P-Area Reactor 1993 Annual Groundwater Monitoring Report

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Joseph P. Kunkle, Engineer 11-16-94

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Does Not Contain Unclassified
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Westinghouse Savannah River Company
Savannah River Site
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MASTER

SAVANNAH RIVER SITE

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List of Acronyms

ABS	Automatic Backup Shutdown
AEC	Atomic Energy Commission
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CHRS	Confinement Heat Removal System
DMA	Diagnosis of Multiple Alarms
DOE	Department of Energy
DWS	Drinking Water Standard
ECS	Emergency Cooling System
EEM	Essential Equipment Monitor
EP	Extraction Procedure
EPA	U.S. Environmental Protection Agency
EPD/EMS	WSRC Environmental Protection Department/Environmental Monitoring Section
FFA	Federal Facilities Agreement
Gamma PHA	gamma pulse-height analysis
GC VOA	gas chromatographic volatile organic analyses
GTM	Gang Temperature Monitor
mrem/hr	millirems per hour
MRS	Moderator Recovery System
nCi/g	nanoCuries per gram

NPDES	National Pollution Discharge Elimination System
pCi/L	picoCuries per liter
pCi/mL	picoCuries per milliliter
PDWS	primary drinking water standards
RCRA	Resource Conservation and Recovery Act
REDAC	Remote Detection and Control; also called Reactor Data Acquisition Control
REMACS	Remote Monitoring and Control System
RFI/RI	RCRA Facility Investigation/Remedial Investigation
RMA	Radiological Materials Area
SCDHEC	South Carolina Department of Health and Environmental Control
SCHWMR	South Carolina Hazardous Waste Management Regulations
SDWS	secondary drinking water standards
SRS	Savannah River Site
SSS	Supplemental Safety System
TRU	transuranic
WSRC	Westinghouse Savannah River Company
µg/L	micrograms per liter
µS/cm	microSiemens per centimeter

Executive Summary

Groundwater was sampled and analyzed during 1993 from wells monitoring the water table at the following locations in P Area: well P 24A in the eastern section of P Area, the P-Area Acid/Caustic Basin (six PAC wells), the P-Area Coal Pile Runoff Containment Basin (four PCB wells), the P-Area Disassembly Basin (two PDB wells), the P-Area Burning/Rubble Pit (four PRP wells), and the P-Area Seepage Basins (seven PSB wells).

During 1993, pH was above its alkaline standard in well P 24A. Specific conductance was above its standard in one well each from the PAC and PCB series. Lead exceeded its 50 µg/L standard in one well of the PDB series during one quarter. Tetrachloroethylene and trichloroethylene were detected above their final primary drinking water standards (DWS) in one well of the PRP well series. Tritium was consistently above its DWS in the PDB and PSB series.

Also during 1993, radium-228 exceeded the DWS for total radium (radium-226 plus radium-228) in three wells of the PAC series and one well of the PCB series; total alpha-emitting radium (comprising radium-223, -224, and -226) exceeded the same standard in a different PCB well. (Neither radium-228 or total alpha-emitting radium have final primary DWS per se.)

These results are fairly consistent with those from previous years. Unlike results from past years, however, no halogenated volatiles other than trichloroethylene and tetrachloroethylene exceeded DWS in the PRP well series although gas chromatographic volatile organic analyses were performed throughout the year.

Some of the regulated units in P Area appear to need additional monitoring by new wells because there are insufficient downgradient wells, sometimes because the original well network, installed prior to regulation, included sidegradient rather than downgradient wells. No monitoring wells had been installed through 1993 at one of the RCRA/CERCLA units named in the Federal Facilities Agreement, the Bingham Pump Outage Pits.

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P-Area Reactor

Savannah River Site History

In September 1949, the Soviet Union completed successful testing of its first atomic weapon. In response to this development, the United States Department of Defense began planning for a more diversified stockpile of nuclear armaments. In January 1950, President Harry Truman directed the United States Atomic Energy Commission (AEC) to increase research on all forms of nuclear defense, particularly the "super" or hydrogen weapon.

On June 12, 1950, the AEC contracted with E. I. du Pont de Nemours and Company to design, construct, and operate the Savannah River Plant for the purpose of producing materials for use in nuclear and thermonuclear weapons. Site surveys began in July 1950. The plant is located in Aiken, Barnwell, and Allendale counties in South Carolina, southeast of Augusta, Georgia (Figure 1).

Construction of the complex began in February 1951, and the heavy water processing plant became the first facility in operation in August 1952. R Reactor was the first production unit to achieve criticality (December 28, 1953) and was followed by P, L, K, and C Reactors, respectively.

In 1975, the duties of the AEC were transferred to the newly established Energy Research and Development Administration and the Nuclear Regulatory Commission. In 1976, these two agencies evolved into the Department of Energy (DOE), which has overseen all functions of the facility since that year. Du Pont operated the complex through March 1989. Westinghouse Savannah River Company (WSRC) became the operating contractor on April 1, 1989, and the Savannah River Plant was renamed the Savannah River Site (SRS).

During the period of weapons-grade material production, the SRS complex consisted of a heavy water production and rework facility, a fuel and target fabrication plant, five reactors, two chemical separations plants, and a number of waste management facilities. As of August 1994, all SRS production reactors are inactive. C, L, P, and R Reactors are in shutdown status, and K Reactor remains in cold standby.

Recent functions of the SRS complex have included the recycling of nuclear components and the production of isotopes for medical applications and nonweapons use in the nation's space program. In addition to these tasks, SRS' environmental restoration and waste management activities have been expanded.

Figure 1. Savannah River Site and Its Environs

Process Overview

The primary materials produced at the Savannah River Site during operation were plutonium (Pu-238 and Pu-239) and tritium (H-3). These products were produced by absorption of neutrons in neptunium (Np-237), uranium (U-238), and lithium (Li-6).

The production process consisted of

- Fabrication of fuel and target materials into elements/assemblies
- Irradiation of these assemblies in the reactors
- Separation of transuranic elements, tritium, and residual uranium from waste byproducts produced by irradiation
- Recovery and purification of heavy water used as a coolant and neutron moderator
- Storage, processing, and disposal of waste

Figure 2 provides an overview of the production process.

During fission in the reactor, neutrons caused uranium-235 atoms to split into lighter atoms. In addition, each fissioned uranium-235 atom released two to three neutrons. This surge of released neutrons, which split more uranium-235 atoms, resulted in a chain reaction that generated enormous amounts of energy.

Some neutrons from the chain reaction were captured by uranium-238 atoms. When a uranium atom captured a neutron, the atom became an artificial and unstable isotope known as uranium-239. The uranium-239 emitted a beta particle to form neptunium-239, which in turn emitted another beta particle to form plutonium-239.

Reactors were moderated and some of the heat generated by fissioning was removed by recirculating heavy water (deuterium oxide or D₂O). The combination of high moderating ability and low neutron absorption provided by heavy water permitted flexibility in designing different charges to produce different products. Heat was removed from the heavy water in the reactor coolant system's heat exchangers by a once-through flow of "light" water (H₂O) from either the Savannah River or one of two manmade reservoirs, Par Pond or Lake. Figure 3 illustrates the site-wide flow of cooling water from its surface water sources to the reactor buildings and back to surface water.

At the conclusion of controlled fissioning, fuel and target assemblies were moved from the reactor core to a large pool of water in the reactor building to permit decay of short-lived fission products before the assemblies were delivered to one of the chemical separations plants within the SRS complex.

Figure 2. Production Process Diagram

Figure 3. Cooling Water Supply Diagram

Reactor-produced materials were processed in the Separations Area. Target rods were processed to obtain the desired radioactive products, which were compressed in cylinders (tritium) or converted into solids (plutonium) for shipment to other DOE facilities. Gases were extracted from irradiated reactor elements in an electric furnace in the tritium facilities. Several purification steps produced high-purity tritium.

Aluminum cladding on the uranium target slugs was dissolved in sodium hydroxide solution, followed by dissolution of the target material in nitric acid. Spent uranium fuel also was dissolved in nitric acid. After this dissolution, the subsequent nitric acid solution was treated by a solvent extraction process to yield solutions of plutonium, uranium, or neptunium. This method also produced both high- and low-heat liquid wastes containing fission products. Additional processing transformed plutonium, uranium, and other higher atomic number products from solution to solid for shipment, recycling, or processing.

Liquid radioactive wastes produced by the chemical processing were partially concentrated and stored in large underground tanks in the Separations Area, and low-level radioactive solid wastes were disposed of in the centrally located burial grounds.

Reactor Area Processes

All five SRS reactors were production reactors used to fabricate nuclear materials for both government and civilian uses. They were designed to produce thermal neutrons that could be used to create a large amount of isotopes.

The two main products of the reactor were plutonium (produced by the absorption of neutrons in the uranium-238 isotope) and tritium (produced by the absorption of neutrons in the lithium-6 isotope). Other products manufactured at SRS included uranium-233, plutonium-238, curium-244, polonium-210, cobalt-60, and californium-252.

The reactor buildings are large reinforced concrete structures designed to be blast-resistant and reinforced for seismic activity. Heavy concrete shielding and a confinement system were used within each building to protect personnel from radiation and to minimize atmospheric radioactive releases. A cross section of a reactor building is provided in Figure 4. Each building contained four major process areas:

- The assembly area containing the fuel and target receiving areas, assembly and testing areas, and fuel storage areas
- The production reactor and its supporting operational and safety systems
- The disassembly area consisting of a pool (basin) for the storage and disassembly of irradiated fuel and target elements
- A purification-system area containing heavy-water moderator/coolant (D₂O) purification facilities

Assembly

New fuel for use in the reactor process was received, assembled, inspected, tested, and stored in the reactor building's assembly area. The fuel and target fabrication facility manufactured fuel, target, control, and safety rods for use in the production reactors. Fuel and target materials were organized into the proper operating configurations in the assembly area.

During the production process, fuel assemblies produced neutrons for the target assemblies, causing nuclear reactions that eventually produced the desired materials. Fuel rods consisted of extruded enriched-uranium fuel slugs arrayed in aluminum casing. Target rods usually consisted of uranium or lithium (depending on the product to be produced) inside a lithium-aluminum alloy jacket. Aluminum was used because of its low neutron absorption rate, good heat transfer properties, and ability to be easily processed.

Control rods were used to regulate neutron exchange, and safety rods provided immediate shutdown in case of adverse conditions. Control rods were composed of either cadmium or lithium-aluminum depending on the desired product to be manufactured. Safety rods were fabricated from cadmium and were designed as

Figure 4. Schematic Cross Section of Reactor

safeguards against reactor core damage. Cadmium was used in safety and control rods because of its high neutron absorption rate.

Equipment in the assembly area included an inlet conveyor, a charge machine, a discharge machine, and a deposit-and-exit conveyor. The charge and discharge machines were cranes that could perform similar functions, but only the discharge machine could supply heavy- or light-water cooling to an irradiated assembly as it was being removed from the reactor vessel. The charge machine transported assemblies from the assembly area to the reactor.

Inside the Reactor

The reactor area was located in the central portion of the reactor building and housed the reactor, actuator system, heat exchangers, process pumps and piping, motors, crane and reactor control rooms, crane wash and maintenance areas, and auxiliary equipment and service facilities.

Process monitoring and control of the reactor was accomplished in the central control room. Reactivity instruments, controls, and assembly flow and temperature monitors were grouped together at one end of the control room, and instruments for hydraulic and auxiliary systems were at the opposite end.

The nuclear fission process took place within reactor vessels, 4.5 m × 5 m cylinders composed of 1/2-in. stainless steel plate and containing a lattice of fuel and target assemblies, control rods, and instrumentation submerged in the primary heavy-water moderator/coolant. Figure 5 illustrates the process.

The reactor vessels were designed so that D₂O coolant entered through six nozzles at the top of the reactor into a plenum, flowed down coolant channels in the fuel and target assemblies, and discharged into the bulk moderator. Coolant then left through six nozzles at the bottom of the reactor vessel. A gas plenum and top radiation shield were located between the inlet water plenum and the reactor vessel. A radiation shield located under each reactor vessel provided flow and temperature monitoring for each fuel and target position. Figure 6 illustrates a reactor tank.

The assemblies and rods were arranged within a lattice framework to provide the most effective nuclear fission environment. Reactor lattices consisted of approximately 600 fuel and target rods and additional safety rod and control rod clusters that were housed in the reactor tank. Fuel and target rods were arranged in various loading patterns within the reactor to form a charge to initiate the nuclear process. As charging began, the fuel and targets were lifted by the charging machine and inserted into holes in the reactor tank lattice. The flow of D₂O and H₂O was raised to operating levels to moderate the reaction and cool the fuel rods. Safety rods were then extracted by the discharging crane in a predetermined order, followed by the control rods.

Figure 5. Reactor Cooling System Diagram

Figure 6. Reactor Tank

When the safety and control rod clusters were lifted by the discharging machine, the nuclear reaction began. The number and rate at which the rods were removed were closely specified. After the achievement of criticality, the rate of the reaction was raised by adjusting the control rod pattern.

Neutron-absorbing control rods were inserted into the core to regulate power levels by controlling flux, or flow of neutrons, in the reactor. Each fuel and target position contained control rods that could be moved individually or in groups. Two half-length rods in each position controlled the vertical flux distribution, and full-length rods controlled power and radial flux distribution.

Safety rods provided a primary rapid-shutdown system to prevent core damage to the reactor. They were designed to drop into the reactor core within one second upon indication of adverse conditions. Each reactor had a supply of 66 neutron-absorbing cadmium safety rods.

Post-Irradiation Cooling

Following irradiation, fuel and target assemblies were allowed to decay to a specified heat-generation rate prior to assembly discharge. After sufficient heat-generation-rate decay, the discharge machine removed all assemblies from the

reactor vessel and rinsed all fuel and target rods with light water. The rinsing process allowed reclamation of heavy water from the discharged assemblies and minimum carryover of tritiated water to the disassembly basin. The rinse water was collected in a discharge machine water pan and sent to a rinse water collection tank. The rinse water was periodically removed from the tank, placed in drums, and transported to the heavy-water rework facility for removal of light water.

Cooling began automatically when an irradiated assembly was completely withdrawn from the reactor. Cooling could also be enacted if an assembly stuck during withdrawal. Both heavy and light cooling water were available on the discharge machine during the discharge operation.

The discharge machine transported irradiated assemblies to the deposit-and-exit conveyor, housed in a water-filled canal, which transported them beneath the reactor-room wall to a water-filled disassembly basin for temporary storage.

Disassembly

The disassembly basin was used to cool and disassemble all components used in the reaction process. Figure 7 illustrates the flow of cooling water and contaminants associated with activities at the disassembly basin.

The irradiated assemblies were held in the disassembly basin to permit decay of unwanted radionuclides generated by the fission process. Assemblies and components were cooled by natural convection during storage in the disassembly basin. In addition to cooling functions, the water within the basin served to shield personnel from radiation.

After sufficient heat-level decay, the assemblies were disassembled underwater using submerged power tools. Disassembled components were stored in the basin and allowed to decay until their heat levels were acceptable for movement to the Separations Area. The disassembled components were then moved from the basin to a transfer bay where they were deposited in shielded shipping casks. These casks were transported to the Separations Area by rail or tractor-trailer.

Discharged assemblies were often covered by a thin liquid film from the reactor vessel. This liquid film contained activated corrosion products, particulate activities, tritium, and other radioisotopes that could escape from irradiated assemblies. Assembly corrosion, cooling, and disassembly of the components added to the contamination of the disassembly basin water.

Due to the transfer of radiation from the irradiated materials to the disassembly basin water, biannual purging of the basin water was necessary to reduce the accumulation of tritium and any other radioactive substances. During disassembly basin purging, basin cooling water was passed through two deionizer beds, monitored, and discharged to a low-level seepage basin.

Figure 7. Disassembly Basin Diagram

Immediately after discharge, the fuel tubes were temporarily stored in a vertical array under water in the disassembly basin. The fuel tubes were subsequently emptied, collected, and stored in buckets.

Heavy-Water Purification

The function of the reactor building purification system area was to purify and recirculate the heavy water used as reactor coolant throughout the entire irradiation process.

During production, heavy-water moderator/coolant was subject to the introduction of several impurities, including the corrosion of aluminum cladding on fuel and target rods, the massing of neutron-absorbing substances that would otherwise be used in nuclear materials production, molecular decomposition of the heavy water into deuterium and oxygen as a result of radiation, neutron activation of component or suspended corrosion products and impurities, and accumulation of light water in the moderator.

During the production phase, heavy-water moderator/coolant was continuously purified through a system of filters in the reactor area. A side stream of heavy water was continuously diverted from the reactor circulating system and sent through a purification system, which circulated the primary coolant/moderator through a prefilter, a deionizer, and an afterfilter located in a shielded purification area. Most of the side stream was returned to the reactor system; the remainder was transported to a distillation area for removal of light water.

The deionizer contained mixed-bed ion exchange resin for removal of both cations and anions. The filters retained particles larger than 10 micrometers in diameter. The prefilter removed suspended solids, and the afterfilter retained any resin that might have passed through the deionizer.

Storage and Disposal of Waste

SRS stores or disposes of six categories of waste:

- High-level waste
- Transuranic waste
- Low-level waste
- Hazardous waste
- Mixed waste
- Sanitary waste

High-Level Waste

The reactor areas did not produce or store high-level waste.

Transuranic Waste

Transuranic (TRU) waste is produced in radiological materials areas (RMAs) such as the reactor areas. TRU waste is defined as radioactive waste containing transuranic elements above specified concentrations. It decays slowly, thus requiring isolation for thousands of years. TRU waste comprises a variety of materials including miscellaneous trash and equipment. It is stored in the Separations Area.

Low-Level Waste

Low-level waste is any radioactive waste not classified as high-level or TRU waste. It was generated by reactor operations, isotope production, and research and development projects.

Low-level reactor-produced waste includes contaminated equipment such as resins contaminated with carbon-14, irradiated reactor hardware that does not contain spent fuel, and spent lithium-aluminum targets. Other examples of low-level waste include pipe, rags, paper, filters, tools, protective clothing, and suspect materials used within an RMA that cannot be proven to be uncontaminated.

Low-level radioactive solid wastes were disposed of in the centrally located Separations Areas' burial grounds.

Hazardous Waste

Hazardous waste is defined as any solid material that could damage the environment or pose a risk to human health, characterized as toxic, corrosive, reactive, or ignitable, or as containing any of a number of constituents specified by the U.S. Environmental Protection Agency (EPA).

Procedures to screen for radioactivity have been approved at SRS for liquids and solids originating either inside or outside an RMA. If approved for shipment, hazardous wastes may be transported offsite for treatment and disposal. Wastes that fail the screening process must be recategorized as mixed waste.

Mixed Waste

Mixed waste is a combination of radioactive and hazardous wastes and is produced both inside and outside an RMA. Disposal in the Separations Area burial grounds of mixed waste from reactor operations, including tritiated pump oil, lead used for shielding, and cadmium from control rods, safety rods, and shielding, was discontinued in March 1986. Mixed waste storage buildings

within the boundaries of the burial grounds have been receiving such waste since March 1987.

Sanitary Waste

Sanitary waste is neither radioactive nor hazardous. Solid sanitary waste from throughout SRS is disposed of in the landfill; liquid sanitary waste, including sewage and industrial waste, is treated in SRS sewage treatment plants.

P Reactor

P Reactor, located in the east-central portion of the Savannah River Site, achieved criticality in February 1954. It produced plutonium and tritium for national defense until 1987, when it was taken off-line for maintenance and safety upgrades. P Reactor was placed in warm standby in 1988 and in shutdown status in 1991. Facilities discussed in this report are shown in Figure 8. A time line of major activities in the area is shown in Figure 9.

Figure 8. P Area

Reactor Modifications

Supplementary Safety System

A supplementary safety system (SSS) was installed in 1955 to provide for manual reactor shutdown via the injection of a liquid neutron absorber, should the safety rods fail to drop on demand.

Figure 9. Time Line for P Area

1966 through 1980

Figure 9. Time Line for P Area, Continued

Figure 9. Time Line for P Area, Continued

Automatic Backup Shutdown System. The first of the automatic backup shutdown (ABS) systems, the gang temperature monitor (GTM), was installed in 1974. The GTM was completely independent of the safety rod shutdown system and had its own power supply. It was designed to activate the SSS to inject gadolinium nitrate into the reactor tank when the coolant effluent temperatures of assemblies exceeded prescribed limits.

Automatic Backup System. By 1979, faster response time and more comprehensive protection were desired in the reactor facilities. Capability was added that year to back up the safety computer scram relays and supplement the safety rod scram action with automatic injection of the SSS poison if certain emergency conditions were recognized.

Cooling Systems/Bingham Pump Outage Pits

Each SRS reactor received major modifications to primary and secondary cooling systems beginning in 1957. Heat exchangers and larger heavy water pumps were installed at each production facility.

During that time, a Bingham pump outage pit was installed at P Area for disposal of debris contaminated with low-level radioactivity. Normally, all radioactive solid waste generated in the reactor areas was sent to the solid waste burial ground, but an exception to this practice was made during the cooling system modifications. From January to November 1958, the pit was filled with miscellaneous construction equipment such as pipes, cables, ladders, drums, and boxes of miscellaneous hardware. All waste materials with high levels of contamination were sent to the radioactive solid waste burial ground.

The P-Area Bingham Pump Outage Pit was backfilled with clean soil in late 1958. It is believed to contain less than one curie (combined inventory) of cobalt-60, strontium-90, ruthenium-103 and -106, cesium-137, and promethium-147.

Ventilation Exhaust System

The ventilation exhaust system was modified in 1960–61 to remove airborne contaminants. It provided moisture separators, particulate filters, and halogen adsorbers (carbon) to remove airborne contamination, particularly iodine-131, in process area ventilation exhaust. The filter system was upgraded in 1976 with a form of carbon that better retains organic iodides.

In response to concern that the carbon filters would overheat in the event of extensive core melting, reducing their iodine-retention capacity and perhaps even causing collected iodine to be desorbed, a Confinement Heat Removal System (CHRS) was installed in 1979. The system was designed to permit manually flooding the reactor building's -40-ft-level pump room floor with water from the disassembly basin if certain conditions indicated a full-core meltdown. The temperature of molten core that had breached the reactor tank bottom and been

deposited on the floor would be sufficiently reduced by the water to prevent failure of the confinement system filters.

Emergency Cooling System

The emergency cooling system (ECS) received upgrades during 1962–63. A 50-million-gallon earthen cooling basin was constructed to contain contaminated water that would accumulate during a loss-of-cooling or loss-of-circulation accident followed by ECS activation.

The system was updated in 1967 by the addition of a 20,000-gallon storage tank filled with neutron-absorbing solution.

Remote Detection and Control System

P Reactor received a Remote Detection and Control (REDAC) system, also sometimes called the Reactor Data Acquisition and Control System, in 1962–63 to provide the capability to monitor system parameters remotely and to add light water if necessary after an evacuation.

In 1988, the REDAC system was replaced by a new remote emergency monitoring and control system (REMACS) that would allow a reactor to be monitored and controlled from any other reactor or a remote control station.

GE-412 Computer System

A GE-412 computer system was installed in all reactor area control rooms in 1964 for improved reactor temperature monitoring and better operating analysis. The computers could effect control rod reversal if assembly coolant temperatures increased to 1° C above prescribed limits. This reversal capability prevented minor incidents from reaching the point where emergency circuits were involved.

Seismic Upgrades

In 1976, improvements were made to all reactor areas to improve resistance to earthquakes. Upgrades included strengthening the base of the actuator towers and eliminating the spring action of the supporting girders to decrease the towers' response to dynamic forces. Other improvements included strengthening the building exhaust stack and improving lateral support for the emergency cooling system and SSS piping.

Interdata M-70 Computers

The GE-412 process control computers in each reactor area were replaced in 1978 with two Interdata M-70 computers to monitor data and perform control operations. Only one of the M-70 computers performed the primary functions at any given time, while the other provided secondary data processing functions and

remained in standby status. Either computer was able to perform all required functions in case one became unavailable.

Contaminated Water Storage Facilities

In 1979, a 500,000-gallon storage tank was added to the 50-million-gallon earthen storage basin for contaminated water. Following D₂O or H₂O leaks where water flow was designed to drain to the -40-ft sumps, the first 60,000 gallons were to be pumped to Building 106 (the process water storage tank). The next 500,000 gallons were to be pumped to the new storage tank, which was vented back through the 105 Building ventilation/confinement system. Any additional flow was diverted to the 50-million-gallon basin. Water from leaks originating in the reactor room zero level or from pump operation was to go directly to the 50-million-gallon basin.

Diagnosis of Multiple Alarms

The Diagnosis of Multiple Alarms (DMA) system was intended to aid operators in managing abnormal reactor conditions by automatically analyzing patterns of alarms and sensor outputs. Installation was completed in 1982, and the system was placed on-line in 1984.

Essential Equipment Monitor

The Essential Equipment Monitor (EEM) was installed in all reactor areas in 1982 for continuous monitoring of emergency control system equipment and essential functions that were expected to operate if the incident switch was activated.

Moderator Recovery System

A moderator recovery system (MRS) was installed in 1987-88 to cope with small D₂O leaks. When the MRS was activated, spilled D₂O accumulated in the -40-ft sumps was to return to the reactor gas space, where it would flow down into the bulk moderator.

Burning/Rubble Pits

An abundance of construction debris necessitated the construction and activation of a burning/rubble pit in P Area in 1951. The pit received burnable waste materials such as paper, plastics, wood, rubber, rags, cardboard, oil, degreasers, and drummed solvents. Disposal of chemically contaminated soils was prohibited at the P-Area Burning/Rubble Pit. The collected waste materials were incinerated monthly.

Incineration of waste materials in all burning/rubble pits throughout the SRS complex was discontinued in October 1973. A layer of soil was placed over the

remainder of the burning pit waste, and the pits were converted to receiving only rubble, including nonsalvageable materials such as paper, wood, concrete, scrap metal, cans, and empty galvanized steel drums.

The pit reached its capacity in 1978 and was closed and covered with soil to grade level. All burning/rubble pits in the SRS complex were covered by 1981.

Ash Basin and Coal Pile Runoff Containment Basin

The P-Area powerhouse was a coal-operated facility that supplied power to the reactor area. The P-Area Ash Basin was constructed in 1951 to receive fly and bottom ash from the powerhouse. Ash disposal ended in 1990.

Coal is stored in open piles, and rainfall runoff from these piles was allowed to flow into surface streams until 1977. A National Pollutant Discharge Elimination System (NPDES) permit in that year required all discharges to fall between pH 6 and 9. Because the rainfall runoff from SRS coal piles did not meet this standard, coal pile runoff containment basins were constructed at seven sites, including one in P Area in 1981, to meet the NPDES requirement. In 1991, 75% of the P Area coal pile was removed.

Acid/Caustic Basin

The P-Area Acid/Caustic Basin was constructed between 1952 and 1955 to receive spent regenerant solutions from the water treatment facilities. Wastes discharged to the acid/caustic basin included dilute sulfuric acid and sodium hydroxide used to regenerate ion-exchange units, water rinses of the ion exchange units both before and after regeneration, steam condensate from the heater in sodium hydroxide storage tanks, and rainfall runoff from storage tank spill containment enclosures. The spent dilute solutions were transported to the acid/caustic basin through acid-resistant sewers.

The basin discharged into local surface streams, and the daily discharges normally equaled the daily influent flows to the basin. The P-Area Acid/Caustic Basin remained in service until new neutralization facilities became operational in 1982.

In 1993, the P-Area Acid/Caustic Basin was dewatered, vegetation was removed and disposed of, the basin was filled with compacted soil from the Burma Road clay pit, a grass cover was established, and the fences were reinstalled.

Seepage Basins

To ensure safe working conditions, three P-Area Seepage Basins were constructed and put into operation in 1957 to receive low-level purge water from the P-Area Disassembly Basin. The disassembly basin water was purged to the seepage basins when its tritium concentration reached 400,000 pCi/mL.

The P-Area Seepage Basins were deactivated in 1970, at which time filtered, deionized purge water was discharged directly into Steel Creek. This practice continued until 1978, when the P-Area Seepage Basins were reactivated. The seepage basins became inactive in 1988 due to the shutdown of P Reactor.

Par Pond

Par Pond was constructed in 1957–58 for discharging and recycling effluent coolant from the P and R reactors. It was formed by placing an earthen dam across Lower Three Runs Creek. When it became operational in 1958, Par Pond dissipated the thermal effects of P and R operations on secondary coolant water returned to the Savannah River.

Cooling water from P Reactor was withdrawn from the Savannah River and discharged to Steel Creek from 1954 to 1961. From 1961 to 1964, P Reactor used Par Pond as a partial source of cooling water to supplement Savannah River water. When R Reactor was placed on standby in 1964, P Reactor used Par Pond as a source of recirculating cooling water.

Other Sites

There are no records of hazardous wastes or hazardous constituents being disposed of at the currently active P-Area Erosion Control Site (131-1P).

