0.011	<2.2	—[e]	0.37
L-VIS-SO	0.032 ± 0.020	2.6 ± 1.2	—[e]	0.38
L-ZON7-SO	0.030 ± 0.018	<1.0	—[e]	0.79
Median	**0.025**	**<2.2**		**0.50**
Interquartile Range	**0.009**	**—[g]**		**0.28**
Livermore Water Reclamation Plant Soils				
L-WRP1-SO	0.022 ± 0.019	<1.8 ± 1.8	—[e]	0.69
L-WRP2-SO	0.036 ± 0.018	3.3 ± 1.6	—[e]	0.78
L-WRP3-SO	0.033 ± 0.023	2.4 ± 1.0	—[e]	0.58
L-WRP4-SO	0.020 ± 0.017	2.1 ± 1.6	—[e]	0.49
L-WRP5-SO	0.032 ± 0.014	3.5 ± 2.0	—[e]	0.8
L-WRP6-SO	0.015 ± 0.011	2.9 ± 2.3	—[e]	0.46
Median	**0.027**	**2.7**		**0.64**
Interquartile Range	**0.012**	**1.0**		**0.25**
Livermore Sediments[h]				
L-ALPE-SD	<0.008	<1.0	3.4 ± 1.8	(f)
L-ASS2-SD	0.028 ± 0.016	<2.2	1.8 ± 1.6	(f)
L-ASW-SD	0.017 ± 0.009	3.4 ± 1.7	<1.6	(f)
L-CDB1-SD	<0.019	2.6 ± 2.2	20 ± 2.2	(f)
L-ESB-SD	0.020 ± 0.011	<1.9	14 ± 2.0	(f)
L-GRNE-SD	0.022 ± 0.014	<1.5	2.8 ± 1.6	(f)
Median	**<0.019**	**<2.0**	**3.1**	
Interquartile Range	**—[g]**	**—[g]**	**9.4**	

Table 9-1. Radionuclides and beryllium in soils and sediments, 1994 (continued).

	Plutonium-239 10^{-3} Bq/dry g	Cobalt-60[a] 10^{-3} Bq/dry g	Cesium-137 10^{-3} Bq/dry g	Potassium-40 Bq/dry g	Thorium-232[b] μg/dry g
Site 300 Soils					
3-801E-SO	0.042 ± 0.0005	(a)	1.5 ± 0.26	0.429 ± 0.013	8.8 ± 0.25
3-801N-SO	0.074 ± 0.007	(a)	3.1 ± 0.32	0.518 ± 0.017	12.0 ± 0.29
3-801W-SO	0.061 ± 0.006	(a)	2.3 ± 0.23	0.559 ± 0.020	10.2 ± 0.28
3-812N-SO	0.25 ± 0.013	(a)	9.3 ± 0.62	0.455 ± 0.011	44.2 ± 0.88
3-834W-SO	0.16 ± 0.010	(a)	6.2 ± 0.29	0.500 ± 0.020	10.2 ± 0.45
3-851N-SO	0.068 ± 0.006	(a)	2.7 ± 0.34	0.488 ± 0.016	15.2 ± 0.43
3-856N-SO	0.084 ± 0.007	(a)	3.4 ± 0.23	0.403 ± 0.015	9.5 ± 0.23
3-858S-SO	0.12 ± 0.009	(a)	5.4 ± 0.32	0.555 ± 0.016	9.7 ± 0.35
3-DSW-SO	0.20 ± 0.011	(a)	8.2 ± 0.36	0.496 ± 0.016	8.6 ± 0.28
3-EOBS-SO	0.12 ± 0.010	(a)	4.3 ± 0.27	0.577 ± 0.017	10.1 ± 0.32
3-EVAP-SO	0.094 ± 0.008	(a)	4.1 ± 0.24	0.389 ± 0.016	9.0 ± 0.29
3-GOLF-SO	0.14 ± 0.009	(a)	6.3 ± 0.34	0.551 ± 0.022	8.8 ± 0.33
3-NPS-SO	0.10 ± 0.008	(a)	4.7 ± 0.30	0.662 ± 0.021	8.2 ± 0.28
3-WOBS-SO	0.22 ± 0.012	(a)	8.5 ± 0.46	0.429 ± 0.014	7.2 ± 0.20
Median	**0.11**		**4.5**	**0.498**	**9.6**
Interquartile Range	**0.08**		**3.1**	**0.118**	**1.3**
Analysis of Site 300 812 Area Soils					
3-812N-SO	(i)	(a)	3.9 ± 0.76	0.425 ± 0.014	26 ± 0.8
3-812N-N-SO	(i)	(a)	<6.0	0.466 ± 0.010	41 ± 0.8
3-812N-S-SO	(i)	(a)	5.4 ± 0.39	0.448 ± 0.016	33 ± 1.0
3-812N-E-SO	(i)	(a)	5.2 ± 0.38	0.451 ± 0.014	35 ± 0.9
3-812N-W-SO	(i)	(a)	5.6 ± 0.44	0.470 ± 0.030	32 ± 1.0
Median			**<5.4**		**33**
Interquartile Range			**—[g]**		**3.0**

Table 9-1. Radionuclides and beryllium in soils and sediments, 1994 (concluded).

	Uranium-235[c] µg/dry g	Uranium-238[d] µg/dry g	Tritium[e] Bq/L	Beryllium[f] mg/kg
Site 300 Soils				
3-801E-SO	0.019 ± 0.012	<2.1	—[e]	1.4
3-801N-SO	0.025 ± 0.015	6.2 ± 4.2	—[e]	2.6
3-801W-SO	0.049 ± 0.027	6.5 ± 3.9	—[e]	1.5
3-812N-SO	1.815 ± 0.047	870 ± 17.3	—[e]	42
3-834W-SO	0.023 ± 0.014	<0.9	—[e]	1.3
3-851N-SO	0.036 ± 0.028	3.6 ± 2.6	—[e]	2.1
3-856N-SO	0.026 ± 0.015	<1.6	—[e]	1.6
3-858S-SO	0.041 ± 0.023	3.4 ± 2.4	—[e]	1.4
3-DSW-SO	0.036 ± 0.010	6.7 ± 1.5	—[e]	1.6
3-EOBS-SO	0.027 ± 0.015	2.9 ± 2.8	—[e]	2.1
3-EVAP-SO	0.039 ± 0.012	10.0 ± 1.8	—[e]	1.2
3-GOLF-SO	<0.006	<1.4	—[e]	0.68
3-NPS-SO	0.032 ± 0.021	3.4 ± 2.2	—[e]	0.74
3-WOBS-SO	<0.005	<1.5	—[e]	1.4
Median	**0.029**	**3.4**		**1.5**
Interquartile Range	**0.014**	**6.4**		**0.80**
Analysis of Site 300 812 Area Soils				
3-812N-SO	0.56 ± 0.03	260 ± 7	—[e]	23
3-812N-N-SO	0.89 ± 0.03	420 ± 8	—[e]	11
3-812N-S-SO	1.0 ± 0.04	470 ± 12	—[e]	38
3-812N-E-SO	0.89 ± 0.03	400 ± 7	—[e]	9.3
3-812N-W-SO	0.90 ± 0.03	420 ± 8	—[e]	14
Median	**0.89**	**420**		**14.0**
Interquartile Range	**0.009**	**23**		**12.0**

Note: Radionuclides with 100% error are reported as less than the measured value.

a Cobalt-60 is only detected in LWRP samples.

b Thorium-232 activities in Bq/dry g can be determined by dividing the weight in µg/dry g by 247.3, and pCi/dry g can be determined by dividing by 9.15.

c Uranium-235 activities in Bq/dry g can be determined by dividing the weight in µg/dry g by 12.5, and pCi/dry g can be determined by dividing by 0.463.

d Uranium-238 activities in Bq/dry g can be determined by dividing the weight in µg/dry g by 80.3, and pCi/dry g can be determined by dividing by 2.97.

e Tritium (^3H) analysis is only conducted on sediment samples.

f Beryllium analysis is only conducted on soils samples; the analysis is a chemical, not a radiochemical analysis.

g Interquartile range could not be calculated.

h Location WPDC could not be sampled because water was flowing through the drainage channel.

i Area 812 resamples were not analyzed for plutonium.

10. Vegetation and Foodstuff Monitoring

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Vegetation Sampling Methods

When obtaining vegetation samples, LLNL avoids frequently tilled or disturbed areas and locations near buildings or other obstructions. Areas with unusual wind, precipitation, or irrigation influences also are avoided. Practical considerations also temper the location selections. These include access during inclement weather, personnel safety in vehicle operation, vehicle parking, or sample collection requirements.

The selected areas are unshaded and exhibit native vegetation for much of the year. The routine vegetation sampling locations are designated with permanent location markers. Consistent use of the same general sampling locations allows for more meaningful trending of data and closer monitoring of areas of concern. For example, every year at Site 300, LLNL examines vegetation from areas where tritium is known to be present in the subsurface soil.

In 1994, vegetation samples usually consisted of the green leaves and green stems of annual grasses. Other herbaceous vegetation or even perennial vegetation was sampled if grasses were not available. Approximately 0.5 to 1 kilogram of vegetation was collected for analysis. Standard chain-of-custody procedures were followed (Tate et al. 1995).

Samples are delivered on the day of collection to LLNL's Radiation Analytical Sciences laboratory and are kept frozen prior to processing. Water from the vegetation is collected using freeze-drying techniques (lyophilization), and the tritium content of the water is determined by liquid-scintillation counting.

Approximately 10% of the sites are sampled in duplicate to comply with quality assurance protocols (Garcia and Failor 1993). Duplicate samples are preserved, stored, processed, and analyzed with methods identical to those employed for all other samples.

Wine Sampling Methods

Wine samples were purchased in 750-milliliter to 1-liter bottles. One wine from six of the eight non-Livermore, California, wine growing regions and one wine from four of the thirteen European wine growing regions was purchased and submitted for tritium analyses. The selection of samples from all the wines available within a geographic area was random. Any estate wine from a designated area was considered representative of that area. The most recent vintages available were collected, with an equal mix of red and white wines. Approximately 10% of the total complement of wines were sampled in duplicate

to comply with quality assurance protocols. Because of the importance of the wine sampling network, LLNL sampled and analyzed as many of the available Livermore Valley wines as possible. Twelve Livermore Valley estate wines not previously sampled were purchased and analyzed.

The wine samples were submitted for analysis unopened to prevent airborne tritium contamination. Chain-of-custody procedures were followed when delivering samples and throughout the analytical process. Wines were analyzed for tritium using ^{3}He mass spectrometry in the LLNL Nuclear Chemistry Noble Gas Mass Spectrometry Laboratory (Surano et al. 1991). LLNL used this highly sensitive method for our wine analysis to determine differences in the tritium content of the samples. Had less sensitive methods been used, such as those employed by commercial analytical laboratories, the tritium content of all samples would be near or below detection limits and no differences would be apparent.

Table 10-1. Tritium (in Bq/L) in vegetation, 1994.

	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Median	Interquar-tile range	Dose (μSv/y)
Sampling Locations Near Livermore Site							
AQUE	15 ± 2.2	18 ± 2.3	23 ± 2.3	47 ± 3.0	21	12	0.099
VIS	10 ± 2.0	12 ± 2.2	36 ± 2.6	9.0 ± 2.1	11	8.1	0.053
RAIL	5.4 ± 2.3	5.2 ± 1.9	12 ± 2.2	8.4 ± 1.9	6.9	4.0	0.033
MET	5.9 ± 1.9	5.3 ± 1.9	19 ± 2.2	6.0 ± 1.9	6.0	3.5	0.029
MESQ	<1.8	9.5 ± 2.4	19 ± 2.2	3.1 ± 1.9	6.3	9.0	0.030
GARD[a]			<1.7	19 ± 2.3	<10	—[b]	<0.049
Sampling Locations an Intermediate Distance from Livermore Site							
PATT	<1.7	2.9 ± 1.9	4.0 ± 1.7	<1.7	<2.3	3.1	<0.011
ZON7	3.3 ± 1.8	7.7 ± 2.0	12 ± 2.0	7.6 ± 1.9	7.7	2.3	0.037
I580	2.9 ± 1.8	6.6 ± 2.7	19 ± 2.2	4.8 ± 1.8	5.7	5.4	0.027
TESW	2.1 ± 1.8	<1.8	<1.6	17 ± 2.2	<2.0	5.8	<0.009
Sampling Locations Far from Livermore Site							
FCC	<1.7	<1.8	3.2 ± 1.7	<1.7	<1.7	—[b]	<0.008
DAN	<2.0	<1.7	<1.6	<1.6	<1.7	—[b]	<0.008
PARK	2.6 ± 1.8	2.8 ± 1.9	<1.7	<1.8	<2.2	2.7	<0.011
MOD	<2.1	<2.1	<1.7	<1.7	<1.9	—[b]	<0.009
CAL	<1.7	<2.1	<1.6	<1.7	<1.7	—[b]	<0.008
Sampling Locations at Site 300							
CARN	<2.1	<2.1	<1.7	<1.7	<1.9	—[b]	<0.009
GOLF	<2.0	<2.1	<1.7	<1.7	<1.8	—[b]	<0.009
GEO	<2.1	<2.1	<1.7	<1.7	<1.9	—[b]	<0.009
DSW	340 ± 6.8	<2.2	<1.7	<1.7	<1.9	—[b]	<0.009
801E	<2.1	<2.1	<1.7	<1.7	<1.9	—[b]	<0.009
EVAP[c]	2.5 ± 2.0	57 ± 3.6			30	—[b]	0.144

Note: Maps of sampling locations are provided in Volume 1, Figures 10-1 and 10-2.

