Research Technical Completion Report 98-1

Water Quality Trends in the Snake River Plain Aquifer at the Idaho National Engineering and Environmental Laboratory, 1960 to 1995

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Abstract

The United States Geological Survey (USGS) has monitored water quality in the Snake River Plain aquifer (SRPA) beneath the Department of Energy's (DOE) Idaho National Engineering and Environmental Laboratory (INEEL) in southeast Idaho for nearly 50 years, beginning before the site was established in 1949. Operations at various facilities at the INEEL have adversely impacted water quality in the SRPA at several locations, primarily as the result of the disposal of chemical and radionuclide wastes through injection wells and percolation ponds. The USGS database of analytical results from groundwater samples is a valuable source of information for evaluating water quality trends in the SRPA.

The USGS ground water quality database includes data from more than 150 aquifer wells at or near the INEEL. The data covers the period from 1949 through present day and contains analytical data for thousands of ground water samples collected from the SRPA. This report is an attempt to summarize the database in graphical format. Due to the size of the database it is impractical to list all data, therefore, a list of analytes, primarily contaminants from INEEL operations, was selected. In an attempt to prevent this report from being overly cumbersome, analytical data are only presented for ground water samples collected from 66 wells since 1960. The wells were selected to provide adequate spatial coverage to present a historical perspective of ground water quality at the INEEL and vicinity. Waste disposal practices at INEEL facilities are discussed to provide the reader with a synopsis of the principal sources of ground water contamination at the site.

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List of Acronyms

ANL	Argonne National Laboratory
CFA	Central Facilities Area
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
ICPP	Idaho Chemical Processing Plant
INEEL	Idaho National Engineering and Environmental Laboratory
MCL	Maximum Contaminant Level
MDL	Method Detection Limit
mg/L	milligrams per liter
NRF	Naval Reactors Facility
pCi/L	picocuries per liter
RL	Reporting Limit
RWMC	Radioactive Waste Management Complex
SRPA	Snake River Plain aquifer
TAN	Test Area North
TRA	Test Reactor Area
TSF	Technical Support Facility
μg/L	micrograms per liter
μS/cm	microsiemens per centimeter
USGS	United States Geological Survey

1. Introduction

The Idaho National Engineering and Environmental Laboratory (INEEL) is located in southeastern Idaho and operated by the U.S. Department of Energy (DOE). The INEEL covers 890 square miles on the Snake River Plain about 40 miles west of Idaho Falls (Figure 1) and was established in 1949 for the construction and testing of nuclear reactors. To date, 52 nuclear reactors have been constructed and tested at the INEEL. Site activities have also included nuclear fuel testing, nuclear fuel recovery from spent fuel, reactor training, and the storage and disposal of radioactive wastes.

Monitoring of ground water quality in the Snake River Plain aquifer beneath the INEEL has been conducted by the United States Geological Survey (USGS) since before the site was established. The USGS maintains a database containing more than forty years of water quality monitoring data from over 150 wells at the INEEL and surrounding area (Figure 2). This database is a valuable source of information for evaluating the effects of the INEEL activities on water quality of the Snake River Plain aquifer.

1.1 Purpose and Scope

The purpose of this report is to present a historical perspective of water quality trends at the INEEL and along its southern border from 1960 to 1995. Interpretation of the cause(s) of any trends or anomalies is beyond the scope of this study. Rather, the intent of this document is to provide a graphical summary of the database to assist the scientific community in identifying issues which may require further investigation and to provide a reference document for individuals interested in the water quality of the SRPA near the INEEL.

The data used in this report are taken from the water quality database maintained by the district office of the USGS in Boise, Idaho and from the Department of Energy's Radiological and Environmental Sciences Laboratory database at the INEEL. Due to the size of the database, a subset of analytical data from 66 aquifer wells was selected to facilitate presentation. Wells were selected to provide coverage of the major facilities at the INEEL, namely the Argonne

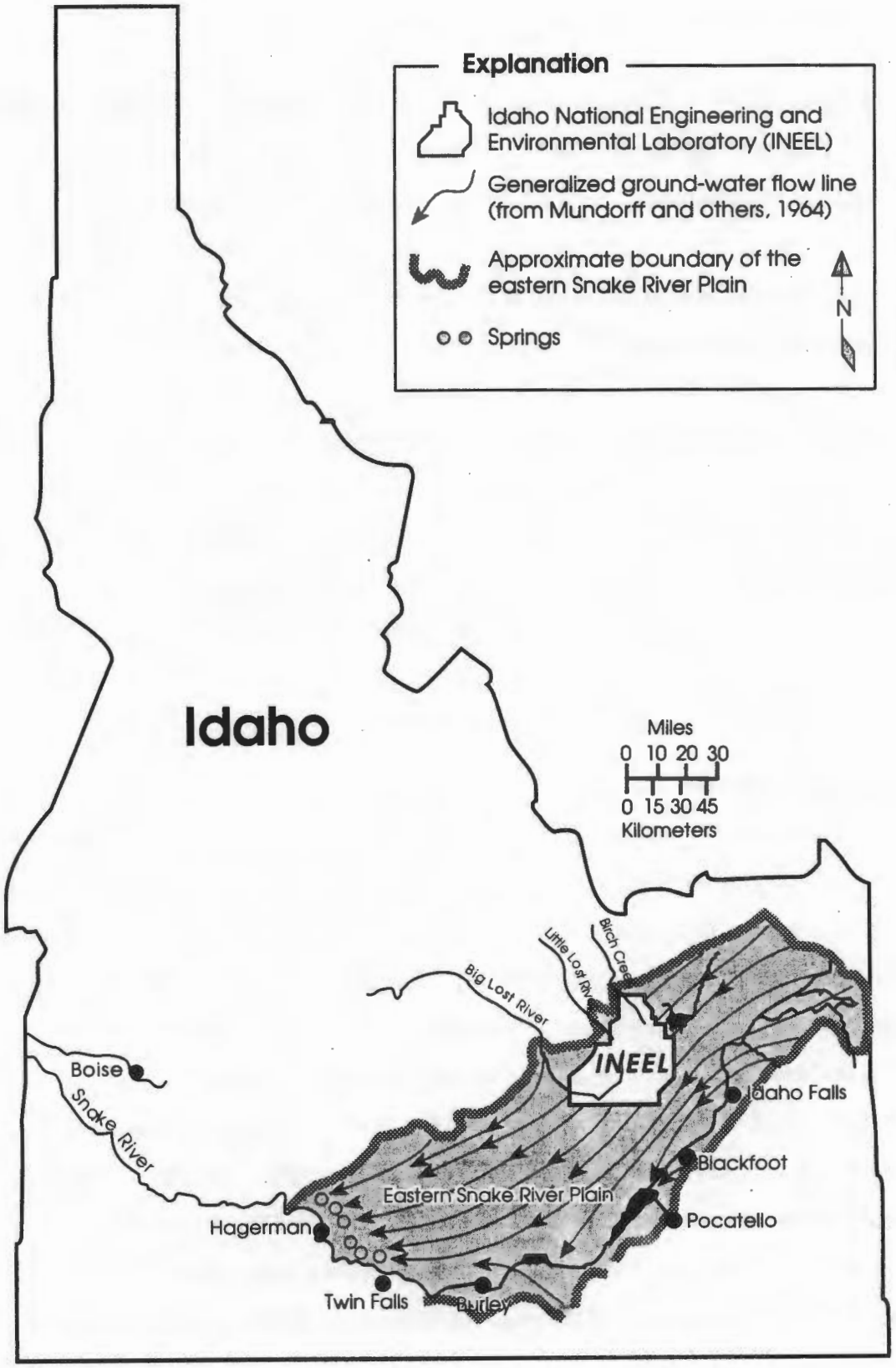

Figure 1. INEEL Location Map.

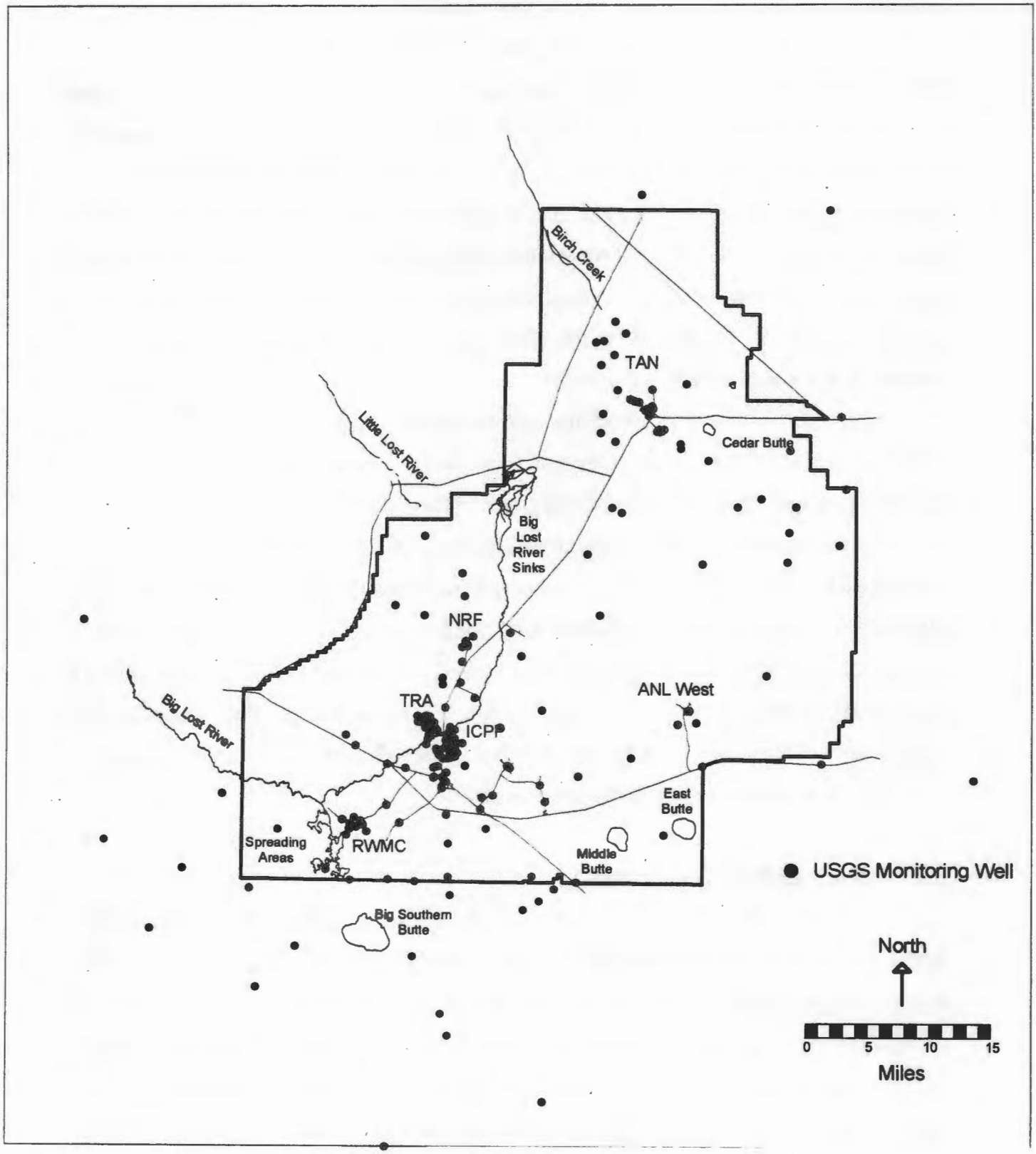

Figure 2. USGS Monitoring Wells at the INEEL.

National Laboratory-West (ANL-West), Central Facilities Area (CFA), Idaho Chemical Processing Plant (ICPP), Naval Reactors Facility (NRF), Radioactive Waste Management Complex (RWMC), Test Area North (TAN), Test Reactor Area (TRA), and the southern (downgradient) boundary of the INEEL. Only water samples from the Snake River Plain aquifer are discussed in this report. Well construction data and sampling methodology are presented for the selected wells. Analytical results are limited to selected radionuclides and inorganic chemicals that were commonly disposed of at the INEEL; many of which also occur naturally. Specific conductance data, a general water quality indicator, are also included. In the mid-1980s, organic compounds were detected in groundwater at the Radioactive Waste Management Complex and Test Area North. Due to the relatively short period of record of analyses for organics, they are not included in this report.

This report also presents a brief discussion of the primary sources of groundwater contaminants at the INEEL. This information is intended to provide some background information to enhance understanding of the groundwater quality trends displayed in this report.

No major effort was made to ensure the accuracy of the database, and some errors may have been introduced during data entry or other activities associated with the compilation of the database. In addition, the sampling method employed by the USGS has changed over time (see section 3.2), and this can influence the analytical results. For example, a thief sampler collects a sample from a discrete interval in the aquifer, whereas a dedicated pump collects a sample from a larger interval of the aquifer. If the water chemistry varies with depth, the results for samples collected with these two methods may not be the same.

1.2 Geologic and Hydrologic Setting

The INEEL is located on the eastern Snake River Plain in southeast Idaho. Beneath the INEEL and the eastern Snake River Plain lies the Snake River Plain aquifer, one of the nations most productive aquifers. The aquifer is bounded by mountain ranges to the north and west, and the Snake River to the south and east. Water in the aquifer moves primarily through fractures and voids in numerous basalt flows which formed over the last 2 million years. Between eruptive sequences, some of the flows were exposed at land surface long enough to be covered

by lake, river, or wind blown sediment, which was later buried by succeeding basalt flows to become sedimentary interbeds. The basalt and interlayered sediments extend to depths of as much as 3,500 feet below the land surface, and are underlain by silicic volcanic and intrusive rocks (Whitehead, 1989). INEL-1, an exploratory geothermal well installed on the INEEL, penetrated 2,460 feet of basaltic lava flows and sedimentary interbeds before encountering silicic rock, which is the dominant lithology to at least 10,365 feet below land surface (Mann, 1986).

The depth to the aquifer beneath the INEEL ranges from approximately 200 feet in the northern portion of the site to more than 900 feet near the southern boundary. Groundwater flows south-southwest under an average hydraulic gradient of approximately 4 feet per mile (Figure 3). Groundwater flows mainly through fractures and rubbly interflow zones within the basalt. The hydraulic conductivity of the basalt ranges from one to as much as 1,000 feet per day (Bartholomay and others, 1995). Based upon evaluation of the transport of iodine-129 to the southern boundary of the site, Mann and Beasley (1994) estimated a minimum average groundwater flow velocity of approximately 6 feet per day in the vicinity of the INEEL.

The aquifer is recharged by infiltration of irrigation water, surface water, and precipitation, and by groundwater inflow from large valleys along the northern boundary of the plain. In the vicinity of the INEEL, significant groundwater recharge can occur from the Big Lost River, which intermittently flows from the western boundary of the site to its terminus at sinks and playas in the north-central portion of the site. Since 1958, some runoff from the Big Lost River has been diverted to topographic depressions (known as spreading areas) in the southwest part of the INEEL (Bartholomay and others, 1995).

1.3 Groundwater Contamination at the INEEL

More than forty-five years of site operations and waste disposal at the INEEL have resulted in groundwater contamination at several locations, notably the Test Area North (TAN), the Idaho Chemical Processing Plant (ICPP), and the Test Reactor Area (TRA). Concentrations of one or more contaminants exceed federal drinking water standards in the groundwater contaminant plumes beneath these facilities. The primary contaminants at each of these facilities are: 1) TAN-trichloroethene, dichloroethene, tetrachloroethene, and radionuclides; 2) ICPP-

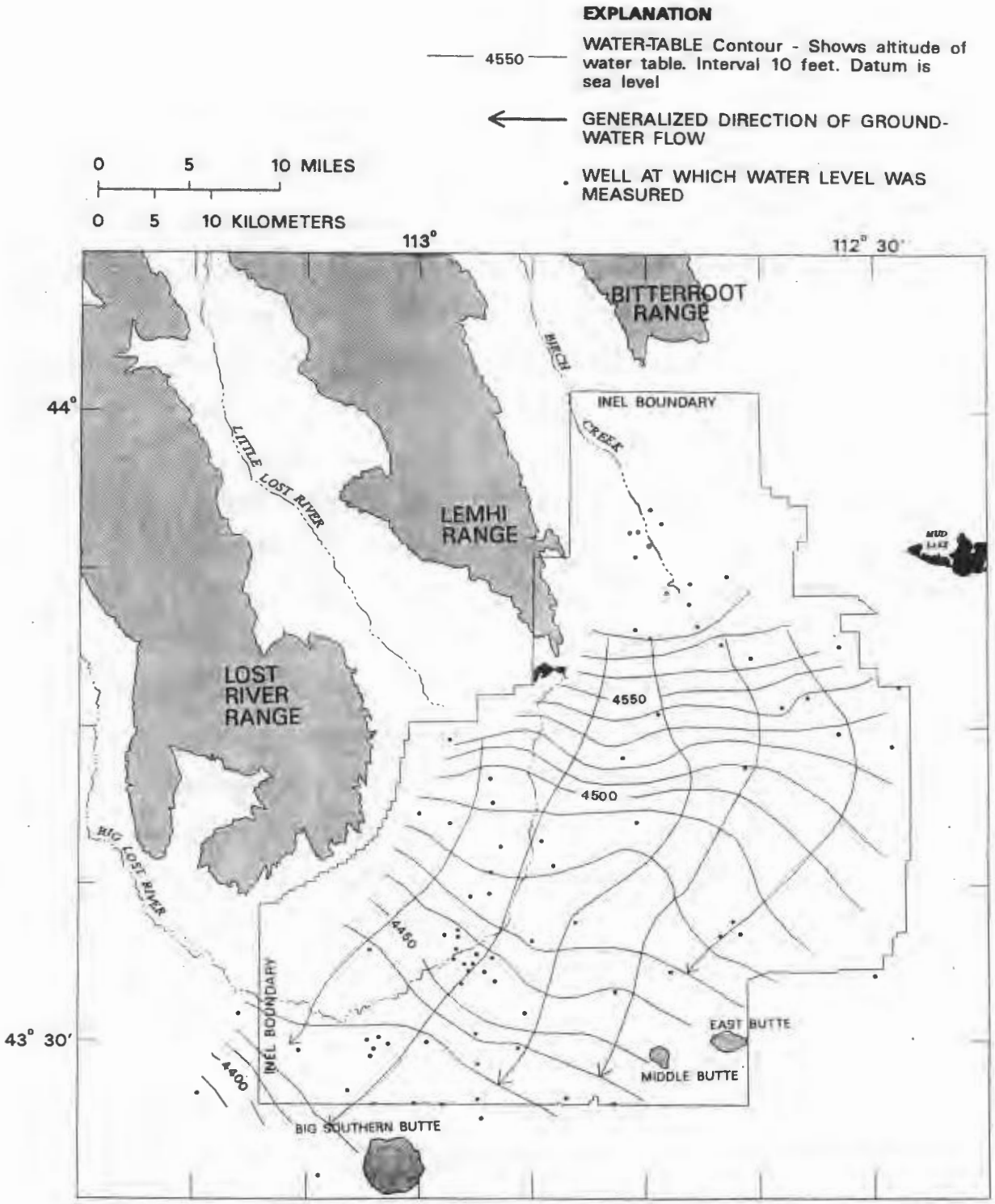

Figure 3. Ground Water Elevation Contour Map (from Bartholomay and others, 1995).

tritium and strontium-90; and 3) TRA-tritium and chromium. In addition, organic compounds, primarily carbon tetrachloride, have been detected in the aquifer beneath the Radioactive Waste Management Facility (RWMC), though the levels do not currently exceed drinking standards. The approximate extent of groundwater contamination at the INEEL is shown on Figure 4. The sources of the contamination at the TAN, ICPP, TRA, and the RWMC are discussed in the following section.

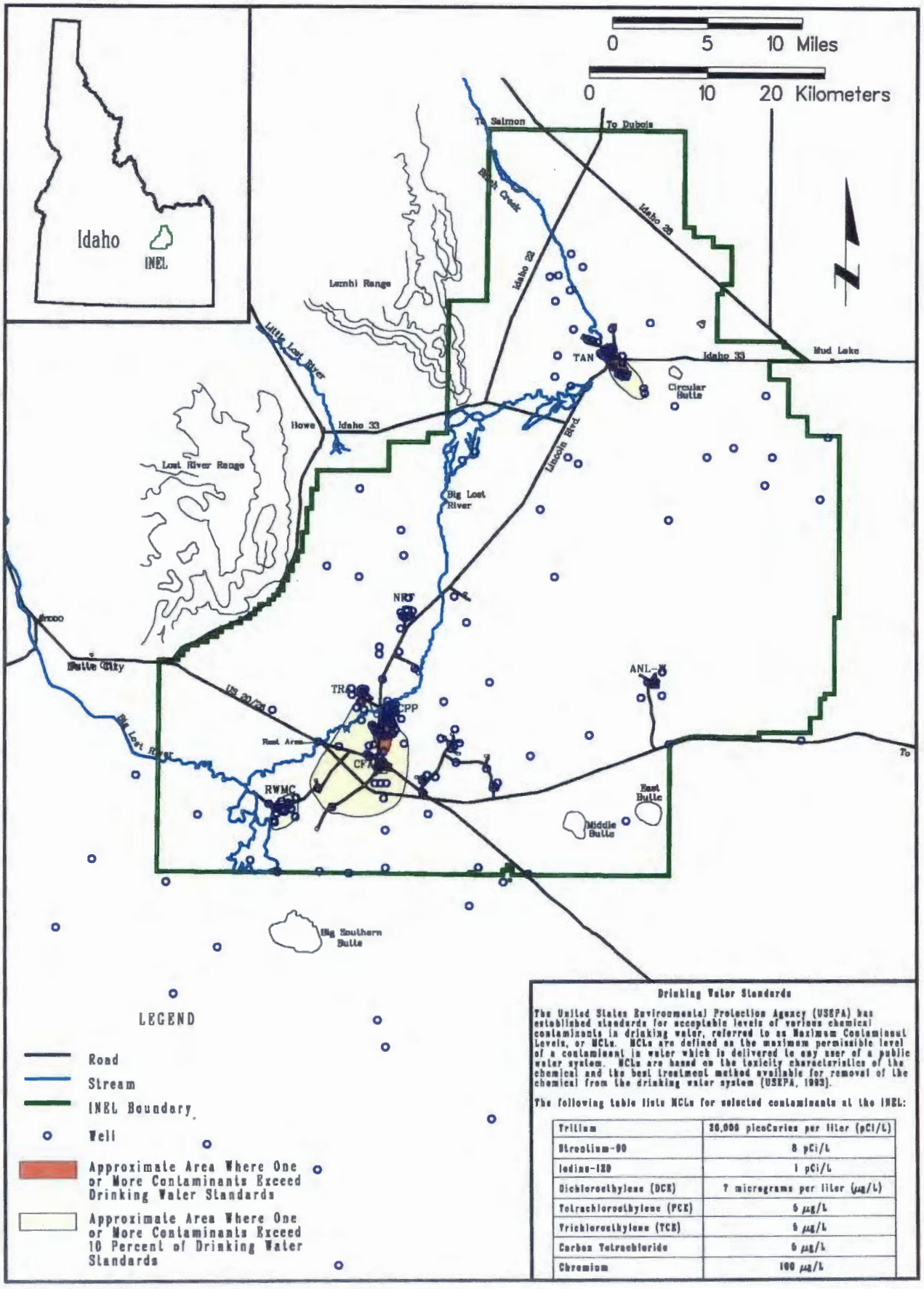

Figure 4. Extent of Ground Water Contamination at the INEEL.

2. Waste Disposal at the INEEL

At the INEEL, disposal of liquid wastes containing radionuclides, organic compounds, and inorganic chemicals has been the main source of groundwater contamination in the Snake River Plain aquifer. Wastewater has been injected into the aquifer through disposal wells, and infiltrated from ponds and ditches. Burial of solid and liquid wastes at the site have also impacted groundwater. The following sections provide a brief description of site activities which have contributed to contamination of the Snake River Plain aquifer. A more detailed discussion can be found in Frederick and others (1998).

2.1 Idaho Chemical Processing Plant

The ICPP was built in the early 1950s for the storage and reprocessing of spent nuclear fuel generated by defense-related projects. Between 1953 and 1984, liquid radioactive, chemical, and sanitary wastes were routinely disposed of by direct injection to the aquifer through the ICPP injection well (Figure 5). The ICPP injection well was drilled to a depth of 610 feet, penetrating the upper portion of the Snake River Plain aquifer. The well was used once in 1986, and then abandoned and filled with grout in 1989. Radioactive contaminants disposed of in the ICPP injection well were principally tritium, with lesser amounts of cesium-137, strontium-90, uranium isotopes, and others. It is estimated that about 22,250 curies, approximately 19,700 curies of which was tritium, were discharged to the ICPP injection well during its 35 years of operation (EG&G, 1993a and 1993b). The primary chemical wastes disposed of through the ICPP injection well were chloride, nitrate, sodium, and sulfate (EG&G, 1993a).

The ICPP percolation ponds were installed in 1984 to replace the ICPP injection well. The wastewater discharged to the ponds consists primarily of steam condensate, cooling water, solutions from water softening and demineralization, and boiler blowdown. Chloride, nitrate, sodium, and sulfate are the primary contaminants in the waste stream (EG&G, 1993b).

Prior to January 1993, the overhead condensate from the Process Equipment Waste (PEW) evaporator, which was slightly radioactive, was discharged to the percolation ponds. The

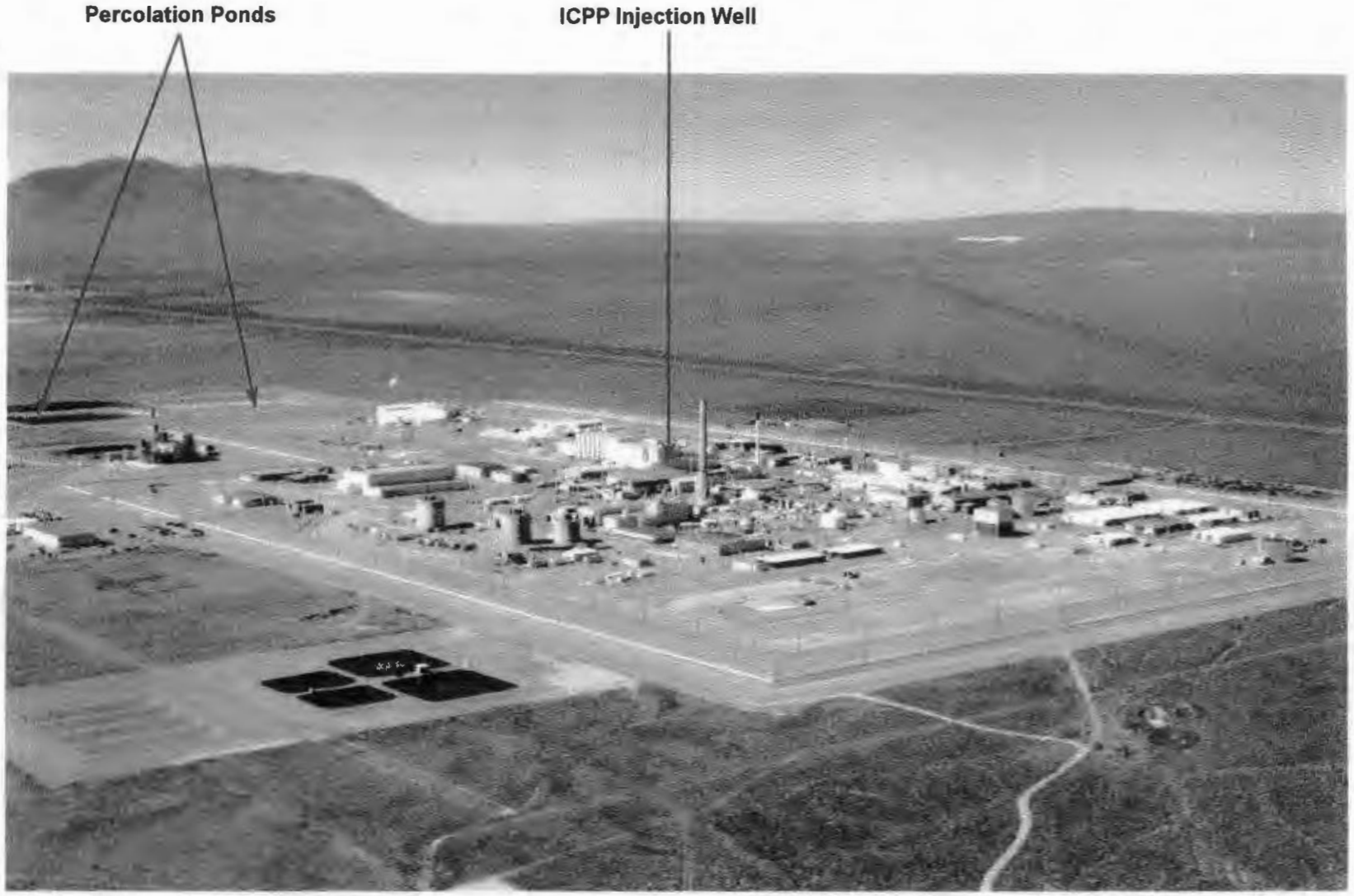

Figure 5. Wastewater discharge locations at the Idaho Chemical Processing Plant. View is to the southwest.

condensate from the PEW evaporator is currently routed to the Liquid Effluent Treatment and Disposal Facility, thus the release of radionuclides to the pond has been nearly eliminated. Approximately 963 curies, principally tritium, were discharged to the ICPP percolation ponds between 1984 and 1992 (EG&G, 1993b). Tritium disposal decreased after 1988 with an estimated 2.7 curies released to the percolation ponds between 1989 and 1991 (Bartholomay and others, 1995).

2.2 Test Reactor Area

The Test Reactor Area was established in the early 1950s. Three research reactors have been constructed at this facility, of which one, the Advanced Test Reactor, is still in operation. Chemical and radioactive liquid wastes generated from research activities and operations at the TRA have been disposed of at several locations at the facility (Figure 6).

From 1952 to 1993, radioactive liquid waste was discharged to the warm waste pond, an unlined percolation pond which eventually consisted of three cells constructed in 1952, 1957, and 1964. The Warm Waste Treatment Facility, completed in 1983, monitors the concentration of radioactive isotopes in the waste water, and uses ion exchange units to treat the effluent. Tritium was the principal radioactive isotope in the liquid waste, with lesser amounts of chromium-51, cobalt-60, cesium-137, strontium-90, and technetium-99. Approximately 41,378 curies were disposed of during the 41 years of operation of the TRA warm waste ponds (EG&G, 1993b). In 1993, the warm waste pond was replaced with two double-lined evaporation ponds to prevent the waste water from infiltrating to the aquifer.

Chemical wastes have been disposed of at several locations during the operating history of TRA, including the warm waste pond, a chemical waste pond, the cold waste pond, well USGS 53, and a deep disposal well (Figure 6). Between 1952 and 1962, all liquid chemical waste was discharged to the warm waste pond. In 1962, the chemical waste pond was excavated and began receiving untreated liquid waste from ion exchange units and water softeners; which contained large quantities of sulfuric acid, sodium hydroxide, and sodium chloride. Treatment to neutralize these acidic and basic solutions prior to discharge to the chemical waste pond began in 1984. The chemical waste pond is still operational although the volume of waste water

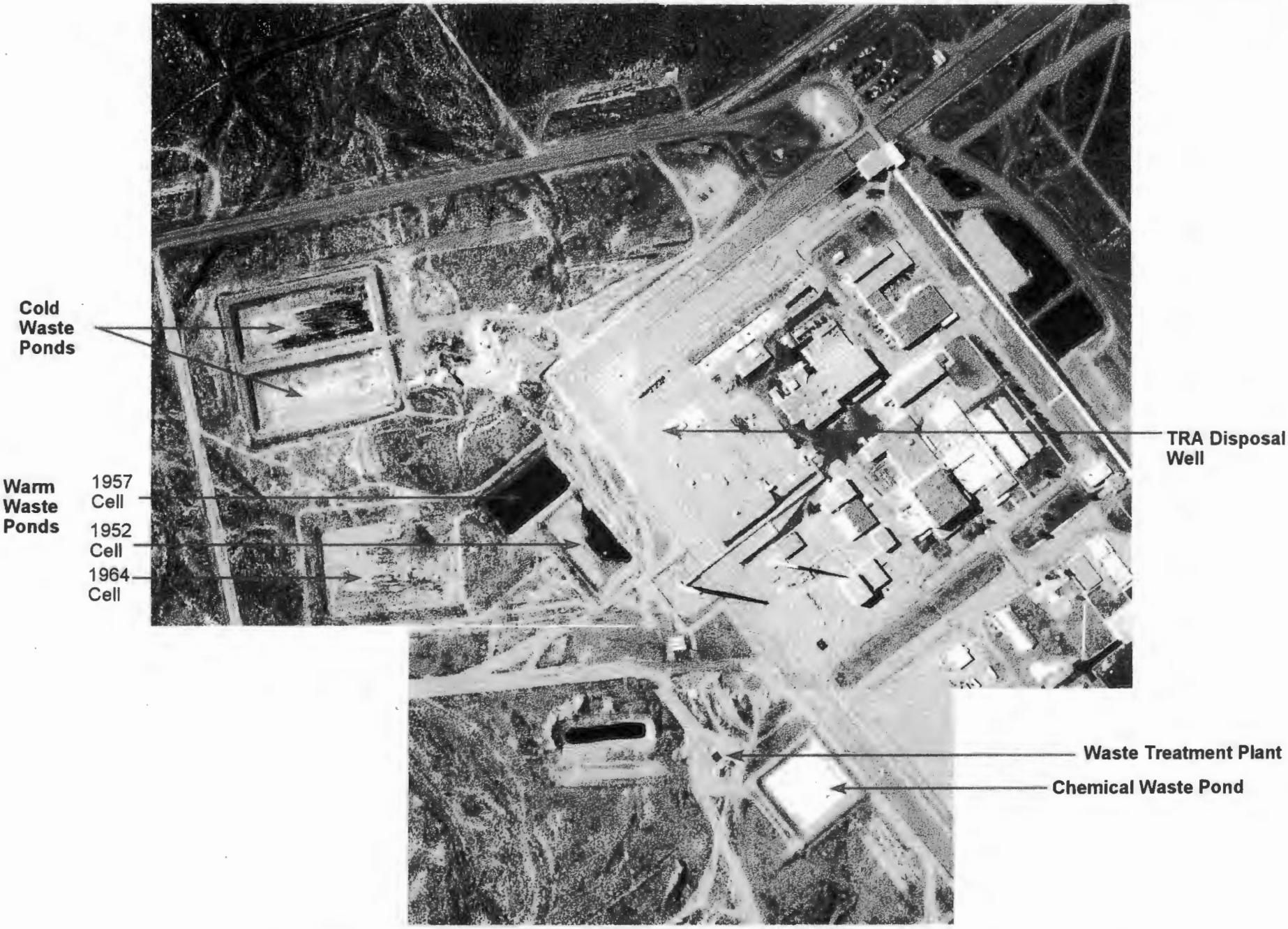

Figure 6. Wastewater discharge locations at the Test Reactor Area. Top of the page is south.

discharged to it has decreased.

USGS 53, a 90-foot deep monitoring well which is completed in basalt and sediment overlying the aquifer, is reported to have been used intermittently for the injection of blowdown water used to clean the reactor cooling towers between 1960 and 1964. A 1,275-feet deep injection well was put into service in 1964 to replace USGS 53 for the disposal of reactor cooling water. Chromate, used as a corrosion inhibitor, was present in the cooling tower blowdown injected into these wells and discharged to the warm waste pond. In 1972, chromate was replaced with phosphate-based inhibitors. The disposal well was used until 1982 when it was capped and reactor cooling water was routed to the cold waste ponds. The cold waste ponds are still operational and receive non-radioactive waste water as well as cooling tower blowdown water from reactor operations (EG&G, 1992 and EG&G, 1993b).

2.3 Test Area North

TAN was built between 1954 and 1961 and has been the site of a number of research programs to test spent nuclear fuel, experimental reactor designs, and the Aircraft Nuclear Propulsion Program. The main contributor to groundwater contamination at the TAN site has been the TAN disposal well (also known as ANP 3 or TSF-05), which was drilled in 1953 to a depth of 305 feet and penetrates the upper part of the Snake River Plain aquifer. The disposal well received treated sanitary sewage, industrial waste water, and low-level radioactive waste until the Technical Support Facility (TSF) disposal pond was built in 1972 (Figure 7). From 1972 until the early 1980s, the TAN disposal well may have been used for overflows from the sump which routes waste water to the TSF disposal pond, though no record of any overflows exist. An estimated 80 to 100 curies were discharged to the TAN disposal well, primarily tritium with lesser amounts of cesium-134, cesium-137, and strontium-90 (EG&G, 1993b). Metals, including chromium, lead, and mercury, may have been discharged into the TAN disposal well (EG&G, 1994). In 1987, organic compounds were discovered in the groundwater at TAN. The main contaminants are dichloroethene, trichloroethene, and tetrachloroethene (EG&G, 1994). The primary source of the organic contamination is the TAN disposal well. As part of the Superfund cleanup at the INEEL, groundwater contaminated by the disposal well is

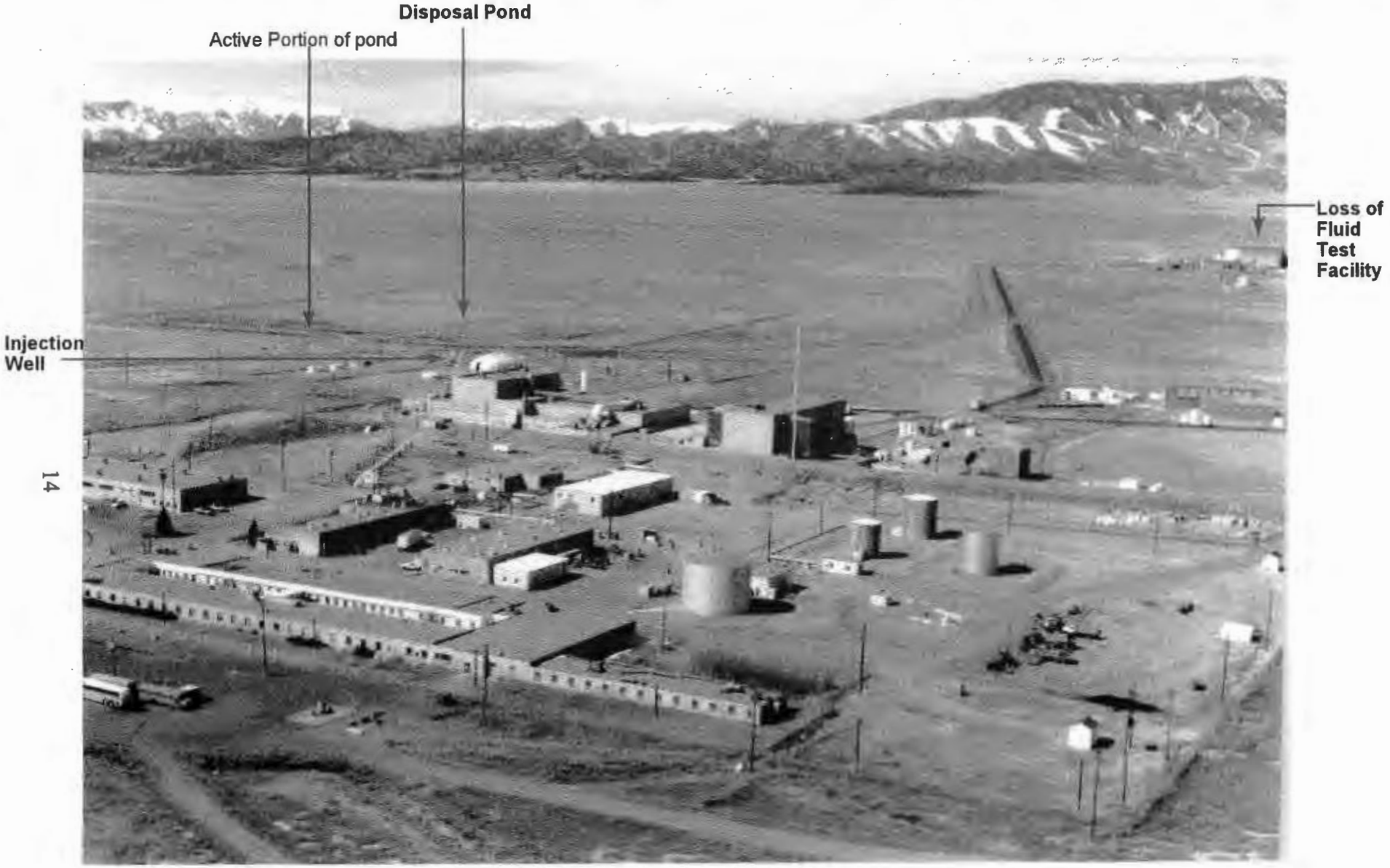

Figure 7. Wastewater discharge locations at the Technical Support Facility. View is to the west.

being treated to reduce the levels of these organic solvents.

In 1972, the unlined TSF disposal pond was constructed to replace the disposal well. The pond receives low-level radioactive waste, process wastes from water softener regeneration, boiler blowdown, and treated sewage effluent. Radioactive isotopes released to the disposal pond include tritium, strontium-90, yttrium-90, among others. Between 1982 and 1992, approximately 1.7 curies were discharged to the TSF disposal pond (EG&G, 1993b).

2.4 Radioactive Waste Management Complex

Radionuclides, inorganic chemicals, and organic compounds have been buried at the RWMC since 1952. Radioactive wastes buried at the RWMC include approximately 242,450 curies of plutonium-238, plutonium-239, plutonium-240, plutonium-241, and americium-241 (Bartholomay and others, 1995). In addition, about 88,400 gallons of carbon tetrachloride, lubricating oil, and other organic compounds including trichloroethene, trichloroethane, tetrachloroethene, toluene, and benzene are buried there (Bartholomay and others, 1995). Organic compounds, primarily carbon tetrachloride, have been detected in groundwater monitoring wells around the RWMC. Elevated levels of chromium and tritium have also been detected in wells around the RWMC. The tritium detected at the RWMC may be from upgradient releases at the TRA or the ICPP.

3. Groundwater Monitoring Program and Well Network

In 1949, at the request of the U.S. Atomic Energy Commission, the USGS began studying the Snake River Plain aquifer beneath the INEEL. Since that time the USGS has maintained a network of observation wells at the INEEL to collect hydrologic data and monitor the concentrations of radionuclides, organic compounds, and inorganic chemicals in the aquifer. Groundwater monitoring at the INEEL has been conducted by other groups; however, no organization maintains a historical record of water quality data comparable to the USGS database.

3.1 USGS Monitoring Well Network

The installation of aquifer wells at the INEEL has been driven by site development and characterization needs. Production wells were installed to supply water for new facilities. Areas where contaminants were detected in the aquifer were the subject of more extensive investigations, prompting the installation of additional monitoring wells. Figures 8 through 12 depict the development of the USGS groundwater monitoring well network on the INEEL. The list of wells monitored by the USGS has been modified over the years as a result of the installation of new wells and changing data needs, therefore not all of these wells have been sampled on a routine basis. Numerous wells at the INEEL have been installed by other organizations, primarily to support Superfund characterization efforts.

From about 1950 to 1960, monitoring wells were installed at numerous locations across the INEEL to support initial aquifer characterization (Figure 8). From 1960 to 1970, most new wells were installed near the TRA and ICPP to provide geochemistry data for evaluating the occurrence and transport of contaminants near these facilities (Figure 9). From 1970 to 1980, several wells were installed near the RWMC, the NRF, and south of the INEEL (Figure 10). During the 1980s several wells were installed downgradient (south) of the ICPP and along the southern border of the site (Figure 11). Only a few wells have been installed since 1990 (Figure 12).

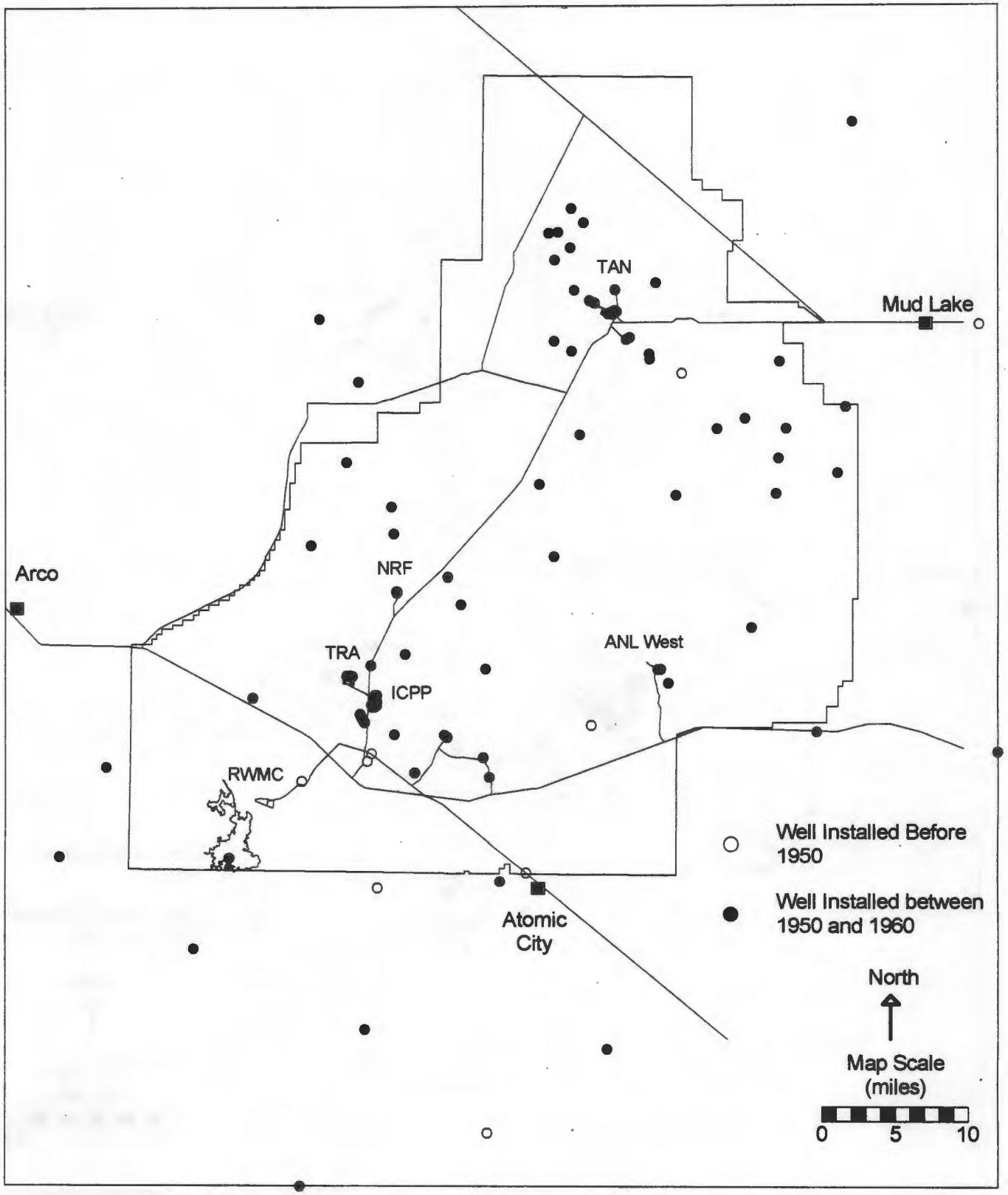

Figure 8. Wells Installed at the INEEL: 1950 to 1960.

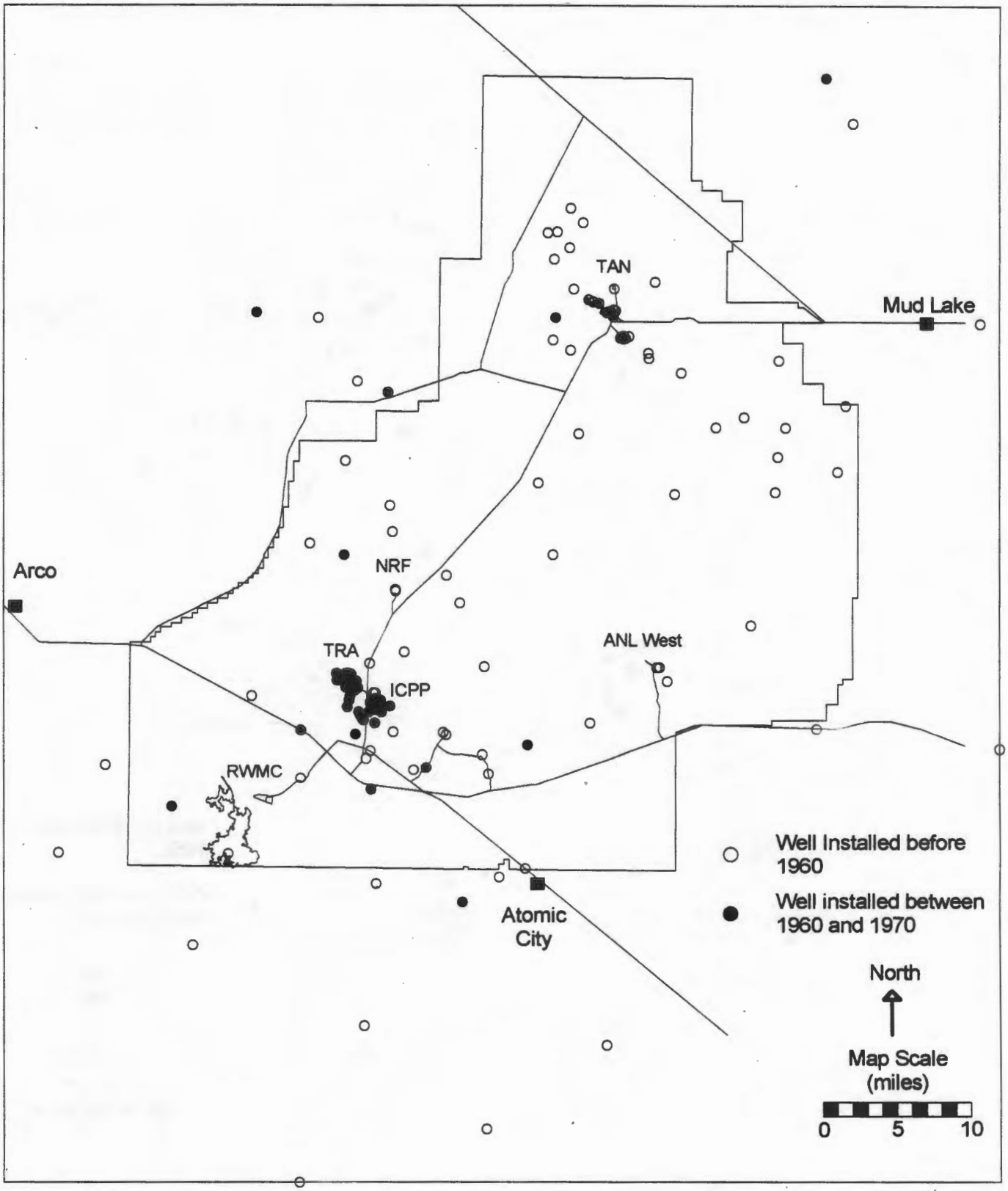

Figure 9. Wells Installed at the INEEL: 1960 to 1970.

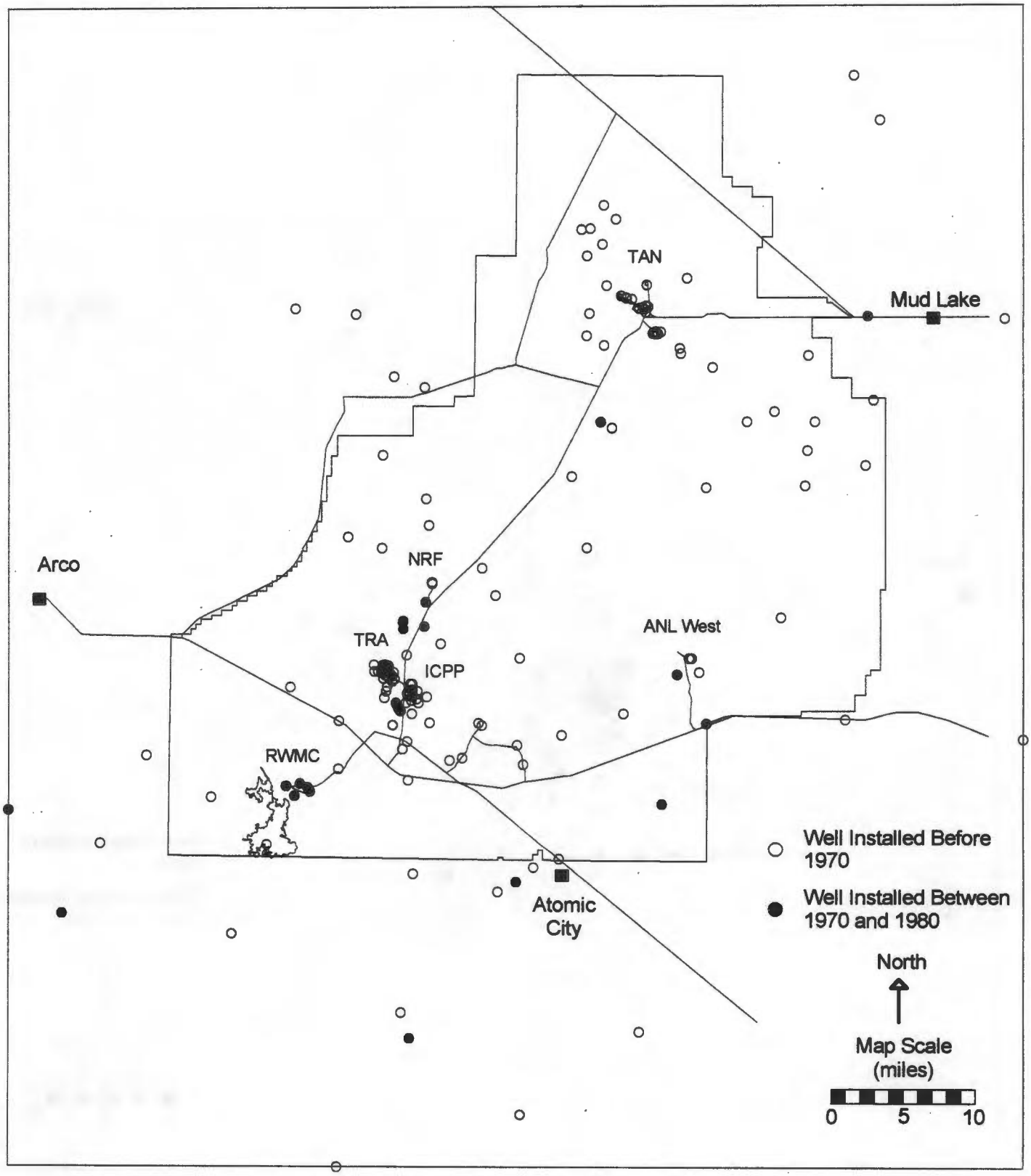

Figure 10. Wells Installed at the INEEL: 1970 to 1980.

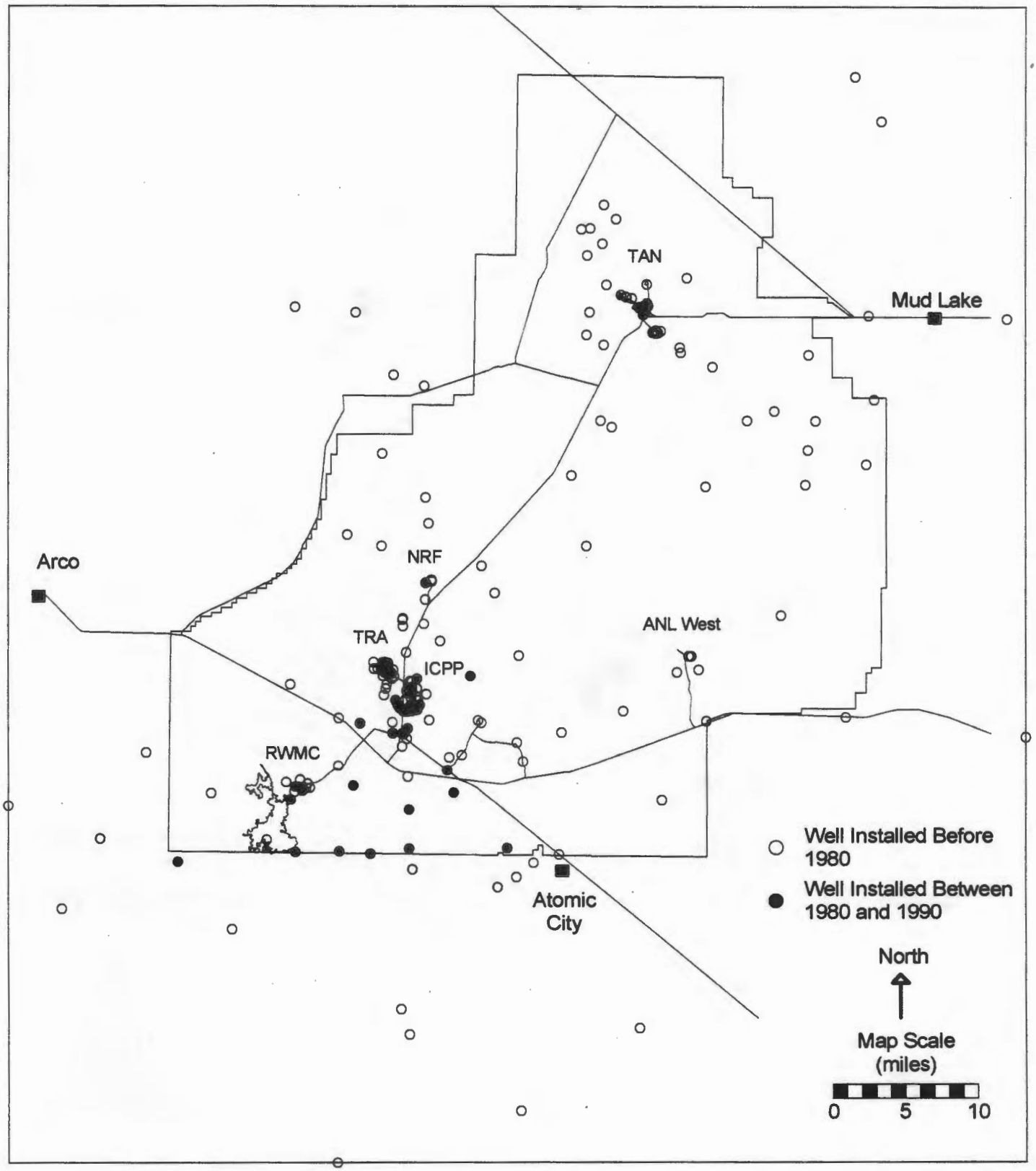

Figure 11. Wells Installed at the INEEL: 1980 to 1990.

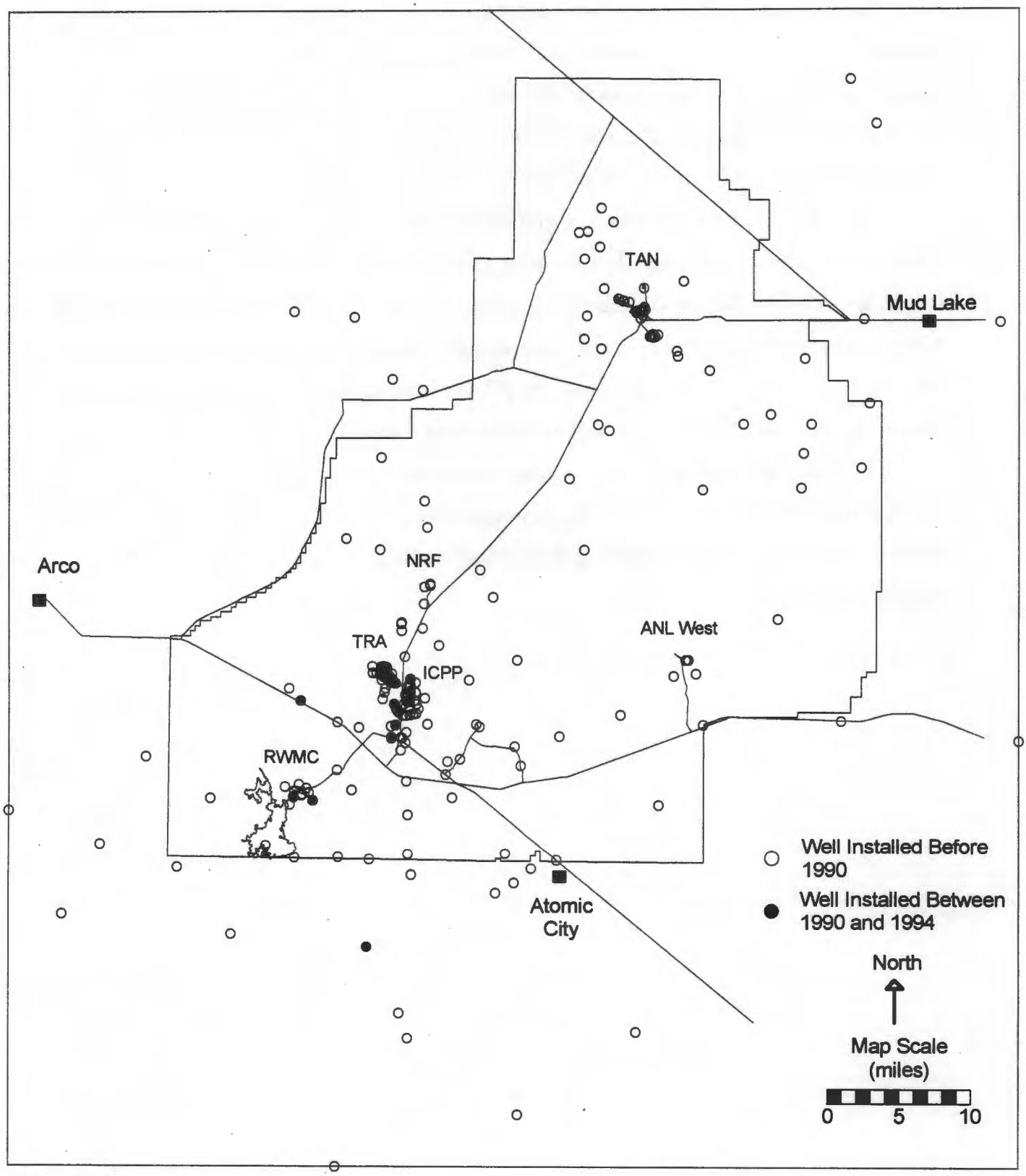

Figure 12. Wells Installed at the INEEL: 1990 to 1994.

3.2 Sample Collection and Analysis

Almost all the samples from the monitoring wells were collected with a thief sampler until the mid-1970s, at which time the USGS began installing dedicated submersible pumps in the wells. Most of the dedicated submersible pumps were installed during the mid- to late-1980s and into the 1990s. Water samples from facility production wells sampled by the USGS have typically been collected using the pump installed in the production well.

The type, frequency, and depth of groundwater sampling generally depend on the information requirements at specific areas on or adjacent to the INEEL. The list of analytes for a particular sample depends on the goals of the monitoring program, but typically includes selected radionuclides, inorganic chemicals, and more recently, organic compounds. Samples are also analyzed in the field for specific conductance, pH, and temperature. The current sampling and analysis plan for the USGS at the INEEL is summarized in Mann (1996).

Analyses for radionuclides and inorganic chemicals have typically been conducted for the USGS at the DOE's Radiological and Environmental Sciences Laboratory (RESL) at the INEEL. Chemical analyses were also performed at the USGS National Water Quality Laboratory in Arvada, Colorado.

4. Water Quality Trends at the INEEL

This report presents selected water quality data from samples collected at 66 wells near the major facilities at the INEEL and the southern (down-gradient) boundary of the site (Figure 13). These wells are identified on Figures 14 through 19. The wells are listed by facility in Table 1, which includes the installation date, the date of pump installation (i.e. change from thief sampling of monitoring wells to sampling with a dedicated pump), the well depth, and its current use. Additional information on each of these wells is available in Sehlke and others (1992).

Water quality data from 1960 to 1995 are presented as a series of graphs of time versus concentration for tritium, strontium-90, chromium, sodium, chloride, nitrate, sulfate, and specific conductance. Specific conductance is a general indicator of water quality, and the other analytes are useful for identifying groundwater contamination because they were common constituents in the liquid effluent disposed of at the INEEL. For the radioisotope data, the reported concentration and the analytical error at a level of three standard deviations (3s) are displayed. Following USGS reporting methods, when the concentration equals or exceeds 3s there is about a 95 percent or greater probability that the radioisotope is present in the sample (see Bartholomay and others, 1995 for a more complete discussion). In this document, 3s is referred to as the reporting level or detection limit.

Before 1976, the analytical error for the radioisotope analyses was not always reported. Instead, the analyst only noted the measured concentration, or that the concentration was less than some value (i.e. detection limit). On the graphs, if the analyte was not detected in the sample, it is shown as an open symbol at the detection limit, or reporting level. For the non-radioactive inorganic chemicals, such as chromium, samples with a reported concentration of 'non-detect' are represented on the graphs with an open symbol at the detection limit.

Because of considerable public interest, the analytical results for plutonium-238, plutonium-239/240 (undifferentiated), cesium-137, and americium-241 are also included; however, these data are presented in a tabular format because of the low incidence of detections. In the summary tables, if, in a given year, more than one sample had a concentration less than the

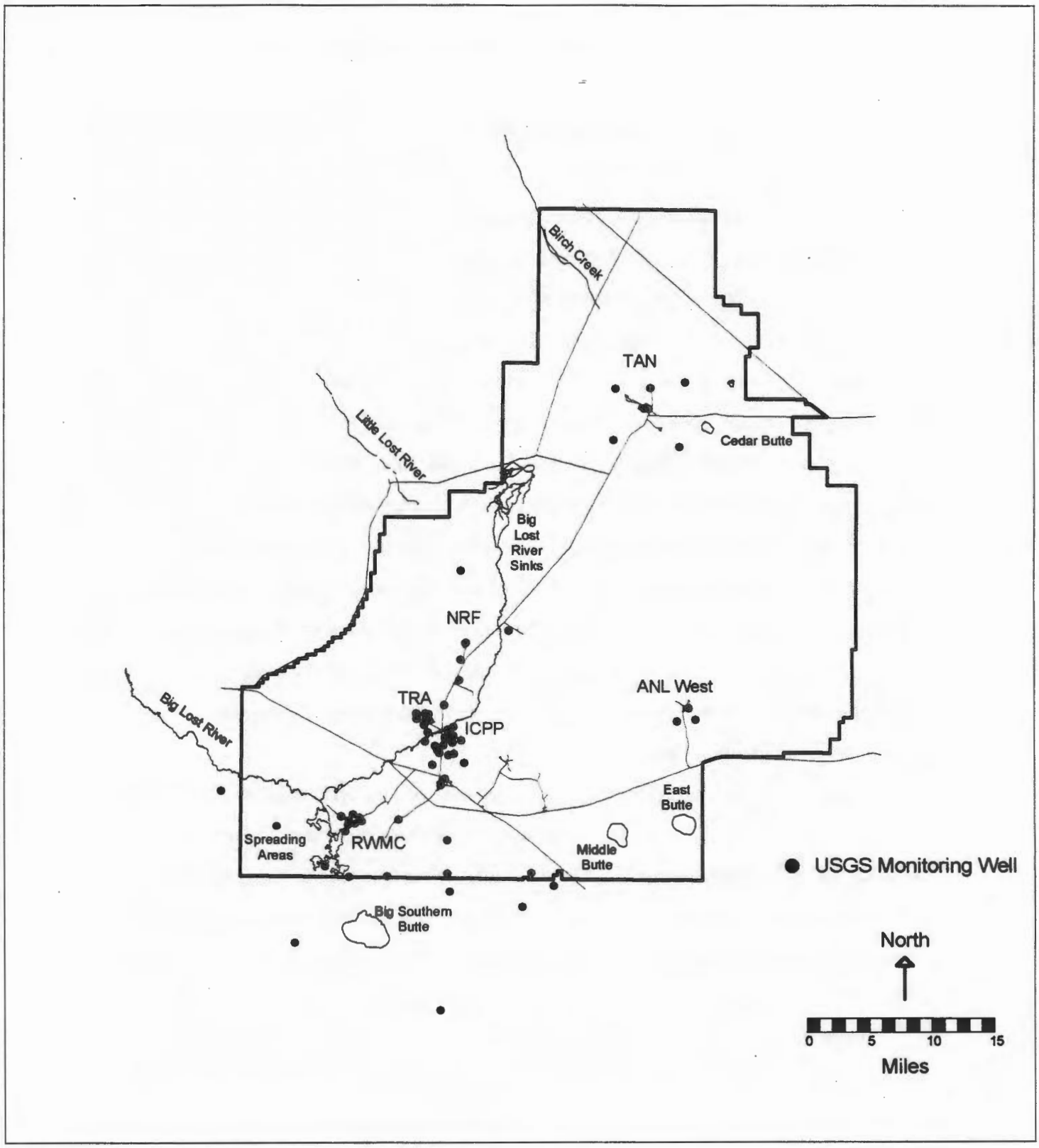

Figure 13. Wells Selected to Represent Water Quality Trends At the INEEL.

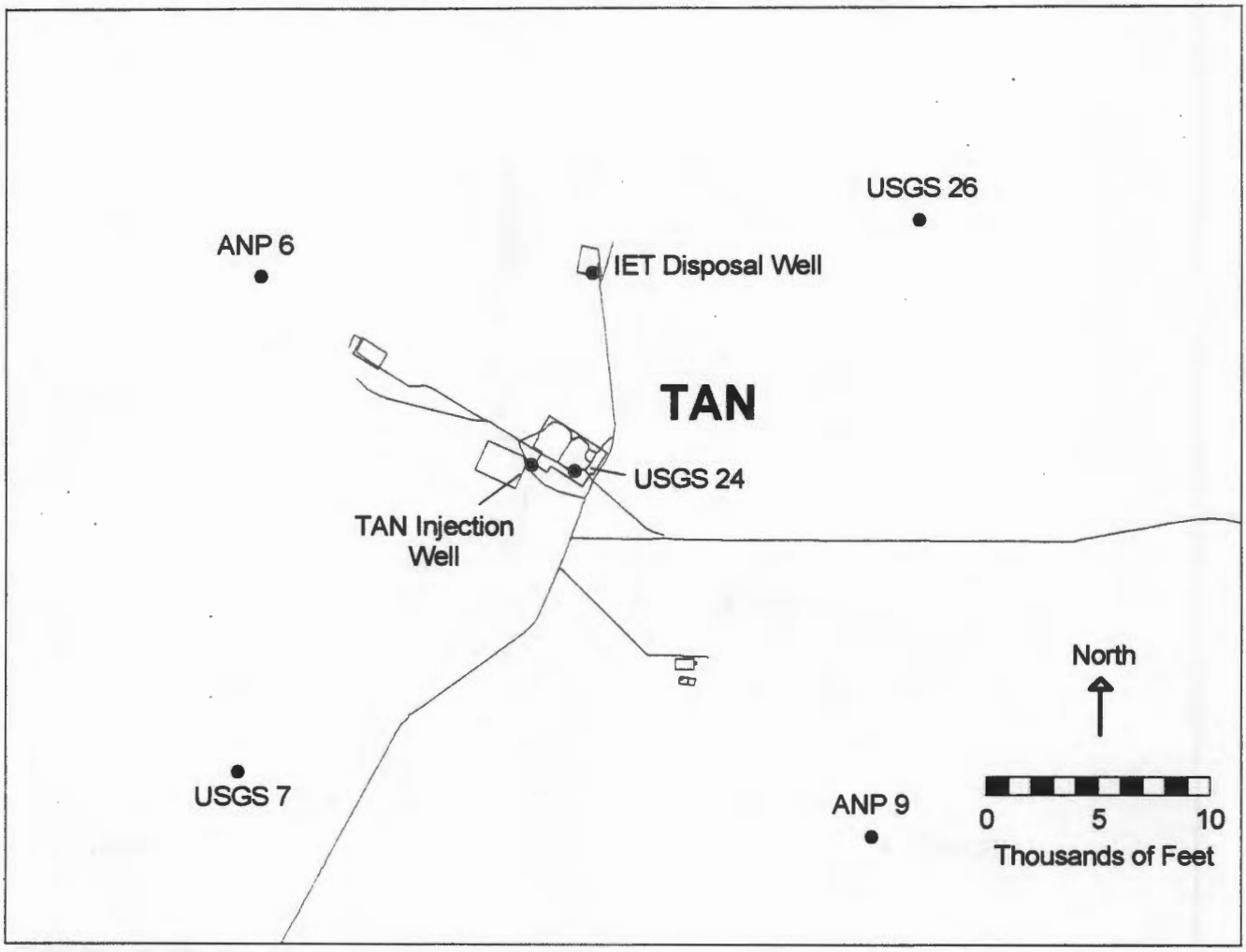

Figure 14. Selected Wells at the Test Area North.