Reactor Incidents

In December 1983, 85 curies of tritium were leaked to Steel Creek from a small moderator leak at a distillation pad.

Restart of P Reactor was attempted in August 1988 after it had been shut down for several months for safety upgrades and seismic modifications. During control rod removal, the expected power increase did not occur. Helium-3 that had built up in the reactor core due to tritium decay absorbed the neutrons that would normally maintain the fission chain reaction. Rather than attempting to determine why reactor power was not increasing as expected, the operators continued control rod removal. Due to the difficulty of monitoring rod position and the tendency of rods to stick, it was common to withdraw at least five more control rods than calculated. However, in this case, 60 more rods than expected were removed. When adequate power could not be maintained, P Reactor was

shut down. This incident posed no threat to the public but was inconsistent with accepted reactor operating practices.

DOE suspended all production reactor operations until weaknesses could be identified and resolved. Demonstrated weaknesses included non-conservative management decisions, inadequate training, and inadequate procedures.

Current Status

P Reactor was placed in shutdown status in 1991, with the intention that it would supply spare parts to L and K reactors. Habitability systems are operable, although no emergency power is available. Reactor fluid systems have been drained. There are 186 cadmium rods in the reactor vessel, two metric tons of spent nuclear material and 54 cadmium rods in the disassembly basin, and 60,000 gallons of moderator in storage tanks.

Regulatory Status

The P-Area Burning/Rubble Pit (131-P) and the P-Area Coal Pile Runoff Basin (189-P) are listed in Appendix C of the Federal Facilities Agreement (FFA) of January 15, 1993, as units regulated under the Resource Conservation and Recovery Act/Comprehensive Environmental Response, Compensation, and Liability Act (RCRA/CERCLA). Par Pond and the Bingham Pump Outage Pit in P Area (643-4G) are RCRA/CERCLA units, also listed in Appendix C of the FFA, that do not require a RCRA permit modification.

Unlike the reactor seepage basins at K and R areas, the three P-Area Seepage Basins (904-061G, 904-062G, 904-063G) are not RCRA/CERCLA units. They are considered to be active and are included among the facilities on the FFA's site evaluation list (Appendix G).

Also included on the site evaluation list are the P-Area Disassembly Basin (105-P); P-Area Erosion Control Site (131-1P); P-Area Reactor Cooling Water System (186-P, the cooling water reservoir, and 190-P, the cooling water pump house, approximately 100 yards east of the reactor building); the P-Area Ash Basin (188-0P); stormwater outfall P-010; various spills; and the groundwater below the P-Area Acid/Caustic Basin. There are no records of hazardous wastes or hazardous constituents being disposed of at the inactive P-Area Erosion Control Site. In addition to coal ash through 1990, the P-Area Ash Basin also has received process/wash water since 1986.

The P-Area Acid/Caustic Basin itself (904-78G) is a RCRA-regulated unit (Appendix H of the FFA) as a result of the Natural Resource Defense Council Consent Decree signed May 26, 1988, by the U.S. District Court (District of South Carolina, Aiken Division).

The P-Area Acid Caustic Basin is to be closed according to South Carolina's Hazardous Waste Management Regulations (SCHWMR). Revision 3 of the closure plan for the basin had not been formally approved as of October 1993, but the South Carolina Department of Health and Environmental Control (SCDHEC) was allowing SRS to proceed "at risk" with filling the basin with compacted native soil as specified in the closure plan. The basin water level is inspected routinely, as are diking, security, and housekeeping.

The U.S. Environmental Protection Agency (EPA) and SCDHEC received Revision 1 of the Phase II RCRA Facility Investigation/ Remedial Investigation (RFI/RI) Plan (WSRC-RP-91-1117) for the inactive P-Area Burning/Rubble Pit on December 31, 1991, and Revision 1 of the RFI/RI Work Plan (WSRC-RP-90-585) for the coal pile runoff containment basins in A, C, D, F, H, K, and P areas on January 21, 1992.

Revision 0 of the RI Work Plan (WSRC-RP-91-1203) for the inactive Bingham pump outage pits in K, L, P and R areas was submitted on July 1, 1992. Revision

1 was restructured to make certain sections specific for the individual reactor areas. Only the revision for the K-Area Bingham Pump Outage Pit had been submitted through October 1994. The individual sections for the other three areas are to be submitted in accordance with their specific FFA schedules. The backfill integrity at the P-Area Bingham Pump Outage Pit is inspected quarterly.

Environmental Data

The purpose of this report is to consolidate the existing groundwater monitoring data to determine the contaminants of potential concern and the extent of any contamination, and to help identify data gaps.

This report examines data from 1989 to 1993. Although there are data for the wells in this area prior to 1989, the data sets are spotty. In addition, the flagging system (Appendix B) that assures follow-up analysis of constituents that appear above predetermined levels was refined in 1989. Data prior to 1989 can be found in the SRS annual reports (see references).

Water-elevation measurements in P Area show groundwater flow in the upper saturated zone to be generally west-northwest from the reactor building. There is an apparent groundwater divide between the P-Area Acid/Caustic Basin, where groundwater flow appears to be nearly due north, and the Disassembly Basin. An effluent ditch runs into Steel Creek to the west.

There are a number of difficulties in characterizing the groundwater data for this area:

- Data for the monitoring wells in P Area are inconsistent.
- Constituents of concern have not been identified and tracked.
- Constituents have not been regularly sampled in all wells in a series.
- Constituents have not been sampled at regular intervals.
- All wells in P Area are screened in the water table, and all of them except the P 24 cluster are located around the circumference of the waste sites. Thus, many of the wells are sidegradient to the sites being monitored.

Despite these difficulties, there are some patterns that can be discovered from the data for the past five years. In order to determine constituents of concern, we present four ways of viewing the groundwater monitoring data:

- Tables of constituents that have appeared above “applicable standards” from 1989 to 1992 (indicator parameters or primary drinking water standards)
- Tables of constituents that have appeared above Flag 2 criteria from 1989 to 1992
- Time series plots (Appendix D) for potential constituents of concern
- Results for all constituents analyzed for individual wells for all four quarters of 1993 (Appendix C)

In the tables of constituents that have appeared above “applicable standards,” there are two sets of standards: the drinking water standards applicable during the year under discussion (both final and proposed through 1991, only final for 1992 and 1993) and the indicator parameters (values for indicator constituents above those usually found in background wells at SRS).

The final primary DWS for 1993 are presented in Appendix A. The parameters for the indicator analytes are the following:

- Specific conductance equal to or greater than 100 $\mu\text{S}/\text{cm}$
- Alkalinity (as CaCO_3) at values equal to or greater than 100 mg/L
- Total dissolved solids (TDS) at values equal to or greater than 200 mg/L
- pH at values equal to or below 4.0 or equal to or above 8.5

The selection of these values as standards for comparison is somewhat arbitrary; however, these values exceed levels usually found in background wells at SRS. The occurrence of elevated alkalinity (as CaCO_3), specific conductance, pH, and TDS within a single well may indicate leaching of the grouting material used in well construction rather than degradation of the groundwater.

In the tables of analytes that have appeared above Flag 2 criteria, the standards are those that were applicable during the year under discussion. Flag 2 criteria have changed frequently during the years and can be found in the individual Environmental Protection Department/Environmental Monitoring Section (EPD/EMS) quarterly reports. Flag 2 criteria for 1993 are presented in Appendix B. Despite the problems presented by the changing flagging criteria and the lack of focus on individual wells, the benefits of looking at the Flag 2 criteria summaries are twofold:

- First, once a constituent appears above Flag 2, it is scheduled for regular sampling according to predetermined rules. Therefore, if a constituent appears once in the Flag 2 tables below and then does not reappear, the single appearance in the table may be an anomaly. The pattern of appearances above Flag 2 is the focus of these tables, not the specific analyte levels or wells.
- Second, unlike the DWS tables below, the Flag 2 tables focus on the quarterly schedule of analyses.

Time series plots (Appendix D) provide another way of looking at the data for selected constituents. Some of these include data prior to 1989. Plots for pH and conductivity are based upon field data rather than laboratory data. Trends in the plots are discussed in the sections below.

Finally, Table 1 at the end of this section presents maximum results for constituents exceeding the DWS in individual P-Area wells during 1993.

P 24 Well Cluster

Wells P 24A, 24TA, 24TB, and 24TD (screened in the Lower Congaree, Lower Black Creek, Black Creek, and Upper Crouch Branch zones, respectively) were added to the groundwater monitoring program effective fourth quarter 1993. Only P 24A was successfully sampled, and a high pH was the only result above

standards (see Table 1 at the end of this section). Field data had been taken during 1992 for some of these wells.

Hydrographs

Hydrographs for the P 24 well cluster are shown in Appendix D.

Acid/Caustic Basin (PAC Well Series)

Since 1984, groundwater below the P-Area Acid/Caustic Basin has been monitored by four water-table wells (PAC 1, 2, 3, and 4) ringing the site. Two additional wells (PAC 5 and 6) were installed north of the basin late in 1988. The local groundwater flow direction in the upper saturated zone is north.

Analytes Over Applicable Standards in Well Series PAC, 1989–1992

Analyte	1989	1990	1991	1992
Alkalinity	•	•	•	•
Gross alpha		•		
Specific conductance	•	•	•	•
Total radium	•	•		
Tritium	•			

Alkalinity and specific conductance have consistently exceeded the standards for indicators each year during the period from 1989 through 1992. Tritium exceeded the DWS in 1989, as did gross alpha in 1990.

Total radium was reported as exceeding the DWS in 1989 and 1990. The DWS for radium is 5 pCi/L for the sum of the activities of radium-226 (an alpha-emitter) and radium-228 (a beta-emitter).¹ Some of the laboratories used in the EPD/EMS monitoring program have interpreted requests for analyses of total radium as requests for analysis of total alpha-emitting radium (which may include, in addition to radium-226, the short-lived isotopes radium-223 and radium-224). Other laboratories have interpreted a request for total radium as a request for analyses of radium-226 and radium-228. During 1992, the laboratories were instructed to discontinue reporting analyses for total alpha-emitting radium as *total radium*. In the PAC wells, separate results for radium-226 and radium-228 were reported during the first and third quarters of 1992, and results for only radium-226 were reported for second and fourth quarter 1992. In 1991 and 1992, all analyses for radium were below the 5 pCi/L standard.

¹ A DWS of 20 pCi/L for each of the constituents of total radium (Ra-226 and Ra-228) has been proposed in EPA 1991.

Analytes Over Flag 2 Criteria For Well Series PAC, 1989–1992

Analyte	189	289	389	489	190	290	390	490	191	291	391	491	192	292	392	492
Calcium									•							
Gross alpha						•										
Iron	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Magnesium									•							
Manganese	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
pH								•								
Selenium					•											
Sodium									•							
Specific conductance									•							•
Sulfate		•	•			•	•	•						•		
Total organic carbon				•						•						
Total organic halogens				•		•					•		•	•		
Total radium		•				•										
Tritium			•													
Turbidity									•							

Iron and manganese exceeded their Flag 2 criteria consistently during the period from 1989 through 1992. No other constituents without DWS consistently exceeded standards, although others exceeded Flag 2 criteria occasionally.

Time Series Plots

Time series plots of conductivity, gross alpha, lead, nonvolatile beta, pH, tritium, and water level for the six PAC wells are shown in Appendix D. Trends are as follows:

Concentrations for the PAC well series consistently have been below current DWS since sampling began for lead; nonvolatile beta activities have also been below current DWS for the reporting period; and pH has been within the Flag 2 range.

Since sampling began, conductivity in PAC 5 has fluctuated between a high of nearly 900 $\mu\text{S}/\text{cm}$ during second quarter 1989 and a low of approximately 250 $\mu\text{S}/\text{cm}$ during third quarter 1991. Specific conductance in PAC 1, 2, 3, 4, and 6 has remained consistently below the Flag 2 criterion with one exception; during second quarter 1990, conductivity in PAC 3 was 594 $\mu\text{S}/\text{cm}$.

With one exception since sampling began, gross alpha activities for the PAC well series have remained below the DWS; during second quarter 1990, gross alpha in PAC 1 was reported at 21.4 pCi/L.

Since sampling began, tritium activities in the PAC well series consistently have remained below the current DWS with one exception; during third quarter 1989, tritium activity in PAC 5 was 21.5 pCi/mL.

1993 Data

Comprehensive analyses, exclusive of boron and lithium, and turbidity were scheduled for the PAC wells during all four quarters of 1993. These analyses were requested under SCHWMR due to the basin's interim status. Gas chromatographic volatile organic analysis (GC VOA) was scheduled for second quarter because tetrachloroethylene had been Flag 1.

Wells PAC 5 and 6 pumped dry during purging all four quarters of sampling. These same wells were also aerated first, second, and fourth quarters. During fourth quarter, well PAC 2 was covered with grass seed and fertilizer, the water from well PAC 5 was brown, and the water from well PAC 6 was orange brown.

The DWS for radium-228 was exceeded in wells PAC 3 and 6 during second quarter 1993, with the highest concentration at $1.6\text{E}+02$ pCi/L in well PAC 3 during second quarter. Specific conductance exceeded standards with a result of 571 $\mu\text{S}/\text{cm}$ in well PAC 5 during fourth quarter.

Aluminum, iron, and manganese exceeded Flag 2 criteria in many of the six PAC wells during 1993. Aluminum exceeded its criterion in the following wells: PAC 1, 4, and 5 in all four quarters; PAC 6 in first, second, and fourth quarters; PAC 3 in second and third quarters; and PAC 2 in fourth quarter. The highest concentration of aluminum, 890 $\mu\text{g}/\text{L}$, occurred in well PAC 4 during third quarter.

Iron exceeded the Flag 2 criterion in all four quarters of 1993 in wells PAC 2 and 6; in well PAC 5 in first, second, and fourth quarters; in well PAC 3 during second, third, and fourth quarters; and in well PAC 4 for third and fourth quarters. The highest concentration of iron, 9,370 $\mu\text{g}/\text{L}$, occurred in well PAC 6 during fourth quarter.

The flag 2 criterion was exceeded for manganese in wells PAC 2, 5, and 6 during all four quarters and in well PAC 3 in second and third quarters. Manganese reached its highest concentration, 646 $\mu\text{g}/\text{L}$, in well PAC 5 during fourth quarter.

Disassembly Basin (PDB Well Series)

P-Area Disassembly Basin groundwater has been monitored by two wells of the PDB series, both screened in the water table, since 1986. One well is located southwest and the other is northeast of the disassembly basin section of the P-Area Reactor Building.

Analytes Over Applicable Standards in Well Series PDB, 1989–1992

Analyte	1989	1990	1991	1992
Lead	•	•	•	•
Potassium-40			•	
Specific conductance			•	•
Tritium	•	•	•	•

Lead and tritium exceeded the DWS each year during the period 1989 through 1992. Potassium-40 exceeded its proposed DWS² during second quarter 1991. Gamma pulse-height analyses (gamma PHA) conducted during first and fourth quarters 1991 revealed no high results; the potassium-40 result is apparently an outlier. Specific conductance, analyzed consistently throughout the period, exceeded the standard for indicator parameters in 1991 and 1992.

Analytes Over Flag 2 Criteria For Well Series PDB, 1989–1992

Analyte	189	289	389	489	190	290	390	490	191	291	391	491	192	292	392	492
Lead	•	•	•		•		•		•	•	•	•	•			
Total organic halogens												•				
Tritium	•	•	•		•	•	•	•	•		•	•	•		•	

Total organic halogens exceeded the Flag 2 criterion in fourth quarter 1991. This constituent was below standard several times during the rest of the period.

Time Series Plots

Time series plots of conductivity, lead, nonvolatile beta, pH, tritium, and water level for the two PDB wells are shown in Appendix D. Trends are as follows:

Since sampling began, nonvolatile beta activities have been below DWS; conductivity has been below the Flag 2 criterion; and pH has remained between 4 and 6, well within the neutral range (between the Flag 2 criteria).

Since sampling began, lead concentrations in PDB 2 have remained below the current standard with the exception of third quarter 1989 when the level was just above 50 µg/L. Lead concentrations in PDB 3 usually remained slightly above the DWS from fourth quarter 1986 through third quarter 1991. Since then, no general trend has appeared; lead concentrations have ranged from below detection limits up to approximately 125 µg/L during third quarter 1993.

Since sampling began, tritium activities in the PDB wells have been above DWS. Activities in PDB 2 have ranged from 145 pCi/mL to approximately 1,500 pCi/mL, and activities in PDB 3 have ranged from 45 pCi/mL to nearly 500 pCi/mL. Since first quarter 1992, the trend in both wells has been downward.

² EPA 1986. Potassium-40 was not included among the radionuclides for which DWS were proposed in EPA 1991.

1993 Data

Comprehensive analyses were scheduled for the PDB wells during the first quarter of 1993. During third quarter, aluminum, lead, and tritium analyses were scheduled because of previous Flag 2 designations, and total organic halogens analysis was scheduled for well PDB 3 because of a Flag 2 designation.

Well PDB 3 pumped dry during purging all four quarters of 1993, and water from well PDB 2 was aerated during third quarter.

Results for tritium exceeded the DWS in wells PDB 2 and 3 during first and third quarters. The highest concentration was 300 pCi/mL in well PDB 2 during first quarter. Lead exceeded its DWS in well PDB 3 during third quarter, with a concentration of 134 µg/L.

Aluminum exceeded its Flag 2 criterion in well PDB 3 during first quarter, with a concentration of 140 µg/L.

Burning/Rubble Pit (PRP Well Series)

Soil gas surveys were conducted at the P-Area Burning/Rubble Pit in 1986 and 1991. The 1986 survey of 16 locations within the pit and eight locations outside its boundaries indicated the presence of several chlorinated solvents: trans-1,2-dichloroethylene, 1,1,1-trichloroethane, trichloroethylene, and tetrachloroethylene in low concentrations at the sampled depth of 18–24 in. Tetrachloroethylene was detected at all locations within the pit. The one auger boring that was drilled showed low levels of trans-1,2-dichloroethylene at depths of 13 to 20 feet below surface.

The 1991 soil gas survey analyzed for pentane, hexane, heptane, benzene, and methane in addition to 1,1,1-trichloroethane and tetrachloroethylene in samples from 10 locations in the pit's center. The alkanes were detected only sporadically. Tetrachloroethylene again was detected at all sample locations, as was methane.

Unit screening of soils conducted during 1988 detected trace levels of volatile and semivolatile organics and metals.

Groundwater below the P-Area Burning/Rubble Pits has been monitored by the four water-table wells of the PRP well series since 1983–84. The wells ring the basin perimeter.

Analytes Over Applicable Standards in Well Series PRP, 1989–1992

Analyte	1989	1990	1991	1992
Carbon tetrachloride	•	•	•	
Chloroform		•		
Chromium	•			
1,2-Dichloroethane			•	
1,1-Dichloroethylene		•	•	
Lead		•	•	•
Specific conductance	•	•		
Tetrachloroethylene	•	•	•	•
1,1,1-Trichloroethane	•	•	•	•
Trichloroethylene	•	•	•	•
Tritium	•	•	•	

Tetrachloroethylene, 1,1,1-trichloroethane, and trichloroethylene exceeded the DWS each year from 1989 through 1992. Carbon tetrachloride and tritium exceeded the DWS each year from 1989 through 1991. Carbon tetrachloride was analyzed twice during 1992 but did not exceed the standard. Total organic halogens, of which carbon tetrachloride is a constituent, was above Flag 2 during 1992. Tritium was analyzed in 1992 but remained below the standard.

Lead exceeded the DWS each year from 1990 through 1992. Lead was analyzed three times during 1989 but remained below the standard. Two constituents exceeded standards during two years: 1,1-dichloroethylene during 1990 and 1991; and specific conductance during 1989 and 1990. Analysis for 1,1-dichloroethylene was performed once during 1989, but not during 1992. Specific conductance did not receive laboratory analysis during most of 1991 and all of 1992. Three constituents exceeded the DWS one year each: chloroform in 1990, chromium in 1989, and 1,2-dichloroethane in 1991. Each of these constituents was analyzed at least occasionally throughout the period except 1,2-dichloroethane, which was not analyzed during 1992.

Analytes Over Flag 2 Criteria For Well Series PRP, 1989–1992

Analyte	189	289	389	489	190	290	390	490	191	291	391	491	192	292	392	492
Carbon tetrachloride	•				•	•					•					
Chloroform								•								
Chromium		•														
1,1-Dichloroethane									•		•					
1,2-Dichloroethane											•					
1,1-Dichloroethylene									•		•					
Dichloromethane									•							
Iron			•													
Lead	•	•	•		•	•	•	•		•	•	•	•	•	•	•
Manganese	•	•	•		•		•		•		•		•		•	•
Tetrachloroethylene	•		•		•	•	•	•	•	•	•	•		•		•
Total organic halogens	•	•	•		•		•		•		•				•	
1,1,1-Trichloroethane			•		•		•	•	•							•
Trichloroethylene	•		•		•	•	•	•	•	•	•	•		•		•
Tritium	•	•	•		•	•	•	•	•	•	•	•				•

Manganese and total organic halogens exceeded the Flag 2 criteria at least half of the quarters during the period. Dichloromethane, 1,1-dichloroethane, and iron exceeded their standards sporadically. For 1990, 1,1-dichloroethylene, which was indicated as being above the DWS, does not appear above the Flag 2 criterion because at that time the Flag 2 criterion was set by the 1987 Code of Federal Regulations (CFR) maximum contaminant level (MCL) and the DWS was set by the 1990 CFR MCL.

Time Series Plots

Time series plots of conductivity, lead, pH, tritium, and water level for the four PRP wells are shown in Appendix D. Trends are as follows:

Since sampling began, conductivity in the four wells has consistently been below the Flag 2 criterion; and pH has ranged between approximately 4 and 6, within the Flag 2 range.

Since sampling began, lead concentrations in PRP 2 and 4 have remained well below current DWS. Lead concentrations in PRP 1A, which is sidegradient to downgradient of the P-Area Burning Rubble Pit, fluctuated between approximately 20 and 80 µg/L until they decreased in third quarter 1990 to less than 20 µg/L and have remained well below DWS since then. Lead concentrations in PRP 3, also side- to downgradient of the P-Area Burning Rubble Pit, have fluctuated similarly, reaching a high near 80 µg/L during first quarter 1988 and fourth quarter 1991. Since first quarter 1992, lead in PRP 3 has remained below DWS.

Tritium activities in PRP 1A were above DWS in the range from approximately 25 pCi/mL to 150 pCi/mL from first quarter 1987 to fourth quarter 1991. After reaching a peak during second quarter 1990, tritium activities in PRP 1A have decreased steadily and, since first quarter 1992, have remained below DWS. Since sampling began, tritium activities in PRP 2 and PRP 4 have been below DWS. After first quarter 1987, when PRP 3 tritium activities were 21.5 pCi/mL, activities in that well also have remained below DWS.

1993 Data

Comprehensive analyses were scheduled for the PRP wells during the first quarter of 1993. GC VOA was scheduled second and third quarters because tetrachloroethylene, 1,1,1-trichloroethane, and trichloroethylene had Flag 2 designations. Lead, manganese, and total organic halogens also were scheduled during third quarter because of Flag 2 designations. Aluminum was scheduled during third quarter because of a Flag 1 designation.

During third quarter sampling, well PRP 1A pumped dry during purging, and the sampler had to estimate the volume purged for PRP 3 because the flowmeter did not work.

In 1993, trichloroethylene exceeded its DWS in well PRP 3 during first, second, and third quarters; the highest concentration was 26 µg/L, occurring in first quarter. Tetrachloroethylene was above DWS in well PRP 3 during second and third quarters, with the highest concentration of 7.3 µg/L occurring during second quarter. These constituents were not analyzed fourth quarter.

Manganese and total organic halogens exceeded Flag 2 criteria in well PRP 3 during first and third quarters. Manganese showed a result of 62 µg/L during third quarter in well PRP 3, and the highest concentration of total organic halogens, 177 µg/L, also occurred in well PRP 3 during third quarter. Aluminum exceeded its Flag 2 criterion in well PRP 4 during third quarter with a high concentration of 65 µg/L.

Coal Pile Runoff Containment Basin (PCB Well Series)

Surface water sampling indicates heavy-metals contamination at the Coal Pile Runoff Containment Basin. A soil sampling program took place in 1988.

P-Area Coal Pile Runoff Containment Basin groundwater has been monitored by four water-table wells of the PCB series since 1980. The original four wells were abandoned and replaced effective first quarter 1984. The wells ring the basin, which is southeast of the P-Area Coal Pile. Gradient designations for these wells are not reliable; the water table is very nearly flat. See the potentiometric map and the hydrographs (Appendix D). Water level elevations in wells PCB 1A and PCB 3A alternate as highest, while the other two wells generally have nearly identical measurements.

Analytes Over Applicable Standards in Well Series PCB, 1989–1992

Analyte	1989	1990	1991	1992
Beryllium		•		
Cadmium	•		•	
Chromium	•			
Fluoride		•		
Gross alpha			•	
Lead	•	•	•	•
Nickel		•	•	
Nitrate as nitrogen			•	
pH	•	•	•	•
Selenium	•	•		
Specific conductance	•	•	•	•
Sulfate	•	•	•	
Total dissolved solids			•	
Total radium	•	•	•	

Lead has exceeded the DWS each year during the period from 1989 through 1992. Specific conductance and pH have also exceeded the applicable standards for these indicators each year during that period. Sulfate and total radium each exceeded their standards from 1989 through 1991. The definition of *applicable standards* included proposed as well as final primary DWS through 1991.

Sulfate, which has only a proposed DWS, thus was removed from consideration as exceeding applicable standards beginning in 1992.

After the laboratories were instructed to discontinue reporting analyses for total alpha-emitting radium as *total radium*, results for total alpha-emitting radium were reported during 1992. These analyses did not exceed the total radium standard.

Cadmium, nickel, and selenium exceeded the standards for only two of the four years, although they were analyzed at least once a year throughout the period. Chromium, beryllium, fluoride, gross alpha, and nitrate as nitrogen exceeded the DWS, and total dissolved solids exceeded its applicable standard, during only one year each, although these constituents were analyzed at least once a year throughout the period.

Analytes Over Flag 2 Criteria For Well Series PCB, 1989–1992

Analyte	189	289	389	489	190	290	390	490	191	291	391	491	192	292	392	492
Cadmium	•	•			•											
Chromium		•	•		•		•									
Copper			•													
Fluoride					•											
Gross alpha									•							
Iron	•	•	•		•		•		•		•		•		•	
Lead		•	•		•	•	•			•	•	•	•		•	
Manganese	•	•	•		•		•		•		•		•		•	
Nickel	•		•		•		•				•					
Selenium		•	•		•											
Specific conductance									•	•	•					•
Sulfate	•	•	•		•		•		•		•					
Total organic halogens			•						•				•			
Total radium		•			•				•		•					

Iron and manganese exceeded their Flag 2 criteria for most quarters of the period 1989 through 1992. Copper exceeded the Flag 2 criterion during third quarter 1989, and total organic halogens exceeded the Flag 2 criterion during one quarter each of 1989, 1991, and 1992.

The Flag 2 table above reflects evaluation of the result against the standard for each quarter, while the DWS table reflects evaluation of the year's results against the standard at year-end. During 1990, cadmium and chromium are indicated as exceeding the Flag 2 criteria but not the DWS because, until first quarter 1991, the Flag 2 criterion was set at half the DWS for many constituents. Since then, the Flag 2 criterion is set at the DWS. Conversely, cadmium is indicated in excess of the DWS during 1991 but not in excess of the Flag 2 criterion because the DWS for cadmium changed from 10 µg/L to 5 µg/L during fourth quarter 1991 but cadmium was only analyzed in the PCB wells during the first quarter 1991.

Time Series Plots

Time series plots of cadmium, conductivity, gross alpha, lead, nonvolatile beta, pH, tritium, and water level for the four PCB wells are shown in Appendix D. Trends are as follows:

Since sampling began, nonvolatile beta activity levels in the four PCB wells have been below DWS, and pH levels have been in the neutral range, well within the Flag 2 criteria.

Cadmium concentrations have been below current DWS for PCB 1A and 2A since sampling began. Cadmium concentrations in well PCB 3A have not produced a steady pattern, but generally increased from 5 µg/L during third quarter 1984 to 15 µg/L during first quarter 1985, and then decreased from a high of 22 µg/L during third quarter 1986 to a low of less than 2 µg/L during early 1993. Cadmium concentrations also, however, were reported below detection limit during first quarter 1986 and third quarter 1990. Cadmium concentrations have been below detection limits or the well was dry for PCB 4A since sampling began except for third quarter 1987 and first quarter 1990 when the cadmium concentrations were approximately 5 µg/L.