[a] New sampling location.

[b] Insufficient data to calculate interquartile range.

[c] During the third and fourth quarter, sample location EVAP was inaccessible due to construction.

Table 10-2. Tritium (in Bq/L) in retail wine, 1994.[a]

Sample	Area of Production		
	Livermore Valley	California	Europe
1	4.32 ± 0.45	0.41 ± 0.13	1.25 ± 0.21
2	3.11 ± 0.68	0.53 ± 0.39	1.41 ± 0.24
3	7.06 ± 0.71	0.54 ± 0.27	1.79 ± 0.43
4	8.02 ± 0.81	0.56 ± 0.11	2.05 ± 0.24
5	3.63 ± 0.42	0.67 ± 0.20	
6	2.72 ± 0.36	0.68 ± 0.49	
7	3.57 ± 0.37		
8	3.94 ± 0.42		
9	5.34 ± 0.73		
10	2.49 ± 0.43		
11	3.28 ± 0.38		
12	2.18 ± 0.26		
Median	3.60	0.55	1.60
Interquartile range	1.21	0.08	0.38
Mean	4.14	0.57	1.63
Standard deviation	1.81	0.1	0.36

Note: radionuclide results are reported $\pm 2\sigma$ in Bq/L. See Chapter 14, Quality Assurance.

[a] Wines from a variety of vintages were purchased and analyzed during 1994. The concentrations shown are not decay-corrected to vintage year.

11. Environmental Radiation Monitoring

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Methods of Gamma Radiation Monitoring

External doses from gamma radiation are monitored at 16 Livermore-site perimeter locations, 48 Livermore Valley locations, and 12 Site 300 perimeter locations. Thermoluminescent dosimeters (TLDs) are prepared for field deployment every quarter. The process involves heat sealing TLDs into a foil sample pouch 8.9 centimeters × 4.5 millimeters thick for protection against light and moisture. Direct gamma radiation doses are measured with reusable TLDs mounted in the field on preexisting structures (such as fences) at approximately one meter above ground to comply with DOE Order 5400.1. The TLDs are installed with an LLNL identification label on each pouch. Additionally, duplicate, trip blanks, and transit control TLDs are prepared as well as calibration control TLDs. The TLDs that are in the field are replaced with those that are newly prepared. These are placed in a reading magazine by location and taken to the Dosimetry Laboratory for processing. Each quarter the TLDs are exchanged, data are read and analyzed, and the doses are subsequently calculated in millirem. A chain-of-custody form accompanies the collection and field deployment of the TLDs so that each responsible party, from collection to archiving, signs the form acknowledging that the task of assigned duties have been completed.

When a TLD is damaged or missing, its annual dose value is calculated from its mean quarterly dose, as determined from available data, multiplied by four. Data from TLDs found on the ground open or damaged are not used to calculate the quarterly or annually totals. These TLDs tend to trap moisture, and the readings can yield erroneous data.

LLNL uses the Panasonic Model UD-814AS1 TLD, which contains three components of thallium-activated calcium sulfate ($CaSO_4$) and one component of lithium borate ($Li_2B_4O_7$). Energy is stored when these compounds are exposed to gamma radiation. Impurities in the TLD crystal form low-temperature trapping sites for electrons that have been excited to higher energy states by gamma radiation at normal ambient temperatures. When the TLDs are heated in the analytical laboratory, the electrons return to lower energy states, and light is emitted. The light intensity is proportional to the original absorbed energy and is measured with a photomultiplier tube. After the TLD is read, it is heated again and reread. This second reading should be near zero, indicating that all the stored energy in the traps has been released and measured. This process, called annealing, also verifies that the TLD is again ready for field deployment.

Direct gamma radiation exposures are measured in milliroentgens (mR). The measured exposure is converted to dose by calibrating the dosimeters against sources that deliver a known absorbed dose and then applying a quality factor for a beta/gamma radiation field. The resultant dose equivalents, in millisieverts (mSv) or millirem (mrem), are compared to the DOE Order 5400.5 radiation protection standards. The doses at the site boundaries are also compared to background measurements to determine the contribution, if any, from LLNL operations.

To ensure accuracy in TLD measurements, some TLDs are irradiated each quarter to specific exposures for calibration purposes, and others are irradiated to specific exposures to serve as quality control accuracy checks. Duplicate TLDs are located in the field at several locations each quarter to assess TLD measurement precision.

Tables

Presented below are data tables for the 1994 gamma radiation monitoring network. **Table 11-1** presents the Livermore-site perimeter data, **Table 11-2** presents the Livermore Valley data, **Table 11-3** presents the Site 300 perimeter, data, and **Table 11-4** presents Tracy and Site 300 off-site data. Summary data are discussed in detail in Volume 1 of this report.

Table 11-1. TLD environmental radiation measurements (in mSv), Livermore-site perimeter, 1994.

Location	Jan–Mar	Apr–Jun	Jul–Sep	Oct–Dec	Total
1	0.191	0.197	0.195	0.197	0.780
2	0.169	0.174	0.173	0.185	0.701
3	0.186	0.199	0.196	0.206	0.787
4	0.200	0.205	0.198	0.201	0.804
5	0.192	0.197	0.193	0.208	0.790
6	0.192	0.193	0.198	0.204	0.787
7	0.186	0.203	0.188	0.206	0.783
10	0.175	0.179	0.173	0.192	0.719
11	0.151	0.149	0.157	0.171	0.628
12	0.154	0.164	0.158	0.174	0.650
13	0.168	0.172	0.172	0.189	0.701
42	0.180	0.243	0.176	0.191	0.790
47	0.168	0.173	0.183	0.187	0.711
50	0.167	0.176	0.175	0.182	0.700
52	0.170	0.177	0.171	0.188	0.706
56	0.174	0.176	0.183	0.190	0.723
		mSv			
Median	**0.175**	**0.178**	**0.180**	**0.191**	**0.721**
Interquartile range	**0.019**	**0.025**	**0.021**	**0.015**	**0.086**
		mrem			
Median	**17.5**	**17.8**	**18.0**	**19.1**	**72.1**
Interquartile range	**1.9**	**2.5**	**2.1**	**1.5**	**8.6**

Table 11-2. TLD environmental radiation measurements (in mSv), Livermore Valley, 1994.

Location	Jan–Mar	Apr–Jun	Jul–Sep	Oct–Dec	Total
14	0.172	0.183	0.171	0.193	0.719
15	0.171	0.172	0.178	0.186	0.707
16	0.166	0.175	—[a]	0.187	0.704[b]
17	0.175	0.183	0.176	0.201	0.735
18	0.142	0.141	0.137	0.169	0.589
19	0.161	0.170	0.164	0.170	0.665
20	0.169	0.169	0.166	0.190	0.694
21	0.157	0.167	0.164	—[a]	0.694
22	0.181	0.196	0.184	0.210	0.748
23	0.180	0.188	0.187	0.198	0.753
24	0.175	0.191	0.187	0.195	0.748
27	0.181	0.208	0.204	0.214	0.807
28	0.189	0.212	0.201	0.211	0.813
29	0.183	0.192	0.198	0.211	0.784
30	—[a]	0.191	0.204	0.196	0.788[b]
31	—[a]	0.186	0.184	0.199	0.759[b]
32	0.174	0.179	0.186	0.201	0.740
33	—[a]	0.188	0.195	0.204	0.783[b]
34	0.189	0.207	0.193	0.212	0.801
35	0.184	0.197	0.194	0.193	0.768
36	0.181	0.188	0.194	0.195	0.758[b]
37	—[a]	0.192	0.193	0.200	0.585
38	0.183	—[a]	—[a]	0.209	0.784[b]
41	0.176	0.183	0.175	0.192	0.726
43	0.168	0.187	0.185	0.196	0.736
44	0.169	0.209	0.195	0.215	0.788
45	0.167	0.172	0.168	0.190	0.697
46	0.171	0.179	0.176	0.193	0.719
51	0.173	0.192	0.184	0.201	0.750
55	0.161	0.173	0.164	0.191	0.689
57	0.176	0.188	0.183	0.201	0.748
58	0.170	0.177	0.165	0.188	0.700
59	0.163	0.177	0.165	0.172	0.677
60	0.171	0.189	0.186	0.198	0.744
61	0.158	0.164	0.157	0.164	0.643
62	0.156	0.167	0.168	0.181	0.672
63	0.169	0.213	0.175	0.189	0.746

Table 11-2. TLD environmental radiation measurements (in mSv), Livermore Valley, 1994.

Location	Jan–Mar	Apr–Jun	Jul–Sep	Oct–Dec	Total
66	0.174	0.186	0.183	0.187	0.730
67	0.160	0.184	0.172	0.183	0.699
68	0.171	0.181	0.178	0.200	0.730
69	0.167	0.179	0.174	0.195	0.715
70	0.169	0.182	0.180	0.190	0.721
71	_[a]	_[a]	0.196	0.211	0.814[b]
72	0.194	0.214	0.201	0.224	0.833
73	0.171	0.183	0.186	0.206	0.745
74	0.166	0.165	0.158	_[a]	0.652[b]
75	0.143	0.155	0.146	0.172	0.616
76	0.149	0.148	0.152	0.170	0.619
77	0.165	0.165	0.169	0.175	0.674
		mSv			
Median	**0.171**	**0.183**	**0.180**	**0.194**	**0.735**
Interquartile range	**0.010**	**0.019**	**0.022**	**0.014**	**0.062**
		mrem			
Median	**17.1**	**18.3**	**18.0**	**19.4**	**73.5**
Interquartile range	**1.0**	**1.9**	**2.2**	**1.4**	**6.2**

a No data available for these samples.

b When a TLD is missing, the annual dose is calculated as four times the mean quarterly dose, as determined from available data.

Table 11-3. TLD environmental radiation measurements (in mSv), Site 300 perimeter location, 1994.

Location	Jan–Mar	Apr–Jun	Jul–Sep	Oct–Dec	Total
78	0.168	0.187	0.174	0.193	0.722
81	0.211	0.256	0.239	0.275	0.981
82	0.186	0.225	0.201	0.235	0.847
83	0.209	0.253	0.232	—[a]	0.925[b]
84	—[a]	—[a]	0.215	0.255	0.940[b]
85	0.191	—[a]	0.211	0.253	0.873[b]
86	—[a]	0.214	0.217	—[a]	0.862[b]
87	0.234	0.261	0.241	0.257	0.987
88	0.192	0.210	0.201	0.227	0.830
89	0.202	0.226	0.220	0.231	0.879
90	0.203	0.230	0.229	0.238	0.900
91	0.195	—[a]	0.216	0.233	0.859
mSv					
Median	**0.199**	**0.226**	**0.217**	**0.237**	**0.876**
Interquartile range	**0.016**	**0.039**	**0.021**	**0.023**	**0.073**
mrem					
Median	**19.9**	**22.6**	**21.7**	**23.7**	**87.6**
Interquartile range	**1.6**	**3.9**	**2.1**	**2.3**	**7.3**

a No data available for these samples.

b When a TLD is missing, the annual dose is calculated as four times the mean quarterly dose, as determined from available data.

Table 11-4. TLD environmental radiation measurements (in mSv), Site 300 vicinity, 1994.

Location	Jan–Mar	Apr–Jun	Jul–Sep	Oct–Dec	Total
Tracy					
92	0.185	0.196	0.188	0.208	0.777
93	0.157	0.167	0.16	0.181	0.665
		mSv			
Median	**0.171**	**0.182**	**0.174**	**0.195**	**0.721**
Interquartile range	**0.014**	**0.015**	**0.014**	**0.014**	**0.056**
		mrem			
Median	**17.1**	**18.2**	**17.4**	**19.5**	**72.1**
Interquartile range	**1.4**	**1.5**	**1.4**	**1.4**	**5.6**
Off-site					
94	0.256	0.288	0.277	0.280	1.101
95	0.211	0.243	0.248	0.243	0.945
96	0.219	0.252	0.250	0.242	0.963
97	0.187	—[a]	—[a]	—[a]	0.748[b]
98	0.195	0.201	—[a]	—[a]	0.792[b]
99	0.205	0.200	—[a]	—[a]	0.810[b]
		mSv			
Median	**0.208**	**0.243**	**0.250**	**0.243**	**0.878**
Interquartile range	**0.020**	**0.051**	**0.015**	**0.019**	**0.162**
		mrem			
Median	**20.8**	**24.3**	**25.0**	**24.3**	**87.8**
Interquartile range	**2.0**	**5.1**	**1.5**	**1.9**	**16.2**

a No data available for these samples.

b When a TLD is missing, the annual dose is calculated as four times the mean quarterly dose, as determined from available data.

There is no supplemental data in this chapter.
Please see Volume 1 for details about
Radiological Dose Assessment.

13. Compliance Self-Monitoring

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Introduction

This chapter provides detailed data on monitoring of the Drainage Retention Basin (DRB) at the Livermore site and the cooling towers at Site 300. This data supplements material provided in Chapter 13 of Volume 1.