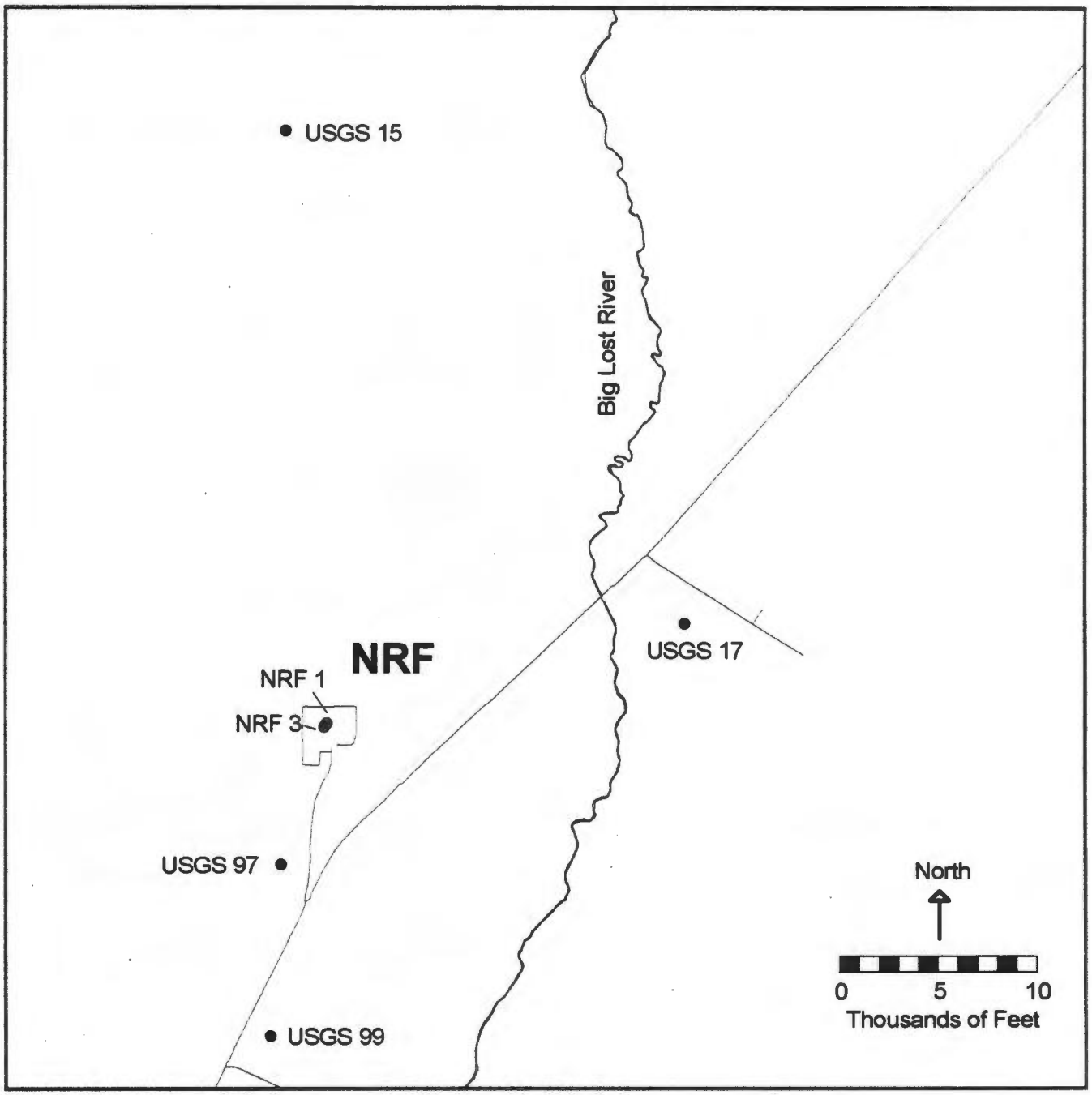

Figure 15. Selected Wells at the Naval Reactors Facility.

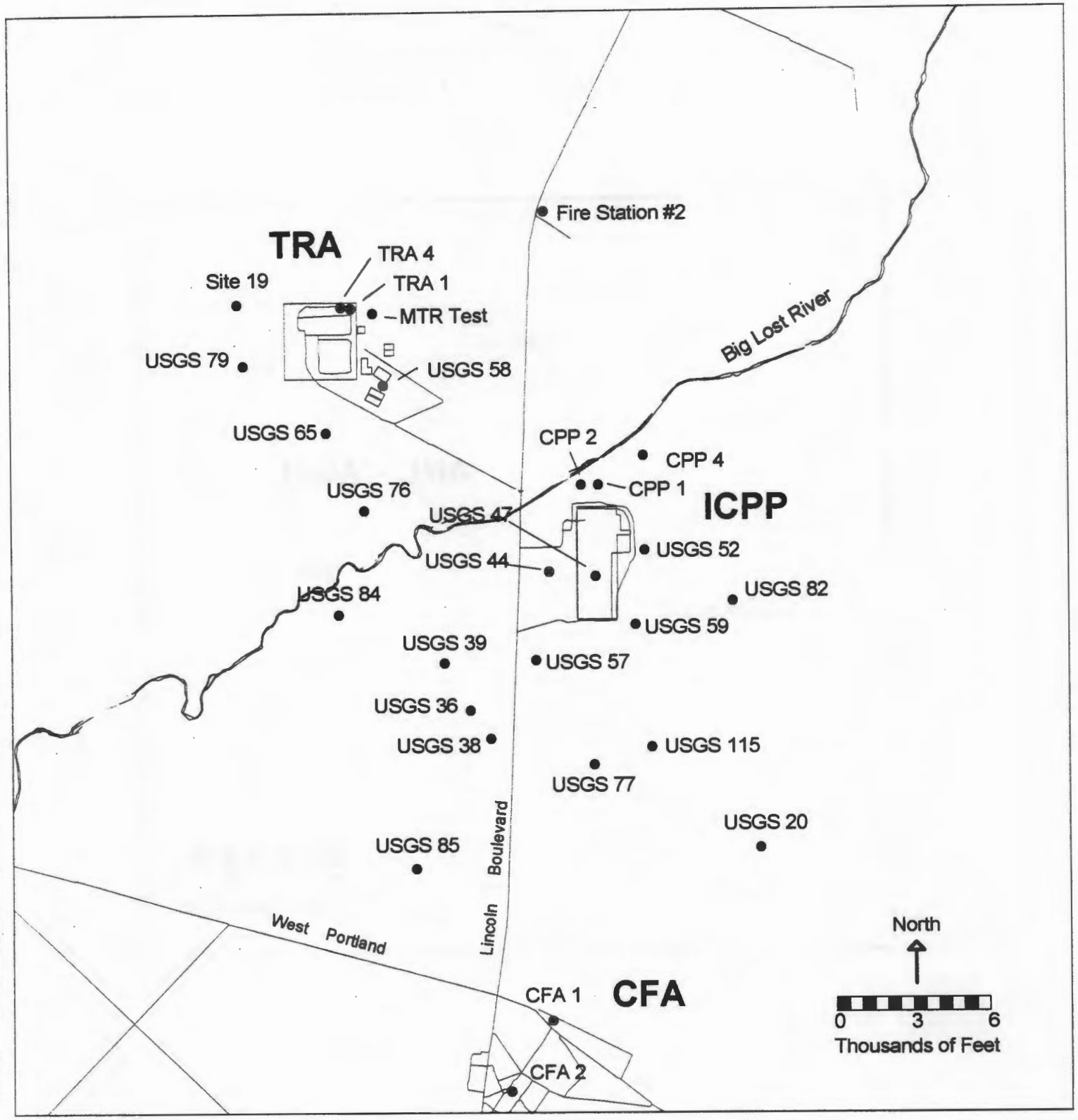

Figure 16. Selected Wells at the Test Reactor Area, Idaho Chemical Processing Plant, and Central Facilities Area.

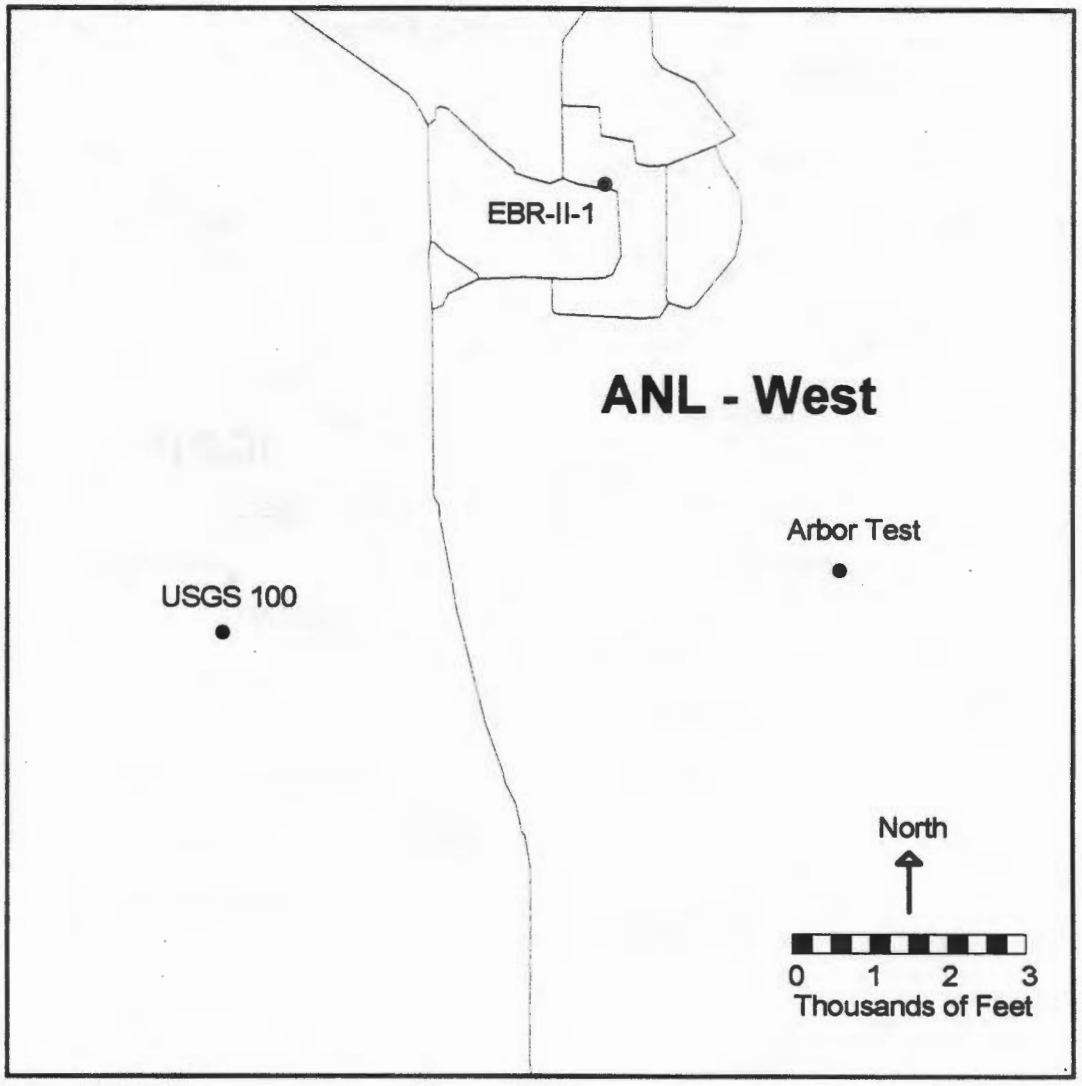

Figure 17. Selected Wells at the Argonne National Laboratory - West.

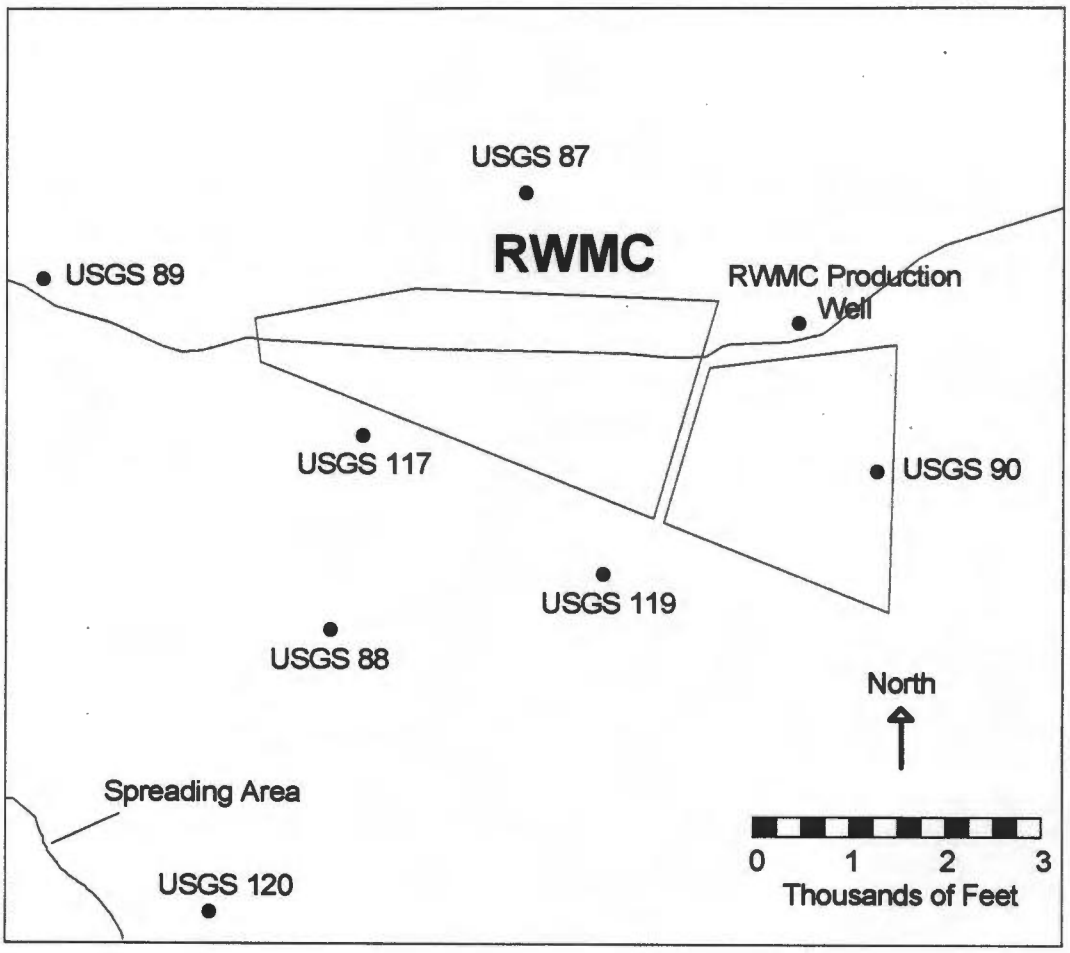

Figure 18. Selected Wells at the Radioactive Waste Management Complex.

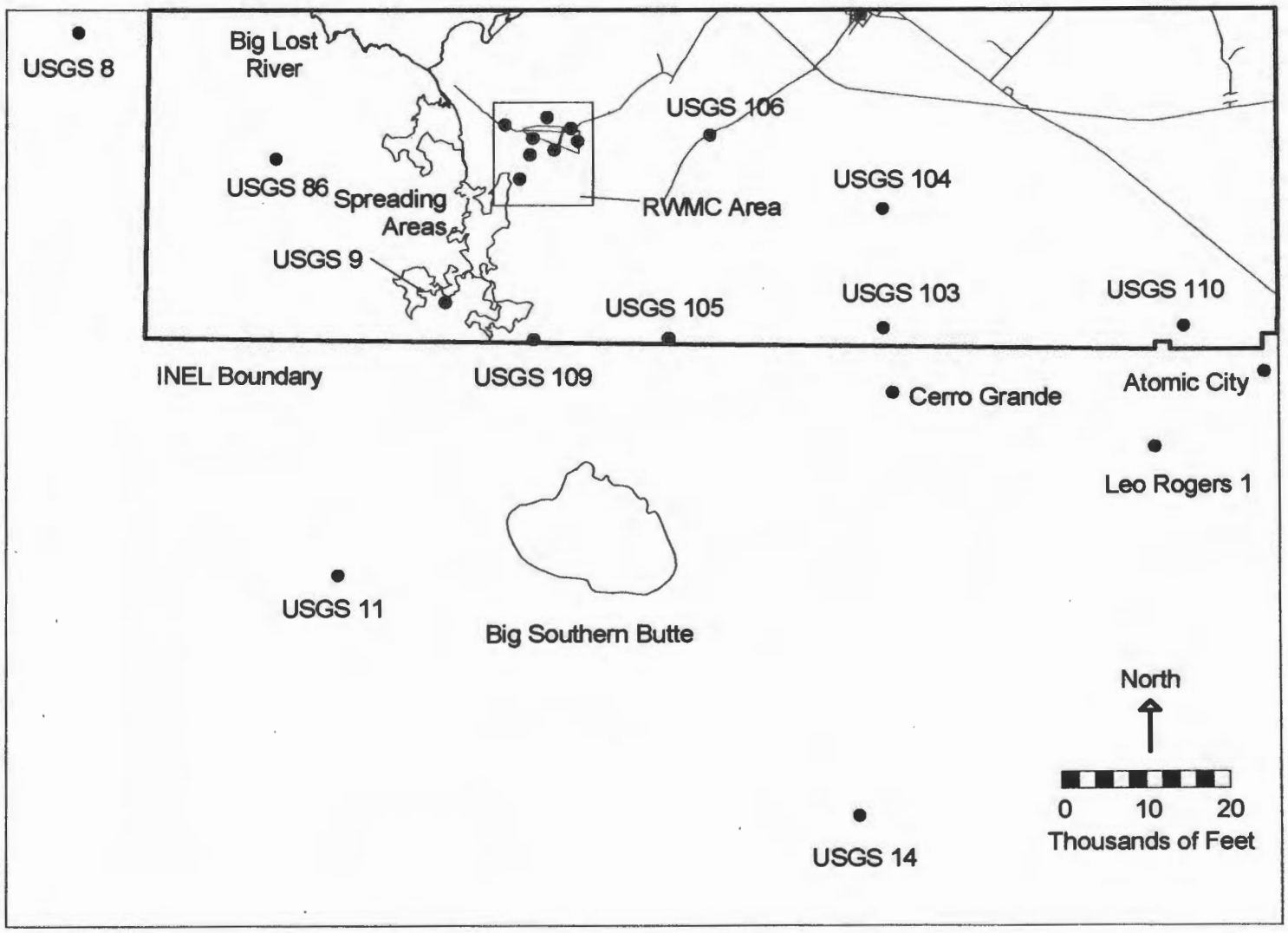

Figure 19. Selected Wells at the INEEL Southern Boundary Area.

reporting level (concentration less than 3s), the number of samples below the reporting level are shown with a superscript. If the radionuclide exceeded the reporting level in a given year, the maximum concentration for that year is reported in the table: if the radionuclide exceeded the reporting level in more than one sample, the superscript denotes the number of samples in which the radionuclide was detected. A table of the analytical results for these radionuclides is included in the attachments.

Table 1. Selected Wells and Well Construction Information.

Local Name (alias)	USGS Well Identifier	Well / Pump Installation Date	Well Depth (ft bls)	Current Well Use
TAN Area				
ANP 3 TAN Disposal	435053112423201	1953 / 1986 to 1989	310	observation
ANP 4 (IET Disposal Well)	435135112420501	1953 / 1986	324	observation
ANP 6	435152112443101	1956 / 1986	305	observation
ANP 9	434856112400001	1956 / NF	322	observation
USGS 7	434915112443901	1950 / 1990	1200	observation
USGS 24	435053112420801	1952 / NF	326	observation
USGS 26	435212112394001	1952 / 1990	266	observation
NRF Area				
NRF 1	433859112545401	1950 / 1950	535	production
NRF 3	433858112545501	1956 / NF	546	production
USGS 15	434234112551701	1951 / 1990	1497	observation
USGS 17	433937112515401	1951 / 1989	498	observation
USGS 97	433807112551501	1973 / 1986	510	observation
USGS 99	433705112552101	1974 / 1986	450	observation

Local Name (alias)	USGS Well Identifier	Well / Pump Installation Date	Well Depth (ft bls)	Current Well Use
TRA/ICPP/CFA Area				
CFA 1	433204112562001	1943 / 1948	639	production
CFA 2	433144112563501	1944 / 1949	681	production
CPP 1	433433112560201	1950 / NF	586	production
CPP 2	443433112560901	1951 / NF	605	production
CPP 4	433440112554401	1983 / NF	700	production
Fire Station 2	433548112562301	1957 / 1957	516	production
MTR Test	433520112572601	1949 / 1986	588	observation
TRA 1	433521112573801	1950 / NF	600	production
TRA 4	433521112574201	1963 / 1963	965	production
Site 19	433522112582101	1960 / 1986	865	observation
USGS 20	433253112545901	1951 / 1990	676	observation
USGS 36	433330112565201	1955 / 1990	567	observation
USGS 38	433322112564301	1955 / 1990	724	observation
USGS 39	433343112570001	1955 / 1990	572	observation
USGS 44	433409112562101	1957 / 1990	650	observation
USGS 47	433407112560301	1958 / 1975 to 1983 and 1986	651	observation
USGS 52	433414112554201	1959 / 1990	650	observation
USGS 57	433344112562601	1960 / 1987	732	observation
USGS 58	433500112572501	1960 / 1986	503	observation
USGS 59	433354112554701	1960 / 1987	657	observation
USGS 65	433447112574501	1960 / 1977	498	observation
USGS 76	433425112573201	1962 / 1986	718	observation
USGS 77	433315112560301	1962 / 1990	610	observation
USGS 79	433505112581901	1962 / 1990	702	observation
USGS 82	433400112551001	1962 / 1987	700	observation
USGS 84	433356112574201	1962 / 1992	505	observation

Local Name (alias)	USGS Well Identifier	Well / Pump Installation Date	Well Depth (ft bls)	Current Well Use
USGS 85	433246112571201	1962 / 1990	637	observation
USGS 115	433320112554101	1984 / 1985	581	observation
ANL West Area				
Arbor Test	433509112384801	1957 / 1988	570	observation
EBR II-1	433546112391601	1958 / 1959	745	production
USGS 100	433503112400701	1974 / 1986	750	observation
RWMC Area				
RWMC Production	433002113021701	1974 / NF	685	production
USGS 87	433013113024201	1971 / 1974	673	observation
USGS 88	432940113030201	1971 / 1974	663	observation
USGS 89	433005113032801	1972 / 1974	646	observation
USGS 90	432954113020501	1972 / 1974	626	observation
USGS 117	432955113025901	1987 / 1987	655	observation
USGS 119	432945113023401	1987 / 1987	705	observation
USGS 120	432919113031501	1987 / 1987	705	observation
INEEL Southern Boundary Area				
Atomic City	432638112484101	1952 / 1954	639	production
Cerro Grande	432618112555501	1922 / NF	563	production
Leo Rogers 1	432533112504901	1966 / 1970	720	production
USGS 8	433121113115801	1950 / 1990	812	observation
USGS 9	432740113044501	1951 / 1987	654	observation
USGS 11	432336113064201	1950 / 1989	704	observation
USGS 14	432019112563201	1951 / 1987	752	observation
USGS 86	432935113080001	1966 / 1987	691	observation
USGS 103	432714112560701	1980 / 1983	760	observation
USGS 104	432856112560801	1980 / 1986	700	observation
USGS 105	432703113001801	1980 / 1983	800	observation

Local Name (alias)	USGS Well Identifier	Well / Pump Installation Date	Well Depth (ft bls)	Current Well Use
USGS 106	432959112593101	1980 / 1986	760	observation
USGS 109	432701113025601	1980 / 1987	800	observation
USGS 110 (inoperable since 1992)	432717112501501	1980 / 1983	780	observation
USGS 110A (replaced 110)	432717112501502	1995/1995	644	observation

Note: NF means not found.

In the mid-1980s, the discovery of organic chemicals in groundwater at the Radioactive Waste Management Complex and Test Area North prompted significant interest in these contaminants. Due to the relatively short period of record of analyses for these compounds, they are not included in this report.

4.1 Tritium

Tritium is a radioisotope of hydrogen, and is a beta-emitter with a half-life of 12.3 years. It occurs naturally as a result of the interaction of cosmic rays and atmospheric gases, and has also been produced by nuclear weapons testing and as a waste product of the nuclear-power industry. As an isotope of hydrogen, tritium readily exchanges with stable hydrogen in water molecules and consequently is very mobile in groundwater. The background concentration of tritium in groundwater near the INEEL is 75 to 150 pCi/L (Orr and others, 1991). The current federal maximum contaminant level (MCL) for tritium in drinking water is 20,000 pCi/L (EPA, 1995).

Due to its mobility in groundwater, the large quantities disposed, and the long period of disposal, tritium is perhaps the most widely dispersed groundwater contaminant at the INEEL, particularly at the TRA and ICPP. It has been detected above background levels in groundwater samples collected at the TAN, TRA, ICPP, CFA, RWMC, and near the southern boundary of the INEEL. Tritium concentration versus time plots for the selected wells are in Attachment A. Because of the large range of concentrations observed in a given well, and the large difference

between the reported concentrations and reporting levels, the tritium concentrations were graphed on a logarithmic scale. If the reported concentration was less than 100, it was graphed as 100 pCi/L so the result could be plotted on a logarithmic scale. In all cases, 100 pCi/L was less than the reporting level (i.e. three times the analytical uncertainty or 3s), so these changes will not affect the interpretation of the analytical data.

4.1.1 TAN Area Wells

Tritium has been present above background concentrations in the groundwater near TAN since the 1960s (Attachment A, Figure A-1). Of the seven selected wells from TAN, only USGS 24 and ANP 3 contained concentrations of tritium above the reporting level in the most recent sample analyses. Seven samples collected from ANP 3 between 1986 and 1989 had tritium concentrations of 27,000 to 43,200 pCi/L, exceeding the MCL of 20,000 pCi/L. Concentrations of tritium in USGS 24 ranged from 37,700 pCi/L in 1977 to 10,100 pCi/L in February 1989. Wells ANP 9, USGS 7, and USGS 26 had sporadic detections of tritium in the early 1960s, but since then no detections have been reported in these wells. ANP 6 and the IET disposal well have not had concentrations of tritium above the reporting level during their sampling histories.

4.1.2 NRF Area Wells

Tritium did not exceed the reporting level in the selected USGS monitoring wells at NRF during the 1990s (Attachment A, Figure A-2). Tritium has not exceeded the reporting level in NRF 1 or NRF 3. Concentrations of 5,000 to 10,000 pCi/L were reported in USGS 15 and USGS 17 during the early to mid-1960s. Tritium was sporadically detected in USGS 97 and USGS 99.

4.1.3 TRA/ICPP/CFA Area Wells

The disposal of tritium at the TRA and ICPP has resulted in a large tritium plume in this area. This is also the area with the largest number of USGS monitoring wells and most intensive sampling by the USGS. Tritium has been detected above background concentrations in groundwater samples collected from all of the 28 selected wells and is currently above

background concentrations in 19 of the 28 selected wells in the TRA/ICPP/CFA area (Attachment A, Figure A-3). Tritium levels exceeded the MCL of 20,000 pCi/L in the most recent samples (October 1995) collected from USGS 65 and USGS 77.

Historical peak concentrations occurred immediately downgradient of the ICPP in USGS 47. A groundwater sample collected from USGS 47 in January 1962 contained 3,440,000 pCi/L of tritium. Concentrations in wells downgradient of the ICPP generally declined from a peak in the early 1960s until the late 1970s. From the late 1970s through mid-1980s, a second, smaller peak in tritium concentrations was observed in wells CPP 1, CPP 2, USGS 38, USGS 39, USGS 44, USGS 47, USGS 52, USGS 57, and USGS 59. During the second peak, the tritium concentration in USGS 47 reached 250,000 pCi/L in 1982. Concentrations have generally declined since the mid-1980s. The most recent groundwater sample from USGS 47 collected in October 1995 contained a concentration of 7,600 pCi/L.

Tritium concentrations in the immediate vicinity of TRA have not been as high as those near the ICPP. The highest tritium concentration in wells near the TRA occurred in USGS 58 and USGS 65. In the early 1960s the peak concentration in USGS 58 was 34,000 pCi/L, and concentrations reached 41,000 pCi/L in 1970. The most recent sample collected from USGS 58 in October 1995 contained 3,600 pCi/L tritium. The peak concentration, 215,000 pCi/L, in USGS 65 occurred in 1971. In late 1995 the concentration in USGS 65 was 21,200 pCi/L.

Peak concentrations in the CFA production wells, CFA 1 and CFA 2, occurred in the early 1970s. The peak in CFA 1 was 179,000 pCi/L in 1971. Concentrations have steadily declined in CFA 1 to 13,400 pCi/L in October 1995. The peak concentration in CFA 2 was 76,000 pCi/L in 1974. Tritium concentrations have also steadily declined in CFA 2 to 11,300 pCi/L in October 1995.

4.1.4 ANL-West Area Wells

None of the three wells selected from the ANL-West had tritium concentrations above the reporting level since the 1970s (Attachment A, Figure A-4). Tritium concentrations of 6,000 to 8,000 pCi/L were detected in the Arbor Test and EBR II-1 wells during the mid-1960s. Tritium has not exceeded the reporting level in these two wells since 1965. Tritium was detected in

USGS 100 in 1977 and 1978 at concentrations of 10,000 and 4,100 pCi/L, respectively, but has not exceeded the reporting level since.

4.1.5 RWMC Area Wells

Tritium concentrations at several of the selected wells on the north and east sides of the RWMC exceed background. None of these wells contain concentrations exceeding the MCL (Attachment A, Figure A-5). USGS 90 had a peak concentration of 26,000 pCi/L in a sample collected during 1974. The RWMC production well, USGS 87, and USGS 90 have each had concentrations of tritium exceeding background level since the mid-1970s; the concentrations in these wells has generally been between 1,000 and 2,000 pCi/L since 1975. Samples collected from USGS 89 in 1973 and 1977 had tritium concentrations of 10,000 pCi/L and 1,000 pCi/L, respectively. Tritium has not exceeded the reporting level in USGS 89 since 1977. Samples from wells USGS 117, USGS 119, and USGS 120 have not had concentrations of tritium above the reporting level.

4.1.6 INEEL Southern Boundary Wells

Since 1980, of the wells selected near the southern boundary of the INEEL, only USGS 104 and USGS 106 have consistently had concentrations of tritium above the reporting level (Attachment A, Figure A-6). Between 1980 and 1987, the concentration of tritium in USGS 104 varied from less than the reporting level to 2,600 pCi/L. Since 1987 the concentrations in USGS 104 have remained relatively constant, averaging approximately 1,500 pCi/L. Tritium concentrations in well USGS 106 have declined from a peak of 6,500 pCi/L in 1983 to about 1,700 pCi/L in 1995.

Several of the samples from the southern boundary wells installed in the 1960s had concentrations of tritium above the reporting level during the 1960s and early 1970s, including the Atomic City well, Cerro Grande, Leo Rogers 1, USGS 8, USGS 9, USGS 11, and USGS 14. Tritium concentrations ranged from 5,000 to 10,000 pCi/L.

During the 1980s, tritium exceeded the reporting level in wells USGS 11, USGS 103, and USGS 105. In 1980, a sample from USGS 11 contained 800 pCi/L. During 1983 and 1985

tritium concentrations of 800 pCi/L and 1,200 pCi/L were detected in USGS 103. In 1983, tritium concentrations in three samples from USGS 105 ranged from 1,200 to 3,400 pCi/L. Tritium was also detected in USGS 105 in samples collected during 1993 and 1995 at concentrations of 280 pCi/L and 250 pCi/L, respectively.

No samples collected from USGS 86, USGS 109, or USGS 110 contained concentrations of tritium above the reporting level.

4.2 Strontium-90

Strontium-90 (Sr-90) is a beta-emitter, and has a half-life of 29 years. With the exception of very rare natural reactors in uranium-enriched mineral deposits, Sr-90 is not a naturally-occurring radionuclide. It is present in the environment due to weapons testing and as a waste product of the nuclear industry. The background concentration of Sr-90 in the Snake River Plain aquifer is generally zero (Orr and others, 1991). The MCL for Sr-90 is 8 pCi/L (EPA, 1995).

Strontium-90 has been detected in groundwater samples collected at the ICPP, TRA, TAN, and RWMC, and it currently exceeds the MCL in some of the wells near the ICPP and TAN. Strontium-90 concentration versus time plots for selected wells are in Attachment B.

4.2.1 TAN Area Wells

Of the seven selected wells at TAN, concentrations of Sr-90 only exceeded the reporting level in samples from USGS 24 and ANP 3 (Attachment B, Figure B-1). Four samples collected from ANP 3 between 1987 and 1989 contained 680 to 1,930 pCi/L of Sr-90, which is above the MCL. Two of the four samples collected from USGS 24 contained a detectable concentration of Sr-90.

4.2.2 NRF Area Wells

Sr-90 has not exceeded the reporting level in the water samples collected by the USGS from wells near the NRF (Attachment B, Figure B-2).

4.2.3 TRA/ICPP/CFA Area Wells

The disposal of liquid waste via the ICPP injection well has resulted in a Sr-90 plume at the ICPP. Strontium-90 has exceeded the reporting level in groundwater samples collected from 16 of the 28 selected wells; in 1995, concentrations exceeded the MCL in 6 of the 28 selected wells in the TRA/ICPP/CFA area (Attachment B, Figure B-3). These wells, USGS 36, USGS 38, USGS 47, USGS 52, USGS 57, and USGS 59, are all within the facility boundaries of the ICPP or immediately downgradient of the ICPP.

The peak concentration at the ICPP occurred at USGS 44; a water sample collected from this well in 1981 contained 210 pCi/L Sr-90. Concentrations in wells at or immediately downgradient of the ICPP generally peaked in the early 1980s and have since declined, generally to less than 50 pCi/L. These include wells USGS 44, USGS 52 , USGS 57, and USGS 59. Further downgradient of the ICPP, in wells USGS 36 and USGS 38, Sr-90 concentrations have fluctuated from 10 to 40 pCi/L since samples were first analyzed for Sr-90 in the early 1970s. The highest concentration detected in 1995, 76 pCi/L, was at USGS 47.

In the vicinity of the TRA, Sr-90 has exceeded the reporting level once in samples from well USGS 58 and twice in USGS 65. No other samples collected from these two wells contained concentrations of Sr-90 above the reporting level.

In 1979, Sr-90 was detected in well CFA 1 at the MCL of 8 pCi/L. Since then, no samples have contained concentrations of Sr-90 above the reporting level. Sr-90 has not been detected in CFA 2.

4.2.4 ANL-West Area Wells

Limited sampling for Sr-90 has been conducted in the selected wells at ANL-West. Three samples were collected at wells Arbor Test and EBR-II-1 (Attachment B, Figure B-4). None of the samples contained concentrations of Sr-90 above the reporting level. No Sr-90 analyses were available for USGS 100.

4.2.5 RWMC Area Wells

Infrequent detections of Sr-90 have occurred in the selected wells at the RWMC, predominantly in the early 1970s (Attachment B, Figure B-5). The most recent detection of Sr-90 at the RWMC, 7 pCi/L, occurred in 1988 at USGS 120.

4.2.6 INEEL Southern Boundary Wells

Strontium-90 has not exceeded the reporting level in the water samples collected by the USGS from wells near the southern boundary of the INEEL (Attachment B, Figure B-6).

4.3 Plutonium-238

Plutonium-238 (Pu-238) is an alpha-particle emitter, and has a half-life of 87.75 years. Some plutonium may be naturally produced through neutron capture by uranium isotopes, but the main source in the environment is as a waste product of the nuclear industry. The background concentration of Pu-238 in the Snake River Plain aquifer is zero (Orr and others, 1991). The MCL for gross-alpha activity is 15 pCi/L (EPA, 1995).

Plutonium-238 has exceeded the reporting level in groundwater samples collected at the INEEL, most notably at TAN, ICPP, and the RMWC; however, it is not widely distributed and the detections have been relatively infrequent. Attachment C contains a summary table of Pu-238 results for samples collected at the INEEL.

4.3.1 TAN Area Wells

Of the selected wells at TAN, Pu-238 has only exceeded the reporting level in samples collected from ANP 3 (Attachment C, Table C-1). Concentrations were 1.22, 0.18 and 0.26 pCi/L during 1987, 1988, and 1989, respectively.

4.3.2 NRF Area Wells

Concentrations of Pu-238 did not exceed the reporting level in samples collected by the USGS from wells near the NRF (Attachment C, Table C-1).

4.3.3 TRA/ICPP/CFA Area Wells

Of the selected wells near the ICPP, Pu-238 only exceeded the reporting level in one well, USGS 47 (Attachment C, Table C-1). The concentration of Pu-238 was above the reporting level in five of the eight samples collected from USGS 47 between 1974 and 1983; the maximum concentration of 0.5 pCi/L was in a sample collected in 1983. In subsequent sampling, Pu-238 has not exceeded the reporting level in USGS 47.

At the CFA, Pu-238 exceeded the reporting level in one sample from well CFA 1. This sample, collected in 1987, had a concentration of 0.11 pCi/L. None of the three samples collected from this well in 1988 contained detectable concentrations of Pu-238.

Pu-238 has not exceeded the reporting level in USGS groundwater sampling in the immediate vicinity of TRA.

4.3.4 ANL-West Area Wells

Pu-238 concentrations have not exceeded the reporting level in USGS groundwater sampling in the vicinity of ANL-West (Attachment C, Table C-1).

4.3.5 RWMC Area Wells

Pu-238 has exceeded the reporting level in several wells (USGS 87, USGS 88, USGS 89, USGS 90) near the RWMC: most detections occurred during the early 1970s (Attachment C, Table C-1). The maximum concentration was 9 pCi/L in USGS 90 in 1972. The peak concentrations in USGS 87, USGS 88, and USGS 89 were 0.08 pCi/L, 0.81 pCi/L, and 0.04 pCi/L, respectively. Concentrations of Pu-238 above the reporting level have not occurred at the monitoring wells near the RWMC since 1983.

4.3.6 INEEL Southern Boundary Wells

Pu-238 concentrations have not exceeded the reporting level in groundwater samples collected by the USGS from wells near the southern boundary of the INEEL (Attachment C, Table C-1).

4.4 Plutonium-239/240 (Undifferentiated)

Plutonium-239 and plutonium-240 are alpha-emitters with half-lives of 24,131 and 6,569 years, respectively. Because it is not possible to differentiate between plutonium-239 and plutonium-240 with standard analyses, the concentrations of these isotopes are reported as a sum. Plutonium-239/240 has the same source, background concentrations, and drinking water standard as plutonium-238.

Concentrations of plutonium-239/240 above the reporting level have occurred in groundwater samples collected at TAN, ICPP, and the RWMC. The detections have been relatively infrequent. Attachment D contains a summary table of the plutonium-239/240 data.

4.4.1 TAN Area Wells

Of the wells selected near TAN, Pu-239/240 has only exceeded the reporting level in ANP 3 (Attachment D, Table D-1). Concentrations were 5.0 pCi/L, 0.95 pCi/L, and 0.71 pCi/L during 1987, 1988, and 1989, respectively.

4.4.2 NRF Area Wells

Concentrations of Pu-239/240 have not exceeded the reporting level in groundwater samples collected by the USGS from wells near the NRF (Attachment D, Table D-1).

4.4.3 TRA/ICPP/CFA Area Wells

Pu-239/240 has exceeded the reporting level in monitoring well USGS 47 near the ICPP (Attachment D, Table D-1). Sampling of USGS 47 in 1974 and 1975 resulted in two detections of Pu-239/240 with a maximum concentration of 0.03 pCi/L occurring in 1974. In this well, Pu-239/240 concentrations have not been above the reporting level since 1975.

Pu-239/240 has not exceeded the reporting level in USGS groundwater sampling in the vicinity or either TRA or the CFA.

4.4.4 ANL-West Area Wells

Pu-239/240 concentrations have not exceeded the reporting level in groundwater samples collected by the USGS in the vicinity of ANL-West (Attachment D, Table D-1).

4.4.5 RWMC Area Wells

Concentrations of Pu-239/240 have exceeded the reporting level in samples collected from wells USGS 87, USGS 88, USGS 89, and USGS 90 (Attachment D, Table D-1). Pu-239/240 was detected in the same four wells as Pu-238. The maximum concentration detected was 0.29 pCi/L in a sample collected from USGS 89 in 1973. Pu-239/240 has not been detected in USGS sampling of groundwater monitoring wells at the RWMC since 1976.

4.4.6 INEEL Southern Boundary Wells

Pu-239/240 has not exceeded the reporting level in groundwater samples collected by the USGS from wells near the southern boundary of the INEEL (Attachment D, Table D-1).

4.5 Americium-241

Americium-241 (Am-241) is a alpha-emitter with a half-life of 432 years. The primary source of Am-241 is the manufacturing of atomic weapons and the nuclear industry. The background concentration of Am-241 in the Snake River Plain aquifer is zero (Orr and others, 1991). The MCL for gross-alpha activity is 15 pCi/L (EPA, 1995).

Concentrations of Am-241 have been above the reporting level in groundwater samples collected at the TAN, ICPP, and RWMC. Detections have been infrequent and it is not widely distributed. Attachment E contains a summary table of the Am-241 detections at the INEEL, including all wells in which it has been detected by the USGS.

4.5.1 TAN Area Wells

Am-241 exceeded the reporting level in ANP 3 in 1987 and 1988; the maximum concentration was 0.21 pCi/L (Attachment E, Table E-1). In 1990, an Am-241 concentration of 0.91 pCi/L was reported for a sample from USGS 24.

4.5.2 NRF Area Wells

Am-241 has not exceeded the reporting level in groundwater samples collected by the USGS near the NRF (Attachment E, Table E-1).

4.5.3 TRA/ICPP/CFA Area Wells

Am-241 has not exceeded the reporting level in groundwater samples collected by the USGS at the TRA/ICPP/CFA area (Attachment E, Table E-1).

4.5.4 ANL-West Area Wells

Am-241 concentrations have not exceeded the reporting level in groundwater samples collected by the USGS in the vicinity of ANL-West (Attachment E, Table E-1).

4.5.5 RWMC Area Wells

Am-241 was detected in the same four wells as plutonium: USGS 87, USGS 88, USGS 89, and USGS 90 (Attachment E, Table E-1). The maximum concentration was 5.0 pCi/L in a sample collected from USGS 89 in 1972. It has not been above the reporting level in the samples collected from this well since 1974. The most recent detection of Am-241 near the RWMC was a sample with a concentration of 0.06 pCi/L collected from well USGS 120 in 1993.

4.5.6 INEEL Southern Boundary Wells

Am-241 has not been above the reporting level in groundwater samples collected by the USGS near the southern boundary of the INEEL (Attachment E, Table E-1).

4.6 Cesium-137

Cesium-137 (Cs-137) is a beta-emitter with a half-life of 30 years. Cs-137 is not a naturally-occurring isotope, but is present in the environment due to weapons testing and the nuclear industry. The background concentration of Cs-137 in the Snake River Plain aquifer near the INEEL is zero (Orr and others, 1991). A dose of four millirem per year is the MCL for beta emitters: this is equivalent to a Cs-137 concentration of 200 pCi/L (EPA, 1976).

Cs-137 concentrations above the reporting level have occurred in groundwater samples collected at the TAN, ICPP, TRA, and RWMC. Detections have been infrequent and it is not widely distributed. Attachment F contains a summary of the Cs-137 detections at the INEEL, and includes all wells in which it has been detected under the USGS sampling program.

4.6.1 TAN Area Wells

Cs-137 concentrations were above the reporting level in all the groundwater samples collected from ANP 3 between 1986 and 1989 (Attachment F, Table F-1). The maximum concentration was 7,500 pCi/L in 1987. The most recent sample from ANP 3, collected in December 1989, had a concentration of 4,370 pCi/L. Cs-137 has not been detected by the USGS in the other selected monitoring wells at the TAN.

4.6.2 NRF Area Wells

Cs-137 has not exceeded the reporting level in groundwater samples collected by the USGS near the NRF (Attachment F, Table F-1).

4.6.3 TRA/ICPP/CFA Area Wells

Between 1984 and 1986, Cs-137 exceeded the reporting level in samples from two of the selected wells near the ICPP, CPP 1 and USGS 47 (Attachment F, Table F-1). The peak concentration, 200 pCi/L, was observed in USGS 47 in 1984.

Of the selected wells near the TRA, a Cs-137 concentration of 58 pCi/L was reported for a sample collected from USGS 76 in 1982. Cs-137 has not exceeded the reporting level in any samples collected from this well since 1982.

Cs-137 concentrations have not exceeded the reporting level in samples from the selected well at the CFA.

4.6.4 ANL-West Area Wells

In a sample collected from well Arbor Test in 1994, the Cs-137 concentration was at the reporting level of 60 pCi/L (Attachment F, Table F-1). Cs-137 was below the reporting level in the other samples collected near ANL-West.

4.6.5 RWMC Area Wells

Near the RWMC, Cs-137 concentrations exceeded the reporting level in some samples from USGS 87, USGS 88, USGS 89, and USGS 90; the same four wells at which plutonium and Am-241 were detected (Attachment F, Table F-1). The maximum concentration, 90 pCi/L, was reported in four samples collected from wells USGS 87, USGS 89, and USGS 90. The most recent detection was in 1989 at USGS 90.

4.6.6 INEEL Southern Boundary Wells

Cs-137 has exceeded the reporting level once in USGS monitoring of the INEEL southern boundary wells. A sample collected from USGS 11 in 1986 had a Cs-137 concentration of 140 pCi/L (Attachment F, Table F-1).

4.7 Dissolved Chromium

Chromium occurs naturally in the minerals which make up the basalt of the Eastern Snake River Plain. The background concentration of dissolved chromium in groundwater near the INEEL generally ranges from 2 to 3 μg/L (Orr and others, 1991). Significant quantities of chromium have been introduced into the aquifer at the INEEL through the use and disposal of chromate, a corrosion inhibitor used in cooling water. This practice ceased in 1972 (Bartholomay and others, 1995). The MCL for total chromium is 100 μg/L.

Elevated chromium concentrations have historically been detected in the groundwater beneath TAN, TRA, ICPP, and the RWMC. Currently, the drinking water standard for total chromium is only exceeded near the TRA. Graphs of dissolved chromium concentrations versus time are in Attachment G. On the graphs, MDL refers to Method Detection Limit.

This report includes only the dissolved chromium entries in the database. It should be

noted that prior to October 1989, the USGS reported at least some dissolved chromium analyses as total chromium (Bartholomay and others, 1995). These results should actually have been reported as dissolved chromium, and the database apparently has not been updated to rectify this error. Consequently, there are additional dissolved chromium analyses other than those discussed in this report, and the inclusion of this data may provide a different perspective of chromium contamination than that presented in this section[1]. Also of note, between 1986 and 1988, dissolved chromium analyses often had a relatively high detection limit of 50 μg/L.

4.7.1 TAN Area Wells

In samples from six of the seven selected wells at TAN, dissolved chromium has been detected above the background concentration of 2-3 μg/L estimated by Orr and others (1991) (Attachment G, Figure G-1). The highest concentration, 22 μg/L, was detected in a sample collected from ANP 3 in 1986.

4.7.2 NRF Area Wells

The maximum dissolved chromium concentration in the samples collected at the NRF area wells was 10 μg/L in a sample from USGS 97 in 1994 (Attachment G, Figure G-2). Dissolved chromium concentrations above the estimated background of 2-3 μg/L have been reported in each of the selected wells except USGS 17.

4.7.3 TRA/ICPP/CFA Area Wells

The concentration of dissolved chromium in samples collected from well Fire Station 2, located upgradient of the TRA, ICPP, and CFA, has been as high as 17 μg/L (Attachment G, Figure G-3). The concentration increased considerably from 1993 to 1994, suggesting the higher concentrations in this well may indicate groundwater contamination from the NRF.

The highest dissolved chromium concentration reported for samples from the selected

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[1] The discrepancy between dissolved chromium and total chromium data was discovered during the late stages of the completion of this report.

wells in the immediate vicinity of the ICPP was 70 μg/L in a sample collected from USGS 36 in 1975. In the 1990s, dissolved chromium concentrations in samples from the selected wells near the ICPP have been below 10 μg/L, with the exception of USGS 77.

Of the selected wells near the TRA, USGS 65 is the only well from which samples had dissolved chromium concentrations above the current MCL of 100 μg/L. The maximum dissolved chromium concentration in USGS 65, 460 μg/L, was reported in a sample collected in 1982. Dissolved chromium concentrations in this well have steadily decreased since 1982. Samples from the TRA production wells, TRA 1 and TRA 4, have never exceeded 4 μg/L, near the estimated background concentration of 2-3 μg/L (Orr and others, 1991).

Of the selected wells near the CFA, the highest reported dissolved chromium concentration, 90 μg/L, was at well USGS 85, located northwest of the CFA. Chromium concentrations have been variable at well CFA 1, ranging from 1-50 μg/L since 1975. The peak concentration was measured in a sample collected in 1989.

4.7.4 ANL-West Area Wells

The highest dissolved chromium concentration reported in the selected ANL-West wells was 5 μg/L, in a sample collected from USGS 100 in 1986. The dissolved chromium concentrations in all the other samples have been at the estimated background concentration of 2-3μg/L.

4.7.5 RWMC Area Wells

Dissolved chromium data was not available for five of the eight selected wells in the vicinity of the RWMC (1991). The highest reported concentration was 61 μg/L, in a sample collected from well USGS 88 in 1972 (Attachment G, Figure G-5). At USGS 120, concentrations increased from 6 μg/L to 11 μg/L between 1987 and 1995.

4.7.6 INEEL Southern Boundary Wells

The maximum dissolved chromium concentration observed in the selected INEEL southern boundary wells was 19 μg/L in a sample collected from USGS 86 in 1991 (Attachment

G, Figure G-6). Concentrations in USGS 86 subsequently decreased to between 12 and 14 μg/L in 1995. Of the fourteen selected wells, dissolved chromium concentrations in some of the samples collected from nine of the wells exceeded the estimated background concentration of 2-3 μg/L from Orr and others (1991); however, only samples from USGS 9 and USGS 86 exceeded 10 μg/L. No data were available for three of the fourteen selected wells.

4.8 Sodium

Sodium occurs naturally in the Snake River Plain aquifer, and therefore is routinely detected as a dissolved constituent in groundwater. Elevated concentrations of sodium are also detected at the INEEL as the result of the disposal of water-softening solutions with high concentrations of dissolved salts.

The background concentration of sodium varies in the vicinity of the INEEL, depending on local geology and the source of the recharge water. On the west side of the plain background levels are probably less than 13 mg/L. Sodium concentrations tend to be higher, about 30 mg/L, in groundwater near Mud Lake. The higher levels in this region may be due to evaporative concentration in irrigation water, or possibly undiscovered evaporite deposits (Hem, 1985; Stearns and Bryan, 1925). The graphs of dissolved sodium concentrations versus time are in Attachment H.

4.8.1 TAN Area Wells

Since 1960, the concentration of sodium in groundwater samples collected near this facility have ranged from <8 to 97 mg/L (Attachment H, Figure H-1). The sodium levels reported for a particular well are generally constant, and tend to cluster around one of three concentrations: 10-15 mg/L, 20-25 mg/L, and 100 mg/L. For example, only one of the samples from ANP 6, ANP 9, and USGS 26 had a concentration greater than 15 mg/L. In contrast, a few of the samples from USGS 7 and USGS 24 had low concentrations, but most were 20-25 mg/L. Mann (1986) noted that sodium concentrations in the aquifer increased with increasing depth. Therefore, the variations in sodium concentrations in USGS 7, which is about 1200 feet deep, may be related to the depth at which the sample was collected.

4.8.2 NRF Area Wells

The sodium concentrations at the two wells upgradient of the NRF, USGS 15 and USGS 17, have never exceeded 10 mg/L (Attachment H, Figure H-2). The highest sodium concentrations, 21-23 mg/L, were measured at the two production wells, NRF 1 and NRF 3. These wells also had more variable concentrations than the other wells in this area. Sodium concentrations at USGS 97 and USGS 99, downgradient of NRF, were generally more than 10 mg/L.

4.8.3 TRA/ICPP/CFA Area Wells

At the wells upgradient of this area (Fire Station 2, Site 19, TRA 1, and TRA 4), sodium concentrations have not exceeded 10 mg/L (Attachment H, Figure H-3). In the three production wells at the ICPP (CPP 1, CPP 2, CPP 4), sodium levels have been less than 10 mg/L since 1985, except for one sample from CPP 4 in 1990 which had a concentration of 72 mg/L. The highest concentration, 190 mg/L, was reported at USGS 59, near the southern boundary of the ICPP, in 1960. At most wells near the ICPP, sodium concentrations have increased or remained nearly constant since the late 1980s. At downgradient wells such as CFA 1, CFA 2, USGS 77, and USGS 85, sodium levels have increased, primarily since the late 1960s.

Similar to the ICPP area, sodium concentrations in groundwater in the immediate vicinity of the TRA were highest in the early 1960s. The highest concentration reported for this area was 136 mg/L in a sample collected from USGS 58 in 1960. Since 1962, only one sample collected from this well had a sodium concentration of more than 10 mg/L. In the 1990s, sodium concentrations in USGS 65 were typically 13-14 mg/L, slightly above background. None of the samples collected from USGS 76 or USGS 84 exceeded 10 mg/L sodium.

4.8.4 ANL-West Area Wells

Sodium concentrations in the three wells near the ANL-West ranged from 7-18 mg/L (Attachment H, Figure H-4).

4.8.5 RWMC Area Wells

Sodium concentrations in groundwater samples collected near the RWMC since the 1960s are generally greater than 10 mg/L, and highly variable (Attachment H, Figure H-5). The highest sodium concentration measured at the wells included in this report, 230 mg/L, was at USGS 88 in 1972. There are not any known waste-water disposal facilities at the RWMC; however, flooding occurred at the RWMC in 1962, 1969, and 1982. Sodium concentrations in USGS 87, USGS 88, USGS 89, and USGS 90 have decreased since 1972, but have subsequently increased since 1988 in three of the wells. None of the samples collected from the RWMC Production well exceeded 10 mg/L sodium.

4.8.6 INEEL Southern Boundary Wells

Sodium concentrations in samples collected from wells near the southern boundary of the INEEL ranged from 1-28 mg/L. In some of the wells, sodium concentrations are highly variable, ranging from 1-28 mg/L at USGS 109, 3-20 mg/L in USGS 9, and 7-24 mg/L at Leo Rodgers 1 (Attachment H, Figure H-6). Relatively large fluctuations in concentration were also observed at the Atomic City and Cerro Grande wells. Some trends, such as lower concentrations in 1977, were observed in each of these wells. Several wells, including USGS 103, USGS 104, USGS 105, and USGS 109, had lower concentrations in the samples collected in October-November 1988. Sodium concentrations remained nearly constant (6-9 mg/L) at USGS 11 and USGS 106.

4.9 Chloride

Chloride occurs naturally in the Snake River Plain aquifer, and therefore is routinely detected as a dissolved constituent in groundwater. Elevated chloride concentrations are detected at the INEEL as a result of the disposal of water conditioning solutions high in dissolved salts. Chloride concentrations of less than about 20 mg/L probably represent background levels; however, background concentrations may be higher in some areas. The secondary MCL for chloride is 250 mg/L; higher concentrations can cause water to taste salty.

The occurrence of elevated chloride concentrations is very similar to sodium. Elevated chloride concentrations have been reported in the vicinity of TAN, TRA, ICPP, CFA, and the

RWMC. Chloride concentrations versus time for the selected wells at the INEEL are in Attachment I.

4.9.1 TAN Area Wells

Chloride concentrations in the samples collected at four of the seven selected wells at the TAN (ANP 6, ANP 9, USGS 7, and USGS 26) were less than 20 mg/L (Attachment I, Figure I-1). Concentrations appear elevated in the three remaining wells: ANP 3, ANP 4, and USGS 24. The maximum concentration reported was 170 mg/L, in a sample collected from ANP 3 in 1987.

4.9.2 NRF Area Wells

Chloride concentrations at well USGS 15, upgradient of the NRF, have been as high as 43 mg/L, while concentrations at the other upgradient well, USGS 17, have not exceeded 10 mg/L (Attachment I, Figure I-2). These data complicate the estimation of background levels for this area . Four samples collected from well NRF 1 between 1950 and 1956, when the NRF was first established, had chloride concentrations of 35-36 mg/L, suggesting background levels in this area may be close to 40 mg/L.

Chloride concentrations at wells NRF 1 and NRF 3 ranged from 28 to 61 mg/L, and show the same general trend: higher concentrations in the early 1980s, a low in 1987, and then an increase. A somewhat similar trend was observed at USGS 97 and USGS 99.

4.9.3 TRA/ICPP/CFA Area Wells

The highest chloride concentration measured in the immediate vicinity of the TRA was 81 mg/L in a sample collected from USGS 58 in 1960 (Attachment I, Figure -3). Chloride concentrations near this facility were 10-18 mg/L in 1995.

At the ICPP, chloride concentrations above background have been measured in samples from many of the wells. At wells CPP 1 and CPP 2, north of the facility, the peak concentration was measured in 1981; levels have since declined and were less than 20 mg/L in 1995. In the early 1980s, chloride concentrations reached a maximum at many of the wells near the ICPP (e.g. USGS 44, USGS 47, USGS 59), and the highest concentration at any of the selected wells, 229

mg/L, occurred in 1983 at USGS 47. While concentrations in these wells have declined, they have increased in wells farther downgradient, such as USGS 38 and USGS 77. The maximum concentration measured in 1995 was 150 mg/L at USGS 57.

At CFA 1 and CFA 2, chloride concentrations have generally ranged from 50 to 125 mg/L since the wells were first sampled in 1972.

4.9.4 ANL-West Area Wells

Two samples collected from USGS 100 had chloride concentrations of 21 mg/L, all the other samples from the three wells near the ANL-West had concentrations of less than 20 mg/L (Attachment I, Figure I-4).

4.9.5 RWMC Area Wells

At the selected wells near the RWMC, chloride concentrations have generally decreased or remained constant (Attachment I, Figure I-5). Three samples collected from USGS 88 in 1972 had chloride concentrations which exceeded the secondary MCL of 250 mg/L. Chloride concentrations in samples from USGS 117, USGS 119, and the RWMC Production well are generally less than 20 mg/L; while concentrations in samples from USGS 88, USGS 89, and USGS 120 are typically greater than 20 mg/L.

4.9.6 INEEL Southern Boundary Wells

The highest chloride concentration reported for the selected wells in this area was 71 mg/L at Cerro Grande in 1977 (Attachment I, Figure I-6). Of the fourteen wells selected near the southern boundary, chloride concentrations were less than 20 mg/L in all samples collected from USGS 8, USGS 11, USGS 103, and USGS 104. Concentrations did not exceed 35 mg/L in any of the samples collected at Atomic City, Leo Rodgers 1, USGS 14, USGS 86, USGS 105, USGS 106, and USGS 110. Additional investigation is required to determine whether levels over 20 mg/L represent higher background levels, or contamination from the INEEL.

Two wells, USGS 9 and USGS 109, had maximum chloride concentrations greater than 40 mg/L, presumably reflecting groundwater contamination from the INEEL. Concentrations

have been decreasing since the 1980s.

4.10 Nitrate + Nitrite as Nitrogen

Nitrate in groundwater is most commonly the result of human activities such as sewage disposal and the application of fertilizer. Nitrate has been a component of waste water discharged at several facilities on the INEEL. The background concentration of nitrate (as nitrogen) in the SRPA near the INEEL is 0 to 1.4 mg/L (Orr and others, 1991). The MCL for nitrate + nitrite (as nitrogen) is 10 mg/L (EPA, 1995).

Elevated nitrate concentrations at the INEEL have been noted near NRF, TRA, ICPP, and the RWMC (Bartholomay and others, 1995). The graphs of nitrate + nitrite (as nitrogen) concentrations versus time are in Attachment J.

4.10.1 TAN Area Wells

Groundwater samples collected in the selected wells near the TAN were first analyzed for nitrate+nitrite (as nitrogen) in 1984 (Attachment J, Figure J-1). The single sample from USGS 24 had a reported concentration of 1.7 mg/L. This was the only sample from any of the seven wells at TAN that had a concentration greater than the estimated background range of 0-1.4 mg/L (Orr and others, 1991).

4.10.2 NRF Area Wells

Analyses for nitrate+nitrite at the NRF were also initiated in 1984 (Attachment J, Figure J-2). Samples collected from the two upgradient wells, USGS 15 and USGS 17, have occasionally had concentrations higher than the estimated background, although most samples had a reported concentration of less than 1.0 mg/L. Concentrations at the other wells near NRF were typically between 1.5 and 2.0 mg/L.

4.10.3 TRA/ICPP/CFA Area Wells

Samples from the selected wells at the TRA/ICPP/CFA area were first analyzed for nitrate+nitrite (as nitrogen) in 1981. The highest concentration reported in this area was 12 mg/L

in a sample collected from USGS 52, east of the ICPP, in 1981 (Attachment J, Figure J-3). That same year, relatively high concentrations were measured in USGS 44, USGS 47, and USGS 57. The concentrations in each of these three wells declined rapidly between 1981 and the next sampling event in 1984, presumably due to the injection well at the ICPP being taken out of service in 1982. At the TRA, samples from only one well, USGS 65, exceeded 1.4 mg/L: seven samples collected from this well from 1988 to 1993 had concentrations of 1.5-1.6 mg/L.

4.10.4 ANL-West Area Wells

Only eight samples from the three selected wells at ANL-W were analyzed for nitrate+nitrite (as nitrogen). Concentrations appear to have increased since the first analyses for this constituent were conducted in 1984 (Attachment J, Figure J-4). A sample collected from USGS 100 in 1993 had a concentration of 1.5 mg/L, the other samples were within the estimated background range of 0 to 1.4 mg/L.

4.10.5 RWMC Area Wells

The maximum concentration of nitrate+nitrite (as nitrogen) measured in the selected wells near the RWMC was 2.5 mg/L in a sample collected from USGS 88 in 1972 (Attachment J, Figure J-5). None of the samples collected from the RWMC Production well, USGS 90, USGS 117, or USGS 120 had a reported concentration greater than 1.4 mg/L. Nitrate concentrations in the wells in this area have generally remained constant or increased since the early 1980s.

4.10.6 INEEL Southern Boundary Wells

Some of the samples collected from wells USGS 9, USGS 11, and USGS 86 exceeded the estimated background range of 0-1.4 mg/L (Attachment J, Figure J-6); these wells are all near the western boundary of the INEEL. The maximum concentration, 1.9 mg/L, was reported for a sample collected from USGS 9 in 1994.

4.11 Sulfate

Sulfate is a naturally occurring constituent in groundwater resulting from the weathering and dissolution of sulfur in igneous and sedimentary rocks (Hem, 1985). The background concentration of sulfate at the INEEL ranges from 10 to 40 mg/L (Bartholomay and others, 1995). Elevated sulfate concentrations in groundwater at the INEEL are common due to the disposal of sulfuric acid used to regenerate water softeners. The secondary MCL for sulfate is 250 mg/L; higher concentrations can cause water to have a bitter taste and unpleasant odor.

Elevated sulfate concentrations have been detected at TAN, NRF, TRA, and the ICPP. Attachment K contains the graphs of sulfate concentration versus time for the selected wells at the INEEL.

4.11.1 TAN Area Wells

The maximum sulfate concentration measured at the selected wells near TAN was 50 mg/L in a sample collected from USGS 24 in 1977 (Attachment K, Figure K-1). The sulfate concentration in the samples collected from the other wells were within the estimated background levels. Sulfate concentrations in USGS 7 were typically lower than in the other wells, ranging from less than 0.2 mg/L to 20 mg/L.

4.11.2 NRF Area Wells

At NRF, the highest sulfate concentration measured was 47 mg/L in samples from an upgradient well, USGS 15, and also USGS 99 (Attachment K, Figure K-2). As a result, it is difficult to determine whether activities at NRF have affected sulfate concentrations in the aquifer near the facility. However, sulfate concentrations in the three wells closest to the NRF (NRF 1, NRF 3, and USGS 97) had higher sulfate concentrations, on average, than the two upgradient wells.

4.11.3 TRA/ICPP/CFA Area Wells

At the TRA, samples collected from MTR Test, USGS 58, and USGS 65 have exceeded the estimated maximum background concentration of sulfate of 40 mg/L (Attachment K, Figure

K-3). The maximum sulfate concentration measured near this facility was 498 mg/L in a sample collected from USGS 58 in 1960. Sulfate levels in this well have since declined; however, concentrations have increased in MTR Test and USGS 65. None of the samples collected in 1995 exceeded the secondary MCL of 250 mg/L.

Of the samples collected from the selected wells near the ICPP and CFA, most had a sulfate concentration of less than 30 mg/L, and only three exceeded 40 mg/L. These samples were collected from USGS 44, USGS 47, and USGS 52 in 1981, and had sulfate concentrations of 41-43 mg/L.

4.11.4 ANL-West Area Wells

The first sample collected from USGS 100, in 1977, had a sulfate concentration of 47 mg/L. Sulfate did not exceed 17 mg/L in any of the other 10 samples from the three wells selected near ANL-W (Attachment K, Figure K-4).

4.11.5 RWMC Area Wells

The highest sulfate concentration measured in samples from the selected wells at this facility was 76 mg/L in a sample from USGS 87 collected in 1971 (Attachment K, Figure K-5). Sulfate concentrations in samples from USGS 88 and USGS 120 have also exceeded 40 mg/L.

4.11.6 INEEL Southern Boundary Wells

All of the samples collected from the selected wells near the southern boundary of the INEEL had sulfate concentrations within the estimated background range of 10-40 mg/L, except three that were less than 10 mg/L (Attachment K, Figure K-6). The maximum sulfate concentration reported was 36 mg/L in a sample collected from USGS 9 in 1987.

4.12 Specific Conductance

Specific conductance is a measure of a fluid's ability to conduct an electric current, measured in microsiemens per centimeter (μS/cm). As such, specific conductance is a function of the amount of dissolved ions in the water, and serves as a general indicator of water quality.

The disposal of dissolved chemicals in waste water has resulted in an increase in the specific conductance in groundwater downgradient of many INEEL facilities. Robertson and others (1974) reported that the natural specific conductance of water in the vicinity of the TRA, ICPP, and CFA was about 300-325 μS/cm; however, this may not be applicable to all areas of the INEEL. There is not a drinking water standard for specific conductance, but the secondary MCL for total dissolved solids is 500 mg/L. The concentration of total dissolved solids can be approximated from specific conductance data using the following equation from Hem (1985) and Robertson and others (1974):

$$TDS = 0.6(SC)$$

where,

TDS = total dissolved solids (mg/L)
SC = specific conductance (μS/cm)

Elevated specific conductance levels have been detected in the vicinity of TAN, TRA, ICPP, CFA, and the RWMC. Graphs of specific conductance versus time for the selected wells are in Attachment L.

4.12.1 TAN Area Wells

The specific conductance of groundwater samples collected at the two upgradient wells, USGS 26 and ANP 6, ranged from 266 to 402 μS/cm (Attachment L, Figure L-1). Samples from USGS 7, located southwest of the TAN, tended to have the lowest specific conductance of any of the samples collected in this area. The maximum specific conductance reported for groundwater samples from the selected wells was 1,034 μS/cm in a sample collected from the TAN Disposal well in 1989.

The specific conductance data for USGS 24 illustrates an important consideration in the interpretation of the historical water quality data. In samples from USGS 24, it appears that the specific conductance decreased for a period in the early 1960s; however, further investigation revealed that the decrease may be artificial because the three samples with a lower specific conductance (213 to 232 μS/cm) were collected at a shallower depth in the well than the samples with a higher specific conductance. As noted in section 3.2, until the mid-1970s most samples

from the monitoring wells were collected at discrete intervals with a thief sampler.

4.12.2 NRF Area Wells

The maximum specific conductance of water samples collected from the selected wells at the NRF was 618 μS/cm, in samples from NRF 1 and NRF 3 in 1995, and USGS 15 in 1992 (Attachment L, Figure L-2). The specific conductance at USGS 15, an upgradient well, has been highly variable during the 1990s, ranging from about 300 to 600 μS/cm. The specific conductance of water samples from wells NRF 1, NRF 3, USGS 97, and USGS 99 has generally increased.

4.12.3 TRA/ICPP/CFA Area Wells

The highest specific conductance measured in water samples collected from the selected wells near the TRA was 2650 μS/cm in a sample collected from USGS 65 in 1962 (Attachment L, Figure L-3). The specific conductance decreased rapidly after that sample was collected, and then generally increased since the 1970s. The specific conductance has ranged from 191 to 625 μS/cm at the two wells farther downgradient (USGS 76 and USGS 84). The specific conductance of samples from Site 19, TRA 1, TRA 4, and USGS 79 has ranged from about 250 to near 450 μS/cm. The conductance of water samples from these wells decreased in the 1970s, and then increased in the late 1980s.

The highest specific conductance for samples collected near the ICPP was 968 μS/cm at USGS 38 in 1994. The specific conductance peaked in the early 1960s and again in the 1980s, at most of the wells near the ICPP, such as USGS 47, USGS 52, and USGS 57. At wells a few miles downgradient, such as USGS 38, USGS 39, and USGS 77, the specific conductance has steadily increased since the 1980s. At the two CFA production wells, the specific conductance has increased to near 600-700 μS/cm since the 1960s and 1970s.

4.12.4 ANL-West Area Wells

The maximum specific conductance measured in samples collected from selected wells near the ANL-West, 460 μS/cm, was in a sample from USGS 100 collected in 1978 (Attachment

L, Figure L-4). The specific conductance has generally increased at each of the wells near this facility.

4.12.5 RWMC Area Wells

The maximum specific conductance measured at the selected wells near this facility was 1800 μS/cm in a water sample collected from USGS 88 on April 17, 1972 (Attachment L, Figure L-5). In general, the specific conductance of water samples from the selected wells near the RWMC has increased since the 1980s.

4.12.6 Southern Boundary Area Wells

The maximum specific conductance measured at the selected wells near the southern boundary was 590 μS/cm in a sample collected from USGS 109 in 1983 (Attachment L, Figure L-6). The specific conductance of water samples collected from USGS 9 were highly variable, and increased rapidly in 1965 and 1987. The specific conductance of samples from most of the wells has increased over the period of record.

5. References

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ATTACHMENT A

Graphs of Tritium Concentration Versus Time

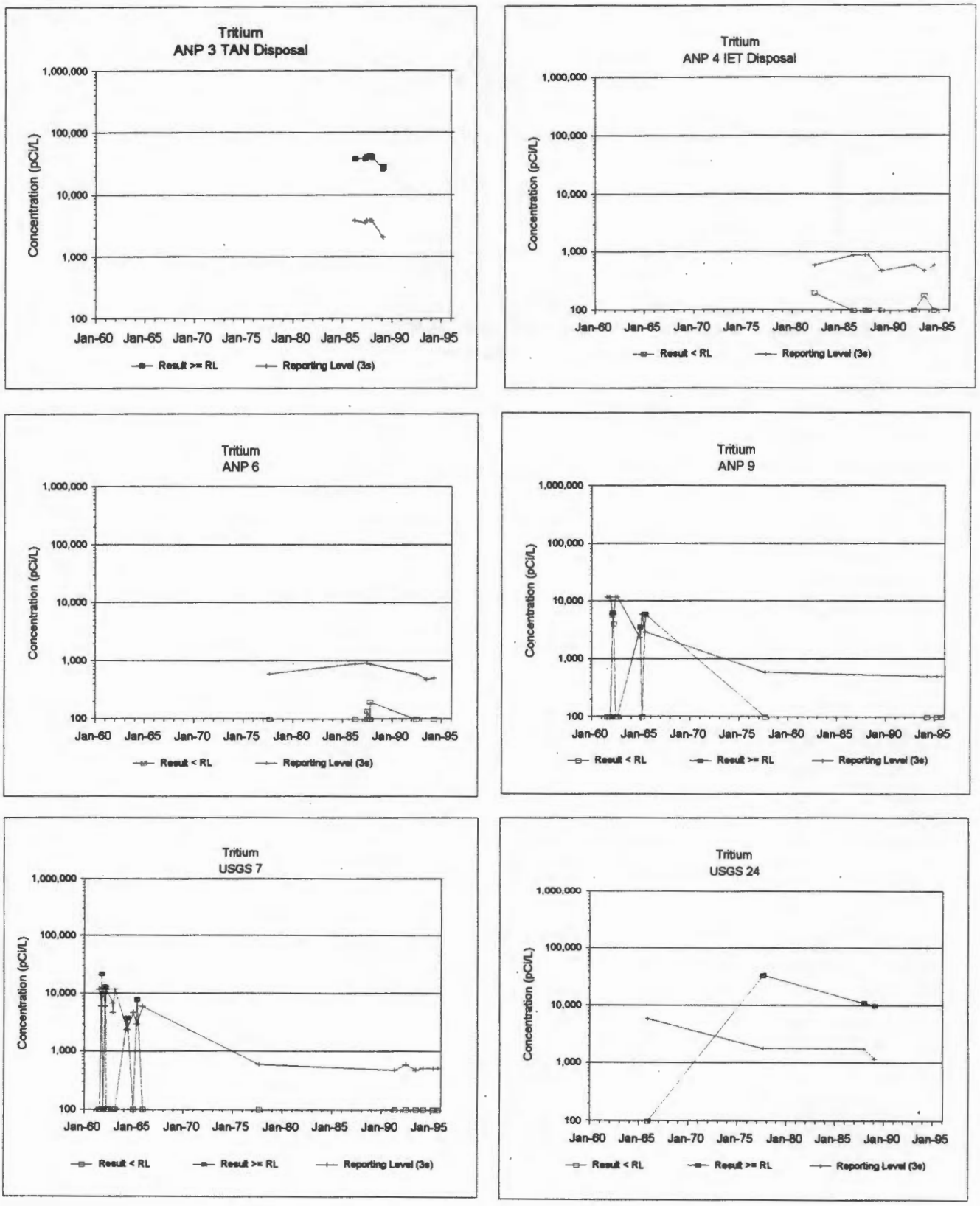


Figure A-1. Tritium Concentrations in Selected Wells in the TAN Area.

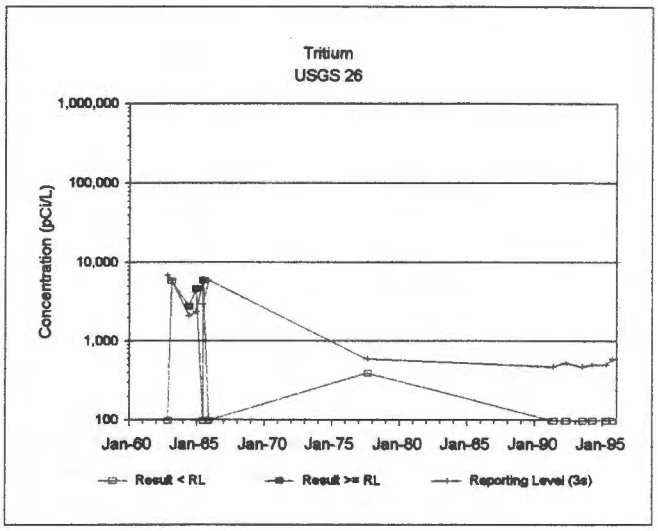


Figure A-1. Tritium Concentrations in Selected Wells in the TAN Area (continued).