Conductivity in PCB 1A has remained below the current Flag 2 criterion except that it was slightly above that standard in second quarter 1987 and third quarter 1989. Conductivity in PCB 2A was below the current Flag 2 criterion until first quarter 1993 when it increased to approximately 600 µS/cm. Since then, conductivity has remained between approximately 400 and 800 µS/cm. Conductivity in PCB 3A peaked at 2,600 µS/cm during second quarter 1985 and decreased to below the Flag 2 criterion during early 1986. After a second peak of nearly 2,000 µS/cm during fourth quarter 1986, conductivity has generally decreased to below Flag 2 criterion. Conductivity in PCB 4A has remained below the Flag 2 criterion except for isolated occurrences above 500 µS/cm during first quarter 1990 and second and third quarters 1991.

Gross alpha activities for PCB 1A and 2A were below DWS during the reporting period. For PCB 3A, gross alpha remained below DWS except for an activity level of 45 pCi/L early in 1985. Activities in PCB 4A have been below DWS except for first quarter 1991 when the gross alpha activity level was 15 pCi/L; it decreased to approximately 5 pCi/L during first quarter 1992 and has remained below DWS during the reporting period.

Lead concentrations in PCB 1A and 2A have remained below current DWS since sampling began. Lead concentration levels for PCB 3A range from below detection limits to a high of approximately 150 µg/L early in 1985. There has been a general downward trend in lead levels since third quarter 1989, and lead has not been above DWS in PCB 3A since second quarter 1990. Lead in PCB 4A was below DWS until third quarter 1986 when it approached 100 µg/L. It was again above DWS during first and third quarters 1988, but has been well below the DWS since first quarter 1989.

Tritium activities in the four PCB wells have been below the DWS except that during first quarter 1988, tritium activities in PCB 1A and 4A were just above that level.

1993 Data

Comprehensive analyses were scheduled for the PCB wells during the first quarter of 1993. Alpha-emitting radium, fluoride, lead, nickel, selenium, specific conductance, and sulfate were requested second, third, and fourth quarters in compliance with the RFI/RI program. During third quarter, aluminum, iron, manganese, and total organic halogens were scheduled because of Flag 2 designations.

Water from PCB 2A and 3A was aerated during third quarter sampling.

The following results exceeded DWS in the PCB wells. Radium-228, only analyzed for during second quarter, showed a concentration of 9.0E+00 pCi/L in well PCB 1A. Also in well PCB 1A, the result for total alpha-emitting radium, 7.8E+00 pCi/L, exceeded the DWS for total radium in fourth quarter. In well PCB 2A, specific conductance exceeded standards in third and fourth quarters, with the highest concentration at 774 μ S/cm during fourth quarter.

Aluminum and manganese exceeded standards in all four PCB wells during first and third quarters. The highest concentration of each occurred in well PCB 2A during first quarter with aluminum at 17,000 μ g/L and manganese at 1,870 μ g/L.

Iron exceeded its criterion in wells PCB 1A and 3A during first and third quarters; the highest concentration, 1,000 μ g/L, occurred in well PCB 1A during third quarter. Results for sulfate in well PCB 2A exceeded the criterion in third and fourth quarters, with the highest concentration at 531,000 μ g/L in third quarter. Total organic halogens also exceeded standards in well PCB 2A during first and third quarters, with the highest concentration at 135 μ g/L during first quarter.

None of these constituents exceeding Flag 2 criteria was analyzed for in second quarter.

Seepage Basins (PSB Well Series)

Groundwater below the P-Area Seepage Basins has been monitored by the seven water-table wells of the PSB well series since 1978. Seven replacement wells were installed in 1984. There is some confusion, in the absence of formal abandonment reports, about the date when the old wells were no longer sampled; therefore, some of the data in the EPD/EMS monitoring database may be ascribed to the wrong well of a pair. The wells, like most of the others in P Area, surround the basins.

Analytes Over Applicable Standards in Well Series PSB, 1989–1992

Analyte	1989	1990	1991	1992
Chromium		•		
Copper		•		
Lead	•	•	•	•
Nitrate or Nitrate (as nitrogen)	•	•	•	
Nitrate-nitrite (as nitrogen)				•
pH				•
Specific conductance	•	•	•	•
Strontium-89/90			•	
Total dissolved solids	•			
Trichloroethylene				•
Tritium	•	•	•	•

Lead and tritium exceeded the DWS for each year of the period 1989 through 1992. Specific conductance exceeded its standard each year of the period. Nitrate exceeded the standard during all four years of the period. Analyses were reported for nitrate-nitrite (as nitrogen) during 1992; for nitrate (as nitrogen) during 1990 and 1991; and for nitrate during 1989. Several constituents exceeded the DWS only one year during the period: total dissolved solids in 1989, chromium and copper in 1990, strontium-89/90 in 1991, and pH and trichloroethylene in 1992. Chromium and copper were analyzed at least occasionally during the period. Strontium-89/90 was only analyzed during 1991. Although nonvolatile beta was analyzed at least occasionally during 1989 through 1991, it did not exceed the standard. Similarly, pH was analyzed in the laboratory only during the first three years of the period. Trichloroethylene was analyzed at least occasionally in 1990 and 1991.

Analytes Over Flag 2 Criteria For Well Series PSB, 1989–1992

Analyte	189	289	389	489	190	290	390	490	191	291	391	491	192	292	392	492
Cadmium		•														
Chromium						•										
Copper	•		•		•		•									
Iron					•											
Lead	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•
Nitrate (as nitrogen)	•	•	•		•		•		•				•			
Strontium 89/90												•				
Trichloroethylene														•		
Tritium	•	•	•	•	•	•	•	•	•		•	•	•		•	

No constituent without a DWS consistently exceeded the Flag 2 criterion. Cadmium and iron exceeded their Flag 2 criteria one quarter each.

Time Series Plots

Time series plots of conductivity, gross alpha, lead, nonvolatile beta, pH, tritium, and water level for the PSB wells are shown in Appendix D. Trends are as follows:

Since sampling began, conductivity has remained below the Flag 2 criterion; gross alpha activities have remained below the current DWS; and pH has remained within the current Flag 2 ranges.

Since sampling began, lead concentrations for PSB 1A, which is downgradient of Seepage Basin 1, and PSB 7A, which is upgradient to sidegradient of Basin 1, have remained well below the current DWS. Lead in PSB 2A, which is downgradient of Basins 1 and 2, has been below DWS except during fourth quarter 1986 when it was reported at 55 µg/L. Lead concentrations in PSB 3A, which is downgradient of all three basins, fluctuated around the DWS until they last exceeded it in third quarter 1991. Lead concentrations in PSB 4A, which is downgradient to sidegradient of Basin 3, generally were above DWS (up to a high of approximately 125 µg/L during second quarter 1990) until second quarter 1991 when they decreased and have remained below the DWS. After a high of approximately 125 µg/L during second quarter 1986, lead concentrations in PSB 5A, which is upgradient of Basin 3, fluctuated between 40 µg/L and nearly 100 µg/L until second quarter 1991, when they decreased to a level below the DWS where they have remained. Lead concentrations in PSB 6A, which is upgradient of Basin 2 and downgradient of Basin 1, fluctuated slightly above the DWS from first quarter 1986 through first quarter 1987; since third quarter 1987, lead in PSB 6A has remained well below the DWS.

Nonvolatile beta activities in PSB 1A, 3A, 4A, 5A, 6A, and 7A have been below DWS since sampling began. Nonvolatile beta activities in PSB 2A were below DWS with the exception of all four quarters of 1985, when they ranged approximately from 50 to 85 pCi/L.

Tritium activities in the original PSB wells and the replacement wells have been consistently very high. PSB 1A, 2A, 3A, 6A, and 7A all routinely exhibit tritium activities above 100,000 pCi/mL, sometimes approaching 300,000 pCi/mL. PSB 4A has fluctuated from less than 5 pCi/mL to nearly 50,000 pCi/mL. PSB 5A normally ranges from approximately 25 pCi/mL to 1,000 pCi/mL, with occasional activity levels that approach 8,000 pCi/mL. Reported activities for all wells were unusually low during the first quarter of 1986, but only wells PSB 4A and PSB 5A were below DWS.

1993 Data

Comprehensive analyses were scheduled during the first quarter of 1993 for the PSB wells. GC VOA was scheduled for second and third quarters because trichloroethylene had been Flag 2 and tetrachloroethylene had been Flag 1. Aluminum, lead, nitrate, and tritium were scheduled during third quarter because of Flag 2 designations, and nonvolatile beta was scheduled because of a Flag 1 designation. Analysis for lead was requested for second and fourth quarters, and chromium and copper were requested third quarter.

During first and second quarters, the flowmeter for well PSB 3A was not working properly, and the flowmeter for well PSB 5A was not working properly during fourth quarter. The flow rate and volume purged were estimated for these wells during these quarters. PSB 5A pumped dry during purging in first quarter. Water from PSB 3A was aerated second and fourth quarters, water from PSB 4A was aerated second quarter, and water from PSB 7A was aerated second, third, and fourth quarters.

Tritium exceeded its DWS in all seven PSB wells during first and third quarters and in wells PSB 1A, 2A, 3A, and 4A in fourth quarter. Tritium was not analyzed for during second quarter for any PSB wells and was not analyzed for in fourth quarter for wells PSB 5A, PSB 6A, and PSB 7A. The highest concentration of tritium, 81,000 pCi/mL, occurred in well PSB 1A in both third and fourth quarters.

Aluminum was analyzed for in first and third quarters only. Results exceeded the Flag 2 criterion in wells PSB 2A, 3A, 4A, 5A, and 6A during first quarter. In third quarter, the results exceeding standards occurred in wells PSB 4A, 5A, and 6A. The highest concentration was 111 µg/L in well PSB 5A during first quarter.

Other Sites

Sampling of vegetation at the Bingham Pump Outage Pit in 1970 indicated little increase in activity when compared to background vegetation samples taken from the SRS perimeter. Soil gas and ground-penetrating radar surveys have been conducted at this site.

Ash samples from the currently active P-Area Ash Basin were analyzed for extraction procedure (EP) toxicity. They were found not to contain hazardous constituents greater than EP toxicity standards.

Inadequacies in Existing Data

The well networks at several of the P-Area waste units would not meet the minimum RCRA standard for number of detection monitoring wells (one upgradient and three downgradient wells) because several of the wells are sidegradient. Most of these wells were installed at the perimeter of the facilities before RCRA standards were applicable to any of them.

A consistent designation of a downgradient well cannot be made for the PCB well series because the piezometric surface is flat where they are installed. Two of the wells alternate having the highest water level and two others have nearly identical measurements.

Through 1993, there were no groundwater monitoring wells at the P-Area Bingham Outage Pits. The RI work plan was being revised as of October 1994.

Groundwater at the P-Area Ash Basin and at the P-Area Erosion Control Site also is not currently monitored.

Table 1. Maximum Results for Constituents Exceeding Applicable Standards³ in 1993

<u>Well</u>	<u>Constituent</u>	<u>Unit</u>	<u>1Q93</u>	<u>2Q93</u>	<u>3Q93</u>	<u>4Q93</u>	<u>Standard</u>
P 24A	pH	pH	NA ⁴	NA	NA	11	10
PAC 3	Radium-228	pCi/L	— ⁵	1.6E+02	—	NA	5.0E+00 ⁶
PAC 5	Specific conductance	µS/cm	—	—	—	571	500
PAC 6	Radium-228	pCi/L	—	3.4E+01	—	—	5.0E+00
PCB 1A	Radium-228	pCi/L	NA	9.0E+00	NA	NA	5.0E+00
PCB 2A	Specific conductance	µS/cm	—	—	559	744	500
	Radium, total alpha	pCi/L	—	—	—	7.8E+00	5.0E+00 ⁴
PDB 2	Tritium	pCi/mL	3.0E+02	NA	2.3E+02	NA	2.0E+01
PDB 3	Lead	µg/L	—	NA	134	NA	50
	Tritium	pCi/mL	6.7E+01	NA	5.5E+01	NA	2.0E+01
PRP 3	Tetrachloroethylene	µg/L	—	7.3	5.5	NA	5.0
	Trichloroethylene	µg/L	26	25	13	NA	5.0
PSB 1A	Tritium	pCi/mL	1.2E+05	NA† ⁷	8.1E+04	8.1E+04	2.0E+01
PSB 2A	Tritium	pCi/mL	1.1E+04	NA†	6.0E+04	6.9E+04	2.0E+01
PSB 3A	Tritium	pCi/mL	3.2E+04	NA†	1.8E+04	1.8E+04	2.0E+01
PSB 4A	Tritium	pCi/mL	8.1E+02	NA†	3.6E+02	6.2E+02	2.0E+01
PSB 5A	Tritium	pCi/mL	3.0E+01	NA	4.2E+01	NA	2.0E+01
PSB 6A	Tritium	pCi/mL	4.6E+04	NA†	4.9E+04	NA†	2.0E+01
PSB 7A	Tritium	pCi/mL	5.3E+03	NA†	5.1E+03	NA†	2.0E+01

³ DWS or, for specific conductance and pH, Flag 2. See appendices A and B.

⁴ NA = Not analyzed.

⁵ Constituent not found in excess of standard.

⁶ This is the DWS for radium-226 plus radium-228. Total alpha radium comprises radium-226 plus small quantities of radium-223 and -224.

⁷ Total activity was analyzed at greater than the DWS for tritium.

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Glossary

ANION—ion or group of ions having a negative charge and characteristically moving toward a positive electrode.

BOTTOM ASH—mineral matter in fossil fuels such as coal or lignite that is converted during combustion to a fused, glassy ash that does not contribute to air pollution.

CATION—ion or group of ions having a positive charge and characteristically moving toward a negative electrode.

CLADDING—protective metal layer covering fuel, target, control, and safety rods.

CONTROL ROD—neutron-absorbing cadmium or lithium-aluminum rod used to regulate the nuclear fission process within the reactor vessel.

CRITICALITY—point at which a nuclear reactor is self-sustaining.

DISCHARGING MACHINE—remotely or automatically operated device that withdraws fuel and target assemblies from a reactor, cools them, and conveys them to the deposit-and-exit conveyor.

FISSION—nuclear reaction in which an atomic nucleus, especially a heavy nucleus, splits into fragments (usually two fragments of comparable mass) with the release of energy.

FLUX—rate of neutron flow.

FLY ASH—mineral matter from fossil fuels such as coal or lignite, converted during combustion to a fused, glassy ash small enough to enter the furnace flue, escape through the stack, and enter the atmosphere.

FUEL ROD—protective metal rod containing pellets of fuel for a nuclear reactor.

HEAVY WATER—deuterium oxide (D₂O).

HIGH-LEVEL WASTE—the highly radioactive waste material resulting from the reprocessing of spent nuclear fuel. This includes any solid waste derived from the liquid waste produced directly in reprocessing. High-level waste contains a combination of transuranic waste and fission products in concentrations requiring permanent isolation.

LATTICE—spatial arrangement of fissionable and nonfissionable materials in a nuclear reactor.

LOW-LEVEL WASTE—includes low-activity waste (solid waste radiating <200 mrem/hr at 5 cm from an unshielded container), intermediate-level waste (solid waste radiating >200 mrem/hr at 5 cm), intermediate-level tritium waste (solid waste containing 10 Curies of tritium per container and radiating <200 mrem/hr at 5 cm), long-lived waste, and soil suspected of being contaminated.

MODERATOR—substance used in a nuclear reactor to slow down fast neutrons and increase the likelihood of fission.

PLENUM—enclosure in which water, air, or other gas is at a pressure greater than that of the outside atmosphere.

POISON—substance that absorbs neutrons without any fission resulting and thereby lowers the reactivity of a nuclear reactor.

PRIMARY COOLANT—deuterium oxide (D₂O), or heavy water, used as a cooling source and neutron moderator throughout the production process.

REACTIVITY INSTRUMENTS—instrumentation that monitors the deviation of a nuclear reactor from the critical state.

REM—the amount of ionizing radiation required to produce the same biological effect as one roentgen of high-penetration X-rays

REWORK—to recycle or reprocess; refers to heavy water (D₂O).

SAFETY ROD—neutron-absorbing cadmium rod used as a safeguard against reactor core damage.

SCRAM—a sudden shutting down of a nuclear reactor, usually by dropping safety rods, when a predetermined neutron flux or other dangerous condition occurs.

SECONDARY COOLANT—water drawn from the Savannah River, Par Pond, or L Lake and used to receive heat from the primary coolant.

TARGET ROD—lithium-aluminum rod containing materials to be irradiated by the fuel rod.

TRANSURANIC WASTE—waste contaminated with alpha-emitting transuranic radionuclides (having an atomic number greater than 92; e.g., plutonium-239) with half lives greater than 20 years in concentrations greater than specified limits. TRU waste may also contain RCRA-regulated materials.

WSRC-TR-94-0355
Unclassified

Appendix A. Final Primary Drinking Water Standards

Analyte	Unit	Level	Status	Source
Antimony	µg/L	6	Final	EPA, 1993
Arsenic	µg/L	50	Final	EPA, 1993
Asbestos	fibers/L	7,000,000	Final	EPA, 1993
Barium	µg/L	2,000	Final	EPA, 1993
Benzene	µg/L	5	Final	EPA, 1993
Benzo[a]pyrene	µg/L	0.2	Final	EPA, 1993
Beryllium	µg/L	4	Final	EPA, 1993
Bis(2-ethylhexyl) phthalate	µg/L	6	Final	EPA, 1993
Bromodichloromethane	µg/L	100	Final	EPA, 1993
Bromoform	µg/L	100	Final	EPA, 1993
2-sec-Butyl-4,6-dinitrophenol	µg/L	7	Final	EPA, 1993
Cadmium	µg/L	5	Final	EPA, 1993
Carbon tetrachloride	µg/L	5	Final	EPA, 1993
Chlordane	µg/L	2	Final	EPA, 1993
Chlorobenzene	µg/L	100	Final	EPA, 1993
Chloroethene (Vinyl chloride)	µg/L	2	Final	EPA, 1993
Chloroform	µg/L	100	Final	EPA, 1993
Chromium	µg/L	100	Final	EPA, 1993
Copper	µg/L	1,300	Final	EPA, 1993
Cyanide	µg/L	200	Final	EPA, 1993
Dibromochloromethane	µg/L	100	Final	EPA, 1993
1,2-Dibromo-3-chloropropane	µg/L	0.2	Final	EPA, 1993
1,2-Dibromoethane	µg/L	0.05	Final	EPA, 1993
1,2-Dichlorobenzene	µg/L	600	Final	EPA, 1993
1,4-Dichlorobenzene	µg/L	75	Final	EPA, 1993
1,2-Dichloroethane	µg/L	5	Final	EPA, 1993
1,1-Dichloroethylene	µg/L	7	Final	EPA, 1993
1,2-Dichloroethylene	µg/L	50	Final	EPA, 1993
cis-1,2-Dichloroethylene	µg/L	70	Final	EPA, 1993
trans-1,2-Dichloroethylene	µg/L	100	Final	EPA, 1993
Dichloromethane (Methylene chloride)	µg/L	5	Final	EPA, 1993
2,4-Dichlorophenoxyacetic acid	µg/L	70	Final	EPA, 1993
1,2-Dichloropropane	µg/L	5	Final	EPA, 1993
Endrin	µg/L	2	Final	EPA, 1993
Ethylbenzene	µg/L	700	Final	EPA, 1993
Fluoride	µg/L	4,000	Final	EPA, 1993
Gross alpha ¹	pCi/L	1.5E+01	Final	EPA, 1993
Heptachlor	µg/L	0.4	Final	EPA, 1993
Heptachlor epoxide	µg/L	0.2	Final	EPA, 1993
Hexachlorobenzene	µg/L	1	Final	EPA, 1993
Hexachlorocyclopentadiene	µg/L	50	Final	EPA, 1993

¹ The standard given is for gross alpha including radium-226 but excluding radon and uranium.

Analyte	Unit	Level	Status	Source
Lead	µg/L	50	Final	SCDHEC, 1981
Lindane	µg/L	0.2	Final	EPA, 1993
Mercury	µg/L	2	Final	EPA, 1993
Methoxychlor	µg/L	40	Final	EPA, 1993
Nickel	µg/L	100	Final	EPA, 1993
Nitrate as nitrogen	µg/L	10,000	Final	EPA, 1993
Nitrate-nitrite as nitrogen	µg/L	10,000	Final	EPA, 1993
Nitrite as nitrogen	µg/L	1,000	Final	EPA, 1993
Nonvolatile beta	pCi/L	5E+01	Interim final	EPA, 1977
PCB 1016	µg/L	0.5	Final	EPA, 1993
PCB 1221	µg/L	0.5	Final	EPA, 1993
PCB 1232	µg/L	0.5	Final	EPA, 1993
PCB 1242	µg/L	0.5	Final	EPA, 1993
PCB 1248	µg/L	0.5	Final	EPA, 1993
PCB 1254	µg/L	0.5	Final	EPA, 1993
PCB 1260	µg/L	0.5	Final	EPA, 1993
PCB 1262	µg/L	0.5	Final	EPA, 1993
Pentachlorophenol	µg/L	1	Final	EPA, 1993
Radium, total (radium-226 plus radium-228)	pCi/L	5E+00	Final	EPA, 1993
Selenium	µg/L	50	Final	EPA, 1993
Strontium-89/90 ²	pCi/L	8E+00	Final	EPA, 1993
Strontium-90	pCi/L	8E+00	Final	EPA, 1993
Styrene	µg/L	100	Final	EPA, 1993
2,3,7,8-TCDD	µg/L	0.00003	Final	EPA, 1993
Tetrachloroethylene	µg/L	5	Final	EPA, 1993
Thallium	µg/L	2	Final	EPA, 1993
Toluene	µg/L	1,000	Final	EPA, 1993
Toxaphene	µg/L	3	Final	EPA, 1993
2,4,5-TP (Silvex)	µg/L	50	Final	EPA, 1993
1,2,4-Trichlorobenzene	µg/L	70	Final	EPA, 1993
1,1,1-Trichloroethane	µg/L	200	Final	EPA, 1993
1,1,2-Trichloroethane	µg/L	5	Final	EPA, 1993
Trichloroethylene	µg/L	5	Final	EPA, 1993
Tritium	pCi/mL	2E+01	Final	EPA, 1993
Xylenes	µg/L	10,000	Final	EPA, 1993

References

EPA (U.S. Environmental Protection Agency), 1977. *National Interim Primary Drinking Water Regulations*, EPA-570/9-76-003. Washington, DC.

EPA (U.S. Environmental Protection Agency), 1993. *National Primary Drinking Water Regulations, Code of Federal Regulations*, Section 40, Part 141, pp. 592-732. Washington, DC.

² When the laboratories report results for strontium-89/90, the drinking water standard for strontium-90 is applied.

SCDHEC (South Carolina Department of Health and Environmental Control),
1981. **State Primary Drinking Water Regulations**, R.61-58.5. Columbia,
SC.

Appendix B. Flagging Criteria

The Savannah River Site Environmental Protection Department/Environmental Monitoring Section (EPD/EMS) flagging criteria are as follows:

- Flag 2 criteria for constituents equal the Safe Drinking Water Act (SDWA) final Primary Drinking Water Standard (PDWS), the SDWA proposed PDWS, or the SDWA Secondary Drinking Water Standard (SDWS). If a constituent does not have a drinking water standard, the Flag 2 criterion equals 10 times the method detection limit (MDL) calculated as the 90th percentile detection limit obtained recently by one of the primary analytical laboratories.
- Flag 1 criteria for constituents equal one-half of the final PDWS, one-half the proposed PDWS, or one-half the SDWS. If a constituent does not have a drinking water standard, the Flag 1 criterion equals 5 times the MDL calculated as the 90th percentile detection limit obtained recently by one of the primary analytical laboratories.
- Flag 0 criteria are assigned to constituent levels below Flag 1 criteria, constituent levels below the sample detection limits, or constituents having no flagging criteria.
- The following parameters are exceptions to the flagging rules:
- EPD/EMS sets flagging criteria for specific conductance and pH. No flags are set for alkalinity, calcium, carbonate, magnesium, potassium, silica, sodium, total dissolved solids, total phosphates (as P), and total phosphorus. Analyses for these parameters are conducted as part of the biennial comprehensive analyses or by special request.
- Aesthetic parameters such as color, corrosivity, Eh, odor, surfactants, and turbidity are not assigned flagging criteria but are analyzed by special request.
- Common laboratory contaminants and cleaners such as dichloromethane (methylene chloride), ketones, phthalates, and toluene are not assigned flagging criteria unless they have primary drinking water standards. These constituents are analyzed by special request.

Analyte	Unit	Flag 1	Flag 2	Source ^a
Acenaphthene	µg/L	50	100	EPA Method 8270
Acenaphthylene	µg/L	50	100	EPA Method 8270
Acetone	µg/L	500	1,000	EPA Method 8240
Acetonitrile (Methyl cyanide)	µg/L	500	1,000	EPA Method 8240
Acetophenone	µg/L	50	100	EPA Method 8270
2-Acetylaminofluorene	µg/L	50	100	EPA Method 8270
Acrolein	µg/L	100	200	EPA Method 8240
Acrylonitrile	µg/L	100	200	EPA Method 8240
Actinium-228	pCi/L	1.64E+03	3.27E+03	Proposed PDWS (EPA, 1991)
Alachlor	µg/L	1	2	Final PDWS (EPA, 1993a)
Aldicarb ^b	µg/L	1.5	3	Final PDWS (EPA, 1993a)

Analyte	Unit	Flag 1	Flag 2	Source ^a
Aldicarb sulfone ^b	µg/L	1	2	Final PDWS (EPA, 1993a)
Aldicarb sulfoxide ^b	µg/L	2	4	Final PDWS (EPA, 1993a)
Aldrin	µg/L	0.25	0.5	EPA Method 8080
Alkalinity (as CaCO ₃)		No flag	No flag	Set by EPD/EMS
Allyl chloride	µg/L	250	500	EPA Method 8240
Aluminum	µg/L	25	50	SDWS (EPA, 1993b)
Aluminum, dissolved	µg/L	25	50	SDWS (EPA, 1993b)
Aluminum, total recoverable	µg/L	25	50	SDWS (EPA, 1993b)
Americium-241	pCi/L	3.17E+00	6.34E+00	Proposed PDWS (EPA, 1991)
Americium-243	pCi/L	3.19E+00	6.37E+00	Proposed PDWS (EPA, 1991)
4-Aminobiphenyl	µg/L	50	100	EPA Method 8270
Ammonia	µg/L	500	1,000	APHA Method 417B
Ammonia nitrogen	µg/L	500	1,000	EPA Method 350.1
Aniline	µg/L	50	100	EPA Method 8270
Anthracene	µg/L	50	100	EPA Method 8270
Antimony	µg/L	3	6	Final PDWS (EPA, 1993a)
Antimony, dissolved	µg/L	3	6	Final PDWS (EPA, 1993a)
Antimony, total recoverable	µg/L	3	6	Final PDWS (EPA, 1993a)
Antimony-125	pCi/L	1.5E+02	3E+02	Interim Final PDWS (EPA, 1977)
Aramite	µg/L	50	100	EPA Method 8270
Arsenic	µg/L	25	50	Final PDWS (EPA, 1993a)
Arsenic, dissolved	µg/L	25	50	Final PDWS (EPA, 1993a)
Arsenic, total recoverable	µg/L	25	50	Final PDWS (EPA, 1993a)
Asbestos	Fibers/L	3,500,000	7,000,000	Final PDWS (EPA, 1993a)
Atrazine	µg/L	1.5	3	Final PDWS (EPA, 1993a)
Azobenzene	µg/L	50	100	EPA Method 625
Barium	µg/L	1,000	2,000	Final PDWS (EPA, 1993a)
Barium, dissolved	µg/L	1,000	2,000	Final PDWS (EPA, 1993a)
Barium, total recoverable	µg/L	1,000	2,000	Final PDWS (EPA, 1993a)
Barium-140 ^c	pCi/L	4.5E+01	9E+01	Interim Final PDWS (EPA, 1977)
Benzene	µg/L	2.5	5	Final PDWS (EPA, 1993a)
alpha-Benzene hexachloride	µg/L	0.25	0.5	EPA Method 8080
beta-Benzene hexachloride	µg/L	0.25	0.5	EPA Method 8080
delta-Benzene hexachloride	µg/L	0.25	0.5	EPA Method 8080
Benzidine	µg/L	250	500	EPA Method 8270
Benzo[a]anthracene	µg/L	0.05	0.1	Proposed PDWS (EPA, 1990)
Benzo[b]fluoranthene	µg/L	0.1	0.2	Proposed PDWS (EPA, 1990)
Benzo[k]fluoranthene	µg/L	0.1	0.2	Proposed PDWS (EPA, 1990)
Benzoic acid	µg/L	250	500	EPA Method 8270
Benzo[g,h,i]perylene	µg/L	50	100	EPA Method 8270
Benzo[a]pyrene	µg/L	0.1	0.2	Final PDWS (EPA, 1993a)
1,4-Benzquinone	µg/L	50	100	EPA Method 8270
Benzyl alcohol	µg/L	50	100	EPA Method 8270
Beryllium	µg/L	2	4	Final PDWS (EPA, 1993a)
Beryllium, dissolved	µg/L	2	4	Final PDWS (EPA, 1993a)
Beryllium, total recoverable	µg/L	2	4	Final PDWS (EPA, 1993a)
Beryllium-7	pCi/L	3E+03	6E+03	Interim Final PDWS (EPA, 1977)
Bis(2-chloroethoxy) methane	µg/L	50	100	EPA Method 8270
Bis(2-chloroethyl) ether	µg/L	50	100	EPA Method 8270
Bis(2-chloroisopropyl) ether	µg/L	50	100	EPA Method 8270
Bis(chloromethyl) ether	µg/L	50	100	EPA Method 8270
Bis(2-ethylhexyl) phthalate	µg/L	3	6	Final PDWS (EPA, 1993a)
Bismuth-214	pCi/L	9.4E+03	1.89E+04	Proposed PDWS (EPA, 1991)
Boron	µg/L	150	300	EPA Method 6010
Boron, dissolved	µg/L	150	300	EPA Method 6010
Boron, total recoverable	µg/L	150	300	EPA Method 6010
Bromide	µg/L	5,000	10,000	EPA Method 300.0
Bromodichloromethane	µg/L	50	100	Final PDWS (EPA, 1993a)
Bromoform	µg/L	50	100	Final PDWS (EPA, 1993a)
Bromomethane (Methyl bromide)	µg/L	5	10	EPA Method 8240
4-Bromophenyl phenyl ether	µg/L	50	100	EPA Method 8270
2-sec-Butyl-4,6-dinitrophenol	µg/L	3.5	7	Final PDWS (EPA, 1993a)
Butylbenzyl phthalate		No flag	No flag	Set by EPD/EMS