Drainage Retention Basin

Figure 13-1 shows the sampling locations at the DRB used to monitor compliance with the waste discharge permit. The DRB was lined as part of the Livermore site remedial activities and has a capacity of approximately 53 million liters (43 acre-feet). **Figure 13-2** shows the sampling locations used to determine the maintenance of water quality objectives. Sampling to determine whether water quality maintenance objectives are met is conducted at several points within the DRB. Sampling for dissolved oxygen and temperature occurs at eight locations identified in **Figure 13-2**.

During the 1992–1993 wet season, sampling was also conducted at these monitoring locations for all other monitoring parameters. However, because there was evidence of limited variability between sampling locations for all parameters except dissolved oxygen and temperature, all sampling locations except CDBE, located at the middle depth of the DRB, were eliminated March 31, 1993.

Data

Lead was seen above acceptable management levels only once, in third-quarter monitoring results during the semiannual sample collection. However, nickel, first detected in December 1993 in discharge samples, has persisted throughout 1994. The source of these elevated metals is unknown. The detection data for locations CDBX, CDBE, and CDBA through CDBL are presented in **Tables 13-1**, **13-2**, and **13-3** (see Tables 13-9, 13-10, and 13-11 in Volume 1 for a summary of samples where parameters were exceeded.

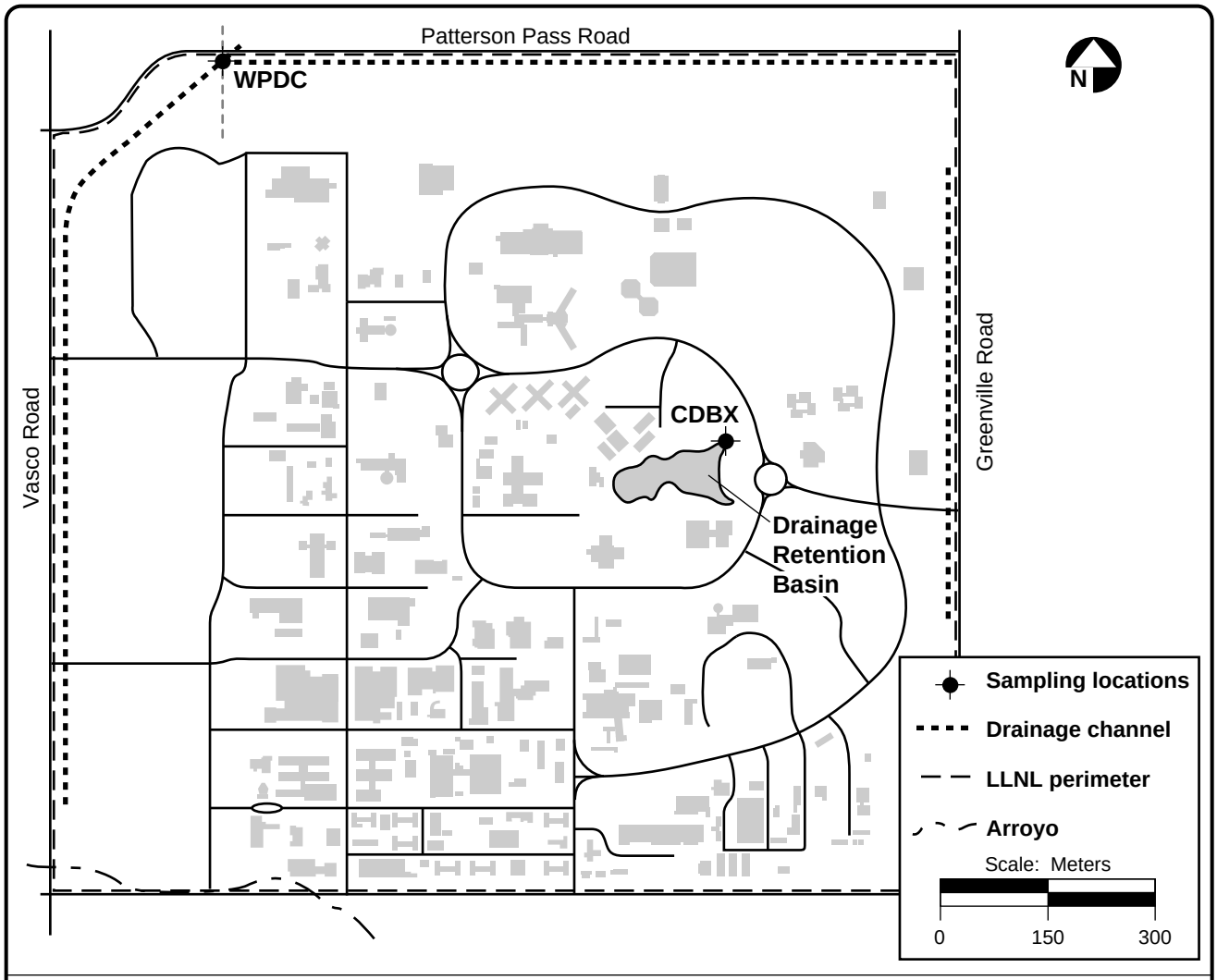

Figure 13-1. Sampling locations to monitor compliance with waste discharge permit.

Cooling Towers

LLNL gathers compliance samples and tests cooling tower discharges for operational needs. LLNL provides this information to the Central Valley Regional Water Quality Control Board (RWQCB) in quarterly reports. However, only results obtained by EPA-approved methods are used to determine compliance with permit limitations.

Self-monitoring data for cooling towers presented in this report are split into two sets of tables:

1. **Tables 13-4a, b,** and **c** present the data collected January through May before the permit was renewed (WDR Order No. 82-105).

2. **Tables 13-5a, b,** and **c** present data collected from June through December under the revised Monitoring Program (WDR Order No. 94-131).

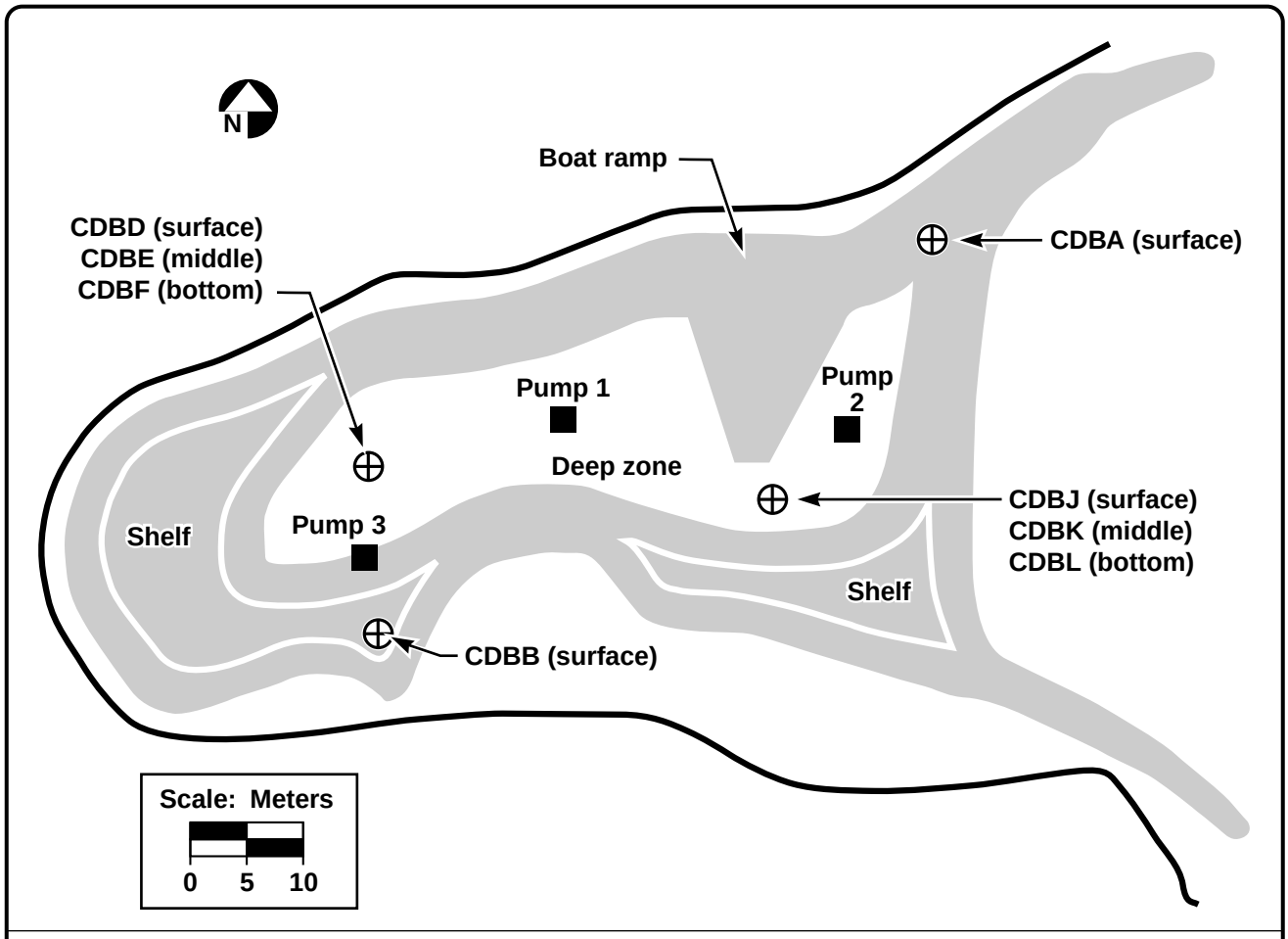

Figure 13-2. Sampling locations within Drainage Retention Basin to determine maintenance of water quality objectives.

Data

The new permit established daily maximum and monthly average total dissolved solids (TDS) limitations for the three towers continuing to regularly discharge to surface water drainage courses. Separate limits were established for the other 14 towers for the temporary periods of discharge to surface water drainage courses. Regular discharges from Buildings 801, 836A, and 865 cannot exceed a monthly average of 2,000 mg/L nor a maximum daily limitation of 2,400 mg/L. TDS concentrations for the other 14 towers during periods of surface water discharge cannot exceed a monthly average of 2,000 mg/L nor a daily maximum of 5,000 mg/L (**Tables 13-5a, b,** and **c**).

Table 13-1. CDBX data summary.

Parameter	Units	Minimum	Maximum	Median	Interquartile Range	Number of Samples
Metals						
Antimony	mg/L	0.0055	<0.06	0.0055	0.0275	3
Arsenic	mg/L	0.0035	0.0046	0.0038	0.00055	3
Beryllium	mg/L	<0.0005	<0.0005	<0.0005	—[a]	3
Boron	mg/L	0.11	0.14	0.12	0.015	3
Cadmium	mg/L	<0.0005	<0.0005	<0.0005	—[a]	3
Chromium	mg/L	0.0061	<0.01	0.01	0.00195	3
Copper	mg/L	0.0067	<0.01	0.0097	0.00165	3
Lead	mg/L	<0.002	0.0045	0.002	—[a]	3
Mercury	mg/L	<0.0002	<0.0002	<0.0002	—[a]	3
Nickel	mg/L	0.0095	0.029	0.01	0.00975	3
Selenium	mg/L	<0.002	<0.002	<0.002	—[a]	3
Silver	mg/L	<0.0005	<0.0005	<0.0005	—[a]	3
Thallium	mg/L	<0.001	<0.005	<0.005	0.002	3
Zinc	mg/L	0.029	0.034	0.0315	0.0025	2
Hexavalent chromium	mg/L	<0.01	<0.01	<0.01	—[a]	2
Toxicity						
Aquatic bioassay, survival	Percent	90				1
Organics						
EPA 610						
Acenaphthene	µg/L	<0.2	<0.2	<0.2	—[a]	2
Acenaphthylene	µg/L	<0.2	<0.2	<0.2	—[a]	2
Anthracene	µg/L	<0.1	<0.1	<0.1	—[a]	2
Benzo(a)anthracene	µg/L	<0.05	<0.05	<0.05	—[a]	2
Benzo(a)pyrene	µg/L	<0.07	<0.07	<0.07	—[a]	2
Benzo(b)fluoranthene	µg/L	<0.07	<0.07	<0.07	—[a]	2
Benzo(g,h,i)perylene	µg/L	<0.06	<0.06	<0.06	—[a]	2
Benzo(k)fluoranthene	µg/L	<0.02	<0.02	<0.02	—[a]	2
Chrysene	µg/L	<0.08	<0.08	<0.08	—[a]	2
Dibenzo(a,h)anthracene	µg/L	<0.08	<0.08	<0.08	—[a]	2
Fluoranthene	µg/L	<0.2	<0.2	<0.2	—[a]	2
Fluorene	µg/L	<0.09	<0.09	<0.09	—[a]	2
Indeno(1,2,3-c,d)pyrene	µg/L	<0.1	<0.1	<0.1	—[a]	2
Naphthalene	µg/L	<0.5	<0.5	<0.5	—[a]	2
Phenanthrene	µg/L	<0.1	<0.1	<0.1	—[a]	2
Pyrene	µg/L	<0.1	<0.1	<0.1	—[a]	2

Table 13-1. CDBX data summary.

