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INTERIM SANITARY LANDFILL 2005 ANNUAL GROUNDWATER REPORT (U)
WSRC-TR-2005-00548
December 15, 2005

Introduction

Groundwater monitoring at the Savannah River Site's Interim Sanitary Landfill (ISL) is conducted under the terms of the current permit (Domestic Waste Permit #025500-1102) and the approved Closure/Post Closure Plan. The SRS Interim Sanitary Landfill (ISL) opened in mid-1992 and operated until 1998.

Over the years several contaminants have been detected in the groundwater beneath the unit. Detected metals include barium, copper, zinc and mercury. Detected volatile organic compounds include trichlorofluoromethane, 1,1-dichloroethane, 1,1 dichloroethylene, trichloroethylene (TCE) and 1,1,1- trichloroethane. SRS performed an assessment of corrective measures for the ISL during the first several months of 2003 and submitted Assessment of Corrective Measures for the Interim Sanitary Landfill (U) WSRC-RP-2003-4100 on June 26, 2003. The assessment demonstrated that no active remedy is needed.

The wells shown in figure 1 were each sampled twice during 2005. Sampling was done during the first and third quarters. The analytical results for all of the wells appear in Appendix A. The well sampling and analyses were conducted in accordance with Procedure Manual 3Q5, Hydrogeologic Data Collection.

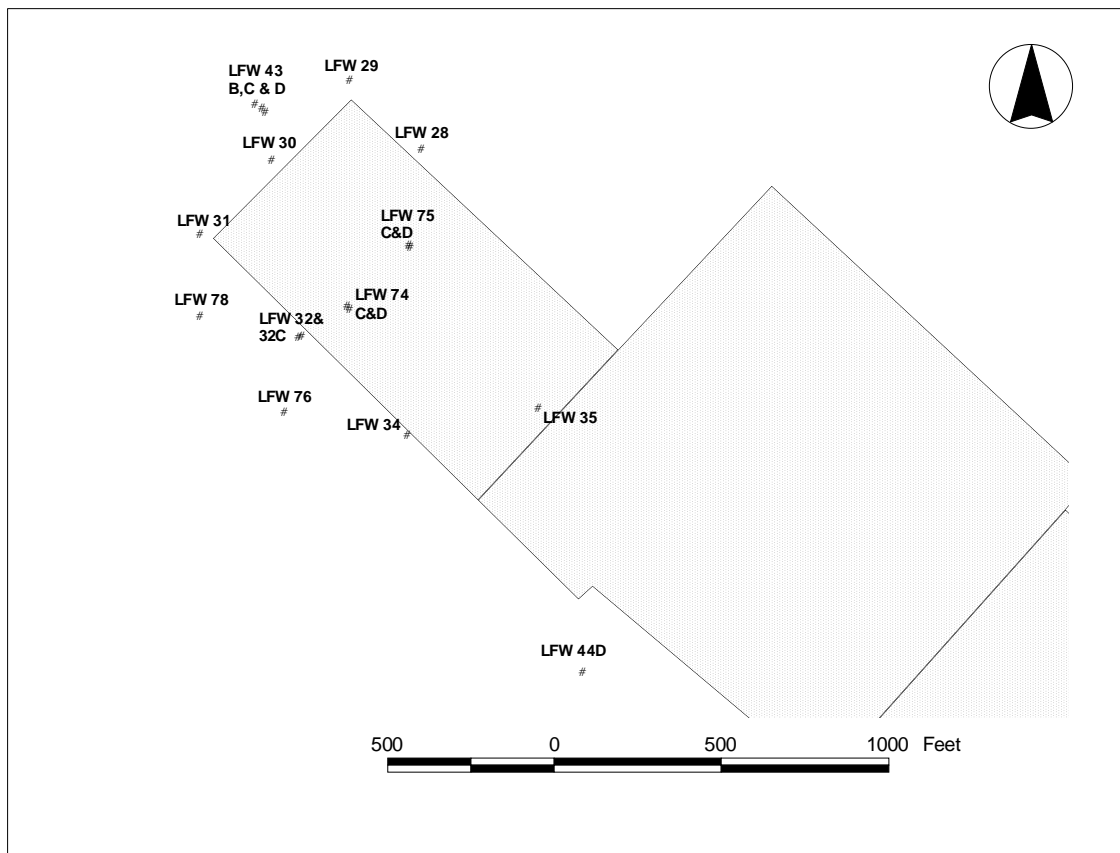


Figure 1. Interim Sanitary Landfill monitoring wells.