Analyte	Unit	Flag 1	Flag 2	Source ^a
Cadmium	µg/L	2.5	5	Final PDWS (EPA, 1993a)
Cadmium, dissolved	µg/L	2.5	5	Final PDWS (EPA, 1993a)
Cadmium, total recoverable	µg/L	2.5	5	Final PDWS (EPA, 1993a)
Calcium		No flag	No flag	Set by EPD/EMS
Calcium, dissolved		No flag	No flag	Set by EPD/EMS
Calcium, total recoverable		No flag	No flag	Set by EPD/EMS
Carbon disulfide	µg/L	5	10	EPA Method 8240
Carbofuran	µg/L	20	40	Final PDWS (EPA, 1993a)
Carbon tetrachloride	µg/L	2.5	5	Final PDWS (EPA, 1993a)
Carbon-14	pCi/L	1E+03	2E+03	Interim Final PDWS (EPA, 1977)
Carbonate		No flag	No flag	Set by EPD/EMS
Cerium-141 ^c	pCi/L	1.5E+02	3E+02	Interim Final PDWS (EPA, 1977)
Cerium-144	pCi/L	1.31E+02	2.61E+02	Proposed PDWS (EPA, 1991)
Cesium-134 ^d	pCi/L	4.07E+01	8.13E+01	Proposed PDWS (EPA, 1991)
Cesium-137	pCi/L	1E+02	2E+02	Interim Final PDWS (EPA, 1977)
Chlordane	µg/L	1	2	Final PDWS (EPA, 1993a)
Chloride	µg/L	125,000	250,000	SDWS (EPA, 1993b)
4-Chloroaniline	µg/L	50	100	EPA Method 8270
Chlorobenzene	µg/L	50	100	Final PDWS (EPA, 1993a)
Chlorobenzilate	µg/L	50	100	EPA Method 8270
Chloroethane	µg/L	5	10	EPA Method 8240
Chloroethene (Vinyl chloride)	µg/L	1	2	Final PDWS (EPA, 1993a)
Chloroethyl vinyl ether	µg/L	5	10	EPA Method 8240
2-Chloroethyl vinyl ether	µg/L	5	10	EPA Method 8240
Chloroform	µg/L	50	100	Final PDWS (EPA, 1993a)
4-Chloro-m-cresol	µg/L	50	100	EPA Method 8270
Chloromethane (Methyl chloride)	µg/L	5	10	EPA Method 8240
2-Chloronaphthalene	µg/L	50	100	EPA Method 8240
2-Chlorophenol	µg/L	50	100	EPA Method 8270
4-Chlorophenyl phenyl ether	µg/L	50	100	EPA Method 8270
Chloroprene	µg/L	1,000	2,000	EPA Method 8240
Chromium	µg/L	50	100	Final PDWS (EPA, 1993a)
Chromium, dissolved	µg/L	50	100	Final PDWS (EPA, 1993a)
Chromium, total recoverable	µg/L	50	100	Final PDWS (EPA, 1993a)
Chromium-51 ^c	pCi/L	3E+03	6E+03	Interim Final PDWS (EPA, 1977)
Chrysene	µg/L	0.1	0.2	Proposed PDWS (EPA, 1990)
Cobalt	µg/L	20	40	EPA Method 6010
Cobalt, dissolved	µg/L	20	40	EPA Method 6010
Cobalt, total recoverable	µg/L	20	40	EPA Method 6010
Cobalt-57	pCi/L	5E+02	1E+03	Interim Final PDWS (EPA, 1977)
Cobalt-58 ^d	pCi/L	4.5E+03	9E+03	Interim Final PDWS (EPA, 1977)
Cobalt-60	pCi/L	5E+01	1E+02	Interim Final PDWS (EPA, 1977)
Color		No flag	No flag	Set by EPD/EMS
Copper	µg/L	500	1,000	Final PDWS (SCDHEC, 1981)
Copper, dissolved	µg/L	500	1,000	Final PDWS (SCDHEC, 1981)
Copper, total recoverable	µg/L	500	1,000	Final PDWS (SCDHEC, 1981)
Corrosivity		No flag	No flag	Set by EPD/EMS
m-Cresol (3-Methylphenol)	µg/L	50	100	EPA Method 8270
o-Cresol (2-Methylphenol)	µg/L	50	100	EPA Method 8270
p-Cresol (4-Methylphenol)	µg/L	50	100	EPA Method 8270
Curium-242	pCi/L	6.65E+01	1.33E+02	Proposed PDWS (EPA, 1991)
Curium-243	pCi/L	4.15E+00	8.3E+00	Proposed PDWS (EPA, 1991)
Curium-243/244 ^e	pCi/L	4.15E+00	8.3E+00	Proposed PDWS (EPA, 1991)
Curium-244	pCi/L	4.92E+00	9.84E+00	Proposed PDWS (EPA, 1991)
Curium-245/246 ^e	pCi/L	3.12E+00	6.23E+00	Proposed PDWS (EPA, 1991)
Curium-246	pCi/L	3.14E+00	6.27E+00	Proposed PDWS (EPA, 1991)
Cyanide	µg/L	100	200	Final PDWS (EPA, 1993a)
Dalapon ^b	µg/L	100	200	Final PDWS (EPA, 1993a)
p,p'-DDD	µg/L	0.5	1	EPA Method 8080
p,p'-DDE	µg/L	0.5	1	EPA Method 8080
p,p'-DDT	µg/L	0.5	1	EPA Method 8080
Di-n-butyl phthalate		No flag	No flag	Set by EPD/EMS

Analyte	Unit	Flag 1	Flag 2	Source ^a
Di-n-octyl phthalate		No flag	No flag	Set by EPD/EMS
Diallylate	µg/L	50	100	EPA Method 8270
Dibenz[a,h]anthracene	µg/L	0.15	0.3	Proposed PDWS (EPA, 1990)
Dibenzofuran	µg/L	50	100	EPA Method 8270
Dibromochloromethane	µg/L	50	100	Final PDWS (EPA, 1993a)
1,2-Dibromo-3-chloropropane	µg/L	0.1	0.2	Final PDWS (EPA, 1993a)
1,2-Dibromoethane	µg/L	0.025	0.05	Final PDWS (EPA, 1993a)
Dibromomethane (Methylene bromide)	µg/L	5	10	EPA Method 8240
1,2-Dichlorobenzene	µg/L	300	600	Final PDWS (EPA, 1993a)
1,3-Dichlorobenzene	µg/L	50	100	EPA Method 8270
1,4-Dichlorobenzene	µg/L	37.5	75	Final PDWS (EPA, 1993a)
3,3'-Dichlorobenzidine	µg/L	50	100	EPA Method 8270
trans-1,4-Dichloro-2-butene	µg/L	150	300	EPA Method 8240
Dichlorodifluoromethane	µg/L	5	10	EPA Method 8240
1,1-Dichloroethane	µg/L	5	10	EPA Method 8240
1,2-Dichloroethane	µg/L	2.5	5	Final PDWS (EPA, 1993a)
1,1-Dichloroethylene	µg/L	3.5	7	Final PDWS (EPA, 1993a)
1,2-Dichloroethylene	µg/L	25	50	Final PDWS (EPA, 1993a)
cis-1,2-Dichloroethylene	µg/L	35	70	Final PDWS (EPA, 1993a)
trans-1,2-Dichloroethylene	µg/L	50	100	Final PDWS (EPA, 1993a)
Dichloromethane (Methylene chloride)	µg/L	2.5	5	Final PDWS (EPA, 1993a)
2,4-Dichlorophenol	µg/L	50	100	EPA Method 8270
2,6-Dichlorophenol	µg/L	50	100	EPA Method 8270
2,4-Dichlorophenoxyacetic acid	µg/L	35	70	Final PDWS (EPA, 1993a)
1,2-Dichloropropane	µg/L	2.5	5	Final PDWS (EPA, 1993a)
cis-1,3-Dichloropropene	µg/L	5	10	EPA Method 8240
trans-1,3-Dichloropropene	µg/L	5	10	EPA Method 8240
Di(2-ethylhexyl) adipate	µg/L	200	400	Final PDWS (EPA, 1993a)
Dieldrin	µg/L	2.5	5	EPA Method 8080
Diethyl phthalate		No flag	No flag	Set by EPD/EMS
Dimethoate	µg/L	50	100	EPA Method 8270
p-Dimethylaminoazobenzene	µg/L	50	100	EPA Method 8270
p-(Dimethylamino)ethylbenzene	µg/L	50	100	EPA Method 8270
7,12-Dimethylbenz[a]anthracene	µg/L	50	100	EPA Method 8270
3,3'-Dimethylbenzidine	µg/L	50	100	EPA Method 8270
a,a-Dimethylphenethylamine	µg/L	50	100	EPA Method 8270
2,4-Dimethyl phenol	µg/L	50	100	EPA Method 8270
Dimethyl phthalate		No flag	No flag	Set by EPD/EMS
1,3-Dinitrobenzene	µg/L	50	100	EPA Method 8270
2,4-Dinitrophenol	µg/L	250	500	EPA Method 8270
2,4-Dinitrotoluene	µg/L	50	100	EPA Method 8270
2,6-Dinitrotoluene	µg/L	50	100	EPA Method 8270
Diquat dibromide ^b	µg/L	10	20	Final PDWS (EPA, 1993a)
1,4-Dioxane	µg/L	50	100	EPA Method 8270
Diphenylamine	µg/L	50	100	EPA Method 8270
1,2-Diphenylhydrazine	µg/L	50	100	EPA Method 8270
Dissolved organic carbon	µg/L	5,000	10,000	EPA Method 9060
Disulfoton	µg/L	50	100	EPA Method 8270
Eh		No flag	No flag	Set by EPD/EMS
Endosulfan I	µg/L	0.5	1	EPA Method 8080
Endosulfan II	µg/L	0.5	1	EPA Method 8080
Endosulfan sulfate	µg/L	0.5	1	EPA Method 8080
Endothall ^b	µg/L	50	100	Final PDWS (EPA, 1993a)
Endrin	µg/L	1	2	Final PDWS (EPA, 1993a)
Endrin aldehyde	µg/L	0.5	1	EPA Method 8080
Endrin ketone		No flag	No flag	Set by EPD/EMS
Ethylbenzene	µg/L	350	700	Final PDWS (EPA, 1993a)
Ethyl methacrylate	µg/L	50	100	EPA Method 8270
Ethyl methanesulfonate	µg/L	50	100	EPA Method 8270
Europium-152	pCi/L	3E+01	6E+01	Interim Final PDWS (EPA, 1977)
Europium-154	pCi/L	1E+02	2E+02	Interim Final PDWS (EPA, 1977)
Europium-155	pCi/L	3E+02	6E+02	Interim Final PDWS (EPA, 1977)

Analyte	Unit	Flag 1	Flag 2	Source ^a
Famphur	µg/L	50	100	EPA Method 8270
Fluoranthene	µg/L	50	100	EPA Method 8270
Fluorene	µg/L	50	100	EPA Method 8270
Fluoride	µg/L	2,000	4,000	Final PDWS (EPA, 1993a)
Glyphosate ^b	µg/L	350	700	Final PDWS (EPA, 1993a)
Gross alpha	pCi/L	7.5E+00	1.5E+01	Final PDWS (EPA, 1993a)
Heptachlor	µg/L	0.2	0.4	Final PDWS (EPA, 1993a)
Heptachlor epoxide	µg/L	0.1	0.2	Final PDWS (EPA, 1993a)
Heptachlorodibenzo-p-dioxin isomers	µg/L	0.00325	0.0065	EPA Method 8280
1,2,3,4,6,7,8-HPCDD	µg/L	0.00325	0.0065	EPA Method 8280
Heptachlorodibenzo-p-furan isomers	µg/L	0.00225	0.0045	EPA Method 8280
1,2,3,4,6,7,8-HPCDF	µg/L	0.00225	0.0045	EPA Method 8280
Hexachlorobenzene	µg/L	0.5	1	Final PDWS (EPA, 1993a)
Hexachlorobutadiene	µg/L	50	100	EPA Method 8270
Hexachlorocyclopentadiene	µg/L	25	50	Final PDWS (EPA, 1993a)
Hexachlorodibenzo-p-dioxin isomers	µg/L	0.00225	0.0045	EPA Method 8280
1,2,3,4,7,8-HXCDD	µg/L	0.00225	0.0045	EPA Method 8280
Hexachlorodibenzo-p-furan isomers	µg/L	0.002	0.004	EPA Method 8280
1,2,3,4,7,8-HXCDF	µg/L	0.002	0.004	EPA Method 8280
Hexachloroethane	µg/L	50	100	EPA Method 8270
Hexachlorophene	µg/L	250	500	EPA Method 8270
Hexachloropropene	µg/L	50	100	EPA Method 8270
2-Hexanone	µg/L	50	100	EPA Method 8240
Indeno[1,2,3-c,d]pyrene	µg/L	50	100	EPA Method 8270
Iodine	µg/L	250	500	APHA Method 415A
Iodine-129	pCi/L	5E-01	1E+00	Interim Final PDWS (EPA, 1977)
Iodine-131 ^c	pCi/L	1.5E+00	3E+00	Interim Final PDWS (EPA, 1977)
Iodomethane (Methyl iodide)	µg/L	75	150	EPA Method 8240
Iron	µg/L	150	300	SDWS (EPA, 1993b)
Iron, dissolved	µg/L	150	300	SDWS (EPA, 1993b)
Iron, total recoverable	µg/L	150	300	SDWS (EPA, 1993b)
Iron-55 ^c	pCi/L	1E+03	2E+03	Interim Final PDWS (EPA, 1977)
Iron-59 ^c	pCi/L	1E+02	2E+02	Interim Final PDWS (EPA, 1977)
Isobutyl alcohol	µg/L	500	1,000	EPA Method 8240
Isodrin	µg/L	50	100	EPA Method 8270
Isophorone	µg/L	50	100	EPA Method 8270
Isosafrole	µg/L	50	100	EPA Method 8270
Kepone	µg/L	50	100	EPA Method 8270
Lanthanum-140 ^c	pCi/L	3E+01	6E+01	Interim Final PDWS (EPA, 1977)
Lead	µg/L	25	50	Final PDWS (SCDHEC, 1981)
Lead, dissolved	µg/L	25	50	Final PDWS (SCDHEC, 1981)
Lead, total recoverable	µg/L	25	50	Final PDWS (SCDHEC, 1981)
Lead-212	pCi/L	6.2E+01	1.23E+02	Proposed PDWS (EPA, 1991)
Lindane	µg/L	0.1	0.2	Final PDWS (EPA, 1993a)
Lithium	µg/L	25	50	EPA Method 6010
Lithium, dissolved	µg/L	25	50	EPA Method 6010
Lithium, total recoverable	µg/L	25	50	EPA Method 6010
Magnesium		No flag	No flag	Set by EPD/EMS
Magnesium, dissolved		No flag	No flag	Set by EPD/EMS
Magnesium, total recoverable		No flag	No flag	Set by EPD/EMS
Manganese	µg/L	25	50	SDWS (EPA, 1993b)
Manganese, dissolved	µg/L	25	50	SDWS (EPA, 1993b)
Manganese, total recoverable	µg/L	25	50	SDWS (EPA, 1993b)
Manganese-54	pCi/L	1.5E+02	3E+02	Interim Final PDWS (EPA, 1977)
Mercury	µg/L	1	2	Final PDWS (EPA, 1993a)
Mercury, dissolved	µg/L	1	2	Final PDWS (EPA, 1993a)
Mercury, total recoverable	µg/L	1	2	Final PDWS (EPA, 1993a)
Methacrylonitrile	µg/L	250	500	EPA Method 8240
Methapyrilene	µg/L	50	100	EPA Method 8270

Analyte	Unit	Flag 1	Flag 2	Source ^a
Methoxychlor	µg/L	20	40	Final PDWS (EPA, 1993a)
3-Methylcholanthrene	µg/L	50	100	EPA Method 8270
2-Methyl-4,6-dinitrophenol	µg/L	250	500	EPA Method 8270
Methyl ethyl ketone		No flag	No flag	Set by EPD/EMS
Methyl isobutyl ketone		No flag	No flag	Set by EPD/EMS
Methyl methacrylate	µg/L	50	100	EPA Method 8270
Methyl methanesulfonate	µg/L	50	100	EPA Method 8270
2-Methylnaphthalene	µg/L	50	100	EPA Method 8270
Molybdenum	µg/L	250	500	EPA Method 6010
Molybdenum, dissolved	µg/L	250	500	EPA Method 6010
Molybdenum, total recoverable	µg/L	250	500	EPA Method 6010
Naphthalene	µg/L	50	100	EPA Method 8270
1,4-Naphthoquinone	µg/L	50	100	EPA Method 8270
1-Naphthylamine	µg/L	50	100	EPA Method 8270
2-Naphthylamine	µg/L	50	100	EPA Method 8270
Neptunium-237	pCi/L	3.53E+00	7.06E+00	Proposed PDWS (EPA, 1991)
Nickel	µg/L	50	100	Final PDWS (EPA, 1993a)
Nickel, dissolved	µg/L	50	100	Final PDWS (EPA, 1993a)
Nickel, total recoverable	µg/L	50	100	Final PDWS (EPA, 1993a)
Nickel-59 ^c	pCi/L	1.5E+02	3E+02	Interim Final PDWS (EPA, 1977)
Nickel-63 ^c	pCi/L	2.5E+01	5E+01	Interim Final PDWS (EPA, 1977)
Niobium-95 ^c	pCi/L	1.5E+02	3.E+02	Interim Final PDWS (EPA, 1977)
Nitrate as nitrogen	µg/L	5,000	10,000	Final PDWS (EPA, 1993a)
Nitrate-nitrite as nitrogen	µg/L	5,000	10,000	Final PDWS (EPA, 1993a)
Nitrite as nitrogen	µg/L	500	1,000	Final PDWS (EPA, 1993a)
m-Nitroaniline	µg/L	50	100	EPA Method 8270
o-Nitroaniline	µg/L	50	100	EPA Method 8270
p-Nitroaniline	µg/L	50	100	EPA Method 8270
Nitrobenzene	µg/L	50	100	EPA Method 8270
Nitrogen by Kjeldahl method	µg/L	500	1,000	EPA Method 351.2
2-Nitrophenol	µg/L	50	100	EPA Method 8270
4-Nitrophenol	µg/L	50	100	EPA Method 8270
4-Nitroquinoline-1-oxide	µg/L	50	100	EPA Method 8270
N-Nitrosodi-n-butylamine	µg/L	50	100	EPA Method 8270
N-Nitrosodiethylamine	µg/L	50	100	EPA Method 8270
N-Nitrosodimethylamine	µg/L	50	100	EPA Method 8270
N-Nitrosodiphenylamine	µg/L	50	100	EPA Method 8270
N-Nitrosodipropylamine	µg/L	50	100	EPA Method 8270
N-Nitrosomethylethylamine	µg/L	50	100	EPA Method 8270
N-Nitrosomorpholine	µg/L	50	100	EPA Method 8270
N-Nitrosopiperidine	µg/L	50	100	EPA Method 8270
N-Nitrosopyrrolidine	µg/L	50	100	EPA Method 8270
5-Nitro-o-toluidine	µg/L	50	100	EPA Method 8270
Nonvolatile beta	pCi/L	2.5E+01	5E+01	Interim Final PDWS (EPA, 1977)
Octachlorodibenzo-p-dioxin isomers	µg/L	0.005	0.01	EPA Method 8280
Octachlorodibenzo-p-furan isomers	µg/L	0.005	0.01	EPA Method 8280
Odor		No flag	No flag	Set by EPD/EMS
Oil & Grease	µg/L	5,000	10,000	EPA Method 413.1
Oxamyl ^b	µg/L	100	200	Final PDWS (EPA, 1993a)
Parathion	µg/L	0.25	0.5	EPA Method 8080
Parathion methyl	µg/L	0.25	0.5	EPA Method 8080
PCB 1016	µg/L	0.25	0.5	Final PDWS (EPA, 1993a)
PCB 1221	µg/L	0.25	0.5	Final PDWS (EPA, 1993a)
PCB 1232	µg/L	0.25	0.5	Final PDWS (EPA, 1993a)
PCB 1242	µg/L	0.25	0.5	Final PDWS (EPA, 1993a)
PCB 1248	µg/L	0.25	0.5	Final PDWS (EPA, 1993a)
PCB 1254	µg/L	0.25	0.5	Final PDWS (EPA, 1993a)
PCB 1260	µg/L	0.25	0.5	Final PDWS (EPA, 1993a)
PCB 1262	µg/L	0.25	0.5	Final PDWS (EPA, 1993a)
Pentachlorobenzene	µg/L	50	100	EPA Method 8270

Analyte	Unit	Flag 1	Flag 2	Source ^a
Pentachlorodibenzo-p-dioxin isomers	µg/L	0.00275	0.0055	EPA Method 8280
1,2,3,7,8-PCDD	µg/L	0.00275	0.0055	EPA Method 8280
Pentachlorodibenzo-p-furan isomers	µg/L	0.00275	0.0055	EPA Method 8280
1,2,3,7,8-PCDF	µg/L	0.00275	0.0055	EPA Method 8280
Pentachloroethane	µg/L	50	100	EPA Method 8270
Pentachloronitrobenzene	µg/L	50	100	EPA Method 8270
Pentachlorophenol	µg/L	0.5	1	Final PDWS (EPA, 1993a)
pH	pH	8	10	Set by EPD/EMS
pH	pH	4	3	Set by EPD/EMS
Phenacetin	µg/L	50	100	EPA Method 8270
Phenanthrene	µg/L	50	100	EPA Method 8270
Phenol	µg/L	50	100	EPA Method 8270
Phenols	µg/L	25	50	EPA Method 420.1
p-Phenylenediamine	µg/L	50	100	EPA Method 8270
Phorate	µg/L	0.5	1	EPA Method 8080
Picloram ^b	µg/L	250	500	Final PDWS (EPA, 1993a)
2-Picoline	µg/L	50	100	EPA Method 8270
Plutonium-238	pCi/L	3.51E+00	7.02E+00	Proposed PDWS (EPA, 1991)
Plutonium-239	pCi/L	3.11E+01	6.21E+01	Proposed PDWS (EPA, 1991)
Plutonium-239/240 ^e	pCi/L	3.11E+01	6.21E+01	Proposed PDWS (EPA, 1991)
Plutonium-240	pCi/L	3.11E+01	6.22E+01	Proposed PDWS (EPA, 1991)
Plutonium-241 ^c	pCi/L	3.13E+01	6.26E+01	Proposed PDWS (EPA, 1991)
Plutonium-242 ^c	pCi/L	3.27E+01	6.54E+01	Proposed PDWS (EPA, 1991)
Potassium		No flag	No flag	Set by EPD/EMS
Potassium, dissolved		No flag	No flag	Set by EPD/EMS
Potassium, total recoverable		No flag	No flag	Set by EPD/EMS
Potassium-40	pCi/L	1.5E+02	3E+02	Proposed PDWS (EPA, 1986)
Promethium-144	pCi/L	5E+01	1E+02	EPA Method 901.1
Promethium-146	pCi/L	5E+01	1E+02	EPA Method 901.1
Promethium-147	pCi/L	5.24E+03	5.24E+03	Proposed PDWS (EPA, 1991)
Pronamid	µg/L	50	100	EPA Method 8270
Propionitrile	µg/L	1,000	2,000	EPA Method 8240
Pyrene	µg/L	50	100	EPA Method 8270
Pyridine	µg/L	50	100	EPA Method 8270
Radium (alpha-emitting) ^f	pCi/L	1E+01	2E+01	Proposed PDWS (EPA, 1991)
Radium-226	pCi/L	1E+01	2E+01	Proposed PDWS (EPA, 1991)
Radium-228	pCi/L	1E+01	2E+01	Proposed PDWS (EPA, 1991)
Radon-222	pCi/L	1.5E+02	3E+02	Proposed PDWS (EPA, 1991)
Ruthenium-103 ^c	pCi/L	1E+02	2E+02	Interim Final PDWS (EPA, 1977)
Ruthenium-106	pCi/L	1.5E+01	3E+01	Interim Final PDWS (EPA, 1977)
Safrole	µg/L	50	100	EPA Method 8270
Selenium	µg/L	25	50	Final PDWS (EPA, 1993a)
Selenium, dissolved	µg/L	25	50	Final PDWS (EPA, 1993a)
Selenium, total recoverable	µg/L	25	50	Final PDWS (EPA, 1993a)
Silica		No flag	No flag	Set by EPD/EMS
Silica, dissolved		No flag	No flag	Set by EPD/EMS
Silica, total recoverable		No flag	No flag	Set by EPD/EMS
Silver	µg/L	50	100	SDWS (EPA, 1993b)
Silver, dissolved	µg/L	50	100	SDWS (EPA, 1993b)
Silver, total recoverable	µg/L	50	100	SDWS (EPA, 1993b)
Simazine ^b	µg/L	2	4	Final PDWS (EPA, 1993a)
Sodium		No flag	No flag	Set by EPD/EMS
Sodium, dissolved		No flag	No flag	Set by EPD/EMS
Sodium, total recoverable		No flag	No flag	Set by EPD/EMS
Sodium-22	pCi/L	2.33E+02	4.66E+02	Proposed PDWS (EPA, 1991)
Specific conductance	µS/cm	250	500	Set by EPD/EMS
Strontium-89	pCi/L	1E+01	2E+01	Interim Final PDWS (EPA, 1977)
Strontium-89/90 ^e	pCi/L	4E+00	8E+00	Final PDWS (EPA, 1993a)
Strontium-90	pCi/L	4E+00	8E+00	Final PDWS (EPA, 1993a)
Styrene	µg/L	50	100	Final PDWS (EPA, 1993a)