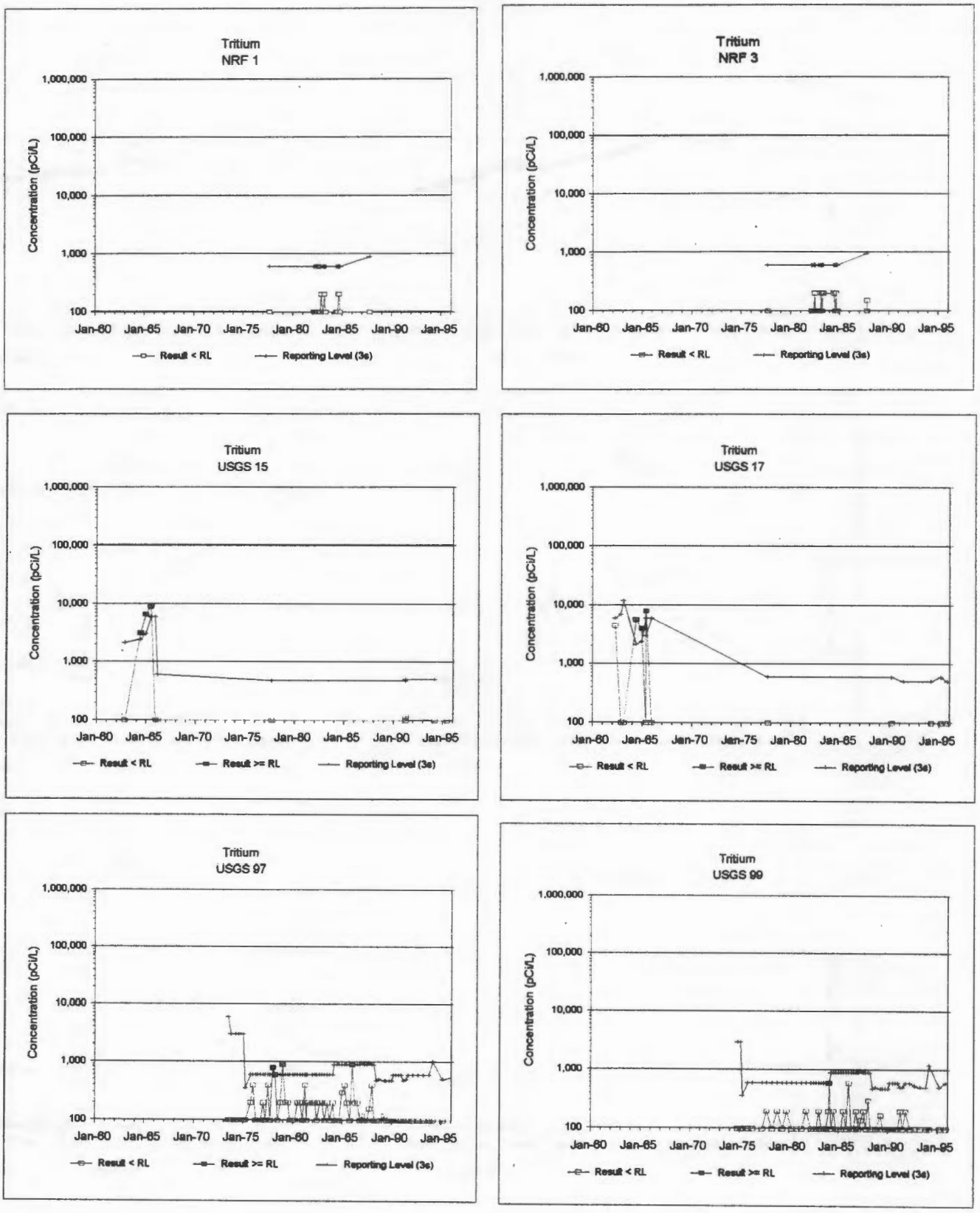


Figure A-2. Tritium Concentrations in Selected Wells in the NRF Area.

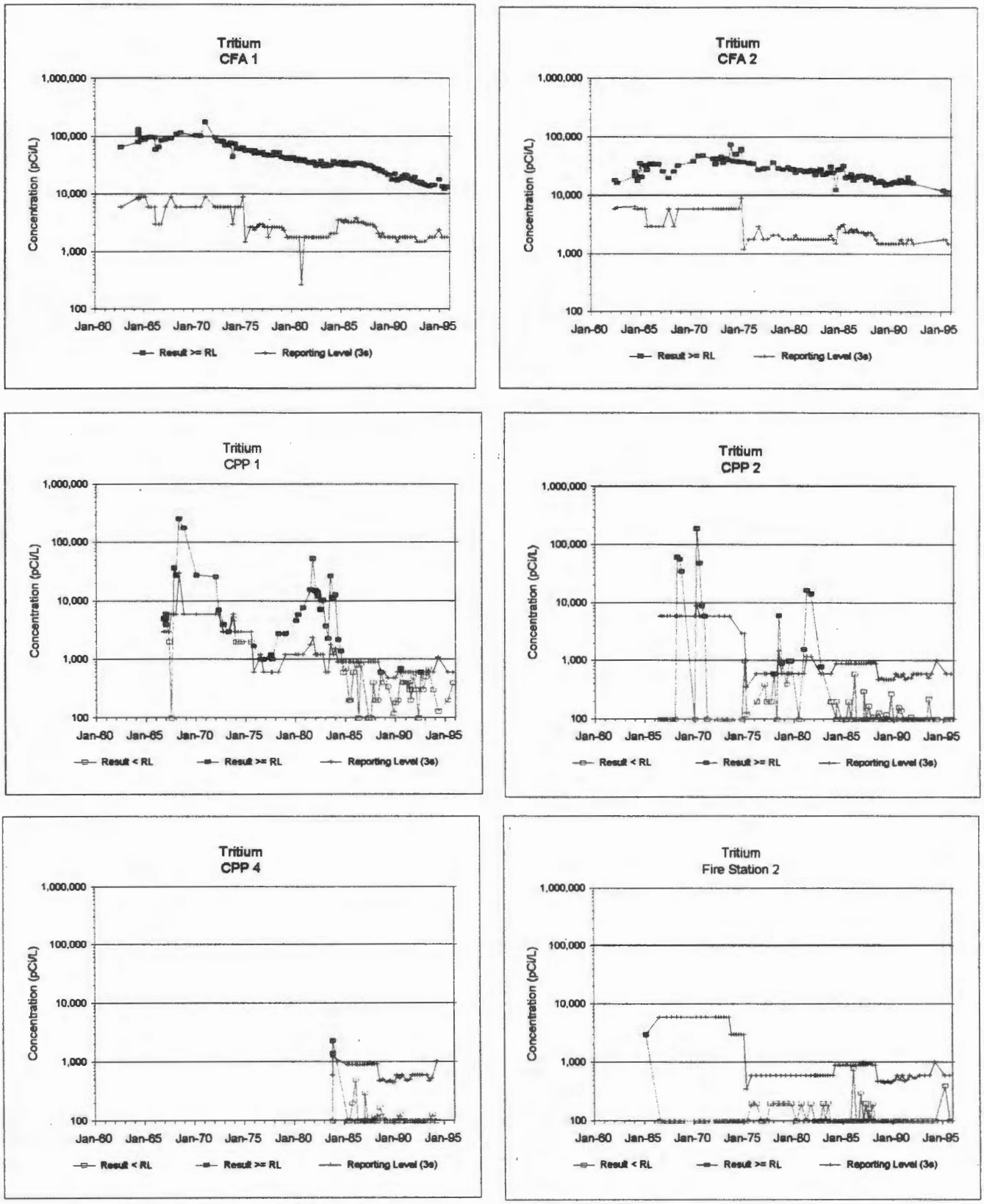


Figure A-3. Tritium Concentrations in Selected Wells in the TRA/ICPP/CFA Area.

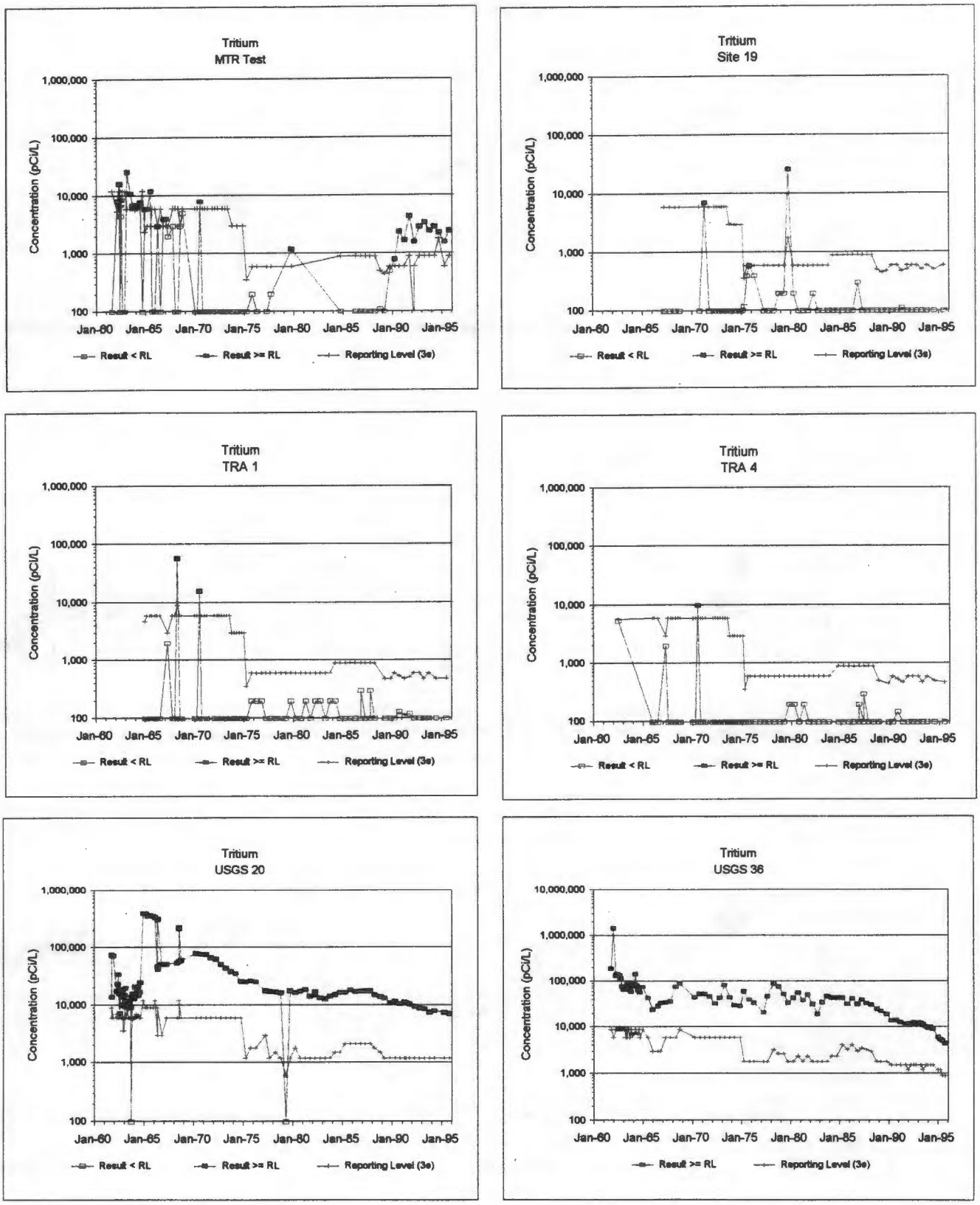


Figure A-3. Tritium Concentrations in Selected Wells in the TRA/ICPP/CFA Area (continued).

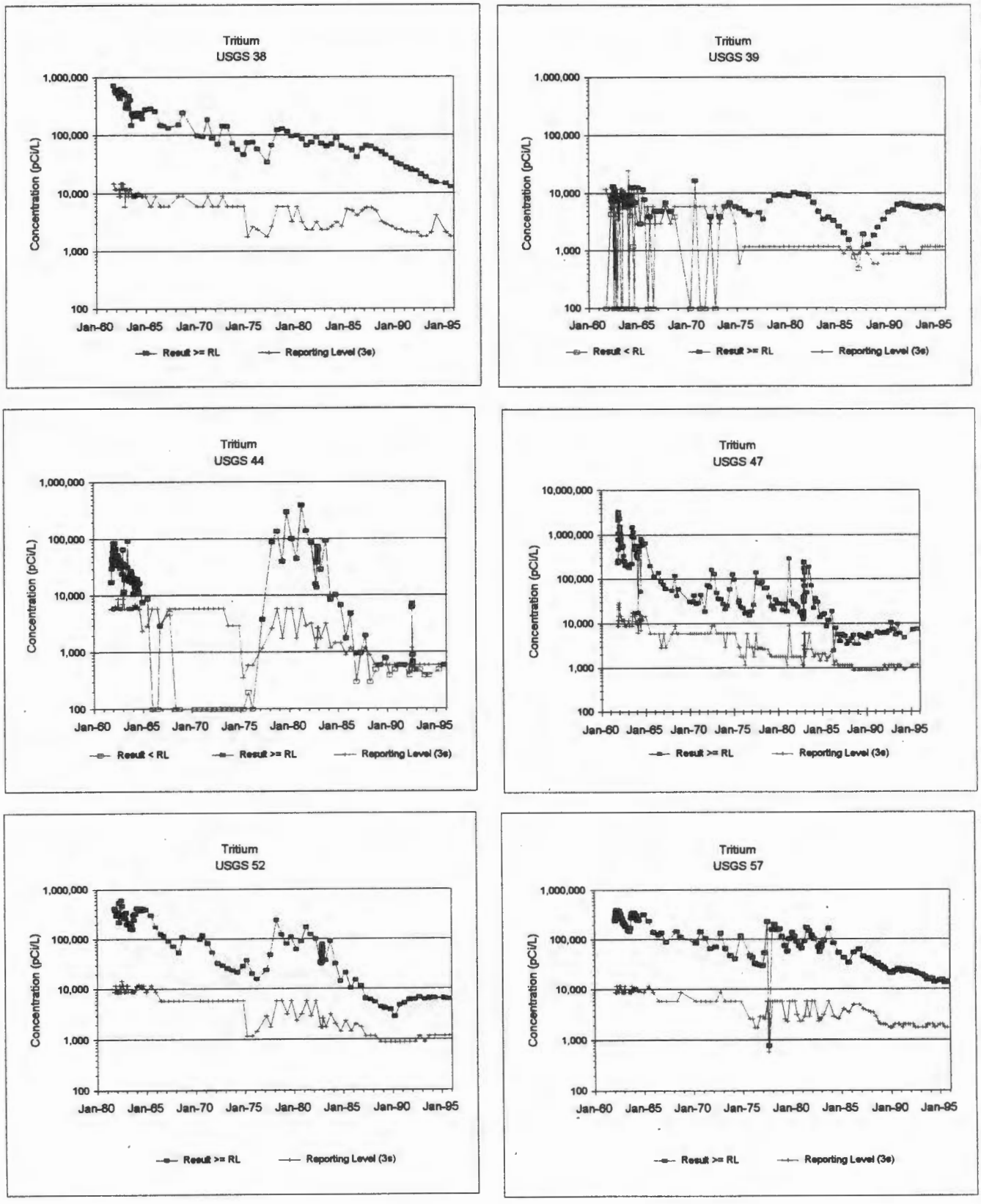


Figure A-3. Tritium Concentrations in Selected Wells in the TRA/ICPP/CFA Area (continued).

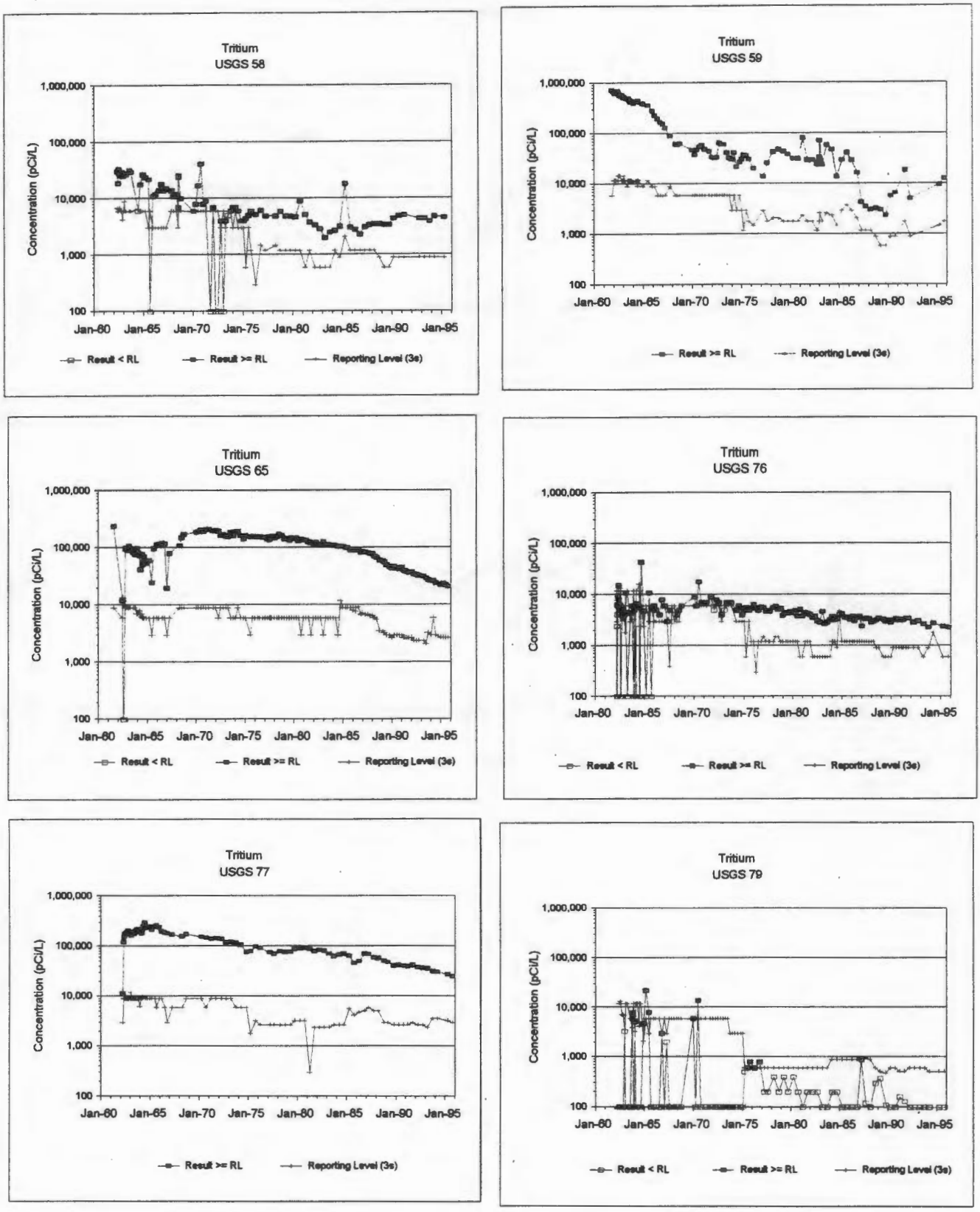


Figure A-3. Tritium Concentrations in Selected Wells in the TRA/ICPP/CFA Area (continued).

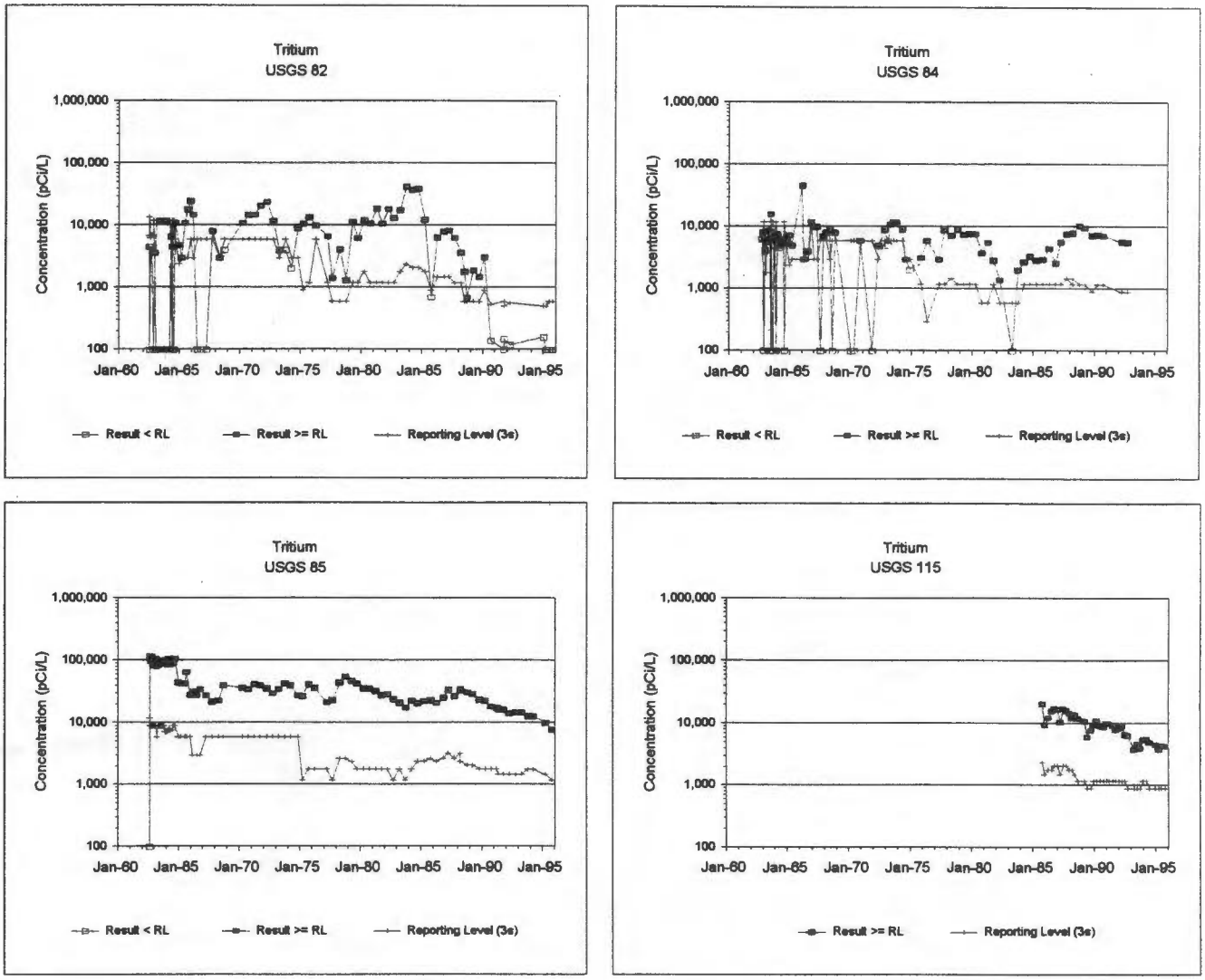
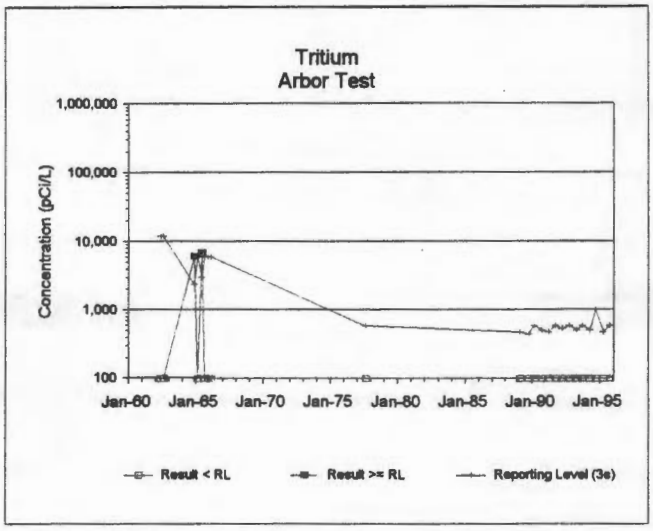
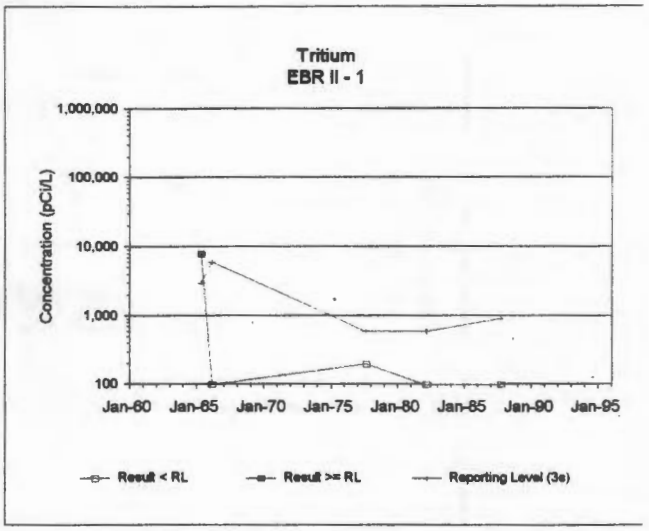


Figure A-3. Tritium Concentrations in Selected Wells in the TRA/ICPP/CFA Area (continued).





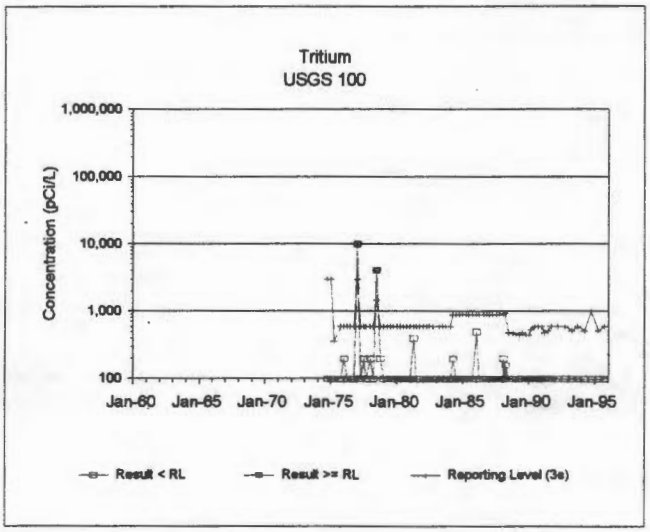


Figure A-4. Tritium Concentrations in Selected Wells in the ANL-West Area.

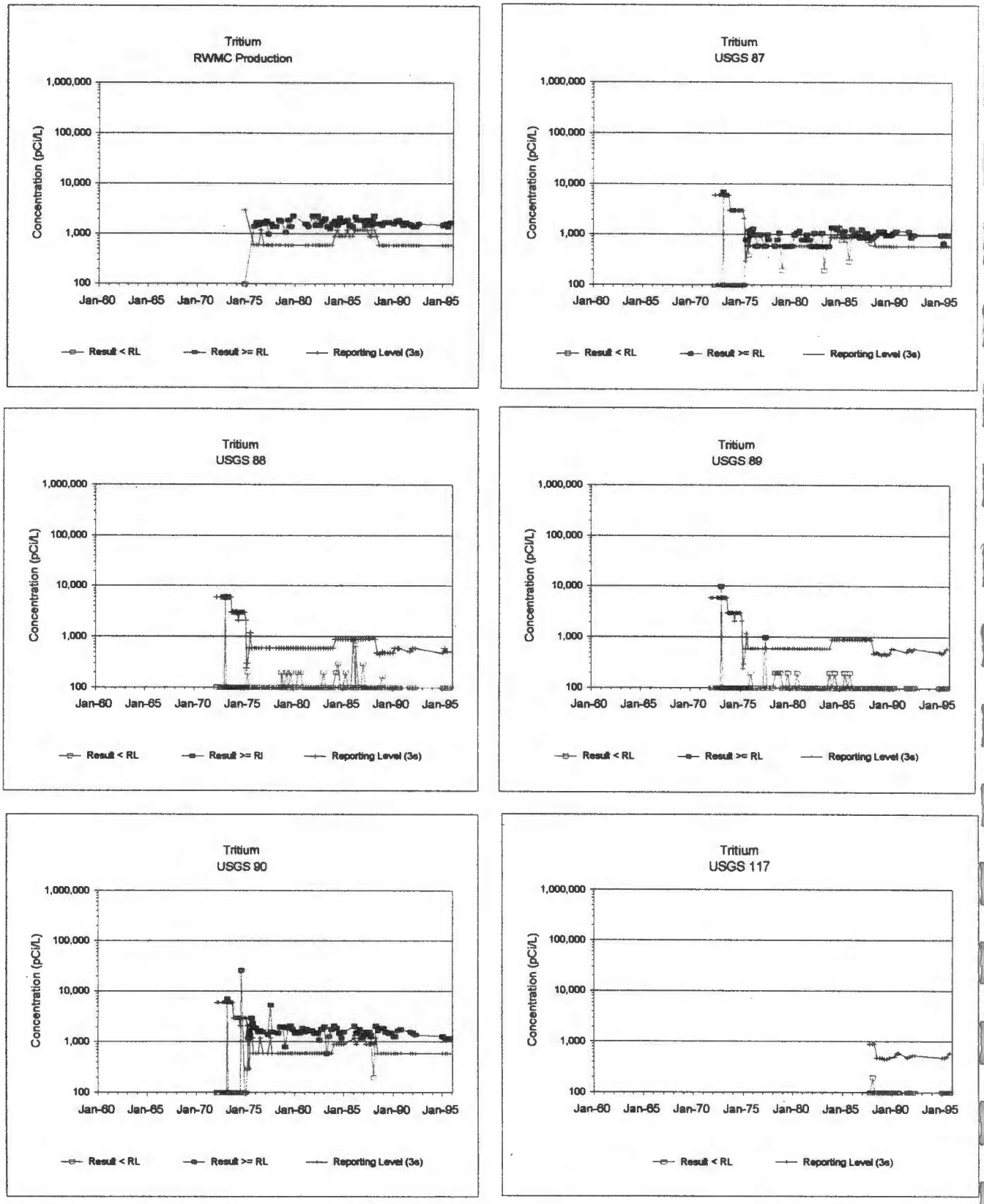
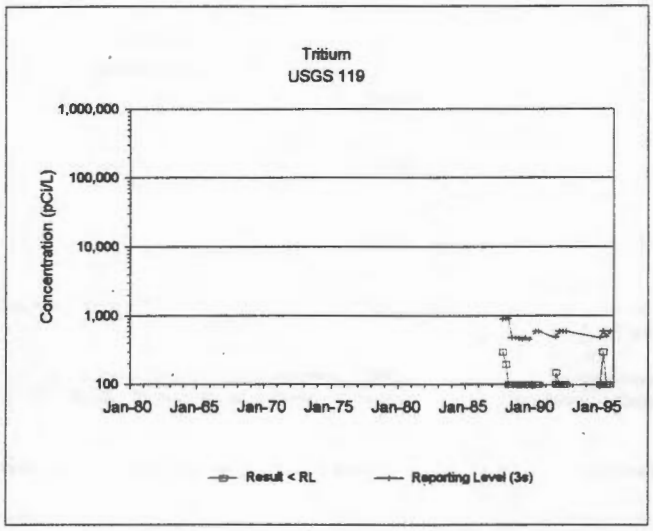


Figure A-5. Tritium Concentrations in Selected Wells in the RWMC Area.



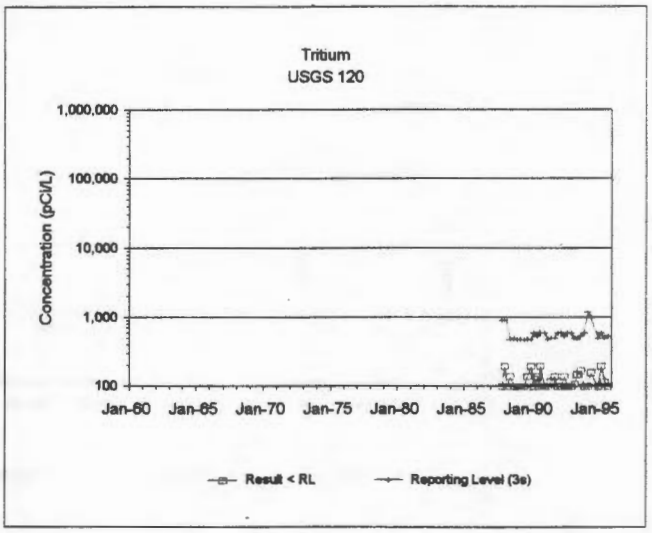


Figure A-5. Tritium Concentrations in Selected Wells in the RWMC Area (continued).

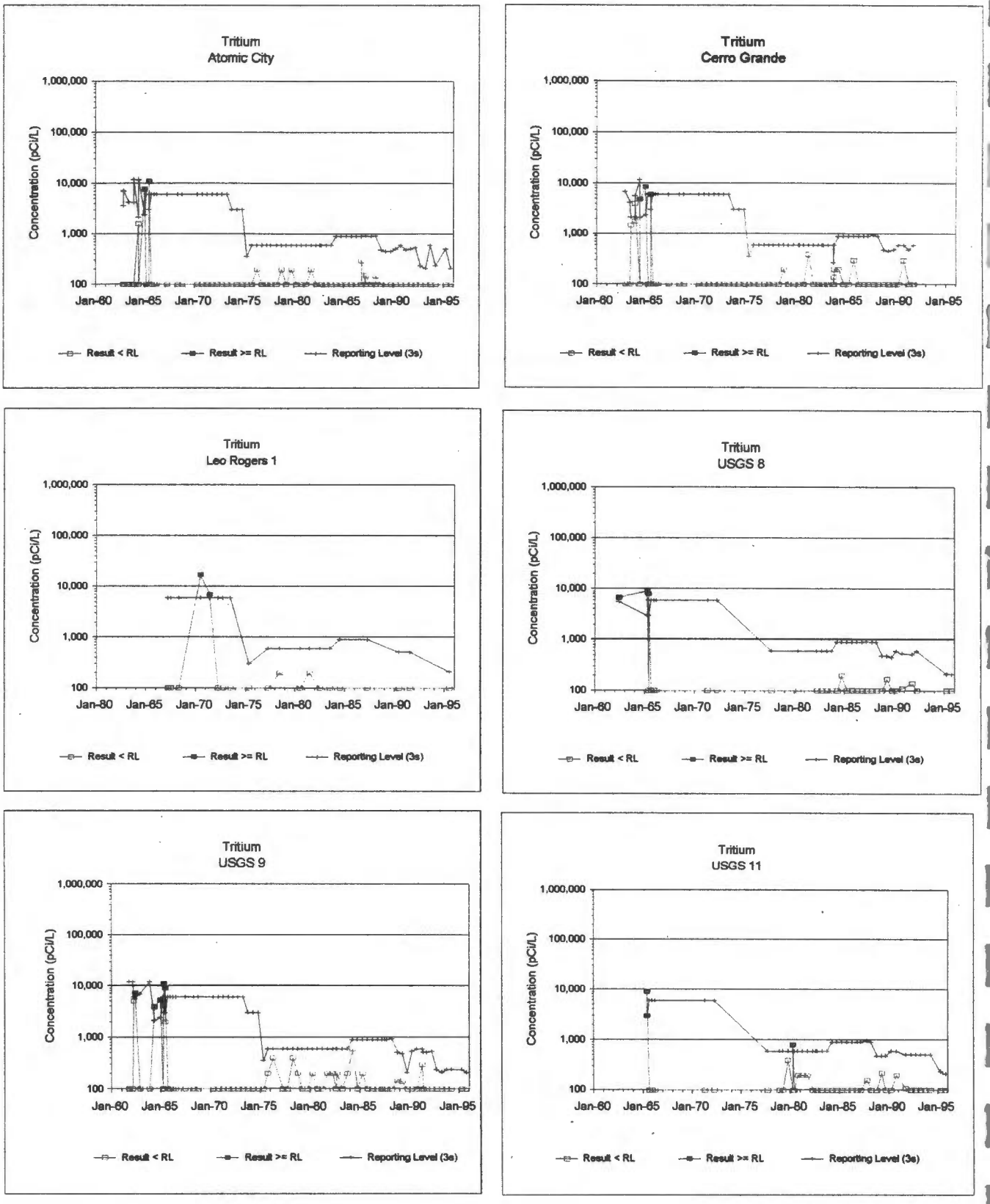


Figure A-6. Tritium Concentrations in Selected Wells near the INEEL Southern Boundary.

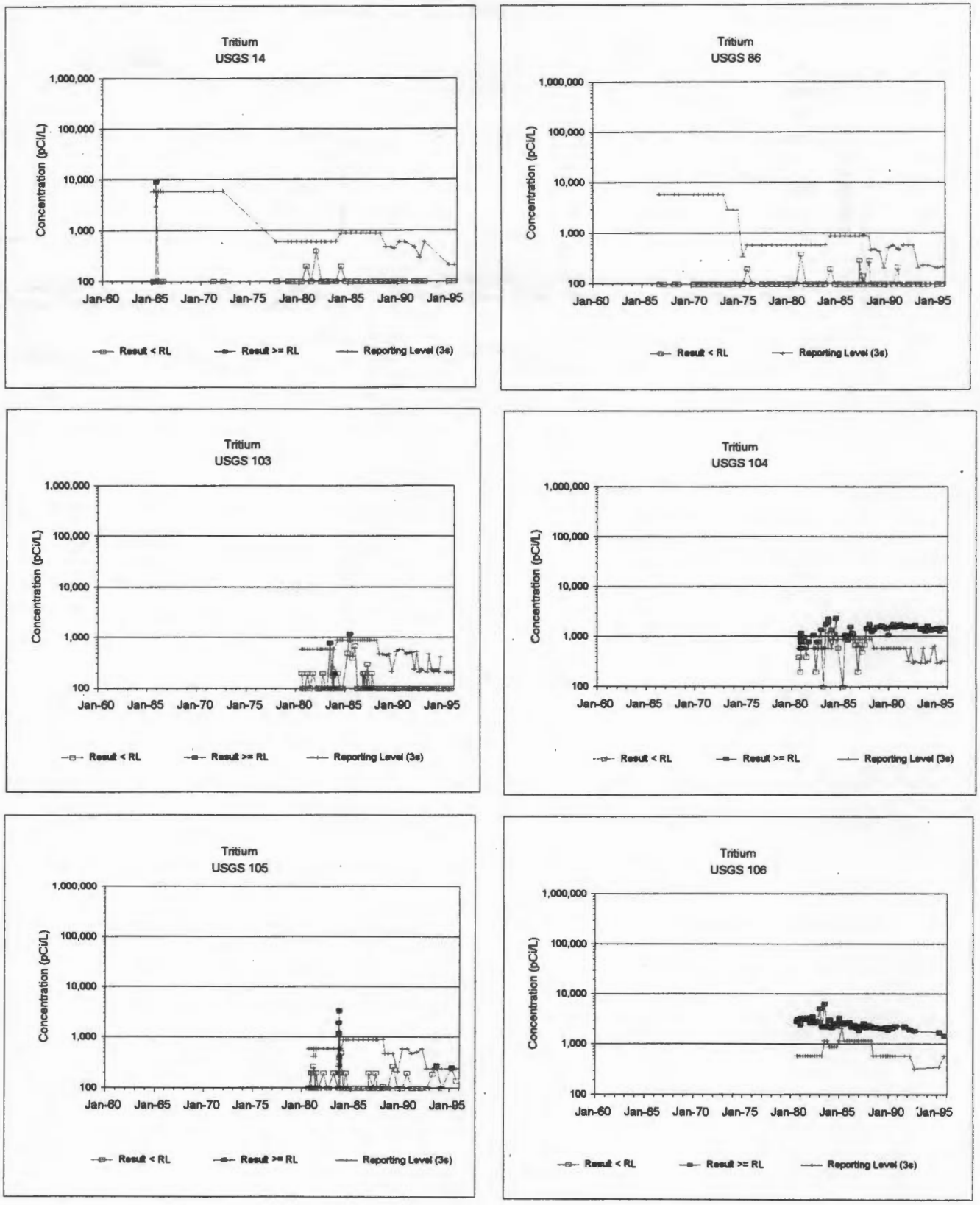
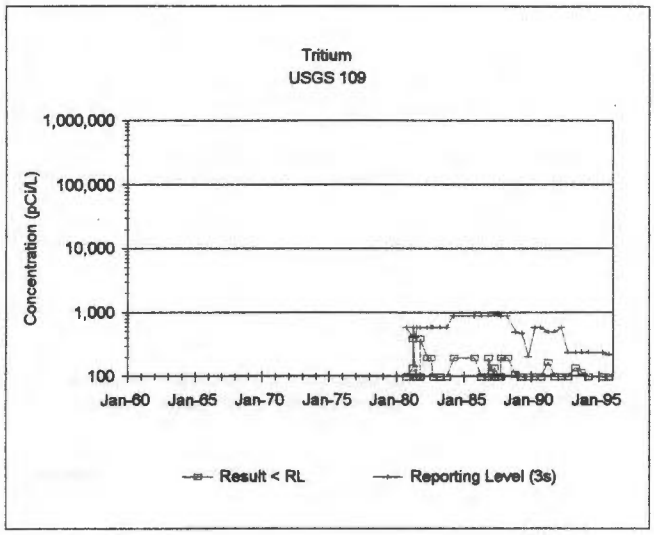


Figure A-6. Tritium Concentrations in Selected Wells near the INEEL Southern Boundary (continued).



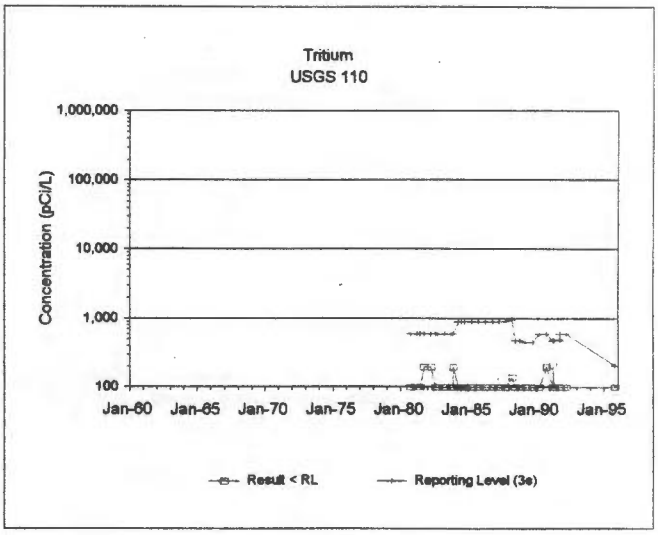


Figure A-6. Tritium Concentrations in Selected Wells near the INEEL Southern Boundary (continued).

ATTACHMENT B

Graphs of Strontium-90 Concentration Versus Time

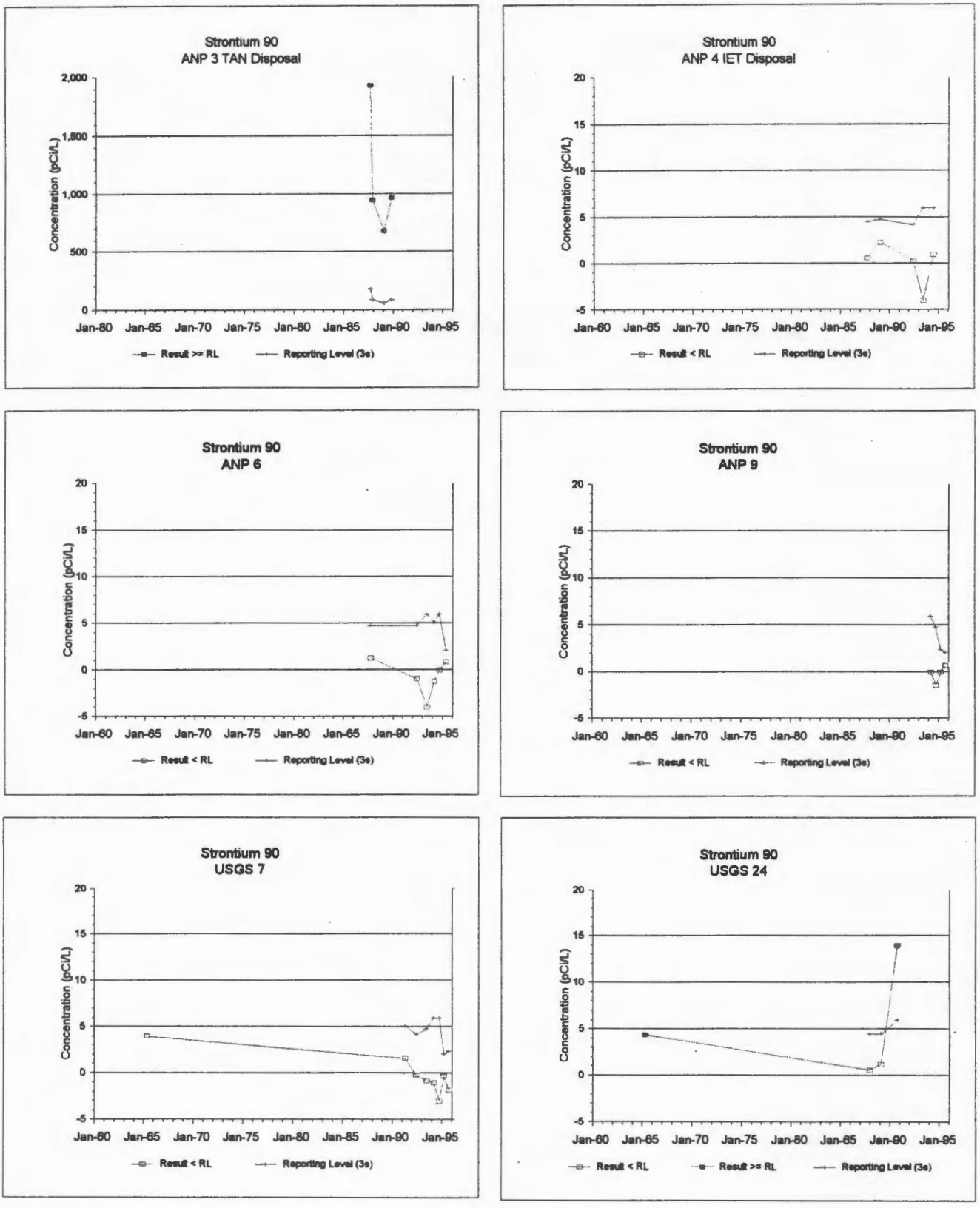


Figure B-1. Strontium-90 Concentrations in Selected Wells in the TAN Area.

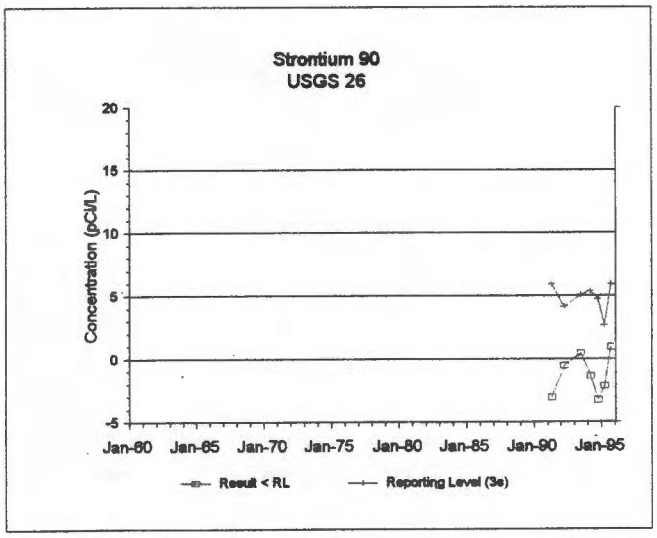


Figure B-1. Strontium-90 Concentrations in Selected Wells in the TAN Area (continued).

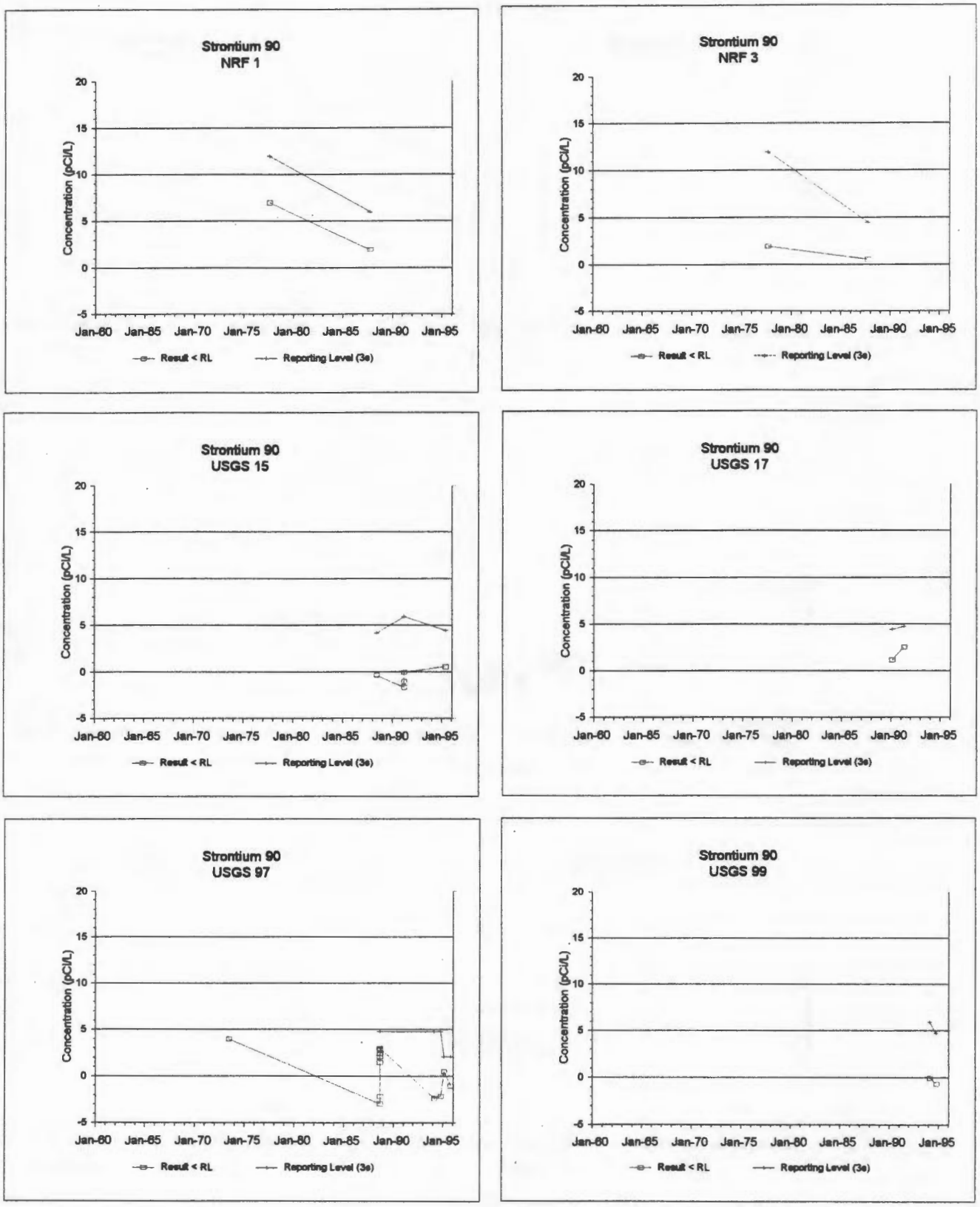


Figure B-2. Strontium-90 Concentrations in Selected Wells in the NRF Area.

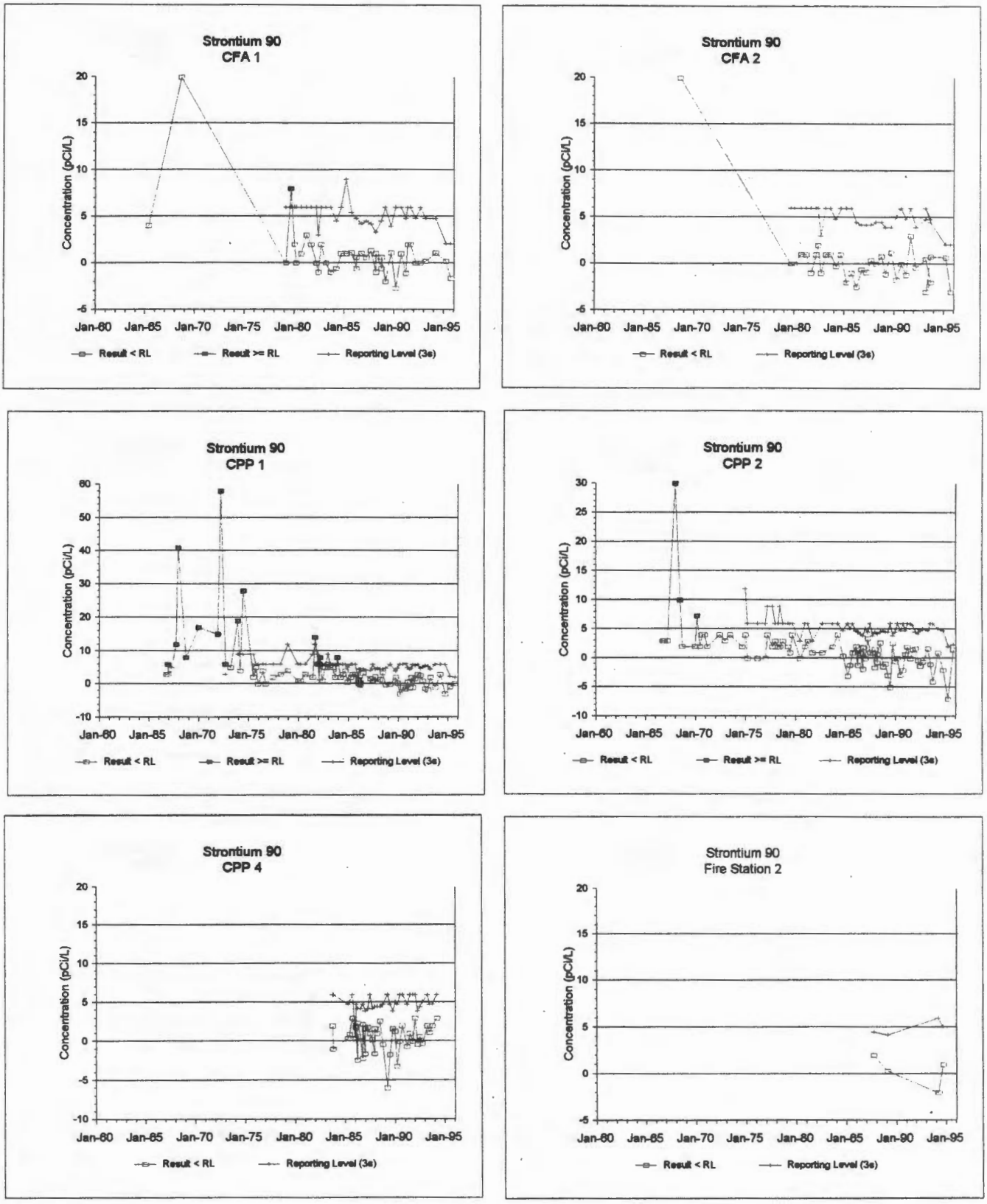


Figure B-3. Strontium-90 Concentrations in Selected Wells in the TRA/ICPP/CFA Area.

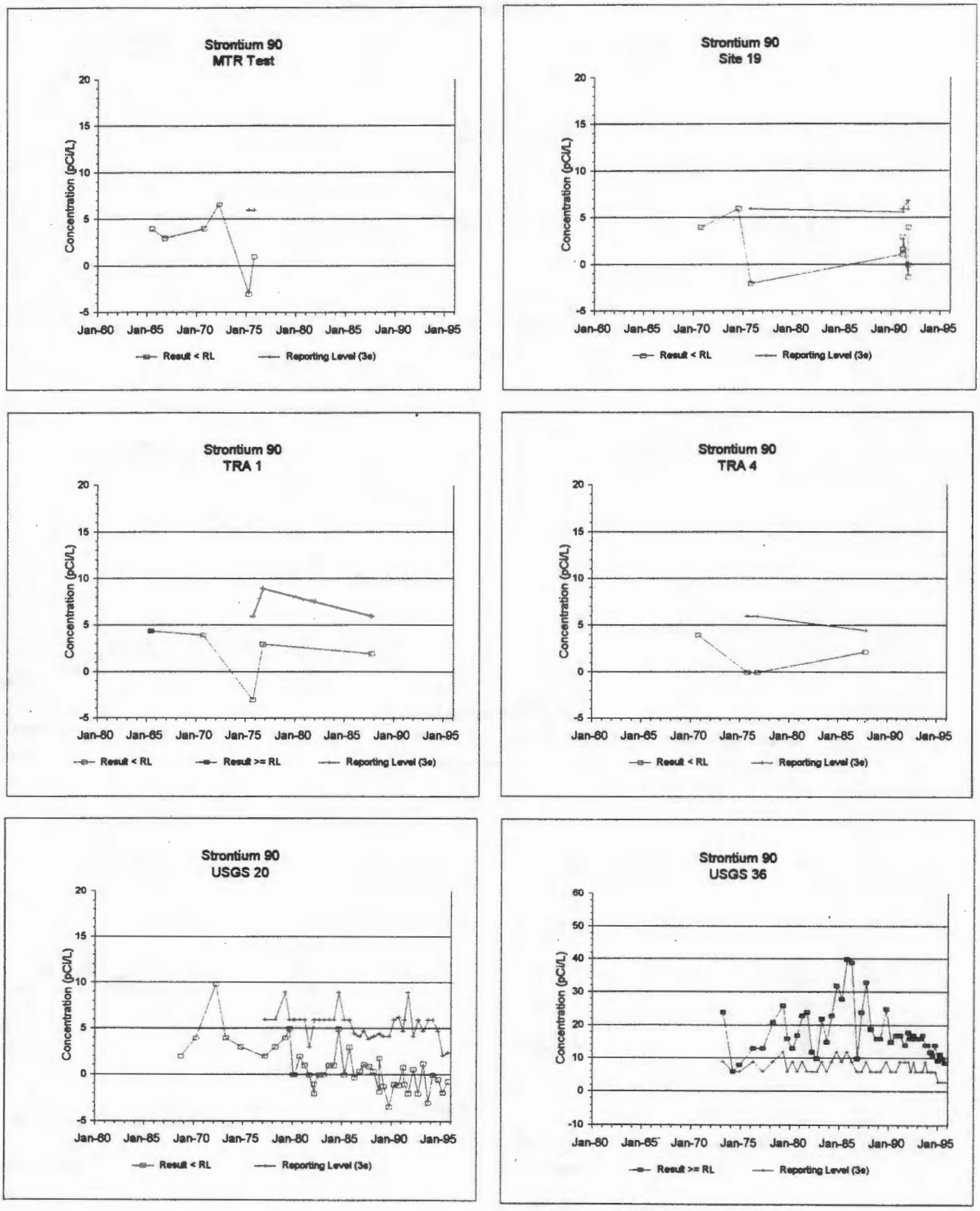
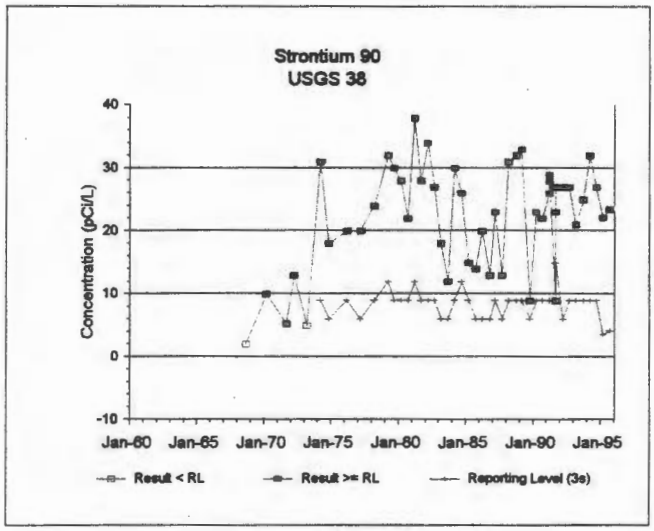
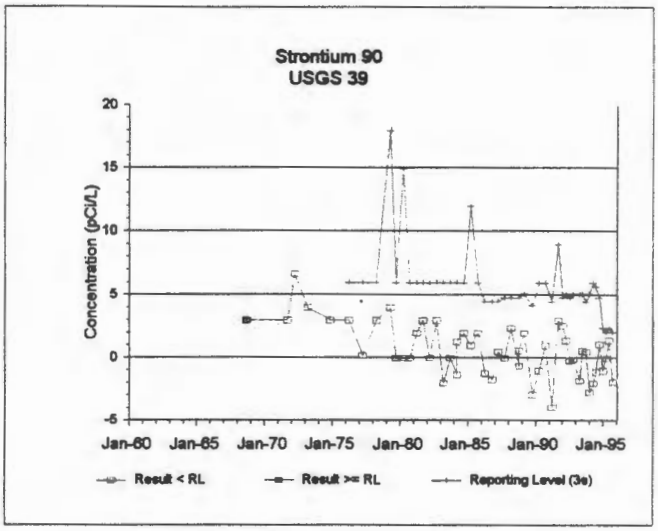
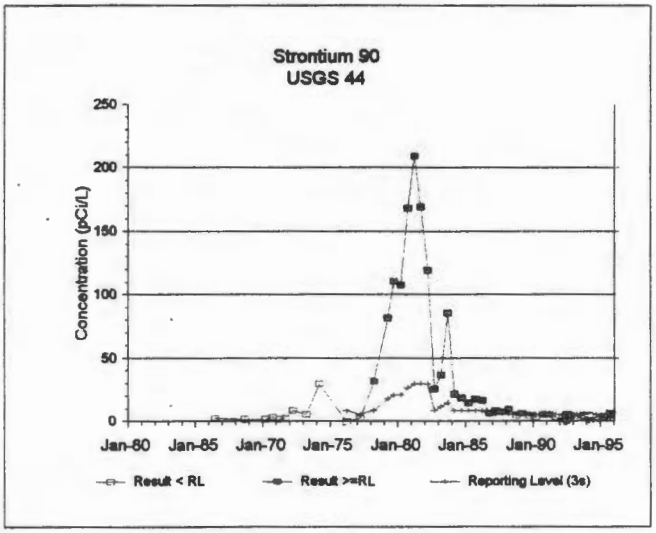
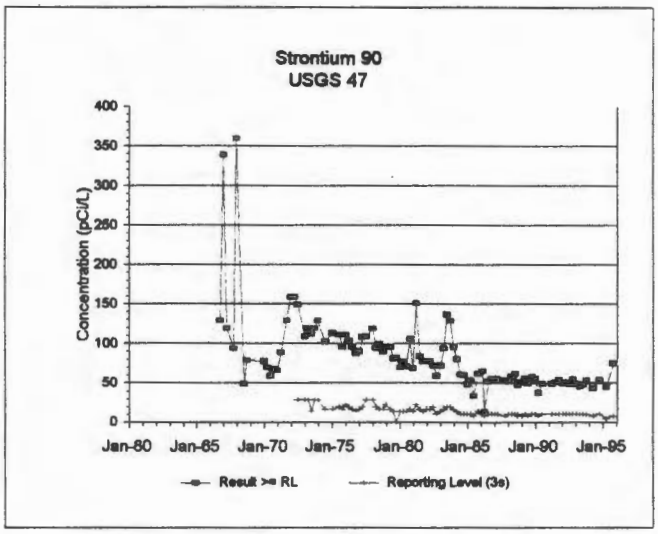


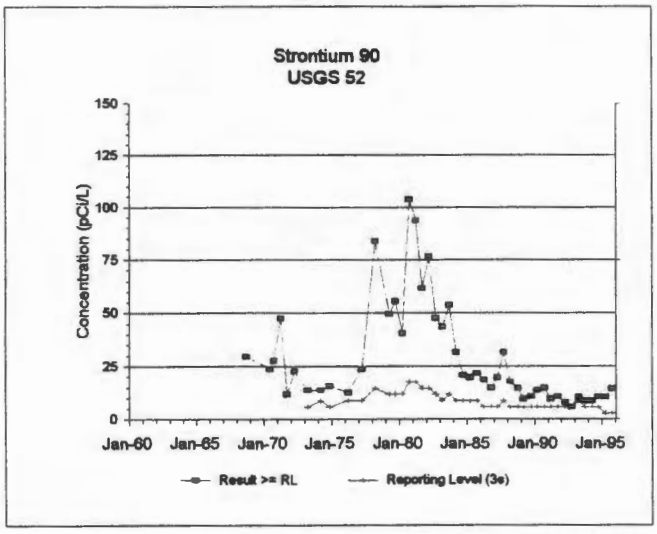
Figure B-3. Strontium-90 Concentrations in Selected Wells in the TRA/ICPP/CFA Area (continued).











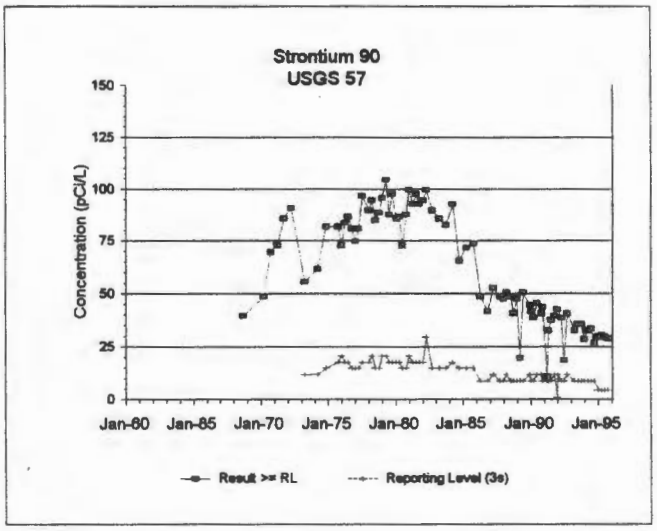


Figure B-3. Strontium-90 Concentrations in Selected Wells in the TRA/ICPP/CFA Area (continued).

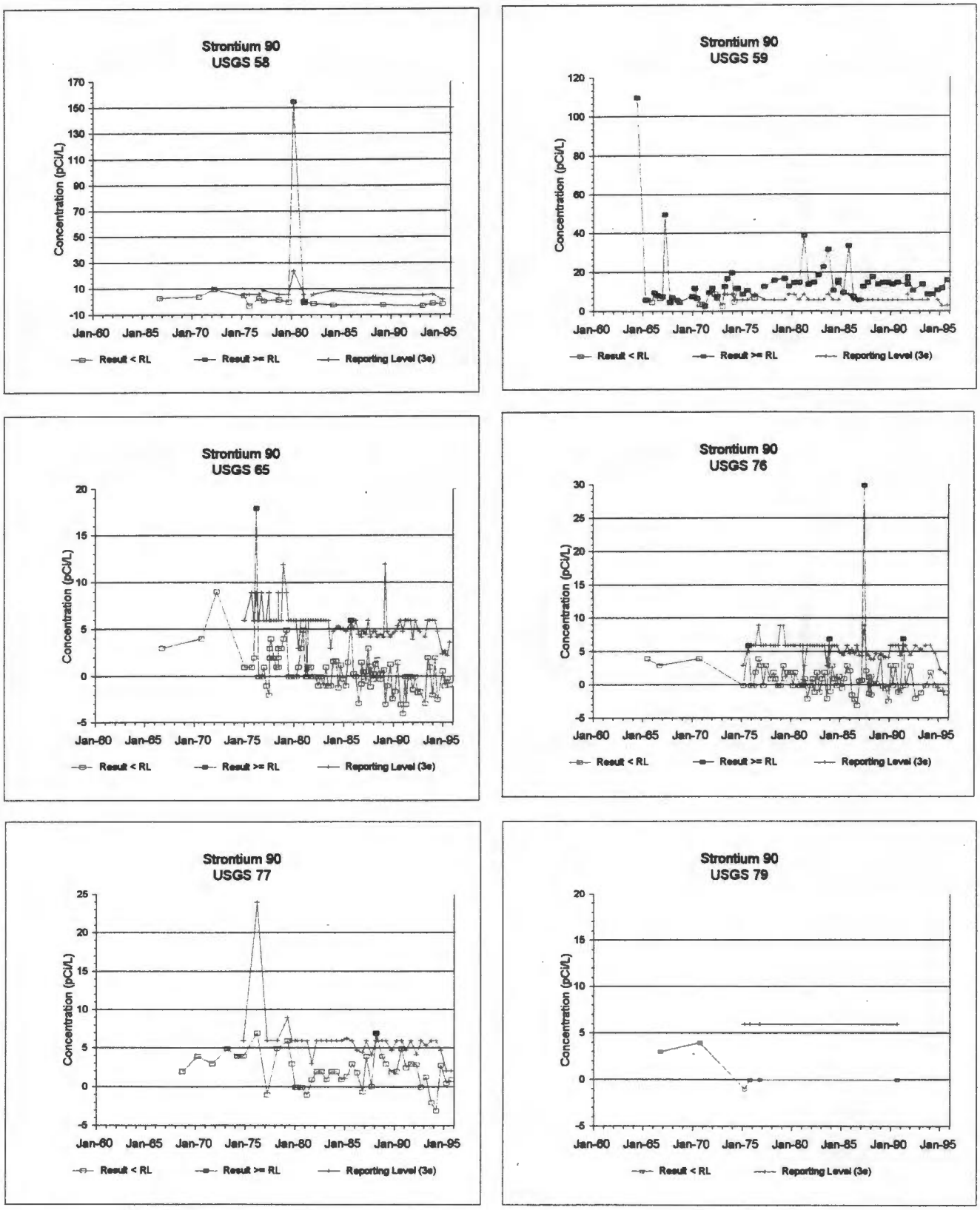


Figure B-3. Strontium-90 Concentrations in Selected Wells in the TRA/ICPP/CFA Area (continued).

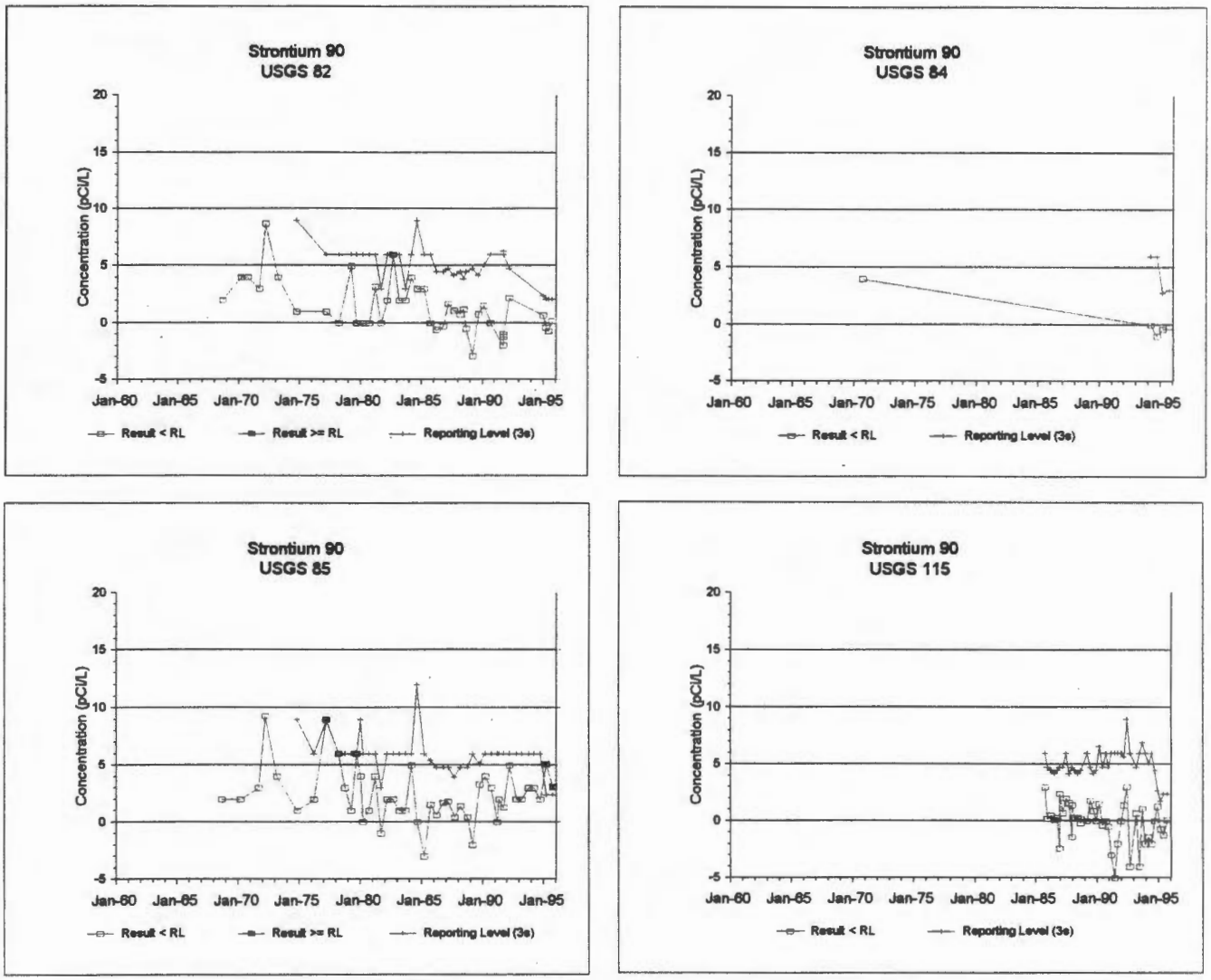
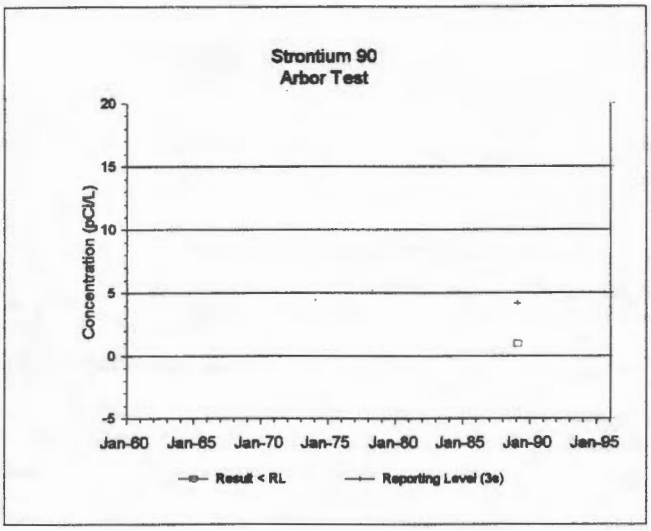
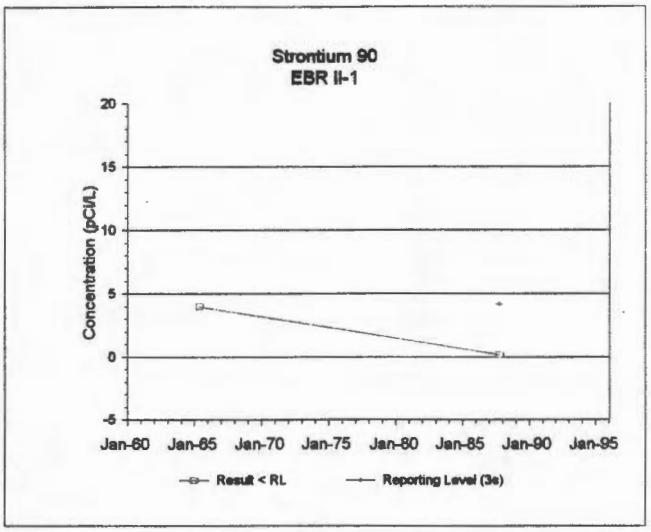


Figure B-3. Strontium-90 Concentrations in Selected Wells in the TRA/ICPP/CFA Area (continued).