Parameter	Units	Minimum	Maximum	Median	Interquartile Range	Number of Samples
EPA 504						
Ethylene dibromide	µg/L	<0.01	<0.1	<0.02	0.045	3
EPA 601						
1,1,1-Trichloroethane	µg/L	<0.5	<0.5	<0.5	—[a]	3
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	—[a]	3
1,1,2-Trichloroethane	µg/L	<0.5	<0.5	<0.5	—[a]	3
1,1-Dichloroethane	µg/L	<0.5	<0.5	<0.5	—[a]	3
1,1-Dichloroethene	µg/L	<0.5	<0.5	<0.5	—[a]	3
1,2-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	—[a]	3
1,2-Dichloroethane	µg/L	<0.5	<0.5	<0.5	—[a]	3
1,2-Dichloroethene (total)	µg/L	<0.5	<0.5	<0.5	—[a]	3
1,2-Dichloropropane	µg/L	<0.5	<0.5	<0.5	—[a]	3
1,3-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	—[a]	3
1,4-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	—[a]	3
2-Chloroethylvinylether	µg/L	<0.5	<0.5	<0.5	—[a]	3
Bromodichloromethane	µg/L	<0.5	<0.5	<0.5	—[a]	3
Bromoform	µg/L	<0.5	<0.5	<0.5	—[a]	3
Bromomethane	µg/L	<0.5	<0.5	<0.5	—[a]	3
Carbon tetrachloride	µg/L	<0.5	<0.5	<0.5	—[a]	3
Chlorobenzene	µg/L	<0.5	<0.5	<0.5	—[a]	3
Chloroethane	µg/L	<0.5	<0.5	<0.5	—[a]	3
Chloroform	µg/L	<0.5	<0.5	<0.5	—[a]	3
Chloromethane	µg/L	<0.5	<0.5	<0.5	—[a]	3
cis-1,3-Dichloropropene	µg/L	<0.5	<0.5	<0.5	—[a]	3
Dibromochloromethane	µg/L	<0.5	<0.5	<0.5	—[a]	3
Dichlorodifluoromethane	µg/L	<0.5	<0.5	<0.5	—[a]	3
Freon-113	µg/L	<0.5	<0.5	<0.5	—[a]	3
Methylene chloride	µg/L	<0.5	<0.5	<0.5	—[a]	3
Tetrachloroethene	µg/L	<0.5	<0.5	<0.5	—[a]	3
trans-1,3-Dichloropropene	µg/L	<0.5	<0.5	<0.5	—[a]	3
Trichloroethene	µg/L	<0.5	<0.5	<0.5	—[a]	3
Trichlorofluoromethane	µg/L	<0.5	<0.5	<0.5	—[a]	3
Vinyl chloride	µg/L	<0.5	<0.5	<0.5	—[a]	3
EPA 602						
1,2-Dichlorobenzene	µg/L	<0.3				1
1,3-Dichlorobenzene	µg/L	<0.3				1
1,4-Dichlorobenzene	µg/L	<0.3				1

Table 13-1. CDBX data summary.

Parameter	Units	Minimum	Maximum	Median	Interquartile Range	Number of Samples
EPA 602 (continued)						
Benzene	µg/L	<0.3				1
Chlorobenzene	µg/L	<0.3				1
Ethylbenzene	µg/L	<0.3				1
Toluene	µg/L	<0.3				1
Total xylene isomers	µg/L	<0.6				1
EPA 625						
1,2,4-Trichlorobenzene	µg/L	<10	<10	<10	—[a]	3
1,2-Dichlorobenzene	µg/L	<10	<10	<10	—[a]	3
1,3-Dichlorobenzene	µg/L	<10	<10	<10	—[a]	3
1,4-Dichlorobenzene	µg/L	<10	<10	<10	—[a]	3
2,4,5-Trichlorophenol	µg/L	<10	<10	<10	—[a]	3
2,4,6-Trichlorophenol	µg/L	<10	<10	<10	—[a]	3
2,4-Dichlorophenol	µg/L	<10	<10	<10	—[a]	3
2,4-Dimethylphenol	µg/L	<10	<10	<10	—[a]	3
2,4-Dinitrophenol	µg/L	<50	<50	<50	—[a]	3
2,4-Dinitrotoluene	µg/L	<10	<10	<10	—[a]	3
2,6-Dinitrotoluene	µg/L	<10	<10	<10	—[a]	3
2-Chloronaphthalene	µg/L	<10	<10	<10	—[a]	3
2-Chlorophenol	µg/L	<10	<10	<10	—[a]	3
2-Methyl Phenol	µg/L	<10	<10	<10	—[a]	3
2-Methyl-4,6-dinitrophenol	µg/L	<10	<10	<10	—[a]	3
2-Methylnaphthalene	µg/L	<10	<10	<10	—[a]	3
2-Nitroaniline	µg/L	<50	<50	<50	—[a]	3
2-Nitrophenol	µg/L	<10	<10	<10	—[a]	3
3,3'-Dichlorobenzidine	µg/L	<20	<20	<20	—[a]	3
3-Nitroaniline	µg/L	<50	<50	<50	—[a]	3
4-Bromophenylphenylether	µg/L	<10	<10	<10	—[a]	3
4-Chloro-3-methylphenol	µg/L	<20	<20	<20	—[a]	3
4-Chloroaniline	µg/L	<20	<20	<20	—[a]	3
4-Chlorophenylphenylether	µg/L	<10	<10	<10	—[a]	3
4-Nitroaniline	µg/L	<50	<50	<50	—[a]	3
4-Nitrophenol	µg/L	<50	<50	<50	—[a]	3
Acenaphthene	µg/L	<10	<10	<10	—[a]	3
Acenaphthylene	µg/L	<10	<10	<10	—[a]	3
Anthracene	µg/L	<10	<10	<10	—[a]	3
Benzo(a)anthracene	µg/L	<10	<10	<10	—[a]	3

Table 13-1. CDBX data summary.

Parameter	Units	Minimum	Maximum	Median	Interquartile Range	Number of Samples
EPA 625 (continued)						
Benzo(a)pyrene	µg/L	<10	<10	<10	—[a]	3
Benzo(b)fluoranthene	µg/L	<10	<10	<10	—[a]	3
Benzo(g,h,i)perylene	µg/L	<10	<10	<10	—[a]	3
Benzo(k)fluoranthene	µg/L	<10	<10	<10	—[a]	3
Benzoic acid	µg/L	<50	<50	<50	—[a]	3
Benzyl alcohol	µg/L	<20	<20	<20	—[a]	3
Bis(2-chloroethoxy)methane	µg/L	<10	<10	<10	—[a]	3
Bis(2-chloroethyl)ether	µg/L	<10	<10	<10	—[a]	3
Bis(2-chloroisopropyl)ether	µg/L	<10	<10	<10	—[a]	3
Bis(2-ethylhexyl)phthalate	µg/L	<10	<10	<10	—[a]	3
Butylbenzylphthalate	µg/L	<10	<10	<10	—[a]	3
Chrysene	µg/L	<10	<10	<10	—[a]	3
Di-n-butylphthalate	µg/L	<10	<10	<10	—[a]	3
Di-n-octylphthalate	µg/L	<10	<10	<10	—[a]	3
Dibenzo(a,h)anthracene	µg/L	<10	<10	<10	—[a]	3
Dibenzofuran	µg/L	<10	<10	<10	—[a]	3
Diethylphthalate	µg/L	<10	<10	<10	—[a]	3
Dimethylphthalate	µg/L	<10	<10	<10	—[a]	3
Fluoranthene	µg/L	<10	<10	<10	—[a]	3
Fluorene	µg/L	<10	<10	<10	—[a]	3
Hexachlorobenzene	µg/L	<10	<10	<10	—[a]	3
Hexachlorobutadiene	µg/L	<10	<10	<10	—[a]	3
Hexachlorocyclopentadiene	µg/L	<10	<10	<10	—[a]	3
Hexachloroethane	µg/L	<10	<10	<10	—[a]	3
Indeno(1,2,3-c,d)pyrene	µg/L	<10	<10	<10	—[a]	3
Isophorone	µg/L	<10	<10	<10	—[a]	3
m- and p-Cresol	µg/L	<10	<10	<10	—[a]	3
N-Nitrosodi-n-propylamine	µg/L	<10	<10	<10	—[a]	3
N-Nitrosodiphenylamine	µg/L	<10	<10	<10	—[a]	3
Naphthalene	µg/L	<10	<10	<10	—[a]	3
Nitrobenzene	µg/L	<10	<10	<10	—[a]	3
Pentachlorophenol	µg/L	<50	<50	<50	—[a]	3
Phenanthrene	µg/L	<10	<10	<10	—[a]	3
Phenol	µg/L	<10	<10	<10	—[a]	3
Pyrene	µg/L	<10	<10	<10	—[a]	3

Table 13-1. CDBX data summary.

Parameter	Units	Minimum	Maximum	Median	Interquartile Range	Number of Samples
General Minerals						
Aluminum	mg/L	<0.2	<0.2	<0.2	—[a]	3
Bicarbonate alk (as $CaCO_3$)	mg/L	70	74	71	2	3
Calcium	mg/L	21	23	21	—[a]	3
Carbonate alk (as $CaCO_3$)	mg/L	<1	<1	<1	—[a]	3
Chloride	mg/L	7.8	14	8.7	3.1	3
Copper	mg/L	<0.05	<0.05	<0.05	—[a]	3
Fluoride	mg/L	0.089	0.13	0.12	0.0205	3
Hydroxide alk (as $CaCO_3$)	mg/L	<1	<1	<1	—[a]	3
Iron	mg/L	<0.1	<0.1	<0.1	—[a]	3
Magnesium	mg/L	5.4	6.2	5.6	0.4	3
Manganese	mg/L	<0.03	<0.03	<0.03	—[a]	3
Nickel	mg/L	<0.1	<0.1	<0.1	—[a]	3
Nitrate (as N)	mg/L	<0.5	0.59	<0.5	—[a]	3
pH	Units	7.3	8.3	7.7	0.5	3
Potassium	mg/L	3.6	4.1	3.6	—[a]	3
Sodium	mg/L	8.7	11	11	1.15	3
Specific conductance	µmho/cm	180	190	180	—[a]	3
Sulfate	mg/L	4.8	18	6.3	6.6	3
Surfactant	mg/L	<0.5	<0.5	<0.5	—[a]	3
Total alkalinity (as $CaCO_3$)	mg/L	70	74	71	2	3
Total dissolved solids (TDS)	mg/L	110	120	110	—[a]	3
Total hardness (as $CaCO_3$)	mg/L	75	83	75	—[a]	3
Zinc	mg/L	<0.05	<0.05	<0.05	—[a]	3
Total suspended solids (TSS)	mg/L	4	29	20	12.5	3
Ortho-phosphate	mg/L	<0.05	<0.05	<0.05	—[a]	2
Total phosphorus (as P)	mg/L	<0.05	<0.05	<0.05	—[a]	2
Oil and grease	mg/L	<5	<5	<5	—[a]	3
Total organic carbon (TOC)	mg/L	6.6	8	7.4	0.7	3
Chemical oxygen demand	mg/L	21	34	27.5	6.5	2
Radiological						
Gross alpha	pCi/L	0.81	0.95	0.92	0.07	3
Gross beta	pCi/L	2.99	8.75	3.68	2.88	3
Tritium	pCi/L	444	662	542	109	3
Petroleum Product						
Diesel fuel	µg/L	<50	<50	<50	—[a]	2
Gasoline fingerprint	µg/L	<50	<50	<50	—[a]	2

[a] Not calculated for nondetections or when less than limit of sensitivity.

Table 13-2. Data summary of maintenance monitoring at sampling location CDBE.

Parameter	Units	Minimum	Maximum	Median	Interquartile Range	Number of Samples
Field Measurements						
Dissolved oxygen	mg/L	6	10	8	2	37
Temperature	degrees C	8	25	19	8	38
Turbidity	meters	0.28	3.66	0.61	1.397	15
Chlorophyll a	µg/L	<0.5	36	12	20.2	11
General Minerals						
Aluminum	mg/L	<0.2	<0.2	<0.2	—[a]	11
Bicarbonate alk (as $CaCO_3$)	mg/L	62	230	76	16.5	11
Calcium	mg/L	18	25	20	3	11
Carbonate alk (as $CaCO_3$)	mg/L	1	1	1	—[a]	11
Chloride	mg/L	5.2	27	6.7	2.05	11
Copper	mg/L	0.05	0.05	0.05	—[a]	11
Fluoride	mg/L	0.087	0.13	0.1	0.0135	11
Hydroxide alk (as $CaCO_3$)	mg/L	<1	<1	<1	—[a]	11
Iron	mg/L	<0.1	<0.1	<0.1	—[a]	11
Magnesium	mg/L	4.7	6.6	5.5	0.8	11
Manganese	mg/L	<0.03	<0.03	<0.03	—[a]	11
Nickel	mg/L	<0.1	<0.1	<0.1	—[a]	11
pH	Units	6.5	9	7.8	0.75	11
Potassium	mg/L	2.8	4.5	3.7	0.5	11
Sodium	mg/L	7.8	11	9.1	1.45	11
Specific conductance	umhos/cm	130	210	150	45	11
Sulfate	mg/L	4	19	5.6	1.55	11
Surfactant	mg/L	<0.5	<0.5	<0.5	—[a]	11
Total alkalinity (as $CaCO_3$)	mg/L	62	230	76	16.5	11
Total dissolved solids (TDS)	mg/L	63	160	110	26.5	11
Total hardness (as $CaCO_3$)	mg/L	64	87	74	11.5	11
Zinc	mg/L	<0.05	<0.05	<0.05	—[a]	11
Total suspended solids (TSS)	mg/L	1	26	9	9	9
Nutrients						
Ammonia nitrogen (as N)	µg/L	<0.1	<0.5	<0.15	0.0925	10
Nitrate (as N)	mg/L	<0.5	<5	<0.5	—[a]	11
Nitrite (as N)	mg/L	<0.1	<5	<0.5	—[a]	10
Ortho-phosphate	mg/L	<0.05	<0.05	<0.05	—[a]	8
Total Kjeldahl nitrogen	mg/L	<0.5	1.2	0.6	0.225	11
Total phosphorus (as P)	mg/L	<0.05	0.073	<0.05	0.0095	7
Oil and Grease	mg/L	<5	<5	<5	—[a]	4

Table 13-2. Data summary of maintenance monitoring at sampling location CDBE.