Analyte	Unit	Flag 1	Flag 2	Source ^a
Sulfate	µg/L	200,000	400,000	Proposed PDWS (EPA, 1990)
Sulfide	µg/L	5,000	10,000	EPA Method 9030
Sulfotep	µg/L	50	100	EPA Method 8270
Surfactants	No flag	No flag	No flag	Set by EPD/EMS
2,3,7,8-TCDD	µg/L	0.000015	0.00003	Final PDWS (EPA, 1993a)
2,3,7,8-TCDF	µg/L	0.002	0.004	EPA Method 8280
Technetium-99	pCi/L	4.5E+02	9E+02	Interim Final PDWS (EPA, 1977)
1,2,4,5-Tetrachlorobenzene	µg/L	50	100	EPA Method 8270
Tetrachlorodibenzo-p-dioxin isomers	µg/L	0.00225	0.0045	EPA Method 8280
Tetrachlorodibenzo-p-furan isomers	µg/L	0.002	0.004	EPA Method 8280
1,1,1,2-Tetrachloroethane	µg/L	5	10	EPA Method 8240
1,1,2,2-Tetrachloroethane	µg/L	5	10	EPA Method 8240
Tetrachloroethylene	µg/L	2.5	5	Final PDWS (EPA, 1993a)
2,3,4,6-Tetrachlorophenol	µg/L	50	100	EPA Method 8270
Thallium	µg/L	1	2	Final PDWS (EPA, 1993a)
Thallium, dissolved	µg/L	1	2	Final PDWS (EPA, 1993a)
Thallium, total recoverable	µg/L	1	2	Final PDWS (EPA, 1993a)
Thionazin	µg/L	50	100	EPA Method 8270
Thorium-228	pCi/L	6.25E+01	1.25E+02	Proposed PDWS (EPA, 1991)
Thorium-230	pCi/L	3.96E+01	7.92E+01	Proposed PDWS (EPA, 1991)
Thorium-232	pCi/L	4.4E+01	8.8E+01	Proposed PDWS (EPA, 1991)
Thorium-234	pCi/L	2E+02	4.01E+02	Proposed PDWS (EPA, 1991)
Tin	µg/L	10	20	EPA Method 282.2
Tin, dissolved	µg/L	10	20	EPA Method 282.2
Tin, total recoverable	µg/L	10	20	EPA Method 282.2
Tin-113 ^c	pCi/L	1.5E+02	3E+02	Interim Final PDWS (EPA, 1977)
Toluene	µg/L	500	1,000	Final PDWS (EPA, 1993a)
o-Toluidine	µg/L	50	100	EPA Method 8270
Total carbon	µg/L	5,000	10,000	EPA Method 9060
Total coliform	0	0	0	Final PDWS (EPA, 1993a)
Total dissolved solids	No flag	No flag	No flag	Set by EPD/EMS
Total hydrocarbons	µg/L	5,000	10,000	EPA Method 418.1
Total inorganic carbon	µg/L	5,000	10,000	EPA Method 9060
Total organic carbon	µg/L	5,000	10,000	EPA Method 9060
Total organic halogens	µg/L	25	50	EPA Method 9020
Total organic nitrogen	µg/L	500	1,000	APHA Method 420
Total petroleum hydrocarbons	µg/L	5,000	10,000	EPA Method 418.1
Total phosphates (as P)	No flag	No flag	No flag	Set by EPD/EMS
Total phosphorus	No flag	No flag	No flag	Set by EPD/EMS
Toxaphene	µg/L	1.5	3	Final PDWS (EPA, 1993a)
2,4,5-TP (Silvex)	µg/L	25	50	Final PDWS (EPA, 1993a)
Tributyl phosphate	µg/L	50	100	EPA Method 8270
1,2,4-Trichlorobenzene	µg/L	35	70	Final PDWS (EPA, 1993a)
1,1,1-Trichloroethane	µg/L	100	200	Final PDWS (EPA, 1993a)
1,1,2-Trichloroethane	µg/L	2.5	5	Final PDWS (EPA, 1993a)
Trichloroethylene	µg/L	2.5	5	Final PDWS (EPA, 1993a)
Trichlorofluoromethane	µg/L	5	10	EPA Method 8240
2,4,5-Trichlorophenol	µg/L	50	100	EPA Method 8270
2,4,6-Trichlorophenol	µg/L	50	100	EPA Method 8270
2,4,5-Trichlorophenoxyacetic acid	µg/L	2.5	5	EPA Method 8150
1,2,3-Trichloropropane	µg/L	5	10	EPA Method 8240
O,O,O-Triethyl phosphorothioate	µg/L	50	100	EPA Method 8270
1,3,5-Trinitrobenzene	µg/L	50	100	EPA Method 8270
Tritium	pCi/mL	1E+01	2E+01	Final PDWS (EPA, 1993a)
Turbidity ^g	No flag	No flag	No flag	Set by EPD/EMS
Uranium	µg/L	10	20	Proposed PDWS (EPA, 1991)
Uranium, dissolved	µg/L	10	20	Proposed PDWS (EPA, 1991)
Uranium, total recoverable	µg/L	10	20	Proposed PDWS (EPA, 1991)
Uranium alpha activity	pCi/L	1.5E+01	3E+01	Proposed PDWS (EPA, 1991)
Uranium-233/234 ^e	pCi/L	6.9E+00	1.38E+01	Proposed PDWS (EPA, 1991)
Uranium-234	pCi/L	6.95E+00	1.39E+01	Proposed PDWS (EPA, 1991)
Uranium-235	pCi/L	7.25E+00	1.45E+01	Proposed PDWS (EPA, 1991)

Analyte	Unit	Flag 1	Flag 2	Source ^a
Uranium-238	pCi/L	7.3E+00	1.46E+01	Proposed PDWS (EPA, 1991)
Vanadium	µg/L	40	80	EPA Method 6010
Vanadium, dissolved	µg/L	40	80	EPA Method 6010
Vanadium, total recoverable	µg/L	40	80	EPA Method 6010
Vinyl acetate	µg/L	5	10	EPA Method 8240
Xylenes	µg/L	5,000	10,000	Final PDWS (EPA, 1993a)
Yttrium-88	pCi/L	5E+01	1E+02	EPA Method 901.1
Zinc	µg/L	2,500	5,000	SDWS (EPA, 1993b)
Zinc, dissolved	µg/L	2,500	5,000	SDWS (EPA, 1993b)
Zinc, total recoverable	µg/L	2,500	5,000	SDWS (EPA, 1993b)
Zinc-65	pCi/L	1.5E+02	3E+02	Interim Final PDWS (EPA, 1977)
Zirconium-95 ^c	pCi/L	1E+02	2E+02	Interim Final PDWS (EPA, 1977)
Zirconium/Niobium-95 ^c	pCi/L	1E+02	2E+02	Interim Final PDWS (EPA, 1977)

^a References for dated sources are at the end of this appendix.

^b EMS is currently unable to perform this analysis.

^c EMS discontinued monitoring this radionuclide because it is inappropriate for the SRS groundwater monitoring program.

^d EPD/EMS set this flagging criterion using the 1991 proposed PDWS because the final PDWS in 1977 may have been in error.

^e For double radionuclide analyses where each separate radionuclide has its own standard, the more stringent standard is used.

^f The applied standard is for radium-226.

^g The primary maximum contaminant level range for turbidity is 1–5 NTU, which is inappropriate for the SRS groundwater monitoring program.

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EPA (U.S. Environmental Protection Agency), 1993b. *National Secondary Drinking Water Regulations. Code of Federal Regulations*, Section 40, Part 143, pp. 774–777. Washington, DC.

WSRC-TR-94-0355
Unclassified

SCDHEC (South Carolina Department of Health and Environmental Control), 1981. **State Primary Drinking Water Regulations**, R.61-58.5. Columbia, SC.

Appendix C. 1993 Groundwater Monitoring Results for Individual Wells

WELL P 24A

<u>SRS Coord.</u>	<u>Lat/Longitude</u>	<u>Screen Zone Elevation</u>	<u>Top of Casing</u>	<u>Casing</u>	<u>Pump</u>	<u>Screen Zone</u>
N43142.2 E66569.7	33.229776 °N 81.575364 °W	8.9-(1.9) ft msl	315.3 ft msl	4" CS	S	Lower Congaree

SAMPLE DATE 12/08/93

FIELD DATA

<u>Analyte</u>	<u>1Q93</u>	<u>2Q93</u>	<u>3Q93</u>	<u>4Q93</u>	<u>Unit</u>
Water elevation				190.6	ft msl
Depth to water				124.7	ft
pH				11.3	pH
Sp. conductance				370	µS/cm
Water temperature				19.2	°C
Alkalinity as CaCO ₃				118	mg/L
Turbidity				1	NTU
Volume purged				0.4	Well vol.
Sampling code				X	

ANALYTICAL DATA

<u>H</u>	<u>D</u>	<u>Analyte</u>	<u>1Q93</u>	<u>2Q93</u>	<u>3Q93</u>	<u>4Q93</u>	<u>Mod</u>	<u>Unit</u>	<u>Lab</u>	<u>Flag</u>
		Aluminum, total recoverable				148		µg/L	GE	2
		Arsenic, total recoverable				<2.0		µg/L	GE	0
		Barium, total recoverable				128		µg/L	GE	0
		Boron, total recoverable				<30		µg/L	GE	0
		Cadmium, total recoverable				<2.0		µg/L	GE	0
		Calcium, total recoverable				31,900	J2	µg/L	GE	0
		Chloride				2,050		µg/L	GE	0
		Chromium, total recoverable				<4.0		µg/L	GE	0
		2,4-Dichlorophenoxyacetic acid				<0.30		µg/L	GE	0
		Endrin				<0.0060		µg/L	GE	0
		Fluoride				<100		µg/L	GE	0
		Gross alpha				<2.0E+00		pCi/L	GE	0
		Iron, total recoverable				157		µg/L	GE	1
		Lead, total recoverable				26		µg/L	GE	2
		Lindane				<0.0050		µg/L	GE	0
		Lithium, total recoverable				29		µg/L	GE	1
		Magnesium, total recoverable				254		µg/L	GE	0
		Manganese, total recoverable				8.6		µg/L	GE	0
		Mercury, total recoverable				<0.20		µg/L	GE	0
		Methoxychlor				<0.50		µg/L	GE	0
		Nitrate-nitrite as nitrogen				<50		µg/L	GE	0
		Nonvolatile beta				2.9E+00		pCi/L	GE	0
•		pH				11	J	pH	GE	2
		Phenols				<5.0		µg/L	GE	0
		Potassium, total recoverable				2,380		µg/L	GE	0
		Radium, total alpha-emitting				<1.0E+00		pCi/L	GE	0
		Selenium, total recoverable				<2.0	J1	µg/L	GE	0
		Silica, total recoverable				12,600		µg/L	GE	0
		Silver, total recoverable				<2.0		µg/L	GE	0
		Sodium, total recoverable				2,640		µg/L	GE	0
		Specific conductance				205		µS/cm	GE	0
		Sulfate				<1,000		µg/L	GE	0
		Total activity				-2.5E+03	J	pCi/L	EM	0
		Total dissolved solids				86,000	V	µg/L	GE	0
		Total organic carbon				<1,000		µg/L	GE	0
		Total organic halogens				<5.0		µg/L	GE	0
		Total phosphates (as P)				<50		µg/L	GE	0
		Toxaphene				<0.24		µg/L	GE	0
		2,4,5-TP (Silvex)				<0.090		µg/L	GE	0
		Tritium				<7.0E-01		pCi/mL	GE	0

Note: Flagging levels, modifiers, and laboratories are for 4th quarter 1993 data only. See Appendix B for flagging criteria.

• = exceeded holding time for 4th quarter 1993.

■ = exceeded screening level or final primary drinking water standard for 4th quarter 1993.

Unclassified

WELL P 24TA

<u>SRS Coord.</u>	<u>Lat/Longitude</u>	<u>Screen Zone Elevation</u>	<u>Top of Casing</u>	<u>Casing</u>	<u>Pump</u>	<u>Screen Zone</u>
N43096.2 E66565.2	33.229667 °N 81.575287 °W	(637.6)-(659.2) ft msl	315.4 ft msl	4" CS	S	Lower Black Creek

SAMPLE DATE 12/08/93

FIELD DATA

<u>Analyte</u>	<u>1Q93</u>	<u>2Q93</u>	<u>3Q93</u>	<u>4Q93</u>	<u>Unit</u>
Water elevation				182.0	ft msl
Depth to water				133.4	ft
pH					pH
Sp. conductance					µS/cm
Water temperature					°C
Alkalinity as CaCO ₃					mg/L
Turbidity					NTU
Volume purged					Well vol.
Sampling code				P	

WELL P 24TB

<u>SRS Coord.</u>	<u>Lat/Longitude</u>	<u>Screen Zone Elevation</u>	<u>Top of Casing</u>	<u>Casing</u>	<u>Pump</u>	<u>Screen Zone</u>
N43110.4 E66561.7	33.229692 °N 81.575324 °W	(481.6)-(491.6) ft msl	315.7 ft msl	4" CS	S	Black Creek

SAMPLE DATE 12/08/93

FIELD DATA

<u>Analyte</u>	<u>1Q93</u>	<u>2Q93</u>	<u>3Q93</u>	<u>4Q93</u>	<u>Unit</u>
Water elevation				184.6	ft msl
Depth to water				131.1	ft
pH					pH
Sp. conductance					µS/cm
Water temperature					°C
Alkalinity as CaCO ₃					mg/L
Turbidity					NTU
Volume purged					Well vol.
Sampling code				P	

Note: Flagging levels, modifiers, and laboratories are for 4th quarter 1993 data only. See Appendix B for flagging criteria.

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WELL P 24TD

<u>SRS Coord.</u>	<u>Lat/Longitude</u>	<u>Screen Zone Elevation</u>	<u>Top of Casing</u>	<u>Casing</u>	<u>Pump</u>	<u>Screen Zone</u>
N43139.3 E66554.9	33.229745 °N 81.575398 °W	(175.9)-(186.8) ft msl	315.6 ft msl	4" CS		Upper Crouch Branch

SAMPLE DATE 12/08/93

FIELD DATA

<u>Analyte</u>	<u>1Q93</u>	<u>2Q93</u>	<u>3Q93</u>	<u>4Q93</u>	<u>Unit</u>
Water elevation				182.3	ft msl
Depth to water				133.3	ft
pH					pH
Sp. conductance					µS/cm
Water temperature					°C
Alkalinity as CaCO ₃					mg/L
Turbidity					NTU
Volume purged					Well vol.
Sampling code				P	

WELL PAC 1

<u>SRS Coord.</u>	<u>Lat/Longitude</u>	<u>Screen Zone Elevation</u>	<u>Top of Casing</u>	<u>Casing</u>	<u>Pump</u>	<u>Screen Zone</u>
N43543.3 E66753.4	33.230963 °N 81.575658 °W	283.9-253.9 ft msl	295.9 ft msl	4" PVC	S	Water table

SAMPLE DATE 02/15/93 05/17/93 07/16/93 10/29/93

FIELD DATA

<u>Analyte</u>	<u>1Q93</u>	<u>2Q93</u>	<u>3Q93</u>	<u>4Q93</u>	<u>Unit</u>
Water elevation	287.2	286.1	284.4	283.6	ft msl
Depth to water	8.7	9.8	11.5	12.3	ft
pH	5.3	5.0	5.2	5.0	pH
Sp. conductance	41	39	38	38	µS/cm
Water temperature	17.4	17.1	18.1	20.2	°C
Alkalinity as CaCO ₃	3	5	1	5	mg/L
Turbidity	5	6	7	8	NTU
Volume purged	17.5	11.2	13.1	10.1	Well vol.
Sampling code					

ANALYTICAL DATA

<u>H</u>	<u>D</u>	<u>Analyte</u>	<u>1Q93</u>	<u>2Q93</u>	<u>3Q93</u>	<u>4Q93</u>	<u>Mod</u>	<u>Unit</u>	<u>Lab</u>	<u>Flag</u>
		Aluminum, total recoverable	96	188	159	71		µg/L	WA	2
		Arsenic, total recoverable	<2.0	<2.0	<2.0	<2.0		µg/L	WA	0
		Barium, total recoverable	21	16	12	14		µg/L	WA	0
		Cadmium, total recoverable	<2.0	<2.0	<2.0	<2.0		µg/L	WA	0
		Calcium, total recoverable	594	374	290	361	V	µg/L	WA	0
		Carbon tetrachloride		<1.0				µg/L		
		Chloride	3,710	3,440	2,880	2,820		µg/L	WA	0
		Chloroform		<1.0				µg/L		
		Chromium, total recoverable	<4.0	<4.0	<4.0	<4.0		µg/L	WA	0
		2,4-Dichlorophenoxyacetic acid	<0.30	<1.1	<1.1	<1.0		µg/L	WA	0
		Endrin	<0.0060	<0.11	<0.11	<0.11		µg/L	WA	0
		Fluoride	<100	<100	<100	<100		µg/L	WA	0

Note: Flagging levels, modifiers, and laboratories are for 4th quarter 1993 data only. See Appendix B for flagging criteria.

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Well PAC 1 continued

ANALYTICAL DATA

H	D	Analyte	1Q93	2Q93	3Q93	4Q93	Mod	Unit	Lab	Flag
		Gross alpha	<5.0E-01	<7.0E-01	<5.0E-01	<5.2E-01		pCi/L	TM	0
		Iron, total recoverable	59	123	110	119	V	µg/L	WA	0
		Lead, total recoverable	6.8	3.4	3.8	4.3	J3	µg/L	WA	0
		Lindane	<0.0050	<0.053	<0.058	<0.055		µg/L	WA	0
		Magnesium, total recoverable	267	192	151	171		µg/L	WA	0
		Manganese, total recoverable	8.9	4.5	2.9	4.2		µg/L	WA	0
		Mercury, total recoverable	<0.20	<0.20	<0.20	<0.20		µg/L	WA	0
		Methoxychlor	<0.50	<0.53	<0.58	<0.55		µg/L	WA	0
		Nitrate as nitrogen	814	743	787	466		µg/L	WA	0
		Nitrate-nitrite as nitrogen	870					µg/L		
		Nonvolatile beta	8.0E-01	9.0E-01	<9.0E-01	9.0E-01		pCi/L	TM	0
•		pH	5.5	5.4	5.3	5.2	J	pH	WA	0
		Phenols	<5.0	<5.0	<5.0	<5.0		µg/L	WA	0
		Potassium, total recoverable	551	532	645	549	J3	µg/L	WA	0
		Radium-226	<2.2E-01	1.6E-01	<1.7E-01	<2.1E-01		pCi/L	TM	0
		Radium-228	<3.0E-01	2.9E+00	1.2E+00	1.4E+00		pCi/L	TM	0
		Radium, total alpha-emitting	<1.0E+00					pCi/L		
		Selenium, total recoverable	<2.0	<2.0	<2.0	<2.0		µg/L	WA	0
		Silica, total recoverable	5,250	4,800	4,750	5,790	V	µg/L	WA	0
		Silver, total recoverable	<2.0	<2.0	<2.0	<2.0		µg/L	WA	0
		Sodium, total recoverable	6,290	5,930	5,660	5,750	V	µg/L	WA	0
		Specific conductance	40	37	32	31		µS/cm	WA	0
		Sulfate	1,650	1,290	1,350	1,430		µg/L	WA	0
		Tetrachloroethylene		<1.0				µg/L		
		Total dissolved solids	48,000	88,000	31,000	23,000		µg/L	WA	0
		Total organic carbon	<1,000	<1,000	<1,000	<1,000		µg/L	WA	0
		Total organic halogens	<5.0	7.6	<5.0	<5.0		µg/L	WA	0
		Total phosphates (as P)	<50	<50	<50	101		µg/L	WA	0
		Toxaphene	<0.24	<1.1	<1.1	<1.1		µg/L	WA	0
		2,4,5-TP (Silvex)	<0.090	<0.54	<0.57	<0.52		µg/L	WA	0
		1,1,1-Trichloroethane		<1.0				µg/L		
		Trichloroethylene		<1.0				µg/L		
		Tritium	6.3E+00	6.1E+00	5.8E+00	5.7E+00		pCi/mL	TM	0
•		Turbidity	4.1	4.8	4.4	5.6	J	NTU	WA	0

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WELL PAC 2

<u>SRS Coord.</u>	<u>Lat/Longitude</u>	<u>Screen Zone Elevation</u>	<u>Top of Casing</u>	<u>Casing</u>	<u>Pump</u>	<u>Screen Zone</u>
N43527.7 E66980.9	33.231299 °N 81.575029 °W	277.9-247.9 ft msl	284.8 ft msl	4" PVC	S	Water table

<u>SAMPLE DATE</u>	02/15/93	05/17/93	07/16/93	10/28/93

FIELD DATA

<u>Analyte</u>	<u>1Q93</u>	<u>2Q93</u>	<u>3Q93</u>	<u>4Q93</u>	<u>Unit</u>
Water elevation	273.5	273.5	271.5	270.1	ft msl
Depth to water	11.3	11.3	13.3	14.7	ft
pH	6.2	6.3	6.4	6.2	pH
Sp. conductance	80	95	97	95	µS/cm
Water temperature	17.0	18.4	21.2	21.0	°C
Alkalinity as CaCO ₃	24	31	13	28	mg/L
Turbidity	4	2	7	22	NTU
Volume purged	15.1	19.6	14.6	16.1	Well vol.
Sampling code					

ANALYTICAL DATA

<u>H</u>	<u>D</u>	<u>Analyte</u>	<u>1Q93</u>	<u>2Q93</u>	<u>3Q93</u>	<u>4Q93</u>	<u>Mod</u>	<u>Unit</u>	<u>Lab</u>	<u>Flag</u>
		Aluminum, total recoverable	<20	<20	<20	147		µg/L	WA	2
		Arsenic, total recoverable	<2.0	2.0	2.8	<2.0		µg/L	WA	0
		Barium, total recoverable	27	28	29	29		µg/L	WA	0
		Cadmium, total recoverable	<2.0	<2.0	<2.0	<2.0		µg/L	WA	0
		Calcium, total recoverable	4,790	5,170	4,660	4,450		µg/L	WA	0
		Carbon tetrachloride		<1.0				µg/L		
		Chloride	3,390	2,850	3,520	3,820		µg/L	WA	0
		Chloroform		<1.0				µg/L		
		Chromium, total recoverable	<4.0	<4.0	<4.0	<4.0		µg/L	WA	0
		2,4-Dichlorophenoxyacetic acid	<1.1	<1.1	<1.1	<1.1		µg/L	WA	0
		Endrin	<0.11	<0.11	<0.11	<0.11		µg/L	WA	0
		Fluoride	<100	<100	<100	<100		µg/L	WA	0
		Gross alpha	1.3E+00	1.1E+00	<6.0E-01			pCi/L		
		Iron, total recoverable	6,190	9,240	8,790	7,510		µg/L	WA	2
		Lead, total recoverable	<3.0	<3.0	<3.0	<3.0		µg/L	WA	0
		Lindane	<0.054	<0.054	<0.055	<0.055		µg/L	WA	0
		Magnesium, total recoverable	836	879	865	758		µg/L	WA	0
		Manganese, total recoverable	88	101	99	90		µg/L	WA	2
		Mercury, total recoverable	<0.20	<0.20	<0.20	<0.20		µg/L	WA	0
		Methoxychlor	<0.54	<0.54	<0.55	<0.55		µg/L	WA	0
		Nitrate as nitrogen	47	<20	58	<20		µg/L	WA	0
		Nonvolatile beta	2.2E+00	4.3E+00	1.9E+00			pCi/L		
•		pH	6.3	6.3	6.2	7.0	J	pH	WA	0
		Phenols	<5.0	<5.0	<5.0	<5.0		µg/L	WA	0
		Potassium, total recoverable	807	1,070	1,290	1,170		µg/L	WA	0
		Radium-226	<2.9E-01	<1.6E-01	2.3E-01			pCi/L		
		Radium-228	<3.0E-01	2.1E+00	6.0E-01			pCi/L		
		Selenium, total recoverable	<2.0	<2.0	<2.0	<2.0		µg/L	WA	0
		Silica, total recoverable	7,350	7,590	8,550	7,940	V	µg/L	WA	0
		Silver, total recoverable	<2.0	<2.0	<2.0	<2.0		µg/L	WA	0
		Sodium, total recoverable	5,080	4,970	5,640	5,780	V	µg/L	WA	0
		Specific conductance	68	75	74	90		µS/cm	WA	0
		Sulfate	5,940	6,310	7,450	10,300	J2	µg/L	WA	0
		Tetrachloroethylene		<1.0				µg/L		
		Total dissolved solids	66,000	36,000	58,000	56,000		µg/L	WA	0
		Total organic carbon	1,090	1,060	1,180	1,030		µg/L	WA	0
		Total organic halogens	<5.0	7.5	26	9.3	J3	µg/L	WA	0
		Total phosphates (as P)	<50	<50	<50	213		µg/L	WA	0
		Toxaphene	<1.1	<1.1	<1.1	<1.1		µg/L	WA	0

Note: Flagging levels, modifiers, and laboratories are for 4th quarter 1993 data only. See Appendix B for flagging criteria.

● = exceeded holding time for 4th quarter 1993.

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Well PAC 2 continued

ANALYTICAL DATA

H	D	Analyte	1Q93	2Q93	3Q93	4Q93	Mod	Unit	Lab	Flag
		2,4,5-TP (Silvex)	<0.53	<0.54	<0.55	<0.55		µg/L	WA	0
		1,1,1-Trichloroethane		<1.0				µg/L		
		Trichloroethylene		<1.0				µg/L		
		Tritium	6.9E-01	6.7E-01	4.1E-01			pCi/mL		
		Turbidity	6.0	8.2	9.1	15		NTU	WA	0

WELL PAC 3

SRS Coord.	Lat/Longitude	Screen Zone Elevation	Top of Casing	Casing	Pump	Screen Zone
N43585.6 E66861.4	33.231232 °N 81.575456 °W	282.9-252.9 ft msl	289.9 ft msl	4" PVC	S	Water table

SAMPLE DATE	02/16/93	05/17/93	07/16/93	10/28/93

FIELD DATA

Analyte	1Q93	2Q93	3Q93	4Q93	Unit
Water elevation	273.8	273.9	272.0	270.5	ft msl
Depth to water	16.1	16.0	17.9	19.4	ft
pH	6.1	6.0	5.7	5.5	pH
Sp. conductance	201	515	320	197	µS/cm
Water temperature	16.0	18.5	18.3	19.3	°C
Alkalinity as CaCO ₃	15	31	5	16	mg/L
Turbidity	3	5	4	2	NTU
Volume purged	11.9	21.9	13.7	13.7	Well vol.
Sampling code					

ANALYTICAL DATA

H	D	Analyte	1Q93	2Q93	3Q93	4Q93	Mod	Unit	Lab	Flag
		Aluminum, total recoverable	30	384	269	46		µg/L	WA	1
		Arsenic, total recoverable	<2.0	<2.0	<2.0	<2.0		µg/L	WA	0
		Barium, total recoverable	52	143	75	34		µg/L	WA	0
		Cadmium, total recoverable	<2.0	<2.0	<2.0	<2.0		µg/L	WA	0
		Calcium, total recoverable	7,980	24,400	11,200	5,490		µg/L	WA	0
		Carbon tetrachloride		<1.0				µg/L		
		Chloride	4,360	13,300	16,400	10,400		µg/L	WA	0
		Chloroform		<1.0				µg/L		
		Chromium, total recoverable	<4.0	<4.0	18	<4.0		µg/L	WA	0
		2,4-Dichlorophenoxyacetic acid	<1.1	<1.1	<0.30	<1.1		µg/L	WA	0
		Endrin	<0.11	<0.11	<0.0060	<0.11		µg/L	WA	0
		Fluoride	<100	<100	154	168		µg/L	WA	0
		Gross alpha	8.0E-01	<6.0E-01	9.0E-01			pCi/L		
		Iron, total recoverable	202	2,150	1,270	699		µg/L	WA	2
		Lead, total recoverable	<3.0	3.6	<3.0	<3.0		µg/L	WA	0
		Lindane	<0.055	<0.053	<0.0050	<0.055		µg/L	WA	0
		Magnesium, total recoverable	2,280	6,640	4,440	2,750		µg/L	WA	0
		Manganese, total recoverable	4.6	196	302	37		µg/L	WA	1
		Mercury, total recoverable	<0.20	<0.20	<0.20	<0.20		µg/L	WA	0
		Methoxychlor	<0.55	<0.53	<0.50	<0.55		µg/L	WA	0
		Nitrate as nitrogen	46	457	900	1,760		µg/L	WA	0
		Nitrate-nitrite as nitrogen			490			µg/L		
		Nonvolatile beta	2.9E+00	9.5E+00	4.4E+00			pCi/L		
		pH	6.0	6.0	5.9	6.8	J	pH	WA	0
		Phenols	<5.0	<5.0	<5.0	<5.0		µg/L	WA	0
		Potassium, total recoverable	745	1,260	1,800	1,520		µg/L	WA	0
		Radium-226	<2.1E-01	3.2E-01	3.1E-01			pCi/L		
		Radium-228	<3.0E-01	1.6E+02	3.3E+00			pCi/L		
		Radium, total alpha-emitting			1.4E+00			pCi/L		
		Selenium, total recoverable	<2.0	<2.0	<2.0	<2.0		µg/L	WA	0

Note: Flagging levels, modifiers, and laboratories are for 4th quarter 1993 data only. See Appendix B for flagging criteria.