Flow Direction and Rate

Figures 2 and 3 are potentiometric surface maps for second and third quarters. While the surfaces seem to show flow to the southwest and the southeast, monitoring wells to the southwest have historically shown relatively minor amounts of contamination. This indicates that the predominant direction of groundwater flow is to the southeast. The flow rate can be estimated using the following equation:

$$\text{Flow(ft/day)} = \frac{\text{Hydraulic Conductivity (ft/day)}}{\text{Porosity (unitless)}} \times \frac{dh(ft)}{dl(ft)}$$

The hydraulic conductivity constant is set at 16 ft/day (from Closure/Post Closure Plan), and the effective porosity value is estimated to be 20 percent. The gradients (dh/dl) from the potentiometric surfaces in figures 2 and 3 are estimated at .005. So the estimated velocity was:

$$16 / .20 \times .005 = 0.4 \text{ ft/day or } 146 \text{ ft/year.}$$

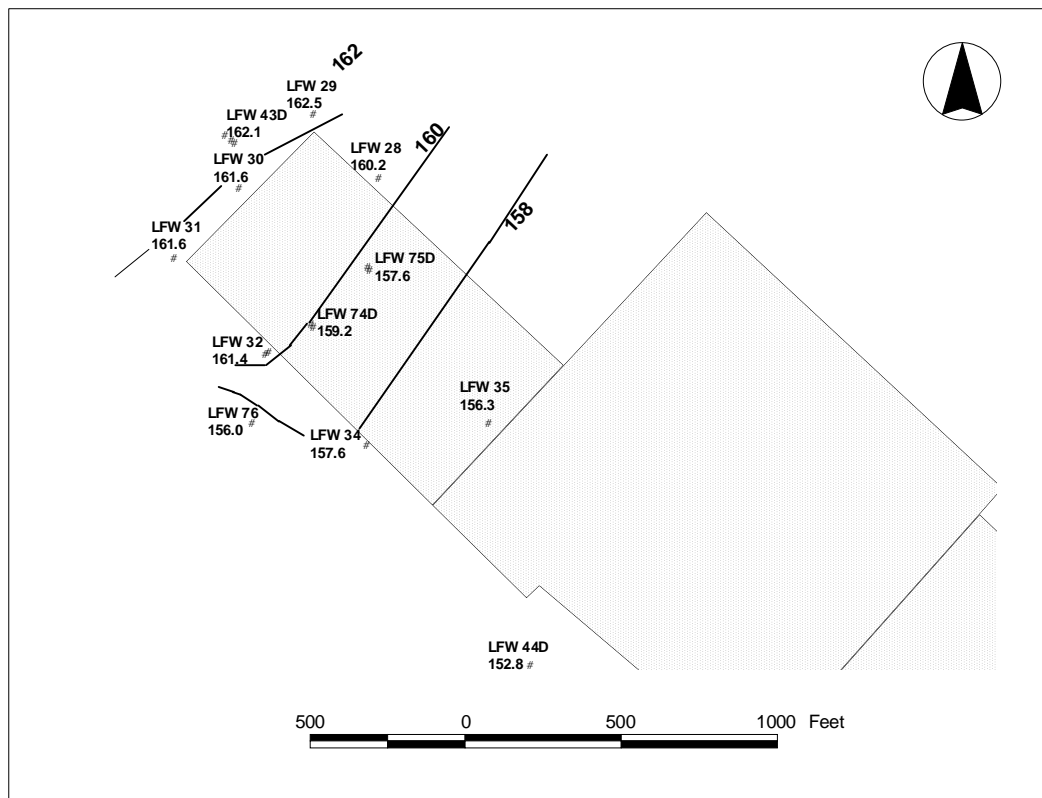


Figure 2. Potentiometric surface map of the Steed Pond Aquifer, first half of 2005 (contours in feet above sea level).