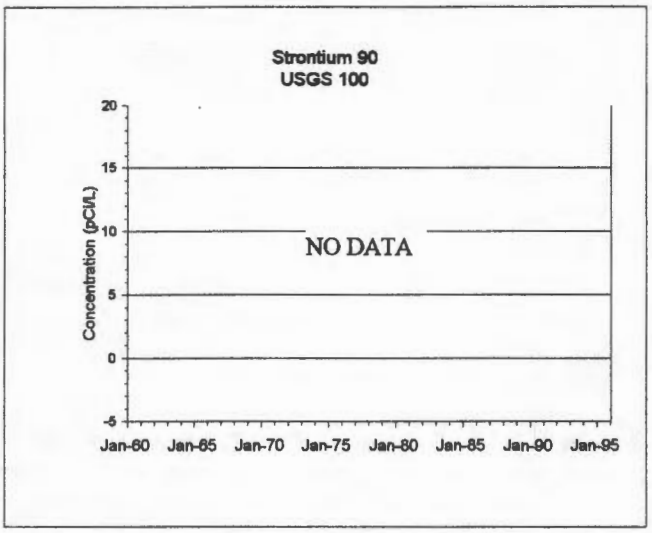


Figure B-4. Strontium-90 Concentrations in Selected Wells in the ANL-West Area.

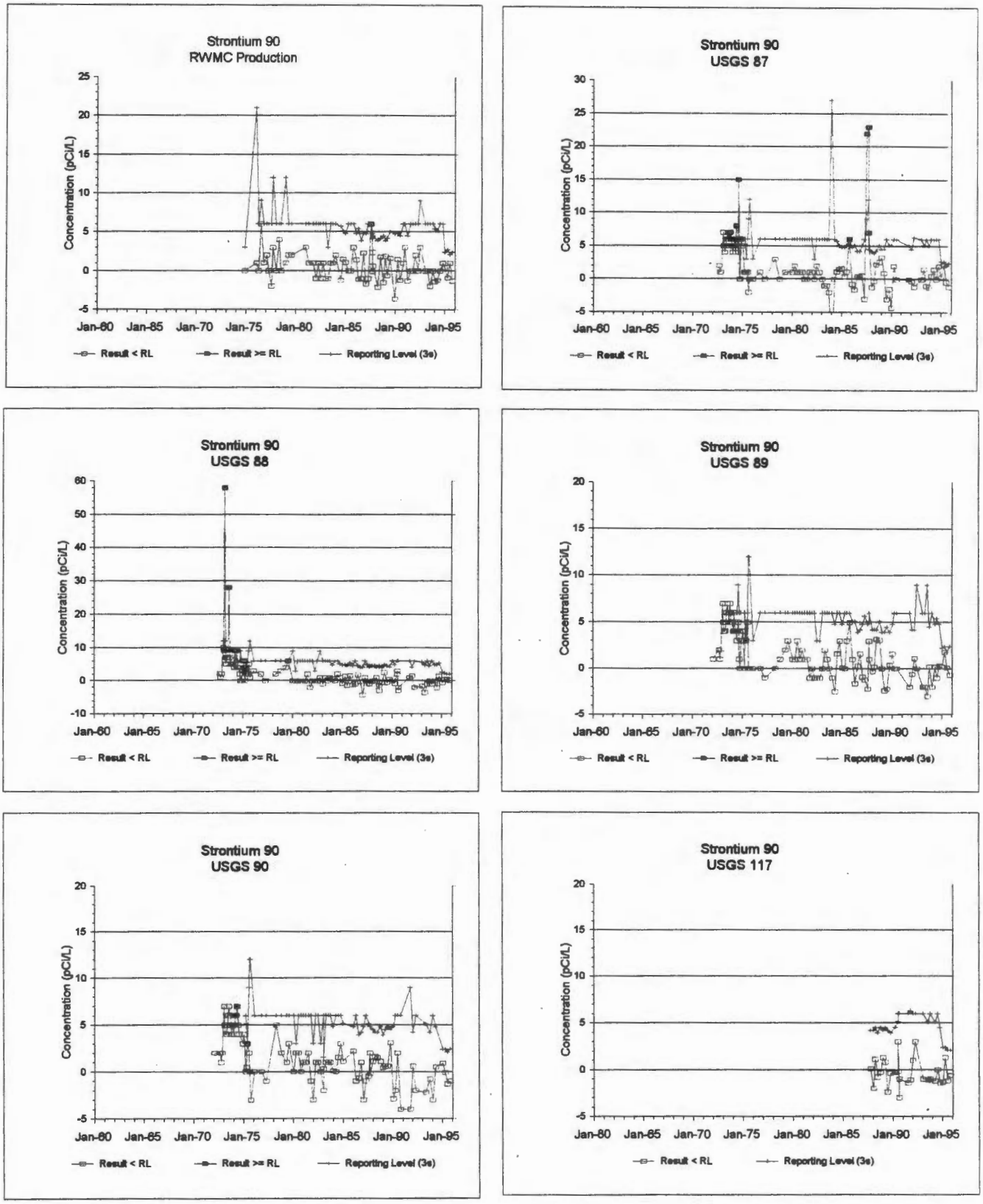
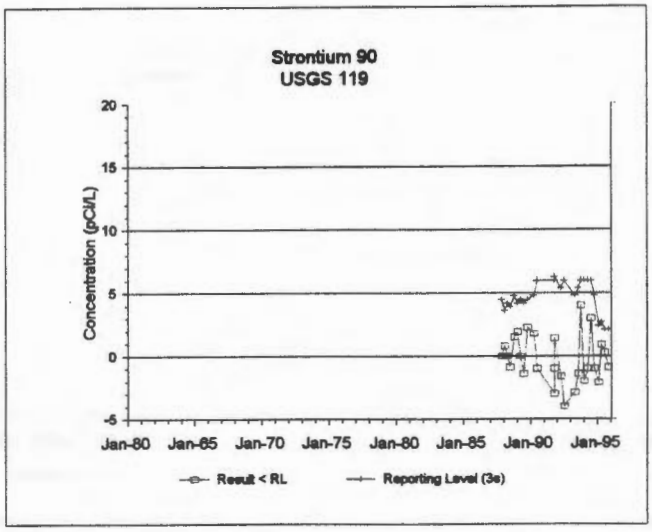


Figure B-5. Strontium-90 Concentrations in Selected Wells in the RWMC Area.



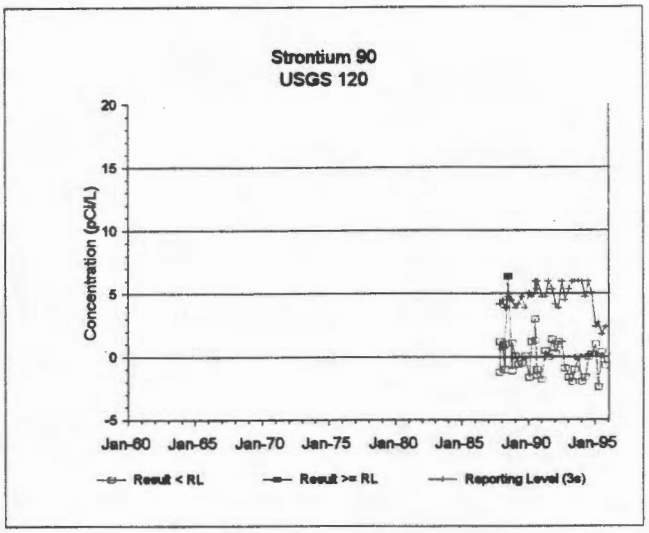


Figure B-5. Strontium-90 Concentrations in Selected Wells in the RWMC Area (continued).

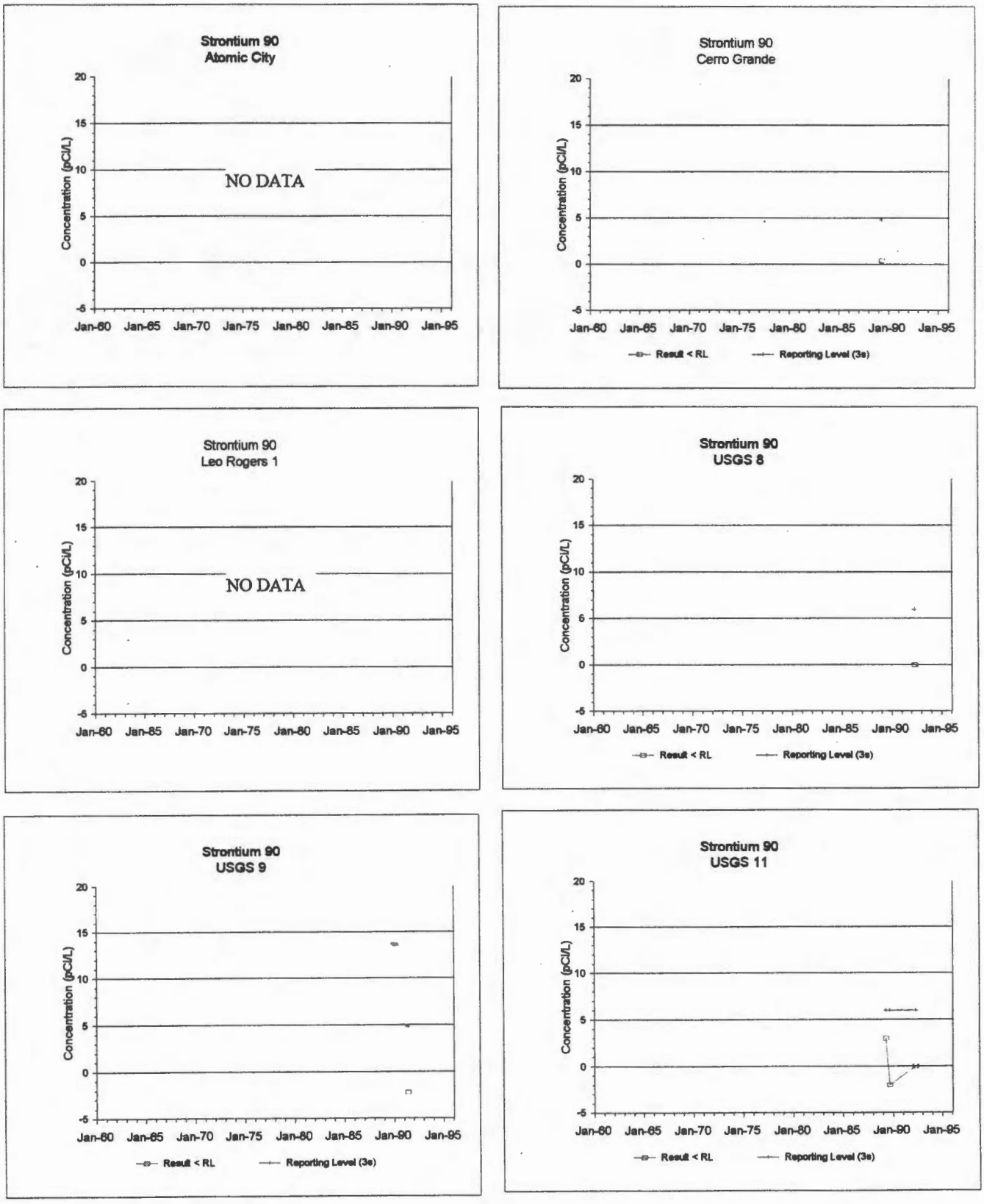


Figure B-6. Strontium-90 Concentrations in Selected Wells near the INEEL Southern Boundary.

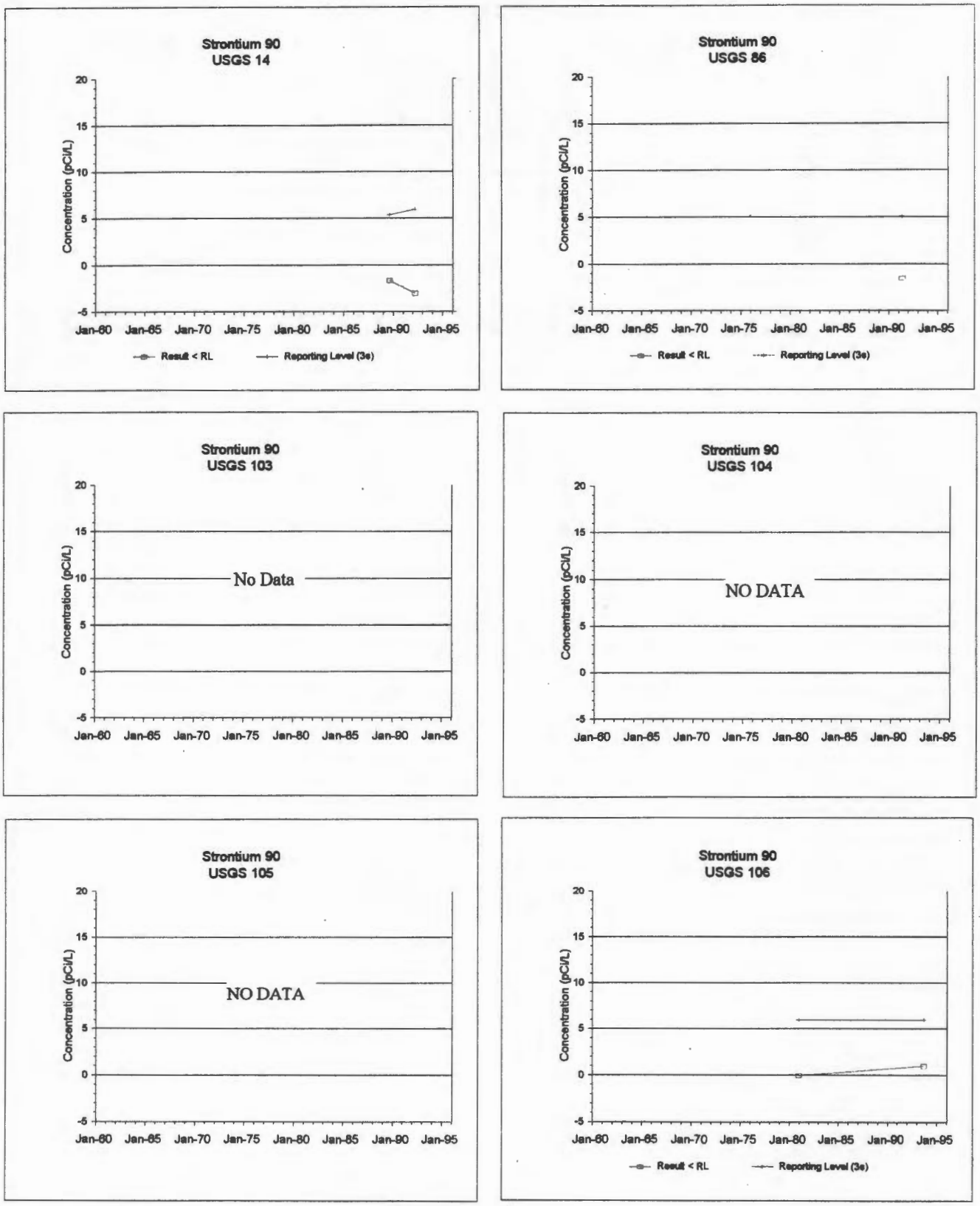
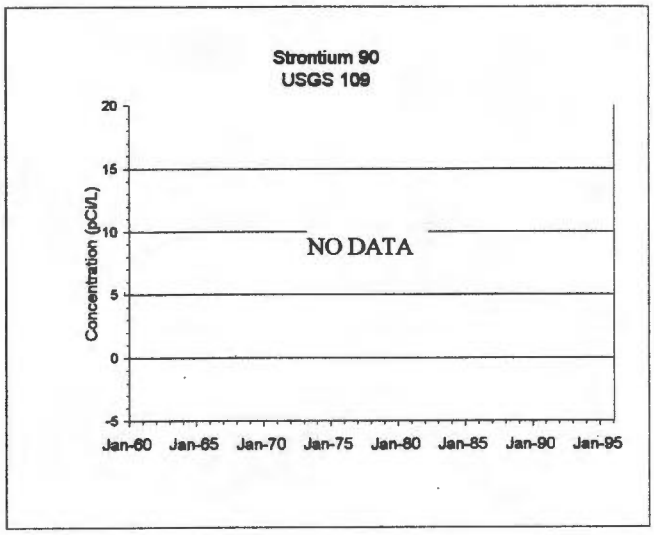


Figure B-6. Strontium-90 Concentrations in Selected Wells near the INEEL Southern Boundary (continued).



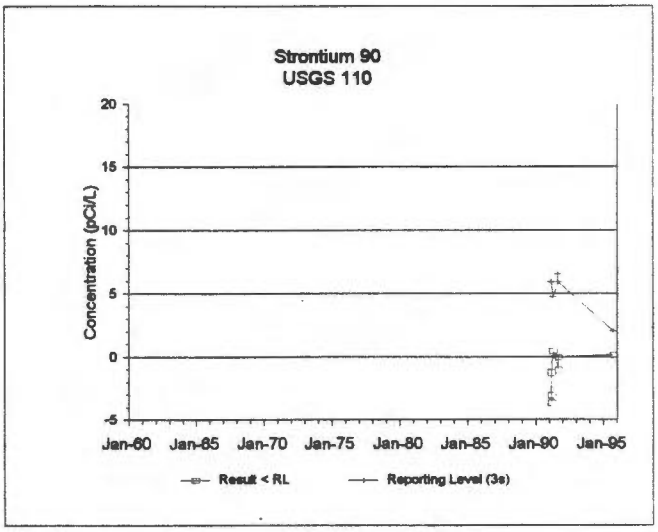


Figure B-6. Strontium-90 Concentrations in Selected Wells near the INEEL Southern Boundary (continued).

ATTACHMENT C

Summary Table of Plutonium-238 Results

Table C-1. Summary of Plutonium-238 Results.

Well Name	'72	'73	'74	'75	'76	'77	'78	'79	'80	'81	'82	'83	'84	'85	'86	'87	'88	'89	'90	'91	'92	'93	'94	'95
TAN Area Wells																								
ANP 3 (TAN Injection Well)																1.22	0.18	ND 0.26						
ANP 4 (IET Injection Well)																ND		ND						
ANP 6																ND								
ANP 9																								
USGS 7																								
USGS 24																	ND	ND						
USGS 26																								
NRF Area Wells																								
NRF 1																ND								
NRF 3																ND								
USGS 15																								
USGS 17																			ND					
USGS 97																							ND	ND[2]
USGS 99																							ND	
TRA/ICPP/CFA Area Wells																								
CFA 1																0.11	ND[3]							
CFA 2																ND	ND							
CPP 1														ND		ND							ND	ND[2]
CPP 2																ND							ND	

Table C-1. Summary of Plutonium-238 Results (Continued).

Well Name	'72	'73	'74	'75	'76	'77	'78	'79	'80	'81	'82	'83	'84	'85	'86	'87	'88	'89	'90	'91	'92	'93	'94	'95
CPP 4												ND[2]				ND							ND	
Fire Station 2																ND							ND	
MTR Test																								
TRA 1																ND								
TRA-4																ND								
Site 19																								
USGS 20																								
USGS 36																								
USGS 38																							ND	ND[2]
USGS 39																								
USGS 44																					ND[3]			
USGS 47			0.05 ND	0.007[3] ND							ND	0.5			ND	ND	ND	ND		ND	ND	ND		ND
USGS 52																								
USGS 57																								
USGS 58				ND																				
USGS 59																								
USGS 65											ND		ND										ND	ND[2]
USGS 76																							ND	
USGS 77																								ND[2]
USGS 79																								
USGS 82																								
USGS 84																								ND[2]
USGS 85																								
USGS 115																								

Table C-1. Summary of Plutonium-238 Results (Continued).

Well Name	'72	'73	'74	'75	'76	'77	'78	'79	'80	'81	'82	'83	'84	'85	'86	'87	'88	'89	'90	'91	'92	'93	'94	'95
ANL West Area Wells																								
Arbor Test																		ND						
EBR II-1																ND								
USGS 100																								
RWMC Area Wells																								
RWMC Prod.			ND	ND[3]	ND	ND	ND			ND[2]	ND[2]	ND[2]	ND[2]	ND[2]	ND[2]	ND[3]	ND[2]	ND[3]	ND[2]	ND[2]	ND			ND[2]
USGS 87	ND[2]	0.08[3] ND[8]	0.03 ND[10]	ND[3]	ND	ND	ND[2]	ND	ND[2]	ND[2]	ND[3]	ND[2]	ND[2]	ND[2]	ND[2]	ND[2]	ND[3]	ND[4]	ND[3]	ND	ND[2]			ND[3]
USGS 88	ND[3]	0.27[3] ND[9]	0.03 ND[11]	ND[6]	ND	ND	ND[2]	ND	ND[2]	ND[2]	ND[3]	0.81 ND[4]	ND[2]	ND[2]	ND[2]	ND[3]	ND[3]	ND[4]	ND[5]	ND	ND[2]			ND[3]
USGS 89	ND[3]	0.04[2] ND[11]	0.04[2] ND[10]	ND[7]	ND[2]	ND	ND[2]	ND	ND	ND[2]	ND[3]	ND[2]	ND[2]	ND[2]	ND[2]	ND[3]	ND[3]	ND[3]	ND	ND	ND			ND[2]
USGS 90	9.0[2] ND[2]	0.13[2] ND[10]	0.04[2] ND[6]	ND[5]	ND[2]	ND	ND[2]	ND	ND[2]	ND[2]	ND[4]	ND[3]	ND[2]		ND[2]	ND[3]	ND[3]	ND[4]	ND[4]	ND	ND[2]			ND[3]
USGS 117																ND	ND[2]	ND[3]	ND[3]	ND	ND			ND[2]
USGS 119																ND	ND[2]	ND[3]	ND	ND[2]	ND			ND[2]
USGS 120																ND	ND[2]	ND[4]	ND[6]	ND	ND[5]	ND[4]	ND[3]	ND[3]
INEL Southern Boundary Area Wells																								
Atomic City				ND[3]																				
Cerro Grande																								
Leo Rogers 1																								
USGS 8																								
USGS 9																								
USGS 11																		ND						
USGS 14																		ND						

Table C-1. Summary of Plutonium-238 Results (Continued).																							
Well Name	'72	'73	'74	'75	'76	'77	'78	'79	'80	'81	'82	'83	'84	'85	'86	'87	'88	'89	'90	'91	'92	'93	'94	'95
USGS 86																								
USGS 103																								
USGS 104																								
USGS 105																								
USGS 106																								
USGS 109																								
USGS 110																								ND

Concentrations reported in the table are in pCi/L.

ND Nondetect, analytical result was less than the reporting level (3s).

Note: Positive detections and non-detects are reported separately. If more than one non-detect result is available in a year, the number of samples are reported in superscript. If more than one positive detection value is available in a year, the maximum reported concentration is reported with the number of positive detections shown in superscript.

Table C-2. Plutonium-238 Results.

Well Name	Sample Date	Analyte	Result* (pCi/L)	Uncertainty at 3 Sigma (pCi/L)
ANP 3	***10/27/87***	***Pu-238***	***1.22***	***0.3***
ANP 3	***01/11/88***	***Pu-238***	***0.18***	***0.15***
ANP 3	03/07/89	Pu-238	0.01	0.09
ANP 3	***12/12/89***	***Pu-238***	***0.26***	***0.12***
ANP 4	10/27/87	Pu-238	0	0.09
ANP 4	03/01/89	Pu-238	-0.02	0.06
ANP 06	10/28/87	Pu-238	0.02	0.06
Arbor Test	02/15/89	Pu-238	-0.02	0.12
Atomic City	10/27/75	Pu-238	0.0009	0.0015
Atomic City	11/13/75	Pu-238	0.0001	0.0018
Atomic City	12/03/75	Pu-238	0.0009	0.0018
CFA 1	***10/15/87***	***Pu-238***	***0.11***	***0.09***
CFA 1	01/05/88	Pu-238	0.13	0.18
CFA 1	04/12/88	Pu-238	-0.008	0.042
CFA 1	04/19/88	Pu-238	0.0014	0.0129
CFA 2	10/14/87	Pu-238	-0.03	0.06
CFA 2	01/05/88	Pu-238	-0.02	0.09
CPP 1	05/13/85	Pu-238	0.001	0.012
CPP 1	10/22/87	Pu-238	0	0.06
CPP 1	04/22/94	Pu-238	0.004	0.048
CPP 1	04/13/95	Pu-238	-0.11	0.048
CPP 1	10/16/95	Pu-238	-0.01	0.06
CPP 2	10/22/87	Pu-238	-0.014	0.048
CPP 2	05/04/94	Pu-238	0	0.06
CPP 4	10/26/83	Pu-238	-0.03	0.06
CPP 4	11/15/83	Pu-238	0.001	0.039
CPP 4	10/22/87	Pu-238	0.04	0.09
CPP 4	04/13/94	Pu-238	-0.004	0.042
EBR II 1	10/15/87	Pu-238	-0.06	0.06
Firesta 2	11/03/87	Pu-238	0.01	0.06
Firesta 2	04/07/94	Pu-238	0.007	0.096
NRF 1	10/29/87	Pu-238	0.07	0.09
NRF 3	10/29/87	Pu-238	0.01	0.057
RWMC Prod.	11/23/74	Pu-238	0.02	0.06
RWMC Prod.	10/28/75	Pu-238	0.0006	0.0015
RWMC Prod.	11/13/75	Pu-238	0.001	0.006
RWMC Prod.	12/03/75	Pu-238	0.001	0.0027
RWMC Prod.	10/26/76	Pu-238	0.001	0.015
RWMC Prod.	04/20/77	Pu-238	0	0.015
RWMC Prod.	05/11/78	Pu-238	0.01	0.018
RWMC Prod.	04/30/81	Pu-238	0.01	0.06
RWMC Prod.	10/13/81	Pu-238	0	0.06
RWMC Prod.	04/15/82	Pu-238	0.03	0.06
RWMC Prod.	10/11/82	Pu-238	0	0.06
RWMC Prod.	04/13/83	Pu-238	0.01	0.06
RWMC Prod.	10/06/83	Pu-238	0	0.06
RWMC Prod.	04/17/84	Pu-238	-0.004	0.006
RWMC Prod.	10/12/84	Pu-238	0.02	0.06
RWMC Prod.	04/26/85	Pu-238	0.03	0.06
RWMC Prod.	10/25/85	Pu-238	-0.017	0.06
RWMC Prod.	05/01/86	Pu-238	-0.008	0.045
RWMC Prod.	10/31/86	Pu-238	0.02	0.12
RWMC Prod.	04/21/87	Pu-238	-0.01	0.06
RWMC Prod.	09/30/87	Pu-238	0.03	0.09
RWMC Prod.	10/14/87	Pu-238	0	0.09

Table C-2. Plutonium-238 Results.

Well Name	Sample Date	Analyte	Result* (pCi/L)	Uncertainty at 3 Sigma (pCi/L)
RWMC Prod.	04/06/88	Pu-238	-0.05	0.09
RWMC Prod.	10/28/88	Pu-238	0	0.06
RWMC Prod.	01/18/89	Pu-238	-0.03	0.09
RWMC Prod.	03/23/89	Pu-238	-0.04	0.06
RWMC Prod.	07/11/89	Pu-238	-0.04	0.06
RWMC Prod.	04/05/90	Pu-238	0.015	0.066
RWMC Prod.	10/30/90	Pu-238	0.03	0.09
RWMC Prod.	04/04/91	Pu-238	-0.03	0.06
RWMC Prod.	10/15/91	Pu-238	-0.016	0.054
RWMC Prod.	04/21/92	Pu-238	-0.02	0.09
RWMC Prod.	04/17/95	Pu-238	-0.011	0.048
RWMC Prod.	10/12/95	Pu-238	-0.001	0.045
TRA 01	10/30/87	Pu-238	-0.01	0.06
TRA 04	10/30/87	Pu-238	0	0.06
USGS 011	09/13/89	Pu-238	0.006	0.039
USGS 014	09/14/89	Pu-238	0	0.06
USGS 017	03/20/90	Pu-238	0	0.06
USGS 024	01/14/88	Pu-238	-0.03	0.09
USGS 024	02/28/89	Pu-238	-0.04	0.06
USGS 038	04/18/94	Pu-238	-0.015	0.039
USGS 038	04/05/95	Pu-238	0.011	0.054
USGS 038	10/12/95	Pu-238	0.008	0.051
USGS 044	07/01/92	Pu-238	-0.014	0.066
USGS 044	07/20/92	Pu-238	0	0.06
USGS 044	07/24/92	Pu-238	-0.016	0.066
USGS 044	07/28/92	Pu-238	0	0.06
USGS 044	07/30/92	Pu-238	0	0.06
USGS 044	08/03/92	Pu-238	0.01	0.06
USGS 044	08/14/92	Pu-238	0.014	0.06
USGS 044	08/18/92	Pu-238	0	0.06
USGS 047	04/12/74	Pu-238	0.013	0.018
USGS 047	***08/01/74***	***Pu-238***	***0.05***	***0.03***
USGS 047	09/02/75	Pu-238	0.02	0.03
USGS 047	***10/27/75***	***Pu-238***	***0.0071***	***0.0039***
USGS 047	***11/12/75***	***Pu-238***	***0.006***	***0.003***
USGS 047	***12/02/75***	***Pu-238***	***0.0068***	***0.0039***
USGS 047	04/09/82	Pu-238	0.005	0.009
USGS 047	***10/17/83***	***Pu-238***	***0.5***	***0.18***
USGS 047	10/29/86	Pu-238	0.015	0.081
USGS 047	10/26/87	Pu-238	0	0.06
USGS 047	09/30/88	Pu-238	0.02	0.06
USGS 047	10/19/89	Pu-238	-0.001	0.042
USGS 047	10/24/91	Pu-238	0	0.06
USGS 047	10/21/92	Pu-238	0	0.09
USGS 047	10/26/93	Pu-238	0.004	0.045
USGS 047	10/16/95	Pu-238	0.003	0.045
USGS 058	04/26/75	Pu-238	0.009	0.015
USGS 065	04/09/82	Pu-238	0.0004	0.0042
USGS 065	04/17/84	Pu-238	-0.002	0.009
USGS 065	04/15/94	Pu-238	0	0.048
USGS 065	04/12/95	Pu-238	-0.015	0.045
USGS 065	10/11/95	Pu-238	0.004	0.045
USGS 076	04/26/94	Pu-238	0	0.06
USGS 077	04/24/95	Pu-238	-0.01	0.06
USGS 077	10/24/95	Pu-238	-0.001	0.042

Table C-2. Plutonium-238 Results.

Well Name	Sample Date	Analyte	Result* (pCi/L)	Uncertainty at 3 Sigma (pCi/L)
USGS 084	03/29/95	Pu-238	-0.02	0.06
USGS 084	10/18/95	Pu-238	0.01	0.06
USGS 087	09/20/72	Pu-238	<0.05	—
USGS 087	10/12/72	Pu-238	<0.05	—
USGS 087	11/20/72	Pu-238	<0.04	—
USGS 087	02/24/73	Pu-238	0.008	0.03
USGS 087	03/30/73	Pu-238	0.005	0.015
USGS 087	***04/30/73***	***Pu-238***	***0.04***	***0.027***
USGS 087	***05/29/73***	***Pu-238***	***0.029***	***0.024***
USGS 087	06/29/73	Pu-238	0.016	0.024
USGS 087	07/24/73	Pu-238	0.017	0.024
USGS 087	08/29/73	Pu-238	0.02	0.03
USGS 087	09/26/73	Pu-238	0.012	0.021
USGS 087	10/31/73	Pu-238	0.02	0.06
USGS 087	***11/29/73***	***Pu-238***	***0.08***	***0.018***
USGS 087	12/20/73	Pu-238	0.014	0.018
USGS 087	01/18/74	Pu-238	0.005	0.018
USGS 087	02/25/74	Pu-238	0.0011	0.0021
USGS 087	**03/27/74**	**Pu-238**	**0.03**	**0.03**
USGS 087	04/24/74	Pu-238	0.007	0.021
USGS 087	05/29/74	Pu-238	0.01	0.03
USGS 087	08/02/74	Pu-238	0.001	0.006
USGS 087	08/27/74	Pu-238	0.004	0.024
USGS 087	09/30/74	Pu-238	0.04	0.06
USGS 087	10/15/74	Pu-238	<0.02	—
USGS 087	11/26/74	Pu-238	0.02	0.09
USGS 087	12/27/74	Pu-238	0.009	0.021
USGS 087	02/01/75	Pu-238	0.004	0.015
USGS 087	03/27/75	Pu-238	0.015	0.027
USGS 087	04/25/75	Pu-238	-0.003	0.015
USGS 087	05/30/75	Pu-238	-0.001	0.027
USGS 087	09/29/75	Pu-238	0	0.003
USGS 087	02/05/76	Pu-238	0	0.03
USGS 087	04/19/77	Pu-238	-0.003	0.018
USGS 087	04/26/78	Pu-238	0.005	0.012
USGS 087	10/04/78	Pu-238	-0.0042	0.036
USGS 087	05/03/79	Pu-238	-0.0098	0.036
USGS 087	04/21/80	Pu-238	-0.002	0.042
USGS 087	10/14/80	Pu-238	0.01	0.06
USGS 087	04/09/81	Pu-238	-0.01	0.06
USGS 087	10/07/81	Pu-238	0.01	0.06
USGS 087	04/08/82	Pu-238	-0.009	0.039
USGS 087	07/15/82	Pu-238	-0.003	0.006
USGS 087	10/06/82	Pu-238	-0.02	0.06
USGS 087	04/15/83	Pu-238	0	0.06
USGS 087	10/06/83	Pu-238	0.01	0.06
USGS 087	04/17/84	Pu-238	-0.02	0.06
USGS 087	10/10/84	Pu-238	-0.01	0.06
USGS 087	04/26/85	Pu-238	0.04	0.09
USGS 087	10/22/85	Pu-238	0.03	0.09
USGS 087	04/18/86	Pu-238	0.02	0.06
USGS 087	10/31/86	Pu-238	-0.017	0.081
USGS 087	04/22/87	Pu-238	0.01	0.06
USGS 087	09/30/87	Pu-238	-0.01	0.09
USGS 087	04/06/88	Pu-238	0.01	0.09
USGS 087	06/22/88	Pu-238	0.012	0.057
USGS 087	10/18/88	Pu-238	0.005	0.048
USGS 087	01/04/89	Pu-238	-0.03	0.09
USGS 087	04/05/89	Pu-238	0.07	0.09
USGS 087	07/11/89	Pu-238	-0.04	0.09
USGS 087	10/26/89	Pu-238	0.003	0.039
USGS 087	01/03/90	Pu-238	0	0.09
USGS 087	04/04/90	Pu-238	-0.02	0.06
USGS 087	07/09/90	Pu-238	-0.06	0.09
USGS 087	10/15/91	Pu-238	-0.013	0.051
USGS 087	01/14/92	Pu-238	0	0.06
USGS 087	04/21/92	Pu-238	-0.04	0.09
USGS 087	01/11/95	Pu-238	-0.008	0.045

Table C-2. Plutonium-238 Results.

Well Name	Sample Date	Analyte	Result* (pCi/L)	Uncertainty at 3 Sigma (pCi/L)
USGS 087	04/17/95	Pu-238	-0.02	0.048
USGS 087	10/16/95	Pu-238	-0.011	0.045
USGS 088	09/20/72	Pu-238	<0.09	---
USGS 088	10/12/72	Pu-238	<0.05	---
USGS 088	11/20/72	Pu-238	0.04	0.06
USGS 088	02/02/73	Pu-238	0.02	0.15
USGS 088	02/24/73	Pu-238	0.008	0.027
USGS 088	03/30/73	Pu-238	0.005	0.012
USGS 088	***04/30/73***	***Pu-238***	***0.028***	***0.021***
USGS 088	***05/29/73***	***Pu-238***	***0.27***	***0.09***
USGS 088	06/29/73	Pu-238	0.01	0.03
USGS 088	07/24/73	Pu-238	0.013	0.021
USGS 088	08/29/73	Pu-238	0.01	0.03
USGS 088	09/26/73	Pu-238	0.01	0.03
USGS 088	10/31/73	Pu-238	0.01	0.03
USGS 088	11/29/73	Pu-238	0.005	0.015
USGS 088	***12/20/73***	***Pu-238***	***0.04***	***0.03***
USGS 088	01/18/74	Pu-238	<0.02	---
USGS 088	02/25/74	Pu-238	0.002	0.06
USGS 088	03/27/74	Pu-238	0.002	0.015
USGS 088	***04/24/74***	***Pu-238***	***0.033***	***0.027***
USGS 088	05/29/74	Pu-238	0.01	0.03
USGS 088	06/29/74	Pu-238	0.007	0.015
USGS 088	08/02/74	Pu-238	<0.02	---
USGS 088	08/27/74	Pu-238	<0.01	---
USGS 088	09/30/74	Pu-238	<0.02	---
USGS 088	10/16/74	Pu-238	<0.02	---
USGS 088	11/26/74	Pu-238	0.02	0.09
USGS 088	12/27/74	Pu-238	0.014	0.015
USGS 088	02/01/75	Pu-238	0.006	0.018
USGS 088	04/25/75	Pu-238	0.002	0.012
USGS 088	05/30/75	Pu-238	-0.001	0.015
USGS 088	07/25/75	Pu-238	0.014	0.027
USGS 088	08/28/75	Pu-238	0	0.018
USGS 088	09/29/75	Pu-238	-0.003	0.027
USGS 088	02/05/76	Pu-238	0	0.03
USGS 088	04/19/77	Pu-238	-0.002	0.018
USGS 088	04/26/78	Pu-238	0.007	0.018
USGS 088	10/25/78	Pu-238	-0.005	0.027
USGS 088	05/03/79	Pu-238	-0.0059	0.066
USGS 088	04/21/80	Pu-238	-0.014	0.042
USGS 088	10/14/80	Pu-238	0.004	0.039
USGS 088	04/09/81	Pu-238	-0.01	0.06
USGS 088	10/07/81	Pu-238	0.02	0.06
USGS 088	04/08/82	Pu-238	-0.002	0.042
USGS 088	07/15/82	Pu-238	0	0.009
USGS 088	10/06/82	Pu-238	0	0.12
USGS 088	04/18/83	Pu-238	0.03	0.18
USGS 088	***04/18/83***	***Pu-238***	***0.81***	***0.24***
USGS 088	04/18/83	Pu-238	0.03	0.06
USGS 088	09/23/83	Pu-238	-0.001	0.024
USGS 088	10/06/83	Pu-238	-0.013	0.036
USGS 088	04/18/84	Pu-238	-0.017	0.042
USGS 088	10/10/84	Pu-238	-0.012	0.045
USGS 088	04/26/85	Pu-238	-0.015	0.054
USGS 088	10/22/85	Pu-238	-0.04	0.06
USGS 088	04/18/86	Pu-238	0	0.06
USGS 088	11/03/86	Pu-238	-0.01	0.09
USGS 088	04/22/87	Pu-238	-0.015	0.054
USGS 088	09/22/87	Pu-238	-0.01	0.09
USGS 088	09/30/87	Pu-238	-0.01	0.06
USGS 088	04/05/88	Pu-238	-0.01	0.06
USGS 088	06/24/88	Pu-238	-0.02	0.06
USGS 088	09/29/88	Pu-238	-0.03	0.09
USGS 088	01/04/89	Pu-238	-0.02	0.09
USGS 088	04/04/89	Pu-238	-0.04	0.06
USGS 088	07/12/89	Pu-238	-0.016	0.069
USGS 088	10/17/89	Pu-238	-0.014	0.072

Table C-2. Plutonium-238 Results.

Well Name	Sample Date	Analyte	Result* (pCi/L)	Uncertainty at 3 Sigma (pCi/L)
USGS 088	01/23/90	Pu-238	-0.01	0.042
USGS 088	04/10/90	Pu-238	0.014	0.054
USGS 088	07/19/90	Pu-238	-0.03	0.09
USGS 088	08/28/90	Pu-238	-0.012	0.051
USGS 088	08/28/90	Pu-238	-0.01	0.054
USGS 088	10/15/91	Pu-238	0.004	0.051
USGS 088	01/16/92	Pu-238	0.02	0.06
USGS 088	04/15/92	Pu-238	-0.014	0.045
USGS 088	01/24/95	Pu-238	0.013	0.042
USGS 088	04/18/95	Pu-238	-0.007	0.048
USGS 088	10/23/95	Pu-238	-0.011	0.048
USGS 089	09/20/72	Pu-238	<0.05	---
USGS 089	10/12/72	Pu-238	<0.05	---
USGS 089	11/20/72	Pu-238	<0.04	---
USGS 089	02/02/73	Pu-238	0.007	0.06
USGS 089	02/24/73	Pu-238	0.0004	0.003
USGS 089	03/30/73	Pu-238	0.005	0.015
USGS 089	04/30/73	Pu-238	0.009	0.021
USGS 089	05/29/73	Pu-238	0.02	0.09
USGS 089	06/29/73	Pu-238	<0.02	---
USGS 089	07/24/73	Pu-238	<0.02	---
USGS 089	08/29/73	Pu-238	0.01	0.03
USGS 089	***09/26/73***	***Pu-238***	***0.04***	***0.03***
USGS 089	09/26/73	Pu-238	0.01	0.03
USGS 089	***11/01/73***	***Pu-238***	***0.021***	***0.018***
USGS 089	11/29/73	Pu-238	0.016	0.021
USGS 089	12/20/73	Pu-238	0	0.03
USGS 089	01/18/74	Pu-238	0.04	0.06
USGS 089	02/26/74	Pu-238	0.01	0.021
USGS 089	03/27/74	Pu-238	0.02	0.03
USGS 089	***04/25/74***	***Pu-238***	***0.04***	***0.03***
USGS 089	***05/29/74***	***Pu-238***	***0.04***	***0.03***
USGS 089	06/28/74	Pu-238	0.002	0.015
USGS 089	08/01/74	Pu-238	<0.03	---
USGS 089	08/27/74	Pu-238	<0.03	---
USGS 089	10/01/74	Pu-238	0.02	0.03
USGS 089	10/16/74	Pu-238	<0.02	---
USGS 089	11/26/74	Pu-238	0.02	0.06
USGS 089	12/27/74	Pu-238	0.01	0.012
USGS 089	02/01/75	Pu-238	0.012	0.021
USGS 089	03/27/75	Pu-238	0	0.021
USGS 089	04/25/75	Pu-238	0	0.012
USGS 089	05/31/75	Pu-238	0	0.015
USGS 089	07/25/75	Pu-238	0	0.018
USGS 089	08/28/75	Pu-238	0.007	0.024
USGS 089	09/29/75	Pu-238	0	0.03
USGS 089	02/05/76	Pu-238	-0.01	0.03
USGS 089	10/30/76	Pu-238	-0.004	0.018
USGS 089	04/18/77	Pu-238	0.005	0.018
USGS 089	04/26/78	Pu-238	-0.001	0.015
USGS 089	10/27/78	Pu-238	-0.0048	0.033
USGS 089	05/04/79	Pu-238	-0.02	0.03
USGS 089	10/14/80	Pu-238	0.001	0.039
USGS 089	04/09/81	Pu-238	-0.02	0.06
USGS 089	10/07/81	Pu-238	0	0.06
USGS 089	04/08/82	Pu-238	-0.013	0.042
USGS 089	07/15/82	Pu-238	-0.004	0.009
USGS 089	10/06/82	Pu-238	-0.008	0.042
USGS 089	04/18/83	Pu-238	0	0.06
USGS 089	10/06/83	Pu-238	0.005	0.042
USGS 089	04/18/84	Pu-238	0.01	0.108
USGS 089	10/17/84	Pu-238	-0.012	0.045
USGS 089	04/29/85	Pu-238	0.02	0.06
USGS 089	10/22/85	Pu-238	0	0.06
USGS 089	04/18/86	Pu-238	0	0.06
USGS 089	11/04/86	Pu-238	0	0.09
USGS 089	04/22/87	Pu-238	0.015	0.066
USGS 089	09/22/87	Pu-238	0	0.09

Table C-2. Plutonium-238 Results.

Well Name	Sample Date	Analyte	Result* (pCi/L)	Uncertainty at 3 Sigma (pCi/L)
USGS 089	09/30/87	Pu-238	0	0.09
USGS 089	04/05/88	Pu-238	-0.01	0.06
USGS 089	06/24/88	Pu-238	0.02	0.06
USGS 089	10/18/88	Pu-238	-0.02	0.06
USGS 089	01/04/89	Pu-238	-0.04	0.09
USGS 089	04/04/89	Pu-238	0.01	0.06
USGS 089	10/18/89	Pu-238	-0.01	0.09
USGS 089	04/10/90	Pu-238	-0.01	0.06
USGS 089	10/16/91	Pu-238	0.01	0.06
USGS 089	04/15/92	Pu-238	-0.022	0.042
USGS 089	04/21/95	Pu-238	-0.02	0.09
USGS 089	10/25/95	Pu-238	-0.005	0.042
USGS 090	***02/14/72***	***Pu-238***	***0.96***	***0.27***
USGS 090	***09/20/72***	***Pu-238***	***9***	***0.09***
USGS 090	10/12/72	Pu-238	<0.04	---
USGS 090	11/20/72	Pu-238	<0.05	---
USGS 090	02/02/73	Pu-238	0.01	0.12
USGS 090	02/24/73	Pu-238	0.01	0.03
USGS 090	03/30/73	Pu-238	0.05	0.15
USGS 090	04/30/73	Pu-238	0.014	0.018
USGS 090	05/29/73	Pu-238	0.013	0.015
USGS 090	06/29/73	Pu-238	0.008	0.012
USGS 090	***07/24/73***	***Pu-238***	***0.13***	***0.06***
USGS 090	08/29/73	Pu-238	0	0.03
USGS 090	09/26/73	Pu-238	0.01	0.03
USGS 090	10/31/73	Pu-238	0.012	0.021
USGS 090	***11/29/73***	***Pu-238***	***0.024***	***0.024***
USGS 090	12/20/73	Pu-238	0.004	0.03
USGS 090	01/18/74	Pu-238	0	0.6
USGS 090	***02/25/74***	***Pu-238***	***0.035***	***0.027***
USGS 090	03/27/74	Pu-238	0	0.03
USGS 090	04/24/74	Pu-238	0.05	0.06
USGS 090	05/29/74	Pu-238	0	0.03
USGS 090	***06/29/74***	***Pu-238***	***0.03***	***0.03***
USGS 090	08/02/74	Pu-238	0.005	0.012
USGS 090	12/14/74	Pu-238	0.007	0.009
USGS 090	01/31/75	Pu-238	0.009	0.027
USGS 090	03/27/75	Pu-238	0	0.024
USGS 090	04/25/75	Pu-238	-0.003	0.012
USGS 090	05/30/75	Pu-238	-0.002	0.015
USGS 090	09/26/75	Pu-238	0	0.018
USGS 090	02/05/76	Pu-238	0	0.03
USGS 090	10/29/76	Pu-238	-0.008	0.015
USGS 090	04/18/77	Pu-238	-0.0009	0.015
USGS 090	04/26/78	Pu-238	-0.001	0.012
USGS 090	10/25/78	Pu-238	0.0019	0.072
USGS 090	05/13/79	Pu-238	-0.02	0.027
USGS 090	04/21/80	Pu-238	-0.009	0.042
USGS 090	10/14/80	Pu-238	0.009	0.042
USGS 090	04/09/81	Pu-238	0.11	0.12
USGS 090	10/08/81	Pu-238	0.04	0.09
USGS 090	04/08/82	Pu-238	-0.018	0.045
USGS 090	07/15/82	Pu-238	-0.001	0.006
USGS 090	10/06/82	Pu-238	0.0004	0.0045
USGS 090	10/06/82	Pu-238	-0.01	0.06
USGS 090	01/24/83	Pu-238	0.001	0.015
USGS 090	04/15/83	Pu-238	-0.02	0.06
USGS 090	10/06/83	Pu-238	-0.001	0.042
USGS 090	04/17/84	Pu-238	-0.03	0.12
USGS 090	10/10/84	Pu-238	-0.02	0.06
USGS 090	04/18/86	Pu-238	0	0.06
USGS 090	11/03/86	Pu-238	-0.017	0.081
USGS 090	04/22/87	Pu-238	0.011	0.057
USGS 090	09/23/87	Pu-238	-0.03	0.09
USGS 090	09/30/87	Pu-238	0.015	0.084
USGS 090	04/06/88	Pu-238	-0.03	0.06
USGS 090	06/22/88	Pu-238	-0.013	0.054
USGS 090	10/18/88	Pu-238	0.004	0.045

Table C-2. Plutonium-238 Results.

Well Name	Sample Date	Analyte	Result* (pCi/L)	Uncertainty at 3 Sigma (pCi/L)
USGS 090	01/18/89	Pu-238	-0.04	0.09
USGS 090	04/05/89	Pu-238	-0.02	0.06
USGS 090	07/11/89	Pu-238	-0.03	0.06
USGS 090	10/18/89	Pu-238	-0.01	0.09
USGS 090	01/23/90	Pu-238	0.02	0.06
USGS 090	04/10/90	Pu-238	-0.002	0.042
USGS 090	07/02/90	Pu-238	-0.05	0.09
USGS 090	10/24/90	Pu-238	-0.01	0.09
USGS 090	10/16/91	Pu-238	-0.007	0.045
USGS 090	01/16/92	Pu-238	0	0.06
USGS 090	04/20/92	Pu-238	0	0.09
USGS 090	01/12/95	Pu-238	-0.029	0.039
USGS 090	04/21/95	Pu-238	-0.022	0.045
USGS 090	10/25/95	Pu-238	0.012	0.048
USGS 097	03/14/94	Pu-238	-0.036	0.045
USGS 097	03/16/95	Pu-238	-0.011	0.045
USGS 097	11/06/95	Pu-238	-0.009	0.042
USGS 098	11/29/89	Pu-238	0.01	0.06
USGS 098	03/14/94	Pu-238	-0.011	0.045
USGS 099	03/14/94	Pu-238	-0.023	0.045
USGS 110	10/25/95	Pu-238	-0.005	0.045
USGS 117	10/19/87	Pu-238	-0.05	0.06
USGS 117	06/27/88	Pu-238	0.02	0.06
USGS 117	10/17/88	Pu-238	0	0.06
USGS 117	01/12/89	Pu-238	-0.02	0.06
USGS 117	04/03/89	Pu-238	-0.01	0.06
USGS 117	10/13/89	Pu-238	-0.012	0.066
USGS 117	04/10/90	Pu-238	0.01	0.06
USGS 117	08/29/90	Pu-238	0.03	0.06
USGS 117	08/29/90	Pu-238	0.016	0.06
USGS 117	10/16/91	Pu-238	0.01	0.06
USGS 117	04/15/92	Pu-238	-0.02	0.06
USGS 117	04/21/95	Pu-238	0.002	0.048
USGS 117	10/24/95	Pu-238	0.04	0.06
USGS 119	11/06/87	Pu-238	0.014	0.075
USGS 119	06/27/88	Pu-238	0.02	0.06
USGS 119	10/17/88	Pu-238	-0.011	0.117
USGS 119	01/12/89	Pu-238	-0.012	0.099
USGS 119	04/03/89	Pu-238	0.1	0.12
USGS 119	10/17/89	Pu-238	-0.02	0.06
USGS 119	04/09/90	Pu-238	-0.015	0.042
USGS 119	10/15/91	Pu-238	0.02	0.06
USGS 119	10/15/91	Pu-238	0	0.06
USGS 119	04/16/92	Pu-238	-0.029	0.045
USGS 119	04/17/95	Pu-238	-0.15	0.051
USGS 119	10/25/95	Pu-238	0.017	0.051
USGS 120	11/18/87	Pu-238	0	0.06
USGS 120	06/27/88	Pu-238	-0.013	0.06
USGS 120	10/18/88	Pu-238	0.03	0.06
USGS 120	01/12/89	Pu-238	-0.014	0.099
USGS 120	04/04/89	Pu-238	-0.03	0.06
USGS 120	07/12/89	Pu-238	-0.02	0.06
USGS 120	10/12/89	Pu-238	0	0.06
USGS 120	01/22/90	Pu-238	0.01	0.069
USGS 120	04/09/90	Pu-238	0.02	0.06
USGS 120	07/19/90	Pu-238	-0.04	0.09
USGS 120	07/19/90	Pu-238	-0.07	0.09
USGS 120	08/27/90	Pu-238	-0.023	0.039
USGS 120	08/27/90	Pu-238	-0.02	0.039
USGS 120	10/25/91	Pu-238	-0.004	0.045
USGS 120	01/16/92	Pu-238	0	0.06
USGS 120	04/15/92	Pu-238	-0.022	0.045

Table C-2. Plutonium-238 Results.

Well Name	Sample Date	Analyte	Result* (pCi/L)	Uncertainty at 3 Sigma (pCi/L)
USGS 120	04/15/92	Pu-238	-0.022	0.045
USGS 120	07/10/92	Pu-238	0.01	0.06
USGS 120	10/05/92	Pu-238	-0.02	0.06
USGS 120	01/20/93	Pu-238	0.01	0.06
USGS 120	04/20/93	Pu-238	0.006	0.042
USGS 120	06/22/93	Pu-238	0.003	0.039
USGS 120	10/06/93	Pu-238	0.006	0.042
USGS 120	01/10/94	Pu-238	0.003	0.048
USGS 120	04/20/94	Pu-238	0.016	0.048
USGS 120	07/11/94	Pu-238	-0.024	0.039
USGS 120	01/25/95	Pu-238	0.013	0.039
USGS 120	04/12/95	Pu-238	-0.024	0.051
USGS 120	10/23/95	Pu-238	-0.012	0.051

* Concentrations greater than or equal to the reporting level of 3 sigma (3s) are in italics.

ATTACHMENT D

Summary Table of Plutonium-239/240 Results

Table D-1. Summary of Plutonium 239/240 (undifferentiated) Results.

Well Name	'72	'73	'74	'75	'76	'77	'78	'79	'80	'81	'82	'83	'84	'85	'86	'87	'88	'89	'90	'91	'92	'93	'94	'95
TAN Area Wells																								
ANP 3 (TAN Injection Well)																5	0.96	0.71 ND						
ANP 4 (IET Injection Well)																ND		ND						
ANP 6																ND								
ANP 9																								
USGS 7																								
USGS 24																	ND	ND						
USGS 26																								
NRF Area Wells																								
NRF 1																ND								
NRF 3																ND								
USGS 15																								
USGS 17																			ND					
USGS 97																								ND[2]
USGS 99																								
TRA/ICPP/CFA Area Wells																								
CFA 1																ND	ND[3]							
CFA 2																ND	ND							
CPP 1														ND		ND							ND	ND[2]
CPP 2																ND							ND	

Table D-1. Summary of Plutonium 239/240 (undifferentiated) Results (Continued).

Well Name	'72	'73	'74	'75	'76	'77	'78	'79	'80	'81	'82	'83	'84	'85	'86	'87	'88	'89	'90	'91	'92	'93	'94	'95
CPP 4												ND[2]				ND							ND	
Fire Station 2																ND								
MTR Test																								
TRA 1																ND								
TRA-4																ND								
Site 19																								
USGS 20																								
USGS 36																								
USGS 38																							ND	ND[2]
USGS 39																								
USGS 44																								
USGS 47			0.03 ND	0.003 ND[3]							ND	ND			ND	ND	ND	ND		ND				ND
USGS 52																								
USGS 57																								
USGS 58				ND																				
USGS 59																								
USGS 65											ND		ND										ND	ND[2]
USGS 76																							ND	
USGS 77																								ND[2]
USGS 79																								
USGS 82																								
USGS 84																								ND[2]
USGS 85																								
USGS 115																								

Table D-1. Summary of Plutonium 239/240 (undifferentiated) Results (Continued).

Well Name	'72	'73	'74	'75	'76	'77	'78	'79	'80	'81	'82	'83	'84	'85	'86	'87	'88	'89	'90	'91	'92	'93	'94	'95
ANL West Area Wells																								
Arbor Test																		ND						
EBR II-1																ND								
USGS 100																								
RWMC Area Wells																								
RWMC Prod.			ND	ND[3]	ND	ND	ND			ND[2]	ND[2]	ND[2]	ND[2]	ND[2]	ND[2]	ND[3]	ND[2]	ND[3]	ND[2]	ND[2]	ND			ND[2]
USGS 87	ND[3]	0.03 ND[10]	0.03 ND[9]	ND[5]	ND[2]	ND	ND[2]	ND	ND[2]	ND[2]	ND[3]	ND[2]	ND[2]	ND[2]	ND[2]	ND[2]	ND[3]	ND[4]	ND[3]	ND	ND[2]			ND[3]
USGS 88	ND[3]	ND[12]	0.04 ND[11]	ND[6]	0.04 ND	ND	ND[2]	ND	ND[2]	ND[2]	ND[3]	ND[5]	ND[2]	ND[2]	ND[2]	ND[3]	ND[3]	ND[4]	ND[5]	ND	ND[2]			ND[3]
USGS 89	ND[4]	0.29 ND[12]	0.07[9] ND[9]	ND[7]	ND[2]	ND	ND[2]	ND	ND	ND[2]	ND[3]	ND[2]	ND[2]	ND[2]	ND[2]	ND[3]	ND[3]	ND[3]	ND	ND	ND			ND[2]
USGS 90	ND[4]	ND[11]	0.03[2] ND[6]	ND[5]	ND	ND	ND[2]	ND	ND[2]	ND[2]	ND[4]	ND[3]	ND[2]		ND[2]	ND[3]	ND[3]	ND[4]	ND[4]	ND	ND[2]			ND[3]
USGS 117																ND	ND[2]	ND[3]	ND[3]	ND	ND			ND[2]
USGS 119																ND	ND[2]	ND[3]	ND	ND[2]	ND			ND[2]
USGS 120																ND	ND[2]	ND[4]	ND[5]	ND	ND[2]		ND[2]	ND[3]
INEL Southern Boundary Area Wells																								
Atomic City				ND[3]																				
Cerro Grande																								
Leo Rogers 1																								
USGS 8																								
USGS 9																								
USGS 11																		ND						
USGS 14																		ND						

Table D-1. Summary of Plutonium 239/240 (undifferentiated) Results (Continued).																								
Well Name	'72	'73	'74	'75	'76	'77	'78	'79	'80	'81	'82	'83	'84	'85	'86	'87	'88	'89	'90	'91	'92	'93	'94	'95
USGS 86																								
USGS 103																								
USGS 104																								
USGS 105																								
USGS 106																								
USGS 109																								
USGS 110																								ND

Concentrations reported in the table are in pCi/L.

ND Nondetect, analytical result was less than the reporting level (3s).

Note: Positive detections and non-detects are reported separately. If more than one non-detect result is available in a year, the number of samples are reported in superscript. If more than one positive detection value is available in a year, the maximum reported concentration is reported with the number of positive detections shown in superscript.

Table D-2. Plutonium-239/240 (Undifferentiated) Results.

Well Name	Sample Date	Analyte	Result* (pCi/L)	Uncertainty at 3 Sigma (pCi/L)
ANP 3	***10/27/87***	***Pu-239/240***	***5***	***0.9***
ANP 3	***01/11/88***	***Pu-239/240***	***0.96***	***0.24***
ANP 3	03/07/89	Pu-239/240	0.02	0.06
ANP 3	***12/12/89***	***Pu-239/240***	***0.71***	***0.18***
ANP 4	10/27/87	Pu-239/240	0.01	0.06
ANP 4	03/01/89	Pu-239/240	0	0.06
ANP 6	10/28/87	Pu-239/240	0.013	0.054
Arbor Test	02/15/89	Pu-239/240	-0.03	0.06
Atomic City	10/27/75	Pu-239/240	-0.003	0.0018
Atomic City	11/13/75	Pu-239/240	-0.0009	0.0015
Atomic City	12/03/75	Pu-239/240	-0.0001	0.0015
CFA 1	10/15/87	Pu-239/240	0.02	0.06
CFA 1	01/05/88	Pu-239/240	0	0.09
CFA 1	04/12/88	Pu-239/240	-0.009	0.024
CFA 1	04/19/88	Pu-239/240	0.0012	0.0078
CFA 2	10/14/87	Pu-239/240	-0.009	0.048
CFA 2	01/05/88	Pu-239/240	0.015	0.057
CPP 1	05/13/85	Pu-239/240	-0.002	0.012
CPP 1	10/22/87	Pu-239/240	-0.009	0.048
CPP 1	04/22/94	Pu-239/240	0.004	0.033
CPP 1	04/13/95	Pu-239/240	0	0.036
CPP 1	10/16/95	Pu-239/240	0	0.045
CPP 2	10/22/87	Pu-239/240	-0.014	0.048
CPP 2	05/04/94	Pu-239/240	0.014	0.051
CPP 4	10/26/83	Pu-239/240	-0.004	0.045
CPP 4	11/15/83	Pu-239/240	-0.009	0.039
CPP 4	10/22/87	Pu-239/240	-0.01	0.06
CPP 4	04/13/94	Pu-239/240	0.022	0.039
EBR II 1	10/15/87	Pu-239/240	-0.014	0.048
Firestation 2	11/03/87	Pu-239/240	-0.001	0.048
NRF 1	10/29/87	Pu-239/240	0	0.06
NRF 3	10/29/87	Pu-239/240	-0.01	0.06
RWMC Prod.	11/23/74	Pu-239/240	0.02	0.06
RWMC Prod.	10/28/75	Pu-239/240	0	0.0015
RWMC Prod.	11/13/75	Pu-239/240	0	0.003
RWMC Prod.	12/03/75	Pu-239/240	-0.0005	0.0015
RWMC Prod.	10/26/76	Pu-239/240	0	0.018
RWMC Prod.	04/20/77	Pu-239/240	-0.002	0.015
RWMC Prod.	05/11/78	Pu-239/240	-0.021	0.021
RWMC Prod.	04/30/81	Pu-239/240	0	0.06
RWMC Prod.	10/13/81	Pu-239/240	0.01	0.06
RWMC Prod.	04/15/82	Pu-239/240	0	0.06
RWMC Prod.	10/11/82	Pu-239/240	-0.04	0.06
RWMC Prod.	04/13/83	Pu-239/240	-0.04	0.06
RWMC Prod.	10/06/83	Pu-239/240	-0.02	0.06
RWMC Prod.	04/17/84	Pu-239/240	0.002	0.006
RWMC Prod.	10/12/84	Pu-239/240	0	0.06
RWMC Prod.	04/26/85	Pu-239/240	0	0.06
RWMC Prod.	10/25/85	Pu-239/240	-0.01	0.06
RWMC Prod.	05/01/86	Pu-239/240	-0.008	0.045
RWMC Prod.	10/31/86	Pu-239/240	-0.01	0.06
RWMC Prod.	04/21/87	Pu-239/240	0.011	0.048
RWMC Prod.	09/30/87	Pu-239/240	0.005	0.051
RWMC Prod.	10/14/87	Pu-239/240	-0.04	0.09
RWMC Prod.	04/06/88	Pu-239/240	-0.006	0.048

Table D-2. Plutonium-239/240 (Undifferentiated) Results.

Well Name	Sample Date	Analyte	Result* (pCi/L)	Uncertainty at 3 Sigma (pCi/L)
RWMC Prod.	10/28/88	Pu-239/240	-0.005	0.048
RWMC Prod.	01/18/89	Pu-239/240	-0.01	0.06
RWMC Prod.	03/23/89	Pu-239/240	0.02	0.06
RWMC Prod.	07/11/89	Pu-239/240	0.01	0.051
RWMC Prod.	04/05/90	Pu-239/240	0.003	0.042
RWMC Prod.	10/30/90	Pu-239/240	0	0.06
RWMC Prod.	04/04/91	Pu-239/240	-0.001	0.036
RWMC Prod.	10/15/91	Pu-239/240	-0.005	0.042
RWMC Prod.	04/21/92	Pu-239/240	-0.005	0.048
RWMC Prod.	04/17/95	Pu-239/240	0	0.033
RWMC Prod.	11/20/95	Pu-239/240	0.004	0.045
TRA 01	10/30/87	Pu-239/240	-0.01	0.054
TRA 04	10/30/87	Pu-239/240	0	0.048
USGS 011	09/13/89	Pu-239/240	-0.001	0.039
USGS 014	09/14/89	Pu-239/240	0.005	0.045
USGS 017	03/20/90	Pu-239/240	-0.013	0.048
USGS 024	01/14/88	Pu-239/240	0	0.06
USGS 024	02/28/89	Pu-239/240	0	0.06
USGS 038	04/18/94	Pu-239/240	0.012	0.042
USGS 038	04/05/95	Pu-239/240	0.018	0.048
USGS 038	10/12/95	Pu-239/240	0.008	0.045
USGS 047	***04/12/74***	***Pu-239/240***	***0.03***	***0.024***
USGS 047	08/01/74	Pu-239/240	0.01	0.03
USGS 047	09/02/75	Pu-239/240	-0.002	0.015
USGS 047	***10/27/75***	***Pu-239/240***	***0.0028***	***0.0021***
USGS 047	11/12/75	Pu-239/240	0.0018	0.0021
USGS 047	12/02/75	Pu-239/240	0.0029	0.003
USGS 047	04/09/82	Pu-239/240	0.002	0.006
USGS 047	10/17/83	Pu-239/240	0.02	0.06
USGS 047	10/29/86	Pu-239/240	0	0.06
USGS 047	10/26/87	Pu-239/240	-0.005	0.045
USGS 047	09/30/88	Pu-239/240	0.013	0.057
USGS 047	10/19/89	Pu-239/240	0.003	0.042
USGS 047	10/24/91	Pu-239/240	0.006	0.036
USGS 047	10/16/95	Pu-239/240	0.008	0.042
USGS 058	04/26/75	Pu-239/240	0	0.012
USGS 065	04/09/82	Pu-239/240	-0.002	0.006
USGS 065	04/17/84	Pu-239/240	0.0013	0.0057
USGS 065	04/15/94	Pu-239/240	0.015	0.039
USGS 065	04/12/95	Pu-239/240	0.004	0.039
USGS 065	10/11/95	Pu-239/240	0	0.045
USGS 076	04/26/94	Pu-239/240	0.003	0.036
USGS 077	04/24/95	Pu-239/240	0.001	0.045
USGS 077	10/24/95	Pu-239/240	0.007	0.042
USGS 084	03/29/95	Pu-239/240	0.02	0.06
USGS 084	10/18/95	Pu-239/240	0.01	0.06
USGS 087	09/20/72	Pu-239/240	0.09	0.135
USGS 087	10/12/72	Pu-239/240	<0.05	---
USGS 087	11/20/72	Pu-239/240	<0.02	---
USGS 087	02/24/73	Pu-239/240	0.01	0.03
USGS 087	03/30/73	Pu-239/240	0.005	0.009
USGS 087	04/30/73	Pu-239/240	0.009	0.021
USGS 087	05/29/73	Pu-239/240	0.014	0.024
USGS 087	06/29/73	Pu-239/240	0.005	0.015
USGS 087	07/24/73	Pu-239/240	0.004	0.012

Table D-2. Plutonium-239/240 (Undifferentiated) Results.

Well Name	Sample Date	Analyte	Result* (pCi/L)	Uncertainty at 3 Sigma (pCi/L)
USGS 087	08/29/73	Pu-239/240	0.003	0.024
USGS 087	09/26/73	Pu-239/240	0.004	0.012
USGS 087	10/31/73	Pu-239/240	0.002	0.015
USGS 087	***11/29/73***	***Pu-239/240***	***0.03***	***0.012***
USGS 087	12/20/73	Pu-239/240	0.002	0.024
USGS 087	01/18/74	Pu-239/240	0.002	0.024
USGS 087	02/25/74	Pu-239/240	0.0009	0.0012
USGS 087	03/27/74	Pu-239/240	0.01	0.015
USGS 087	***04/24/74***	***Pu-239/240***	***0.03***	***0.024***
USGS 087	05/29/74	Pu-239/240	0.011	0.018
USGS 087	08/02/74	Pu-239/240	0.002	0.006
USGS 087	08/27/74	Pu-239/240	<0.003	---
USGS 087	09/30/74	Pu-239/240	<0.02	---
USGS 087	10/15/74	Pu-239/240	<0.02	---
USGS 087	11/26/74	Pu-239/240	0.01	0.03
USGS 087	02/01/75	Pu-239/240	0.011	0.012
USGS 087	03/27/75	Pu-239/240	0.008	0.021
USGS 087	04/25/75	Pu-239/240	-0.002	0.012
USGS 087	05/30/75	Pu-239/240	-0.004	0.024
USGS 087	09/29/75	Pu-239/240	-0.003	0.018
USGS 087	02/05/76	Pu-239/240	-0.003	0.015
USGS 087	10/27/76	Pu-239/240	0.002	0.018
USGS 087	04/19/77	Pu-239/240	0.004	0.018
USGS 087	04/26/78	Pu-239/240	-0.021	0.021
USGS 087	10/04/78	Pu-239/240	0.00069	0.033
USGS 087	05/03/79	Pu-239/240	-0.01	0.06
USGS 087	04/21/80	Pu-239/240	0.01	0.06
USGS 087	10/14/80	Pu-239/240	0.01	0.06
USGS 087	04/09/81	Pu-239/240	0	0.06
USGS 087	10/07/81	Pu-239/240	0.01	0.06
USGS 087	04/08/82	Pu-239/240	-0.001	0.039
USGS 087	07/15/82	Pu-239/240	0	0.006
USGS 087	10/06/82	Pu-239/240	0.01	0.09
USGS 087	04/15/83	Pu-239/240	-0.01	0.06
USGS 087	10/06/83	Pu-239/240	0.008	0.045
USGS 087	04/17/84	Pu-239/240	0.01	0.06
USGS 087	10/10/84	Pu-239/240	0.003	0.051
USGS 087	04/26/85	Pu-239/240	0.04	0.06
USGS 087	10/22/85	Pu-239/240	-0.01	0.06
USGS 087	04/18/86	Pu-239/240	-0.008	0.042
USGS 087	10/31/86	Pu-239/240	0.01	0.06
USGS 087	04/22/87	Pu-239/240	0	0.06
USGS 087	09/30/87	Pu-239/240	-0.005	0.048
USGS 087	04/06/88	Pu-239/240	0.006	0.042
USGS 087	06/22/88	Pu-239/240	-0.001	0.048
USGS 087	10/18/88	Pu-239/240	0	0.048
USGS 087	01/04/89	Pu-239/240	-0.015	0.054
USGS 087	04/05/89	Pu-239/240	-0.03	0.06
USGS 087	07/11/89	Pu-239/240	0.02	0.06
USGS 087	10/26/89	Pu-239/240	-0.005	0.039
USGS 087	01/03/90	Pu-239/240	0.009	0.048
USGS 087	04/04/90	Pu-239/240	0.005	0.048
USGS 087	07/09/90	Pu-239/240	0.01	0.06
USGS 087	10/15/91	Pu-239/240	-0.013	0.033
USGS 087	01/14/92	Pu-239/240	0.008	0.042
USGS 087	04/21/92	Pu-239/240	0.011	0.051
USGS 087	01/11/95	Pu-239/240	0.009	0.045
USGS 087	04/17/95	Pu-239/240	0.004	0.039
USGS 087	10/16/95	Pu-239/240	0	0.039
USGS 088	09/20/72	Pu-239/240	<0.05	---
USGS 088	10/12/72	Pu-239/240	<0.05	---
USGS 088	11/20/72	Pu-239/240	0.008	0.024
USGS 088	02/02/73	Pu-239/240	0.006	0.06
USGS 088	02/24/73	Pu-239/240	0.003	0.009
USGS 088	03/30/73	Pu-239/240	0.01	0.024
USGS 088	04/30/73	Pu-239/240	0.008	0.018
USGS 088	05/29/73	Pu-239/240	0.012	0.021
USGS 088	06/29/73	Pu-239/240	<0.01	---

Table D-2. Plutonium-239/240 (Undifferentiated) Results.