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Well PAC 3 continued

ANALYTICAL DATA

H	D	Analyte	1Q93	2Q93	3Q93	4Q93	Mod	Unit	Lab	Flag
		Silica, total recoverable	8,110	12,400	14,300	12,000	V	µg/L	WA	0
		Silver, total recoverable	<2.0	<2.0	<2.0	<2.0		µg/L	WA	0
		Sodium, total recoverable	25,700	62,500	45,000	24,000	V	µg/L	WA	0
		Specific conductance	11	490	320	191		µS/cm	WA	0
		Sulfate	60,600	175,000	94,600	45,400		µg/L	WA	0
		Tetrachloroethylene		<1.0				µg/L		
		Total dissolved solids	138,000	324,000	229,000	129,000		µg/L	WA	0
		Total organic carbon	<1,000	8,070	3,630	<1,000		µg/L	WA	0
		Total organic halogens	21	16	17	9.6		µg/L	WA	0
		Total phosphates (as P)	<50	<50	<50	109		µg/L	WA	0
		Toxaphene	<1.1	<1.1	<0.24	<1.1		µg/L	WA	0
		2,4,5-TP (Silvex)	<0.56	<0.55	<0.090	<0.55		µg/L	WA	0
		1,1,1-Trichloroethane		<1.0				µg/L		
		Trichloroethylene		<1.0				µg/L		
		Tritium	3.5E+00	6.3E+00	7.5E+00			pCi/mL		
		Turbidity	2.7	20	11	1.8		NTU	WA	0

WELL PAC 4

SRS Coord.	Lat/Longitude	Screen Zone Elevation	Top of Casing	Casing	Pump	Screen Zone
N43495.4 E66863.2	33.231036 °N 81.575276 °W	280.6-250.6 ft msl	291.6 ft msl	4" PVC	S	Water table

SAMPLE DATE	02/15/93	05/17/93	07/16/93	10/29/93

FIELD DATA

Analyte	1Q93	2Q93	3Q93	4Q93	Unit
Water elevation	285.9	285.3	284.1	283.5	ft msl
Depth to water	5.7	6.3	7.5	8.1	ft
pH	5.3	5.2	5.2	5.5	pH
Sp. conductance	116	104	106	102	µS/cm
Water temperature	18.6	19.7	20.5	22.1	°C
Alkalinity as CaCO ₃	3	4	1	6	mg/L
Turbidity	5	5	11	17	NTU
Volume purged	14.3	11.5	8.5	9.9	Well vol.
Sampling code					

ANALYTICAL DATA

H	D	Analyte	1Q93	2Q93	3Q93	4Q93	Mod	Unit	Lab	Flag
		Aluminum, total recoverable	55	246	890	182		µg/L	WA	2
		Arsenic, total recoverable	<2.0	<2.0	<2.0	<2.0		µg/L	WA	0
		Barium, total recoverable	12	14	14	14		µg/L	WA	0
		Cadmium, total recoverable	<2.0	<2.0	<2.0	<2.0		µg/L	WA	0
		Calcium, total recoverable	142	144	140	171	V	µg/L	WA	0
		Carbon tetrachloride		<1.0				µg/L		
		Chloride	3,440	2,670	2,810	2,850		µg/L	WA	0
		Chloroform		<1.0				µg/L		
		Chromium, total recoverable	<4.0	<4.0	43	22		µg/L	WA	0
		2,4-Dichlorophenoxyacetic acid	<1.1	<0.30	<1.1	<1.0		µg/L	WA	0
		Endrin	<0.11	<0.0060	<0.11	<0.11		µg/L	WA	0
		Fluoride	<100	<100	<100	<100		µg/L	WA	0
		Gross alpha	7.0E-01	<6.0E-01	9.0E-01	<5.0E-01		pCi/L	TM	0
		Iron, total recoverable	54	71	492	318	V	µg/L	WA	2
		Lead, total recoverable	<3.0	<3.0	<3.0	<3.0		µg/L	WA	0
		Lindane	<0.054	<0.0050	<0.057	<0.055		µg/L	WA	0
		Magnesium, total recoverable	191	166	166	174		µg/L	WA	0
		Manganese, total recoverable	2.3	2.5	5.8	3.5		µg/L	WA	0
		Mercury, total recoverable	<0.20	<0.20	<0.20	<0.20		µg/L	WA	0

Note: Flagging levels, modifiers, and laboratories are for 4th quarter 1993 data only. See Appendix B for flagging criteria.

● = exceeded holding time for 4th quarter 1993.

■ = exceeded screening level or final primary drinking water standard for 4th quarter 1993.

Well PAC 4 continued

ANALYTICAL DATA

H	D	Analyte	1Q93	2Q93	3Q93	4Q93	Mod	Unit	Lab	Flag
		Methoxychlor	<0.54	<0.50	<0.57	<0.55		µg/L	WA	0
		Nitrate as nitrogen	789	786	972	704		µg/L	WA	0
		Nitrate-nitrite as nitrogen		926				µg/L		
•		Nonvolatile beta	1.7E+00	2.6E+00	2.5E+00	2.6E+00		pCi/L	TM	0
		pH	5.5	5.5	5.4	5.3	J	pH	WA	0
		Phenols	<5.0	<5.0	<5.0	<5.0		µg/L	WA	0
		Potassium, total recoverable	509	561	573	633	J3	µg/L	WA	0
		Radium-226	<2.2E-01	<2.1E-01	<2.5E-01	1.8E-01		pCi/L	TM	0
		Radium-228	1.9E+00	2.5E+00	2.2E+00	1.9E+00		pCi/L	TM	0
		Radium, total alpha-emitting		1.0E+00				pCi/L		
		Selenium, total recoverable	2.6	<2.0	<2.0	<2.0		µg/L	WA	0
		Silica, total recoverable	4,950	5,610	5,940	6,050	V	µg/L	WA	0
		Silver, total recoverable	<2.0	<2.0	<2.0	<2.0		µg/L	WA	0
		Sodium, total recoverable	19,800	18,900	16,200	17,400	V	µg/L	WA	0
		Specific conductance	104	108	89	89		µS/cm	WA	0
		Sulfate	42,000	26,900	27,100	23,800		µg/L	WA	0
		Tetrachloroethylene		<1.0				µg/L		
		Total dissolved solids	83,000	93,000	80,000	68,000		µg/L	WA	0
		Total organic carbon	<1,000	<1,000	<1,000	<1,000		µg/L	WA	0
		Total organic halogens	<5.0	8.6	<5.0	<5.0		µg/L	WA	0
		Total phosphates (as P)	<50	<50	<50	103		µg/L	WA	0
		Toxaphene	<1.1	<0.24	<1.1	<1.1		µg/L	WA	0
		2,4,5-TP (Silvex)	<0.55	<0.090	<0.56	<0.53		µg/L	WA	0
		1,1,1-Trichloroethane		<1.0				µg/L		
		Trichloroethylene		<1.0				µg/L		
•		Tritium	6.0E+00	5.5E+00	4.4E+00	4.9E+00		pCi/mL	TM	0
		Turbidity	3.3	17	7.5	9.7	J	NTU	WA	0

WELL PAC 5

SRS Coord.	Lat/Longitude	Screen Zone Elevation	Top of Casing	Casing	Pump	Screen Zone
N43561.7 E66907.1	33.231254 °N 81.575289 °W	275.1-255.1 ft msl	289.3 ft msl	4" PVC	S	Water table

SAMPLE DATE	02/16/93	05/17/93	07/16/93	10/29/93

FIELD DATA

Analyte	1Q93	2Q93	3Q93	4Q93	Unit
Water elevation	276.7	278.4	276.3	273.3	ft msl
Depth to water	12.6	10.9	13.0	16.0	ft
pH	6.9	6.8	6.8	7.0	pH
Sp. conductance	270	259	366	593	µS/cm
Water temperature	13.8	20.2	21.6	19.0	°C
Alkalinity as CaCO ₃	52	96	124	272	mg/L
Turbidity	15	12	2	50	NTU
Volume purged	0.8	0.9	1.1	0.9	Well vol.
Sampling code	X	X	X	X	

ANALYTICAL DATA

H	D	Analyte	1Q93	2Q93	3Q93	4Q93	Mod	Unit	Lab	Flag
		Aluminum, total recoverable	103	842	231	145		µg/L	WA	2
		Arsenic, total recoverable	<2.0	<2.0	<2.0	<2.0		µg/L	WA	0
		Barium, total recoverable	34	29	60	125		µg/L	WA	0
		Cadmium, total recoverable	<2.0	<2.0	<2.0	<2.0		µg/L	WA	0
		Calcium, total recoverable	23,600	15,500	26,400	57,200	V	µg/L	WA	0
		Carbon tetrachloride		<1.0				µg/L		
		Chloride	3,650	3,230	4,680	10,100		µg/L	WA	0
		Chloroform		<1.0				µg/L		

Note: Flagging levels, modifiers, and laboratories are for 4th quarter 1993 data only. See Appendix B for flagging criteria.

• = exceeded holding time for 4th quarter 1993.

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Well PAC 5 continued

ANALYTICAL DATA

H	D	Analyte	1Q93	2Q93	3Q93	4Q93	Mod	Unit	Lab	Flag
		Chromium, total recoverable	<4.0	21	23	23		µg/L	WA	0
		2,4-Dichlorophenoxyacetic acid	<1.1	<1.1	<1.1	<1.1		µg/L	WA	0
		Endrin	<0.11	<0.11	<0.11	<0.11		µg/L	WA	0
		Fluoride	<100	<100	<100	<100		µg/L	WA	0
		Gross alpha	1.2E+00	<9.0E-01	1.2E+00	1.9E+00		pCi/L	TM	0
		Iron, total recoverable	397	910	121	508	V	µg/L	WA	2
		Lead, total recoverable	<3.0	15	<3.0	<3.0		µg/L	WA	0
		Lindane	<0.055	<0.056	<0.055	<0.055		µg/L	WA	0
		Magnesium, total recoverable	5,640	2,890	6,170	17,000		µg/L	WA	0
		Manganese, total recoverable	146	81	266	646		µg/L	WA	2
		Mercury, total recoverable	<0.20	<0.20	<0.20	<0.20		µg/L	WA	0
		Methoxychlor	<0.55	<0.56	<0.55	<0.55		µg/L	WA	0
		Nitrate as nitrogen	32	41	46	35		µg/L	WA	0
		Nonvolatile beta	6.2E+00	3.9E+00	6.1E+00	1.1E+01		pCi/L	TM	0
•		pH	6.8	7.2	7.0	7.0	J	pH	WA	0
		Phenols	<5.0	<5.0	<5.0	<5.0		µg/L	WA	0
		Potassium, total recoverable	1,240	961	1,580	2,640		µg/L	WA	0
		Radium-226	<1.6E-01	5.5E-01	2.8E-01	6.0E-01		pCi/L	TM	0
		Radium-228	1.4E+00	4.8E+00	2.5E+00	2.9E+00		pCi/L	TM	0
		Selenium, total recoverable	<2.0	<2.0	<2.0	<2.0		µg/L	WA	0
		Silica, total recoverable	10,300	9,510	17,300	23,900	V	µg/L	WA	0
		Silver, total recoverable	<2.0	<2.0	<2.0	<2.0		µg/L	WA	0
		Sodium, total recoverable	26,900	18,900	35,900	65,800	V	µg/L	WA	0
		Specific conductance	194	239	338	571		µS/cm	WA	2
		Sulfate	52,000	24,100	33,900	49,700		µg/L	WA	0
		Tetrachloroethylene		<1.0				µg/L		
		Total dissolved solids	186,000	97,000	248,000	387,000		µg/L	WA	0
		Total organic carbon	2,120	1,880	2,800	3,390		µg/L	WA	0
		Total organic halogens	22	20	10	33		µg/L	WA	1
		Total phosphates (as P)	<50	56	<50	101		µg/L	WA	0
		Toxaphene	<1.1	<1.1	<1.1	<1.1		µg/L	WA	0
		2,4,5-TP (Silvex)	<0.56	<0.55	<0.56	<0.55		µg/L	WA	0
		1,1,1-Trichloroethane		<1.0				µg/L		
		Trichloroethylene		<1.0				µg/L		
•		Tritium	3.3E+00	4.6E+00	4.0E+00	4.8E+00		pCi/mL	TM	0
		Turbidity	4.1	4.2	1.5	5.5	J	NTU	WA	0

Note: Flagging levels, modifiers, and laboratories are for 4th quarter 1993 data only. See Appendix B for flagging criteria.

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Unclassified

WELL PAC 6

SRS Coord.	Lat/Longitude	Screen Zone Elevation	Top of Casing	Casing	Pump	Screen Zone
N43580.1 E66894.7	33.231274 °N 81.575358 °W	275.2-255.2 ft msl	289.4 ft msl	4" PVC	S	Water table

SAMPLE DATE	02/16/93	05/17/93	07/16/93	10/29/93

FIELD DATA

Analyte	1Q93	2Q93	3Q93	4Q93	Unit
Water elevation	277.6	277.8	275.4	273.8	ft msl
Depth to water	11.8	11.6	14.0	15.6	ft
pH	6.8	6.3	6.3	6.8	pH
Sp. conductance	230	226	251	283	µS/cm
Water temperature	13.3	21.6	22.5	21.8	°C
Alkalinity as CaCO ₃	46	6	77	99	mg/L
Turbidity	4	7	4	95	NTU
Volume purged	1.0	0.9	1.1	0.8	Well vol.
Sampling code	X	X	X	X	

ANALYTICAL DATA

H	D	Analyte	1Q93	2Q93	3Q93	4Q93	Mod	Unit	Lab	Flag
		Aluminum, total recoverable	75	113	45	480		µg/L	WA	2
		Arsenic, total recoverable	<2.0	<2.0	<2.0	<2.0		µg/L	WA	0
		Barium, total recoverable	33	24	35	57		µg/L	WA	0
		Cadmium, total recoverable	<2.0	<2.0	<2.0	<2.0		µg/L	WA	0
		Calcium, total recoverable	13,500	8,370	10,300	14,700	V	µg/L	WA	0
		Carbon tetrachloride		<1.0				µg/L		
		Chloride	3,180	5,140	3,810	7,590		µg/L	WA	0
		Chloroform		<1.0				µg/L		
		Chromium, total recoverable	<4.0	<4.0	<4.0	<4.0		µg/L	WA	0
		2,4-Dichlorophenoxyacetic acid	<1.1	<1.1	<1.1	<1.1		µg/L	WA	0
		Endrin	<0.11	<0.11	<0.11	<0.11		µg/L	WA	0
		Fluoride	<100	<100	<100	<100		µg/L	WA	0
		Gross alpha	<7.0E-01	<9.0E-01	<8.0E-01	1.6E+00		pCi/L	TM	0
		Iron, total recoverable	2,950	2,550	2,650	9,370	V	µg/L	WA	2
		Lead, total recoverable	<3.0	<3.0	<3.0	<3.0		µg/L	WA	0
		Lindane	<0.055	<0.055	<0.055	<0.055		µg/L	WA	0
		Magnesium, total recoverable	4,130	2,300	3,460	4,370		µg/L	WA	0
		Manganese, total recoverable	240	152	202	238		µg/L	WA	2
		Mercury, total recoverable	<0.20	<0.20	<0.20	<0.20		µg/L	WA	0
		Methoxychlor	<0.55	<0.55	<0.55	<0.55		µg/L	WA	0
		Nitrate as nitrogen	<20	<20	24	<20		µg/L	WA	0
		Nonvolatile beta	4.4E+00	7.2E+00	4.4E+00	5.1E+00		pCi/L	TM	0
		pH	6.4	6.8	6.7	6.6	J	pH	WA	0
		Phenols	<5.0	<5.0	<5.0	<5.0		µg/L	WA	0
		Potassium, total recoverable	940	611	952	1,090		µg/L	WA	0
		Radium-226	<2.8E-01	5.1E-01	<3.3E-01	1.6E-01		pCi/L	TM	0
		Radium-228	1.6E+00	3.4E+01	8.0E-01	1.6E+00		pCi/L	TM	0
		Selenium, total recoverable	<2.0	<2.0	<2.0	<2.0		µg/L	WA	0
		Silica, total recoverable	16,600	13,100	22,000	24,500	V	µg/L	WA	0
		Silver, total recoverable	<2.0	<2.0	<2.0	<2.0		µg/L	WA	0
		Sodium, total recoverable	24,800	18,300	28,200	37,300	V	µg/L	WA	0
		Specific conductance	190	209	212	246		µS/cm	WA	0
		Sulfate	35,800	31,000	35,000	36,000		µg/L	WA	0
		Tetrachloroethylene		<1.0				µg/L		
		Total dissolved solids	75,000	137,000	185,000	166,000		µg/L	WA	0
		Total organic carbon	1,330	1,680	1,370	<1,000		µg/L	WA	0
		Total organic halogens	<5.0	11	13	33		µg/L	WA	1
		Total phosphates (as P)	<50	<50	<50	127		µg/L	WA	0
		Toxaphene	<1.1	<1.1	<1.1	<1.1		µg/L	WA	0

Note: Flagging levels, modifiers, and laboratories are for 4th quarter 1993 data only. See Appendix B for flagging criteria.

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Well PAC 6 continued

ANALYTICAL DATA

H	D	Analyte	1Q93	2Q93	3Q93	4Q93	Mod	Unit	Lab	Flag
		2,4,5-TP (Silvex)	<0.53	<0.55	<0.56	<0.55		µg/L	WA	0
		1,1,1-Trichloroethane		<1.0				µg/L		
		Trichloroethylene		<1.0				µg/L		
•		Tritium	3.3E+00	4.8E+00	4.8E+00	4.4E+00		pCi/mL	TM	0
		Turbidity	11	9.3	9.2	39	J	NTU	WA	0

WELL PCB 1A

SRS Coord.	Lat/Longitude	Screen Zone Elevation	Top of Casing	Casing	Pump	Screen Zone
N41988.2 E65070.6	33.224779 °N 81.577074 °W	293.5-263.5 ft msl	305.5 ft msl	4" PVC	S	Water table

SAMPLE DATE	03/17/93	05/25/93	08/26/93	11/24/93

FIELD DATA

Analyte	1Q93	2Q93	3Q93	4Q93	Unit
Water elevation	284.1	284.3	281.5	280.5	ft msl
Depth to water	21.4	21.2	24.0	25.0	ft
pH	4.5	4.2	4.7	4.9	pH
Sp. conductance	170	148	105	100	µS/cm
Water temperature	18.8	19.1	19.8	19.0	°C
Alkalinity as CaCO ₃	0	0	0	0	mg/L
Turbidity	1	0	1	1	NTU
Volume purged	13.4	13.9	15.8	13.8	Well vol.
Sampling code					

ANALYTICAL DATA

H	D	Analyte	1Q93	2Q93	3Q93	4Q93	Mod	Unit	Lab	Flag
		Aluminum, total recoverable	4,650		687			µg/L		
		Arsenic, total recoverable	<2.0					µg/L		
		Barium, total recoverable	24					µg/L		
		Cadmium, total recoverable	<2.0					µg/L		
		Calcium, total recoverable	5,080					µg/L		
		Chloride	4,930					µg/L		
		Chromium, total recoverable	<4.0					µg/L		
		2,4-Dichlorophenoxyacetic acid	<0.30					µg/L		
		Endrin	<0.0060					µg/L		
		Fluoride	114	113	<100	<100		µg/L	GE	0
		Gross alpha	<2.0E+00					pCi/L		
		Iron, total recoverable	436		1,000			µg/L		
		Lead, total recoverable	4.2	<3.0	<3.0	<3.0	J1	µg/L	GE	0
		Lindane	<0.0050					µg/L		
		Magnesium, total recoverable	2,030					µg/L		
		Manganese, total recoverable	284		357			µg/L		
		Mercury, total recoverable	<0.20					µg/L		
		Methoxychlor	<0.50					µg/L		
		Nickel, total recoverable		11	<4.0	<4.0		µg/L	GE	0
		Nitrate-nitrite as nitrogen	<50					µg/L		
		Nonvolatile beta	2.5E+00					pCi/L		
		pH	4.4					pH		
		Phenols	<5.0					µg/L		
		Potassium, total recoverable	650					µg/L		
		Radium-226		6.6E-01				pCi/L		
		Radium-228		9.0E+00				pCi/L		
		Radium, total alpha-emitting	1.1E+00	2.1E+00	<1.0E+00	<1.0E+00		pCi/L	GE	0
		Selenium, total recoverable	<2.0	<2.0	<2.0	<2.0	J1	µg/L	GE	0
		Silica, total recoverable	3,890					µg/L		
		Silver, total recoverable	<2.0					µg/L		

Note: Flagging levels, modifiers, and laboratories are for 4th quarter 1993 data only. See Appendix B for flagging criteria.

• = exceeded holding time for 4th quarter 1993.

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Unclassified

Well PCB 1A continued

ANALYTICAL DATA

H	D	Analyte	1Q93	2Q93	3Q93	4Q93	Mod	Unit	Lab	Flag
		Sodium, total recoverable	6,520					µg/L		
		Specific conductance	161	148	93	96		µS/cm	GE	0
		Sulfate	68,000	63,200	32,700	28,600		µg/L	GE	0
		Total dissolved solids	81,000					µg/L		
		Total organic carbon	<1,000					µg/L		
		Total organic halogens	<5.0		<5.0			µg/L		
		Total phosphates (as P)	<50					µg/L		
		Toxaphene	<0.24					µg/L		
		2,4,5-TP (Silvex)	<0.090					µg/L		
		Tritium	4.7E+00					pCi/mL		

WELL PCB 2A

SRS Coord.	Lat/Longitude	Screen Zone Elevation	Top of Casing	Casing	Pump	Screen Zone
N41821.4	33.224117 °N	287.8-257.8 ft msl	304.9 ft msl	4" PVC	S	Water table
E64891.4	81.577222 °W					

SAMPLE DATE	03/15/93	05/25/93	08/26/93	11/24/93

FIELD DATA

Analyte	1Q93	2Q93	3Q93	4Q93	Unit
Water elevation	282.5	283.4	280.5	279.5	ft msl
Depth to water	22.4	21.5	24.4	25.4	ft
pH	4.8	4.2	4.2	4.1	pH
Sp. conductance	483	392	558	732	µS/cm
Water temperature	19.7	20.5	20.5	19.7	°C
Alkalinity as CaCO ₃	0	0	0	0	mg/L
Turbidity	3	2	1	4	NTU
Volume purged	27.4	18.7	19.9	25.7	Well vol.
Sampling code					

ANALYTICAL DATA

H	D	Analyte	1Q93	2Q93	3Q93	4Q93	Mod	Unit	Lab	Flag
		Aluminum, total recoverable	17,000		11,000			µg/L		
		Arsenic, total recoverable	<2.0					µg/L		
		Barium, total recoverable	48					µg/L		
		Cadmium, total recoverable	2.4					µg/L		
		Calcium, total recoverable	29,900					µg/L		
		Chloride	4,870					µg/L		
		Chromium, total recoverable	<4.0					µg/L		
		2,4-Dichlorophenoxyacetic acid	<0.30					µg/L		
		Endrin	<0.0060					µg/L		
		Fluoride	2,460	1,570	1,840	3,200		µg/L	GE	1
		Gross alpha	1.0E+01					pCi/L		
		Iron, total recoverable	28		20			µg/L		
		Lead, total recoverable	6.6	3.4	5.4	12	J2	µg/L	GE	1
		Lindane	<0.0050					µg/L		
		Magnesium, total recoverable	17,000					µg/L		
		Manganese, total recoverable	1,870		1,470			µg/L		
		Mercury, total recoverable	0.62					µg/L		
		Methoxychlor	<0.50					µg/L		
		Nickel, total recoverable		14	14	22		µg/L	GE	0
		Nitrate as nitrogen	255					µg/L		
		Nitrate-nitrite as nitrogen	260					µg/L		
		Nonvolatile beta	1.3E+01					pCi/L		
		pH	4.4					pH		
		Phenols	<5.0					µg/L		
		Potassium, total recoverable	937					µg/L		

Note: Flagging levels, modifiers, and laboratories are for 4th quarter 1993 data only. See Appendix B for flagging criteria.

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Well PCB 2A continued

ANALYTICAL DATA

H	D	Analyte	1Q93	2Q93	3Q93	4Q93	Mod	Unit	Lab	Flag
		Radium-226	2.8E+00					pCi/L		
		Radium-228	4.5E+00					pCi/L		
		Radium, total alpha-emitting	4.8E+00	4.2E+00	4.8E+00	7.8E+00		pCi/L	GE	0
		Selenium, total recoverable	5.2	3.8	4.6	5.4	J2	µg/L	GE	0
		Silica, total recoverable	14,500					µg/L		
		Silver, total recoverable	<2.0					µg/L		
		Sodium, total recoverable	8,560					µg/L		
		Specific conductance	476	340	559	744		µS/cm	GE	2
		Sulfate	250,000	235,000	531,000	446,000		µg/L	GE	2
		Total dissolved solids	384,000					µg/L		
		Total organic carbon	3,350					µg/L		
		Total organic halogens	135		62			µg/L		
		Total phosphates (as P)	<50					µg/L		
		Toxaphene	<0.24					µg/L		
		2,4,5-TP (Silvex)	<0.090					µg/L		
		Tritium	7.3E+00					pCi/mL		

WELL PCB 3A

SRS Coord.	Lat/Longitude	Screen Zone Elevation	Top of Casing	Casing	Pump	Screen Zone
N42036.0 E64706.3	33.224291 °N 81.578126 °W	292.7-262.7 ft msl	304.6 ft msl	4" PVC	S	Water table

SAMPLE DATE	03/17/93	05/25/93	08/26/93	11/24/93

FIELD DATA

Analyte	1Q93	2Q93	3Q93	4Q93	Unit
Water elevation	284.4	285.0	281.5	280.7	ft msl
Depth to water	20.2	19.6	23.1	23.9	ft
pH	4.1	3.9	3.9	3.9	pH
Sp. conductance	289	233	31	323	µS/cm
Water temperature	14.5	20.5	23.6	21.1	°C
Alkalinity as CaCO ₃	0	0	0	0	mg/L
Turbidity	1	1	2	1	NTU
Volume purged	3.3	2.5	5.4	3.2	Well vol.
Sampling code					

ANALYTICAL DATA

H	D	Analyte	1Q93	2Q93	3Q93	4Q93	Mod	Unit	Lab	Flag
		Aluminum, total recoverable	13,100		11,900			µg/L		
		Arsenic, total recoverable	<2.0					µg/L		
		Barium, total recoverable	23					µg/L		
		Cadmium, total recoverable	<2.0					µg/L		
		Calcium, total recoverable	16,100					µg/L		
		Chloride	1,070					µg/L		
		Chromium, total recoverable	<4.0					µg/L		
		2,4-Dichlorophenoxyacetic acid	<0.30					µg/L		
		Endrin	<0.0060					µg/L		
		Fluoride	175	168	197	232		µg/L	GE	0
		Gross alpha	3.2E+00					pCi/L		
		Iron, total recoverable	571		527			µg/L		
		Lead, total recoverable	11	6.0	27	9.8	J2	µg/L	GE	1
		Lindane	<0.0050					µg/L		
		Magnesium, total recoverable	3,260					µg/L		
		Manganese, total recoverable	234		333			µg/L		
		Mercury, total recoverable	<0.20					µg/L		
		Methoxychlor	<0.50					µg/L		
		Nickel, total recoverable		36	55	56		µg/L	GE	1

Note: Flagging levels, modifiers, and laboratories are for 4th quarter 1993 data only. See Appendix B for flagging criteria.

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Well PCB 3A continued

ANALYTICAL DATA

H	D	Analyte	1Q93	2Q93	3Q93	4Q93	Mod	Unit	Lab	Flag
		Nitrate-nitrite as nitrogen	280					µg/L		
		Nonvolatile beta	3.0E+00					pCi/L		
		pH	4.2					pH		
		Phenols	<5.0					µg/L		
		Potassium, total recoverable	813					µg/L		
		Radium, total alpha-emitting	1.9E+00	2.5E+00	3.5E+00	2.0E+00		pCi/L	GE	0
		Selenium, total recoverable	<2.0	<2.0	2.4	<2.0	J1	µg/L	GE	0
		Silica, total recoverable	7,970					µg/L		
		Silver, total recoverable	<2.0					µg/L		
		Sodium, total recoverable	938					µg/L		
		Specific conductance	288	195	299	318		µS/cm	GE	1
		Sulfate	160,000	149,000	251,000	172,000		µg/L	GE	0
		Total dissolved solids	181,000					µg/L		
		Total organic carbon	<1,000					µg/L		
		Total organic halogens	<5.0		<5.0			µg/L		
		Total phosphates (as P)	<50					µg/L		
		Toxaphene	<0.24					µg/L		
		2,4,5-TP (Silvex)	<0.090					µg/L		
		Tritium	<7.0E-01					pCi/mL		

WELL PCB 4A

SRS Coord.	Lat/Longitude	Screen Zone Elevation	Top of Casing	Casing	Pump	Screen Zone
N42171.0	33.224907 °N	292.9-262.9 ft msl	309.6 ft msl	4" PVC	S	Water table
E64901.4	81.577874 °W					

SAMPLE DATE	03/17/93	05/25/93	08/26/93	11/24/93

FIELD DATA

Analyte	1Q93	2Q93	3Q93	4Q93	Unit
Water elevation	282.9	283.8	281.3	280.1	ft msl
Depth to water	26.7	25.8	28.3	29.5	ft
pH	4.6	4.0	4.1	4.4	pH
Sp. conductance	195	262	145	97	µS/cm
Water temperature	20.0	20.5	20.5	19.8	°C
Alkalinity as CaCO ₃	0	0	0	0	mg/L
Turbidity	1	4	1	1	NTU
Volume purged	21.9	15.0	16.7	12.0	Well vol.
Sampling code					

ANALYTICAL DATA

H	D	Analyte	1Q93	2Q93	3Q93	4Q93	Mod	Unit	Lab	Flag
		Aluminum, total recoverable	6,600		4,030			µg/L		
		Arsenic, total recoverable	<2.0					µg/L		
		Barium, total recoverable	6.2					µg/L		
		Cadmium, total recoverable	<2.0					µg/L		
		Calcium, total recoverable	4,620					µg/L		
		Chloride	6,110					µg/L		
		Chromium, total recoverable	<4.0					µg/L		
		2,4-Dichlorophenoxyacetic acid	<0.30					µg/L		
		Endrin	<0.0060					µg/L		
		Fluoride	196	246	117	<100		µg/L	GE	0
		Gross alpha	6.0E+00					pCi/L		
		Iron, total recoverable	53		56			µg/L		
		Lead, total recoverable	7.5	5.0	5.3	5.2	J2	µg/L	GE	0
		Lindane	<0.0050					µg/L		
		Magnesium, total recoverable	1,980					µg/L		
		Manganese, total recoverable	201		142			µg/L		

Note: Flagging levels, modifiers, and laboratories are for 4th quarter 1993 data only. See Appendix B for flagging criteria.