Parameter	Units	Minimum	Maximum	Median	Interquartile Range	Number of Samples
Chemical Oxygen Demand	mg/L	18	110	26	26	4
Biological						
Fecal coliform	MPN/100mL	2	4	2	1	4
Total coliform	MPN/100mL	8	500	158.5	335.25	4
Metals						
Antimony	mg/L	<0.005	<0.06	<0.06	0.0275	3
Arsenic	mg/L	0.0034	0.0043	0.0037	0.00045	3
Beryllium	mg/L	<0.0005	<0.0005	<0.0005	—[a]	3
Boron	mg/L	<0.1	<0.1	<0.1	—[a]	2
Cadmium	mg/L	<0.0005	<0.0005	<0.0005	—[a]	3
Chromium (total)	mg/L	<0.01	<0.01	<0.01	—[a]	3
Copper	mg/L	0.0079	0.012	<0.01	0.00205	3
Iron	mg/L	1.2	1.6	1.4	0.2	2
Lead	mg/L	<0.002	0.0027	<0.002	—[a]	3
Manganese	mg/L	0.034	0.057	0.0455	0.0115	2
Mercury	mg/L	<0.0002	<0.0002	<0.0002	—[a]	3
Nickel	mg/L	0.008	0.012	0.01	0.002	2
Selenium	mg/L	<0.002	0.003	<0.002	—[a]	3
Silver	mg/L	<0.0005	<0.0005	<0.0005	—[a]	3
Thallium	mg/L	<0.005	<0.005	<0.005	—[a]	3
Zinc	mg/L	<0.02	0.042	0.04	0.011	3
Hexavalent chromium	mg/L	<0.01	<0.01	<0.01	—[a]	2
Organics						
EPA 504						
Ethylene dibromide	µg/L	<0.01	<0.1	<0.05	0.05	2
EPA 601/602						
1,1,1-Trichloroethane	µg/L	<0.5	<0.5	<0.5	—[a]	2
1,1,2,2-Tetrachloroethane	µg/L	<0.5	<0.5	<0.5	—[a]	2
1,1,2-Trichloroethane	µg/L	<0.5	<0.5	<0.5	—[a]	2
1,1-Dichloroethane	µg/L	<0.5	<0.5	<0.5	—[a]	2
1,1-Dichloroethene	µg/L	<0.5	<0.5	<0.5	—[a]	2
1,2-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	—[a]	2
1,2-Dichloroethane	µg/L	<0.5	<0.5	<0.5	—[a]	2
1,2-Dichloroethene (total)	µg/L	<0.5	<0.5	<0.5	—[a]	2
1,2-Dichloropropane	µg/L	<0.5	<0.5	<0.5	—[a]	2
1,3-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	—[a]	2
1,4-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	—[a]	2

Table 13-2. Data summary of maintenance monitoring at sampling location CDBE.

Parameter	Units	Minimum	Maximum	Median	Interquartile Range	Number of Samples
EPA 601/602 (continued)						
2-Chloroethylvinylether	µg/L	<0.5	<0.5	<0.5	—[a]	2
Bromodichloromethane	µg/L	<0.5	<0.5	<0.5	—[a]	2
Bromoform	µg/L	<0.5	<0.5	<0.5	—[a]	2
Bromomethane	µg/L	<0.5	<0.5	<0.5	—[a]	2
Carbon tetrachloride	µg/L	<0.5	<0.5	<0.5	—[a]	2
Chlorobenzene	µg/L	<0.5	<0.5	<0.5	—[a]	2
Chloroethane	µg/L	<0.5	<0.5	<0.5	—[a]	2
Chloroform	µg/L	<0.5	<0.5	<0.5	—[a]	2
Chloromethane	µg/L	<0.5	<0.5	<0.5	—[a]	2
cis-1,3-Dichloropropene	µg/L	<0.5	<0.5	<0.5	—[a]	2
Dibromochloromethane	µg/L	<0.5	<0.5	<0.5	—[a]	2
Dichlorodifluoromethane	µg/L	<0.5	<0.5	<0.5	—[a]	1
Freon-113	µg/L	<0.5	<0.5	<0.5	—[a]	2
Methylene chloride	µg/L	<0.5	<0.5	<0.5	—[a]	2
Tetrachloroethene	µg/L	<0.5	<0.5	<0.5	—[a]	2
trans-1,3-Dichloropropene	µg/L	<0.5	<0.5	<0.5	—[a]	2
Trichloroethene	µg/L	<0.5	<0.5	<0.5	—[a]	2
Trichlorofluoromethane	µg/L	<0.5	<0.5	<0.5	—[a]	2
Vinyl chloride	µg/L	<0.5	<0.5	<0.5	—[a]	2
EPA 610						
1,2-Dichlorobenzene	µg/L	<0.3	<0.3	<0.3	—[a]	2
1,3-Dichlorobenzene	µg/L	<0.3	<0.3	<0.3	—[a]	2
1,4-Dichlorobenzene	µg/L	<0.3	<0.3	<0.3	—[a]	2
Benzene	µg/L	<0.3	<0.3	<0.3	—[a]	2
Chlorobenzene	µg/L	<0.3	<0.3	<0.3	—[a]	2
Ethylbenzene	µg/L	<0.3	<0.3	<0.3	—[a]	2
Toluene	µg/L	<0.3	<0.3	<0.3	—[a]	2
Total xylene isomers	µg/L	<0.6	<0.6	<0.6	—[a]	2
Acenaphthene	µg/L	<0.17	<0.2	<0.185	0.015	2
Acenaphthylene	µg/L	<0.2	<0.25	<0.225	0.025	2
Anthracene	µg/L	<0.1	<0.1	<0.1	—[a]	2
Benzo(a)anthracene	µg/L	<0.05	<0.051	<0.0505	0.0005	2
Benzo(a)pyrene	µg/L	<0.07	<0.072	<0.071	0.001	2
Benzo(b)fluoranthene	µg/L	<0.068	<0.07	<0.069	0.001	2
Benzo(g,h,i)perylene	µg/L	<0.057	<0.06	<0.0585	0.0015	2
Benzo(k)fluoranthene	µg/L	<0.02	<0.02	<0.02	—[a]	2

Table 13-2. Data summary of maintenance monitoring at sampling location CDBE.

Parameter	Units	Minimum	Maximum	Median	Interquartile Range	Number of Samples
EPA 610 (continued)						
Chrysene	µg/L	<0.08	<0.084	<0.082	0.002	2
Dibenzo(a,h)anthracene	µg/L	<0.08	<0.084	<0.082	0.002	2
Fluoranthene	µg/L	<0.16	<0.2	<0.18	0.02	2
Fluorene	µg/L	<0.09	<0.09	<0.09	—[a]	2
Indeno(1,2,3-c,d)pyrene	µg/L	<0.096	<0.1	<0.098	0.002	2
Naphthalene	µg/L	<0.5	<0.5	<0.5	—[a]	2
Phenanthrene	µg/L	<0.1	<0.12	<0.11	0.01	2
Pyrene	µg/L	<0.1	<0.14	<0.12	0.02	2
EPA 625						
1,2,4-Trichlorobenzene	µg/L	<10	<10	<10	—[a]	2
1,2-Dichlorobenzene	µg/L	<10	<10	<10	—[a]	2
1,3-Dichlorobenzene	µg/L	<10	<10	<10	—[a]	2
1,4-Dichlorobenzene	µg/L	<10	<10	<10	—[a]	2
2,4,5-Trichlorophenol	µg/L	<10	<10	<10	—[a]	2
2,4,6-Trichlorophenol	µg/L	<10	<10	<10	—[a]	2
2,4-Dichlorophenol	µg/L	<10	<10	<10	—[a]	2
2,4-Dimethylphenol	µg/L	<10	<10	<10	—[a]	2
2,4-Dinitrophenol	µg/L	<50	<50	<50	—[a]	2
2,4-Dinitrotoluene	µg/L	<10	<10	<10	—[a]	2
2,6-Dinitrotoluene	µg/L	<10	<10	<10	—[a]	2
2-Chloronaphthalene	µg/L	<10	<10	<10	—[a]	2
2-Chlorophenol	µg/L	<10	<10	<10	—[a]	2
2-Methyl Phenol	µg/L	<10	<10	<10	—[a]	2
2-Methyl-4,6-dinitrophenol	µg/L	<50	<50	<50	—[a]	2
2-Methylnaphthalene	µg/L	<10	<10	<10	—[a]	2
2-Nitroaniline	µg/L	<50	<50	<50	—[a]	2
2-Nitrophenol	µg/L	<10	<10	<10	—[a]	2
3,3'-Dichlorobenzidine	µg/L	<20	<20	<20	—[a]	2
3-Nitroaniline	µg/L	<50	<50	<50	—[a]	2
4-Bromophenylphenylether	µg/L	<10	<10	<10	—[a]	2
4-Chloro-3-methylphenol	µg/L	<20	<20	<20	—[a]	2
4-Chloroaniline	µg/L	<20	<20	<20	—[a]	2
4-Chlorophenylphenylether	µg/L	<10	<10	<10	—[a]	2
4-Nitroaniline	µg/L	<50	<50	<50	—[a]	2
4-Nitrophenol	µg/L	<50	<50	<50	—[a]	2
Acenaphthene	µg/L	<10	<10	<10	—[a]	2

Table 13-2. Data summary of maintenance monitoring at sampling location CDBE.

Parameter	Units	Minimum	Maximum	Median	Interquartile Range	Number of Samples
EPA 625 (continued)						
Acenaphthylene	µg/L	<10	<10	<10	—[a]	2
Anthracene	µg/L	<10	<10	<10	—[a]	2
Benzo(a)anthracene	µg/L	<10	<10	<10	—[a]	2
Benzo(a)pyrene	µg/L	<10	<10	<10	—[a]	2
Benzo(b)fluoranthene	µg/L	<10	<10	<10	—[a]	2
Benzo(g,h,i)perylene	µg/L	<10	<10	<10	—[a]	2
Benzo(k)fluoranthene	µg/L	<10	<10	<10	—[a]	2
Benzoic acid	µg/L	<50	<50	<50	—[a]	2
Benzyl alcohol	µg/L	<20	<20	<20	—[a]	2
Bis(2-chloroethoxy)methane	µg/L	<10	<10	<10	—[a]	2
Bis(2-chloroethyl)ether	µg/L	<10	<10	<10	—[a]	2
Bis(2-chloroisopropyl)ether	µg/L	<10	<10	<10	—[a]	2
Bis(2-ethylhexyl)phthalate	µg/L	<10	<10	<10	—[a]	2
Butylbenzylphthalate	µg/L	<10	<10	<10	—[a]	2
Chrysene	µg/L	<10	<10	<10	—[a]	2
Di-n-butylphthalate	µg/L	<10	<10	<10	—[a]	2
Di-n-octylphthalate	µg/L	<10	<10	<10	—[a]	2
Dibenzo(a,h)anthracene	µg/L	<10	<10	<10	—[a]	2
Dibenzofuran	µg/L	<10	<10	<10	—[a]	2
Diethylphthalate	µg/L	<10	<10	<10	—[a]	2
Dimethylphthalate	µg/L	<10	<10	<10	—[a]	2
Fluoranthene	µg/L	<10	<10	<10	—[a]	2
Fluorene	µg/L	<10	<10	<10	—[a]	2
Hexachlorobenzene	µg/L	<10	<10	<10	—[a]	2
Hexachlorobutadiene	µg/L	<10	<10	<10	—[a]	2
Hexachlorocyclopentadiene	µg/L	<10	<10	<10	—[a]	2
Hexachloroethane	µg/L	<10	<10	<10	—[a]	2
Indeno(1,2,3-c,d)pyrene	µg/L	<10	<10	<10	—[a]	2
Isophorone	µg/L	<10	<10	<10	—[a]	2
m- and p- Cresol	µg/L	<10	<10	<10	—[a]	2
N-Nitrosodi-n-propylamine	µg/L	<10	<10	<10	—[a]	2
N-Nitrosodiphenylamine	µg/L	<10	<10	<10	—[a]	2
Naphthalene	µg/L	<10	<10	<10	—[a]	2
Nitrobenzene	µg/L	<10	<10	<10	—[a]	2
Pentachlorophenol	µg/L	<50	<50	<50	—[a]	2

Table 13.2. Data summary of maintenance monitoring at sampling location CDBE.