Well Name	Sample Date	Analyte	Result* (pCi/L)	Uncertainty at 3 Sigma (pCi/L)
USGS 088	07/24/73	Pu-239/240	0.004	0.012
USGS 088	08/29/73	Pu-239/240	0.01	0.03
USGS 088	09/26/73	Pu-239/240	0.004	0.024
USGS 088	10/31/73	Pu-239/240	0.011	0.027
USGS 088	11/29/73	Pu-239/240	0.002	0.018
USGS 088	12/20/73	Pu-239/240	0.003	0.009
USGS 088	01/18/74	Pu-239/240	<0.03	---
USGS 088	02/25/74	Pu-239/240	0.004	0.021
USGS 088	03/27/74	Pu-239/240	0.004	0.012
USGS 088	***04/24/74***	***Pu-239/240***	***0.04***	***0.027***
USGS 088	05/29/74	Pu-239/240	0.01	0.03
USGS 088	06/29/74	Pu-239/240	<0.003	---
USGS 088	08/02/74	Pu-239/240	<0.02	---
USGS 088	08/27/74	Pu-239/240	0.002	0.009
USGS 088	09/30/74	Pu-239/240	<0.02	---
USGS 088	10/16/74	Pu-239/240	<0.02	---
USGS 088	11/26/74	Pu-239/240	0.02	0.09
USGS 088	12/27/74	Pu-239/240	0.003	0.021
USGS 088	02/01/75	Pu-239/240	0.004	0.009
USGS 088	04/25/75	Pu-239/240	0.003	0.009
USGS 088	05/30/75	Pu-239/240	-0.005	0.009
USGS 088	07/25/75	Pu-239/240	0	0.015
USGS 088	08/28/75	Pu-239/240	0.001	0.018
USGS 088	09/29/75	Pu-239/240	-0.005	0.015
USGS 088	02/05/76	Pu-239/240	-0.0007	0.018
USGS 088	***10/30/76***	***Pu-239/240***	***0.04***	***0.03***
USGS 088	04/19/77	Pu-239/240	0	0.018
USGS 088	04/26/78	Pu-239/240	-0.022	0.018
USGS 088	10/25/78	Pu-239/240	7.4E-05	0.03
USGS 088	05/03/79	Pu-239/240	-0.03	0.03
USGS 088	04/21/80	Pu-239/240	0.01	0.06
USGS 088	10/14/80	Pu-239/240	0	0.06
USGS 088	04/09/81	Pu-239/240	0.01	0.06
USGS 088	10/07/81	Pu-239/240	-0.02	0.09
USGS 088	04/08/82	Pu-239/240	0.02	0.06
USGS 088	07/15/82	Pu-239/240	0.002	0.006
USGS 088	10/06/82	Pu-239/240	-0.07	0.15
USGS 088	04/18/83	Pu-239/240	-0.01	0.06
USGS 088	04/18/83	Pu-239/240	0.02	0.09
USGS 088	04/18/83	Pu-239/240	0.03	0.15
USGS 088	09/23/83	Pu-239/240	0.011	0.03
USGS 088	10/06/83	Pu-239/240	0.016	0.045
USGS 088	04/18/84	Pu-239/240	-0.016	0.06
USGS 088	10/10/84	Pu-239/240	-0.01	0.048
USGS 088	04/26/85	Pu-239/240	0.02	0.06
USGS 088	10/22/85	Pu-239/240	0	0.06
USGS 088	04/18/86	Pu-239/240	-0.015	0.039
USGS 088	11/03/86	Pu-239/240	0.004	0.051
USGS 088	04/22/87	Pu-239/240	0	0.06
USGS 088	09/22/87	Pu-239/240	-0.009	0.048
USGS 088	09/30/87	Pu-239/240	-0.005	0.051
USGS 088	04/05/88	Pu-239/240	-0.005	0.045
USGS 088	06/24/88	Pu-239/240	0	0.06
USGS 088	09/29/88	Pu-239/240	-0.001	0.048
USGS 088	01/04/89	Pu-239/240	-0.01	0.06
USGS 088	04/04/89	Pu-239/240	-0.01	0.06
USGS 088	07/12/89	Pu-239/240	-0.001	0.048
USGS 088	10/17/89	Pu-239/240	-0.02	0.06
USGS 088	01/23/90	Pu-239/240	-0.005	0.042
USGS 088	04/10/90	Pu-239/240	0.005	0.045
USGS 088	07/19/90	Pu-239/240	0	0.06
USGS 088	08/28/90	Pu-239/240	-0.001	0.051
USGS 088	08/28/90	Pu-239/240	-0.001	0.045
USGS 088	10/15/91	Pu-239/240	0.018	0.048
USGS 088	01/16/92	Pu-239/240	-0.012	0.042
USGS 088	04/15/92	Pu-239/240	0.01	0.039
USGS 088	01/24/95	Pu-239/240	0.002	0.042
USGS 088	04/18/95	Pu-239/240	0	0.039
USGS 088	10/23/95	Pu-239/240	0.001	0.048

Table D-2. Plutonium-239/240 (Undifferentiated) Results.

Well Name	Sample Date	Analyte	Result* (pCi/L)	Uncertainty at 3 Sigma (pCi/L)
USGS 089	02/14/72	Pu-239/240	<0.05	---
USGS 089	09/20/72	Pu-239/240	<0.05	---
USGS 089	10/12/72	Pu-239/240	<0.05	---
USGS 089	11/20/72	Pu-239/240	<0.01	---
USGS 089	02/02/73	Pu-239/240	0.04	0.06
USGS 089	03/30/73	Pu-239/240	0.0005	0.009
USGS 089	04/30/73	Pu-239/240	0.007	0.015
USGS 089	05/29/73	Pu-239/240	0.02	0.03
USGS 089	***05/29/73***	***Pu-239/240***	***0.29***	***0.06***
USGS 089	06/29/73	Pu-239/240	<0.01	---
USGS 089	07/24/73	Pu-239/240	<0.01	---
USGS 089	08/29/73	Pu-239/240	0.003	0.024
USGS 089	09/26/73	Pu-239/240	0.01	0.03
USGS 089	09/26/73	Pu-239/240	0.002	0.009
USGS 089	11/01/73	Pu-239/240	0.007	0.012
USGS 089	11/29/73	Pu-239/240	0.014	0.018
USGS 089	12/20/73	Pu-239/240	0.004	0.018
USGS 089	01/18/74	Pu-239/240	0.003	0.024
USGS 089	02/26/74	Pu-239/240	0.009	0.015
USGS 089	03/27/74	Pu-239/240	0.002	0.012
USGS 089	***04/25/74***	***Pu-239/240***	***0.03***	***0.03***
USGS 089	***05/29/74***	***Pu-239/240***	***0.036***	***0.024***
USGS 089	06/28/74	Pu-239/240	0.007	0.018
USGS 089	08/01/74	Pu-239/240	0.03	0.09
USGS 089	08/27/74	Pu-239/240	<0.02	---
USGS 089	10/01/74	Pu-239/240	0.03	0.06
USGS 089	***10/16/74***	***Pu-239/240***	***0.07***	***0.06***
USGS 089	11/26/74	Pu-239/240	0.03	0.06
USGS 089	12/27/74	Pu-239/240	0.05	0.18
USGS 089	02/01/75	Pu-239/240	0.012	0.015
USGS 089	03/27/75	Pu-239/240	0.004	0.021
USGS 089	04/25/75	Pu-239/240	0.004	0.009
USGS 089	05/31/75	Pu-239/240	0.009	0.015
USGS 089	07/25/75	Pu-239/240	-0.005	0.015
USGS 089	08/28/75	Pu-239/240	0.005	0.021
USGS 089	09/29/75	Pu-239/240	0	0.015
USGS 089	02/05/76	Pu-239/240	0	0.015
USGS 089	10/30/76	Pu-239/240	-0.002	0.015
USGS 089	04/18/77	Pu-239/240	0.001	0.018
USGS 089	04/26/78	Pu-239/240	-0.018	0.021
USGS 089	10/27/78	Pu-239/240	9.7E-05	0.036
USGS 089	05/04/79	Pu-239/240	0.0034	0.048
USGS 089	10/14/80	Pu-239/240	0	0.06
USGS 089	04/09/81	Pu-239/240	-0.03	0.06
USGS 089	10/07/81	Pu-239/240	0.01	0.06
USGS 089	04/08/82	Pu-239/240	-0.003	0.042
USGS 089	07/15/82	Pu-239/240	0.001	0.006
USGS 089	10/06/82	Pu-239/240	-0.02	0.06
USGS 089	04/18/83	Pu-239/240	0.03	0.06
USGS 089	10/06/83	Pu-239/240	-0.001	0.039
USGS 089	04/18/84	Pu-239/240	0.01	0.078
USGS 089	10/17/84	Pu-239/240	0.01	0.06
USGS 089	04/29/85	Pu-239/240	0.003	0.048
USGS 089	10/22/85	Pu-239/240	0	0.06
USGS 089	04/18/86	Pu-239/240	-0.011	0.042
USGS 089	11/04/86	Pu-239/240	0.011	0.045
USGS 089	04/22/87	Pu-239/240	0.02	0.06
USGS 089	09/22/87	Pu-239/240	0	0.06
USGS 089	09/30/87	Pu-239/240	0.02	0.06
USGS 089	04/05/88	Pu-239/240	0.008	0.048
USGS 089	06/24/88	Pu-239/240	0.003	0.045
USGS 089	10/18/88	Pu-239/240	-0.006	0.042
USGS 089	01/04/89	Pu-239/240	0	0.06
USGS 089	04/04/89	Pu-239/240	0.016	0.054
USGS 089	10/18/89	Pu-239/240	-0.01	0.06
USGS 089	04/10/90	Pu-239/240	0.002	0.045
USGS 089	10/16/91	Pu-239/240	-0.004	0.039
USGS 089	04/15/92	Pu-239/240	0.003	0.039

Table D-2. Plutonium-239/240 (Undifferentiated) Results.

Well Name	Sample Date	Analyte	Result* (pCi/L)	Uncertainty at 3 Sigma (pCi/L)
USGS 089	04/21/95	Pu-239/240	0	0.09
USGS 089	10/25/95	Pu-239/240	0.004	0.039
USGS 090	02/14/72	Pu-239/240	0.04	0.048
USGS 090	09/20/72	Pu-239/240	0.14	0.15
USGS 090	10/12/72	Pu-239/240	<0.02	---
USGS 090	11/20/72	Pu-239/240	<0.02	---
USGS 090	02/02/73	Pu-239/240	0.05	0.15
USGS 090	02/24/73	Pu-239/240	0.02	0.03
USGS 090	03/30/73	Pu-239/240	0.0005	0.009
USGS 090	04/30/73	Pu-239/240	<0.01	---
USGS 090	05/29/73	Pu-239/240	<0.01	---
USGS 090	06/29/73	Pu-239/240	<0.01	---
USGS 090	07/24/73	Pu-239/240	<0.01	---
USGS 090	08/29/73	Pu-239/240	0.002	0.009
USGS 090	09/26/73	Pu-239/240	0.009	0.024
USGS 090	10/31/73	Pu-239/240	0.012	0.027
USGS 090	11/29/73	Pu-239/240	0.002	0.018
USGS 090	01/18/74	Pu-239/240	0.003	0.018
USGS 090	02/25/74	Pu-239/240	0.02	0.03
USGS 090	03/27/74	Pu-239/240	0.018	0.018
USGS 090	04/24/74	Pu-239/240	0.006	0.018
USGS 090	05/29/74	Pu-239/240	0.01	0.03
USGS 090	***06/29/74***	***Pu-239/240***	***0.03***	***0.03***
USGS 090	08/02/74	Pu-239/240	0.005	0.012
USGS 090	***12/14/74***	***Pu-239/240***	***0.012***	***0.012***
USGS 090	01/31/75	Pu-239/240	0.009	0.021
USGS 090	03/27/75	Pu-239/240	0.009	0.024
USGS 090	04/25/75	Pu-239/240	0.002	0.009
USGS 090	05/30/75	Pu-239/240	-0.005	0.009
USGS 090	09/26/75	Pu-239/240	0.003	0.018
USGS 090	10/29/76	Pu-239/240	-0.002	0.015
USGS 090	04/18/77	Pu-239/240	-0.0002	0.015
USGS 090	04/26/78	Pu-239/240	-0.028	0.024
USGS 090	10/25/78	Pu-239/240	0.00094	0.033
USGS 090	05/13/79	Pu-239/240	-0.02	0.03
USGS 090	04/21/80	Pu-239/240	0	0.06
USGS 090	10/14/80	Pu-239/240	0.04	0.06
USGS 090	04/09/81	Pu-239/240	0.01	0.06
USGS 090	10/08/81	Pu-239/240	0.02	0.09
USGS 090	04/08/82	Pu-239/240	-0.014	0.036
USGS 090	07/15/82	Pu-239/240	-0.001	0.006
USGS 090	10/06/82	Pu-239/240	-0.04	0.06
USGS 090	10/06/82	Pu-239/240	-0.003	0.009
USGS 090	01/24/83	Pu-239/240	-0.002	0.015
USGS 090	04/15/83	Pu-239/240	-0.02	0.06
USGS 090	10/06/83	Pu-239/240	0.01	0.06
USGS 090	04/17/84	Pu-239/240	-0.01	0.09
USGS 090	10/10/84	Pu-239/240	-0.002	0.051
USGS 090	04/18/86	Pu-239/240	0.001	0.045
USGS 090	11/03/86	Pu-239/240	0.01	0.06
USGS 090	04/22/87	Pu-239/240	0.01	0.06
USGS 090	09/23/87	Pu-239/240	0	0.06
USGS 090	09/30/87	Pu-239/240	0.01	0.06
USGS 090	04/06/88	Pu-239/240	-0.001	0.045
USGS 090	06/22/88	Pu-239/240	0.008	0.045
USGS 090	10/18/88	Pu-239/240	-0.005	0.045
USGS 090	01/18/89	Pu-239/240	-0.01	0.06
USGS 090	04/05/89	Pu-239/240	0.015	0.051
USGS 090	07/11/89	Pu-239/240	-0.005	0.045
USGS 090	10/18/89	Pu-239/240	-0.01	0.06
USGS 090	01/23/90	Pu-239/240	-0.001	0.045
USGS 090	04/10/90	Pu-239/240	-0.001	0.039
USGS 090	07/02/90	Pu-239/240	0.01	0.06
USGS 090	10/24/90	Pu-239/240	0.013	0.078
USGS 090	10/16/91	Pu-239/240	-0.015	0.042
USGS 090	01/16/92	Pu-239/240	-0.004	0.033
USGS 090	04/20/92	Pu-239/240	-0.002	0.048
USGS 090	01/12/95	Pu-239/240	0.001	0.036

Table D-2. Plutonium-239/240 (Undifferentiated) Results.

Well Name	Sample Date	Analyte	Result* (pCi/L)	Uncertainty at 3 Sigma (pCi/L)
USGS 090	04/21/95	Pu-239/240	0	0.033
USGS 090	10/25/95	Pu-239/240	0.001	0.042
USGS 097	03/16/95	Pu-239/240	0.007	0.036
USGS 097	11/06/95	Pu-239/240	0.012	0.045
USGS 110	10/25/95	Pu-239/240	0	0.045
USGS 117	10/19/87	Pu-239/240	0	0.06
USGS 117	06/27/88	Pu-239/240	0.012	0.045
USGS 117	10/17/88	Pu-239/240	-0.009	0.048
USGS 117	01/12/89	Pu-239/240	-0.01	0.06
USGS 117	04/03/89	Pu-239/240	0.014	0.048
USGS 117	10/13/89	Pu-239/240	-0.018	0.051
USGS 117	04/10/90	Pu-239/240	-0.004	0.042
USGS 117	08/29/90	Pu-239/240	0.04	0.06
USGS 117	08/29/90	Pu-239/240	0.003	0.045
USGS 117	10/16/91	Pu-239/240	-0.004	0.036
USGS 117	04/15/92	Pu-239/240	-0.001	0.042
USGS 117	04/21/95	Pu-239/240	0.009	0.039
USGS 117	10/24/95	Pu-239/240	0.011	0.045
USGS 119	11/06/87	Pu-239/240	-0.009	0.045
USGS 119	06/27/88	Pu-239/240	0.004	0.048
USGS 119	10/17/88	Pu-239/240	-0.01	0.06
USGS 119	01/12/89	Pu-239/240	-0.007	0.048
USGS 119	04/03/89	Pu-239/240	-0.08	0,09
USGS 119	10/17/89	Pu-239/240	0	0.06
USGS 119	04/09/90	Pu-239/240	-0.002	0.036
USGS 119	10/15/91	Pu-239/240	-0.01	0.039
USGS 119	10/15/91	Pu-239/240	-0.013	0.036
USGS 119	04/16/92	Pu-239/240	0.01	0.039
USGS 119	04/17/95	Pu-239/240	0.016	0.039
USGS 119	10/25/95	Pu-239/240	0.001	0.042
USGS 120	11/18/87	Pu-239/240	0.01	0.06
USGS 120	06/27/88	Pu-239/240	0.003	0.045
USGS 120	10/18/88	Pu-239/240	-0.005	0.048
USGS 120	01/12/89	Pu-239/240	-0.015	0.048
USGS 120	04/04/89	Pu-239/240	-0.001	0.045
USGS 120	07/12/89	Pu-239/240	0.005	0.051
USGS 120	10/12/89	Pu-239/240	0.002	0.048
USGS 120	01/22/90	Pu-239/240	0.03	0.06
USGS 120	04/09/90	Pu-239/240	0.014	0.051
USGS 120	07/19/90	Pu-239/240	0	0.06
USGS 120	08/27/90	Pu-239/240	0.009	0.039
USGS 120	08/27/90	Pu-239/240	0	0.039
USGS 120	10/25/91	Pu-239/240	0.005	0.033
USGS 120	01/16/92	Pu-239/240	-0.004	0.036
USGS 120	04/15/92	Pu-239/240	-0.008	0.039
USGS 120	04/20/94	Pu-239/240	0.004	0.045
USGS 120	07/11/94	Pu-239/240	0.001	0.039
USGS 120	01/25/95	Pu-239/240	0.009	0.039
USGS 120	04/12/95	Pu-239/240	0.009	0.039
USGS 120	10/23/95	Pu-239/240	0.002	0.048

* Concentrations greater than or equal to the reporting level of 3 sigma (3s) are in italics.

ATTACHMENT E

Summary Table of Americium-241 Results

Table E-1. Summary of Americium-241 Results.

Well Name	'72	'73	'74	'75	'76	'77	'78	'79	'80	'81	'82	'83	'84	'85	'86	'87	'88	'89	'90	'91	'92	'93	'94	'95
TAN Area Wells																								
ANP 3 (TAN Injection Well)																0.21	0.1	ND[2]						
ANP 4 (IET Injection Well)																ND		ND						
ANP 6																ND								
ANP 9																								
USGS 7																								
USGS 24																	ND	ND	0.91					
USGS 26																								
NRF Area Wells																								
NRF 1																ND								
NRF 3																ND								
USGS 15																								
USGS 17																			ND					
USGS 97																							ND	ND[2]
USGS 99																							ND	
TRA/ICPP/CFA Area Wells																								
CFA 1																ND	ND[3]							
CFA 2																ND	ND							
CPP 1														ND		ND							ND	ND[2]
CPP 2																ND							ND	

Table E-1. Summary of Americium-241 Results (Continued).

Well Name	'72	'73	'74	'75	'76	'77	'78	'79	'80	'81	'82	'83	'84	'85	'86	'87	'88	'89	'90	'91	'92	'93	'94	'95
CPP 4												ND[2]				ND							ND	
Fire Station 2																ND							ND	
MTR Test																								
TRA 1																ND								
TRA-4																ND								
Site 19																								
USGS 20																								
USGS 36																								
USGS 38																							ND	ND[2]
USGS 39																								
USGS 44																					ND[9]			
USGS 47			ND[2]	ND[4]								ND			ND	ND	ND	ND		ND	ND	ND		ND
USGS 52																								
USGS 57																								
USGS 58				ND																				
USGS 59																								
USGS 65													ND										ND	ND[2]
USGS 76																							ND	
USGS 77																								ND[2]
USGS 79																								
USGS 82																								
USGS 84																								ND[2]
USGS 85																								
USGS 115																								

Table E-1. Summary of Americium-241 Results (Continued).

Well Name	'72	'73	'74	'75	'76	'77	'78	'79	'80	'81	'82	'83	'84	'85	'86	'87	'88	'89	'90	'91	'92	'93	'94	'95
ANL West Area Wells																								
Arbor Test																		ND						
EBR II-1																ND								
USGS 100																								
RWMC Area Wells																								
RWMC Prod.			ND	ND[3]	ND	ND	ND			ND[2]	ND[2]	ND[2]	ND[2]	ND[2]	ND[2]	ND[3]	ND[2]	ND[3]	ND[2]	ND[2]	ND			ND[2]
USGS 87	0.04 ND[2]	0.3[3] ND[8]	ND[11]	ND[5]	ND[2]		ND[2]	ND	ND[2]	ND[2]	ND[3]	ND[2]	ND[2]	ND[2]	ND[2]	ND[2]	ND[3]	ND[4]	ND[3]	ND	ND[2]			ND[3]
USGS 88	ND[3]	0.13[6] ND[5]	0.06 ND[11]	ND[7]	ND[2]	ND	ND[2]	ND	ND[2]	ND[2]	0.02 ND[2]	ND[3]	ND[2]	ND[2]	ND[2]	ND[3]	ND[3]	ND[4]	ND[6]	ND	ND[2]			ND[3]
USGS 89	5.0 ND[3]	0.14[5] ND[9]	0.09[2] ND[10]	ND[7]	ND[2]	ND	ND[2]	ND	ND	ND[2]	ND[3]	ND[2]	ND[2]	ND[2]	ND[2]	ND[3]	ND[3]	ND[3]	ND	ND	ND			ND[2]
USGS 90	1.5 ND[2]	0.17[4] ND[7]	ND[8]	ND[5]	0.03 ND	ND	ND[2]	ND	ND[2]	0.14 ND	ND[4]	ND[3]	ND[2]		ND[2]	ND[3]	ND[3]	ND[4]	ND[4]	ND	ND[2]			ND[3]
USGS 117																ND	ND[2]	ND[3]	ND[2]	ND	ND			ND[2]
USGS 119																ND	ND[2]	ND[3]	ND	ND[3]	ND			ND[2]
USGS 120																ND	ND[2]	ND[4]	ND[6]	ND	ND[5]	0.06 ND[3]	ND[3]	ND[3]
INEL Southern Boundary Area Wells																								
Atomic City				ND[3]																				
Cerro Grande																								
Leo Rogers 1																								

Table E-1. Summary of Americium-241 Results (Continued).

Well Name	'72	'73	'74	'75	'76	'77	'78	'79	'80	'81	'82	'83	'84	'85	'86	'87	'88	'89	'90	'91	'92	'93	'94	'95
USGS 8																								
USGS 9																								
USGS 11																		ND						
USGS 14																		ND						
USGS 86																								
USGS 103																								
USGS 104																								
USGS 105																								
USGS 106																								
USGS 109																								
USGS 110																								ND

Concentrations reported in the table are in pCi/L.

ND Nondetect, analytical result was less than the reporting level (3s).

Note: Positive detections and non-detects are reported separately. If more than one non-detect result is available in a year, the number of samples are reported in superscript. If more than one positive detection value is available in a year, the maximum reported concentration is reported with the number of positive detections shown in superscript.

Table E-2. Americium-241 Results.

Well Name	Sample Date	Analyte	Result* (pCi/L)	Uncertainty at 3 Sigma (pCi/L)
ANP 3	***10/27/87***	***Am-241***	***0.21***	***0.12***
ANP 3	***01/11/88***	***Am-241***	***0.1***	***0.09***
ANP 3	03/07/89	Am-241	0.03	0.12
ANP 3	12/12/89	Am-241	0.17	0.21
ANP 4	10/27/87	Am-241	0.012	0.09
ANP 4	03/01/89	Am-241	0.01	0.09
ANP 06	10/28/87	Am-241	0.01	0.09
Arbor Test	02/15/89	Am-241	-0.01	0.09
Atomic City	10/27/75	Am-241	-0.0006	0.009
Atomic City	11/13/75	Am-241	-0.0002	0.0033
Atomic City	12/03/75	Am-241	0	0.0042
CFA 1	10/15/87	Am-241	-0.02	0.09
CFA 1	01/05/88	Am-241	0.05	0.12
CFA 1	04/12/88	Am-241	-0.002	0.033
CFA 1	04/19/88	Am-241	0.007	0.012
CFA 2	10/14/87	Am-241	-0.03	0.09
CFA 2	01/05/88	Am-241	-0.014	0.075
CPP 1	05/13/85	Am-241	-0.003	0.015
CPP 1	10/22/87	Am-241	-0.01	0.09
CPP 1	04/22/94	Am-241	-0.03	0.06
CPP 1	04/13/95	Am-241	0	0.06
CPP 1	10/16/95	Am-241	-0.01	0.06
CPP 2	10/22/87	Am-241	-0.04	0.06
CPP 2	05/04/94	Am-241	-0.02	0.06
CPP 4	10/26/83	Am-241	0.02	0.09
CPP 4	11/15/83	Am-241	0.04	0.09
CPP 4	10/22/87	Am-241	0.03	0.09
CPP 4	04/13/94	Am-241	-0.03	0.06
EBR II 1	10/15/87	Am-241	0.02	0.09
Firesta 2	11/03/87	Am-241	0.03	0.09
Firesta 2	04/07/94	Am-241	-0.04	0.06
NRF 1	10/29/87	Am-241	0.02	0.09
NRF 3	10/29/87	Am-241	0.05	0.09
RWMC Prod.	11/23/74	Am-241	<0.03	—
RWMC Prod.	10/28/75	Am-241	0.0015	0.003
RWMC Prod.	11/13/75	Am-241	0.0007	0.0036
RWMC Prod.	12/03/75	Am-241	-0.0004	0.0045
RWMC Prod.	10/26/76	Am-241	0.008	0.033
RWMC Prod.	04/20/77	Am-241	-0.009	0.018
RWMC Prod.	05/11/78	Am-241	-0.0008	0.015
RWMC Prod.	04/30/81	Am-241	-0.02	0.09
RWMC Prod.	10/13/81	Am-241	-0.03	0.06
RWMC Prod.	04/15/82	Am-241	-0.04	0.06
RWMC Prod.	10/11/82	Am-241	-0.02	0.06
RWMC Prod.	04/13/83	Am-241	-0.02	0.09
RWMC Prod.	10/06/83	Am-241	0.01	0.09
RWMC Prod.	04/17/84	Am-241	0.015	0.018
RWMC Prod.	10/12/84	Am-241	-0.01	0.09
RWMC Prod.	04/26/85	Am-241	-0.01	0.09
RWMC Prod.	10/25/85	Am-241	0	0.09
RWMC Prod.	05/01/86	Am-241	0.01	0.09

Table E-2. Americium-241 Results.

Well Name	Sample Date	Analyte	Result* (pCi/L)	Uncertainty at 3 Sigma (pCi/L)
RWMC Prod.	10/31/86	Am-241	-0.016	0.111
RWMC Prod.	04/21/87	Am-241	-0.03	0.09
RWMC Prod.	09/30/87	Am-241	0.011	0.09
RWMC Prod.	10/14/87	Am-241	-0.02	0.15
RWMC Prod.	04/06/88	Am-241	0.012	0.081
RWMC Prod.	10/28/88	Am-241	-0.015	0.063
RWMC Prod.	01/18/89	Am-241	-0.03	0.09
RWMC Prod.	03/23/89	Am-241	-0.012	0.072
RWMC Prod.	07/11/89	Am-241	0.04	0.09
RWMC Prod.	04/05/90	Am-241	-0.01	0.09
RWMC Prod.	10/30/90	Am-241	0.06	0.15
RWMC Prod.	04/04/91	Am-241	0	0.09
RWMC Prod.	10/15/91	Am-241	-0.04	0.06
RWMC Prod.	04/21/92	Am-241	0.03	0.09
RWMC Prod.	04/17/95	Am-241	0	0.06
RWMC Prod.	10/12/95	Am-241	0.02	0.06
TRA 01	10/30/87	Am-241	0.05	0.09
TRA 04	10/30/87	Am-241	-0.03	0.09
USGS 011	09/13/89	Am-241	-0.03	0.12
USGS 014	09/14/89	Am-241	-0.04	0.15
USGS 017	03/20/90	Am-241	0	0.09
USGS 024	01/14/88	Am-241	0.04	0.09
USGS 024	02/28/89	Am-241	0	0.09
USGS 024	***10/30/90***	***Am-241***	***0.91***	***0.24***
USGS 038	04/18/94	Am-241	0.02	0.06
USGS 038	04/05/95	Am-241	-0.01	0.06
USGS 038	10/12/95	Am-241	0.01	0.054
USGS 044	07/01/92	Am-241	0.05	0.09
USGS 044	07/20/92	Am-241	0.04	0.09
USGS 044	07/24/92	Am-241	0.03	0.09
USGS 044	07/28/92	Am-241	0.08	0.09
USGS 044	07/30/92	Am-241	0.07	0.09
USGS 044	08/03/92	Am-241	0.06	0.09
USGS 044	08/14/92	Am-241	0.06	0.09
USGS 044	08/18/92	Am-241	0.06	0.09
USGS 047	04/12/74	Am-241	0	0.06
USGS 047	08/01/74	Am-241	<0.01	—
USGS 047	09/02/75	Am-241	-0.009	0.027
USGS 047	10/27/75	Am-241	-0.0006	0.0039
USGS 047	11/12/75	Am-241	0	0.0033
USGS 047	12/02/75	Am-241	0	0.006
USGS 047	10/17/83	Am-241	0.01	0.09
USGS 047	10/29/86	Am-241	-0.09	0.12
USGS 047	10/26/87	Am-241	-0.02	0.09
USGS 047	09/30/88	Am-241	-0.02	0.12
USGS 047	10/19/89	Am-241	-0.03	0.09
USGS 047	10/24/91	Am-241	0.04	0.06
USGS 047	10/21/92	Am-241	0.05	0.09
USGS 047	10/26/93	Am-241	0.01	0.06
USGS 047	10/16/95	Am-241	0.03	0.06
USGS 058	04/26/75	Am-241	0.008	0.018
USGS 065	04/17/84	Am-241	-0.002	0.012
USGS 065	04/15/94	Am-241	-0.02	0.06
USGS 065	04/12/95	Am-241	0.02	0.06

Table E-2. Americium-241 Results.

Well Name	Sample Date	Analyte	Result* (pCi/L)	Uncertainty at 3 Sigma (pCi/L)
USGS 065	10/11/95	Am-241	-0.013	0.051
USGS 076	04/26/94	Am-241	-0.015	0.063
USGS 077	04/24/95	Am-241	0.014	0.057
USGS 077	10/24/95	Am-241	0	0.06
USGS 084	03/29/95	Am-241	0.03	0.06
USGS 084	10/18/95	Am-241	0	0.06
USGS 087	09/20/72	Am-241	0.01	0.12
USGS 087	***10/12/72***	***Am-241***	***0.04***	***0.03***
USGS 087	11/20/72	Am-241	<0.07	—
USGS 087	02/02/73	Am-241	0.03	0.12
USGS 087	02/24/73	Am-241	0.005	0.03
USGS 087	03/30/73	Am-241	0.004	0.024
USGS 087	04/30/73	Am-241	0.01	0.03
USGS 087	***05/29/73***	***Am-241***	***0.3***	***0.06***
USGS 087	07/24/73	Am-241	0.04	0.06
USGS 087	***08/29/73***	***Am-241***	***0.11***	***0.06***
USGS 087	***09/26/73***	***Am-241***	***0.13***	***0.06***
USGS 087	10/31/73	Am-241	<0.03	—
USGS 087	11/29/73	Am-241	0.02	0.06
USGS 087	12/20/73	Am-241	0.005	0.06
USGS 087	01/18/74	Am-241	<0.02	—
USGS 087	02/25/74	Am-241	0.004	0.006
USGS 087	03/27/74	Am-241	<0.02	—
USGS 087	04/24/74	Am-241	0	0.06
USGS 087	05/29/74	Am-241	0.01	0.06
USGS 087	08/02/74	Am-241	0.01	0.06
USGS 087	08/27/74	Am-241	<0.02	—
USGS 087	09/30/74	Am-241	<0.03	—
USGS 087	10/15/74	Am-241	<0.02	—
USGS 087	11/26/74	Am-241	0.02	0.09
USGS 087	12/27/74	Am-241	0	0.012
USGS 087	02/01/75	Am-241	0	0.021
USGS 087	03/27/75	Am-241	-0.01	0.06
USGS 087	04/25/75	Am-241	-0.007	0.027
USGS 087	05/30/75	Am-241	-0.008	0.027
USGS 087	09/29/75	Am-241	-0.004	0.018
USGS 087	02/05/76	Am-241	0	0.03
USGS 087	10/27/76	Am-241	0.004	0.027
USGS 087	04/26/78	Am-241	-0.007	0.021
USGS 087	10/04/78	Am-241	-0.02	0.06
USGS 087	05/03/79	Am-241	0.03	0.09
USGS 087	04/21/80	Am-241	0.03	0.06
USGS 087	10/14/80	Am-241	0.02	0.09
USGS 087	04/09/81	Am-241	-0.02	0.06
USGS 087	10/07/81	Am-241	-0.03	0.09
USGS 087	04/08/82	Am-241	0.01	0.09
USGS 087	07/15/82	Am-241	-0.006	0.012
USGS 087	10/06/82	Am-241	-0.02	0.06
USGS 087	04/15/83	Am-241	0.05	0.09
USGS 087	10/06/83	Am-241	0	0.09
USGS 087	04/17/84	Am-241	-0.01	0.09
USGS 087	10/10/84	Am-241	0.03	0.09
USGS 087	04/26/85	Am-241	0.03	0.09
USGS 087	10/22/85	Am-241	-0.014	0.087
USGS 087	04/18/86	Am-241	-0.03	0.12
USGS 087	10/31/86	Am-241	-0.03	0.12
USGS 087	04/22/87	Am-241	0.05	0.09
USGS 087	09/30/87	Am-241	-0.08	0.09
USGS 087	04/06/88	Am-241	0.01	0.09
USGS 087	06/22/88	Am-241	-0.06	0.09
USGS 087	10/18/88	Am-241	0	0.09

Table E-2. Americium-241 Results.

Well Name	Sample Date	Analyte	Result* (pCi/L)	Uncertainty at 3 Sigma (pCi/L)
USGS 087	01/04/89	Am-241	0.02	0.09
USGS 087	04/05/89	Am-241	0.01	0.06
USGS 087	07/11/89	Am-241	0.03	0.12
USGS 087	10/26/89	Am-241	0.01	0.09
USGS 087	01/03/90	Am-241	0	0.09
USGS 087	04/04/90	Am-241	0	0.09
USGS 087	07/09/90	Am-241	0	0.12
USGS 087	10/15/91	Am-241	-0.01	0.09
USGS 087	01/14/92	Am-241	0.01	0.06
USGS 087	04/21/92	Am-241	0	0.06
USGS 087	01/11/95	Am-241	0	0.06
USGS 087	04/17/95	Am-241	-0.01	0.06
USGS 087	10/16/95	Am-241	0.012	0.054
USGS 088	09/20/72	Am-241	0.1	1.2
USGS 088	10/12/72	Am-241	0	0.03
USGS 088	11/20/72	Am-241	0.02	0.12
USGS 088	02/02/73	Am-241	0.01	0.09
USGS 088	02/24/73	Am-241	0.001	0.003
USGS 088	03/30/73	Am-241	0.002	0.015
USGS 088	***04/30/73***	***Am-241***	***0.045***	***0.024***
USGS 088	***05/29/73***	***Am-241***	***0.13***	***0.06***
USGS 088	***06/29/73***	***Am-241***	***0.07***	***0.06***
USGS 088	***08/29/73***	***Am-241***	***0.08***	***0.06***
USGS 088	***09/26/73***	***Am-241***	***0.07***	***0.06***
USGS 088	10/31/73	Am-241	<0.03	---
USGS 088	***11/29/73***	***Am-241***	***0.06***	***0.06***
USGS 088	12/20/73	Am-241	0.001	0.06
USGS 088	01/18/74	Am-241	<0.04	---
USGS 088	02/25/74	Am-241	<0.04	---
USGS 088	03/27/74	Am-241	<0.02	---
USGS 088	***04/24/74***	***Am-241***	***0.06***	***0.06***
USGS 088	05/29/74	Am-241	<0.02	---
USGS 088	06/29/74	Am-241	0.01	0.09
USGS 088	08/02/74	Am-241	0.01	0.21
USGS 088	08/27/74	Am-241	0.01	0.06
USGS 088	09/30/74	Am-241	0.02	0.06
USGS 088	10/16/74	Am-241	<0.03	---
USGS 088	11/26/74	Am-241	<0.03	---
USGS 088	12/27/74	Am-241	<0.02	---
USGS 088	02/01/75	Am-241	0.012	0.027
USGS 088	03/27/75	Am-241	-100	300
USGS 088	04/25/75	Am-241	0	0.03
USGS 088	05/30/75	Am-241	0	0.03
USGS 088	07/25/75	Am-241	0.005	0.027
USGS 088	08/28/75	Am-241	-0.002	0.018
USGS 088	09/29/75	Am-241	0	0.03
USGS 088	02/05/76	Am-241	0.01	0.03
USGS 088	10/30/76	Am-241	0.01	0.03
USGS 088	04/19/77	Am-241	-0.007	0.015
USGS 088	04/26/78	Am-241	-0.004	0.021
USGS 088	10/25/78	Am-241	-0.02	0.06
USGS 088	05/03/79	Am-241	0.02	0.06
USGS 088	04/21/80	Am-241	0.02	0.06
USGS 088	10/14/80	Am-241	0.01	0.09
USGS 088	04/09/81	Am-241	-0.02	0.09
USGS 088	10/07/81	Am-241	0.02	0.09
USGS 088	04/08/82	Am-241	0	900
USGS 088	***07/15/82***	***Am-241***	***0.02***	***0.018***
USGS 088	10/06/82	Am-241	-0.04	0.18
USGS 088	04/18/83	Am-241	0.03	0.06
USGS 088	09/23/83	Am-241	0.01	0.06
USGS 088	10/06/83	Am-241	0	0.09
USGS 088	04/18/84	Am-241	0	0.09
USGS 088	10/10/84	Am-241	0	0.09

Table E-2. Americium-241 Results.

Well Name	Sample Date	Analyte	Result* (pCi/L)	Uncertainty at 3 Sigma (pCi/L)
USGS 088	04/26/85	Am-241	0.04	0.09
USGS 088	10/22/85	Am-241	0.01	0.09
USGS 088	04/18/86	Am-241	0.07	0.12
USGS 088	11/03/86	Am-241	-0.013	0.102
USGS 088	04/22/87	Am-241	0	0.06
USGS 088	09/22/87	Am-241	0.03	0.09
USGS 088	09/30/87	Am-241	0.03	0.09
USGS 088	04/05/88	Am-241	-0.01	0.06
USGS 088	06/24/88	Am-241	-0.06	0.12
USGS 088	09/29/88	Am-241	-0.05	0.09
USGS 088	01/04/89	Am-241	0.01	0.09
USGS 088	04/04/89	Am-241	0.012	0.075
USGS 088	07/12/89	Am-241	0	0.09
USGS 088	10/17/89	Am-241	0.3	0.6
USGS 088	01/23/90	Am-241	-0.01	0.09
USGS 088	04/10/90	Am-241	0.01	0.09
USGS 088	07/19/90	Am-241	-0.012	0.09
USGS 088	07/19/90	Am-241	-0.02	0.09
USGS 088	08/28/90	Am-241	0.05	0.09
USGS 088	08/28/90	Am-241	0.04	0.09
USGS 088	10/15/91	Am-241	0.01	0.06
USGS 088	01/16/92	Am-241	0.04	0.06
USGS 088	04/15/92	Am-241	0	0.09
USGS 088	01/24/95	Am-241	-0.031	0.048
USGS 088	04/18/95	Am-241	0	0.06
USGS 088	10/23/95	Am-241	-0.01	0.06
USGS 089	02/14/72	Am-241	1	9
USGS 089	09/20/72	Am-241	<0.2	—
USGS 089	***10/12/72***	***Am-241***	***5***	***3***
USGS 089	11/20/72	Am-241	<0.02	—
USGS 089	02/02/73	Am-241	0.04	0.09
USGS 089	02/24/73	Am-241	0.02	0.15
USGS 089	03/30/73	Am-241	0.02	0.06
USGS 089	04/30/73	Am-241	0.04	0.06
USGS 089	05/29/73	Am-241	<0.06	—
USGS 089	05/29/73	Am-241	<0.02	—
USGS 089	***06/29/73***	***Am-241***	***0.011***	***0.006***
USGS 089	***07/24/73***	***Am-241***	***0.07***	***0.06***
USGS 089	***08/29/73***	***Am-241***	***0.14***	***0.09***
USGS 089	***09/26/73***	***Am-241***	***0.11***	***0.06***
USGS 089	***09/26/73***	***Am-241***	***0.09***	***0.06***
USGS 089	11/01/73	Am-241	0.04	0.06
USGS 089	11/29/73	Am-241	0.04	0.06
USGS 089	12/20/73	Am-241	0.01	0.06
USGS 089	***01/18/74***	***Am-241***	***0.027***	***0.006***
USGS 089	02/26/74	Am-241	0.02	0.06
USGS 089	03/27/74	Am-241	0.02	0.09
USGS 089	04/25/74	Am-241	0.04	0.09
USGS 089	05/29/74	Am-241	0	0.06
USGS 089	06/28/74	Am-241	<0.02	—
USGS 089	08/01/74	Am-241	<0.01	—
USGS 089	08/27/74	Am-241	<0.05	—
USGS 089	10/01/74	Am-241	<0.02	—
USGS 089	10/16/74	Am-241	<0.03	—
USGS 089	11/26/74	Am-241	<0.03	—
USGS 089	***12/27/74***	***Am-241***	***0.09***	***0.06***
USGS 089	02/01/75	Am-241	0.018	0.021
USGS 089	03/27/75	Am-241	-0.02	0.06
USGS 089	04/25/75	Am-241	-0.01	0.06
USGS 089	05/31/75	Am-241	0	0.03
USGS 089	07/25/75	Am-241	-0.01	0.024
USGS 089	08/28/75	Am-241	0.002	0.018
USGS 089	09/29/75	Am-241	0.01	0.03
USGS 089	02/05/76	Am-241	0	0.03

Table E-2. Americium-241 Results.

Well Name	Sample Date	Analyte	Result* (pCi/L)	Uncertainty at 3 Sigma (pCi/L)
USGS 089	10/30/76	Am-241	-0.007	0.027
USGS 089	04/18/77	Am-241	-0.005	0.018
USGS 089	04/26/78	Am-241	0.013	0.021
USGS 089	10/27/78	Am-241	-0.0022	0.081
USGS 089	05/04/79	Am-241	0.04	0.06
USGS 089	10/14/80	Am-241	-0.02	0.06
USGS 089	04/09/81	Am-241	-0.03	0.09
USGS 089	10/07/81	Am-241	0.03	0.09
USGS 089	04/08/82	Am-241	-0.02	0.06
USGS 089	07/15/82	Am-241	-0.001	0.012
USGS 089	10/06/82	Am-241	0	0.09
USGS 089	04/18/83	Am-241	0.02	0.06
USGS 089	10/06/83	Am-241	-0.01	0.09
USGS 089	04/18/84	Am-241	0	0.09
USGS 089	10/17/84	Am-241	0.017	0.081
USGS 089	04/29/85	Am-241	-0.03	0.09
USGS 089	10/22/85	Am-241	-0.014	0.093
USGS 089	04/18/86	Am-241	-0.011	0.09
USGS 089	11/04/86	Am-241	-0.02	0.12
USGS 089	04/22/87	Am-241	0.04	0.09
USGS 089	09/22/87	Am-241	0.01	0.12
USGS 089	09/30/87	Am-241	0.03	0.09
USGS 089	04/05/88	Am-241	0.01	0.09
USGS 089	06/24/88	Am-241	-0.02	0.09
USGS 089	10/18/88	Am-241	-0.015	0.063
USGS 089	01/04/89	Am-241	0.03	0.09
USGS 089	04/04/89	Am-241	0	0.06
USGS 089	10/18/89	Am-241	0	0.6
USGS 089	04/10/90	Am-241	0.04	0.06
USGS 089	10/16/91	Am-241	0	0.06
USGS 089	04/15/92	Am-241	-0.013	0.072
USGS 089	04/21/95	Am-241	0	0.06
USGS 089	10/25/95	Am-241	-0.01	0.06
USGS 090	***09/20/72***	***Am-241***	***1.5***	***1.2***
USGS 090	10/12/72	Am-241	0.06	0.09
USGS 090	11/20/72	Am-241	<0.03	---
USGS 090	02/24/73	Am-241	0.002	0.006
USGS 090	03/30/73	Am-241	0.01	0.03
USGS 090	***04/30/73***	***Am-241***	***0.17***	***0.06***
USGS 090	05/29/73	Am-241	<0.04	---
USGS 090	06/29/73	Am-241	0.03	0.06
USGS 090	***07/24/73***	***Am-241***	***0.07***	***0.06***
USGS 090	***08/29/73***	***Am-241***	***0.06***	***0.06***
USGS 090	***09/26/73***	***Am-241***	***0.13***	***0.09***
USGS 090	10/31/73	Am-241	<0.03	---
USGS 090	11/29/73	Am-241	0.003	0.06
USGS 090	12/20/73	Am-241	0.02	0.06
USGS 090	01/18/74	Am-241	<0.02	---
USGS 090	02/25/74	Am-241	0.04	0.06
USGS 090	03/27/74	Am-241	<0.04	---
USGS 090	04/24/74	Am-241	0	0.06
USGS 090	05/29/74	Am-241	0.03	0.06
USGS 090	06/29/74	Am-241	0.03	0.06
USGS 090	08/02/74	Am-241	<0.03	---
USGS 090	12/14/74	Am-241	0.02	0.06
USGS 090	01/31/75	Am-241	0	0.015
USGS 090	03/27/75	Am-241	0.02	0.06
USGS 090	04/25/75	Am-241	-0.003	0.027
USGS 090	05/30/75	Am-241	-0.002	0.027
USGS 090	09/26/75	Am-241	-0.001	0.018
USGS 090	***02/05/76***	***Am-241***	***0.03***	***0.03***
USGS 090	10/29/76	Am-241	0.024	0.036
USGS 090	04/18/77	Am-241	-0.0006	0.015
USGS 090	04/26/78	Am-241	0.0005	0.0189

Table E-2. Americium-241 Results.

Well Name	Sample Date	Analyte	Result* (pCi/L)	Uncertainty at 3 Sigma (pCi/L)
USGS 090	10/25/78	Am-241	0.0063	0.075
USGS 090	05/13/79	Am-241	0.01	0.06
USGS 090	04/21/80	Am-241	0.02	0.06
USGS 090	10/14/80	Am-241	0	0.06
USGS 090	04/09/81	Am-241	0.2	1.5
USGS 090	***10/08/81***	***Am-241***	***0.14***	***0.12***
USGS 090	04/08/82	Am-241	-0.03	0.09
USGS 090	07/15/82	Am-241	-0.002	0.012
USGS 090	10/06/82	Am-241	-0.002	0.009
USGS 090	10/06/82	Am-241	-0.03	0.09
USGS 090	01/24/83	Am-241	0.001	0.018
USGS 090	04/15/83	Am-241	0	0.09
USGS 090	10/06/83	Am-241	-0.03	0.06
USGS 090	04/17/84	Am-241	0.01	0.09
USGS 090	10/10/84	Am-241	0.02	0.09
USGS 090	04/18/86	Am-241	-0.01	0.12
USGS 090	11/03/86	Am-241	-0.01	0.12
USGS 090	04/22/87	Am-241	0.03	0.09
USGS 090	09/23/87	Am-241	0.011	0.099
USGS 090	09/30/87	Am-241	-0.03	0.06
USGS 090	04/06/88	Am-241	0.06	0.09
USGS 090	06/22/88	Am-241	-0.02	0.12
USGS 090	10/18/88	Am-241	-0.01	0.06
USGS 090	01/18/89	Am-241	-0.04	0.09
USGS 090	04/05/89	Am-241	0.016	0.09
USGS 090	07/11/89	Am-241	0	0.09
USGS 090	10/18/89	Am-241	-0.14	0.45
USGS 090	01/23/90	Am-241	0	0.09
USGS 090	04/10/90	Am-241	0.04	0.06
USGS 090	07/02/90	Am-241	0.04	0.09
USGS 090	10/24/90	Am-241	-0.012	0.15
USGS 090	10/16/91	Am-241	0	0.06
USGS 090	01/16/92	Am-241	0.03	0.06
USGS 090	04/20/92	Am-241	0	0.06
USGS 090	01/12/95	Am-241	0	0.06
USGS 090	04/21/95	Am-241	0	0.06
USGS 090	10/25/95	Am-241	0.02	0.06
USGS 097	03/14/94	Am-241	0.02	0.06
USGS 097	03/16/95	Am-241	0	0.06
USGS 097	11/06/95	Am-241	0	0.06
USGS 099	03/14/94	Am-241	0.012	0.054
USGS 110	10/25/95	Am-241	0.01	0.06
USGS 117	10/19/87	Am-241	0.06	0.09
USGS 117	06/27/88	Am-241	-0.04	0.09
USGS 117	10/17/88	Am-241	-0.03	0.09
USGS 117	01/12/89	Am-241	0.01	0.09
USGS 117	04/03/89	Am-241	0.015	0.093
USGS 117	10/13/89	Am-241	0.04	0.09
USGS 117	04/10/90	Am-241	0.03	0.06
USGS 117	08/29/90	Am-241	0.05	0.09
USGS 117	10/16/91	Am-241	0.07	0.09
USGS 117	04/15/92	Am-241	-0.03	0.06
USGS 117	04/21/95	Am-241	-0.012	0.054
USGS 117	10/24/95	Am-241	0.015	0.057
USGS 119	11/06/87	Am-241	-0.03	0.09
USGS 119	06/27/88	Am-241	-0.05	0.09
USGS 119	10/17/88	Am-241	0.04	0.09
USGS 119	01/12/89	Am-241	0.02	0.09
USGS 119	04/03/89	Am-241	0.03	0.09
USGS 119	10/17/89	Am-241	-0.05	0.27

Table E-2. Americium-241 Results.

Well Name	Sample Date	Analyte	Result* (pCi/L)	Uncertainty at 3 Sigma (pCi/L)
USGS 119	04/09/90	Am-241	0.02	0.09
USGS 119	10/15/91	Am-241	0.06	0.09
USGS 119	10/15/91	Am-241	0.01	0.06
USGS 119	10/15/91	Am-241	0	0.09
USGS 119	04/16/92	Am-241	0	0.09
USGS 119	04/17/95	Am-241	0.02	0.06
USGS 119	10/25/95	Am-241	0.01	0.054
USGS 120	11/18/87	Am-241	0.011	0.102
USGS 120	06/27/88	Am-241	0	0.12
USGS 120	10/18/88	Am-241	0.03	0.09
USGS 120	01/12/89	Am-241	0.017	0.081
USGS 120	04/04/89	Am-241	-0.016	0.075
USGS 120	07/12/89	Am-241	-0.014	0.096
USGS 120	10/12/89	Am-241	0.04	0.09
USGS 120	01/22/90	Am-241	-0.011	0.09
USGS 120	04/09/90	Am-241	0	0.06
USGS 120	07/19/90	Am-241	-0.014	0.099
USGS 120	07/19/90	Am-241	-0.01	0.09
USGS 120	08/27/90	Am-241	0.01	0.075
USGS 120	08/27/90	Am-241	-0.03	0.06
USGS 120	10/25/91	Am-241	-0.03	0.06
USGS 120	01/16/92	Am-241	0.03	0.06
USGS 120	04/15/92	Am-241	0	0.06
USGS 120	04/15/92	Am-241	0	0.06
USGS 120	07/10/92	Am-241	0.04	0.09
USGS 120	10/05/92	Am-241	0.06	0.09
USGS 120	01/20/93	Am-241	0.06	0.09
USGS 120	***04/20/93***	***Am-241***	***0.06***	***0.06***
USGS 120	06/22/93	Am-241	0.017	0.048
USGS 120	10/06/93	Am-241	-0.011	0.054
USGS 120	01/10/94	Am-241	0.02	0.06
USGS 120	04/20/94	Am-241	-0.02	0.06
USGS 120	07/11/94	Am-241	0.03	0.06
USGS 120	01/25/95	Am-241	-0.01	0.06
USGS 120	04/12/95	Am-241	-0.01	0.06
USGS 120	10/23/95	Am-241	0.01	0.054

* Concentrations greater than or equal to the reporting level of 3 sigma (3s) are in italics

ATTACHMENT F

Summary Table of Cesium-137 Results

Table F-1. Summary of Cesium-137 Results.

Well Name	'72	'73	'74	'75	'76	'77	'78	'79	'80	'81	'82	'83	'84	'85	'86	'87	'88	'89	'90	'91	'92	'93	'94	'95
TAN Area Wells																								
ANP 3 (TAN Injection Well)															3800	7500[3]	3060	4370[2]						
ANP 4 (IET Injection Well)																								
ANP 6																							ND	
ANP 9																							ND	ND[2]
USGS 7																								
USGS 24																	ND	ND						
USGS 26																							ND	ND[2]
NRF Area Wells																								
NRF 1																ND								
NRF 3																ND								
USGS 15																							ND	
USGS 17																			ND				ND	ND[2]
USGS 97																							ND	ND[2]
USGS 99																							ND	
TRA/ICPP/CFA Area Wells																								
CFA 1											ND					ND								
CFA 2											ND					ND								
CPP 1											ND	ND			100	ND							ND	ND[2]
CPP 2													ND		ND	ND							ND	

Table F-1. Summary of Cesium-137 Results (Continued).

Well Name	'72	'73	'74	'75	'76	'77	'78	'79	'80	'81	'82	'83	'84	'85	'86	'87	'88	'89	'90	'91	'92	'93	'94	'95
CPP 4												ND[3]			ND	ND							ND	
Fire Station 2																ND							ND	
MTR Test															ND									
TRA 1																ND								
TRA-4																ND								
Site 19																								
USGS 20																							ND	
USGS 36																								
USGS 38																							ND	ND[2]
USGS 39																								
USGS 44										ND[2]	ND[2]	ND[2]	ND[2]	ND[2]	ND[2]	ND[2]	ND[2]	ND	ND	ND	ND[11]	ND[2]	ND	ND[2]
USGS 47							ND[2]			ND[2]	ND[3]	ND[4]	200 ND[3]	140[2] ND[2]	ND[4]	ND[3]	ND[4]	ND[4]	ND[3]	ND	ND[5]	ND[4]	ND	MD[2]
USGS 52																								
USGS 57																								
USGS 58									ND	ND[3]		ND	ND	ND	ND	ND	ND		ND			ND	ND	ND
USGS 59										ND														
USGS 65										ND[2]	ND[4]	ND[4]	ND[4]	ND[4]	ND[5]	ND[4]	ND[4]	ND[3]	ND[3]	ND	ND[5]	ND[3]	ND[3]	ND[3]

Table F-1. Summary of Cesium-137 Results (Continued).

Well Name	'72	'73	'74	'75	'76	'77	'78	'79	'80	'81	'82	'83	'84	'85	'86	'87	'88	'89	'90	'91	'92	'93	'94	'95
USGS 76										ND[2]	58 ND[2]	ND[4]	ND[5]	ND[4]	ND[3]	ND[4]	ND[4]	ND[3]	ND[3]	ND	ND[3]	ND[2]	ND	ND[2]
USGS 77																								ND[2]
USGS 79																								
USGS 82																								
USGS 84										ND														ND[2]
USGS 85																							ND	
USGS 115																								
ANL West Area Wells																								
Arbor Test																		ND					60 ND	
EBR II-1																ND								
USGS 100																								
RWMC Area Wells																								
RWMC Prod.			ND		ND	ND	ND	ND[2]		ND[2]	ND[2]	ND[3]	ND	ND[2]	ND[2]	ND[4]	ND[2]	ND[3]	ND[2]	ND[2]	ND			ND[2]
USGS 87	ND[3]	90 ND[11]	30 ND[10]	ND[5]	ND[2]	ND	ND[2]	ND[2]	ND[2]	ND[2]	ND[2]	ND[3]	ND[2]	ND[2]	ND[2]	ND[3]	ND[3]	ND[4]	ND[7]	ND	ND[2]			ND[4]
USGS 88	24 ND[2]	ND[12]	ND[12]	ND[6]	ND[2]	ND	ND[2]	ND[2]	ND[2]	ND[2]	ND[2]	ND[3]	ND[2]	ND[2]	ND[2]	30 ND[3]	ND[3]	ND[4]	ND[6]	ND	ND[2]			ND[4]
USGS 89	90[2] ND[2]	ND[12]	ND[12]	ND[6]	24 ND	ND	ND[2]	ND[2]	ND[2]	ND[2]	ND[2]	ND[3]	ND[2]	ND[2]	ND[2]	25 ND[3]	ND[3]	ND[2]	ND	ND	ND			ND[2]
USGS 90	90[2] ND[2]	ND[12]	ND[9]	ND[6]	ND[2]	ND	ND[2]	ND[2]	ND[2]	ND[2]	ND[2]	ND[4]	ND[2]		ND[2]	ND[3]	ND[3]	90 ND[3]	ND[4]	ND	ND[2]			
USGS 117																ND	ND[2]	ND[3]	ND[3]	ND	ND			ND[2]
USGS 119																ND	ND[2]	ND[3]	ND	ND[3]	ND			ND[2]
USGS 120																ND	ND[2]	ND[4]	ND[6]	ND	ND[5]	ND[4]	ND[3]	ND[4]

Table F-1. Summary of Cesium-137 Results (Continued).

Well Name	'72	'73	'74	'75	'76	'77	'78	'79	'80	'81	'82	'83	'84	'85	'86	'87	'88	'89	'90	'91	'92	'93	'94	'95
INEL Southern Boundary Area Wells																								
Atomic City																								
Cerro Grande											ND	ND[2]	ND[2]	ND[2]	ND[2]	ND[2]	ND[2]		ND[2]	ND				
Leo Rogers 1									ND	ND		ND	ND			ND			ND	ND				ND
USGS 8											ND	ND[2]	ND[2]	ND[2]	ND[2]	ND[2]	ND[2]	ND[2]	ND[2]	ND	ND			ND[2]
USGS 9									ND						ND	ND							ND	ND[2]
USGS 11							ND	ND[2]	ND[2]	ND[2]	ND	ND[2]	ND[2]	ND[2]	140 ND[2]	ND[2]	ND[2]	ND	ND[2]	ND	ND			ND[2]
USGS 14							ND	ND[2]	ND[2]	ND[2]	ND	ND[2]	ND[2]	ND[2]	ND[2]	ND[2]	ND[2]	ND[2]	ND[2]	ND	ND			ND[2]
USGS 86									ND						ND[2]	ND							ND	ND[2]
USGS 103																							ND[2]	ND[2]
USGS 104																								
USGS 105																ND[2]							ND	ND[2]
USGS 106										ND														
USGS 109																ND							ND	ND[2]
USGS 110																								ND

Concentrations reported in the table are in pCi/L.

ND Nondetect, analytical result was less than the reporting level (3s).

Note: Positive detections and non-detects are reported separately. If more than one non-detect result is available in a year, the number of samples are reported in superscript. If more than one positive detection value is available in a year, the maximum reported concentration is reported with the number of positive detections shown in superscript.

Table F-2. Cesium-137 Results.

Well Name	Sample Date	Analyte	Result* (pCi/L)	Uncertainty at 3 Sigma (pCi/L)
ANP 3	***04/25/86***	***Cs-137***	***3800***	***600***
ANP 3	***05/14/87***	***Cs-137***	***3360***	***540***
ANP 3	***07/13/87***	***Cs-137***	***2880***	***480***
ANP 3	***10/27/87***	***Cs-137***	***7500***	***900***
ANP 3	***01/11/88***	***Cs-137***	***3060***	***450***
ANP 3	***03/07/89***	***Cs-137***	***3170***	***540***
ANP 3	***12/12/89***	***Cs-137***	***4370***	***600***
ANP 6	04/11/94	Cs-137	-30	90
ANP 9	04/13/94	Cs-137	-20	90
ANP 9	04/06/95	Cs-137	-16	108
ANP 9	10/10/95	Cs-137	30	60
Arbor Test	02/15/89	Cs-137	10	90
Arbor Test	04/15/94	Cs-137	0	90
Arbor Test	***09/29/94***	***Cs-137***	***60***	***60***
cerro grande	10/04/82	Cs-137	-10.8	93
cerro grande	04/07/83	Cs-137	19.2	69
cerro grande	10/05/83	Cs-137	6.21	57
cerro grande	04/13/84	Cs-137	-30	60
cerro grande	10/05/84	Cs-137	-30	90
cerro grande	04/18/85	Cs-137	0	120
cerro grande	10/22/85	Cs-137	-15	72
cerro grande	04/22/86	Cs-137	6	33
cerro grande	11/04/86	Cs-137	-70	120
cerro grande	04/08/87	Cs-137	70	90
cerro grande	10/29/87	Cs-137	60	120
cerro grande	04/05/88	Cs-137	30	120
cerro grande	10/27/88	Cs-137	-40	60
cerro grande	04/27/90	Cs-137	20	60
cerro grande	10/18/90	Cs-137	-70	90
cerro grande	04/26/91	Cs-137	30	90
CFA 1	10/11/82	Cs-137	-13	66
CFA 1	10/15/87	Cs-137	-10	120
CFA 2	10/11/82	Cs-137	-91.1	102
CFA 2	10/14/87	Cs-137	60	90
CPP 1	04/09/82	Cs-137	9.15	26.7
CPP 1	01/18/83	Cs-137	-87	108
CPP 1	***02/28/86***	***Cs-137***	***100***	***90***
CPP 1	10/22/87	Cs-137	10	90
CPP 1	04/22/94	Cs-137	-20	90
CPP 1	04/13/95	cs-137	16	81
CPP 1	10/16/95	cs-137	40	90
CPP 2	11/07/84	Cs-137	20	120
CPP 2	02/28/86	Cs-137	-40	90
CPP 2	10/22/87	Cs-137	-20	90
CPP 2	05/04/94	Cs-137	30	90
CPP 4	10/26/83	Cs-137	5.38	48
CPP 4	11/15/83	Cs-137	-5	36
CPP 4	11/15/83	Cs-137	21.7	39
CPP 4	02/28/86	Cs-137	-12	90
CPP 4	10/22/87	Cs-137	10	90
CPP 4	04/13/94	Cs-137	40	90
EBR II 1	10/15/87	Cs-137	-14	111
Firestation 2	11/03/87	Cs-137	-60	120
Firestation 2	04/07/94	Cs-137	-15	81

Table F-2. Cesium-137 Results.

Well Name	Sample Date	Analyte	Result* (pCi/L)	Uncertainty at 3 Sigma (pCi/L)
Leo Rogers 1	07/17/80	Cs-137	-45.8	105
Leo Rogers 1	07/10/81	Cs-137	-1.35	21.3
Leo Rogers 1	07/12/83	Cs-137	-5.38	42
Leo Rogers 1	07/18/84	Cs-137	19	42
Leo Rogers 1	04/30/87	Cs-137	-10	90
Leo Rogers 1	06/29/90	Cs-137	20	90
Leo Rogers 1	07/25/91	Cs-137	10	60
Leo Rogers 1	07/14/95	Cs-137	-11	111
MTR Test	10/22/70	Cs-137	<800	---
MTR Test	04/24/86	Cs-137	30	120
NRF 1	10/29/87	Cs-137	0	90
NRF 3	10/29/87	Cs-137	-20	120
RWMC Prod.	11/23/74	Cs-137	0	60
RWMC Prod.	10/26/76	Cs-137	-20	30
RWMC Prod.	04/20/77	Cs-137	5	15
RWMC Prod.	05/11/78	Cs-137	-6.21	20.1
RWMC Prod.	04/13/79	Cs-137	-14.1	66
RWMC Prod.	10/15/79	Cs-137	12.2	81
RWMC Prod.	04/30/81	Cs-137	8.4	19.2
RWMC Prod.	10/13/81	Cs-137	12.7	21.9
RWMC Prod.	04/15/82	Cs-137	-2.57	21.3
RWMC Prod.	10/11/82	Cs-137	-11.6	111
RWMC Prod.	01/17/83	Cs-137	-73.7	105
RWMC Prod.	04/13/83	Cs-137	18.8	90
RWMC Prod.	10/06/83	Cs-137	15.9	75
RWMC Prod.	10/12/84	Cs-137	10	60
RWMC Prod.	04/26/85	Cs-137	-20	120
RWMC Prod.	10/25/85	Cs-137	0	90
RWMC Prod.	05/01/86	Cs-137	20	90
RWMC Prod.	10/31/86	Cs-137	30	60
RWMC Prod.	04/21/87	Cs-137	-14	108
RWMC Prod.	09/23/87	Cs-137	6	21
RWMC Prod.	09/30/87	Cs-137	-28	42
RWMC Prod.	10/14/87	Cs-137	-30	120
RWMC Prod.	04/06/88	Cs-137	-13	117
RWMC Prod.	10/28/88	Cs-137	-30	90
RWMC Prod.	01/18/89	Cs-137	-20	90
RWMC Prod.	03/23/89	Cs-137	-40	150
RWMC Prod.	07/11/89	Cs-137	-10	90
RWMC Prod.	04/05/90	Cs-137	-40	90
RWMC Prod.	10/30/90	Cs-137	0	90
RWMC Prod.	04/04/91	Cs-137	-40	90
RWMC Prod.	10/15/91	Cs-137	70	90
RWMC Prod.	04/21/92	Cs-137	-10	90
RWMC Prod.	04/17/95	Cs-137	10	120
RWMC Prod.	10/12/95	Cs-137	-40	60
Site 19	10/21/70	Cs-137	<800	---
TRA 1	10/15/70	Cs-137	<800	---
TRA 1	10/30/87	Cs-137	20	120
TRA 4	10/30/70	Cs-137	<800	---
TRA 4	10/30/87	Cs-137	6	42
USGS 008	10/04/82	Cs-137	33.7	87
USGS 008	04/14/83	Cs-137	26.8	111
USGS 008	10/07/83	Cs-137	-102	102
USGS 008	04/27/84	Cs-137	14	102
USGS 008	10/12/84	Cs-137	15	54

Table F-2. Cesium-137 Results.

Well Name	Sample Date	Analyte	Result* (pCi/L)	Uncertainty at 3 Sigma (pCi/L)
USGS 008	04/17/85	Cs-137	11	96
USGS 008	10/22/85	Cs-137	50	90
USGS 008	04/22/86	Cs-137	20	120
USGS 008	11/04/86	Cs-137	60	90
USGS 008	04/08/87	Cs-137	80	120
USGS 008	10/30/87	Cs-137	-100	120
USGS 008	04/05/88	Cs-137	-16	105
USGS 008	10/27/88	Cs-137	-15	75
USGS 008	05/01/89	Cs-137	-20	90
USGS 008	10/20/89	Cs-137	20	90
USGS 008	04/05/90	Cs-137	-40	120
USGS 008	10/25/90	Cs-137	-10	90
USGS 008	10/25/91	Cs-137	40	90
USGS 008	04/23/92	Cs-137	10	60
USGS 008	04/06/95	Cs-137	0	90
USGS 008	10/12/95	Cs-137	20	120
USGS 009	04/16/80	Cs-137	-8.43	102
USGS 009	11/01/86	Cs-137	-30	90
USGS 009	07/30/87	Cs-137	0	90
USGS 009	03/31/94	Cs-137	0	60
USGS 009	04/20/95	CS-137	-20	90
USGS 009	10/12/95	Cs-137	-30	90
USGS 011	12/02/78	Cs-137	1.95	24.9
USGS 011	03/31/79	Cs-137	-11.8	19.2
USGS 011	10/11/79	Cs-137	0	108
USGS 011	04/16/80	Cs-137	13.4	75
USGS 011	10/08/80	Cs-137	0.607	17.4
USGS 011	04/02/81	Cs-137	2.43	21
USGS 011	10/09/81	Cs-137	-41.7	96
USGS 011	10/04/82	Cs-137	-24.9	108
USGS 011	04/14/83	Cs-137	-18.8	45
USGS 011	10/07/83	Cs-137	21.5	45
USGS 011	04/16/84	Cs-137	-60	120
USGS 011	10/05/84	Cs-137	-10	90
USGS 011	04/17/85	Cs-137	20	120
USGS 011	10/22/85	Cs-137	70	120
USGS 011	04/22/86	Cs-137	14	90
USGS 011	***11/04/86***	***Cs-137***	***140***	***120***
USGS 011	11/04/86	Cs-137	-10	90
USGS 011	03/13/87	Cs-137	20	90
USGS 011	10/30/87	Cs-137	-20	90
USGS 011	04/05/88	Cs-137	-40	90
USGS 011	10/27/88	Cs-137	-11	63
USGS 011	09/13/89	Cs-137	-80	120
USGS 011	04/03/90	Cs-137	-70	120
USGS 011	10/24/90	Cs-137	-30	90
USGS 011	10/08/91	Cs-137	20	90
USGS 011	04/21/92	Cs-137	40	90
USGS 011	04/20/95	Cs-137	-16	105
USGS 011	10/26/95	Cs-137	10	120
USGS 014	12/02/78	Cs-137	10.3	27.9
USGS 014	03/31/79	Cs-137	-45.9	102
USGS 014	10/11/79	Cs-137	-12.8	90
USGS 014	04/16/80	Cs-137	-2.41	81
USGS 014	10/08/80	Cs-137	14.3	24
USGS 014	04/02/81	Cs-137	9.2	18.9
USGS 014	10/09/81	Cs-137	-35.1	69
USGS 014	10/04/82	Cs-137	25.4	96
USGS 014	04/14/83	Cs-137	-16	111
USGS 014	10/07/83	Cs-137	-10.3	108
USGS 014	04/16/84	Cs-137	40	90
USGS 014	10/05/84	Cs-137	90	120

Table F-2. Cesium-137 Results.

Well Name	Sample Date	Analyte	Result* (pCi/L)	Uncertainty at 3 Sigma (pCi/L)
USGS 014	04/17/85	Cs-137	-10	90
USGS 014	10/22/85	Cs-137	-10	60
USGS 014	04/22/86	Cs-137	10	120
USGS 014	11/04/86	Cs-137	-20	90
USGS 014	04/08/87	Cs-137	30	90
USGS 014	10/30/87	Cs-137	70	120
USGS 014	04/05/88	Cs-137	30	90
USGS 014	10/27/88	Cs-137	40	90
USGS 014	05/01/89	Cs-137	30	90
USGS 014	09/14/89	Cs-137	-12	117
USGS 014	04/03/90	Cs-137	-10	123
USGS 014	09/28/90	Cs-137	-16	81
USGS 014	10/02/91	Cs-137	0	90
USGS 014	04/08/92	Cs-137	-20	60
USGS 014	04/06/95	Cs-137	10	60
USGS 014	10/26/95	Cs-137	30	120
USGS 015	03/11/94	Cs-137	-30	60
USGS 017	03/20/90	Cs-137	40	120
USGS 017	03/10/94	Cs-137	-40	60
USGS 017	03/16/95	Cs-137	-40	90
USGS 017	11/07/95	Cs-137	12	96
USGS 020	04/04/94	Cs-137	50	90
USGS 024	01/14/88	Cs-137	-30	90
USGS 024	02/28/89	Cs-137	-10	90
USGS 026	03/31/94	Cs-137	-30	90
USGS 026	04/11/95	Cs-137	7	96
USGS 026	10/04/95	Cs-137	0	120
USGS 038	04/18/94	Cs-137	30	90
USGS 038	04/05/95	Cs-137	30	60
USGS 038	10/12/95	Cs-137	17	48
USGS 044	04/24/81	Cs-137	3.7	18.9
USGS 044	10/08/81	Cs-137	0.359	22.5
USGS 044	04/16/82	Cs-137	-0.0617	19.2
USGS 044	10/06/82	Cs-137	21	72
USGS 044	04/12/83	Cs-137	36.6	75
USGS 044	10/12/83	Cs-137	-12.1	57
USGS 044	04/10/84	Cs-137	-20	90
USGS 044	10/09/84	Cs-137	0	150
USGS 044	04/22/85	Cs-137	-11	96
USGS 044	10/29/85	Cs-137	0	90
USGS 044	04/28/86	Cs-137	30	90
USGS 044	11/14/86	Cs-137	100	120
USGS 044	04/22/87	Cs-137	20	90
USGS 044	10/20/87	Cs-137	-10	60
USGS 044	04/09/88	Cs-137	-30	120
USGS 044	11/06/88	Cs-137	60	90
USGS 044	04/07/89	Cs-137	10	60
USGS 044	04/03/90	Cs-137	0	120
USGS 044	10/09/91	Cs-137	0	60
USGS 044	04/20/92	Cs-137	-16	84
USGS 044	04/20/92	Cs-137	-16	84
USGS 044	07/01/92	Cs-137	10	60
USGS 044	07/20/92	Cs-137	0	90
USGS 044	07/24/92	Cs-137	-10	60
USGS 044	07/28/92	Cs-137	10	90
USGS 044	07/30/92	Cs-137	40	90
USGS 044	08/03/92	Cs-137	14	90
USGS 044	08/14/92	Cs-137	-10	90

Table F-2. Cesium-137 Results.