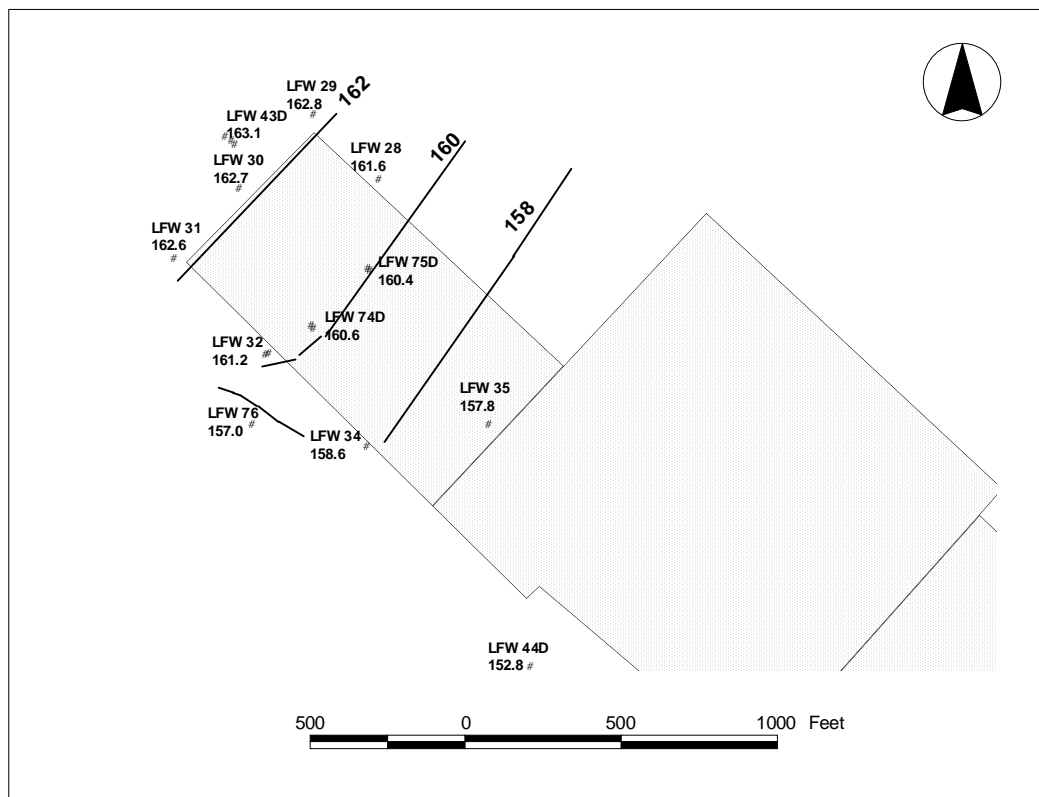


Figure 3. Potentiometric surface map of the Steed Pond Aquifer, second half of 2005 (contours in feet above sea level). Asterisk indicates anomalous value.

Analytical Results

The following analytes were detected at levels above background:

- 1,1,1-trichloroethane
- 1,1 –dichloroethane
- 1,1 –dichloroethylene
- cis-1,2-dichloroethylene
- methylene chloride
- copper
- lead
- mercury
- o-xylene
- trichlorofluoromethane
- trichloroethylene
- xlenes
- zinc

Organic Compounds

In 1995 wells on the western side of the landfill (LFW 74D and LFW 32) detected trichlorofluoromethane, 1,1-dichloroethylene and 1,1,1-trichloroethane. Since then, other nearby wells have become contaminated and additional chlorinated organics have been detected including 1,1-dichloroethane, vinyl chloride and TCE. Trichlorofluoromethane is typically present in concentrations in the hundreds of ppb. In 2005 the highest concentration reported was 468 ppb in well LFW 32. The organic plume seems to be coming from the southwest corner of the landfill and is moving to the southeast. The trichlorofluoromethane extends as far as well LFW 44D at the the Sanitary Landfill Hazardous Waste Management Facility (figure 4).

TCE, methylene chloride and 1,1-dichloroethylene are in excess of the Primary Drinking Water Standards (PDWS) in one or more wells. The maximum TCE detection for 2005 was 11.2 ppb in well LFW-32 (PDWS is 5 ppb). The maximum value for methylene chloride was 41.2 ppb in well LFW 32 (PDWS is 5 ppb). The maximum 1,1 dichloroethylene concentration for 2005 was 32 ppb in well LFW-32 (PDWS is 7 ppb).