Parameter	Units	Minimum	Maximum	Median	Interquartile Range	Number of Samples
EPA 625 (continued)						
Phenanthrene	µg/L	<10	<10	<10	—[a]	2
Phenol	µg/L	<10	<10	<10	—[a]	2
Pyrene	µg/L	<10	<10	<10	—[a]	2
Petroleum Products						
Diesel fuel	µg/L	<50	<50	<50	—[a]	2
Gasoline fingerprint	µg/L	<50	<50	<50	—[a]	2
Total Organic Carbon (TOC)	mg/L	6	8	7	1	2
Toxicity						
Aquatic Bioassay, Survival	Percent	100	100	100	—[a]	1

[a] Not calculated for nondetections or when less than limit of sensitivity.

Table 13-3. Drainage Retention Basin maintenance field measurement monitoring summary for all stations except CDBE.

Parameter	CDBA	CDBC	CDBD	CDBF	CDBJ	CDBL
Dissolved oxygen (mg/L)						
Minimum	7	5	6	4	6	3
Maximum	13	12	11	10	11	11
Median	9	9	8	8	8	8
Interquartrile range	2	2	2	2	2	1
Number of samples	37	37	37	37	37	37
Temperature (degrees Celsius)						
Minimum	8	8	8	8	8	8
Maximum	28	26	26	25	26	26
Median	22	21	20	19	21	20
Interquartile range	7	7	7	8	7	7
Number of samples	38	38	38	38	38	38

Table 13-4a. Cooling tower monitoring summary, flow self-monitoring data (liters/day), January–May 1994.[(a)]

Tower No.	Minimum	Maximum	Maximum Permitted Design Flow	Median	Inter-quartile Range	Number of Samples
801	2,282	9,778	16,297	5,670	3,923	11
836a	0	2452	8,149	1,398	632	10
865	0	37,028	90,960	11,427	5,340	11
805	87	345	5,685	171	87	9
809	87	345	5,685	171	NA	9
810	345	940	5,685	424	466	11
812	87	1,277	6,822	663	747	10
815	171	1,452	5,685	853	429	10
817	171	1,364	5,685	940	386	10
826	171	424	5,685	278	94	4
827 (No. 1)	1,452	4,093	11,370	2,391	468	7
827 (No. 2)	682	2,729	11,370	1,895	1,204	6
828	424	1,027	5,685	512	299	11
836d	0	970	8,149	328	286	10
851 (No. 1)	3,756	5,287	11,370	4,775	341	11
851 (No. 2)	87	940	5,685	512	258	9
854	637	2,642	8,338	1,789	809	11

[a] Flow Permit Limitation: Not to significantly exceed maximum permitted design flow.

Table 13-4b. Cooling tower monitoring summary, pH self-monitoring data, January–May 1994.[a]

Tower No.	Minimum	Maximum	Median	Interquartile Range	Number of Samples
801	8.75	9.02	8.89	0.21	11
836A	8.77	8.91	8.83	0.04	10
865	8.40	9.07	8.81	0.18	11
805	8.46	9.06	8.74	0.17	9
809	8.71	8.86	8.78	0.05	9
810	8.26	9.30	8.80	0.21	11
812	8.65	9.18	8.86	0.21	10
815	8.56	8.96	8.77	0.15	10
817	8.71	9.15	8.85	0.18	10
826	8.66	9.08	8.86	0.27	4
827 (No. 1)	8.75	9.07	8.91	0.16	7
827 (No. 2)	8.51	9.48	9.00	0.25	6
828	8.65	9.29	9.02	0.32	11
836D	8.69	8.96	8.82	0.16	10
851 (No. 1)	8.69	8.95	8.81	0.08	11
851 (No. 2)	8.10	9.07	8.55	0.29	9
854	8.76	8.98	8.87	0.10	11

a Permit pH Limitation: Not less than 6.5 nor greater than 8.5. See Volume 1 for a discussion of exceedances.

Table 13-4c. Cooling tower monitoring summary, temperature self-monitoring data (˚C), January–May 1994.[a]

Tower No.	Minimum	Maximum	Median	Interquartile Range	Number of Samples
801	18	24	21	1.5	11
836A	13	20	19	1	10
865	8	19	13	5.5	11
805	12	21	18	5	9
809	13	25	19	7	9
810	19	26	23	2	11
812	18	36	22	6.25	10
815	11	18	14	4.75	10
817	13	22	19	4.5	10
826	21	29	24	4	4
827 (No. 1)	15	29	18	10	7
827 (No. 2)	16	31	19	3.25	6
828	16	24	20	4.5	11
836D	12	23	19	6.25	10
851 (No. 1)	22	26	24	0.5	11
851 (No. 2)	11	19	14	2	9
854	14	23	19	5	11

[a] Temperature not to alter receiving water temperature more than 2.8˚C (5˚F).

Table 13-5a. Cooling tower monitoring summary, flow self-monitoring data (liters/day), June–December 1994.[(a)]

Tower No.	Minimum	Maximum	Maximum Permitted Design Flow	Median	Interquartile Range	Number of Samples
801	0	24,195	16,297	13,417	14,172	13
836A	0	5670	8,149	2702	2,445	13
865	0	85,457	90,960	31,802	45,744	13
805	171	6,337	5,685	942	2,209	7
809	171	3,889	5,685	1,391	502	9
810	595	3,601	5,685	2,134	1,344	10
812	470	2,880	6,822	1,192	825	11
815	595	3,066	5,685	2,160	340	9
817	720	2,520	5,685	1,637	881	6
826	0	2,592	5,685	607	1,184	11
827 (No. 1)	216	3,055	11,370	745	1,212	12
827 (No. 2)	1,027	10,915	11,370	5,759	5,684	12
828	72	1,364	5,685	508	620	11
836D	0	2,293	8,149	1,167	1,090	10
851 (No. 1)	4,586	8,641	11,370	7,334	2,405	6
851 (No. 2)	576	1,959	5,685	709	650	6
854	0	4,688	8,338	2,376	1,520	13

[a] Flow Permit Limitation: Not to significantly exceed maximum permitted design flow

Table 13-5b. Cooling tower monitoring summary, pH self-monitoring data, June–December 1994.[a]

Tower	Minimum	Maximum	Median	Interquartile Range	Number of Samples
801	8.71	8.92	8.85	0.06	13
836A	8.60	9.03	8.86	0.08	13
865	8.54	8.90	8.75	0.13	13
805	8.35	9.19	8.46	0.2	7
809	8.54	8.84	8.64	0.05	9
810	8.54	8.94	8.75	0.125	10
812	8.57	9.08	8.86	0.09	11
815	8.40	9.29	8.74	0.31	9
817	8.54	9.14	8.83	0.41	6
826	8.63	9.11	8.88	0.195	11
827 (No. 1)	8.56	9.23	8.75	0.135	12
827 (No. 2)	8.58	9.09	8.85	0.15	12
828	8.79	9.26	8.85	0.14	11
836D	8.79	8.94	8.88	0.07	10
851 (No. 1)	8.63	8.87	8.77	0.09	6
851 (No. 2)	8.60	9.03	8.72	0.18	6
854	8.52	9.05	8.77	0.09	13

[a] Permit pH Limitation: Not less than 6.5 nor greater than 10.

Table 13-5c. Cooling tower monitoring summary, total dissolved solids (TDS) self-monitoring data (mg/L), June–December 1994.[a]

Tower No.	Minimum	Maximum	Permitted Maximum Daily TDS	Median	Inter-quartile Range	Number of Samples
801	1,200	1,350	2,400	1,250	112.5	9
836A	1,100	1,250	2,400	1,175	50	9
865	1,100	1,300	2,400	1,200	125	9
805	800	800	5,000	800	0	3
809	750	1,050	5,000	800	100	5
810	900	1,000	5,000	1,000	75	6
812	900	1,500	5,000	1,150	350	7
815	750	1,300	5,000	1,000	400	5
817	800	1,100	5,000	950	150	3
826	800	1,900	5,000	1,075	225	7
827 (No. 1)	800	1,200	5,000	925	137.5	8
827 (No. 2)	800	1,700	5,000	1,000	625	8
828	900	3,700	5,000	1,050	375	7
836D	1,100	1,200	5,000	1,200	37.5	6
851 (No. 1)	1,100	1,300	5,000	1,200	100	2
851 (No. 2)	850	1,000	5,000	925	75	2
854	1,050	1,300	5,000	1,100	37.5	9

[a] Permit Limitation: Not to exceed permitted daily maximum, nor 2,000 mg/L as monthly average.

14. Quality Assurance

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Sampling Location Designators

As described in Volume 1, the LLNL environmental monitoring program uses alpha-numeric location designator codes to define sampling locations. **Tables 14-1** and **14-2** decode sampling location designators and provide a cross-reference between current designators and those used in previous years. Changes made in 1994 are noted on those tables.

Explanation of Missing Samples

Planned samples and actual samples collected and analyzed in 1994 are summarized in Table 14-2 (Volume 1). With the exception of the stormwater runoff network, the Drainage Retention Basin, and neutron monitoring, the levels of completeness for networks that were reported previously are similar to historical levels. A drop in completeness occurred for the storm water runoff network because samples planned for late 1994 (the beginning of the rainy season) could not be taken because no storm occurred that generated enough runoff for sampling during that period. Several weekly Drainage Retention Basin samples were overlooked by sampling technologists during 1994, leading to diminished sampling completeness for that network. This training issue has been addressed. Neutron monitoring results for 1994 were not presented because the rem meters were found to be seriously out of calibration due to age-related deterioration. This monitoring network was eliminated at the end of 1994. The one new sampling network for 1994, Site 300 Cooling Towers, also exhibited relatively low completeness. This was due to sampling startup errors and difficulties in accessing the cooling towers.

Missing air particulate and air tritium samples were due to one of the following reasons: removal of location L-LCCY, air flow out of specified range at the end of a sampling period, motor failure, power problems, access or construction problems, or electrical problems. Three air tritium samples were not taken because the flasks were broken. Arroyo sediment samples could not be taken at one location because of water flow. Vegetation could not be sampled at one location during two quarters because of construction activities. Missing ground water samples were lost during transport between the sampling location and the analytical laboratory. Thermoluminescent dosimeter (TLD) losses were due to vandalism or consumption by cows. Sewage sample losses were due primarily to equipment malfunction (sampling pumps and the weekly sampler); however, some samples were lost due to planned equipment upgrades.

Participation in Laboratory Intercomparison Studies

During 1994, LLNL's Radiation Analytical Sciences (RAS) laboratory and the Hazards Control Department Analytical Laboratory (HCAL) both participated in the EPA's Environmental Monitoring Systems Laboratory (EMSL) Intercomparison Studies Program. **Table 14-3** shows the comparison of analyses by these laboratories with known values. The ratio of the measured value to the known value is considered acceptable if it falls between 0.7 and 1.3. However, normalized deviations that fall between 0.7 and 0.8 and those that fall between 1.2 and 1.3 are considered suspect and could indicate a potential problem with laboratory accuracy. Three of eight samples analyzed by the HCAL were outside of the range of 0.7 to 1.3; however, these samples fell within the control limits provided by EMSL so they are considered acceptable. Two of 11 samples analyzed by RAS fell outside of the acceptable range. One of these occurred because of an error in the data reduction scheme used by the laboratory. The other was due to the fact that the analysis being performed was new to that laboratory. The RAS quality control chemist is developing procedures and working with analysts to ensure that these these processes are brought into control.

The HCAL participated in four California Department of Health Services Environmental Laboratory Accreditation Program (ELAP) Water Pollution Studies for metals during 1994, as shown in **Table 14-4.** The HCAL measures aluminum, arsenic, beryllium, cadmium, chromium, copper, iron, lead, mercury, nickel, silver, and zinc in sewage effluent for the LLNL environmental monitoring program. All ELAP intercomparison values for these metals were acceptable except for one of the zinc analyses, performed on August 5, 1994, which fell above the acceptable limits. Investigation by HCAL personnel identified a zinc contamination problem in the sampling tubes. This was eliminated by changing the process so that tubes are not reused.

RAS also participated in the 1994 intercomparison studies by the DOE Environmental Measurements Laboratory (EML) for various radionuclides on air filters and in soil, vegetation, and water. The data from this study are presented in **Table 14-5**. The results of 10 of the 52 analyses performed for EML fell outside of acceptable limits. Air-filter results for gamma analyses for the March 1, 1994, study were originally calculated incorrectly, resulting in two values falling outside of the acceptable range. These values were recalculated and the corrected values, all of which fall within acceptable ranges, are also shown in **Table 14-5**. Corrected values all fall within the acceptable range. Four of the reported values were unacceptable because the wrong order of magnitude was entered for a value in scientific notation. These values again were acceptable when recalculated using the correct numbers. Four plutonium analyses fell outside of the acceptable range. The source of error for these analyses could not be explained and is still under investigation by RAS.

Contract laboratories are also required to participate in laboratory intercomparison programs; however, permission to publish their results for comparison purposes has not been granted.

Table 14-1. Livermore site and Livermore Valley sampling location designators.