Well Name	Sample Date	Analyte	Result* (pCi/L)	Uncertainty at 3 Sigma (pCi/L)
USGS 044	08/18/92	Cs-137	15	84
USGS 044	11/05/92	Cs-137	-20	60
USGS 044	05/04/93	Cs-137	30	90
USGS 044	11/01/93	Cs-137	-20	60
USGS 044	04/07/94	Cs-137	0	90
USGS 044	04/13/95	Cs-137	-20	90
USGS 044	10/16/95	Cs-137	-20	60
USGS 047	01/06/78	Cs-137	-5.03	90
USGS 047	01/10/78	Cs-137	-14.3	90
USGS 047	04/09/81	Cs-137	9.12	21.3
USGS 047	10/08/81	Cs-137	0.934	20.1
USGS 047	04/09/82	Cs-137	-6.46	21.6
USGS 047	07/06/82	Cs-137	34.1	75
USGS 047	10/07/82	Cs-137	33.7	72
USGS 047	01/18/83	Cs-137	21.1	63
USGS 047	04/15/83	Cs-137	-12.2	216
USGS 047	07/13/83	Cs-137	44.3	75
USGS 047	10/17/83	Cs-137	-42.5	120
USGS 047	01/17/84	Cs-137	30	120
USGS 047	04/11/84	Cs-137	15	120
USGS 047	07/17/84	Cs-137	90	120
USGS 047	***10/23/84***	***Cs-137***	***200***	***150***
USGS 047	01/14/85	Cs-137	80	120
USGS 047	***04/23/85***	***Cs-137***	***140***	***90***
USGS 047	***07/10/85***	***Cs-137***	***90***	***90***
USGS 047	10/29/85	Cs-137	60	90
USGS 047	02/28/86	Cs-137	60	120
USGS 047	04/30/86	Cs-137	-30	90
USGS 047	08/06/86	Cs-137	60	90
USGS 047	10/29/86	Cs-137	40	60
USGS 047	01/20/87	Cs-137	30	120
USGS 047	04/15/87	Cs-137	0	90
USGS 047	10/26/87	Cs-137	50	90
USGS 047	01/29/88	Cs-137	20	120
USGS 047	04/25/88	Cs-137	-30	60
USGS 047	07/29/88	Cs-137	0	90
USGS 047	09/30/88	Cs-137	50	90
USGS 047	01/31/89	Cs-137	-70	90
USGS 047	04/20/89	Cs-137	60	90
USGS 047	06/27/89	Cs-137	60	150
USGS 047	10/19/89	Cs-137	-20	150
USGS 047	01/19/90	Cs-137	16	96
USGS 047	04/17/90	Cs-137	16	126
USGS 047	07/24/90	Cs-137	0	90
USGS 047	10/24/91	Cs-137	20	90
USGS 047	01/23/92	Cs-137	-11	57
USGS 047	04/29/92	Cs-137	70	90
USGS 047	04/29/92	Cs-137	70	90
USGS 047	07/23/92	Cs-137	0	60
USGS 047	10/21/92	Cs-137	40	60
USGS 047	01/25/93	Cs-137	-10	60
USGS 047	04/30/93	Cs-137	-13	90
USGS 047	07/28/93	Cs-137	11	66
USGS 047	10/26/93	Cs-137	30	60
USGS 047	04/22/94	Cs-137	20	90
USGS 047	04/13/95	Cs-137	50	120
USGS 047	10/16/95	Cs-137	-30	120
USGS 058	10/22/70	Cs-137	<800	---
USGS 058	04/23/80	Cs-137	39.2	123
USGS 058	04/24/81	Cs-137	-2.63	19.5
USGS 058	04/24/81	Cs-137	-4.64	20.1
USGS 058	10/08/81	Cs-137	8.23	24.6
USGS 058	04/15/83	Cs-137	13	84

Table F-2. Cesium-137 Results.

Well Name	Sample Date	Analyte	Result* (pCi/L)	Uncertainty at 3 Sigma (pCi/L)
USGS 058	04/18/84	Cs-137	13	87
USGS 058	04/24/85	Cs-137	-30	90
USGS 058	04/24/86	Cs-137	-10	90
USGS 058	04/23/87	Cs-137	-14	99
USGS 058	04/01/88	Cs-137	-17	90
USGS 058	03/13/90	Cs-137	-15	99
USGS 058	04/19/93	Cs-137	30	60
USGS 058	04/19/94	Cs-137	10	78
USGS 058	04/11/95	Cs-137	16	72
USGS 059	10/06/81	Cs-137	-6.57	21.9
USGS 065	10/21/70	Cs-137	<800	---
USGS 065	04/09/81	Cs-137	14.1	19.8
USGS 065	10/07/81	Cs-137	-55.5	36
USGS 065	01/07/82	Cs-137	-33.4	84
USGS 065	04/09/82	Cs-137	5.82	25.2
USGS 065	07/06/82	Cs-137	4.32	84
USGS 065	10/07/82	Cs-137	17.3	81
USGS 065	01/18/83	Cs-137	-34.6	96
USGS 065	04/15/83	Cs-137	24.9	219
USGS 065	07/14/83	Cs-137	37.6	63
USGS 065	10/10/83	Cs-137	6.73	75
USGS 065	01/16/84	Cs-137	50	120
USGS 065	04/17/84	Cs-137	10	90
USGS 065	07/18/84	Cs-137	17	87
USGS 065	10/17/84	Cs-137	0	90
USGS 065	01/10/85	Cs-137	-50	90
USGS 065	04/29/85	Cs-137	10	60
USGS 065	07/11/85	Cs-137	17	102
USGS 065	10/28/85	Cs-137	30	90
USGS 065	01/27/86	Cs-137	70	90
USGS 065	04/24/86	Cs-137	30	90
USGS 065	08/05/86	Cs-137	60	120
USGS 065	11/18/86	Cs-137	60	150
USGS 065	11/18/86	Cs-137	0	90
USGS 065	01/20/87	Cs-137	0	120
USGS 065	04/23/87	Cs-137	40	90
USGS 065	07/27/87	Cs-137	15	54
USGS 065	10/14/87	Cs-137	10	90
USGS 065	01/28/88	Cs-137	11	117
USGS 065	04/12/88	Cs-137	-120	120
USGS 065	06/21/88	Cs-137	-20	90
USGS 065	10/13/88	Cs-137	40	90
USGS 065	02/17/89	Cs-137	-16	96
USGS 065	06/22/89	Cs-137	10	120
USGS 065	10/17/89	Cs-137	10	90
USGS 065	04/04/90	Cs-137	30	120
USGS 065	07/11/90	Cs-137	-10	90
USGS 065	10/23/90	Cs-137	20	90
USGS 065	10/15/91	Cs-137	-12	81
USGS 065	01/15/92	Cs-137	20	90
USGS 065	04/13/92	Cs-137	-30	60
USGS 065	04/13/92	Cs-137	-30	60
USGS 065	07/14/92	Cs-137	-13	60
USGS 065	10/07/92	Cs-137	30	90
USGS 065	04/15/93	Cs-137	-30	60
USGS 065	07/16/93	Cs-137	-50	60
USGS 065	10/08/93	Cs-137	0	90
USGS 065	01/12/94	Cs-137	-12	48
USGS 065	04/15/94	Cs-137	-40	90
USGS 065	07/12/94	Cs-137	-12	78
USGS 065	04/12/95	Cs-137	0	120
USGS 065	07/11/95	Cs-137	-10	90
USGS 065	10/11/95	Cs-137	19	48

Table F-2. Cesium-137 Results.

Well Name	Sample Date	Analyte	Result* (pCi/L)	Uncertainty at 3 Sigma (pCi/L)
USGS 076	10/20/70	Cs-137	<800	---
USGS 076	04/24/81	Cs-137	12.4	25.8
USGS 076	10/08/81	Cs-137	36.3	66
USGS 076	04/16/82	Cs-137	-5.48	18.6
USGS 076	07/07/82	Cs-137	-26.1	90
USGS 076	***10/08/82***	***Cs-137***	***57.7***	***51***
USGS 076	01/17/83	Cs-137	0.481	63
USGS 076	04/15/83	Cs-137	-15.2	270
USGS 076	07/15/83	Cs-137	40.3	75
USGS 076	10/18/83	Cs-137	-17.3	66
USGS 076	01/13/84	Cs-137	-40	90
USGS 076	02/14/84	Cs-137	-40	90
USGS 076	04/17/84	Cs-137	0	60
USGS 076	07/16/84	Cs-137	10	120
USGS 076	10/10/84	Cs-137	10	150
USGS 076	01/11/85	Cs-137	-70	90
USGS 076	04/26/85	Cs-137	30	90
USGS 076	07/09/85	Cs-137	40	120
USGS 076	10/30/85	Cs-137	-20	90
USGS 076	02/11/86	Cs-137	-6	42
USGS 076	04/24/86	Cs-137	0	90
USGS 076	08/05/86	Cs-137	10	90
USGS 076	01/20/87	Cs-137	-30	90
USGS 076	04/23/87	Cs-137	-20	120
USGS 076	07/24/87	Cs-137	40	120
USGS 076	10/08/87	Cs-137	-10	90
USGS 076	01/14/88	Cs-137	10	120
USGS 076	04/12/88	Cs-137	40	90
USGS 076	07/11/88	Cs-137	70	120
USGS 076	10/13/88	Cs-137	20	60
USGS 076	04/07/89	Cs-137	60	90
USGS 076	06/22/89	Cs-137	16	75
USGS 076	09/29/89	Cs-137	50	120
USGS 076	01/05/90	Cs-137	0	90
USGS 076	07/03/90	Cs-137	15	108
USGS 076	10/17/90	Cs-137	-20	120
USGS 076	10/02/91	Cs-137	0	90
USGS 076	04/13/92	Cs-137	20	60
USGS 076	04/13/92	Cs-137	20	60
USGS 076	10/08/92	Cs-137	60	90
USGS 076	04/26/93	Cs-137	-20	90
USGS 076	10/21/93	Cs-137	-40	60
USGS 076	04/26/94	Cs-137	-10	90
USGS 076	04/11/95	Cs-137	-30	60
USGS 076	10/30/95	Cs-137	20	90
USGS 077	04/24/95	Cs-137	0	60
USGS 077	10/24/95	Cs-137	22	96
USGS 079	10/21/70	Cs-137	<800	---
USGS 084	11/03/70	Cs-137	<800	---
USGS 084	04/24/81	Cs-137	-2.91	23.1
USGS 084	03/29/95	Cs-137	20	90
USGS 084	10/18/95	Cs-137	-80	120
USGS 085	04/08/94	Cs-137	-10	60
USGS 086	04/16/80	Cs-137	2.78	69
USGS 086	04/22/86	Cs-137	-14	99
USGS 086	11/04/86	Cs-137	-30	90
USGS 086	08/03/87	Cs-137	0	90
USGS 086	04/14/94	Cs-137	-14	57
USGS 086	04/06/95	Cs-137	-40	120

Table F-2. Cesium-137 Results.

Well Name	Sample Date	Analyte	Result* (pCi/L)	Uncertainty at 3 Sigma (pCi/L)
USGS 086	10/12/95	Cs-137	0	60
USGS 087	09/20/72	Cs-137	<20	---
USGS 087	10/12/72	Cs-137	<20	---
USGS 087	11/20/72	Cs-137	<20	---
USGS 087	02/02/73	Cs-137	<40	---
USGS 087	02/24/73	Cs-137	<20	---
USGS 087	03/30/73	Cs-137	<20	---
USGS 087	04/30/73	Cs-137	<300	---
USGS 087	05/29/73	Cs-137	<300	---
USGS 087	06/29/73	Cs-137	<400	---
USGS 087	07/24/73	Cs-137	<100	---
USGS 087	08/29/73	Cs-137	<400	---
USGS 087	09/26/73	Cs-137	<300	---
USGS 087	***10/31/73***	***Cs-137***	***90***	***60***
USGS 087	11/29/73	Cs-137	<40	---
USGS 087	12/20/73	Cs-137	<20	---
USGS 087	01/18/74	Cs-137	<20	---
USGS 087	02/25/74	Cs-137	<300	---
USGS 087	03/27/74	Cs-137	<40	---
USGS 087	04/24/74	Cs-137	<30	---
USGS 087	***05/29/74***	***Cs-137***	***30***	***30***
USGS 087	08/02/74	Cs-137	0	18
USGS 087	08/27/74	Cs-137	20	30
USGS 087	09/30/74	Cs-137	3	30
USGS 087	10/15/74	Cs-137	0	24
USGS 087	11/26/74	Cs-137	0	18
USGS 087	12/27/74	Cs-137	0	240
USGS 087	03/27/75	Cs-137	15	27
USGS 087	04/25/75	Cs-137	9	18
USGS 087	07/25/75	Cs-137	9	18
USGS 087	08/28/75	Cs-137	0	24
USGS 087	09/29/75	Cs-137	2	15
USGS 087	02/05/76	Cs-137	-7	15
USGS 087	10/27/76	Cs-137	15	24
USGS 087	04/19/77	Cs-137	16	21
USGS 087	04/26/78	Cs-137	11.3	42
USGS 087	10/04/78	Cs-137	-74.6	120
USGS 087	05/03/79	Cs-137	5.71	54
USGS 087	10/12/79	Cs-137	-10.6	42
USGS 087	04/21/80	Cs-137	12.4	45
USGS 087	10/14/80	Cs-137	18	18.9
USGS 087	04/09/81	Cs-137	2.97	22.5
USGS 087	10/07/81	Cs-137	9.77	19.5
USGS 087	04/08/82	Cs-137	-2.69	22.2
USGS 087	10/06/82	Cs-137	32.4	69
USGS 087	01/18/83	Cs-137	-131	105
USGS 087	04/15/83	Cs-137	11.5	75
USGS 087	10/06/83	Cs-137	-28.9	78
USGS 087	04/17/84	Cs-137	20	90
USGS 087	10/10/84	Cs-137	-10	90
USGS 087	04/26/85	Cs-137	-10	120
USGS 087	10/22/85	Cs-137	10	90
USGS 087	***04/18/86***	***Cs-137***	***90***	***90***
USGS 087	10/31/86	Cs-137	50	120
USGS 087	04/22/87	Cs-137	30	90
USGS 087	09/23/87	Cs-137	8	21
USGS 087	09/30/87	Cs-137	-12	42
USGS 087	04/06/88	Cs-137	-30	60
USGS 087	06/22/88	Cs-137	10	90
USGS 087	10/18/88	Cs-137	15	84
USGS 087	01/04/89	Cs-137	10	90
USGS 087	04/05/89	Cs-137	11	84
USGS 087	07/11/89	Cs-137	-30	60
USGS 087	10/26/89	Cs-137	14	78

Table F-2. Cesium-137 Results.

Well Name	Sample Date	Analyte	Result* (pCi/L)	Uncertainty at 3 Sigma (pCi/L)
USGS 087	01/03/90	Cs-137	-17	78
USGS 087	04/04/90	Cs-137	40	60
USGS 087	07/09/90	Cs-137	15	90
USGS 087	10/15/91	Cs-137	40	90
USGS 087	01/14/92	Cs-137	10	60
USGS 087	04/21/92	Cs-137	0	60
USGS 087	01/11/95	Cs-137	12	90
USGS 087	04/17/95	Cs-137	-60	90
USGS 087	07/11/95	Cs-137	0	120
USGS 087	10/16/95	Cs-137	-40	90
USGS 088	09/20/72	Cs-137	<20	—
USGS 088	10/12/72	Cs-137	<20	—
USGS 088	***11/20/72***	***Cs-137***	***24***	***15***
USGS 088	02/02/73	Cs-137	<400	—
USGS 088	02/24/73	Cs-137	<20	—
USGS 088	03/30/73	Cs-137	<400	—
USGS 088	04/30/73	Cs-137	<300	—
USGS 088	05/29/73	Cs-137	<30	—
USGS 088	06/29/73	Cs-137	<300	—
USGS 088	07/24/73	Cs-137	<20	—
USGS 088	08/29/73	Cs-137	<400	—
USGS 088	09/26/73	Cs-137	<300	—
USGS 088	10/31/73	Cs-137	<300	—
USGS 088	11/29/73	Cs-137	<300	—
USGS 088	12/20/73	Cs-137	<20	—
USGS 088	01/18/74	Cs-137	<20	—
USGS 088	02/25/74	Cs-137	<60	—
USGS 088	03/27/74	Cs-137	<40	—
USGS 088	04/24/74	Cs-137	<30	—
USGS 088	05/29/74	Cs-137	0	24
USGS 088	06/29/74	Cs-137	0	24
USGS 088	08/02/74	Cs-137	0	24
USGS 088	08/27/74	Cs-137	0	24
USGS 088	09/30/74	Cs-137	0	60
USGS 088	10/16/74	Cs-137	0	24
USGS 088	11/26/74	Cs-137	0	24
USGS 088	12/27/74	Cs-137	0	24
USGS 088	02/01/75	Cs-137	0	30
USGS 088	03/27/75	Cs-137	3	27
USGS 088	04/25/75	Cs-137	-5	24
USGS 088	07/25/75	Cs-137	23	24
USGS 088	08/28/75	Cs-137	-7	6
USGS 088	09/29/75	Cs-137	-2	15
USGS 088	02/05/76	Cs-137	5	15
USGS 088	10/30/76	Cs-137	-10	60
USGS 088	04/19/77	Cs-137	7	21
USGS 088	04/26/78	Cs-137	-0.35	22.8
USGS 088	10/25/78	Cs-137	-32.9	66
USGS 088	05/03/79	Cs-137	21.5	84
USGS 088	10/12/79	Cs-137	31.8	87
USGS 088	04/21/80	Cs-137	22.7	66
USGS 088	10/14/80	Cs-137	-6.78	20.4
USGS 088	04/09/81	Cs-137	6.34	19.5
USGS 088	10/07/81	Cs-137	2.83	20.4
USGS 088	04/08/82	Cs-137	-21.2	36
USGS 088	10/06/82	Cs-137	18.1	66
USGS 088	01/18/83	Cs-137	-20.5	105
USGS 088	04/18/83	Cs-137	-23.2	84
USGS 088	10/06/83	Cs-137	18.1	42
USGS 088	04/18/84	Cs-137	20	60
USGS 088	10/10/84	Cs-137	-60	90
USGS 088	04/26/85	Cs-137	40	90
USGS 088	10/22/85	Cs-137	60	90
USGS 088	04/18/86	Cs-137	6	48

Table F-2. Cesium-137 Results.

Well Name	Sample Date	Analyte	Result* (pCi/L)	Uncertainty at 3 Sigma (pCi/L)
USGS 088	11/03/86	Cs-137	-30	90
USGS 088	04/22/87	Cs-137	-40	120
USGS 088	09/22/87	Cs-137	0	90
USGS 088	09/30/87	Cs-137	-23	42
USGS 088	***09/30/87***	***Cs-137***	***30***	***27***
USGS 088	04/05/88	Cs-137	-20	120
USGS 088	06/24/88	Cs-137	20	90
USGS 088	09/29/88	Cs-137	20	90
USGS 088	01/04/89	Cs-137	80	120
USGS 088	04/04/89	Cs-137	20	90
USGS 088	07/12/89	Cs-137	20	90
USGS 088	10/17/89	Cs-137	11	105
USGS 088	01/23/90	Cs-137	0	90
USGS 088	04/10/90	Cs-137	0	90
USGS 088	07/19/90	Cs-137	-30	90
USGS 088	07/19/90	Cs-137	11	111
USGS 088	08/28/90	Cs-137	0	90
USGS 088	08/28/90	Cs-137	20	90
USGS 088	10/15/91	Cs-137	50	90
USGS 088	01/16/92	Cs-137	-10	90
USGS 088	04/15/92	Cs-137	-20	60
USGS 088	01/24/95	Cs-137	-30	90
USGS 088	04/18/95	Cs-137	50	90
USGS 088	07/10/95	Cs-137	-20	60
USGS 088	10/23/95	Cs-137	30	120
USGS 089	02/14/72	Cs-137	<20	—
USGS 089	***09/20/72***	***Cs-137***	***90***	***30***
USGS 089	***10/12/72***	***Cs-137***	***27***	***18***
USGS 089	11/20/72	Cs-137	<20	—
USGS 089	02/02/73	Cs-137	<300	—
USGS 089	02/24/73	Cs-137	<20	—
USGS 089	03/30/73	Cs-137	<400	—
USGS 089	04/30/73	Cs-137	<400	—
USGS 089	05/29/73	Cs-137	<400	—
USGS 089	06/29/73	Cs-137	<300	—
USGS 089	07/24/73	Cs-137	<400	—
USGS 089	08/29/73	Cs-137	<300	—
USGS 089	09/26/73	Cs-137	<300	—
USGS 089	11/01/73	Cs-137	<300	—
USGS 089	11/29/73	Cs-137	<40	—
USGS 089	12/20/73	Cs-137	<30	—
USGS 089	01/18/74	Cs-137	<30	—
USGS 089	02/26/74	Cs-137	<50	—
USGS 089	03/27/74	Cs-137	<30	—
USGS 089	04/25/74	Cs-137	<20	—
USGS 089	05/29/74	Cs-137	0	24
USGS 089	06/28/74	Cs-137	0	18
USGS 089	08/01/74	Cs-137	0	24
USGS 089	08/27/74	Cs-137	9	18
USGS 089	10/01/74	Cs-137	20	30
USGS 089	10/16/74	Cs-137	0	24
USGS 089	11/26/74	Cs-137	3	18
USGS 089	12/27/74	Cs-137	0	24
USGS 089	02/01/75	Cs-137	6	18
USGS 089	03/27/75	Cs-137	-5	24
USGS 089	04/25/75	Cs-137	5	15
USGS 089	07/25/75	Cs-137	0	24
USGS 089	08/28/75	Cs-137	-5	6
USGS 089	09/29/75	Cs-137	-3	18
USGS 089	02/05/76	Cs-137	11	27
USGS 089	***10/30/76***	***Cs-137***	***24***	***21***
USGS 089	04/18/77	Cs-137	5	15
USGS 089	04/26/78	Cs-137	-5.57	30
USGS 089	10/27/78	Cs-137	-32.2	75

Table F-2. Cesium-137 Results.

Well Name	Sample Date	Analyte	Result* (pCi/L)	Uncertainty at 3 Sigma (pCi/L)
USGS 089	05/04/79	Cs-137	20	72
USGS 089	11/02/79	Cs-137	3.37	54
USGS 089	04/21/80	Cs-137	-36.6	87
USGS 089	10/14/80	Cs-137	10.9	19.5
USGS 089	04/09/81	Cs-137	-0.634	20.1
USGS 089	10/07/81	Cs-137	-21.5	39
USGS 089	04/08/82	Cs-137	9.64	19.5
USGS 089	10/06/82	Cs-137	-10.1	54
USGS 089	01/18/83	Cs-137	23.5	66
USGS 089	04/18/83	Cs-137	-34.5	78
USGS 089	10/06/83	Cs-137	-47	99
USGS 089	04/18/84	Cs-137	-90	120
USGS 089	10/17/84	Cs-137	0	90
USGS 089	04/29/85	Cs-137	11	111
USGS 089	10/22/85	Cs-137	20	90
USGS 089	04/18/86	Cs-137	-20	120
USGS 089	11/04/86	Cs-137	14	114
USGS 089	04/22/87	Cs-137	10	90
USGS 089	09/22/87	Cs-137	0	90
USGS 089	***09/30/87***	***Cs-137***	***25***	***18***
USGS 089	09/30/87	Cs-137	11	21
USGS 089	04/05/88	Cs-137	20	150
USGS 089	06/24/88	Cs-137	11	96
USGS 089	10/18/88	Cs-137	-20	90
USGS 089	04/04/89	Cs-137	-30	120
USGS 089	10/18/89	Cs-137	50	150
USGS 089	04/10/90	Cs-137	70	150
USGS 089	10/16/91	Cs-137	-2	45
USGS 089	04/15/92	Cs-137	-10	60
USGS 089	04/21/95	Cs-137	-30	60
USGS 089	10/25/95	Cs-137	16	114
USGS 090	***02/14/72***	***Cs-137***	***30***	***18***
USGS 090	09/20/72	Cs-137	<20	—
USGS 090	***10/12/72***	***Cs-137***	***90***	***30***
USGS 090	11/20/72	Cs-137	<20	—
USGS 090	02/02/73	Cs-137	<30	—
USGS 090	02/24/73	Cs-137	<20	—
USGS 090	03/30/73	Cs-137	<400	—
USGS 090	04/30/73	Cs-137	<30	—
USGS 090	05/29/73	Cs-137	<30	—
USGS 090	06/29/73	Cs-137	<300	—
USGS 090	07/24/73	Cs-137	<100	—
USGS 090	08/29/73	Cs-137	<300	—
USGS 090	09/26/73	Cs-137	<300	—
USGS 090	10/31/73	Cs-137	<300	—
USGS 090	11/29/73	Cs-137	<300	—
USGS 090	12/20/73	Cs-137	<20	—
USGS 090	01/18/74	Cs-137	<30	—
USGS 090	02/25/74	Cs-137	<60	—
USGS 090	03/27/74	Cs-137	<40	—
USGS 090	04/24/74	Cs-137	<30	—
USGS 090	05/29/74	Cs-137	0	240
USGS 090	06/29/74	Cs-137	0	24
USGS 090	08/02/74	Cs-137	3	18
USGS 090	12/14/74	Cs-137	0	60
USGS 090	01/31/75	Cs-137	3	18
USGS 090	03/27/75	Cs-137	3	18
USGS 090	04/25/75	Cs-137	10	15
USGS 090	07/25/75	Cs-137	3	18
USGS 090	08/28/75	Cs-137	11	18
USGS 090	09/26/75	Cs-137	-10	30
USGS 090	02/05/76	Cs-137	10	15
USGS 090	10/29/76	Cs-137	8	15
USGS 090	04/18/77	Cs-137	8	21

Table F-2. Cesium-137 Results.

Well Name	Sample Date	Analyte	Result* (pCi/L)	Uncertainty at 3 Sigma (pCi/L)
USGS 090	04/26/78	Cs-137	28.2	42
USGS 090	10/25/78	Cs-137	-19.1	72
USGS 090	05/13/79	Cs-137	-8.11	81
USGS 090	10/12/79	Cs-137	15.4	63
USGS 090	04/21/80	Cs-137	16.2	54
USGS 090	10/14/80	Cs-137	6.89	24.3
USGS 090	04/09/81	Cs-137	-1.22	20.7
USGS 090	10/08/81	Cs-137	6.33	20.7
USGS 090	04/08/82	Cs-137	-29.6	36
USGS 090	10/06/82	Cs-137	-73.4	99
USGS 090	01/18/83	Cs-137	23.2	84
USGS 090	01/24/83	Cs-137	-15	20.1
USGS 090	04/15/83	Cs-137	23.2	84
USGS 090	10/06/83	Cs-137	54.4	84
USGS 090	04/17/84	Cs-137	11	75
USGS 090	10/10/84	Cs-137	-30	120
USGS 090	04/18/86	Cs-137	17	75
USGS 090	11/03/86	Cs-137	0	120
USGS 090	04/22/87	Cs-137	-30	90
USGS 090	09/23/87	Cs-137	20	120
USGS 090	09/30/87	Cs-137	7	15
USGS 090	04/06/88	Cs-137	-30	120
USGS 090	06/22/88	Cs-137	20	120
USGS 090	10/18/88	Cs-137	30	120
USGS 090	***01/18/89***	***Cs-137***	***90***	***90***
USGS 090	04/05/89	Cs-137	40	90
USGS 090	07/11/89	Cs-137	50	120
USGS 090	10/18/89	Cs-137	-40	60
USGS 090	01/23/90	Cs-137	50	120
USGS 090	04/10/90	Cs-137	10	90
USGS 090	07/02/90	Cs-137	-60	90
USGS 090	10/24/90	Cs-137	30	90
USGS 090	10/16/91	Cs-137	30	90
USGS 090	01/16/92	Cs-137	-10	60
USGS 090	04/20/92	Cs-137	0	60
USGS 097	03/14/94	Cs-137	-15	63
USGS 097	03/16/95	Cs-137	0	90
USGS 097	11/06/95	Cs-137	10	90
USGS 099	03/14/94	Cs-137	30	60
USGS 103	04/08/94	Cs-137	11	75
USGS 103	09/30/94	Cs-137	-17	75
USGS 103	04/18/95	Cs-137	-16	126
USGS 103	10/10/95	Cs-137	-14	120
USGS 105	07/30/87	Cs-137	30	60
USGS 105	07/30/87	Cs-137	-60	120
USGS 105	03/31/94	Cs-137	30	90
USGS 105	04/18/95	Cs-137	20	120
USGS 105	10/10/95	Cs-137	50	90
USGS 106	01/14/81	Cs-137	-2.41	75
USGS 109	07/31/87	Cs-137	10	120
USGS 109	03/31/94	Cs-137	-20	90
USGS 109	04/20/95	Cs-137	0	120
USGS 109	10/12/95	Cs-137	0	90
USGS 110	10/25/95	Cs-137	10	90
USGS 117	10/19/87	Cs-137	-14	108
USGS 117	06/27/88	Cs-137	-40	90
USGS 117	10/17/88	Cs-137	40	90

Table F-2. Cesium-137 Results.

Well Name	Sample Date	Analyte	Result* (pCi/L)	Uncertainty at 3 Sigma (pCi/L)
USGS 117	01/12/89	Cs-137	13	123
USGS 117	04/03/89	Cs-137	-40	90
USGS 117	10/13/89	Cs-137	20	60
USGS 117	04/10/90	Cs-137	40	120
USGS 117	08/29/90	Cs-137	-20	120
USGS 117	08/29/90	Cs-137	-80	90
USGS 117	10/16/91	Cs-137	40	90
USGS 117	04/15/92	Cs-137	20	90
USGS 117	04/21/95	Cs-137	10	60
USGS 117	10/24/95	Cs-137	-20	90
USGS 119	11/06/87	Cs-137	-20	120
USGS 119	06/27/88	Cs-137	-40	120
USGS 119	10/17/88	Cs-137	-50	120
USGS 119	01/12/89	Cs-137	-50	90
USGS 119	04/03/89	Cs-137	-14	117
USGS 119	10/17/89	Cs-137	-50	120
USGS 119	04/09/90	Cs-137	60	90
USGS 119	10/15/91	Cs-137	-30	90
USGS 119	10/15/91	Cs-137	0	60
USGS 119	10/15/91	Cs-137	-10	90
USGS 119	04/16/92	Cs-137	40	90
USGS 119	04/17/95	Cs-137	10	90
USGS 119	10/25/95	Cs-137	0	120
USGS 120	11/18/87	Cs-137	13	78
USGS 120	06/27/88	Cs-137	0	60
USGS 120	10/18/88	Cs-137	-20	120
USGS 120	01/12/89	Cs-137	-60	90
USGS 120	04/04/89	Cs-137	30	120
USGS 120	07/12/89	Cs-137	90	150
USGS 120	10/12/89	Cs-137	0	90
USGS 120	01/22/90	Cs-137	0	60
USGS 120	04/09/90	Cs-137	40	90
USGS 120	07/19/90	Cs-137	-20	90
USGS 120	07/19/90	Cs-137	-30	120
USGS 120	08/27/90	Cs-137	0	120
USGS 120	08/27/90	Cs-137	0	60
USGS 120	10/25/91	Cs-137	-11	54
USGS 120	01/16/92	Cs-137	0	60
USGS 120	04/15/92	Cs-137	10	90
USGS 120	04/15/92	Cs-137	10	90
USGS 120	07/10/92	Cs-137	-10	60
USGS 120	10/05/92	Cs-137	12	75
USGS 120	01/20/93	Cs-137	20	60
USGS 120	04/20/93	Cs-137	5	45
USGS 120	06/22/93	Cs-137	-20	90
USGS 120	10/06/93	Cs-137	-10	60
USGS 120	01/10/94	Cs-137	-10	60
USGS 120	04/20/94	Cs-137	0	90
USGS 120	07/11/94	Cs-137	30	60
USGS 120	01/25/95	Cs-137	-30	60
USGS 120	04/12/95	Cs-137	0	60
USGS 120	07/10/95	Cs-137	0	120
USGS 120	10/23/95	Cs-137	0	60

* Concentrations greater than or equal to the reporting level of 3 sigma (3s) are in italics.

ATTACHMENT G

Graphs of Dissolved Chromium Concentration Versus Time

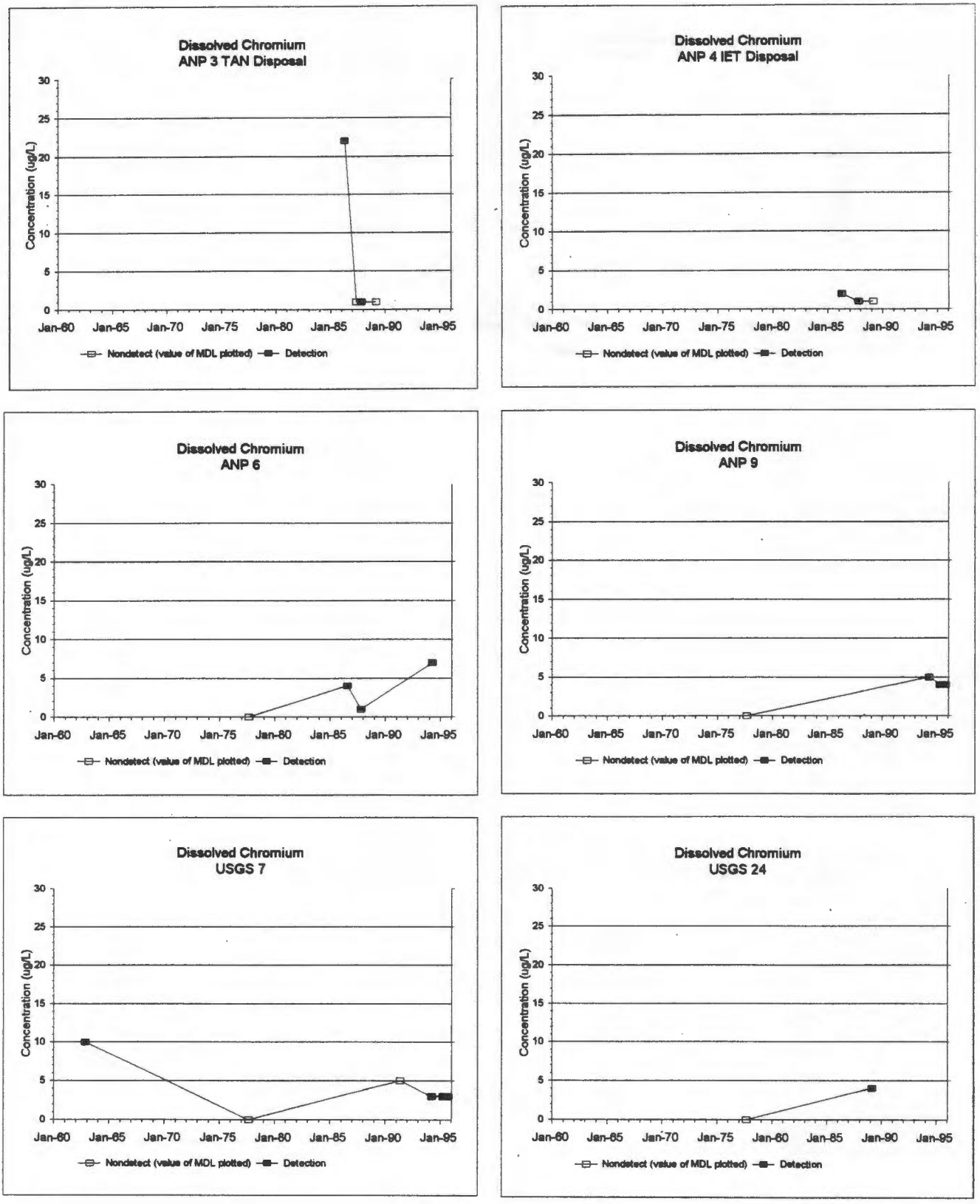


Figure G-1. Dissolved Chromium Concentrations in Selected Wells in the TAN Area.

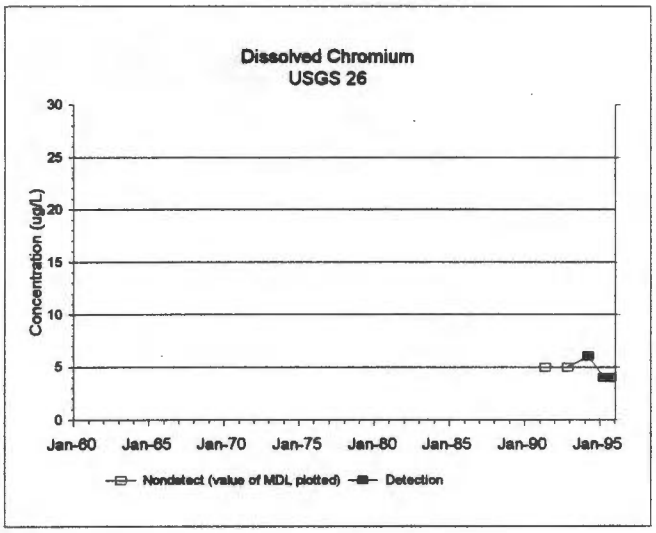


Figure G-1. Dissolved Chromium Concentrations in Selected Wells in the TAN Area (continued).

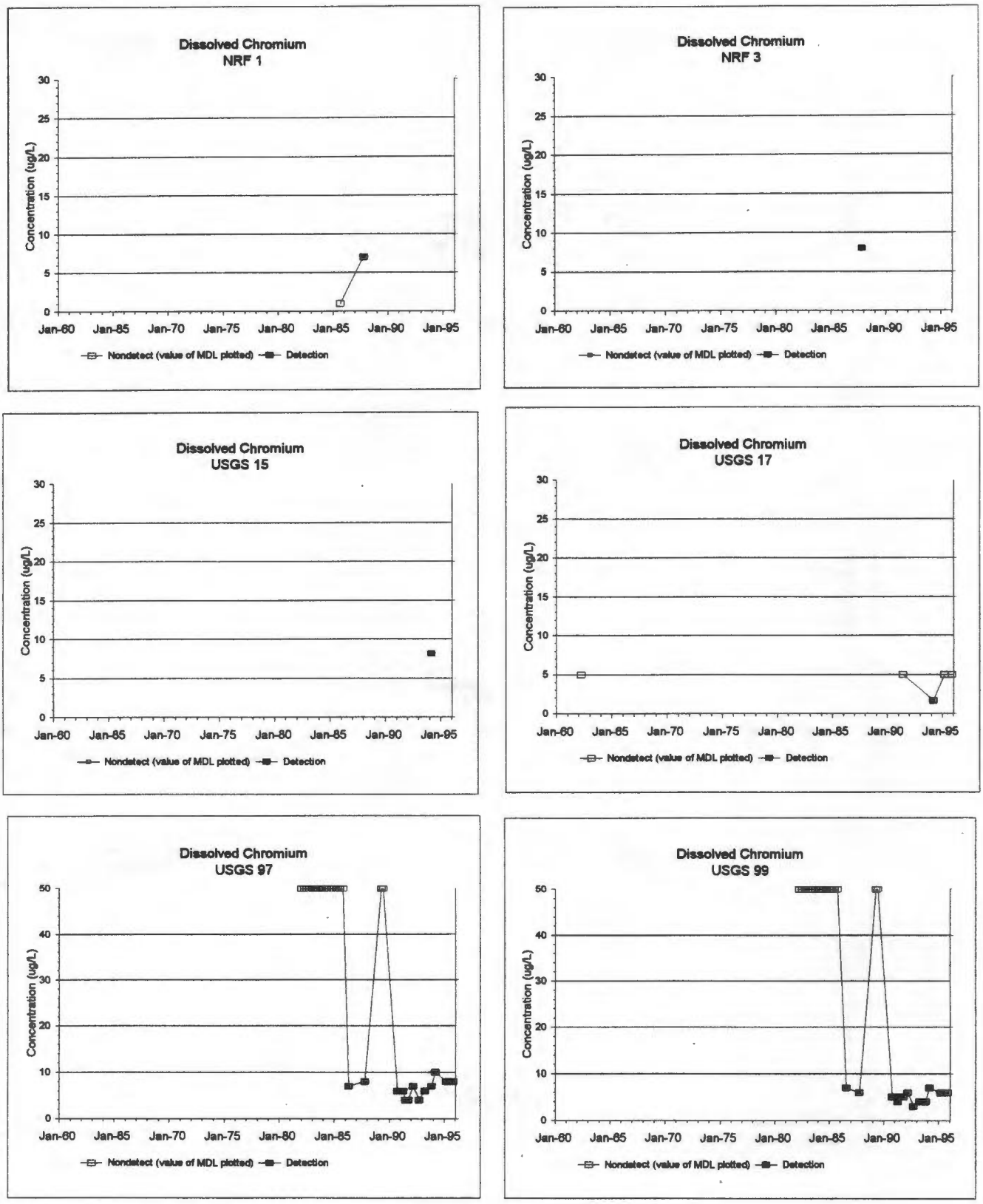


Figure G-2. Dissolved Chromium Concentrations in Selected Wells in the NRF Area.

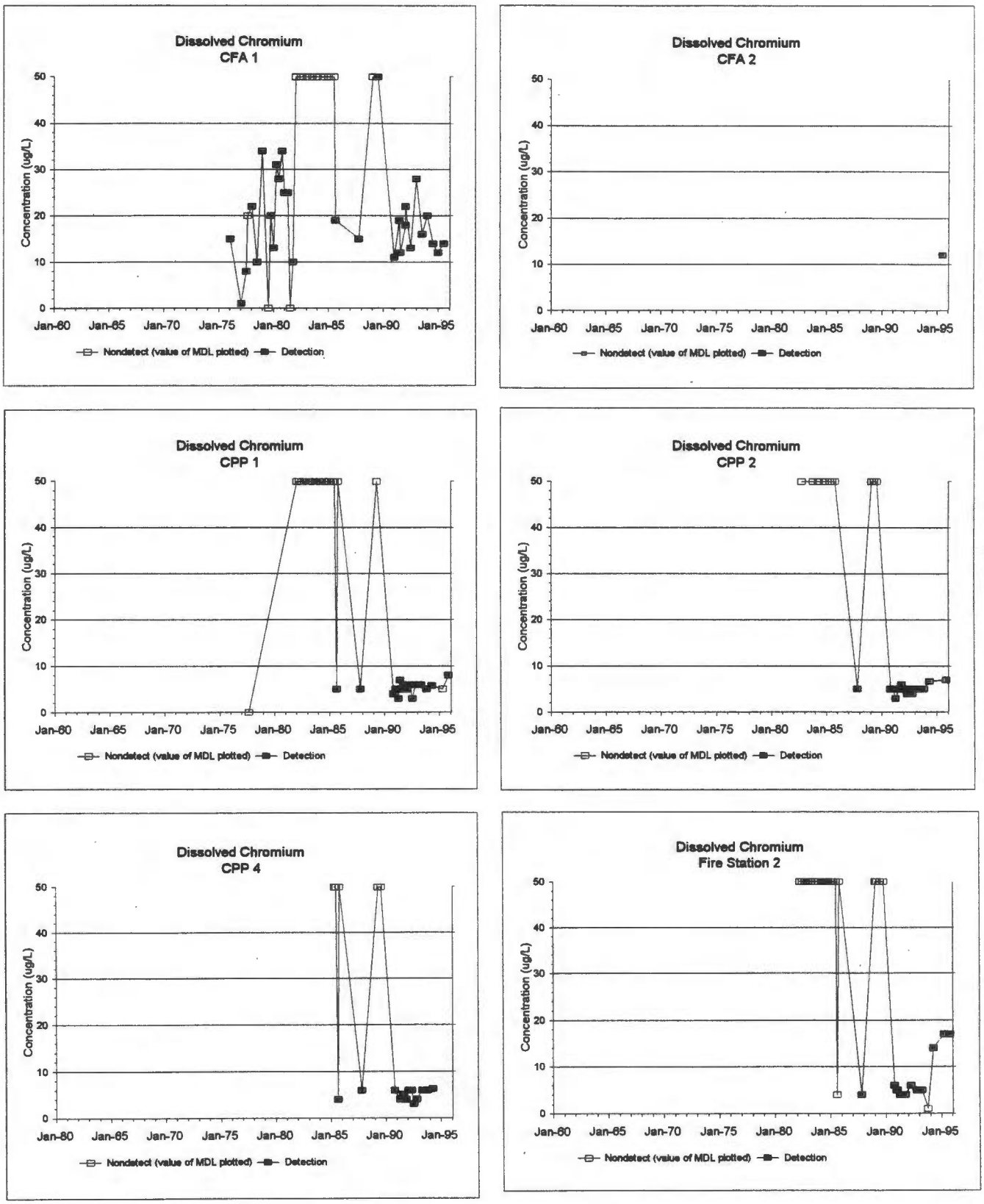


Figure G-3. Dissolved Chromium Concentrations in Selected Wells in the TRA/ICPP/CFA Area.

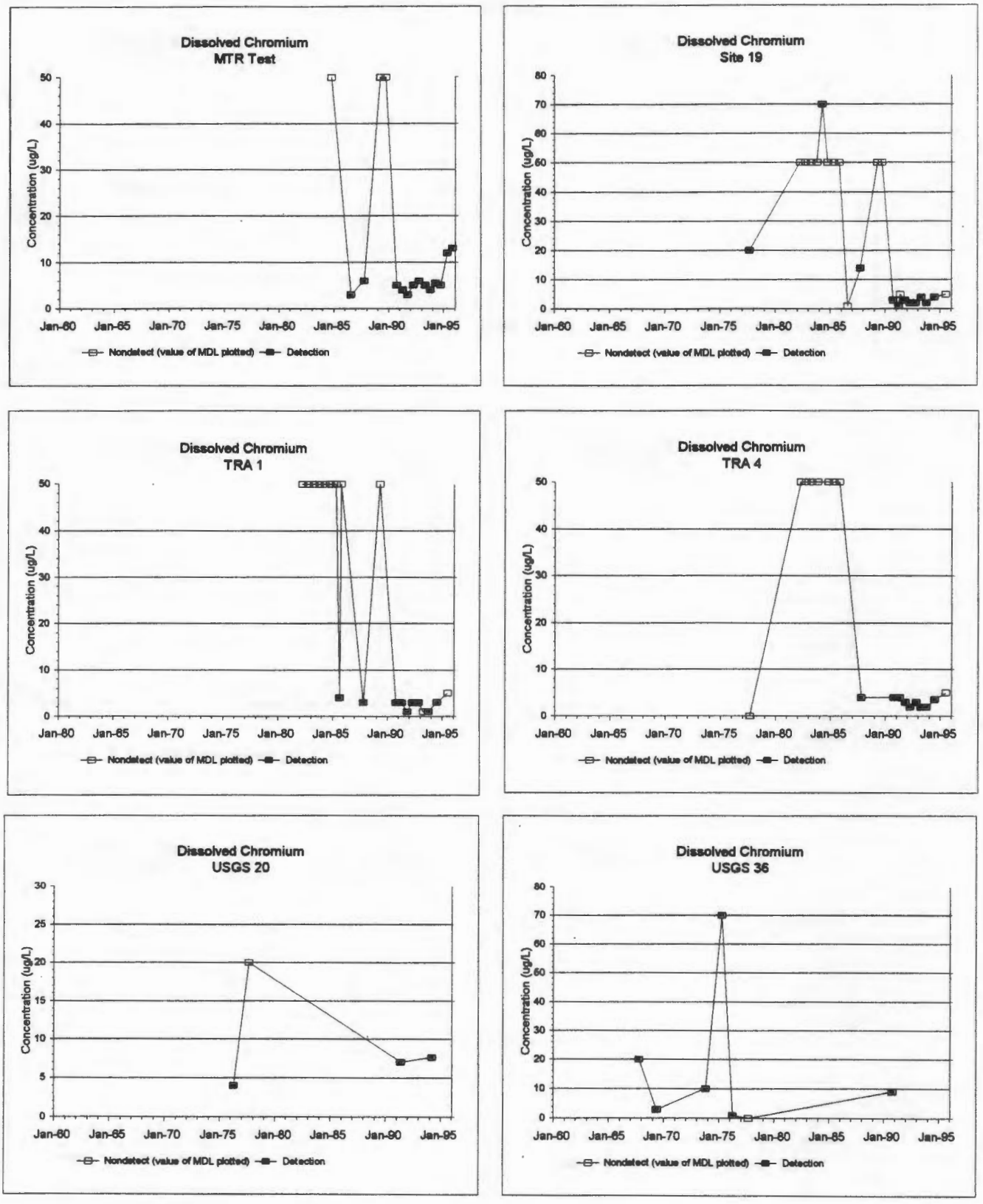
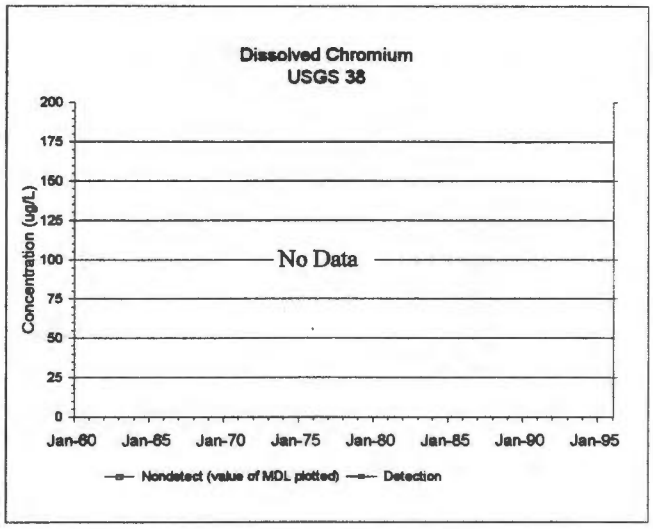
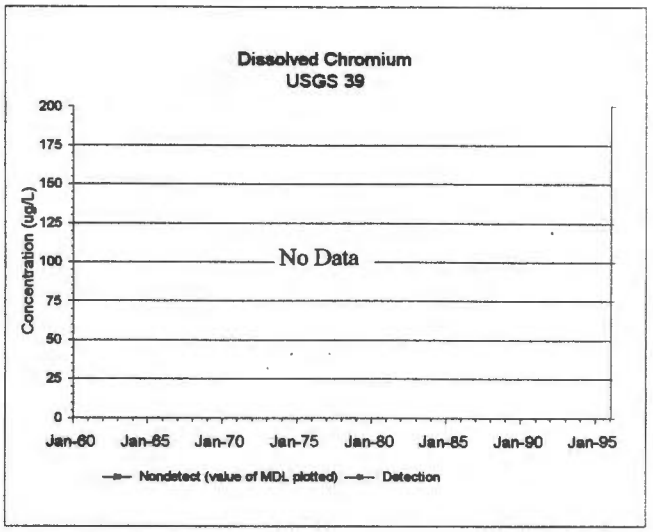
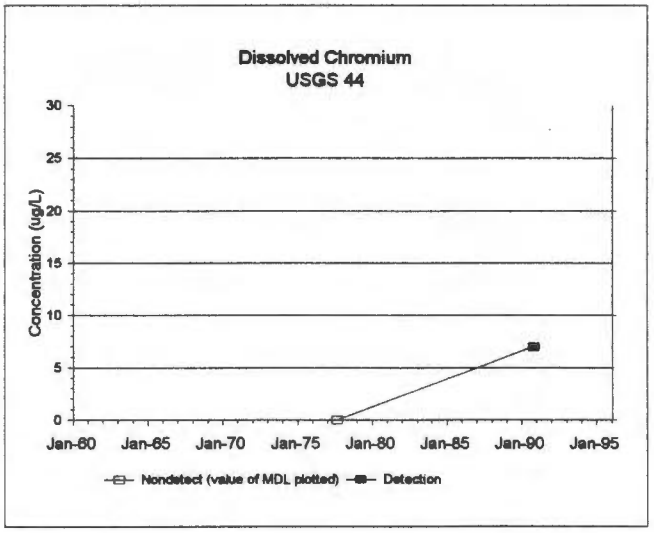
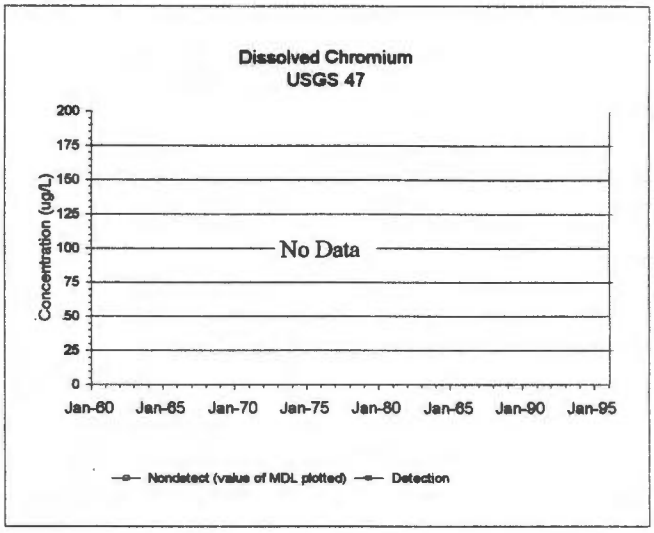


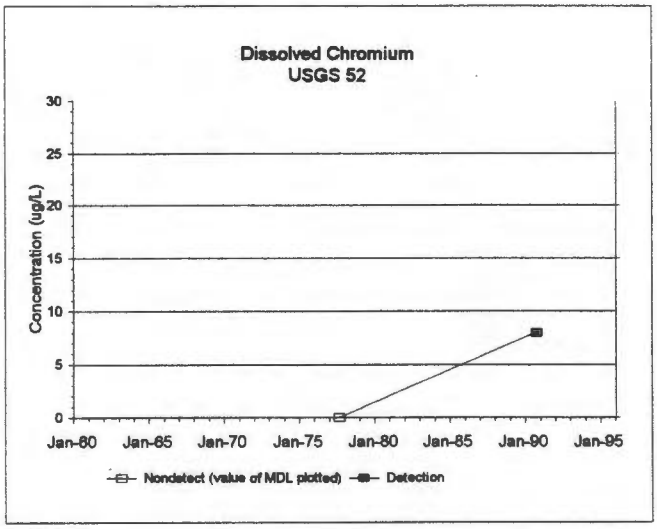
Figure G-3. Dissolved Chromium Concentrations in Selected Wells in the TRA/ICPP/CFA Area (continued).











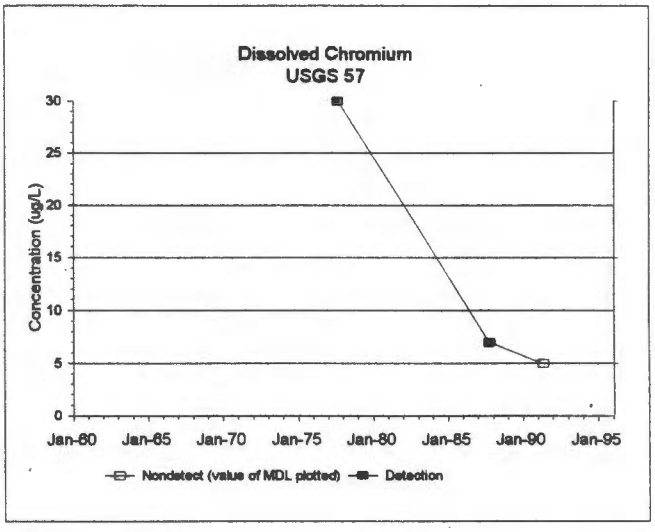


Figure G-3. Dissolved Chromium Concentrations in Selected Wells in the TRA/ICPP/CFA Area (continued).

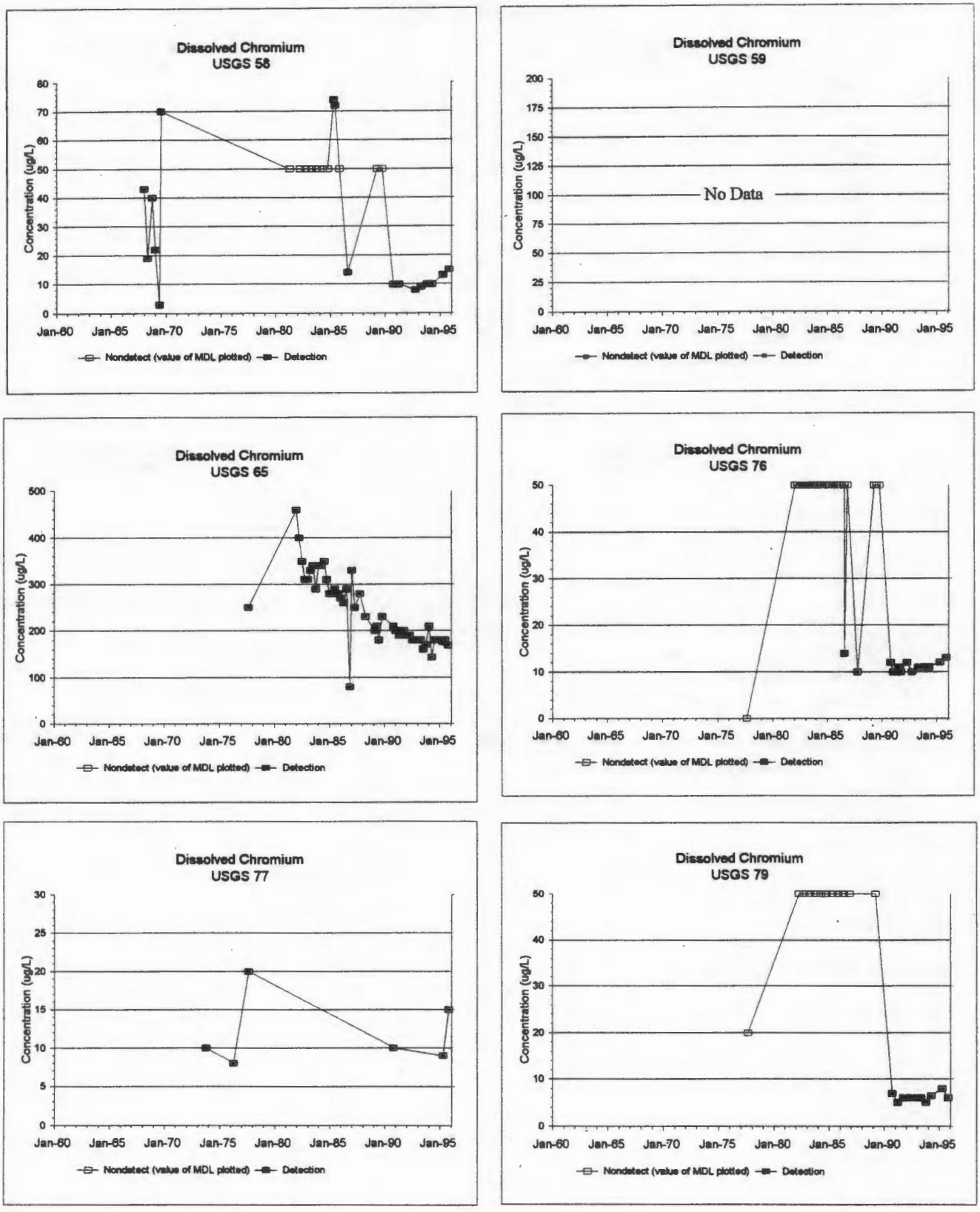


Figure G-3. Dissolved Chromium Concentrations in Selected Wells in the TRA/ICPP/CFA Area (continued).

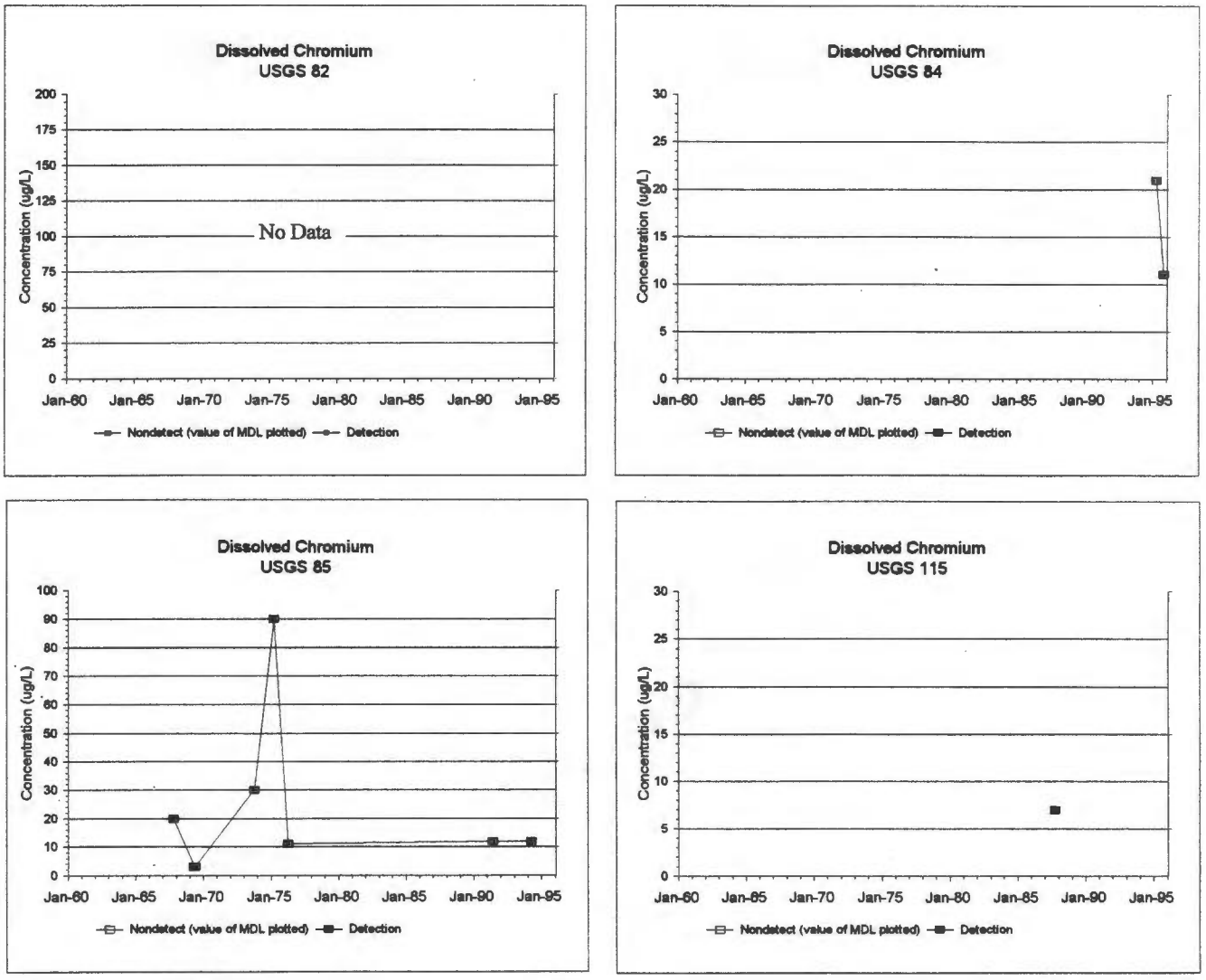
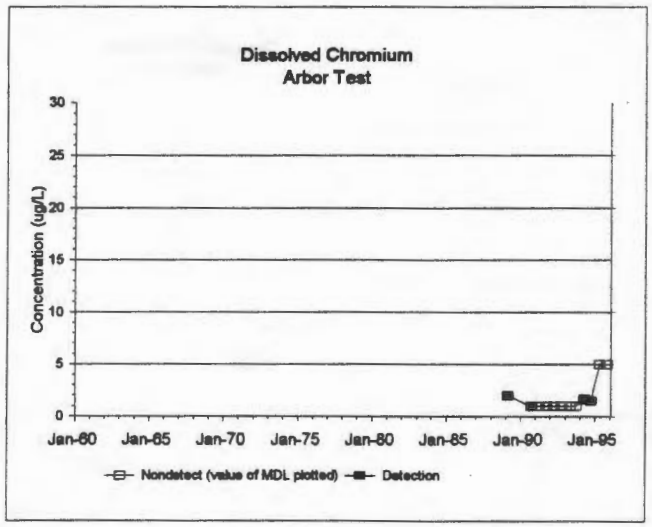
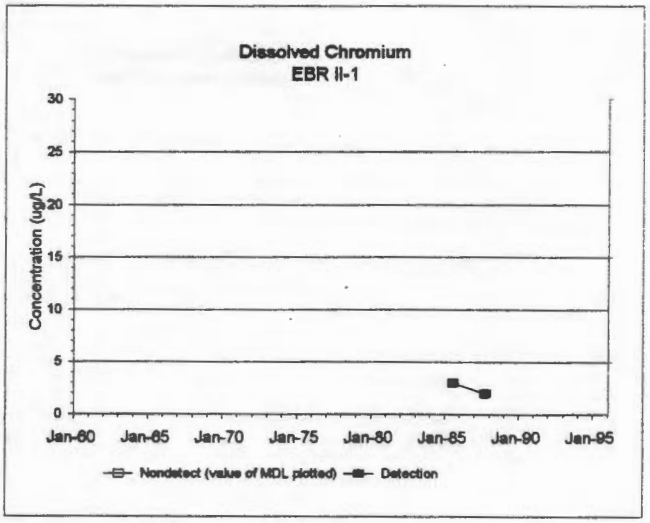


Figure G-3. Dissolved Chromium Concentrations in Selected Wells in the TRA/ICPP/CFA Area (continued).





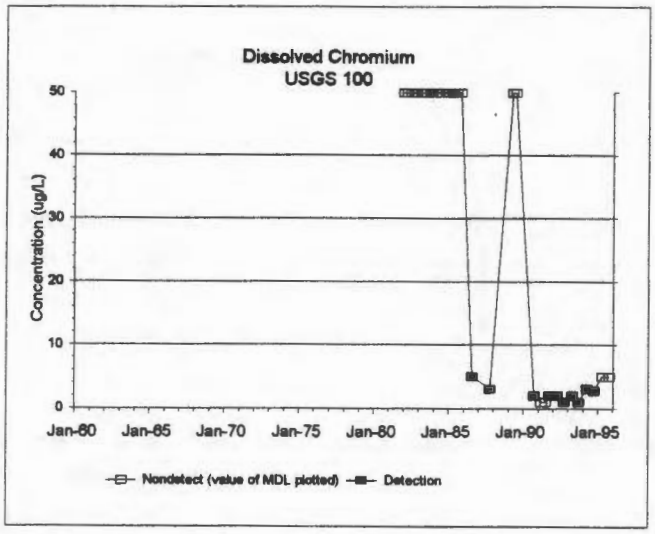


Figure G-4. Dissolved Chromium Concentrations in Selected Wells in the ANL-West Area.

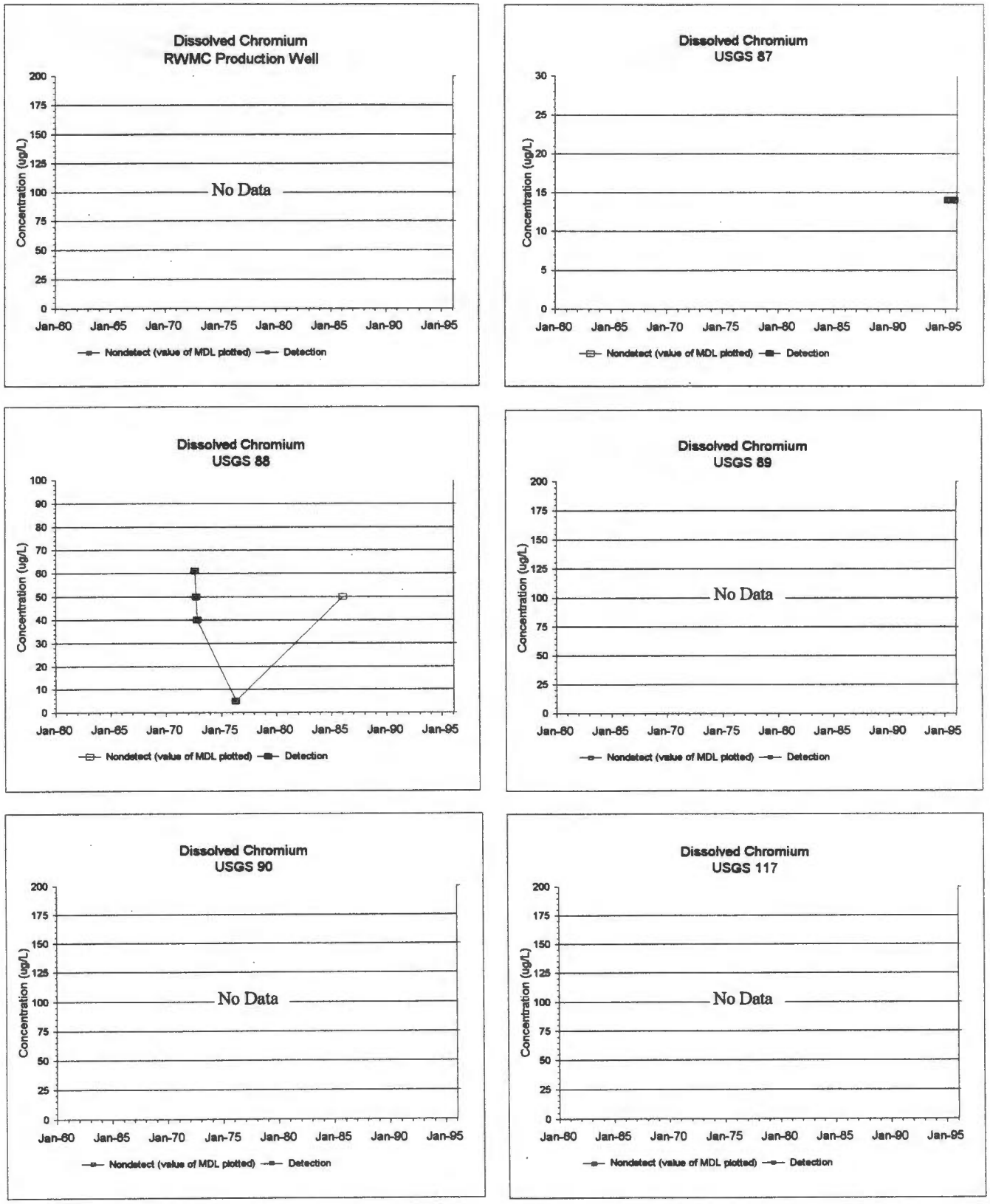
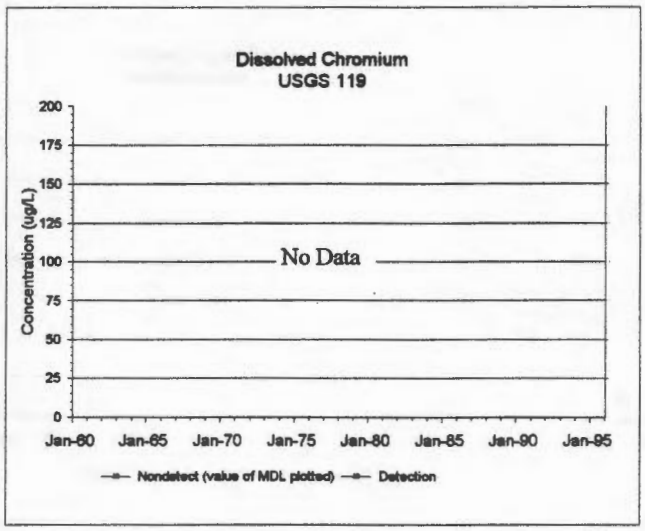


Figure G-5. Dissolved Chromium Concentrations in Selected Wells in the RWMC Area.



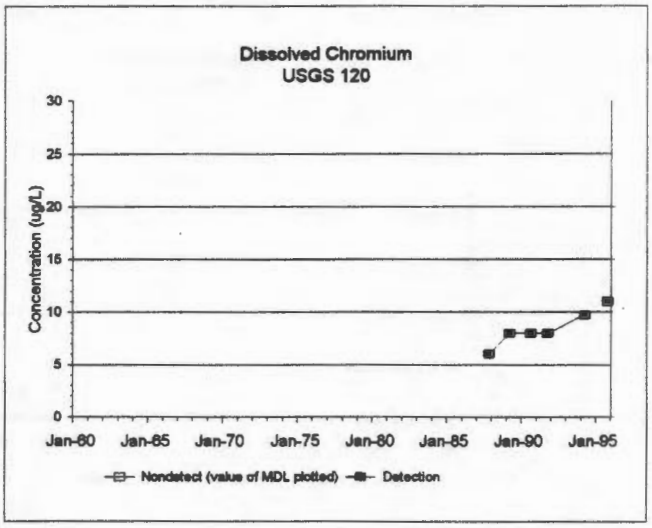


Figure G-5. Dissolved Chromium Concentrations in Selected Wells in the RWMC Area (continued).