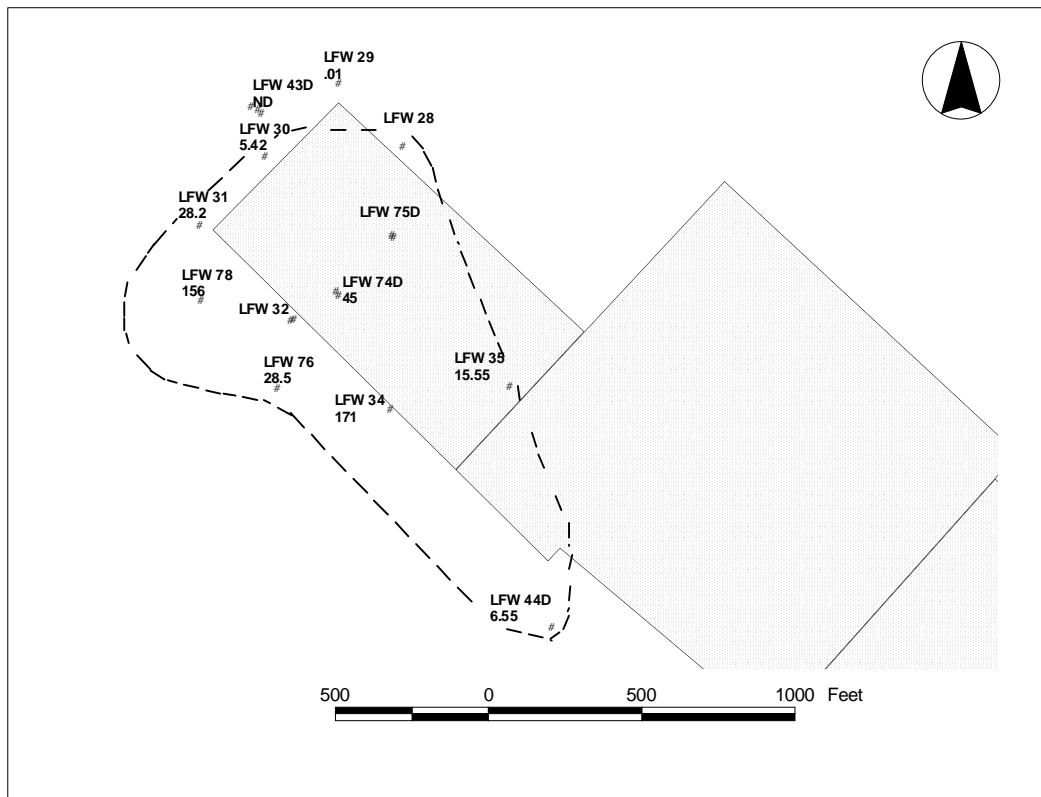


Figure 4. Trichlorofluoromethane concentrations from February-March 2005.

Metals

Elevated results for copper, lead and zinc are not uncommon in the ISL wells. Some of the wells are poor producers, and their samples commonly contain suspended clays which cause

the metals results to be misleadingly high. The elevated results tend to be sporadic and do not show any upward trend that might indicate an impact from the landfill.

Mercury was above the mcl of 2 ppb in wells LFW-32, 34 and 74D (the wells that also contain the highest concentrations of organics). The maximum result was 5.71 ppb from LFW-32.

CONCLUSIONS

The direction of groundwater flow beneath the ISL is similar to past years. Potentiometric surfaces indicate flow to the southwest, south and southeast. The current and historical distributions of contaminants demonstrate that the contaminant plumes of concern are moving to the southeast toward the Sanitary Landfill Hazardous Waste Management Facility.

The most serious contaminants found in the ISL are mercury and a variety of chlorinated hydrocarbons that are concentrated in a plume that extends from well LFW-32 down the southwest fenceline to well LFW-44D. Because the plume appears destined to mix with groundwater that has already been impacted by the Sanitary Landfill, no corrective action is justified at this time. It is highly probable that the ISL contaminants will attenuate before reaching the point of compliance of the Sanitary Landfill. This was demonstrated in Assessment of Corrective Measures for the Interim Sanitary Landfill (U), WSRC-RP-2003-4100 which was submitted in June of 2003.

Landfill gas concentrations in the vadose zone were very high during the first quarter sampling event, but dissipated over the next three quarters. The 2004 monitoring results are shown in table 1.

Table 1. Landfill gas monitoring results.

WELL	DATE	LEL%	O 2%
LGM-1	2/23/2005	0%	20%
LGM-2	2/23/2005	0%	20%
LGM-3	2/23/2005	0%	20.8%
LGM-4	2/23/2005	0%	20%
LGM-1	5/25/2005	0%	20%
LGM-2	5/25/2005	0%	19%
LGM-3	5/25/2005	100%	12%
LGM-4	5/25/2005	0%	20%
LGM-1	8/24/2005	0%	20.0%
LGM-2	8/24/2005	2.5%	19%
LGM-3	8/24/2005	100%	8%
LGM-4	8/24/2005	5%	20.1%
LGM-1	11/22/2005	2%	21%
LGM-2	11/22/2005	0%	20%
LGM-3	11/22/2005	0%	19%
LGM-4	11/22/2005	0%	20.8%