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Well PCB 4A continued

ANALYTICAL DATA

H	D	Analyte	1Q93	2Q93	3Q93	4Q93	Mod	Unit	Lab	Flag
		Mercury, total recoverable	<0.20					µg/L		
		Methoxychlor	<0.50					µg/L		
		Nickel, total recoverable		42	18	8.4		µg/L	GE	0
		Nitrate-nitrite as nitrogen	140					µg/L		
		Nonvolatile beta	3.4E+00					pCi/L		
		pH	4.4					pH		
		Phenols	<5.0					µg/L		
		Potassium, total recoverable	<500					µg/L		
		Radium, total alpha-emitting	3.0E+00	2.6E+00	1.0E+00	1.6E+00		pCi/L	GE	0
		Selenium, total recoverable	<2.0	<2.0	<2.0	<2.0	J1	µg/L	GE	0
		Silica, total recoverable	7,210					µg/L		
		Silver, total recoverable	<2.0					µg/L		
		Sodium, total recoverable	5,960					µg/L		
		Specific conductance	200	225	145	95		µS/cm	GE	0
		Sulfate	83,600	162,000	96,600	25,000		µg/L	GE	0
		Total dissolved solids	91,000					µg/L		
		Total organic carbon	<1,000					µg/L		
		Total organic halogens	6.6		6.7			µg/L		
		Total phosphates (as P)	<50					µg/L		
		Toxaphene	<0.24					µg/L		
		2,4,5-TP (Silvex)	<0.090					µg/L		
		Tritium	8.4E+00					pCi/mL		

WELL PDB 2

SRS Coord.	Lat/Longitude	Screen Zone Elevation	Top of Casing	Casing	Pump	Screen Zone
N43513.1 E64743.1	33.227619 °N 81.580893 °W	268.7-247.7 ft msl	319.5 ft msl	4" PVC	S	Water table

SAMPLE DATE	03/15/93	05/30/93	08/26/93	11/24/93

FIELD DATA

Analyte	1Q93	2Q93	3Q93	4Q93	Unit
Water elevation	279.0	281.4	280.4	279.2	ft msl
Depth to water	40.5	38.1	39.1	40.3	ft
pH	6.1	5.4	5.6	5.7	pH
Sp. conductance	113	113	109	112	µS/cm
Water temperature	22.5	22.5	22.0	21.1	°C
Alkalinity as CaCO ₃	9	12	10	8	mg/L
Turbidity	1	0	1	0	NTU
Volume purged	3.3	4.1	3.7	4.3	Well vol.
Sampling code					

ANALYTICAL DATA

H	D	Analyte	1Q93	2Q93	3Q93	4Q93	Mod	Unit	Lab	Flag
		Aluminum, total recoverable	45		39			µg/L		
		Arsenic, total recoverable	<2.0					µg/L		
		Barium, total recoverable	20					µg/L		
		Cadmium, total recoverable	<2.0					µg/L		
		Calcium, total recoverable	13,500					µg/L		
		Chloride	2,470					µg/L		
		Chromium, total recoverable	<4.0					µg/L		
		2,4-Dichlorophenoxyacetic acid	<0.30					µg/L		
		Endrin	<0.0060					µg/L		
		Fluoride	<100					µg/L		
		Gross alpha	2.8E+00					pCi/L		
		Iron, total recoverable	33					µg/L		
		Lead, total recoverable	14		6.6			µg/L		

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Unclassified

Well PDB 2 continued

ANALYTICAL DATA

H	D	Analyte	1Q93	2Q93	3Q93	4Q93	Mod	Unit	Lab	Flag
		Lindane	<0.0050					µg/L		
		Magnesium, total recoverable	1,640					µg/L		
		Manganese, total recoverable	7.5					µg/L		
		Mercury, total recoverable	<0.20					µg/L		
		Methoxychlor	<0.50					µg/L		
		Nitrate-nitrite as nitrogen	4,400					µg/L		
		Nonvolatile beta	2.7E+00					pCi/L		
		pH	6.0					pH		
		Phenols	<5.0					µg/L		
		Potassium, total recoverable	1,610					µg/L		
		Radium, total alpha-emitting	2.1E+00					pCi/L		
		Selenium, total recoverable	<2.0					µg/L		
		Silica, total recoverable	3,120					µg/L		
		Silver, total recoverable	<2.0					µg/L		
		Sodium, total recoverable	3,230					µg/L		
		Specific conductance	119					µS/cm		
		Sulfate	12,900					µg/L		
		Total activity	3.3E+05		2.5E+05			pCi/L		
		Total dissolved solids	74,000					µg/L		
		Total organic carbon	<1,000					µg/L		
		Total organic halogens	<5.0					µg/L		
		Total phosphates (as P)	<50					µg/L		
		Toxaphene	<0.24					µg/L		
		2,4,5-TP (Silvex)	<0.090					µg/L		
		Tritium	3.0E+02		2.3E+02			pCi/mL		

WELL PDB 3

SRS Coord.	Lat/Longitude	Screen Zone Elevation	Top of Casing	Casing	Pump	Screen Zone
N43542.2	33.228002 °N	269.1-248.1 ft msl	319.5 ft msl	4" PVC	S	Water table
E64938.2	81.580436 °W					

SAMPLE DATE	03/15/93	05/30/93	08/26/93	11/24/93

FIELD DATA

Analyte	1Q93	2Q93	3Q93	4Q93	Unit
Water elevation	279.2	281.2	280.5	279.3	ft msl
Depth to water	40.3	38.3	39.1	40.2	ft
pH	5.5	5.1	5.0	5.2	pH
Sp. conductance	82	95	79	83	µS/cm
Water temperature	16.0	24.5	23.3	20.7	°C
Alkalinity as CaCO ₃	3	1	1	0	mg/L
Turbidity	26	5	5	14	NTU
Volume purged	1.1	1.1	1.2	1.1	Well vol.
Sampling code	X	X	X	X	

ANALYTICAL DATA

H	D	Analyte	1Q93	2Q93	3Q93	4Q93	Mod	Unit	Lab	Flag
		Aluminum, total recoverable	140		49			µg/L		
		Arsenic, total recoverable	<2.0					µg/L		
		Barium, total recoverable	21					µg/L		
		Cadmium, total recoverable	<2.0					µg/L		
		Calcium, total recoverable	3,150					µg/L		
		Chloride	5,600					µg/L		
		Chromium, total recoverable	<4.0					µg/L		
		2,4-Dichlorophenoxyacetic acid	<0.30					µg/L		
		Endrin	<0.0060					µg/L		
		Fluoride	<100					µg/L		

Note: Flagging levels, modifiers, and laboratories are for 4th quarter 1993 data only. See Appendix B for flagging criteria.

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Well PDB 3 continued

ANALYTICAL DATA

H	D	Analyte	1Q93	2Q93	3Q93	4Q93	Mod	Unit	Lab	Flag
		Gross alpha	<2.0E+00					pCi/L		
		Iron, total recoverable	64					µg/L		
		Lead, total recoverable	30		134			µg/L		
		Lindane	<0.0050					µg/L		
		Magnesium, total recoverable	1,600					µg/L		
		Manganese, total recoverable	8.0					µg/L		
		Mercury, total recoverable	<0.20					µg/L		
		Methoxychlor	<0.50					µg/L		
		Nitrate-nitrite as nitrogen	3,200					µg/L		
		Nonvolatile beta	2.4E+00					pCi/L		
		pH	5.4					pH		
		Phenols	<5.0					µg/L		
		Potassium, total recoverable	<500					µg/L		
		Radium, total alpha-emitting	<1.0E+00					pCi/L		
		Selenium, total recoverable	<2.0					µg/L		
		Silica, total recoverable	6,780					µg/L		
		Silver, total recoverable	<2.0					µg/L		
		Sodium, total recoverable	7,560					µg/L		
		Specific conductance	82					µS/cm		
		Sulfate	5,680					µg/L		
		Total activity	7.2E+04					pCi/L		
		Total dissolved solids	50,000					µg/L		
		Total organic carbon	<1,000					µg/L		
		Total organic halogens	<5.0		<5.0			µg/L		
		Total phosphates (as P)	<50					µg/L		
		Toxaphene	<0.24					µg/L		
		2,4,5-TP (Silvex)	<0.090					µg/L		
		Tritium	6.7E+01		5.5E+01			pCi/mL		

WELL PRP 1A

SRS Coord.	Lat/Longitude	Screen Zone Elevation	Top of Casing	Casing	Pump	Screen Zone
N45349.8 E63032.7	33.228896 °N 81.588959 °W	262.9-232.9 ft msl	284.6 ft msl	4" PVC	S	Water table

SAMPLE DATE	03/14/93	05/30/93	08/29/93	11/24/93

FIELD DATA

Analyte	1Q93	2Q93	3Q93	4Q93	Unit
Water elevation	252.5	252.2	248.9	248.0	ft msl
Depth to water	32.1	32.4	35.7	36.6	ft
pH	5.6	4.7	4.8	5.1	pH
Sp. conductance	40	43	45	37	µS/cm
Water temperature	19.0	20.1	22.4	20.6	°C
Alkalinity as CaCO ₃	0	0	0	0	mg/L
Turbidity	2	1	3	2	NTU
Volume purged	4.0	3.3	2.5	3.0	Well vol.
Sampling code			X		

ANALYTICAL DATA

H	D	Analyte	1Q93	2Q93	3Q93	4Q93	Mod	Unit	Lab	Flag
		Aluminum, total recoverable	<20		20			µg/L		
		Arsenic, total recoverable	<2.0					µg/L		
		Barium, total recoverable	65					µg/L		
		Cadmium, total recoverable	<2.0					µg/L		
		Calcium, total recoverable	1,280					µg/L		
		Carbon tetrachloride	<1.0	<1.0	<1.0			µg/L		
		Chloride	3,500					µg/L		

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Well PRP 1A continued

ANALYTICAL DATA

<u>H</u>	<u>D</u>	<u>Analyte</u>	<u>1Q93</u>	<u>2Q93</u>	<u>3Q93</u>	<u>4Q93</u>	<u>Mod</u>	<u>Unit</u>	<u>Lab</u>	<u>Flag</u>
		Chloroform	<1.0	<1.0	<1.0			µg/L		
		Chromium, total recoverable	<4.0		<4.0			µg/L		
		2,4-Dichlorophenoxyacetic acid	<0.30					µg/L		
		Endrin	<0.0060					µg/L		
		Fluoride	<100					µg/L		
		Gross alpha	<2.0E+00					pCi/L		
		Iron, total recoverable	183					µg/L		
		Lead, total recoverable	10.0		14			µg/L		
		Lindane	<0.0050					µg/L		
		Magnesium, total recoverable	872					µg/L		
		Manganese, total recoverable	4.9		3.6			µg/L		
		Mercury, total recoverable	<0.20					µg/L		
		Methoxychlor	<0.50					µg/L		
		Nitrate-nitrite as nitrogen	1,820					µg/L		
		Nonvolatile beta	<2.0E+00					pCi/L		
		pH	5.4					pH		
		Phenols	<5.0					µg/L		
		Potassium, total recoverable	950					µg/L		
		Radium, total alpha-emitting	2.5E+00					pCi/L		
		Selenium, total recoverable	<2.0					µg/L		
		Silica, total recoverable	8,930					µg/L		
		Silver, total recoverable	<2.0					µg/L		
		Sodium, total recoverable	2,960					µg/L		
		Specific conductance	32					µS/cm		
		Sulfate	<1,000					µg/L		
		Tetrachloroethylene	<1.0	<1.0	<1.0			µg/L		
		Total dissolved solids	32,000					µg/L		
		Total organic carbon	<1,000					µg/L		
		Total organic halogens	<5.0		5.0			µg/L		
		Total phosphates (as P)	2,700					µg/L		
		Toxaphene	<0.24					µg/L		
		2,4,5-TP (Silvex)	<0.090					µg/L		
		1,1,1-Trichloroethane	<1.0	<1.0	<1.0			µg/L		
		Trichloroethylene	<1.0	<1.0	<1.0			µg/L		
		Tritium	1.0E+01		9.7E+00			pCi/mL		

Note: Flagging levels, modifiers, and laboratories are for 4th quarter 1993 data only. See Appendix B for flagging criteria.

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WELL PRP 2

<u>SRS Coord.</u>	<u>Lat/Longitude</u>	<u>Screen Zone Elevation</u>	<u>Top of Casing</u>	<u>Casing</u>	<u>Pump</u>	<u>Screen Zone</u>
N45389.5 E63229.0	33.229304 °N 81.588519 °W	264.1-234.1 ft msl	286.4 ft msl	4" PVC	S	Water table

<u>SAMPLE DATE</u>	<u>03/14/93</u>	<u>05/30/93</u>	<u>08/29/93</u>	<u>11/24/93</u>

FIELD DATA

<u>Analyte</u>	<u>1Q93</u>	<u>2Q93</u>	<u>3Q93</u>	<u>4Q93</u>	<u>Unit</u>
Water elevation	263.6	258.8	253.8	252.7	ft msl
Depth to water	22.8	27.6	32.6	33.7	ft
pH	5.8	4.8	4.8	5.1	pH
Sp. conductance	23	31	34	27	µS/cm
Water temperature	17.3	19.3	20.2	19.8	°C
Alkalinity as CaCO ₃	1	0	0	1	mg/L
Turbidity	2	14	5	2	NTU
Volume purged	6.0	9.9	4.4	4.4	Well vol.
Sampling code					

ANALYTICAL DATA

<u>H</u>	<u>D</u>	<u>Analyte</u>	<u>1Q93</u>	<u>2Q93</u>	<u>3Q93</u>	<u>4Q93</u>	<u>Mod</u>	<u>Unit</u>	<u>Lab</u>	<u>Flag</u>
		Aluminum, total recoverable	21		36			µg/L		
		Arsenic, total recoverable	<2.0					µg/L		
		Barium, total recoverable	12					µg/L		
		Cadmium, total recoverable	<2.0					µg/L		
		Calcium, total recoverable	1,360					µg/L		
		Carbon tetrachloride	<1.0	<1.0	<1.0			µg/L		
		Chloride	1,760					µg/L		
		Chloroform	<1.0	<1.0	<1.0			µg/L		
		Chromium, total recoverable	<4.0		<4.0			µg/L		
		2,4-Dichlorophenoxyacetic acid	<0.30					µg/L		
		Endrin	<0.0060					µg/L		
		Fluoride	<100					µg/L		
		Gross alpha	<2.0E+00					pCi/L		
		Iron, total recoverable	38					µg/L		
		Lead, total recoverable	<3.0		9.0			µg/L		
		Lindane	<0.0050					µg/L		
		Magnesium, total recoverable	718					µg/L		
		Manganese, total recoverable	2.1		4.6			µg/L		
		Mercury, total recoverable	<0.20					µg/L		
		Methoxychlor	<0.50					µg/L		
		Nitrate-nitrite as nitrogen	470					µg/L		
		Nonvolatile beta	<2.0E+00					pCi/L		
		pH	5.5					pH		
		Phenols	<5.0					µg/L		
		Potassium, total recoverable	<500					µg/L		
		Radium, total alpha-emitting	<1.0E+00					pCi/L		
		Selenium, total recoverable	<2.0					µg/L		
		Silica, total recoverable	5,520					µg/L		
		Silver, total recoverable	<2.0					µg/L		
		Sodium, total recoverable	1,110					µg/L		
		Specific conductance	20					µS/cm		
		Sulfate	1,240					µg/L		
		Tetrachloroethylene	<1.0	<1.0	<1.0			µg/L		
		Total dissolved solids	28,000					µg/L		
		Total organic carbon	<1,000					µg/L		
		Total organic halogens	6.6		<5.0			µg/L		
		Total phosphates (as P)	<50					µg/L		
		Toxaphene	<0.24					µg/L		
		2,4,5-TP (Silvex)	<0.090					µg/L		

Note: Flagging levels, modifiers, and laboratories are for 4th quarter 1993 data only. See Appendix B for flagging criteria.

● = exceeded holding time for 4th quarter 1993.

■ = exceeded screening level or final primary drinking water standard for 4th quarter 1993.

Well PRP 2 continued

ANALYTICAL DATA

H	D	Analyte	1Q93	2Q93	3Q93	4Q93	Mod	Unit	Lab	Flag
		1,1,1-Trichloroethane	<1.0	<1.0	<1.0			µg/L		
		Trichloroethylene	<1.0	<1.0	<1.0			µg/L		
		Tritium	1.8E+00		3.7E+00			pCi/mL		

WELL PRP 3

SRS Coord.	Lat/Longitude	Screen Zone Elevation	Top of Casing	Casing	Pump	Screen Zone
N45200.7 E63165.5	33.228783 °N 81.588320 °W	258.6-228.6 ft msl	280.7 ft msl	4" PVC	S	Water table

SAMPLE DATE	03/17/93	05/30/93	08/29/93	11/24/93

FIELD DATA

Analyte	1Q93	2Q93	3Q93	4Q93	Unit
Water elevation	260.4	258.6	254.4	253.4	ft msl
Depth to water	20.3	22.1	26.3	27.3	ft
pH	5.2	4.3	4.6	4.6	pH
Sp. conductance	83	83	91	84	µS/cm
Water temperature	20.3	19.9	21.2	21.4	°C
Alkalinity as CaCO ₃	0	0	0	0	mg/L
Turbidity	1	5	4	1	NTU
Volume purged	3.5	5.0	4.1	5.8	Well vol.
Sampling code					

ANALYTICAL DATA

H	D	Analyte	1Q93	2Q93	3Q93	4Q93	Mod	Unit	Lab	Flag
		Aluminum, total recoverable	48		43			µg/L		
		Arsenic, total recoverable	<2.0					µg/L		
		Barium, total recoverable	81					µg/L		
		Cadmium, total recoverable	<2.0					µg/L		
		Calcium, total recoverable	1,110					µg/L		
		Carbon tetrachloride	<10	<5.0	<5.0			µg/L		
		Chloride	9,680					µg/L		
		Chloroform	<10	<5.0	<5.0			µg/L		
		Chromium, total recoverable	<4.0		<4.0			µg/L		
		2,4-Dichlorophenoxyacetic acid	<0.30					µg/L		
		Endrin	<0.0060					µg/L		
		Fluoride	<100					µg/L		
		Gross alpha	<2.0E+00					pCi/L		
		Iron, total recoverable	183					µg/L		
		Lead, total recoverable	32		41			µg/L		
		Lindane	<0.0050					µg/L		
		Magnesium, total recoverable	1,720					µg/L		
		Manganese, total recoverable	53		62			µg/L		
		Mercury, total recoverable	<0.20					µg/L		
		Methoxychlor	<0.50					µg/L		
		Nitrate-nitrite as nitrogen	1,590					µg/L		
		Nonvolatile beta	<2.0E+00					pCi/L		
		pH	4.9					pH		
		Phenols	<5.0					µg/L		
		Potassium, total recoverable	520					µg/L		
		Radium, total alpha-emitting	1.3E+00					pCi/L		
		Selenium, total recoverable	<2.0					µg/L		
		Silica, total recoverable	6,190					µg/L		
		Silver, total recoverable	<2.0					µg/L		
		Sodium, total recoverable	7,810					µg/L		
		Specific conductance	87					µS/cm		
		Sulfate	7,420					µg/L		

Note: Flagging levels, modifiers, and laboratories are for 4th quarter 1993 data only. See Appendix B for flagging criteria.

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Well PRP 3 continued

ANALYTICAL DATA

H	D	Analyte	1Q93	2Q93	3Q93	4Q93	Mod	Unit	Lab	Flag
		Tetrachloroethylene	<10	7.3	5.5			µg/L		
		Total dissolved solids	37,000					µg/L		
		Total organic carbon	1,640					µg/L		
		Total organic halogens	119		177			µg/L		
		Total phosphates (as P)	<50					µg/L		
		Toxaphene	<0.24					µg/L		
		2,4,5-TP (Silvex)	<0.090					µg/L		
		1,1,1-Trichloroethane	178	128	76			µg/L		
		Trichloroethylene	26	25	13			µg/L		
		Tritium	6.3E+00		7.2E+00			pCi/mL		

WELL PRP 4

SRS Coord.	Lat/Longitude	Screen Zone Elevation	Top of Casing	Casing	Pump	Screen Zone
N45268.9	33.229228 °N	262.9-232.9 ft msl	284.7 ft msl	4" PVC	S	Water table
E63345.9	81.587977 °W					

SAMPLE DATE	03/17/93	05/30/93	08/29/93	11/24/93

FIELD DATA

Analyte	1Q93	2Q93	3Q93	4Q93	Unit
Water elevation	262.0	260.3	257.2	256.5	ft msl
Depth to water	22.7	24.3	27.5	28.1	ft
pH	5.3	4.7	4.8	4.9	pH
Sp. conductance	35	38	39	34	µS/cm
Water temperature	19.1	19.7	20.2	20.1	°C
Alkalinity as CaCO ₃	0	0	0	0	mg/L
Turbidity	2	2	1	4	NTU
Volume purged	6.5	8.7	11.8	5.7	Well vol.
Sampling code					

ANALYTICAL DATA

H	D	Analyte	1Q93	2Q93	3Q93	4Q93	Mod	Unit	Lab	Flag
		Aluminum, total recoverable	45		65			µg/L		
		Arsenic, total recoverable	<2.0					µg/L		
		Barium, total recoverable	24					µg/L		
		Cadmium, total recoverable	<2.0					µg/L		
		Calcium, total recoverable	947					µg/L		
		Carbon tetrachloride	<1.0	<1.0	<1.0			µg/L		
		Chloride	2,300					µg/L		
		Chloroform	<1.0	<1.0	<1.0			µg/L		
		Chromium, total recoverable	<4.0		<4.0			µg/L		
		2,4-Dichlorophenoxyacetic acid	<0.30					µg/L		
		Endrin	<0.0060					µg/L		
		Fluoride	<100					µg/L		
		Gross alpha	2.0E+00					pCi/L		
		Iron, total recoverable	<4.0					µg/L		
		Lead, total recoverable	<3.0		<3.0			µg/L		
		Lindane	<0.0050					µg/L		
		Magnesium, total recoverable	1,110					µg/L		
		Manganese, total recoverable	2.7		3.5			µg/L		
		Mercury, total recoverable	0.21					µg/L		
		Methoxychlor	<0.50					µg/L		
		Nitrate-nitrite as nitrogen	1,480					µg/L		
		Nonvolatile beta	<2.0E+00					pCi/L		
		pH	5.1					pH		
		Phenols	<5.0					µg/L		
		Potassium, total recoverable	<500					µg/L		

Note: Flagging levels, modifiers, and laboratories are for 4th quarter 1993 data only. See Appendix B for flagging criteria.

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Well PRP 4 continued

ANALYTICAL DATA

H	D	Analyte	1Q93	2Q93	3Q93	4Q93	Mod	Unit	Lab	Flag
		Radium, total alpha-emitting	1.4E+00					pCi/L		
		Selenium, total recoverable	<2.0					µg/L		
		Silica, total recoverable	7,290					µg/L		
		Silver, total recoverable	<2.0					µg/L		
		Sodium, total recoverable	1,790					µg/L		
		Specific conductance	35					µS/cm		
		Sulfate	<1,000					µg/L		
		Tetrachloroethylene	<1.0	<1.0	<1.0			µg/L		
		Total dissolved solids	7,000					µg/L		
		Total organic carbon	<1,000					µg/L		
		Total organic halogens	<5.0		5.9			µg/L		
		Total phosphates (as P)	<50					µg/L		
		Toxaphene	<0.24					µg/L		
		2,4,5-TP (Silvex)	<0.090					µg/L		
		1,1,1-Trichloroethane	<1.0	<1.0	<1.0			µg/L		
		Trichloroethylene	<1.0	<1.0	<1.0			µg/L		
		Tritium	4.6E+00		5.4E+00			pCi/mL		

WELL PSB 1A

SRS Coord.	Lat/Longitude	Screen Zone Elevation	Top of Casing	Casing	Pump	Screen Zone
N43619.3	33.226874 °N	287.4-257.4 ft msl	329.1 ft msl	4" PVC	S	Water table
E64141.4	81.582683 °W					

SAMPLE DATE	03/14/93	05/25/93	08/29/93	12/07/93

FIELD DATA

Analyte	1Q93	2Q93	3Q93	4Q93	Unit
Water elevation	277.9	279.8	278.6	276.8	ft msl
Depth to water	51.2	49.3	50.5	52.3	ft
pH	6.8	5.7	5.9	5.9	pH
Sp. conductance	48	45	48	46	µS/cm
Water temperature	19.7	20.9	20.5	19.9	°C
Alkalinity as CaCO ₃	3	6	5	5	mg/L
Turbidity	2	1	2	1	NTU
Volume purged	2.9	4.1	3.1	2.8	Well vol.
Sampling code					

ANALYTICAL DATA

H	D	Analyte	1Q93	2Q93	3Q93	4Q93	Mod	Unit	Lab	Flag
		Aluminum, total recoverable	<20		<20			µg/L		
		Arsenic, total recoverable	<2.0					µg/L		
		Barium, total recoverable	5.6					µg/L		
		Cadmium, total recoverable	<2.0					µg/L		
		Calcium, total recoverable	1,850					µg/L		
		Carbon tetrachloride	<1.0	<1.0	<1.0			µg/L		
		Chloride	2,780					µg/L		
		Chloroform	<1.0	<1.0	<1.0			µg/L		
		Chromium, total recoverable	<4.0		<4.0			µg/L		
		Copper, total recoverable	130		151			µg/L		
		2,4-Dichlorophenoxyacetic acid	<0.30					µg/L		
		Endrin	<0.0060					µg/L		
		Fluoride	<100					µg/L		
		Gross alpha	2.5E+00					pCi/L		
		Iron, total recoverable	11					µg/L		
		Lead, total recoverable	14	7.8	12	24		µg/L	GE	2
		Lindane	<0.0050					µg/L		
		Magnesium, total recoverable	233					µg/L		

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Well PSB 1A continued

ANALYTICAL DATA

<u>H</u>	<u>D</u>	<u>Analyte</u>	<u>1Q93</u>	<u>2Q93</u>	<u>3Q93</u>	<u>4Q93</u>	<u>Mod</u>	<u>Unit</u>	<u>Lab</u>	<u>Flag</u>
		Manganese, total recoverable	6.9					µg/L		
		Mercury, total recoverable	<0.20					µg/L		
		Methoxychlor	<0.50					µg/L		
		Nitrate-nitrite as nitrogen	1,880		1,360			µg/L		
		Nonvolatile beta	1.2E+01		9.0E+00			pCi/L		
		pH	6.2					pH		
		Phenols	<5.0					µg/L		
		Potassium, total recoverable	<500					µg/L		
		Radium, total alpha-emitting	1.3E+00					pCi/L		
		Selenium, total recoverable	<2.0					µg/L		
		Silica, total recoverable	7,840					µg/L		
		Silver, total recoverable	<2.0					µg/L		
		Sodium, total recoverable	5,570					µg/L		
		Specific conductance	37					µS/cm		
		Sulfate	1,890					µg/L		
		Tetrachloroethylene	<1.0	<1.0	<1.0			µg/L		
		Total activity	1.3E+08	5.7E+07	9.1E+07			pCi/L		
		Total dissolved solids	32,000					µg/L		
		Total organic carbon	<1,000					µg/L		
		Total organic halogens	6.7					µg/L		
		Total phosphates (as P)	<50					µg/L		
		Toxaphene	<0.24					µg/L		
		2,4,5-TP (Silvex)	<0.090					µg/L		
		1,1,1-Trichloroethane	<1.0	<1.0	<1.0			µg/L		
		Trichloroethylene	<1.0	<1.0	<1.0			µg/L		
		Tritium	1.2E+05		8.1E+04			pCi/mL		
■		Tritium				8.1E+04		pCi/mL	EM	2

WELL PSB 2A

<u>SRS Coord.</u>	<u>Lat/Longitude</u>	<u>Screen Zone Elevation</u>	<u>Top of Casing</u>	<u>Casing</u>	<u>Pump</u>	<u>Screen Zone</u>
N43612.4 E63916.5	33.226492 °N 81.583262 °W	287.2-257.2 ft msl	323.7 ft msl	4" PVC	S	Water table

<u>SAMPLE DATE</u>	<u>03/14/93</u>	<u>05/25/93</u>	<u>08/29/93</u>	<u>12/07/93</u>

FIELD DATA

<u>Analyte</u>	<u>1Q93</u>	<u>2Q93</u>	<u>3Q93</u>	<u>4Q93</u>	<u>Unit</u>
Water elevation	278.0	280.0	278.4	276.6	ft msl
Depth to water	45.7	43.7	45.3	47.1	ft
pH	5.5	4.6	4.9	4.9	pH
Sp. conductance	68	63	86	86	µS/cm
Water temperature	20.2	20.2	20.0	19.3	°C
Alkalinity as CaCO ₃	0	0	0	0	mg/L
Turbidity	2	1	12	3	NTU
Volume purged	6.3	6.3	5.7	8.6	Well vol.
Sampling code					

ANALYTICAL DATA

<u>H</u>	<u>D</u>	<u>Analyte</u>	<u>1Q93</u>	<u>2Q93</u>	<u>3Q93</u>	<u>4Q93</u>	<u>Mod</u>	<u>Unit</u>	<u>Lab</u>	<u>Flag</u>
		Aluminum, total recoverable	67		44			µg/L		
		Arsenic, total recoverable	<2.0					µg/L		
		Barium, total recoverable	89					µg/L		
		Cadmium, total recoverable	<2.0					µg/L		
		Calcium, total recoverable	3,870					µg/L		
		Carbon tetrachloride	<1.0	<1.0	<1.0			µg/L		
		Chloride	3,140					µg/L		
		Chloroform	<1.0	<1.0	<1.0			µg/L		

Note: Flagging levels, modifiers, and laboratories are for 4th quarter 1993 data only. See Appendix B for flagging criteria.