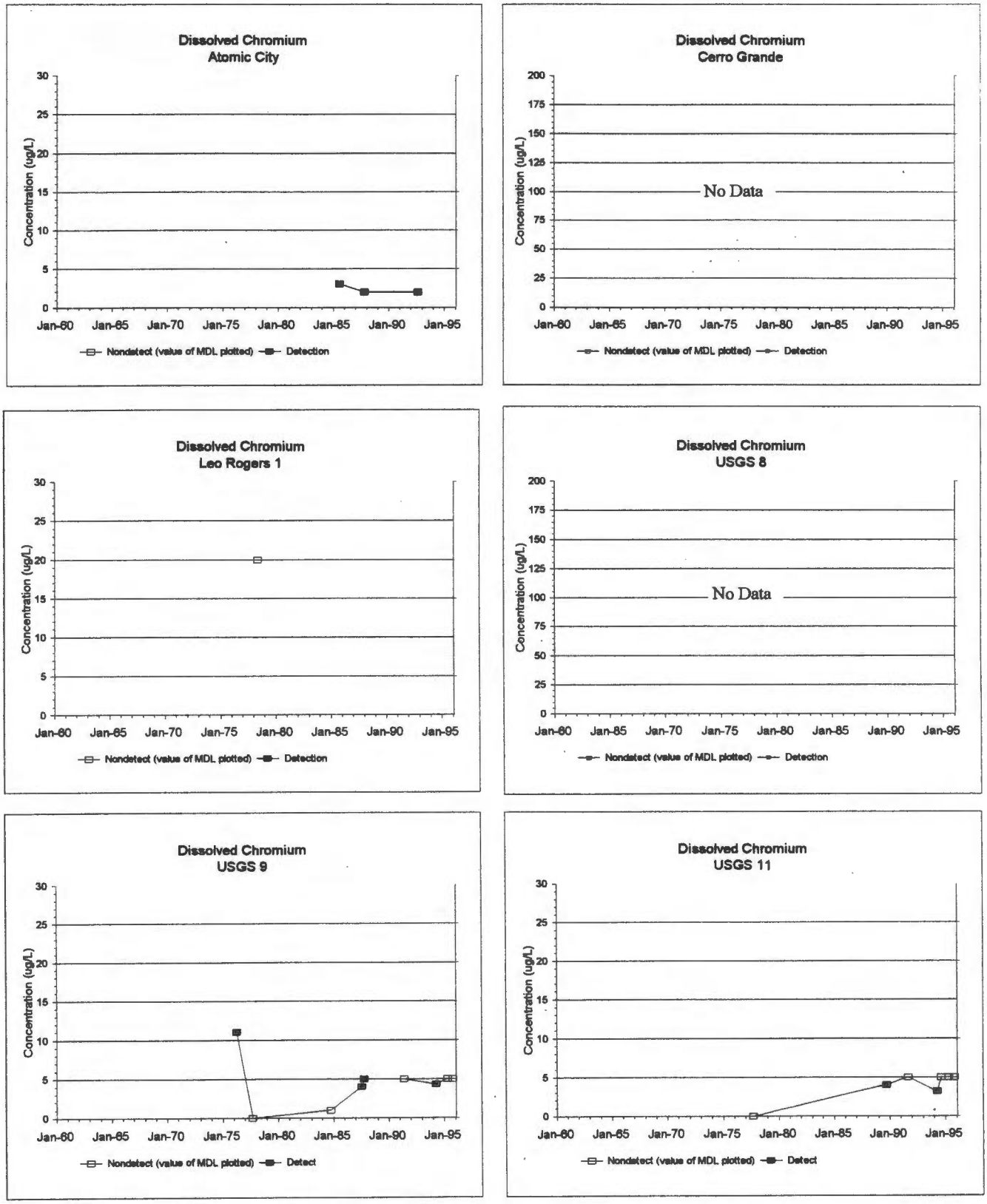


Figure G-6. Dissolved Chromium Concentrations in Selected Wells near the INEEL Southern Boundary.

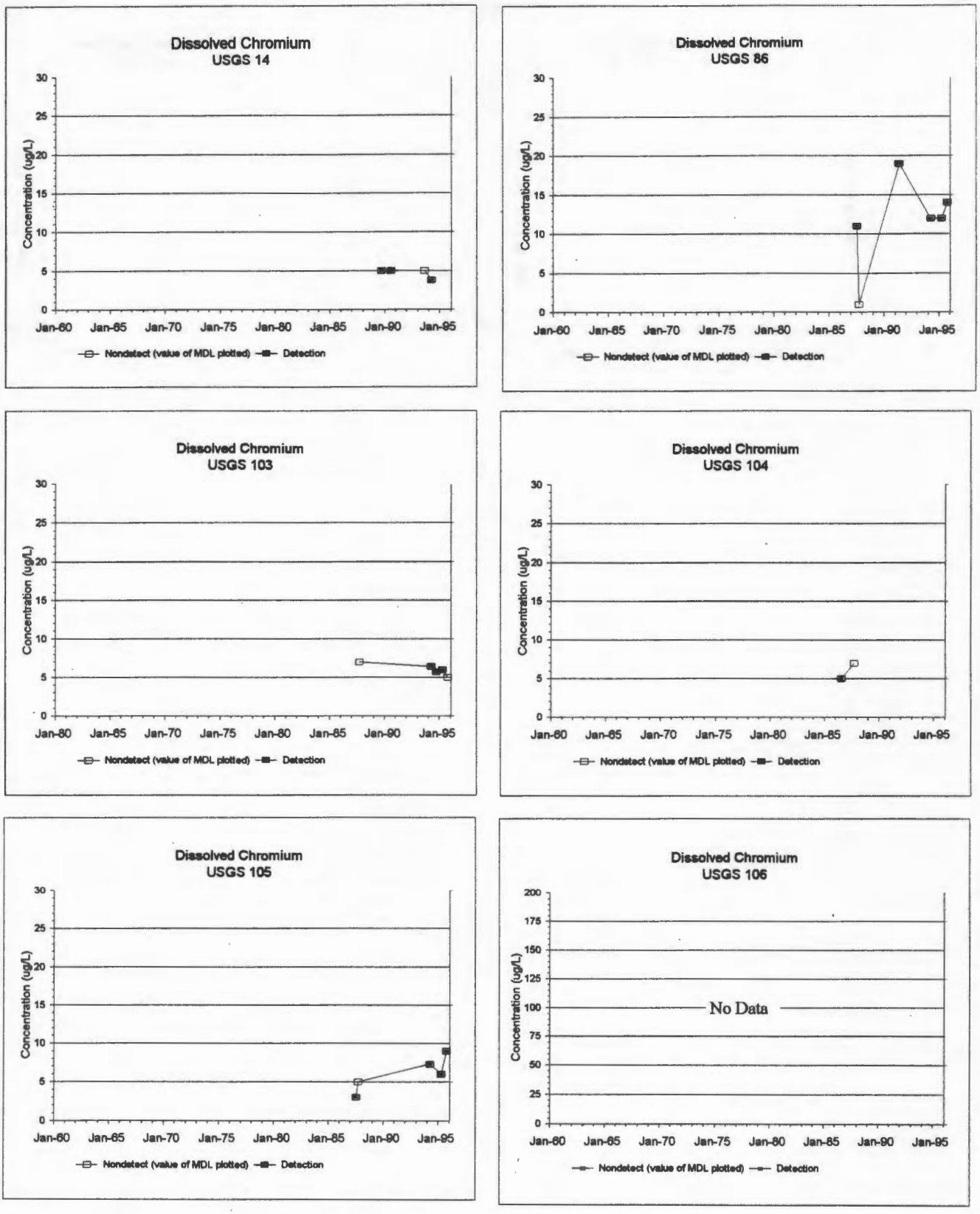
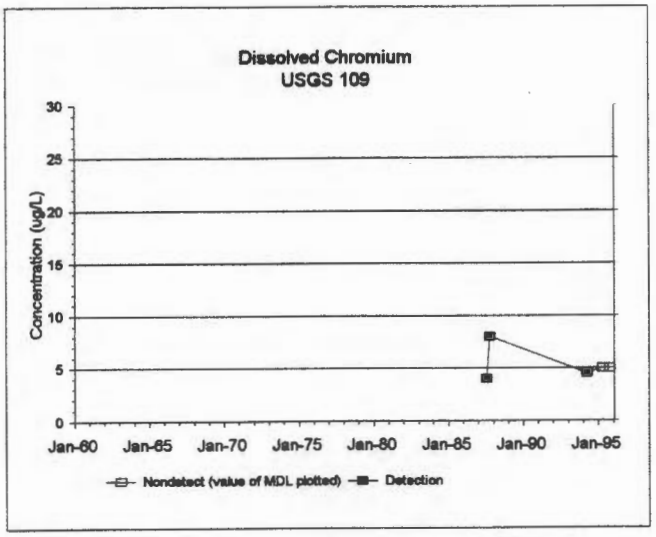


Figure G-6. Dissolved Chromium Concentrations in Selected Wells near the INEEL Southern Boundary (continued).



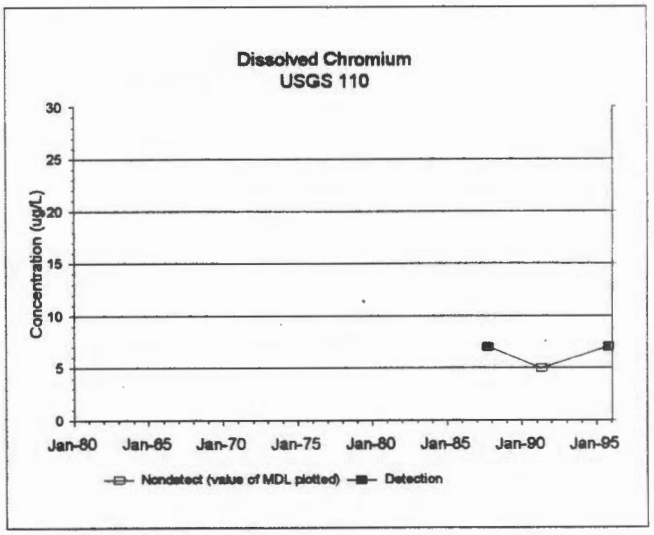


Figure G-6. Dissolved Chromium Concentrations in Selected Wells near the INEEL Southern Boundary (continued).

ATTACHMENT H

Graphs of Sodium Concentration Versus Time

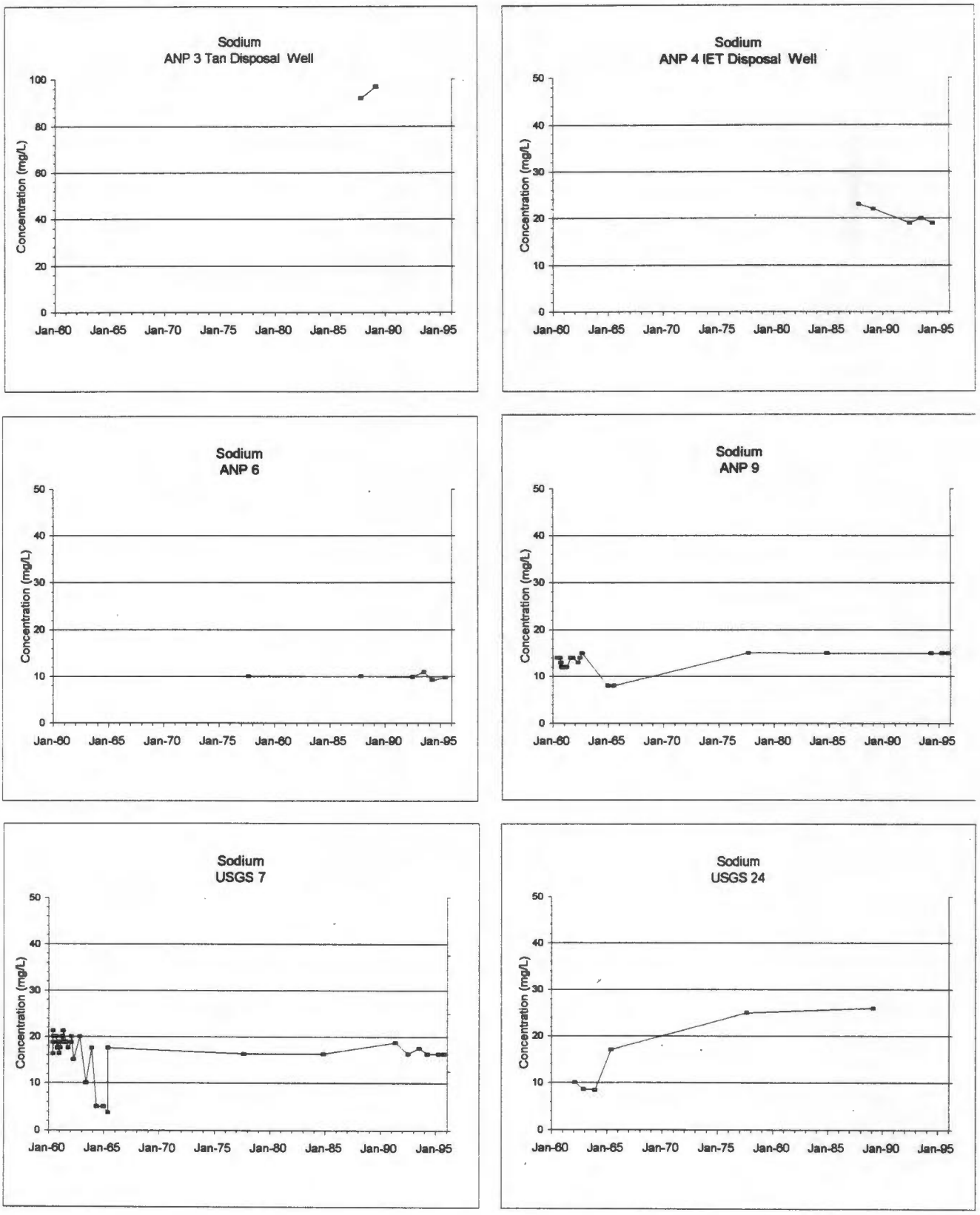


Figure H-1. Sodium Concentrations in Selected Wells in the TAN Area.

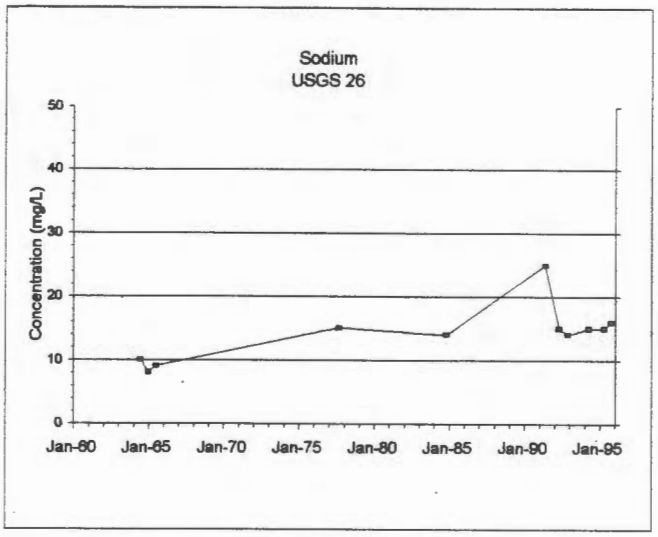


Figure H-1. Sodium Concentrations in Selected Wells in the TAN Area (continued).

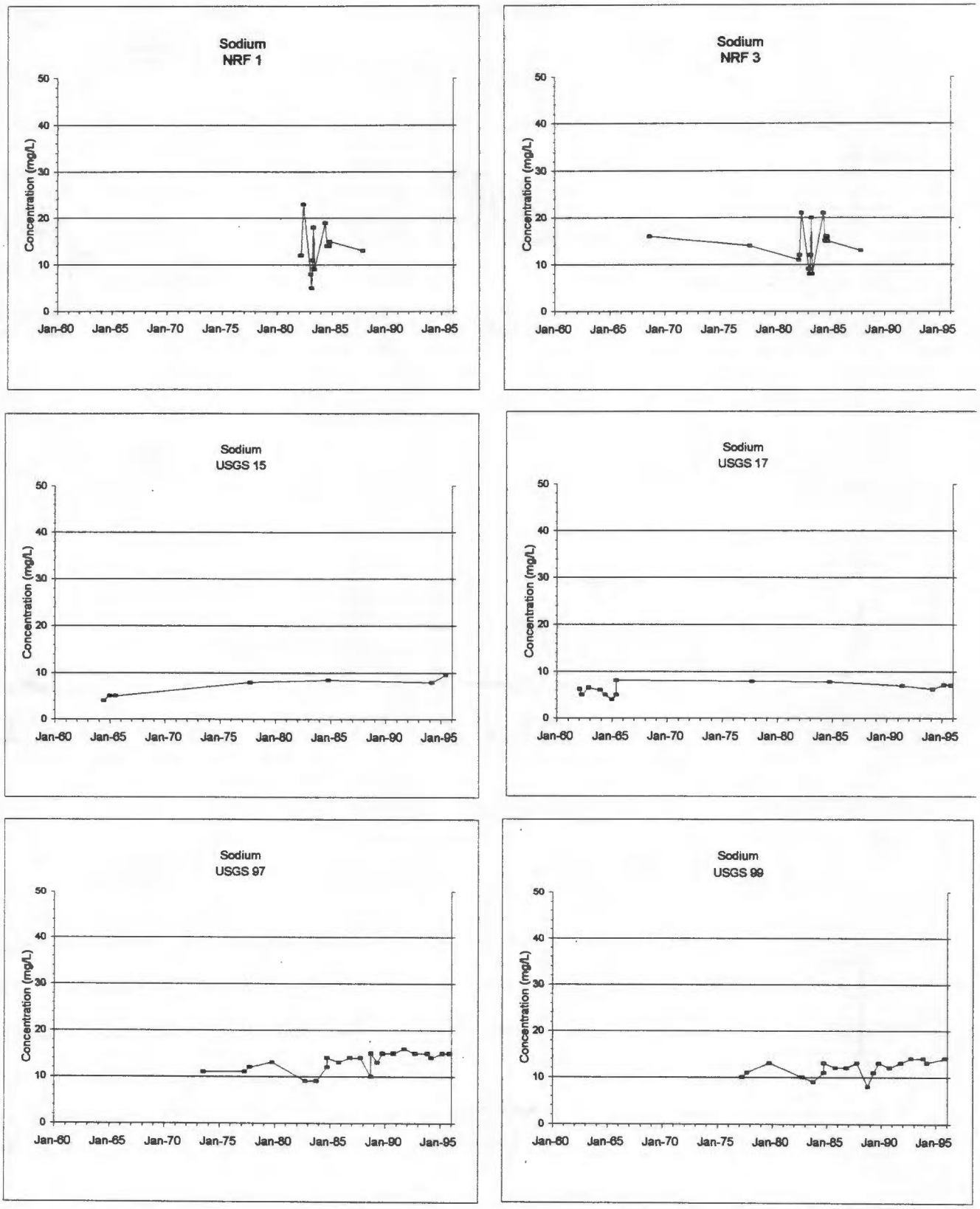


Figure H-2. Sodium Concentrations in Selected Wells in the NRF Area.

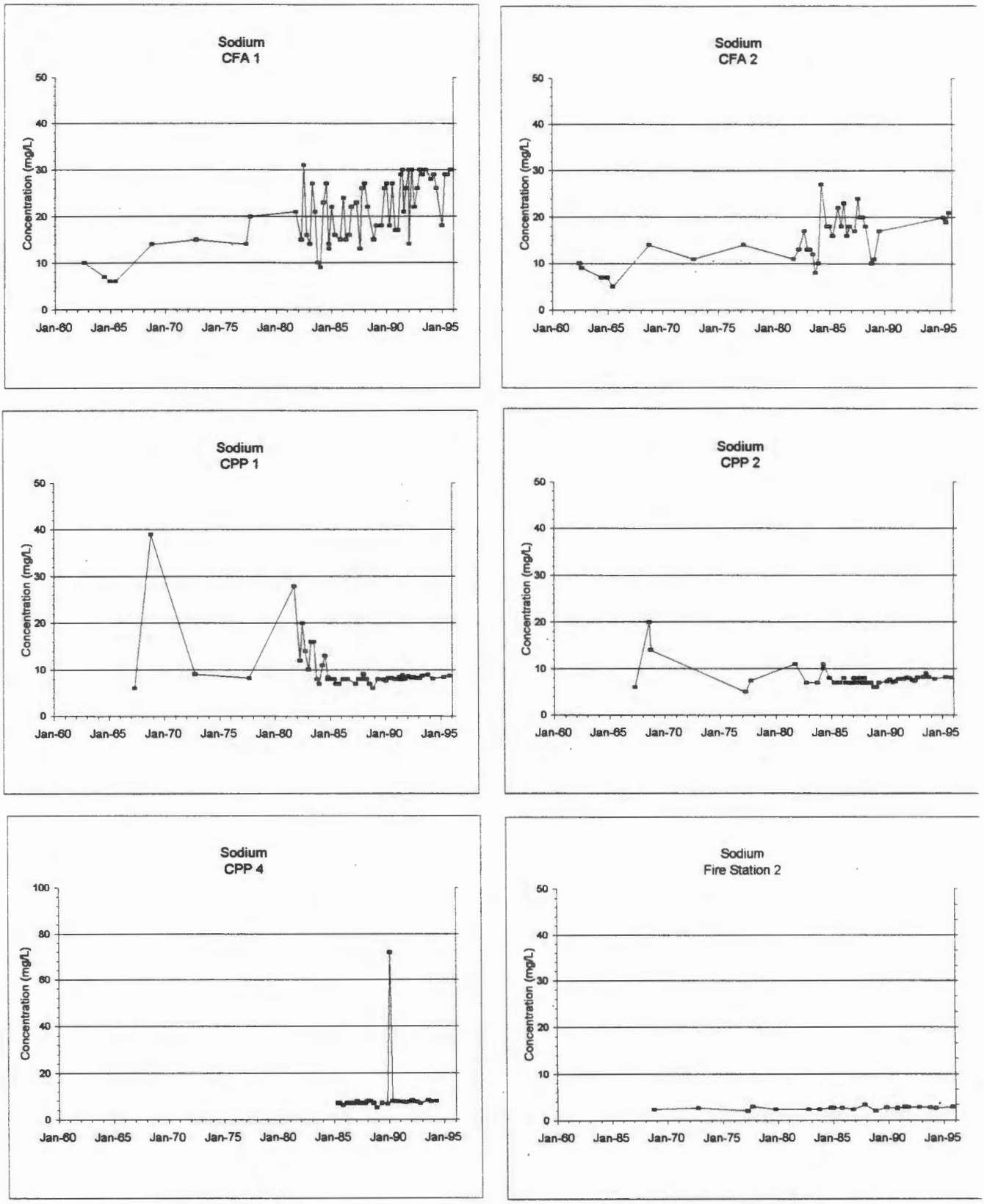


Figure H-3. Sodium Concentrations in Selected Wells in the TRA/ICPP/CFA Area.

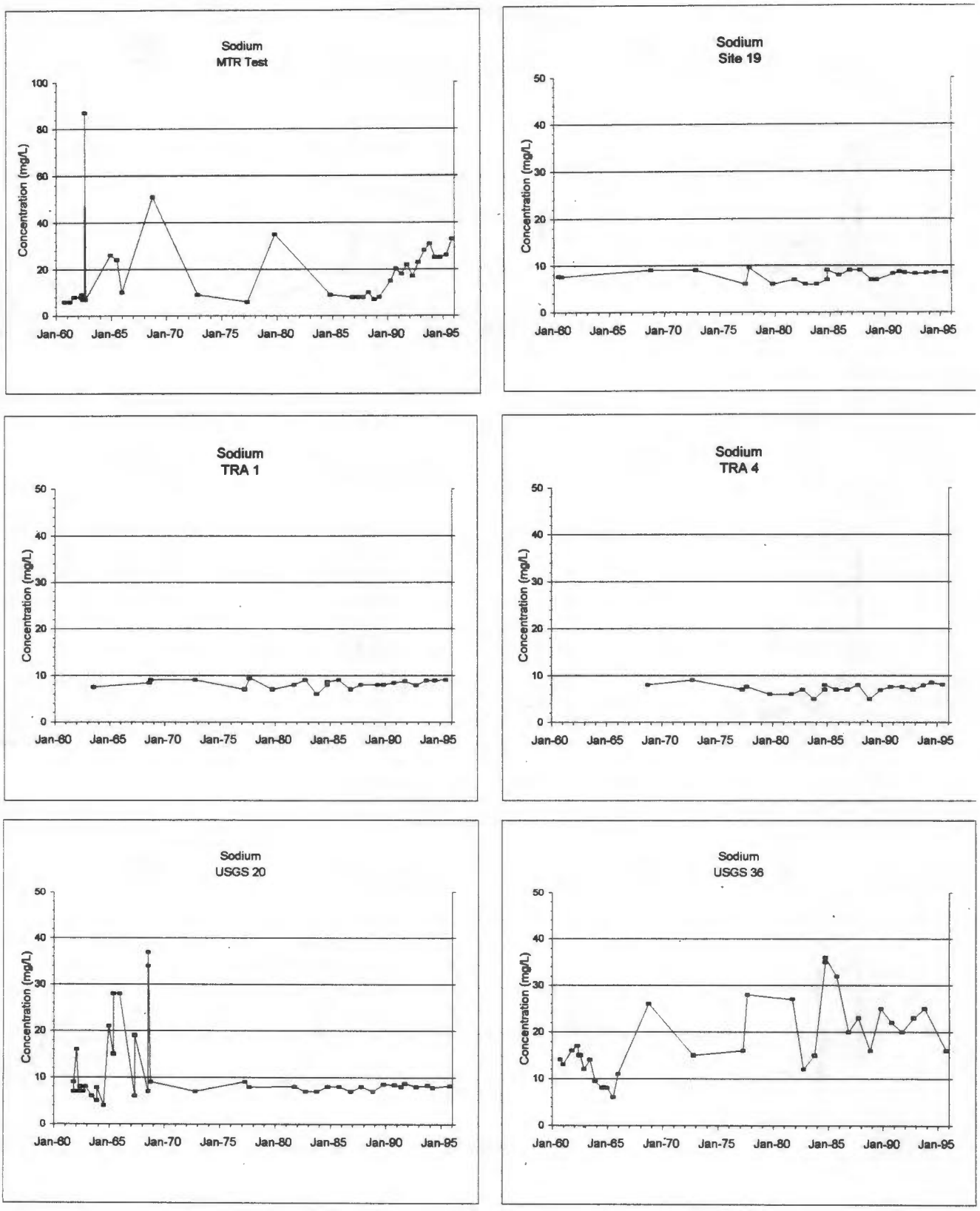


Figure H-3. Sodium Concentrations in Selected Wells in the TRA/ICPP/CFA Area (continued).

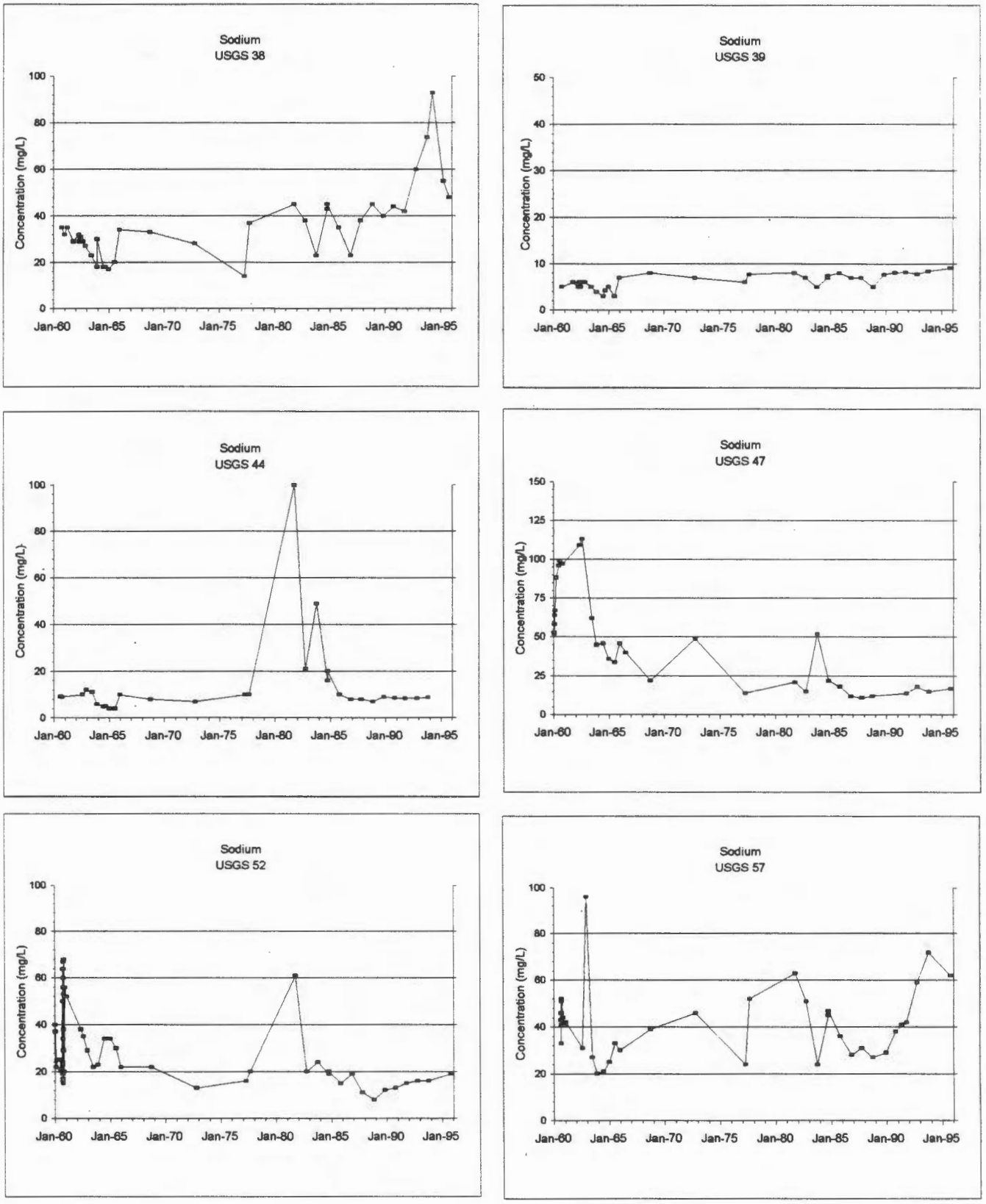


Figure H-3. Sodium Concentrations in Selected Wells in the TRA/ICPP/CFA Area (continued).

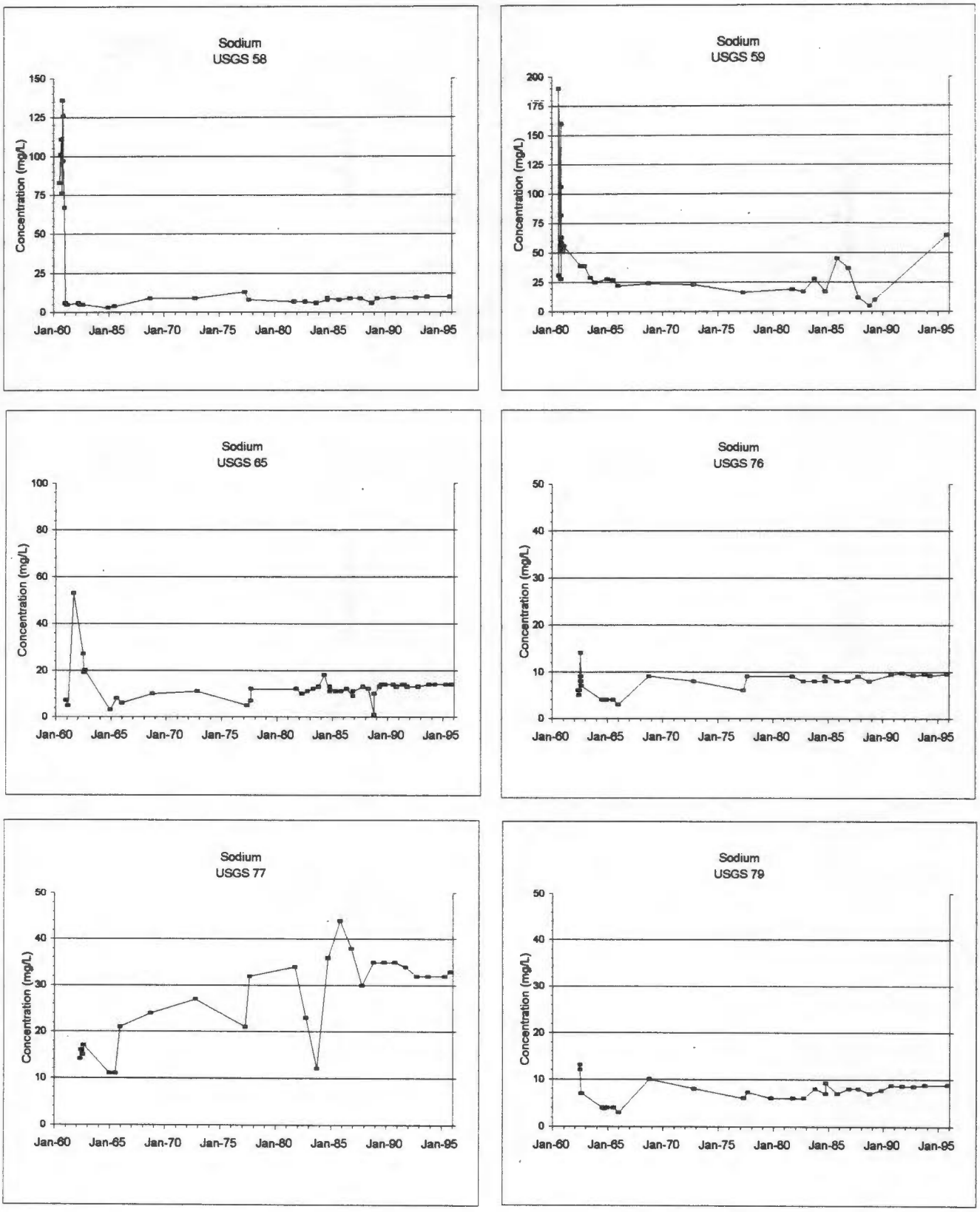


Figure H-3. Sodium Concentrations in Selected Wells in the TRA/ICPP/CFA Area (continued).

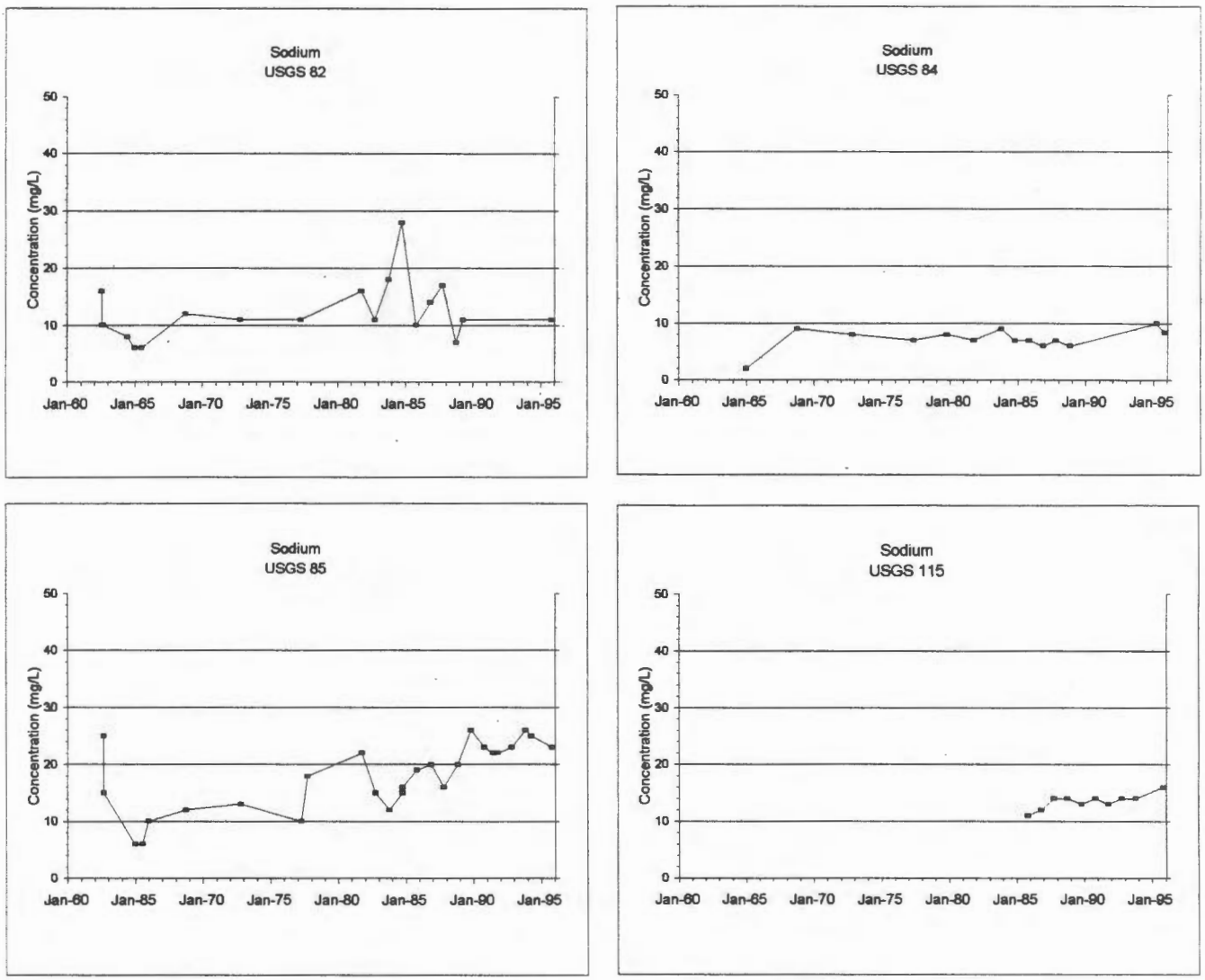


Figure H-3. Sodium Concentrations in Selected Wells in the TRA/ICPP/CFA Area (continued).

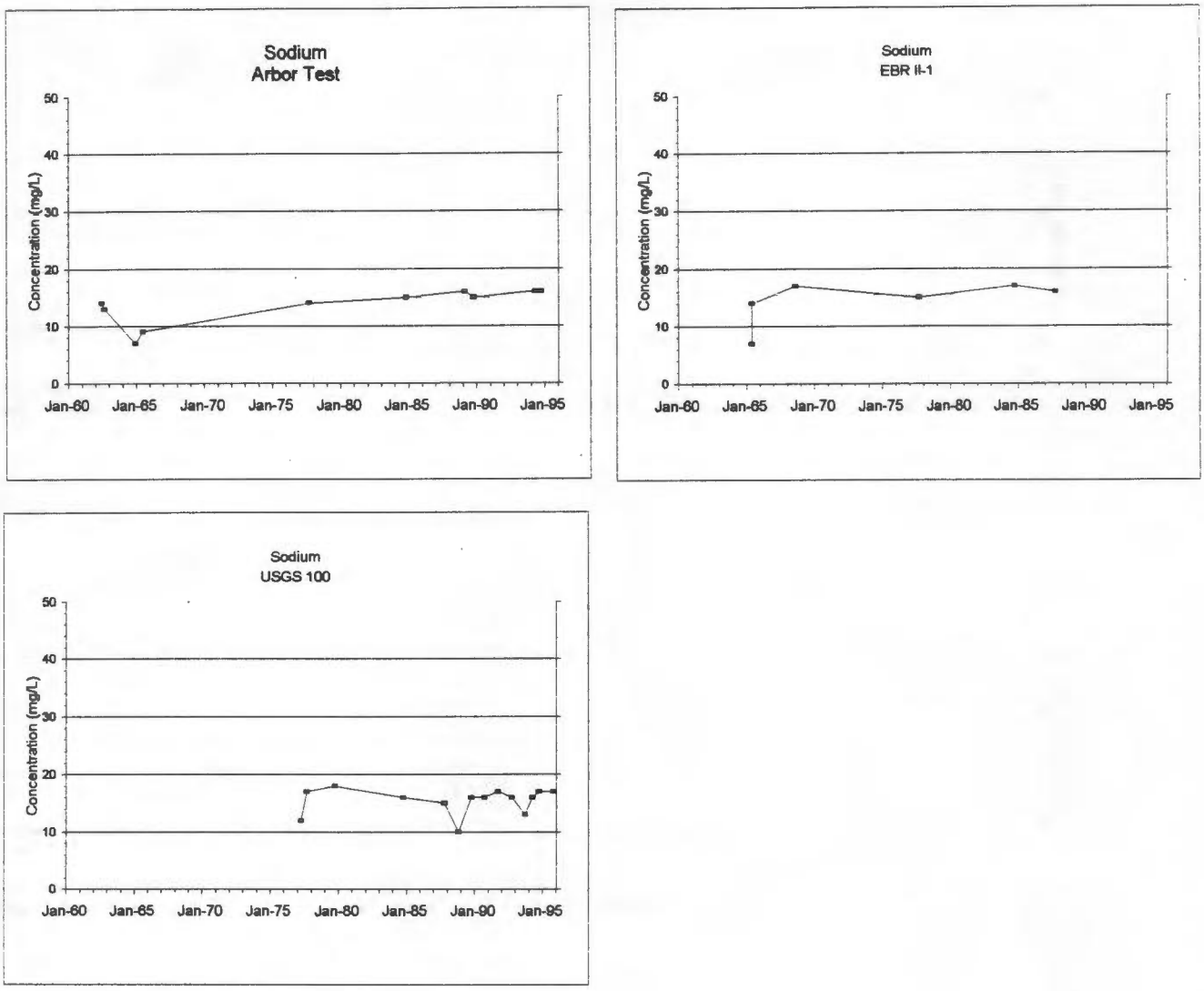


Figure H-4. Sodium Concentrations in Selected Wells in the ANL-West Area.

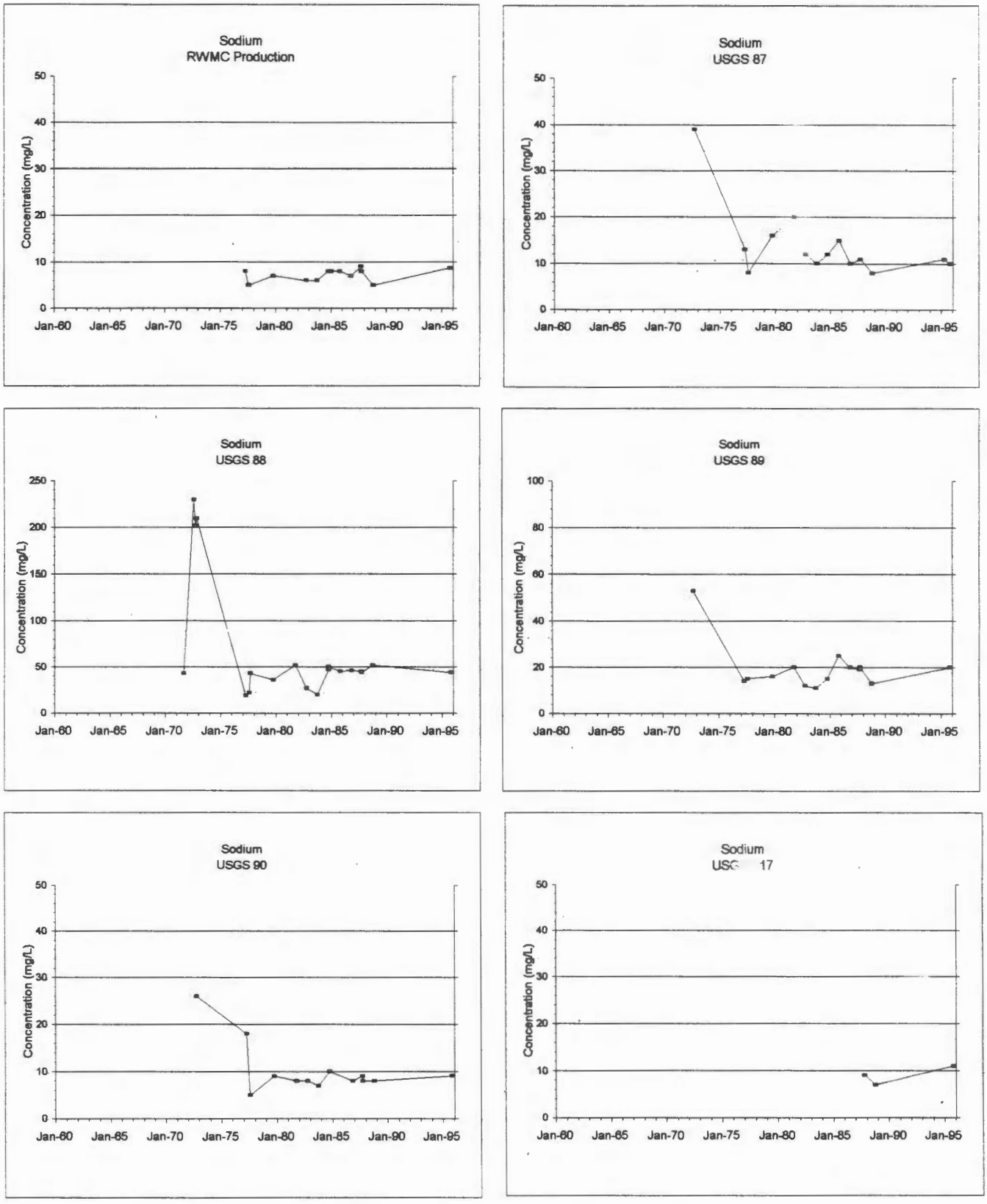
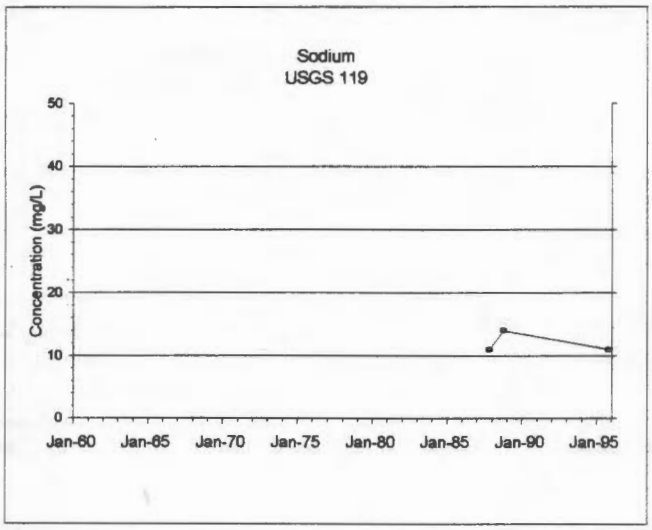


Figure H-5. Sodium Concentrations in Selected Wells in the RWMC Area.



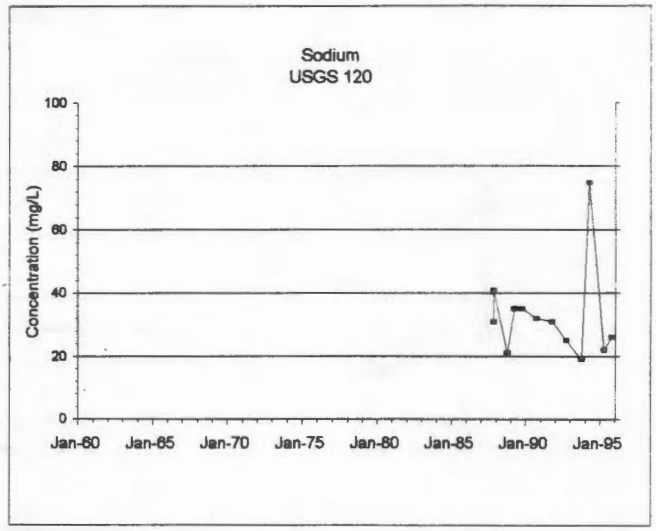


Figure H-5. Sodium Concentrations in Selected Wells in the RWMC Area (continued).

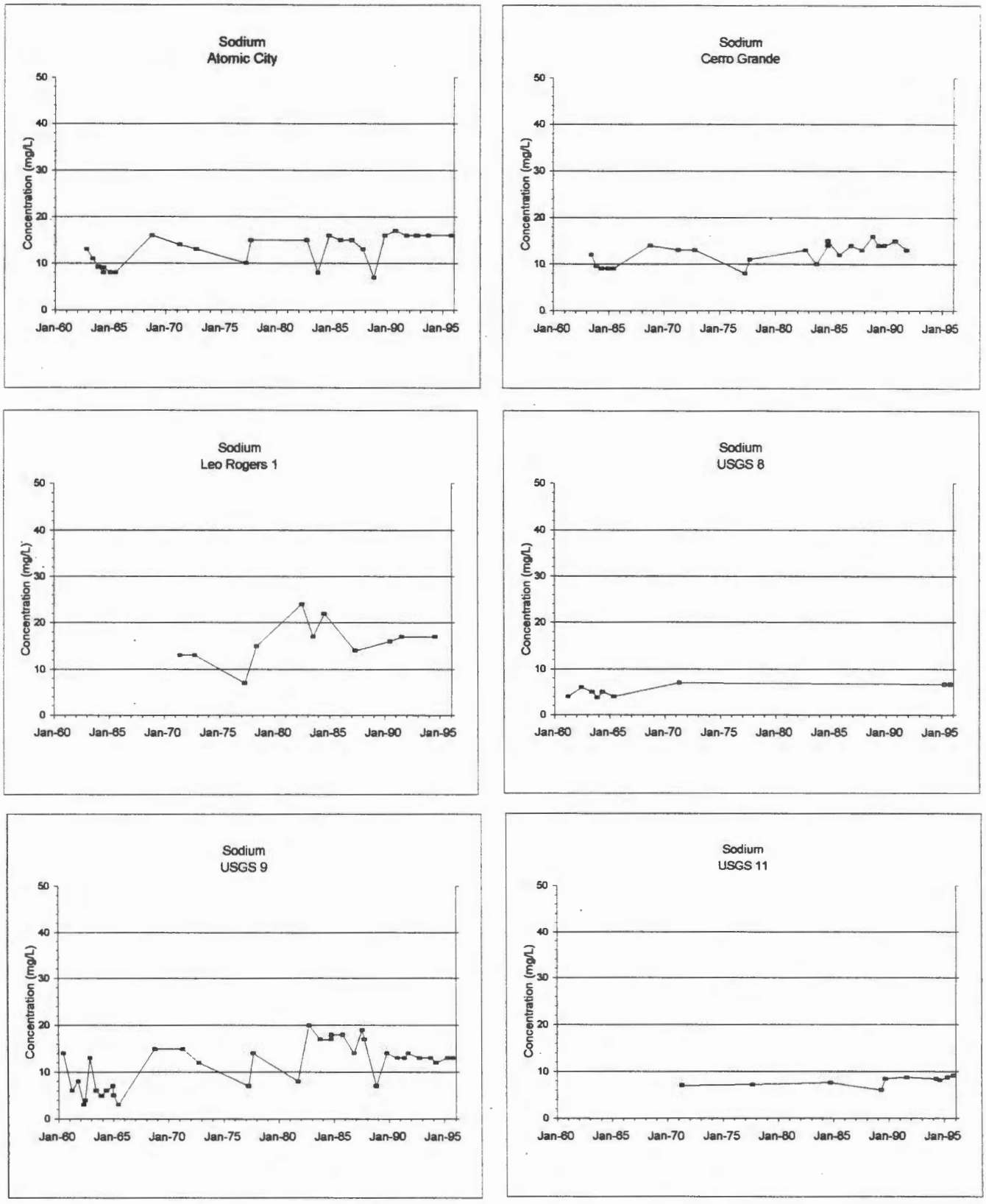


Figure H-6. Sodium Concentrations in Selected Wells near the INEEL Southern Boundary.

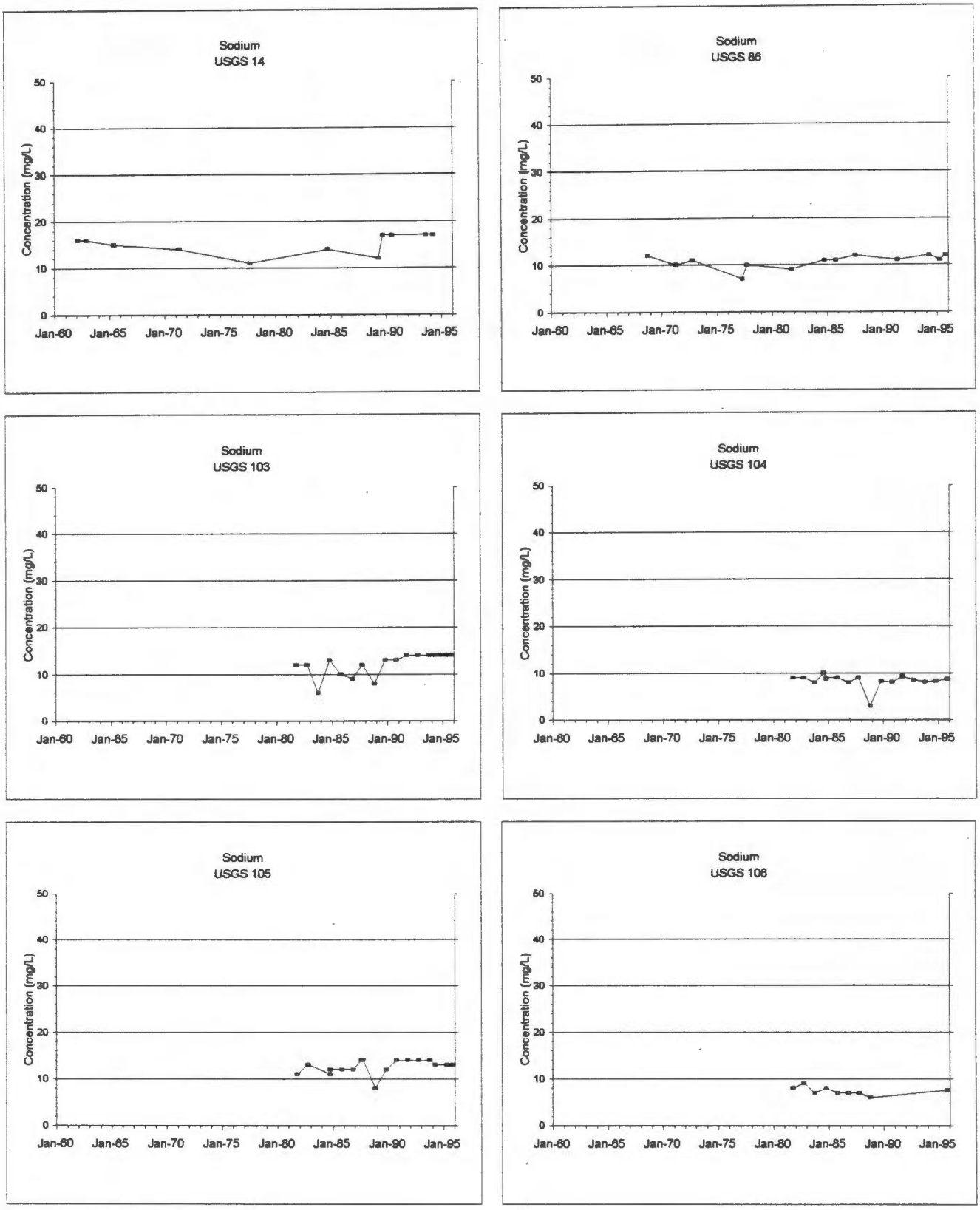
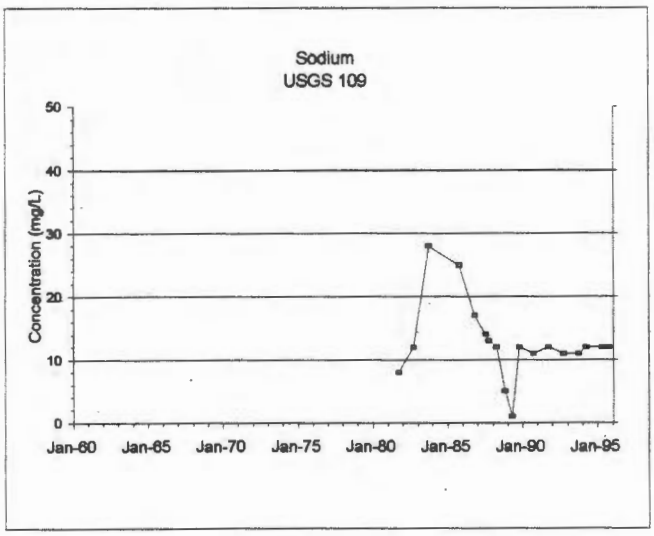


Figure H-6. Sodium Concentrations in Selected Wells near the INEEL Southern Boundary (continued).



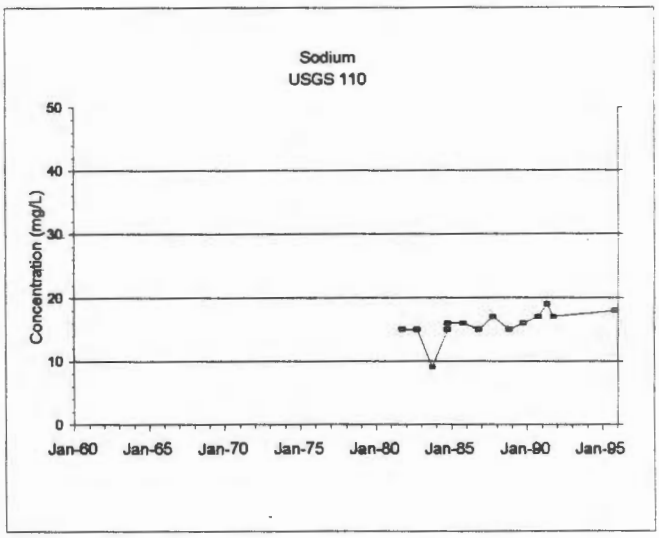
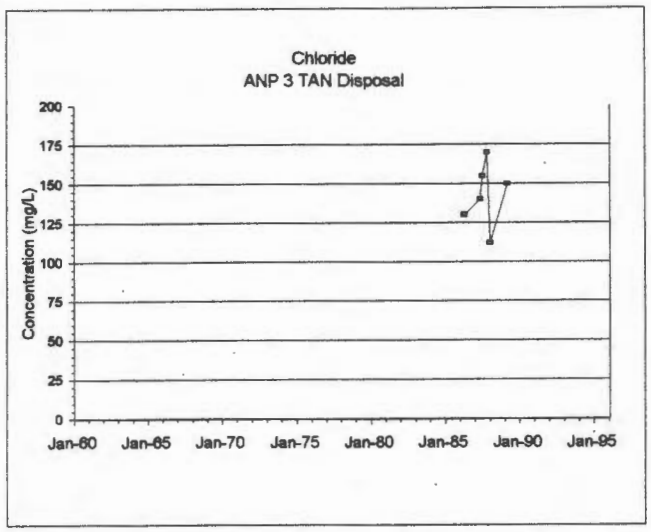
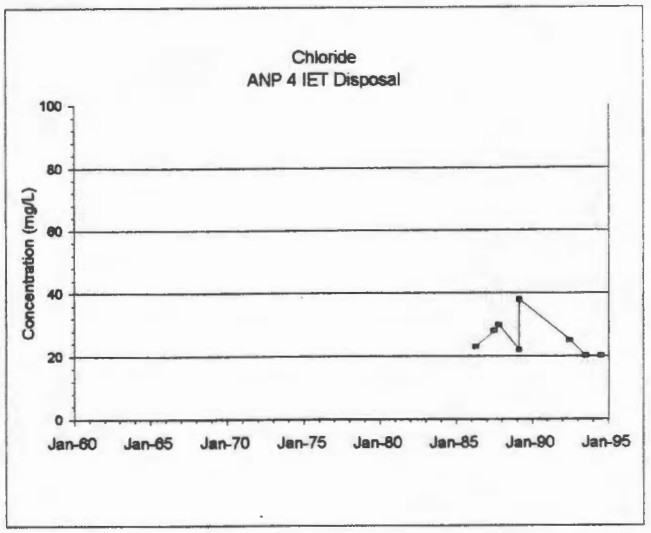


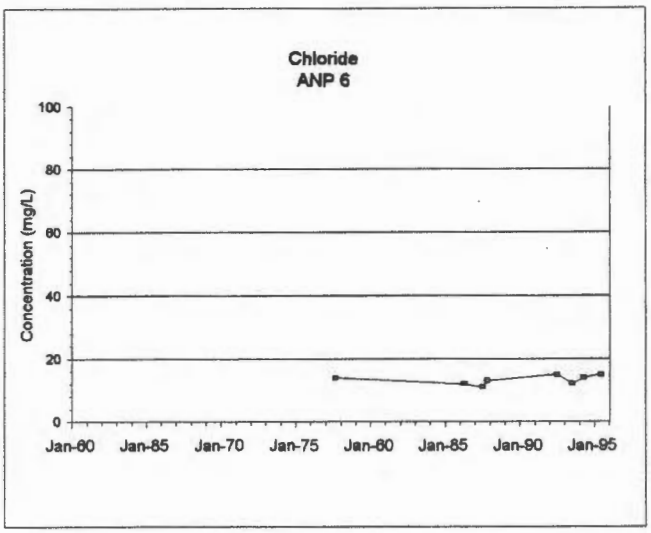
Figure H-6. Sodium Concentrations in Selected Wells near the INEEL Southern Boundary (continued).

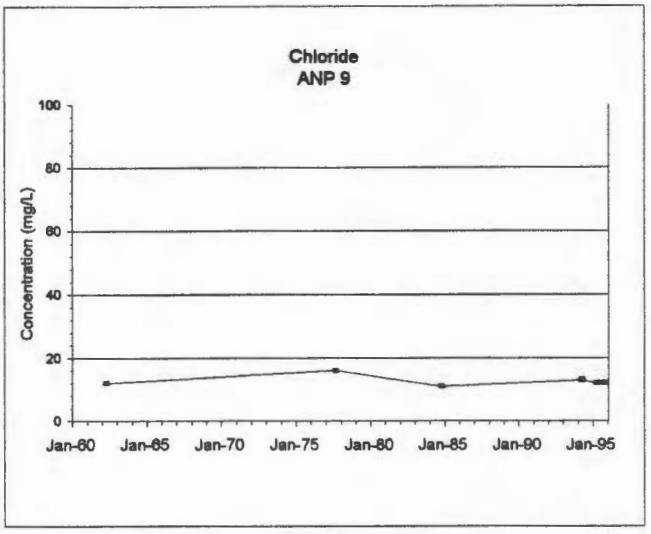
ATTACHMENT I

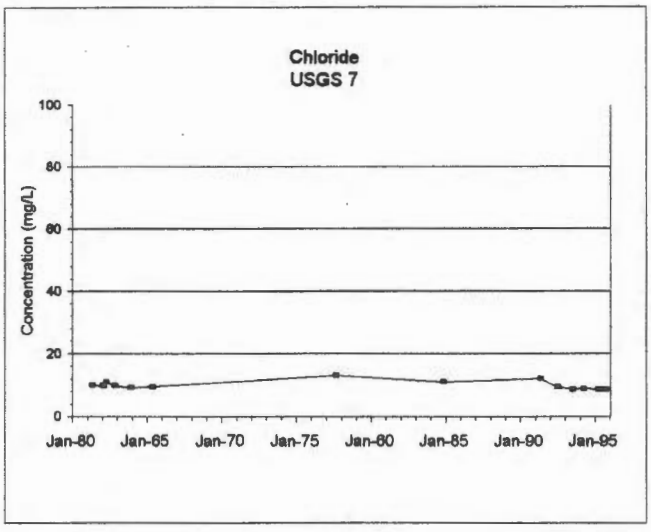
Graphs of Chloride Concentration Versus Time











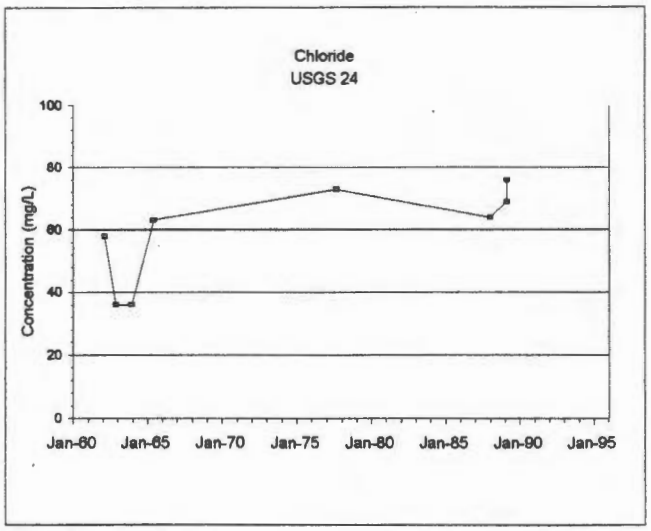


Figure I-1. Chloride Concentrations in Selected Wells in the TAN Area.

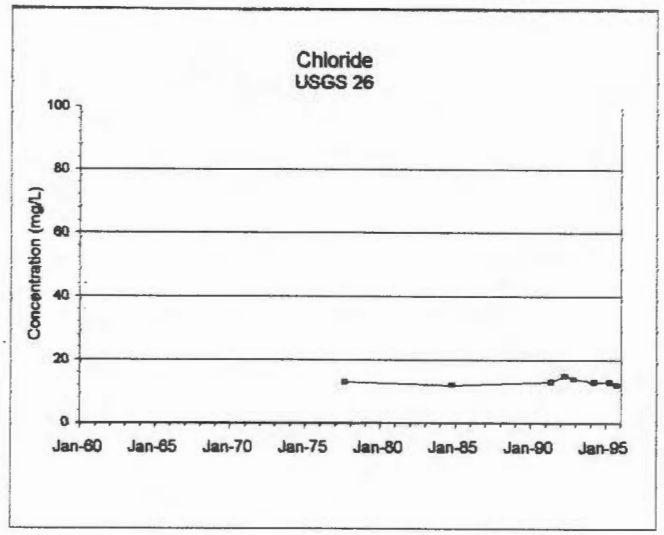


Figure I-1. Chloride Concentrations in Selected Wells in the TAN Area (continued).

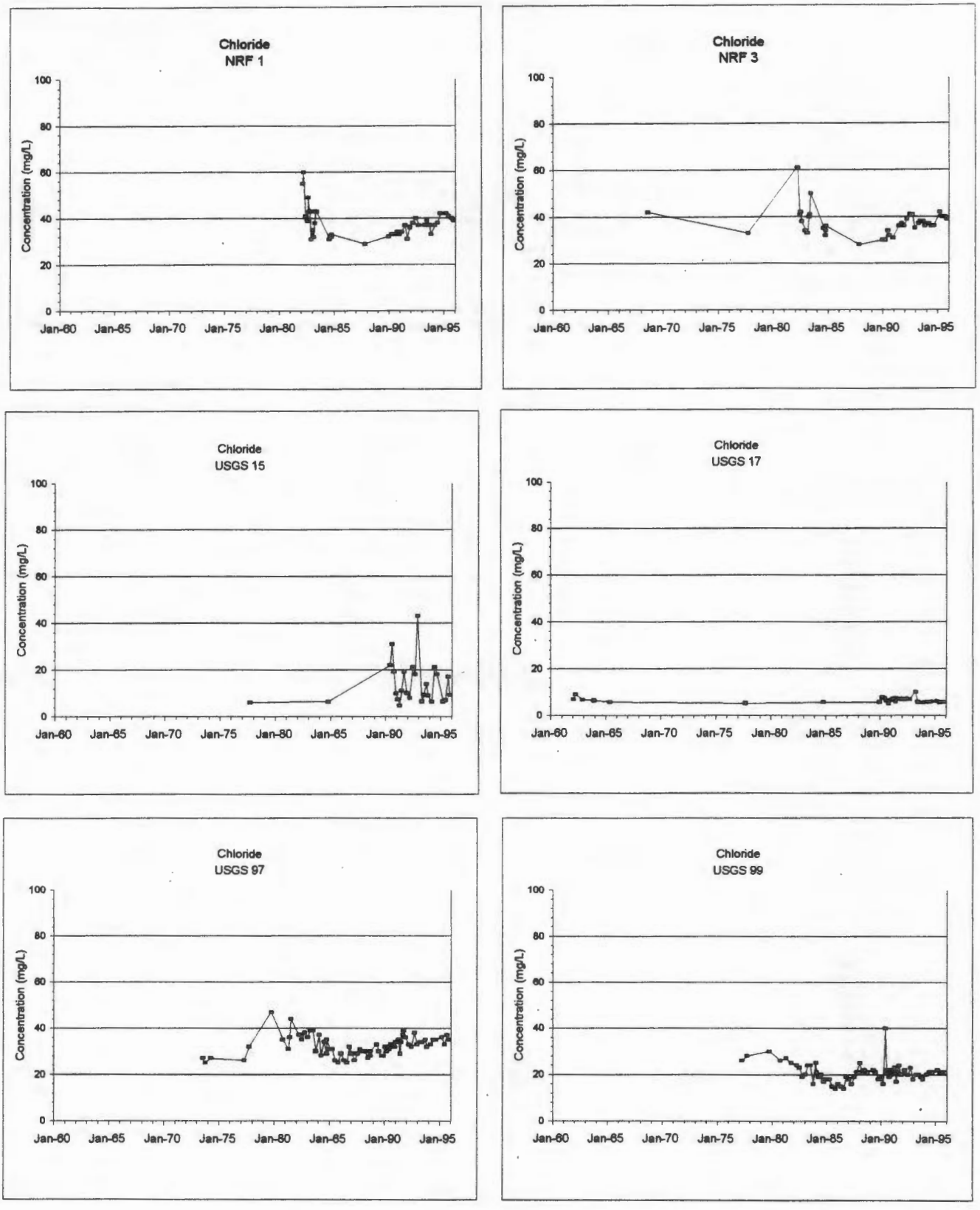


Figure I-2. Chloride Concentrations in Selected Wells in the NRF Area.

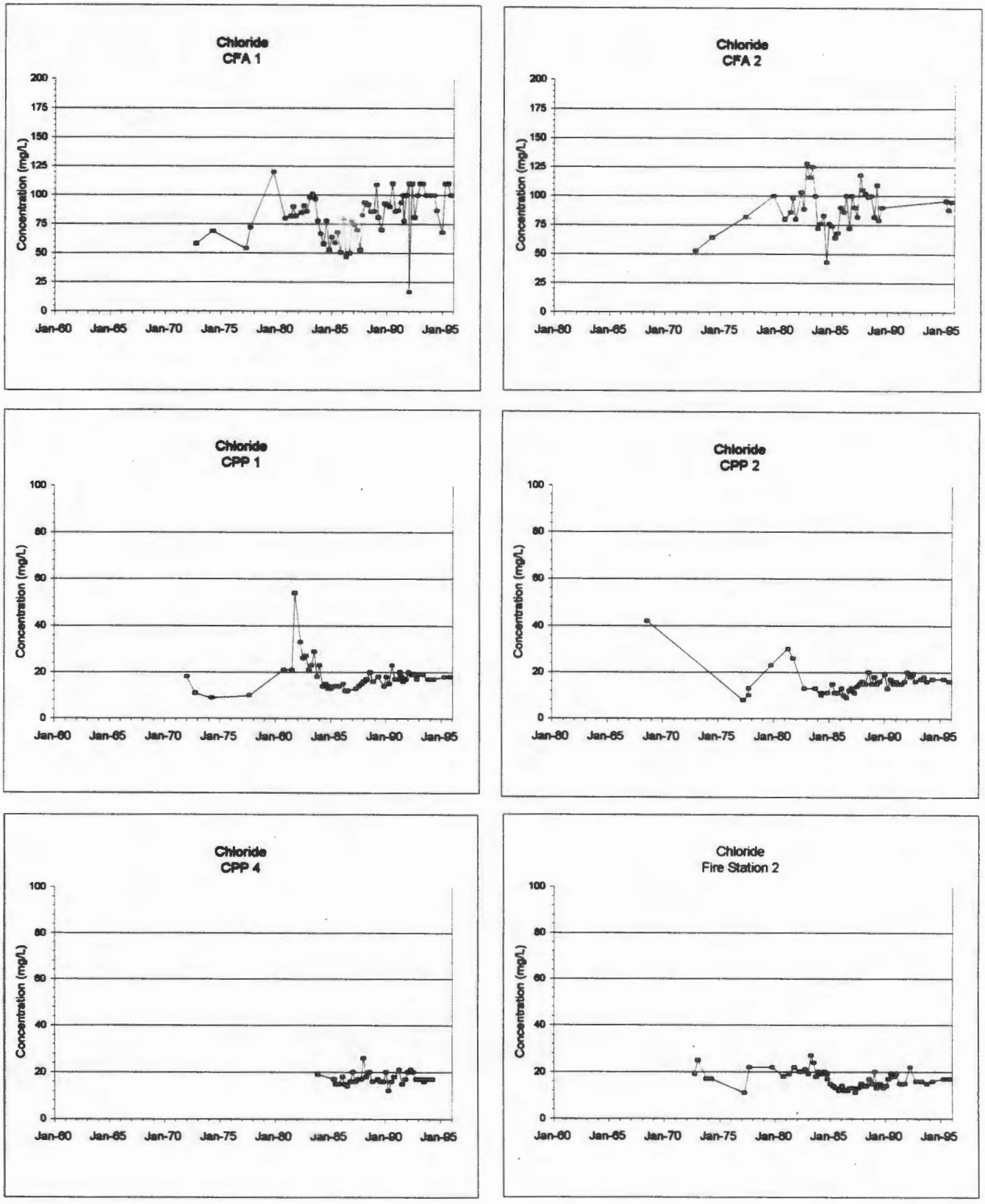


Figure I-3. Chloride Concentrations in Selected Wells in the TRA/ICPP/CFA Area.

