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✓ **M-Area Hazardous Waste Management Facility Groundwater
Monitoring Report-Fourth Quarter 1993 and 1993 Summary
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1.0 Summary

This report describes the groundwater monitoring and corrective action program at the M-Area Hazardous Waste Management Facility (HWMF) at the Savannah River Site (SRS) during fourth quarter 1993 and during the year 1993 as required by South Carolina Hazardous Waste Permit SC1-890-008-989 and section 264.100(g) of the South Carolina Hazardous Waste Management Regulations. Chapter 1 summarizes the results for fourth quarter 1993 and for the year.

- The hydrostratigraphic nomenclature used in this report was revised several times during 1993 as the geologic interpretation of A and M Areas at SRS was updated. The fourth quarter 1993 revision was according to S. E. Lewis and R. K. Aadland in **Hydrogeologic Setting of A/M Area: Framework for Groundwater Transport**, WSRC-TR-92-355 (December 10, 1993, revision).
- During fourth quarter 1993, the 42 point-of-compliance (POC) wells at the M-Area HWMF were sampled for drinking water parameters, Appendix IX constituents listed in Appendix A of Permit SC1-890-008-989, and water quality parameters. 1,1-Dichloroethylene, lead, nitrate-nitrite, tetrachloroethylene, and trichloroethylene exceeded the Groundwater Protection Standards (GWPS) in one or more of the POC wells. Aluminum, barium, chloride, nickel, sodium, sulfate, total phosphates, or zinc exceeded standard background concentrations in one or more of the POC wells. Trichloroethylene, tetrachloroethylene, and sodium exceeded standards most frequently. Trichloroethylene was elevated in 37 wells, tetrachloroethylene was elevated in 32 wells, and sodium concentrations were elevated in 26 wells.
- During 1993, 15 constituents exceeded the GWPS or background concentrations during at least one quarter in one or more of the POC wells. Aluminum was elevated in 23 wells, barium in 1 well, cadmium in 1 well, chloride in 9 wells, 1,1-dichloroethylene in 7 wells, lead in 4 wells, nickel in 6 wells, nitrate and nitrate-nitrite in 15 wells, sodium in 30 wells, sulfate in 11 wells, tetrachloroethylene in 36 wells, total phosphates in 20 wells, 1,1,1-trichloroethane in 1 well, trichloroethylene in 39 wells, and zinc in 1 well. As in 1992, sodium, tetrachloroethylene, and trichloroethylene occurred most frequently during the year.
- During third quarter 1993, the POC wells were analyzed for Appendix IX constituents. Twelve constituents (antimony, bis[2-ethylhexyl] phthalate, carbon disulfide, chloroform, cobalt, dichloromethane [methylene chloride], 1,4-dioxane, PCB 1254, p-phenylenediamine, thallium, tin, and toluene) not identified in Appendix A of Permit SC1-890-008-989 exceeded their analytical method detection limits (see section 2.5 of this report). Confirmation analyses for these constituents will be conducted during first quarter 1994 to determine if any of these constituents should be added to Appendix A of the permit.

- During first quarter 1993, confirmation analyses for third quarter 1992 Appendix IX results were conducted. Duplicated samples from wells MSB 1C, 2B, 3C, 7B, 13B, 62D, and 64B were analyzed for antimony, carbon disulfide, chloroform, dichlorodifluoromethane, 1,1,2-trichloroethane, trichlorofluoromethane, or vanadium. The results of these analyses were compared statistically with background values and confirmed that none of these constituents should be added to Appendix A of the permit.
- Nineteen new plume definition wells were sampled beginning fourth quarter 1993. These wells were MSB 23TR, 32B, 32C, 87B, 87C, 88B, 88C, 88D, 89B, and 89C; and SRW 1BB, 3BB, 4BB, 8BB, 10BB, 11BB, 17BB, 17C, and 17D.
- Arsenic, 1,1-dichloroethylene, lead, nitrate and nitrate-nitrite, tetrachloroethylene, and trichloroethylene exceeded Primary Drinking Water Standards (PDWS) in one or more plume definition wells at the M-Area HWMF during fourth quarter 1993.
- During 1993, arsenic, 1,1-dichloroethylene, lead, nitrate and nitrate-nitrite, tetrachloroethylene, and trichloroethylene exceeded PDWS in one or more plume definition wells at the M-Area HWMF.
- During fourth quarter 1993, the M-1 air stripper removed a total of 4,882 pounds of solvent from the groundwater beneath the M-Area HWMF. The M-1 operated a total of 2,078.4 hours with a downtime of 129.6 hours, resulting in a total utility of 94.1 percent. The emission rate was 2.35 lbs/hr. The quarterly throughput was 56,417,250 gal at an average water feed rate of 453 gal per min (gpm). The average monthly influent of trichloroethylene was 6,618 $\mu\text{g/L}$ and of tetrachloroethylene was 3,764 $\mu\text{g/L}$. The average quarterly effluent total was less than 2.0 $\mu\text{g/L}$.
- During 1993, the M-1 air stripper removed a total of 19,505 pounds of solvent from the groundwater beneath the M-Area HWMF. The M-1 operated a total of 8,444.2 hours with a downtime of 315.8 hours, resulting in a total utility of 96.4 percent. The emission rate was 2.31 lbs/hr. The average monthly influent of trichloroethylene was 6,212 $\mu\text{g/L}$ and of tetrachloroethylene was 3,414 $\mu\text{g/L}$. The average quarterly effluent total was less than 2.1 $\mu\text{g/L}$.
- The M-1 air stripper has removed a cumulative total of 273,293 pounds of solvent from nearly 1.8 billion gal of groundwater while operating at an average utility of 95.3 percent. The water feed rate has averaged 427 gpm since startup. Stripping efficiency has always been greater than 99.95 percent, with effluent trichloroethylene and tetrachloroethylene concentrations less than the permit limit of 5 $\mu\text{g/L}$ (see SCDHEC, 1987, section 2.0). Combined with the contaminated water treated by the experimental units, the total mass of trichloroethylene and tetrachloroethylene removed by the M-1 air stripper was 305,428 pounds.
- The A-1 air stripper removed a total of 165 pounds of solvent from the groundwater beneath the M-Area HWMF during fourth quarter 1993. The A-1 operated 2,202.8 hours with a downtime of 5.2 hours, resulting in a total utility of 99.8 percent. The quarterly throughput was 7,098,707 gal at an average water feed rate of 54 gpm. The average

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