Medium/Location	Current Designator	Previous Designator(s)	Notes
Air Particulate			
Altamont Pass	L-ALTA	90-07	
Near Building 531	L-B531	—	
East Avenue South Cafeteria	L-CAFE	90-12	
Northeast of Building 592	L-COW	90-15	
UNCLE Credit Union, Greenville Road	L-CRED	—	
Residence (Livermore)	L-ERCH	90-11	
FCC station	L-FCC	90-08	
East Avenue firehouse	L-FIRE	90-17	
Livermore VA hospital	L-HOSP	90-10	
Livermore City Corp Yard	L-LCCY	90-09	Abandoned in 1994
LWRP	L-LWRP	90-16	
Mesquite Way	L-MESQ	90-02	
Northwest perimeter (Met Tower)	L-MET	90-13	
Patterson Pass	L-PATT	90-05	
Residence (Livermore)	L-RRCH	90-06	
East Avenue and Greenville Road (salvage)	L-SALV	90-01	
Sandia tanks	L-TANK	90-03	
East perimeter (Visitors Center)	L-VIS	90-14	
Zone 7	L-ZON7	90-04	
Air Tritium			
Altamont Pass	L-ALTA	93-07	
Building 292 area	L-B292	—	
Building 331 yard	L-B331	—	
Building 514 yard	L-B514	—	
Building 624 (612 yard)	L-B624	—	
East Avenue South Cafeteria	L-CAFE	93-12	
Northeast of Building 592	L-COW	93-15	
East Avenue firehouse	L-FIRE	93-17	
Livermore City Corp Yard	L-LCCY	93-09	Abandoned in 1994
West parking lot (Mesquite Way)	L-MESQ	93-02	
Northwest perimeter (Met Tower)	L-MET	93-13	
LLNL pool	L-POOL	—	
East Avenue and Greenville Road (salvage)	L-SALV	93-01	
West of Sandia (veterinarian)	L-VET	93-S2	
East perimeter (Visitors Center)	L-VIS	93-14	
East of Sandia (crossroad)	L-XRDS	93-S1	
Zone 7	L-ZON7	93-04	

Table 14-1. Livermore site and Livermore Valley sampling location designators (continued).

Medium/Location	Current Designator	Previous Designator(s)	Notes
Cow Milk			
Residence (Livermore)	L-WRD	—	Abandoned prior to 1994
Goat Milk			
Cartoned milk	C-CART	91-97	Abandoned in 1994
Residence (Modesto)	C-MOD	91-12	Abandoned in 1994
Residence (Modesto)	C-MOD2	—	Abandoned in 1994
Residence (Ripon)	C-RIP	—	Abandoned in 1994
Residence (Stevenson)	C-STEV	—	Abandoned in 1994
Prepasteurized (Turlock)	C-TUR	—	Abandoned in 1994
Residence (Brentwood)	C-WOOD	—	Abandoned in 1994
Residence (Livermore)	L-COOL	—	Abandoned prior to 1994
Residence (Livermore)	L-LUP	91-13	Replaced prior to 1994
Residence (Livermore)	L-MZF	91-07	Abandoned prior to 1994
Residence (Livermore)	L-WRD	91-05	Abandoned in 1994
Vegetation			
Residence (Modesto)	C-MOD	—	
Aqueduct	L-AQUE	95-23	
Calaveras Reservoir	L-CAL	—	
Residence (Danville)	L-DAN	—	
FCC station	L-FCC	95-33	
LLNL on-site garden	L-GARD		Added in 1994
I-580 and Greenville Road	L-I580	95-20	
Mesquite Way	L-MESQ	—	Replaced L-VASW
Met Tower	L-MET	—	Replaced L-VASW
Camp parks	L-PARK	—	
Patterson Pass	L-PATT	95-04	
North of LLNL (railroad tracks)	L-RAIL	95-29	
Tesla Road (west)	L-TESW	95-32	
Vasco Road (west of LLNL)	L-VASW	95-31	Replaced by L-MESQ and L-MET
Visitors Center	L-VIS	—	
Zone 7	L-ZON7	95-15	
Arroyo Sediment			
East of Building 438	L-438E	—	Abandoned in 1994
4th and A Streets	L-4THA	—	Abandoned in 1994
Arroyo sediment			
Arroyo Las Positas East	L-ALPE	ALPE	
Arroyo Las Positas North	L-ALPN	—	Abandoned in 1994
Arroyo Las Positas West	L-ALPW	ALPW	Abandoned in 1994

Table 14-1. Livermore site and Livermore Valley sampling location designators (continued).

Medium/Location	Current Designator	Previous Designator(s)	Notes
Arroyo Seco East	L-ASE	ASE	Abandoned prior to 1994
Arroyo Seco South	L-ASS	ASS	Replaced by L-ASS2
Arroyo Seco South No. 2	L-ASS2	—	Replaced L-ASS
Arroyo Seco West	L-ASW	L-ASN	Renamed
Drainage Retention Basin	L-CDB	CDB	
Drainage Retention Basin 2	L-CDB2	—	
Eastern Settling Basin	L-ESB	—	Added in 1994
Greenville Road, northeast perimeter	L-GRNE	—	
West perimeter drainage channel	L-WPDC	—	
Soil			
Altamont	L-ALTA	—	
East Avenue South Cafeteria	L-CAFE	—	
Cowbarn	L-COW	L-15	
Residence (Livermore)	L-ERCH	—	
FCC station	L-FCC	L-08	
Livermore VA hospital	L-HOSP	L-10	
Mesquite Way	L-MESQ	L-02	
Northwest perimeter (Met Tower)	L-MET	L-13	
Northeast corner perimeter fence	L-NEP	L-18	
Patterson Pass	L-PATT	L-05	
Residence (Livermore)	L-RRCH	—	
Salvage	L-SALV	—	
Sandia tanks	L-TANK	L-03	
East perimeter (Visitors Center)	L-VIS	L-14	
LWRP (1/3 North)	L-WRP1	L-19	
LWRP (2/3 North)	L-WRP2	L-20	
LWRP (Northwest)	L-WRP3	L-21	
LWRP (1/3 West)	L-WRP4	L-22	
LWRP (2/3 West)	L-WRP5	L-23	
LWRP (Southwest)	L-WRP6	L-24	
Zone 7	L-ZON7	L-04	
Sewage			
Manhole 163A (Sandia)	L-163A	—	
Building 196 (daily composite)	L-B196	LLNL	
Building 196 (weekly composite)	L-C196	—	
LWRP	L-LWRP	LWRP	Replaced by L-WRPE
Manhole 125C	L-M125	—	

Table 14-1. Livermore site and Livermore Valley sampling location designators (continued).

Medium/Location	Current Designator	Previous Designator(s)	Notes
Manhole 177E	L-M177	—	
Manhole 185F	L-M185	—	
Manhole 231A	L-M231	—	
Manhole 238C	L-M238	—	
Manhole 40B	L-M40	—	
Manhole 51A	L-M51	—	
Manhole 53A	L-M53	—	
Manhole 69A	L-M69	—	
Manhole 86B	L-M86	—	
LWRP (digestor)	L-WRD1	—	
LWRP (digestor)	L-WRD2	—	
LWRP (digestor)	L-WRD3	—	
LWRP (effluent)	L-WRPE	—	Replaced L-LWRP
Runoff			
4th and A Streets	L-4THA	—	Abandoned prior to 1994
Arroyo Las Positas (east of LLNL)	L-ALPE	01	
Greenville Road (south of L-GRNE)	L-ALPO		
Arroyo Las Positas (north at cowbarn)	L-ALPN	—	Abandoned prior to 1994
Arroyo Las Positas (northwest boundary)	L-ALPW	03	Abandoned prior to 1994
Arroyo Seco East (influent to Sandia)	L-ASE	04	Abandoned prior to 1994
Arroyo Seco South (west parking lot)	L-ASS	05	Replaced by L-ASS2
Arroyo Seco South No. 2	L-ASS2	—	Replaced L-ASS
Arroyo Seco West (Vasco/East Avenue)	L-ASW	L-ASN;06	Renamed
East of Building 438	L-B438	—	Abandoned prior to 1994
Drainage Retention Basin	L-CDB	02	
Drainage Retention Basin effluent	L-CDBX	—	Added in 1994
Greenville Road (northeast perimeter)	L-GRNE	—	
West perimeter drainage channel	L-WPDC	—	
Rain			
Altamont	L-ALTA	—	Abandoned prior to 1994
Aqueduct	L-AQUE	—	
Building 291	L-B291	—	
Building 343	L-B343	—	
Residence (Livermore)	L-BVA	—	Abandoned prior to 1994
Drainage Retention Basin	L-CDB	—	
Cowbarn	L-COW	—	
Del Valle/Zone 7	L-DEL7	—	Abandoned prior to 1994
East of Sandia	L-ESAN	—	

Table 14-1. Livermore site and Livermore Valley sampling location designators (concluded).

Medium/Location	Current Designator	Previous Designator(s)	Notes
FCC station	L-FCC	—	Abandoned prior to 1994
Greenville and Tesla Roads	L-GTES	—	Abandoned prior to 1994
Northwest perimeter (Met Tower)	L-MET	—	
Camp parks	L-PARK	—	Abandoned prior to 1994
Patterson Pass	L-PATT	—	Abandoned prior to 1994
East Avenue and Greenville Road (salvage)	L-SALV	—	
Residence (Livermore)	L-SLST	—	
Residence (Livermore)	L-VET	—	Added in 1994
Vineyard	L-VINE	—	Abandoned prior to 1994
Visitors Center	L-VIS	—	
Zone 7	L-ZON7	—	
Water			
Arroyo de Laguna (Sunol)	L-ALAG	92-24	
Residence (Livermore)	L-BELL	92-37	
Calaveras Reservoir	L-CAL	92-29	
Drainage Retention Basin	L-CDB	—	
Del Valle Lake	L-DEL	92-11	
Springtown duck pond	L-DUCK	92-16	
Gas station tap water	L-GAS	92-19	
Private well	L-ORCH	92-34	
Residence (Livermore)	L-PALM	92-31	
LLNL pool	L-POOL	92-43	
Shadow Cliffs	L-SHAD	92-26	
Building 151 tap water	L-TAP	92-30	
Zone 7	L-ZON7	92-15	

Table 14-2. Site 300 sampling location designators.

Medium/Location	Current Designator	Previous Designator(s)	Notes
Air Particulate			
East of Building 801	3-801E	40-10	
East control post	3-ECP	40-02	
East observation point	3-EOBS	40-01	
West of main gate	3-GOLF	40-05	
Linac Road	3-LIN	40-04	
North power station	3-NPS	40-08	
Tracy firehouse	3-TFIR	40-06	
West control post	3-WCP	40-03	
West observation point	3-WOBS	40-09	
Soil			
East of Building 801	3-801E	3NXXH01 or 1114	
North of Building 801	3-801N	1117	
West of Building 801	3-801W	3NNWG01 or 1113	
Behind Building 812	3-812N	3NXXC01 or 1115	
West of Building 834	3-834W	3ESEI01 or 1103	
North of road to Building 851	3-851N	3WNWI01 or 1107	
North of Building 856	3-856N	3WXXK01 or 1106	
Near Building 858	3-858S	3WSWI01 or 1104	
West landfill (Disposal Site West)	3-DSW	3NWXP02 or 1111	
North of east observation point	3-EOBS	3NNWL01 or 1112	
North of Well 8	3-EVAP	3WNWK01 or 1109	
West of main gate	3-GOLF	3SEXL01 or 1116	
North power station	3-NPS	3NWXP01 or 1110	
West observation point	3-WOBS	3WNWN01 or 1108	
Vegetation			
East of Building 801	3-801E	45-12	
Carnegie	3-CARN	45-01	
Near Well K7-03	3-DSW	45-06	
Near Well 8	3-EVAP	45-13	
Geodetic Creek	3-GEO	45-03	
West of main gate	3-GOLF	45-02	
Water			
Monitoring well	3-W35A04		Replaced GALLO2
Well 1	3-WELL01	42-01	
Private well	3-CON1	42-07	
Private well	3-CON2	—	
Well 18	3-WELL18	42-22	
Geodetic creek	3-GEOCRK	42-14	

Table 14-2. Site 300 sampling location designators (concluded).

Medium/Location	Current Designator	Previous Designator(s)	Notes
Rain	3-RAIN	42-20	
812 creek	3-812CRK	42-21	
Carnegie retention Well 1	3-CARNRW1	42-23	
Carnegie retention Well 2	3-CARNRW2	42-24	
Well 20	3-WELL20	42-31	
Private well	3-GALLO1	42-28	
Private well	3-GALLO2	—	Abandoned prior to 1994
CDF well	3-CDF1	42-27	
Private well	3-MUL1	—	
Private well	3-MUL2	—	
Private well	3-VIE1	—	
Private well	3-VIE2	—	
Private well	3-STN	—	
Cooling Towers			
Building 801	3-B801	—	Added in 1994
Building 805	3-B805	—	Added in 1994
Building 809	3-B809	—	Added in 1994
Building 810	3-B810	—	Added in 1994
Building 812	3-B812	—	Added in 1994
Building 815	3-B815	—	Added in 1994
Building 817	3-B817	—	Added in 1994
Building 826	3-B826	—	Added in 1994
Building 827, Tower No. 1	3-B827-1	—	Added in 1994
Building 827, Tower No. 2	3-B827-2	—	Added in 1994
Building 828	3-B828	—	Added in 1994
Building 836, Tower A	3-B836A	—	Added in 1994
Building 836, Tower B	3-B836D	—	Added in 1994
Building 851, Tower No. 1	3-B851-1	—	Added in 1994
Building 851, Tower No. 2	3-B851-2	—	Added in 1994
Building 854	3-B854	—	Added in 1994
Building 865	3-B865	—	Added in 1994
Runoff			
North of Well NC2-07	3-NLIN	—	Added in 1994
East of Pit 6	3-N829	—	Added in 1994
South of B873	3-N883	—	Added in 1994
Pit 7 North Stilling Basin	3-NPT7	—	Added in 1994
Corral Hollow Creek	3-NSTN	—	Added in 1994
South East End of Pit 6	3-NPT6	—	Added in 1994

Table 14-3. Results from the EPA Environmental Monitoring Systems Laboratory (EMSL) Intercomparison Program for Water, 1994.