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Well PSB 2A continued

ANALYTICAL DATA

H	D	Analyte	1Q93	2Q93	3Q93	4Q93	Mod	Unit	Lab	Flag
		Chromium, total recoverable	<4.0		<4.0			µg/L		
		Copper, total recoverable	7.8		13			µg/L		
		2,4-Dichlorophenoxyacetic acid	<0.30					µg/L		
		Endrin	<0.0060					µg/L		
		Fluoride	<100					µg/L		
		Gross alpha	3.2E+00					pCi/L		
		Iron, total recoverable	9.2					µg/L		
		Lead, total recoverable	<3.0	<3.0	<3.0	<3.0		µg/L	GE	0
		Lindane	<0.0050					µg/L		
		Magnesium, total recoverable	1,600					µg/L		
		Manganese, total recoverable	41					µg/L		
		Mercury, total recoverable	<0.20					µg/L		
		Methoxychlor	<0.50					µg/L		
		Nitrate-nitrite as nitrogen	3,500		6,100			µg/L		
		Nonvolatile beta	2.5E+01		1.0E+01			pCi/L		
		pH	5.1					pH		
		Phenols	<5.0					µg/L		
		Potassium, total recoverable	609					µg/L		
		Radium, total alpha-emitting	1.4E+00					pCi/L		
		Selenium, total recoverable	<2.0					µg/L		
		Silica, total recoverable	5,450					µg/L		
		Silver, total recoverable	<2.0					µg/L		
		Sodium, total recoverable	3,110					µg/L		
		Specific conductance	60					µS/cm		
		Sulfate	<1,000					µg/L		
		Tetrachloroethylene	<1.0	<1.0	<1.0			µg/L		
		Total activity	1.0E+07	1.8E+07	6.8E+07			pCi/L		
		Total dissolved solids	45,000					µg/L		
		Total organic carbon	<1,000					µg/L		
		Total organic halogens	<5.0					µg/L		
		Total phosphates (as P)	<50					µg/L		
		Toxaphene	<0.24					µg/L		
		2,4,5-TP (Silvex)	<0.090					µg/L		
		1,1,1-Trichloroethane	<1.0	<1.0	<1.0			µg/L		
		Trichloroethylene	<1.0	<1.0	<1.0			µg/L		
		Tritium	1.1E+04		6.0E+04			pCi/mL		
■		Tritium				6.9E+04		pCi/mL	EM	2

Note: Flagging levels, modifiers, and laboratories are for 4th quarter 1993 data only. See Appendix B for flagging criteria.

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WELL PSB 3A

SRS Coord.	Lat/Longitude	Screen Zone Elevation	Top of Casing	Casing	Pump	Screen Zone
N43599.8 E63590.4	33.225932 °N 81.584096 °W	286.5-256.5 ft msl	318.6 ft msl	4" PVC	S	Water table

SAMPLE DATE	03/14/93	05/25/93	08/29/93	12/07/93

FIELD DATA

Analyte	1Q93	2Q93	3Q93	4Q93	Unit
Water elevation	276.8	279.0	277.5	275.4	ft msl
Depth to water	41.8	39.6	41.1	43.2	ft
pH	5.3	4.5	4.8	4.9	pH
Sp. conductance	38	36	38	35	µS/cm
Water temperature	19.7	20.0	19.7	19.0	°C
Alkalinity as CaCO ₃	0	0	0	0	mg/L
Turbidity	1	2	2	1	NTU
Volume purged	2.8	12.5	6.3	10.1	Well vol.
Sampling code					

ANALYTICAL DATA

H	D	Analyte	1Q93	2Q93	3Q93	4Q93	Mod	Unit	Lab	Flag
		Aluminum, total recoverable	60		38			µg/L		
		Arsenic, total recoverable	<2.0					µg/L		
		Barium, total recoverable	12					µg/L		
		Cadmium, total recoverable	<2.0					µg/L		
		Calcium, total recoverable	668					µg/L		
		Carbon tetrachloride	<1.0	<1.0	<1.0			µg/L		
		Chloride	2,520					µg/L		
		Chloroform	<1.0	<1.0	<1.0			µg/L		
		Chromium, total recoverable	<4.0		<4.0			µg/L		
		Copper, total recoverable	201		291			µg/L		
		2,4-Dichlorophenoxyacetic acid	<0.30					µg/L		
		Endrin	<0.0060					µg/L		
		Fluoride	<100					µg/L		
		Gross alpha	3.0E+00					pCi/L		
		Iron, total recoverable	<4.0					µg/L		
		Lead, total recoverable	22	20	35	43		µg/L	GE	2
		Lindane	<0.0050					µg/L		
		Magnesium, total recoverable	769					µg/L		
		Manganese, total recoverable	9.9					µg/L		
		Mercury, total recoverable	<0.20					µg/L		
		Methoxychlor	<0.50					µg/L		
		Nitrate-nitrite as nitrogen	1,980		1,420			µg/L		
		Nonvolatile beta	<2.0E+00		<2.0E+00			pCi/L		
		pH	5.2					pH		
		Phenols	<5.0					µg/L		
		Potassium, total recoverable	765					µg/L		
		Radium, total alpha-emitting	1.3E+00					pCi/L		
		Selenium, total recoverable	<2.0					µg/L		
		Silica, total recoverable	5,710					µg/L		
		Silver, total recoverable	<2.0					µg/L		
		Sodium, total recoverable	2,560					µg/L		
		Specific conductance	30					µS/cm		
		Sulfate	<1,000					µg/L		
		Tetrachloroethylene	<1.0	<1.0	<1.0			µg/L		
		Total activity	2.8E+07	2.1E+07	2.0E+07			pCi/L		
		Total dissolved solids	29,000					µg/L		
		Total organic carbon	<1,000					µg/L		
		Total organic halogens	14					µg/L		
		Total phosphates (as P)	<50					µg/L		

Note: Flagging levels, modifiers, and laboratories are for 4th quarter 1993 data only. See Appendix B for flagging criteria.

● = exceeded holding time for 4th quarter 1993.

■ = exceeded screening level or final primary drinking water standard for 4th quarter 1993.

Unclassified

Well PSB 3A continued

ANALYTICAL DATA

H	D	Analyte	1Q93	2Q93	3Q93	4Q93	Mod	Unit	Lab	Flag
		Toxaphene	<0.24					µg/L		
		2,4,5-TP (Silvex)	<0.090					µg/L		
		1,1,1-Trichloroethane	<1.0	<1.0	<1.0			µg/L		
		Trichloroethylene	<1.0	<1.0	<1.0			µg/L		
■		Tritium	3.2E+04		1.8E+04			pCi/mL		
		Tritium				1.8E+04		pCi/mL	EM	2

WELL PSB 4A

SRS Coord.	Lat/Longitude	Screen Zone Elevation	Top of Casing	Casing	Pump	Screen Zone
N43534.2 E63347.0	33.225391 °N 81.584610 °W	285.5-255.5 ft msl	312.5 ft msl	4" PVC	S	Water table

SAMPLE DATE	03/14/93	05/25/93	08/29/93	12/07/93

FIELD DATA

Analyte	1Q93	2Q93	3Q93	4Q93	Unit
Water elevation	276.0	278.8	276.9	274.6	ft msl
Depth to water	36.5	33.8	35.6	37.9	ft
pH	5.1	4.5	4.7	4.7	pH
Sp. conductance	54	54	59	56	µS/cm
Water temperature	19.0	19.7	19.5	19.0	°C
Alkalinity as CaCO ₃	0	0	0	1	mg/L
Turbidity	1	1	1	1	NTU
Volume purged	5.4	8.7	3.5	4.2	Well vol.
Sampling code					

ANALYTICAL DATA

H	D	Analyte	1Q93	2Q93	3Q93	4Q93	Mod	Unit	Lab	Flag
		Aluminum, total recoverable	53		65			µg/L		
		Arsenic, total recoverable	<2.0					µg/L		
		Barium, total recoverable	23					µg/L		
		Cadmium, total recoverable	<2.0					µg/L		
		Calcium, total recoverable	372					µg/L		
		Carbon tetrachloride	<1.0	<1.0	<1.0			µg/L		
		Chloride	3,380					µg/L		
		Chloroform	<1.0	<1.0	<1.0			µg/L		
		Chromium, total recoverable	<4.0		<4.0			µg/L		
		Copper, total recoverable	308		203			µg/L		
		2,4-Dichlorophenoxyacetic acid	<0.30					µg/L		
		Endrin	<0.0060					µg/L		
		Fluoride	<100					µg/L		
		Gross alpha	<2.0E+00					pCi/L		
		Iron, total recoverable	18					µg/L		
		Lead, total recoverable	26	22	20	27		µg/L	GE	2
		Lindane	<0.0050					µg/L		
		Magnesium, total recoverable	684					µg/L		
		Manganese, total recoverable	3.3					µg/L		
		Mercury, total recoverable	<0.20					µg/L		
		Methoxychlor	<0.50					µg/L		
		Nitrate-nitrite as nitrogen	3,420		3,200			µg/L		
		Nonvolatile beta	2.9E+00		<2.0E+00			pCi/L		
		pH	4.9					pH		
		Phenols	<5.0					µg/L		
		Potassium, total recoverable	<500					µg/L		
		Radium, total alpha-emitting	1.2E+00					pCi/L		
		Selenium, total recoverable	<2.0					µg/L		
		Silica, total recoverable	6,030					µg/L		

Note: Flagging levels, modifiers, and laboratories are for 4th quarter 1993 data only. See Appendix B for flagging criteria.

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■ = exceeded screening level or final primary drinking water standard for 4th quarter 1993.

Well PSB 4A continued

ANALYTICAL DATA

<u>H</u>	<u>D</u>	<u>Analyte</u>	<u>1Q93</u>	<u>2Q93</u>	<u>3Q93</u>	<u>4Q93</u>	<u>Mod</u>	<u>Unit</u>	<u>Lab</u>	<u>Flag</u>
		Silver, total recoverable	<2.0					µg/L		
		Sodium, total recoverable	6,920					µg/L		
		Specific conductance	43					µS/cm		
		Sulfate	<1,000					µg/L		
		Tetrachloroethylene	<1.0	<1.0	<1.0			µg/L		
		Total activity	8.3E+05	4.6E+05	3.8E+05			pCi/L		
		Total dissolved solids	39,000					µg/L		
		Total organic carbon	<1,000					µg/L		
		Total organic halogens	7.8					µg/L		
		Total phosphates (as P)	<50					µg/L		
		Toxaphene	<0.24					µg/L		
		2,4,5-TP (Silvex)	<0.090					µg/L		
		1,1,1-Trichloroethane	<1.0	<1.0	<1.0			µg/L		
		Trichloroethylene	<1.0	<1.0	<1.0			µg/L		
■		Tritium	8.1E+02		3.6E+02			pCi/mL		
		Tritium				6.2E+02		pCi/mL	EM	2

WELL PSB 5A

<u>SRS Coord.</u>	<u>Lat/Longitude</u>	<u>Screen Zone Elevation</u>	<u>Top of Casing</u>	<u>Casing</u>	<u>Pump</u>	<u>Screen Zone</u>
N43440.5 E63606.5	33.225606 °N 81.583745 °W	292.3-262.3 ft msl	319.3 ft msl	4" PVC	S	Water table

<u>SAMPLE DATE</u>	<u>03/14/93</u>	<u>05/25/93</u>	<u>08/26/93</u>	<u>12/07/93</u>

FIELD DATA

<u>Analyte</u>	<u>1Q93</u>	<u>2Q93</u>	<u>3Q93</u>	<u>4Q93</u>	<u>Unit</u>
Water elevation	277.2	279.7	278.3	275.9	ft msl
Depth to water	42.1	39.6	41.0	43.4	ft
pH	6.0	4.8	4.7	4.7	pH
Sp. conductance	44	54	55	54	µS/cm
Water temperature	16.9	20.4	21.0	20.5	°C
Alkalinity as CaCO ₃	1	0	0	0	mg/L
Turbidity	31	1	1	1	NTU
Volume purged	1.8	3.3	3.2	2.8	Well vol.
Sampling code	X				

ANALYTICAL DATA

<u>H</u>	<u>D</u>	<u>Analyte</u>	<u>1Q93</u>	<u>2Q93</u>	<u>3Q93</u>	<u>4Q93</u>	<u>Mod</u>	<u>Unit</u>	<u>Lab</u>	<u>Flag</u>
		Aluminum, total recoverable	111		75			µg/L		
		Arsenic, total recoverable	<2.0					µg/L		
		Barium, total recoverable	9.8					µg/L		
		Cadmium, total recoverable	<2.0					µg/L		
		Calcium, total recoverable	1,590					µg/L		
		Carbon tetrachloride	<1.0	<1.0	<1.0			µg/L		
		Chloride	1,310					µg/L		
		Chloroform	<1.0	<1.0	<1.0			µg/L		
		Chromium, total recoverable	<4.0		<4.0			µg/L		
		Copper, total recoverable	335		262			µg/L		
		2,4-Dichlorophenoxyacetic acid	<0.30					µg/L		
		Endrin	<0.0060					µg/L		
		Fluoride	<100					µg/L		
		Gross alpha	<2.0E+00					pCi/L		
		Iron, total recoverable	64					µg/L		
		Lead, total recoverable	44	36	37	49		µg/L	GE	2
		Lindane	<0.0050					µg/L		
		Magnesium, total recoverable	890					µg/L		
		Manganese, total recoverable	2.7					µg/L		

Note: Flagging levels, modifiers, and laboratories are for 4th quarter 1993 data only. See Appendix B for flagging criteria.

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Well PSB 5A continued

ANALYTICAL DATA

H	D	Analyte	1Q93	2Q93	3Q93	4Q93	Mod	Unit	Lab	Flag
		Mercury, total recoverable	<0.20					µg/L		
		Methoxychlor	<0.50					µg/L		
		Nitrate-nitrite as nitrogen	2,940		4,050			µg/L		
		Nonvolatile beta	<2.0E+00		<2.0E+00			pCi/L		
		pH	5.5					pH		
		Phenols	<5.0					µg/L		
		Potassium, total recoverable	548					µg/L		
		Radium, total alpha-emitting	<1.0E+00					pCi/L		
		Selenium, total recoverable	<2.0					µg/L		
		Silica, total recoverable	5,740					µg/L		
		Silver, total recoverable	<2.0					µg/L		
		Sodium, total recoverable	3,480					µg/L		
		Specific conductance	38					µS/cm		
		Sulfate	1,870					µg/L		
		Tetrachloroethylene	<1.0	<1.0	<1.0			µg/L		
		Total dissolved solids	28,000					µg/L		
		Total organic carbon	<1,000					µg/L		
		Total organic halogens	<5.0					µg/L		
		Total phosphates (as P)	<50					µg/L		
		Toxaphene	<0.24					µg/L		
		2,4,5-TP (Silvex)	<0.090					µg/L		
		1,1,1-Trichloroethane	<1.0	<1.0	<1.0			µg/L		
		Trichloroethylene	<1.0	<1.0	<1.0			µg/L		
		Tritium	3.0E+01		4.2E+01			pCi/mL		

WELL PSB 6A

SRS Coord.	Lat/Longitude	Screen Zone Elevation	Top of Casing	Casing	Pump	Screen Zone
N43436.0	33.226198 °N	292.1-262.1 ft msl	324.2 ft msl	4" PVC	S	Water table
E63975.7	81.582764 °W					

SAMPLE DATE	03/14/93	05/25/93	08/26/93	12/08/93

FIELD DATA

Analyte	1Q93	2Q93	3Q93	4Q93	Unit
Water elevation	278.4	281.0	279.7	277.6	ft msl
Depth to water	45.8	43.3	44.5	46.6	ft
pH	5.5	4.7	4.8	4.9	pH
Sp. conductance	53	57	54	50	µS/cm
Water temperature	19.1	20.3	20.0	19.2	°C
Alkalinity as CaCO ₃	0	0	0	0	mg/L
Turbidity	1	2	1	1	NTU
Volume purged	7.6	9.5	9.8	7.1	Well vol.
Sampling code					

ANALYTICAL DATA

H	D	Analyte	1Q93	2Q93	3Q93	4Q93	Mod	Unit	Lab	Flag
		Aluminum, total recoverable	56		63			µg/L		
		Arsenic, total recoverable	<2.0					µg/L		
		Barium, total recoverable	3.5					µg/L		
		Cadmium, total recoverable	<2.0					µg/L		
		Calcium, total recoverable	144					µg/L		
		Carbon tetrachloride	<1.0	<1.0	<1.0			µg/L		
		Chloride	2,700					µg/L		
		Chloroform	<1.0	<1.0	<1.0			µg/L		
		Chromium, total recoverable	<4.0		<4.0			µg/L		
		Copper, total recoverable	32		34			µg/L		
		2,4-Dichlorophenoxyacetic acid	<0.30					µg/L		

Note: Flagging levels, modifiers, and laboratories are for 4th quarter 1993 data only. See Appendix B for flagging criteria.

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Well PSB 6A continued

ANALYTICAL DATA

<u>H</u>	<u>D</u>	<u>Analyte</u>	<u>1Q93</u>	<u>2Q93</u>	<u>3Q93</u>	<u>4Q93</u>	<u>Mod</u>	<u>Unit</u>	<u>Lab</u>	<u>Flag</u>
		Endrin	<0.0060					µg/L		
		Fluoride	<100					µg/L		
		Gross alpha	<2.0E+00					pCi/L		
		Iron, total recoverable	<4.0					µg/L		
		Lead, total recoverable	4.6	3.2	4.2	5.3		µg/L	GE	0
		Lindane	<0.0050					µg/L		
		Magnesium, total recoverable	607					µg/L		
		Manganese, total recoverable	<2.0					µg/L		
		Mercury, total recoverable	<0.20					µg/L		
		Methoxychlor	<0.50					µg/L		
		Nitrate-nitrite as nitrogen	2,900		3,940			µg/L		
		Nonvolatile beta	<2.0E+00		2.1E+00			pCi/L		
		pH	5.4					pH		
		Phenols	<5.0					µg/L		
		Potassium, total recoverable	<500					µg/L		
		Radium, total alpha-emitting	<1.0E+00					pCi/L		
		Selenium, total recoverable	<2.0					µg/L		
		Silica, total recoverable	5,960					µg/L		
		Silver, total recoverable	<2.0					µg/L		
		Sodium, total recoverable	7,590					µg/L		
		Specific conductance	43					µS/cm		
		Sulfate	4,220					µg/L		
		Tetrachloroethylene	<1.0	<1.0	<1.0			µg/L		
		Total activity	5.0E+07	6.5E+07	5.5E+07	4.3E+07		pCi/L	EM	0
		Total dissolved solids	34,000					µg/L		
		Total organic carbon	<1,000					µg/L		
		Total organic halogens	<5.0					µg/L		
		Total phosphates (as P)	<50					µg/L		
		Toxaphene	<0.24					µg/L		
		2,4,5-TP (Silvex)	<0.090					µg/L		
		1,1,1-Trichloroethane	<1.0	<1.0	<1.0			µg/L		
		Trichloroethylene	<1.0	<1.0	<1.0			µg/L		
		Tritium	4.6E+04		4.9E+04			pCi/mL		

Note: Flagging levels, modifiers, and laboratories are for 4th quarter 1993 data only. See Appendix B for flagging criteria.

● = exceeded holding time for 4th quarter 1993.

■ = exceeded screening level or final primary drinking water standard for 4th quarter 1993.

Unclassified

WELL PSB 7A

SRS Coord.	Lat/Longitude	Screen Zone Elevation	Top of Casing	Casing	Pump	Screen Zone
N43553.3 E64301.0	33.226988 °N 81.582135 °W	289.0-259.0 ft msl	330.7 ft msl	4" PVC	S	Water table

SAMPLE DATE	03/14/93	05/25/93	08/26/93	12/08/93

FIELD DATA

Analyte	1Q93	2Q93	3Q93	4Q93	Unit
Water elevation	278.0	280.3	279.2	277.5	ft msl
Depth to water	52.7	50.4	51.5	53.2	ft
pH	6.3	5.2	5.3	5.4	pH
Sp. conductance	57	53	55	56	µS/cm
Water temperature	19.7	20.5	20.7	19.9	°C
Alkalinity as CaCO ₃	2	4	4	4	mg/L
Turbidity	2	5	3	1	NTU
Volume purged	7.4	12.3	9.1	6.8	Well vol.
Sampling code					

ANALYTICAL DATA

H	D	Analyte	1Q93	2Q93	3Q93	4Q93	Mod	Unit	Lab	Flag
		Aluminum, total recoverable	25		37			µg/L		
		Arsenic, total recoverable	<2.0					µg/L		
		Barium, total recoverable	17					µg/L		
		Cadmium, total recoverable	<2.0					µg/L		
		Calcium, total recoverable	3,110					µg/L		
		Carbon tetrachloride	<1.0	<1.0	<1.0			µg/L		
		Chloride	2,930					µg/L		
		Chloroform	<1.0	<1.0	<1.0			µg/L		
		Chromium, total recoverable	<4.0		<4.0			µg/L		
		Copper, total recoverable	186		128			µg/L		
		2,4-Dichlorophenoxyacetic acid	<0.30					µg/L		
		Endrin	<0.0060					µg/L		
		Fluoride	<100					µg/L		
		Gross alpha	<2.0E+00					pCi/L		
		Iron, total recoverable	19					µg/L		
		Lead, total recoverable	15	14	17	22		µg/L	GE	2
		Lindane	<0.0050					µg/L		
		Magnesium, total recoverable	481					µg/L		
		Manganese, total recoverable	3.9					µg/L		
		Mercury, total recoverable	<0.20					µg/L		
		Methoxychlor	<0.50					µg/L		
		Nitrate-nitrite as nitrogen	3,300		2,660			µg/L		
		Nonvolatile beta	<2.0E+00		<2.0E+00			pCi/L		
		pH	5.7					pH		
		Phenols	<5.0					µg/L		
		Potassium, total recoverable	<500					µg/L		
		Radium, total alpha-emitting	1.1E+00					pCi/L		
		Selenium, total recoverable	<2.0					µg/L		
		Silica, total recoverable	7,670					µg/L		
		Silver, total recoverable	<2.0					µg/L		
		Sodium, total recoverable	5,980					µg/L		
		Specific conductance	48					µS/cm		
		Sulfate	<1,000					µg/L		
		Tetrachloroethylene	<1.0	<1.0	<1.0			µg/L		
		Total activity	5.7E+06	5.1E+06	5.6E+06	4.2E+06		pCi/L	EM	0
		Total dissolved solids	38,000					µg/L		
		Total organic carbon	<1,000					µg/L		
		Total organic halogens	<5.0					µg/L		
		Total phosphates (as P)	<50					µg/L		

Note: Flagging levels, modifiers, and laboratories are for 4th quarter 1993 data only. See Appendix B for flagging criteria.

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Well PSB 7A continued

ANALYTICAL DATA

<u>H</u>	<u>D</u>	<u>Analyte</u>	<u>1Q93</u>	<u>2Q93</u>	<u>3Q93</u>	<u>4Q93</u>	<u>Mod</u>	<u>Unit</u>	<u>Lab</u>	<u>Flag</u>
		Toxaphene	<0.24					µg/L		
		2,4,5-TP (Silvex)	<0.090					µg/L		
		1,1,1-Trichloroethane	<1.0	<1.0	<1.0			µg/L		
		Trichloroethylene	<1.0	<1.0	<1.0			µg/L		
		Tritium	5.3E+03		5.1E+03			pCi/mL		

Note: Flagging levels, modifiers, and laboratories are for 4th quarter 1993 data only. See Appendix B for flagging criteria.

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Appendix D. Time Series Plots

This section presents time series plots for selected constituents or indicator parameters (cadmium, specific conductance, gross alpha, lead, mercury, nonvolatile beta, pH, and tritium) as well as hydrographs for wells in P Area.

Values below detection limit do not appear on the plots.

Cadmium Concentrations PCB Well Series

Unconnected lines indicate
a dry well or a value below
the detection limit.
DWS: 5 $\mu\text{g/L}$

Conductivity PAC Well Series

Conductivity PCB Well Series

Conductivity PDB Well Series

Conductivity PRP Well Series

Conductivity PSB Well Series (1 through 4A)

Conductivity PSB Well Series (5 through 7A)

Gross Alpha Activities PAC Well Series

Unconnected lines indicate a dry well or a value below the detection limit.

DWS: 15 pCi/L

Gross Alpha Activities PCB Well Series

Unconnected lines indicate
a dry well or a value below
the detection limit.
DWS: 15 pCi/L

Gross Alpha Activities PSB Well Series (1A through 3A)

Unconnected lines indicate
a dry well or a value below
the detection limit.

DWS: 15 pCi/L

Gross Alpha Activities PSB Well Series (4A through 7A)

Unconnected lines indicate
a dry well or a value below
the detection limit.

DWS: 15 pCi/L

Lead Concentrations PAC Well Series

Lead Concentrations PCB Well Series

Unconnected lines indicate
a dry well or a value below
the detection limit.
DWS: 50 µg/L

Lead Concentrations PDB Well Series

Unconnected lines indicate
a dry well or a value below
the detection limit.
DWS: 50 $\mu\text{g/L}$

Lead Concentrations PRP Well Series

Lead Concentrations PSB Well Series

Unconnected lines indicate
a dry well or a value below
the detection limit.

DWS: 50 $\mu\text{g/L}$

Nonvolatile Beta Activities PAC Well Series

Unconnected lines indicate
a dry well or a value below
the detection limit.
DWS: 50 pCi/L

Nonvolatile Beta Activities PCB Well Series

Unconnected lines indicate
a dry well or a value below
the detection limit.
DWS: 50 pCi/L

Nonvolatile Beta Activities PDB Well Series

Unconnected lines indicate
a dry well or a value below
the detection limit.
DWS: 50 pCi/L

Nonvolatile Beta Activities PSB Well Series (1A through 4A)

Nonvolatile Beta Activities PSB Well Series (5A through 7A)

pH PAC Well Series

pH PCB Well Series

pH PRP Well Series

pH PSB Well Series (1 through 4A)

pH
PSB Well Series (5 through 7A)

Tritium Activities PAC Well Series

Tritium Activities PCB Well Series

Tritium Activities PDB Well Series

Unconnected lines indicate
a dry well or a value below
the detection limit.
DWS: 20 pCi/mL

Tritium Activities PRP Well Series

Unconnected lines indicate
a dry well or a value below
the detection limit.
DWS: 20 pCi/mL

Tritium Activities PSB Well Series (1A through 4A)

Unconnected lines indicate
a dry well or a value below
the detection limit.
DWS: 20 pCi/mL

Tritium Activities PSB Well Series (5A through 7A)

Hydrograph P Well Series

Hydrograph PAC Well Series

Hydrograph PCB Well Series

Hydrograph PDB Well Series

Hydrograph PRP Well Series

Hydrograph PSB Well Series (1 through 3A)

Hydrograph PSB Well Series (4 through 7A)

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