Analysis	Date	LLNL Value (pCi/L)	Known Value (pCi/L)	Ratio (LLNL/ known)[a]	Lab
Gross alpha	1/28/94	9.67	15.0	0.64[d]	HCAL[b]
	7/22/94	18.7	32.0	0.58[d]	HCAL
	10/28/94	44.3	57.0	0.78[d]	HCAL
	10/28/94	31.0	57.0	0.54[f]	RAS[c]
Gross beta	1/28/94	53.7	62.0	0.87	HCAL
	7/22/94	9.67	10.0	0.97	HCAL
	10/28/94	25.0	23.0	1.09	RAS
	10/28/94	22.0	23.0	0.96	HCAL
Tritium	3/4/94	4540	4940	0.92	HCAL
	3/4/94	4780	4940	0.97	RAS
	8/5/94	8630	9950	0.87	HCAL
	8/5/94	8840	9950	0.89	RAS
^{133}Ba	11/4/94	66.3	73.0	0.91	RAS
^{60}Co	11/4/94	55.7	59.0	0.94	RAS
^{134}Cs	11/4/94	24.3	24.0	1.01	RAS
^{137}Cs	11/4/94	51.3	49.0	1.05	RAS
^{239}Pu	3/11/94	28.6	27.6	1.04	RAS
Total U	10/18/94	9.93	20.0	0.50[e]	RAS
^{65}Zn	11/4/94	108	100	1.08	RAS

a Ratios are acceptable if they are between 0.7 and 1.3; however, deviations between 0.7 and 0.8 or between 1.2 and 1.3 are indicative of potential problems with laboratory accuracy.

b LLNL's Hazards Control Department Analytical Laboratory.

c LLNL's Radiation Analytical Sciences laboratory.

d Outside of acceptable range but within control limits provided by EMSL.

e Outside of acceptable range due to error in data reduction scheme.

f Outside of acceptable range. New analysis for this laboratory. Procedure is being developed.

Table 14-4. Hazards Control Department Analytical Laboratory results from the California Department of Health Services Environmental Laboratory Accreditation Program (ELAP) Water Pollution Studies.[a]

Analysis	Date	Sample	LLNL Value[a]	True Value[a]	Acceptable Limits[b]	Warning Limits[b]
Aluminum	2/10/94	1	1360	1400	1260–1510	
	8/5/94	1	1270	1301	1080–1510	1130–1450
		2	1830	1801	1500–2080	1570–2010
	10/19/94	1	151	151	128–172	
	2/10/95	1	129	130	93.8–175	104–165
		2	589	610	498–719	526–691
Arsenic	2/10/94	1	44.9	39.5	33.1–45.1	
	8/5/94	1	220	210	168–251	179–241
		2	374	350	281–418	299–401
	10/19/94	1	148	140	117–158	
	2/10/95	1	311	311	250–374	265–358
		2	739	743	598–891	635–854
Beryllium	2/10/94	1	8.10	9.07	7.71–10.4	
	8/5/94	1	24.9	28.0	22.2–33.6	23.6–32.1
		2	77.1	85.2	67.1–98.2	71–94.3
	10/19/94	1	5.0	5.33	4.53–6.13	
	2/10/95	1	360	350	294–395	307–383
		2	873	850	716–957	747–927
Cadmium	2/10/94	1	48.6	49.0	39.2–58.8	
	8/5/94	1	77.4	78.0	65.8–91	69–87.9
		2	27.9	27.9	22.5–34	24–32.6
	10/19/94	1	22.6	23.0	18.4–27.6	
	2/10/95	1	85.7	86.8	73.4–101	76.9–97.7
		2	743	750	638–870	667–841
Chromium	2/10/94	1	151	159	135–183	
	8/5/94	1	161	169	140–196	147–189
		2	921	955	795–1100	834–1060
	10/19/94	1	12	11.6	9.86–13.3	
	2/10/95	1	43.7	43.5	35.2–51.1	37.2–49.1
		2	526	529	454–608	473–589

Table 14-4. Hazards Control Department Analytical Laboratory results from the California Department of Health Services Environmental Laboratory Accreditation Program (ELAP) Water Pollution Studies.[a] (continued)

Analysis	Date	Sample	LLNL Value[a]	True Value[a]	Acceptable Limits[b]	Warning Limits[b]
Copper	2/10/94	1	1830	1900	1710–2090	
	8/5/94	1	97.2	98.0	84.7–111	88–107
		2	323	320	280–358	290–348
	10/19/94	1	434	420	378–462	
	2/10/95	1	32.8	33.6	28.1–38.3	29.4–37
		2	175	187	164–208	170–203
Iron	8/5/94	1	308	310	273–346	282–337
		2	2550	2600	2310–2890	2380–2820
	2/10/95	1	65.8	64.5	48.6–81.6	52.7–77.5
		2	1260	1300	1150–1450	1180–1410
Lead	2/10/94	1	75.5	78.7	55.1–102	
	8/5/94	1	97.9	110	92.9–127	97.2–123
		2	190	220	189–247	196–240
	10/19/94	1	29.5	27.0	18.9–35.1	
	2/10/95	1	652	645	546–721	568–699
		2	2890	2900	2540–3240	2630–3150
Mercury	2/10/94	1	1.89	1.77	1.24–2.30	
	8/5/94	1	0.8	0.615	0.321–0.881	0.391–0.811
		2	4.1	3.89	2.87–5.02	3.14–4.75
	10/19/94	1	5.2	5.09	3.56–6.62	
	2/10/95	1	5.8	5.81	4.04–7.33	4.46–6.91
		2	26.7	27.1	20.6–32.5	22.1–31
Nickel	2/10/94	1	466	490	417–563	
	8/5/94	1	639	660	587–732	605–714
		2	2740	2800	2500– 3100	2570–3020
	10/19/94	1	273	270	230–311	
	2/10/95	1	262	265	234–295	242–287
		2	1070	1080	959–1200	989–1170

Table 14-4. Hazards Control Department Analytical Laboratory results from the California Department of Health Services Environmental Laboratory Accreditation Program (ELAP) Water Pollution Studies.[a] (concluded)

Analysis	Date	Sample	LLNL Value[a]	True Value[a]	Acceptable Limits[b]	Warning Limits[b]
Silver	2/10/94	2	58.2	66.9	57.1–75.6	
	8/5/94	3	45.6	47.8	39–56.3	41.2–54.1
		4	94.8	93.1	76.1–109	80.3–105
	10/19/94	2	37.8	38.1	33–42.4	
	2/10/95	3	90.2	84.0	70–98.1	73.5–94.6
		4	400	410	342–478	359–461
Zinc	2/10/94	1	2080	2090	1920–2240	
	8/5/94	1	213[c]	171	150–194	156–188
		2	1760	1710	1500–1920	1550–1870
	10/19/94	1	417	419	385–452	
	2/10/95	1	30.9	31.9	23.9–40.3	26–38.3
		2	706	726	640–813	661–791

a All results reported in micrograms per liter. Based upon theoretical calculations or a reference value when necessary. Samples from 2/10/94 were from Water Supply Study Number WS0033. Samples from 8/5/94 were from Water Pollution Study Number WP032. Samples from 10/19/94 were from Water Supply Study Number WS034. Samples from 2/10/95 were from Water Pollution Study Number WP033

b Acceptance limits are a 99% confidence interval calculated from available performance evaluation data of EPA and state laboratories. Warning limits are a 95% confidence interval produced in the same way as the acceptable limits. Results should fall within acceptable limits 99 times out of 100. Results outside warning limits but inside acceptable limits should be reviewed for possible problems but not necessarily considered unacceptable.

c Outside of acceptable limits.

Table 14-5. Results from the DOE Environmental Measurements Laboratory (EML) Quality Assurance Program, 1994.

Analysis	Date	Medium (units)	LLNL value	EML value	Ratio (LLNL/ EML)[a]
^{54}Mn	9/1/93	Air filter	50.2	33.5	1.50[b]
^{54}Mn[c]	3/1/94	Bq/filter	32.7	33.5	0.98[c]
^{57}Co	9/1/93		16.8	12.5	1.34[b]
^{57}Co[c]	3/1/94		10.8	12.5	0.86[c]
^{60}Co	9/1/93		76.3	70.2	1.09
^{60}Co[c]	3/1/94		68.8	70.2	0.98[c]
^{125}Sb	9/1/93		27.9	23.3	1.20
^{125}Sb[c]	3/1/94		25.2	23.3	1.08[c]
^{137}Cs	9/1/93		41.5	40.0	1.04
^{137}Cs	3/1/94		40.1	40.0	1.00[c]
^{144}Ce	9/1/93		164	128	1.28
^{144}Ce[c]	3/1/94		106	128	0.83[c]
^{238}Pu	3/1/94		0.375	0.334	1.12
^{239}Pu	3/1/94		0.350	0.310	1.13
Total U (μg)	3/1/94		16.6	15.8	1.05
^{40}K		Soil	395	337	1.17
^{137}Cs		(Bq/kg)	179	141	1.27
^{238}Pu			11.4	11.2	1.02
^{239}Pu			3.58	3.56	1.01
^{40}K		Vegetation	967	923	1.05
^{60}Co		(Bq/kg)	3.43	34.0	0.10[d]
^{60}Co[c]			34.3	34.0	1.01[c]
^{137}Cs			503	461	1.09
^{239}Pu			3.75	3.90	0.96
^{3}H		Water	172	187	0.92
^{54}Mn		(Bq/L)	1.04	98.2	0.01[d]
^{54}Mn			104	98.2	1.06
^{60}Co			110	101	1.09
^{134}Cs			167	154	1.08
^{137}Cs			106	93.7	1.13
^{238}Pu			1.07	0.94	1.14
^{239}Pu			1.04	0.96	1.09
Total U (μg)			0.042	0.041	1.01
^{3}H[e]	6/1/94	Water (Bq/L)	162	187	0.87

Table 14-5. Results from the DOE Environmental Measurements Laboratory (EML) Quality Assurance Program, 1994.

Analysis	Date	Medium (units)	LLNL value	EML value	Ratio (LLNL/ EML)[a]
^{54}Mn	9/1/94	Air filter	6.93	6.69	1.04
^{57}Co		(Bq/filter)	11.8	12.9	0.92
^{60}Co			10.5	10.2	1.03
^{125}Sb			28.7	25.3	1.13
^{137}Cs			11.0	10.4	1.06
^{144}Ce			71.8	81.4	0.88
^{238}Pu			0.067	0.072	0.93
^{239}Pu			0.604	0.648	0.93
Total U (µg)			82.8	9.45	8.76[d]
Total U (µg)[c]			8.28	9.45	0.88[c]
^{40}K		Soil	376	428	0.88
^{137}Cs		(Bq/kg)	277	280	0.99
^{238}Pu			0.171	0.310	0.55[f]
^{239}Pu			7.57	7.78	0.97
^{40}K		Vegetation	840	808	1.04
^{60}Co		(Bq/kg)	9.63	10.7	0.90
^{137}Cs			155	148	1.05
^{238}Pu			0.158	0.092	1.72[f]
^{239}Pu			1.42	1.25	1.14
^{3}H		Water (Bq/L)	114	113	1.01
^{54}Mn			96.6	108.0	0.89
^{60}Co			306	317	0.97
^{134}Cs			51.2	53.0	0.97
^{137}Cs			46.4	46.6	1.00
^{144}Ce			438	491	0.89
^{238}Pu			0.005	1.06	0.005[f]
^{239}Pu			0.161	0.602	0.27[f]
Total U (µg)			0.009	0.089	0.01[d]
Total U (µg)[c]			0.086	0.089	0.96[c]
3H[c]	12/1/94	Water (Bq/L)	93.5	113	0.83

a Ratios are acceptable if they are between 0.7 and 1.3; however, deviations between 0.7 and 0.8 or between 1.2 and 1.3 are indicative of potential problems with laboratory accuracy.

b Outside of acceptable range; wrong factor used in calculation (see text).

c Recalculated from previous value; wrong order of magnitude used in calculation (see text).

d Outside of acceptable range; wrong order of magnitude used in calculation (see text).

e LLNL's Hazards Control Department Analytical Laboratory. All other values are from LLNL's Radiation Analytical Sciences Section.

f Outside of acceptable range; cause of error still under investigation (see text).