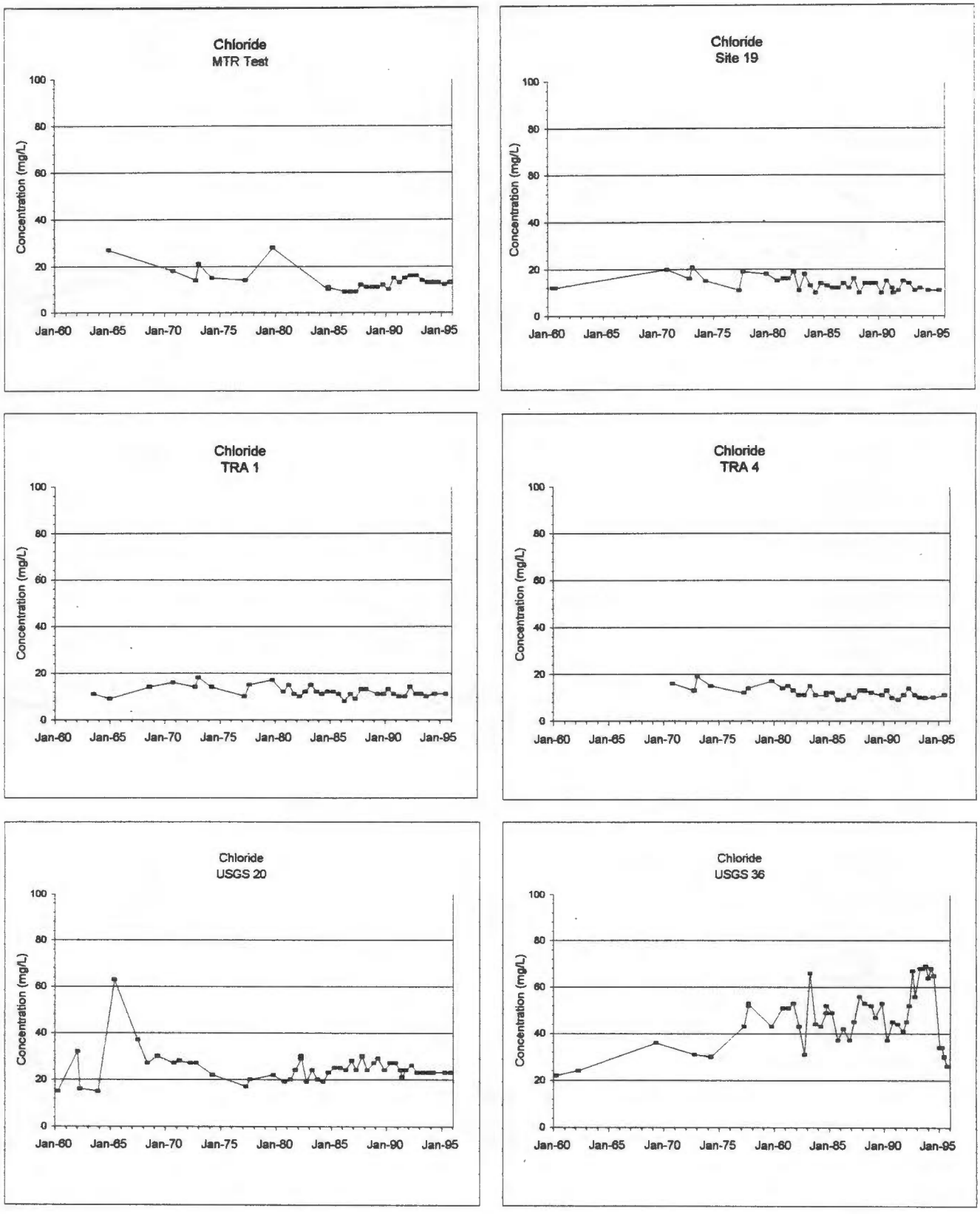


Figure I-3. Chloride Concentrations in Selected Wells in the TRA/ICPP/CFA Area (continued).

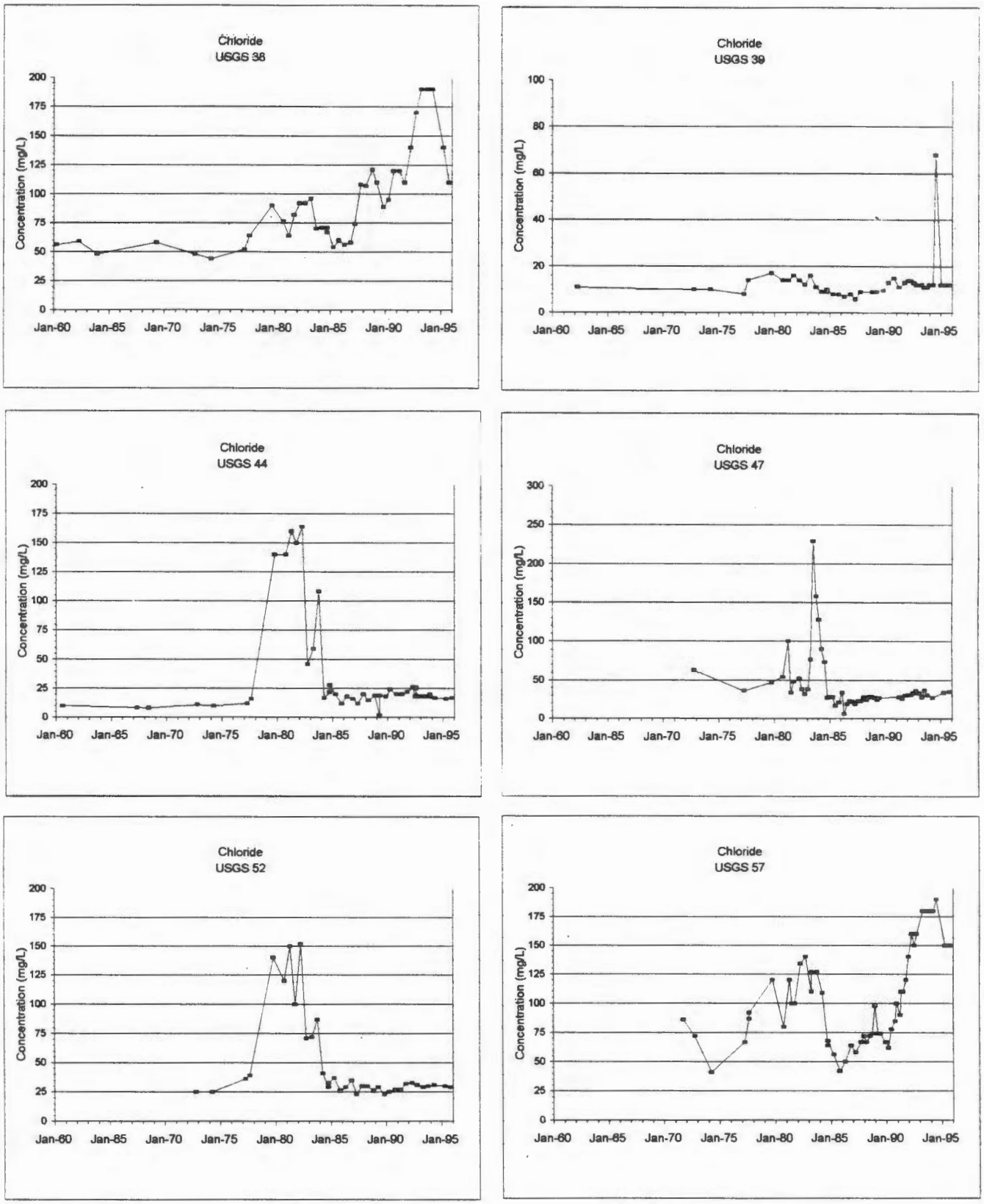


Figure I-3. Chloride Concentrations in Selected Wells in the TRA/ICPP/CFA Area (continued).

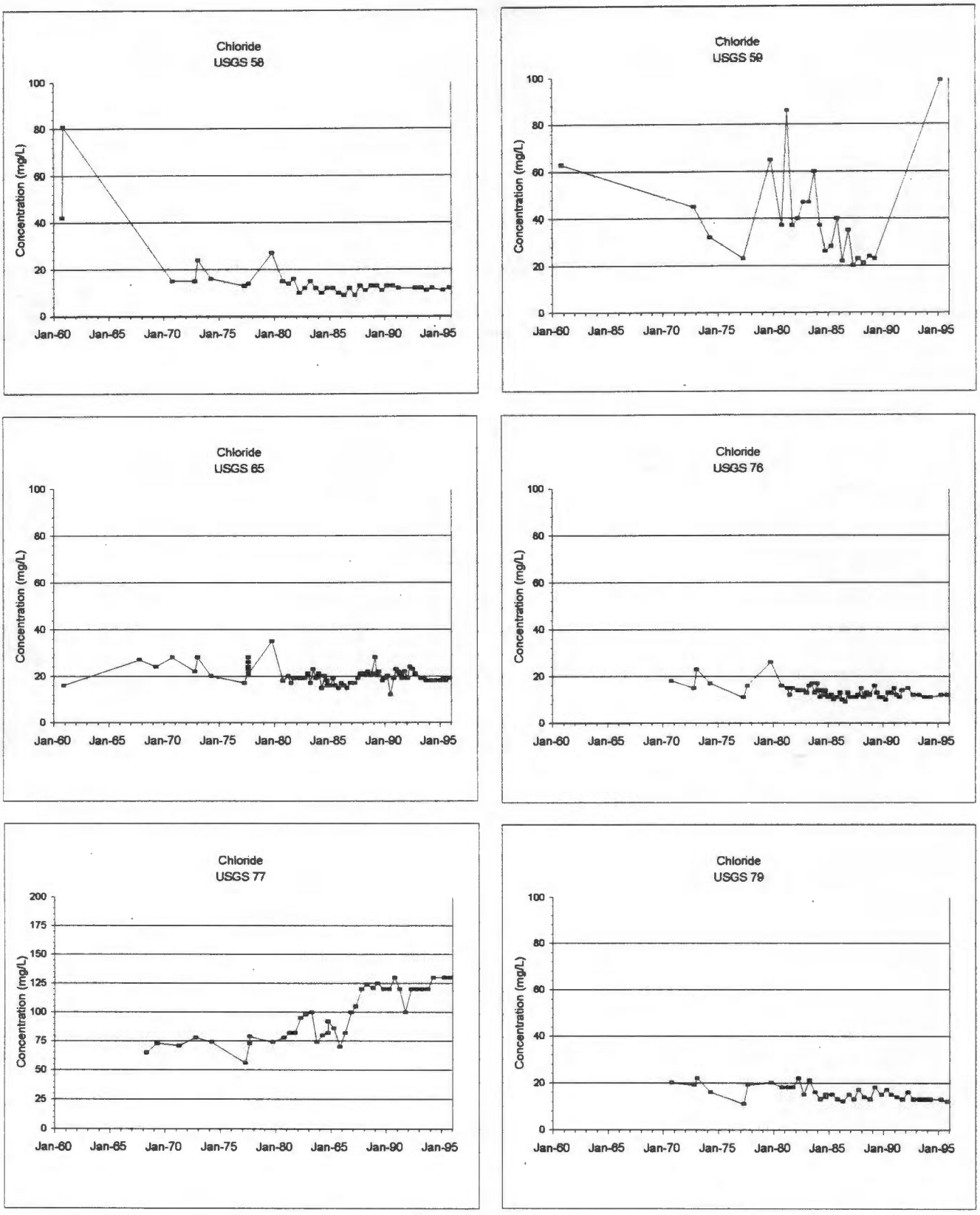


Figure I-3. Chloride Concentrations in Selected Wells in the TRA/ICPP/CFA Area (continued).

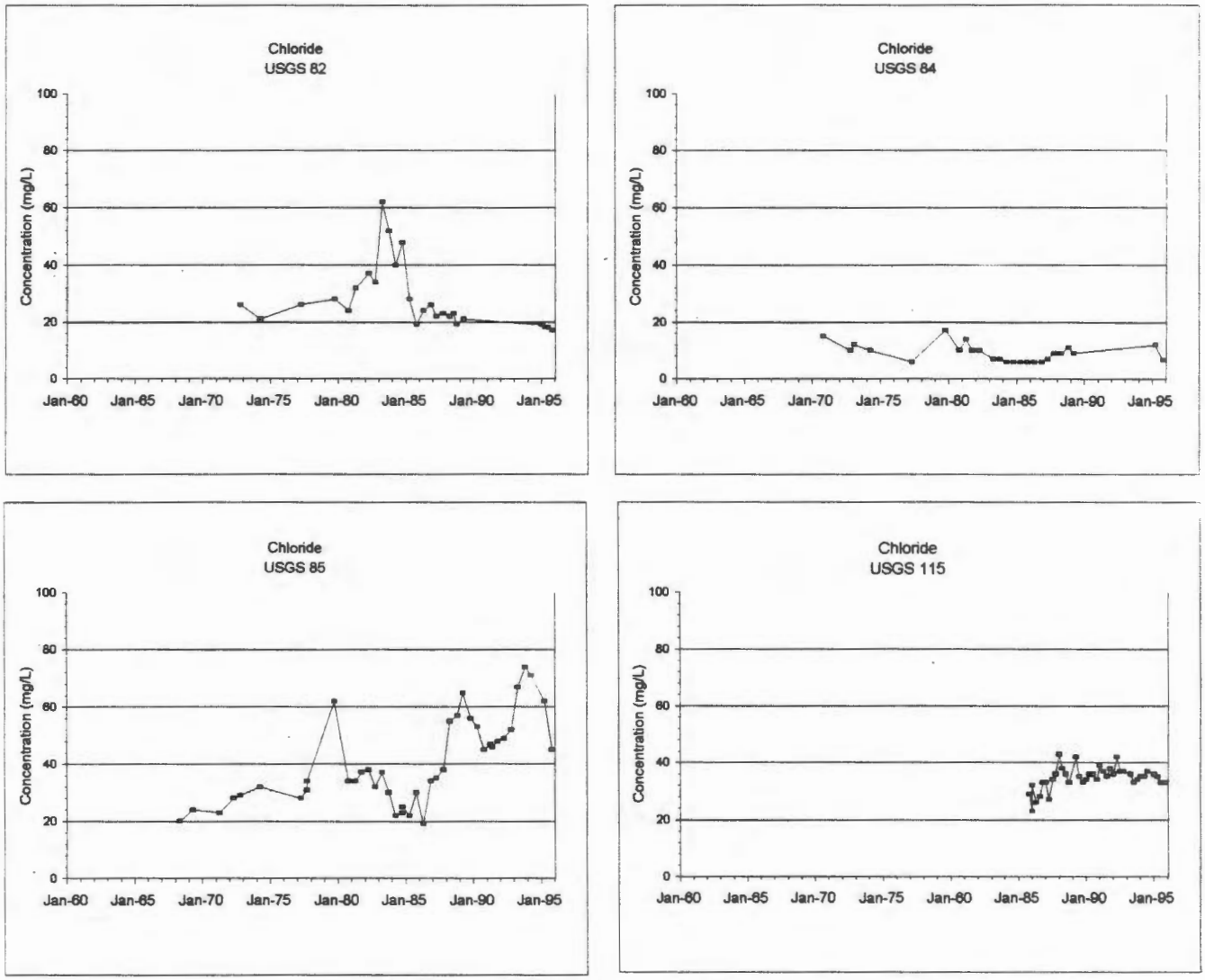
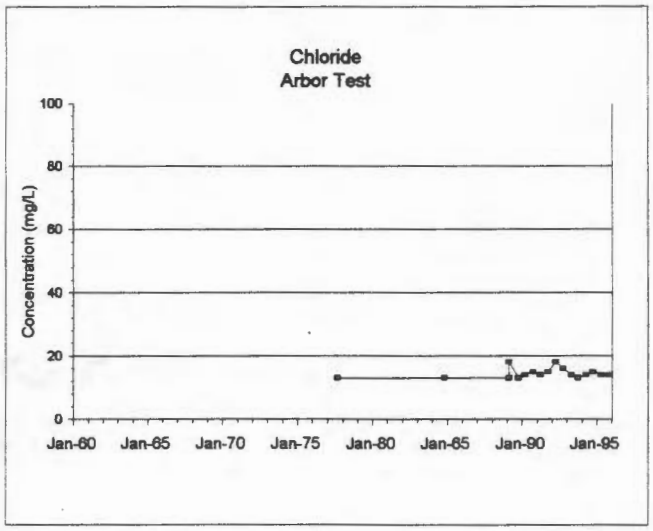
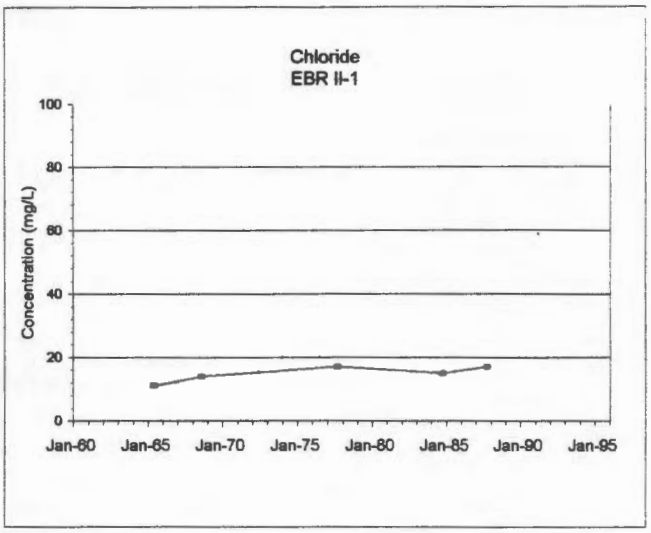


Figure I-3. Chloride Concentrations in Selected Wells in the TRA/ICPP/CFA Area (continued).





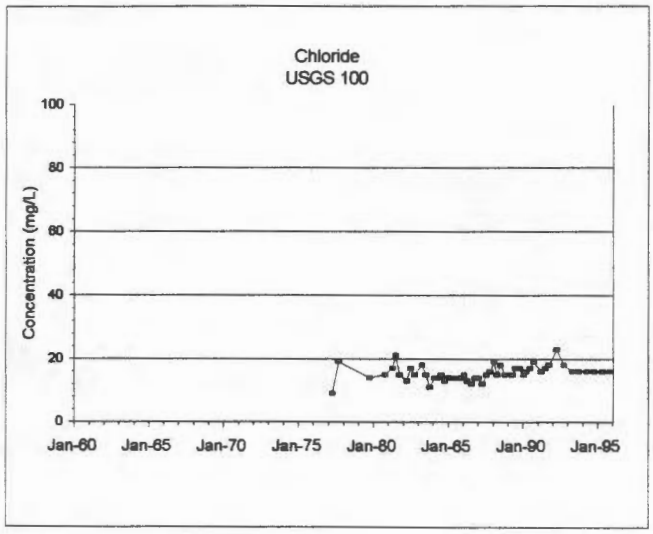


Figure I-4. Chloride Concentrations in Selected Wells in the ANL-West Area.

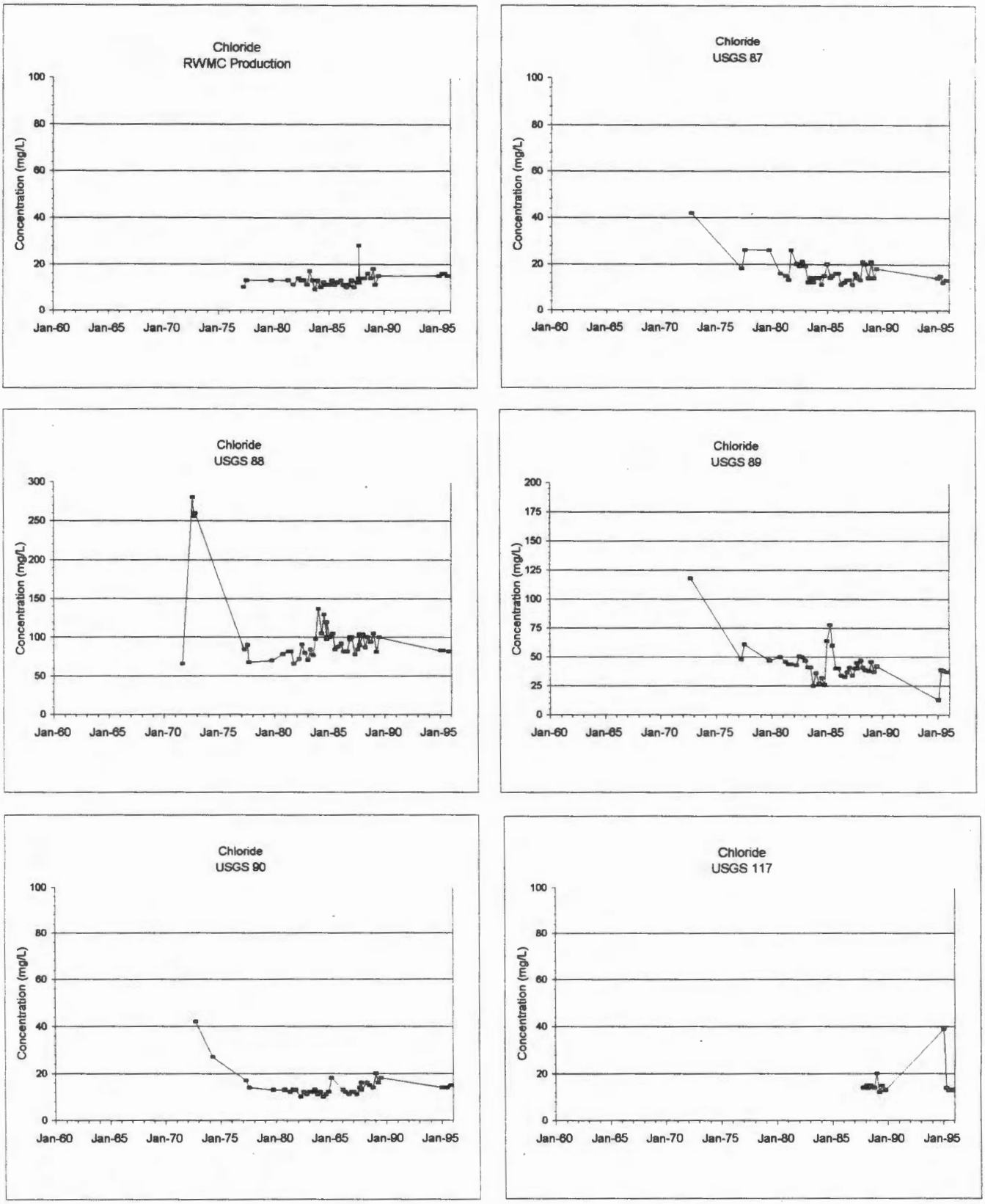
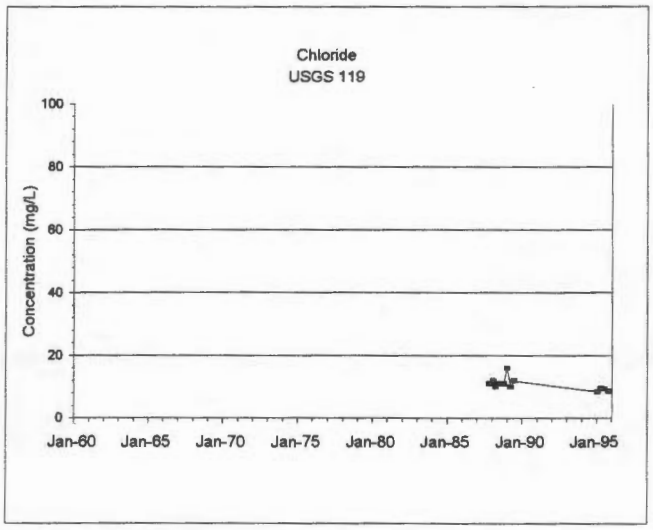


Figure I-5. Chloride Concentrations in Selected Wells in the RWMC Area.



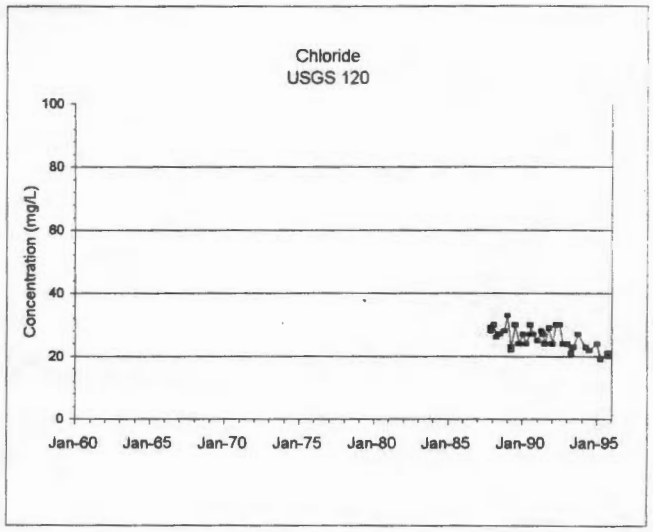
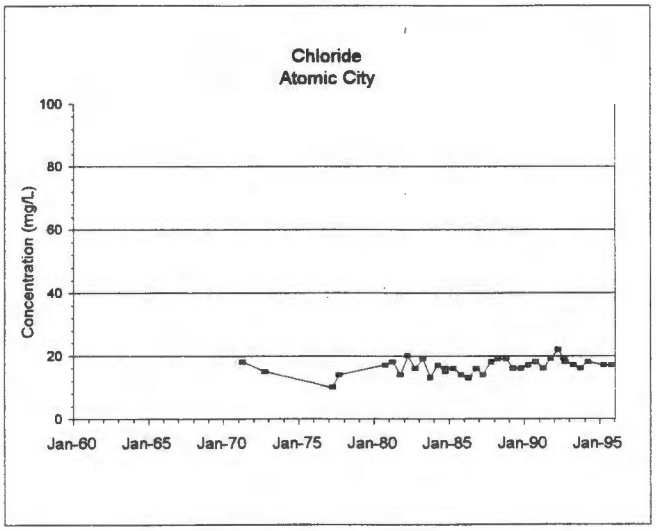
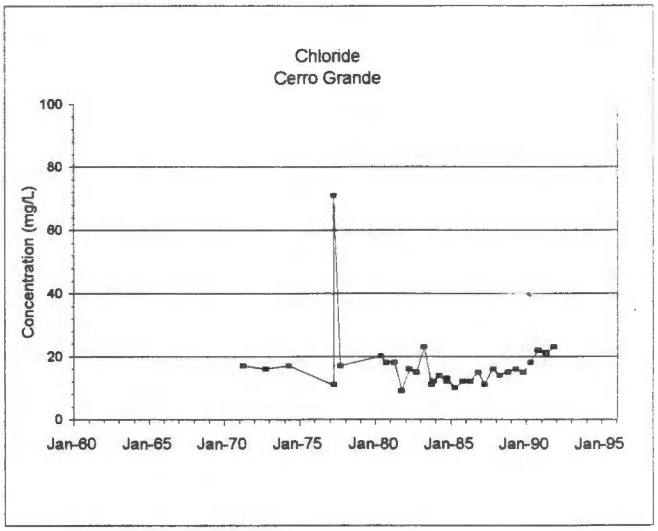
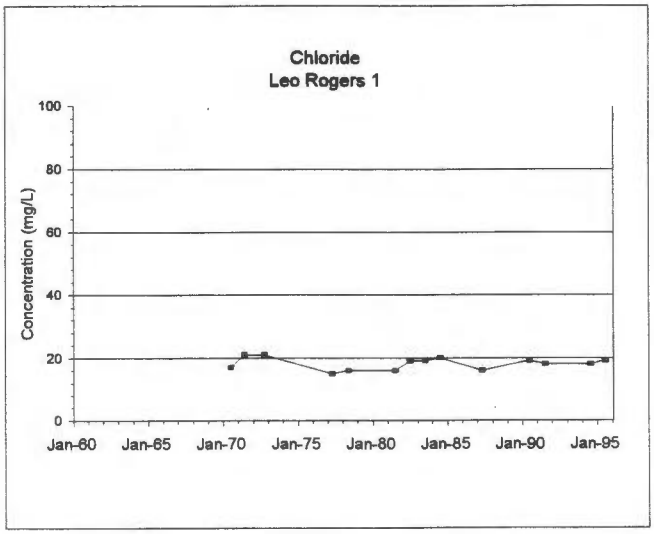
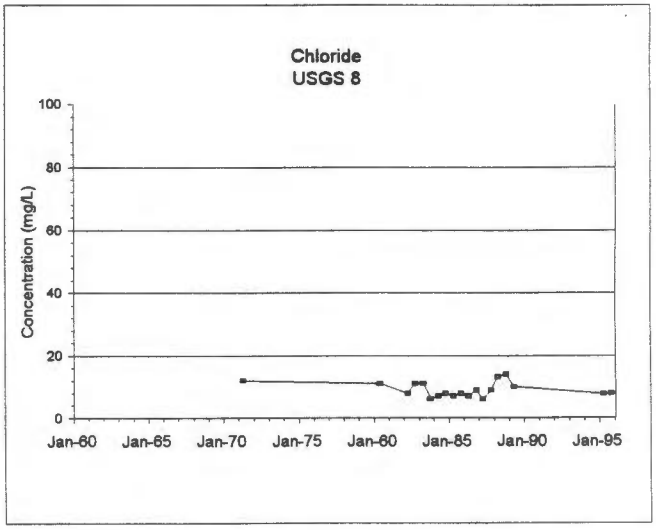


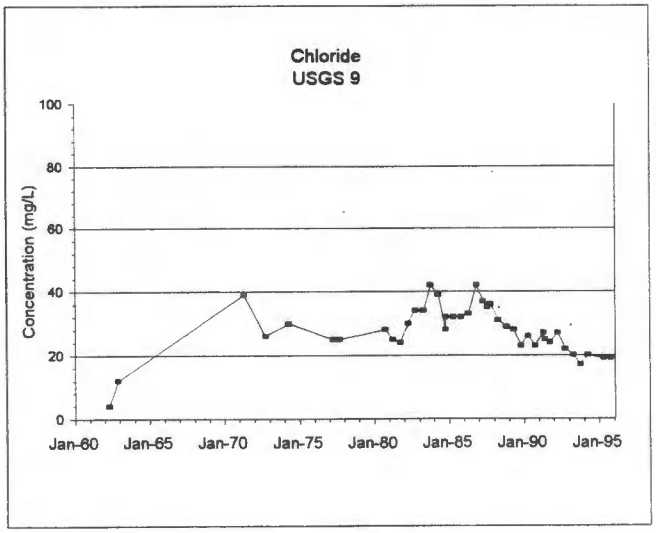
Figure I-5. Chloride Concentrations in Selected Wells in the RWMC Area (continued).











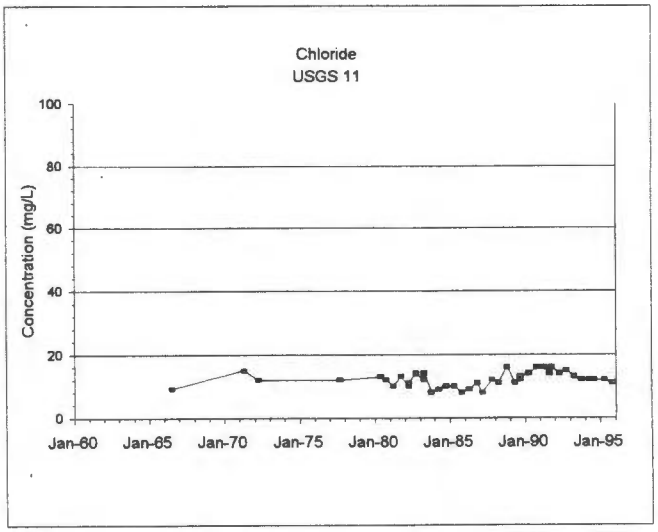


Figure I-6. Chloride Concentrations in Selected Wells near the INEEL Southern Boundary.

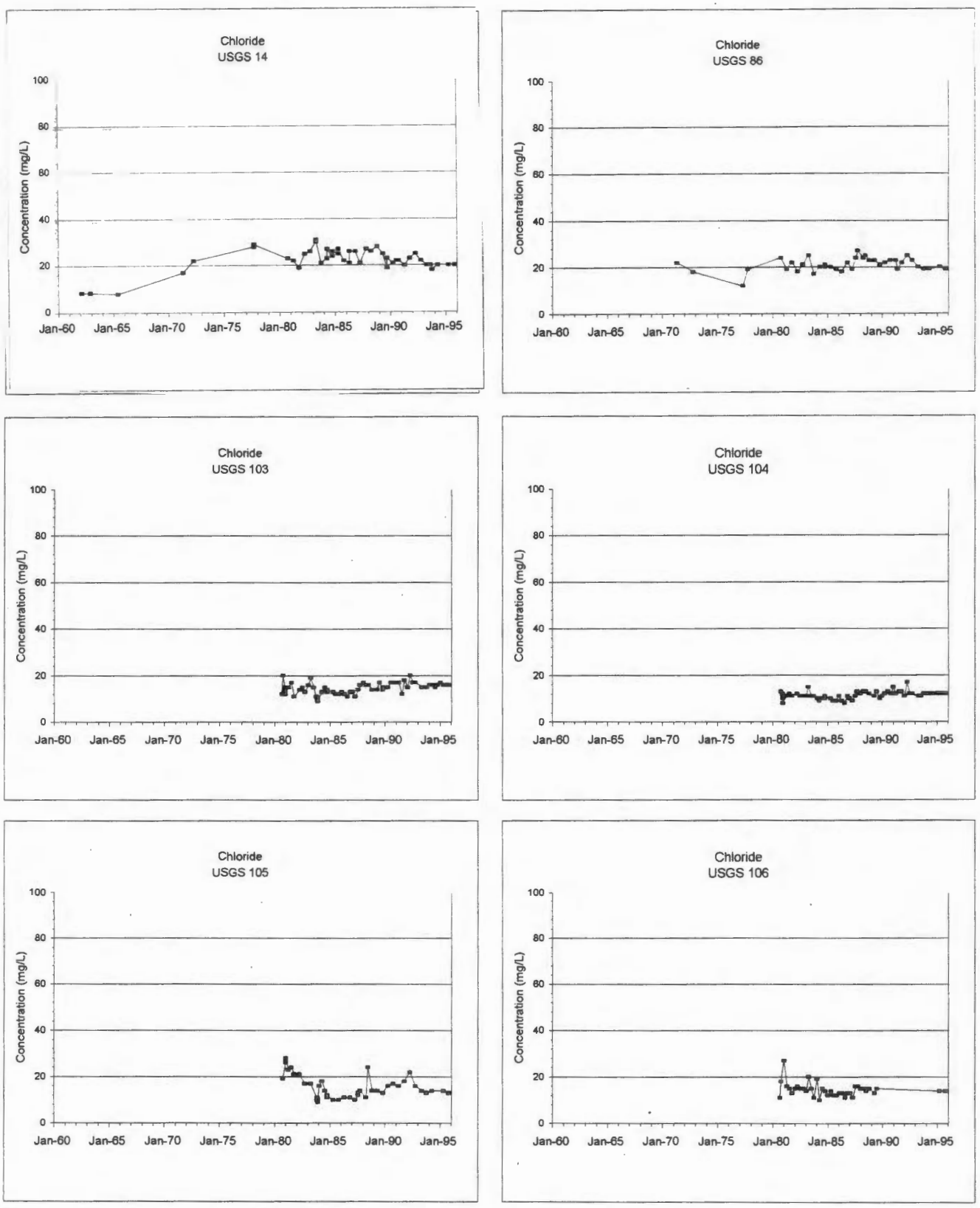
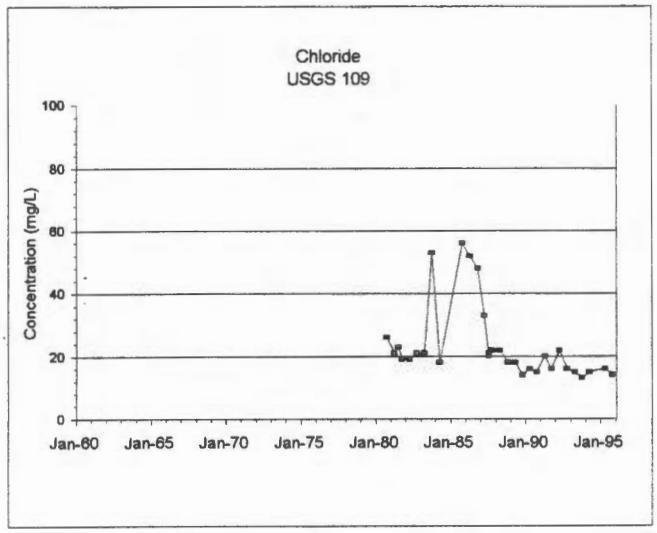


Figure I-6. Chloride Concentrations in Selected Wells near the INEEL Southern Boundary (continued).



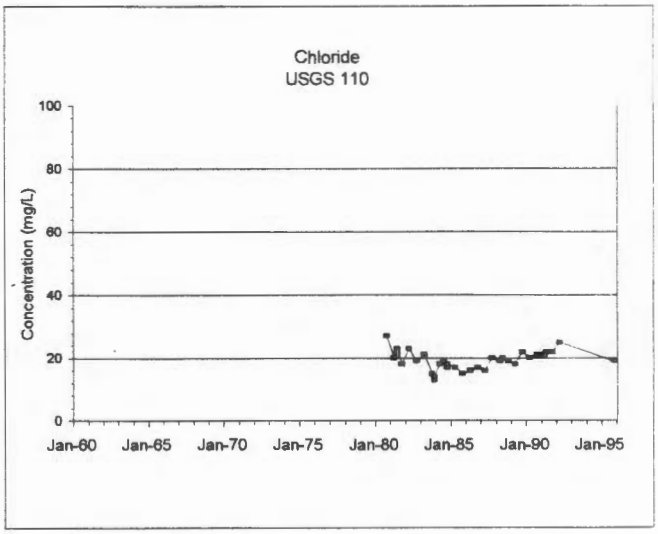


Figure I-6. Chloride Concentrations in Selected Wells near the INEEL Southern Boundary (continued).

ATTACHMENT J

Graphs of Nitrate+Nitrite (as Nitrogen) Concentration Versus Time

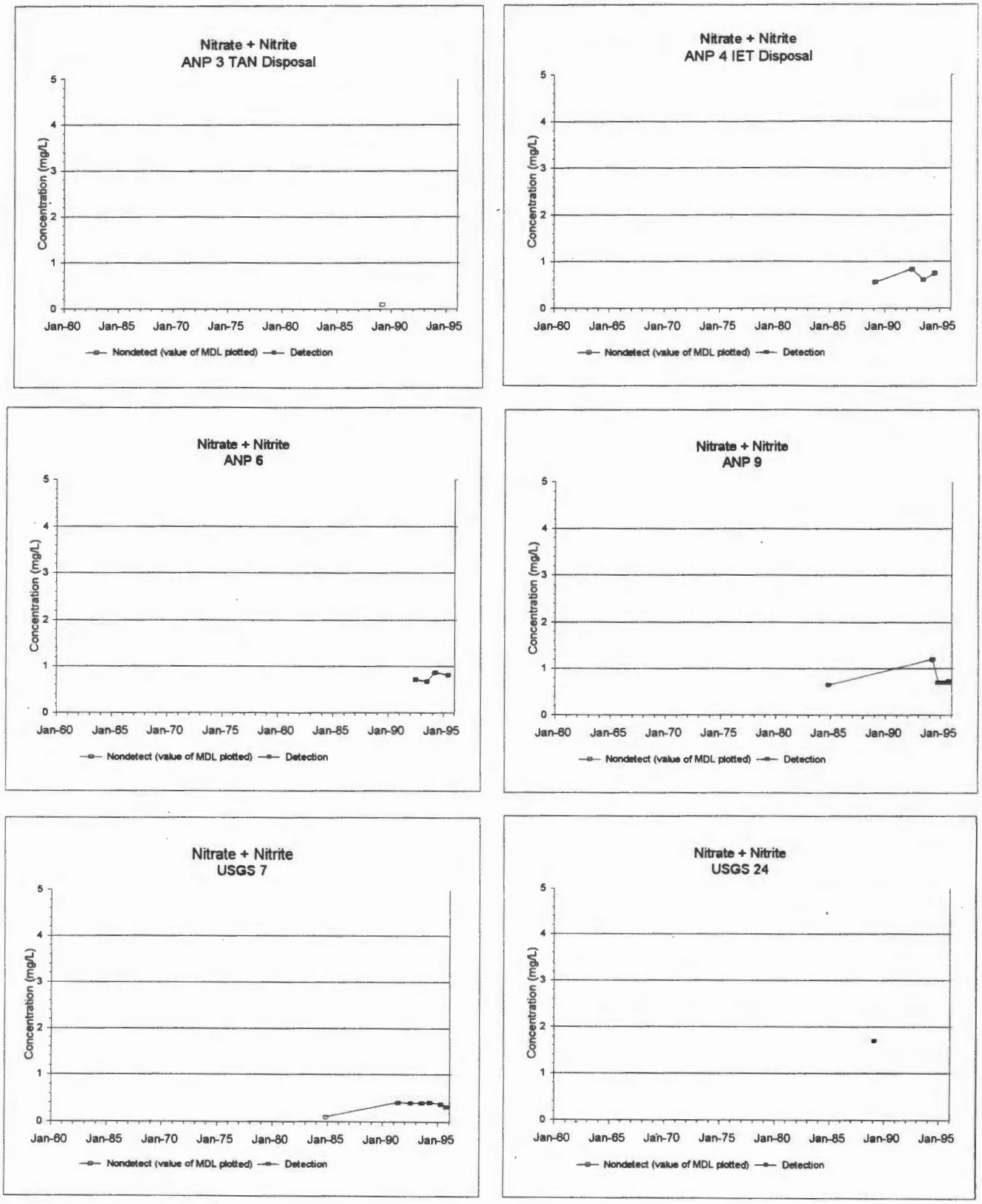


Figure J-1. Nitrate + Nitrite (as Nitrogen) Concentrations in Selected Wells in the TAN Area.

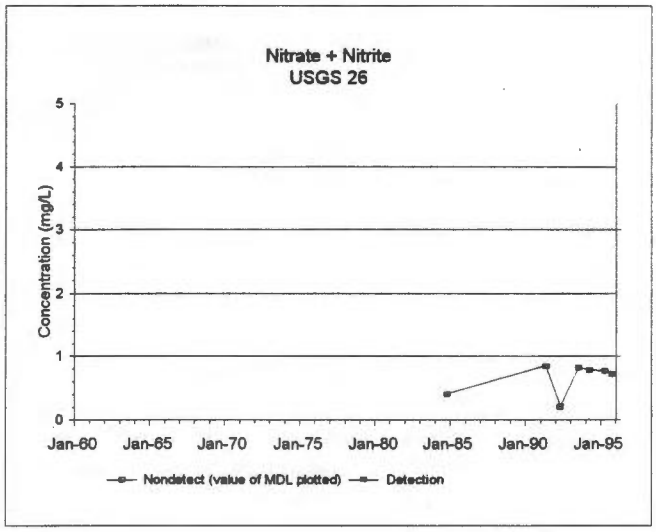


Figure J-1. Nitrate + Nitrite (as Nitrogen) Concentrations in Selected Wells in the TAN Area (continued).

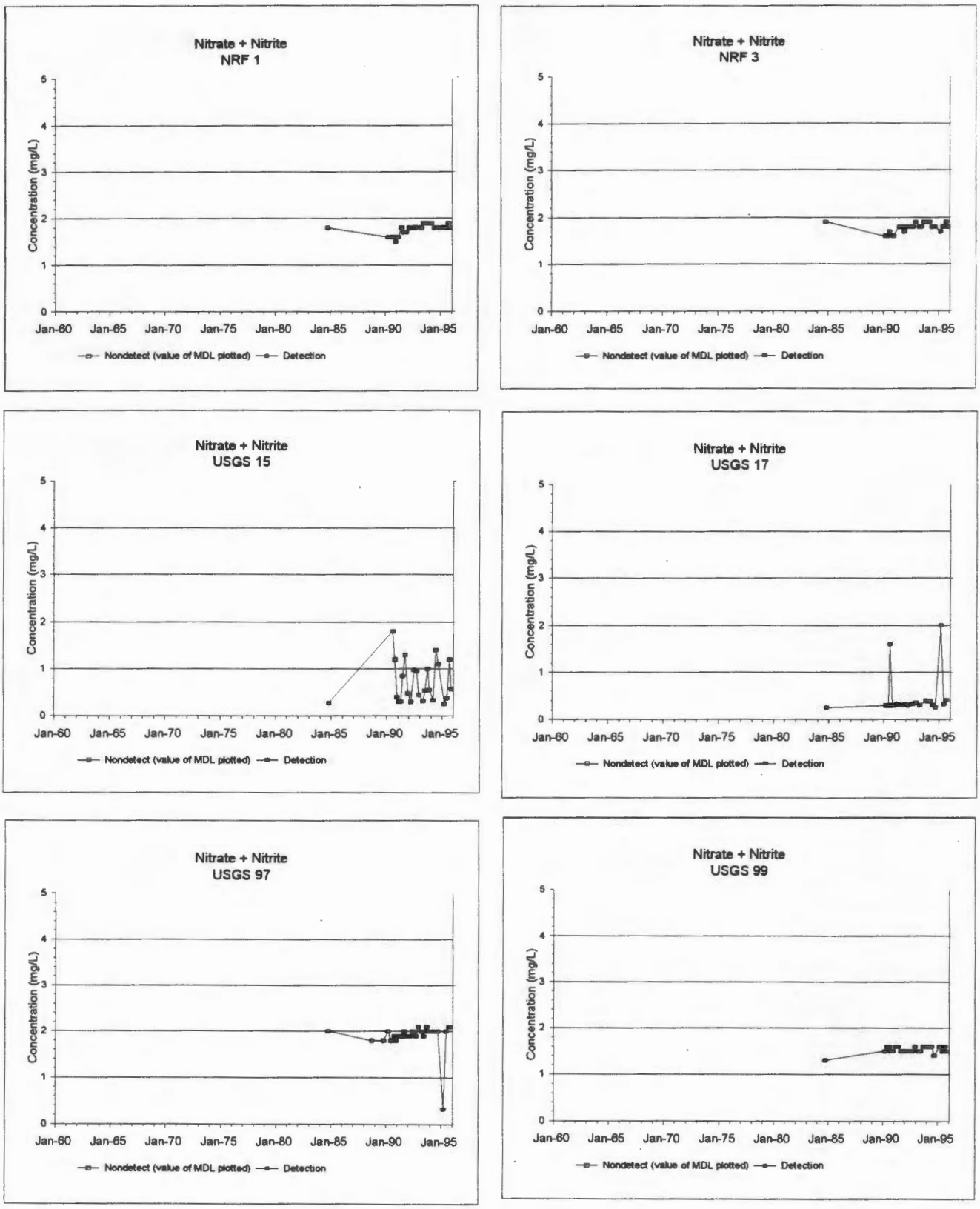
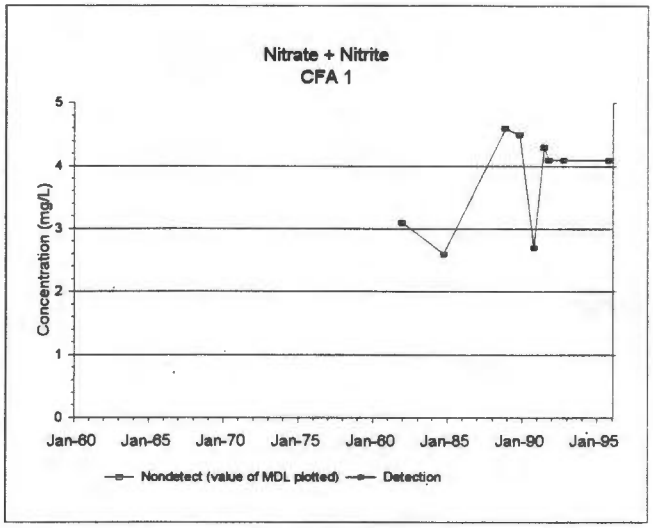
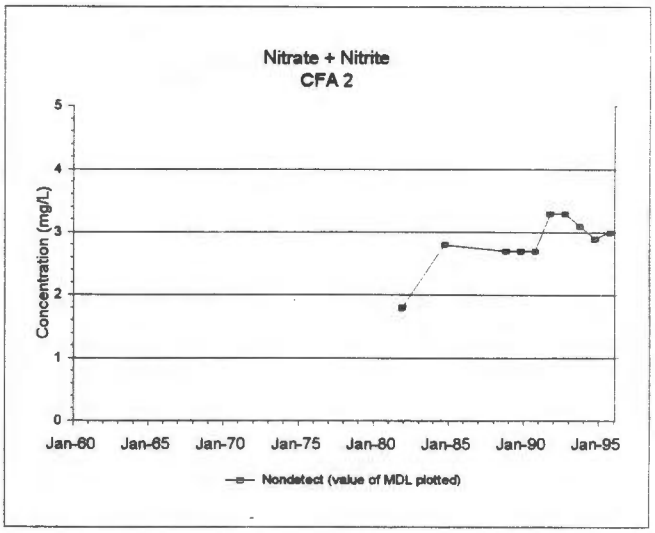
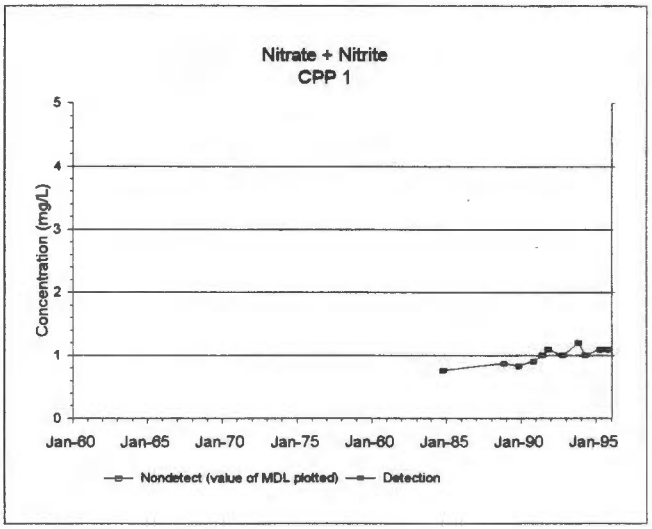
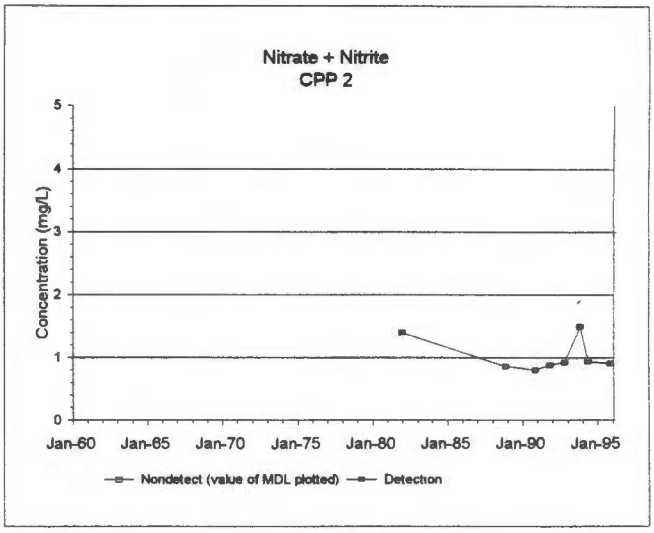


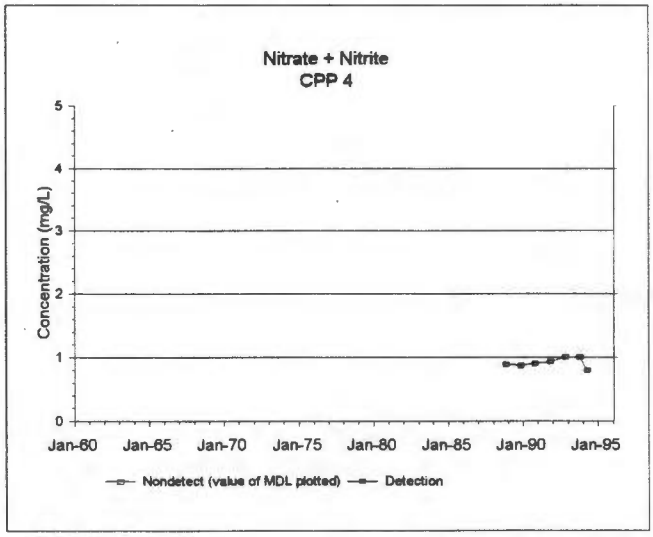
Figure J-2. Nitrate + Nitrite (as Nitrogen) Concentrations in Selected Wells in the NRF Area.











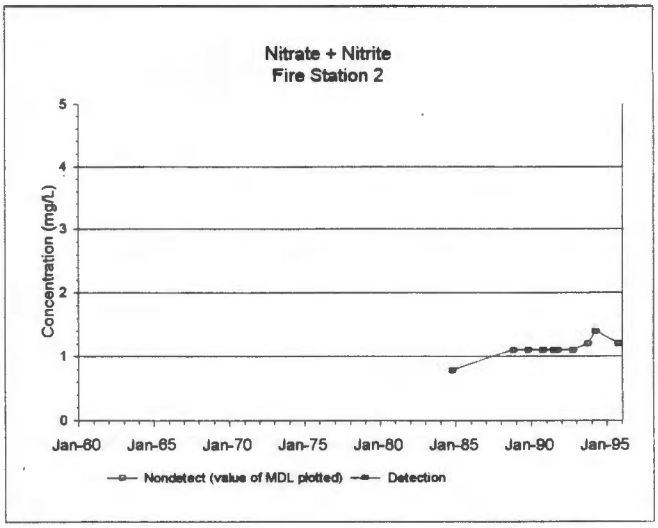


Figure J-3. Nitrate + Nitrite (as Nitrogen) Concentrations in Selected Wells in the TRA/ICPP/ CFA Area.

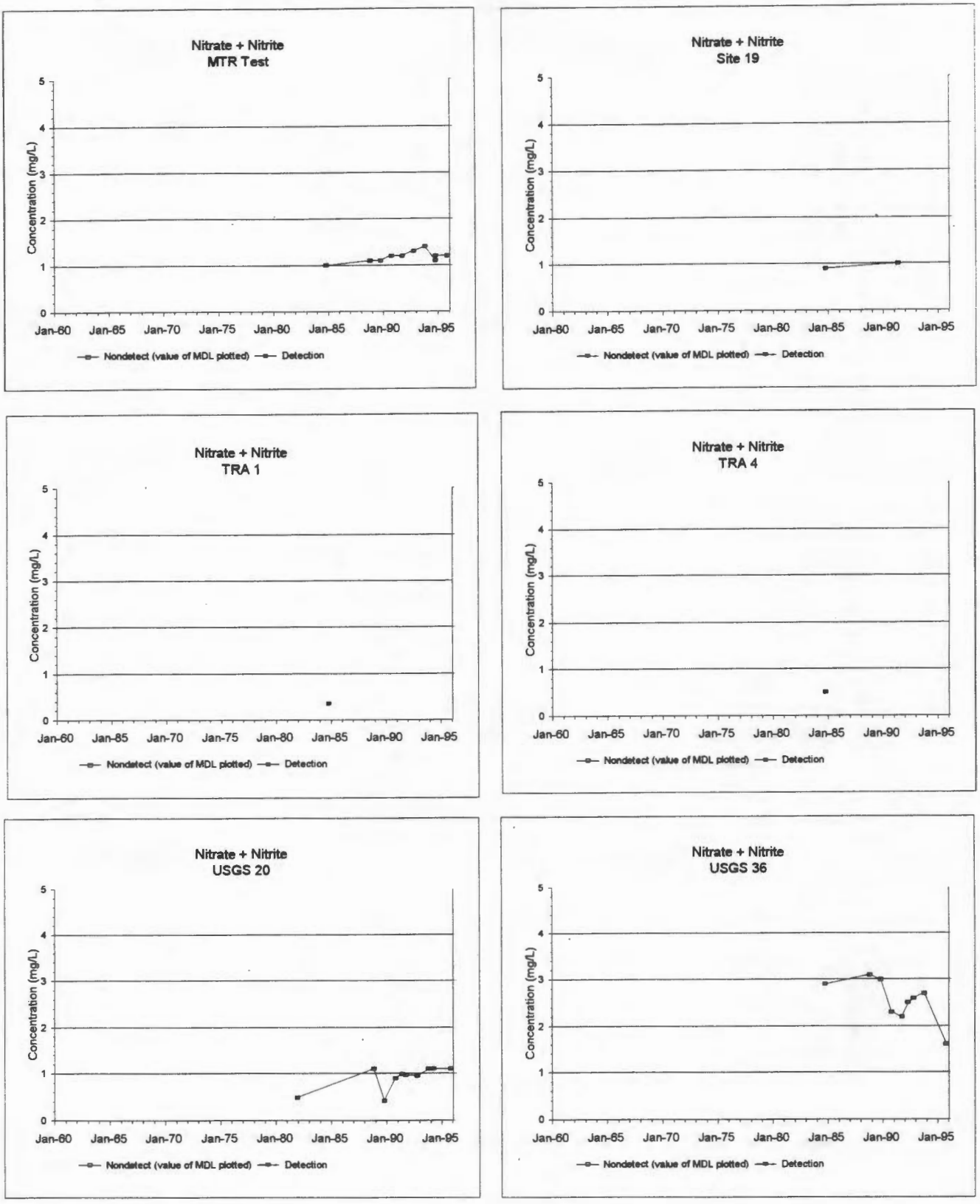


Figure J-3. Nitrate + Nitrite (as Nitrogen) Concentrations in Selected Wells in the TRA/ICPP/ CFA Area (continued).

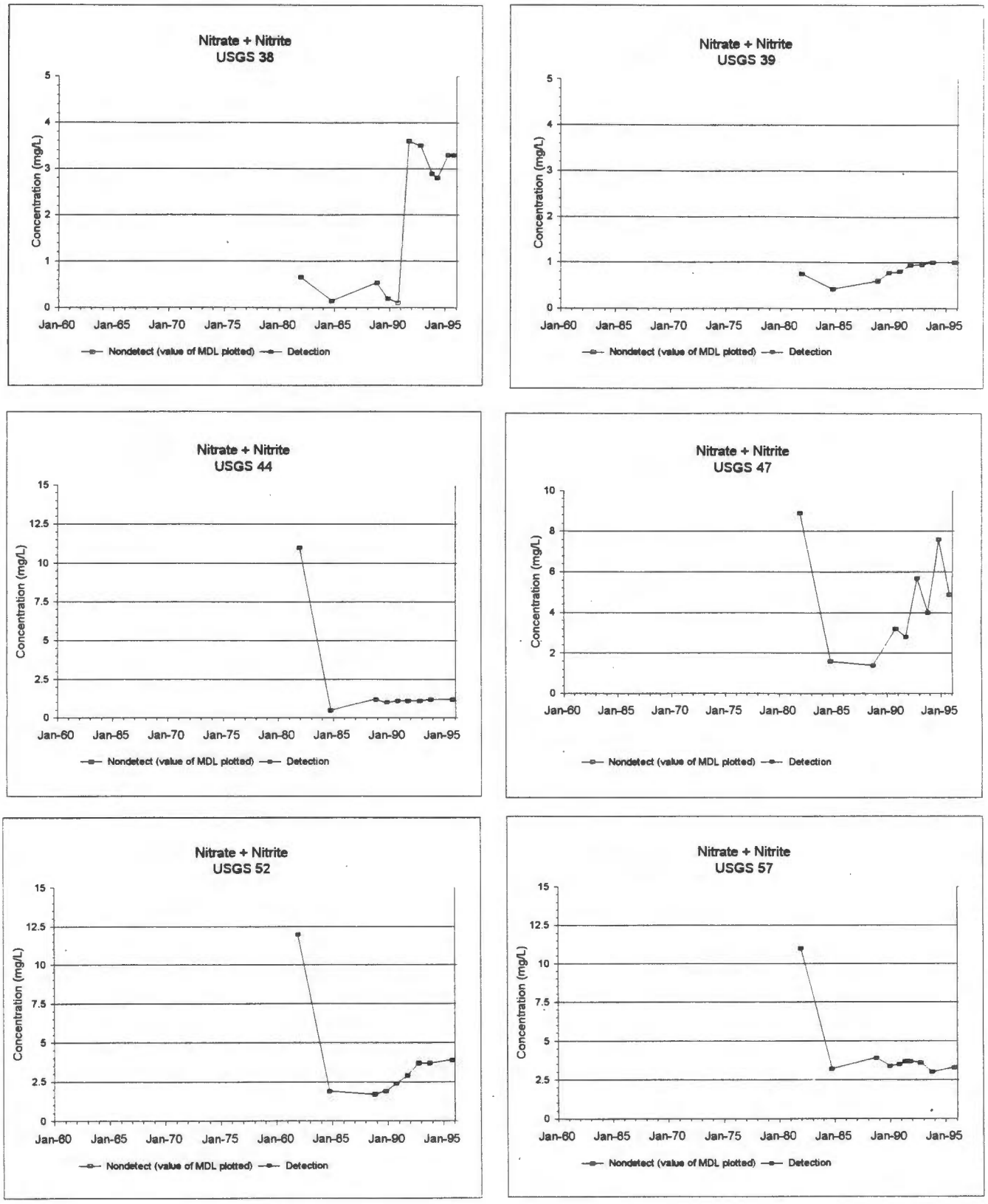
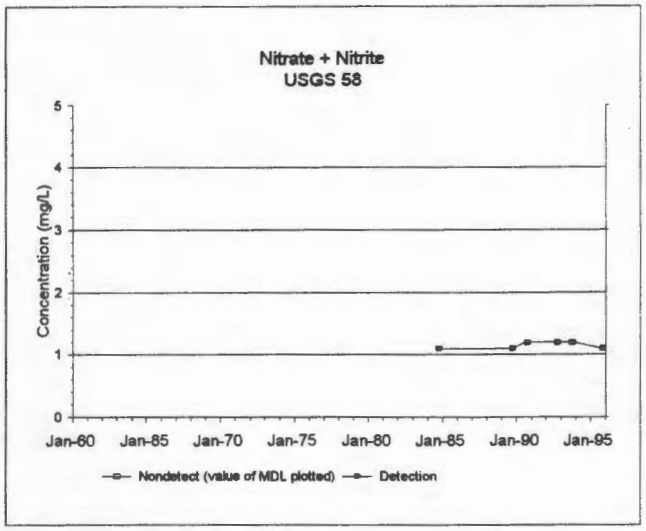
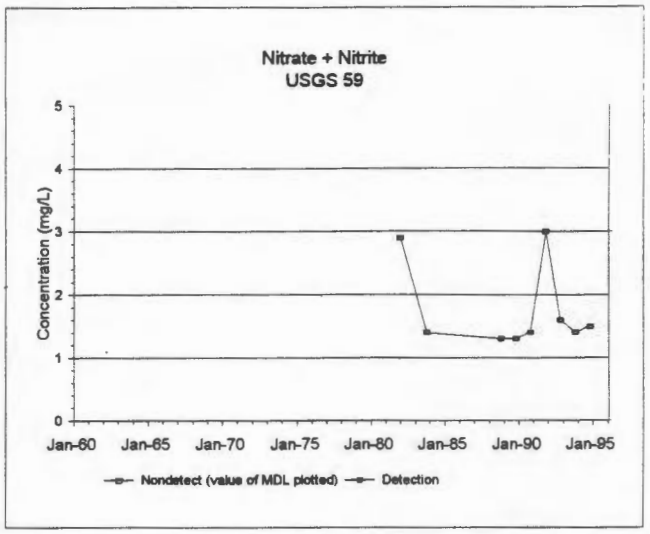
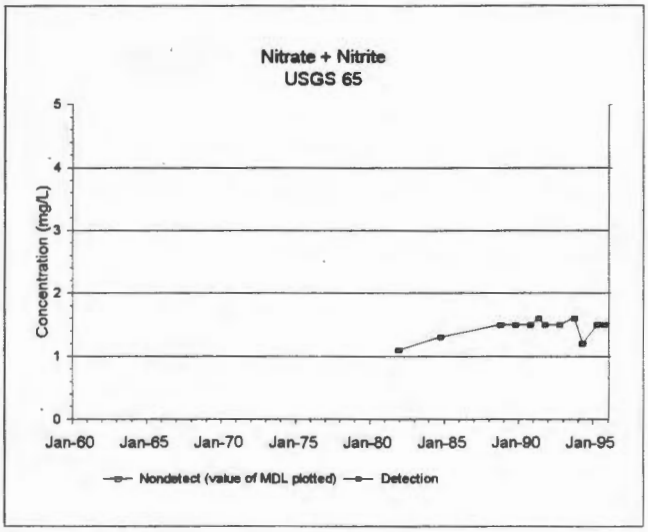
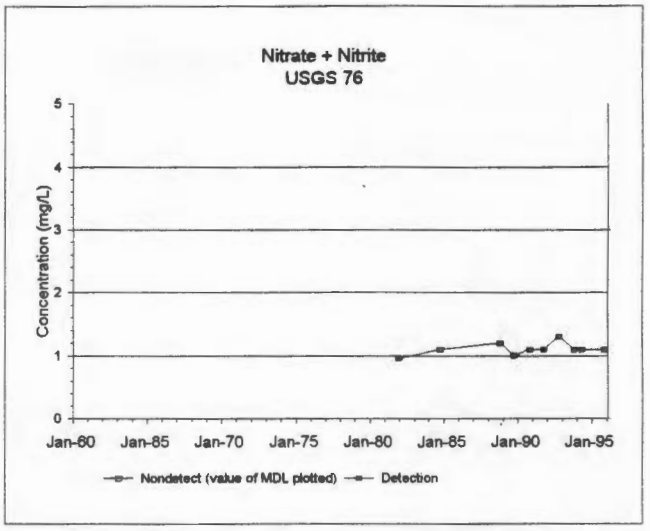


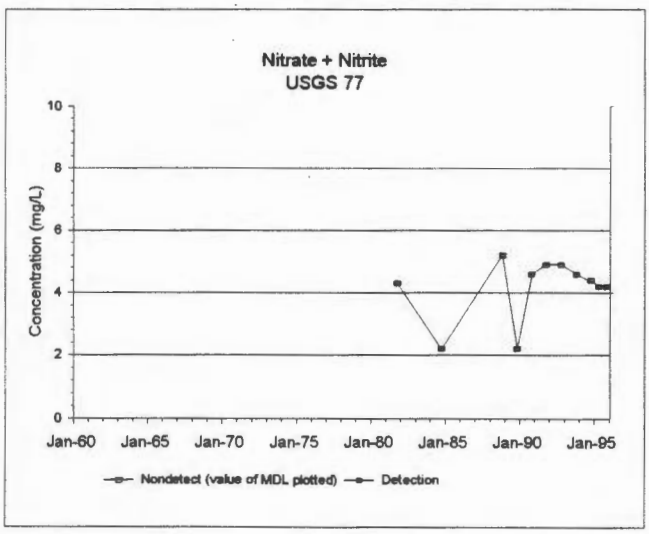
Figure J-3. Nitrate + Nitrite (as Nitrogen) Concentrations in Selected Wells in the TRA/ICPP/ CFA Area (continued).











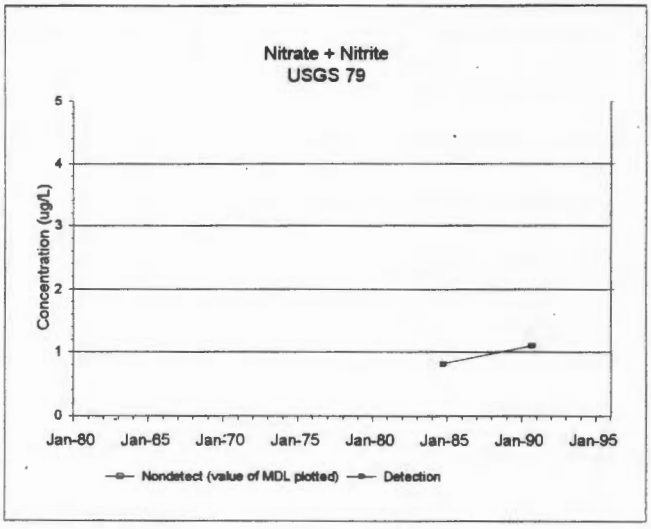


Figure J-3. Nitrate + Nitrite (as Nitrogen) Concentrations in Selected Wells in the TRA/ICPP/ CFA Area (continued).

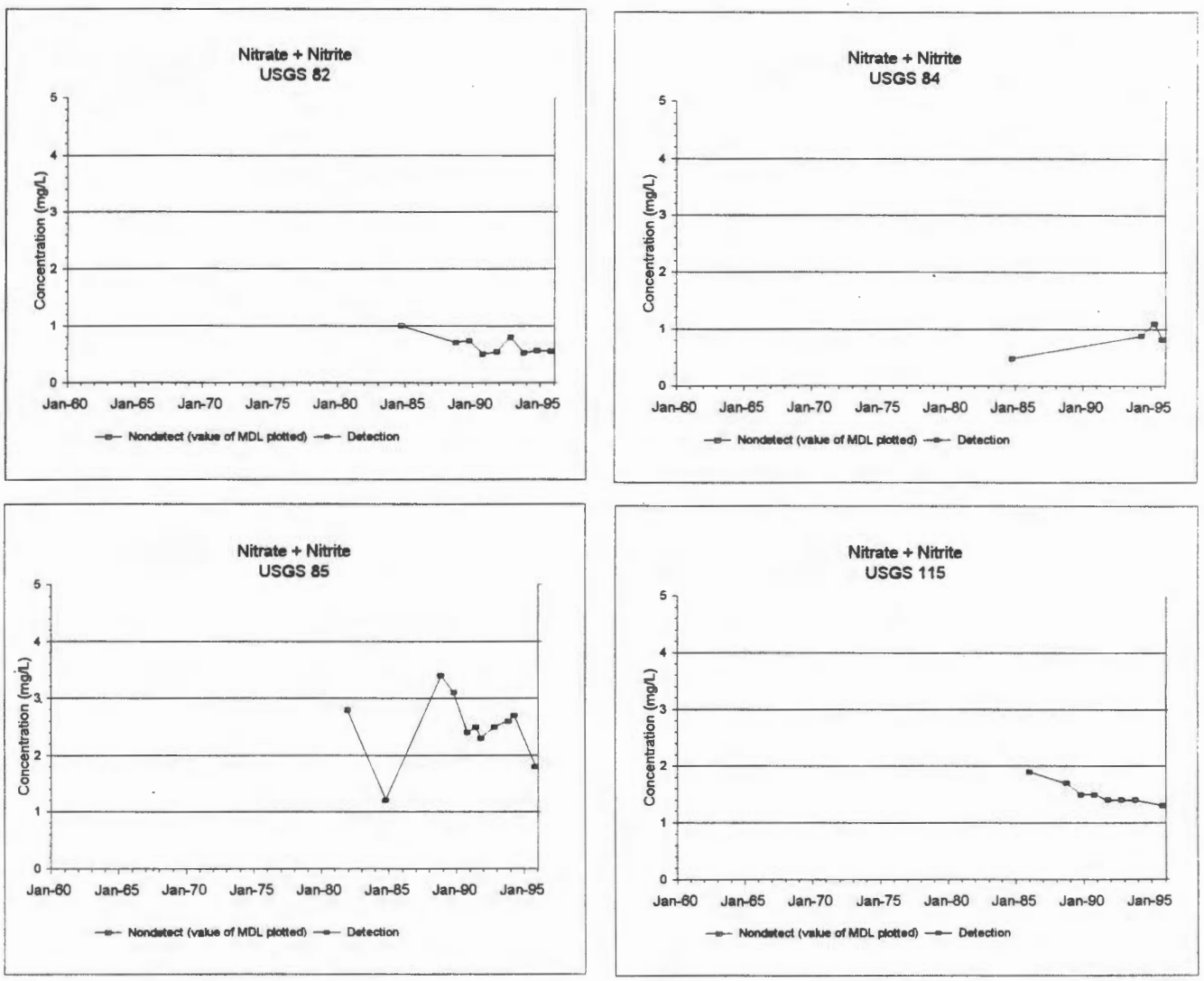
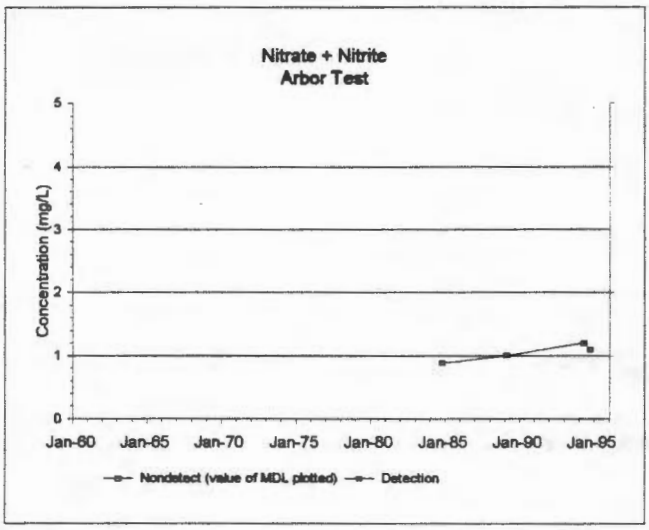
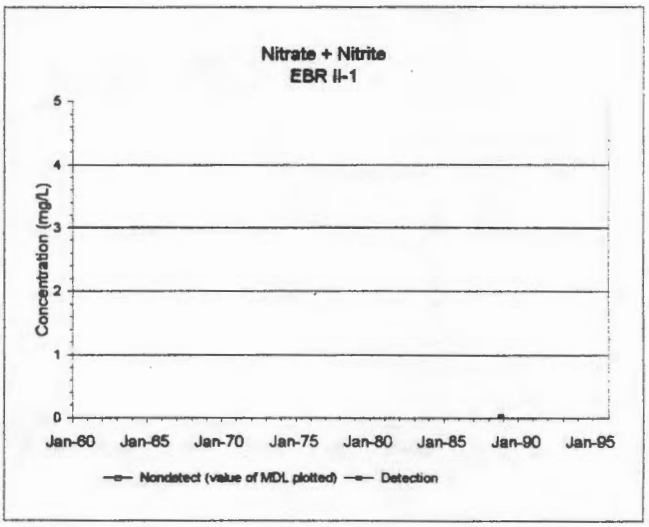


Figure J-3. Nitrate + Nitrite (as Nitrogen) Concentrations in Selected Wells in the TRA/ICPP/ CFA Area (continued).





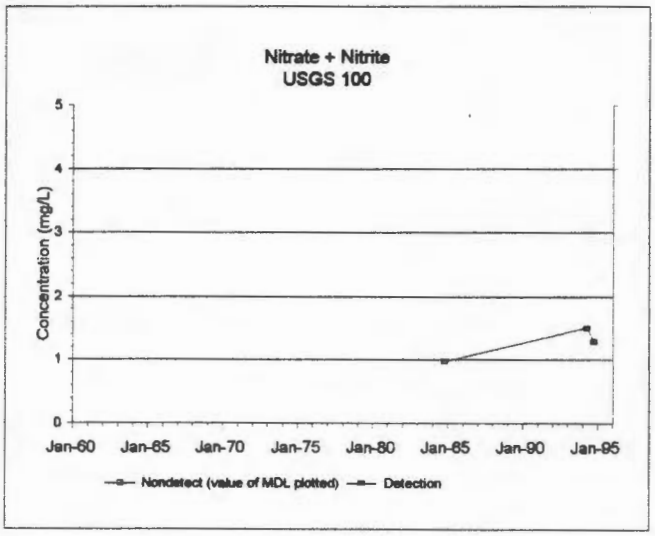


Figure J-4. Nitrate + Nitrite (as Nitrogen) Concentrations in Selected Wells in the ANL-West Area.

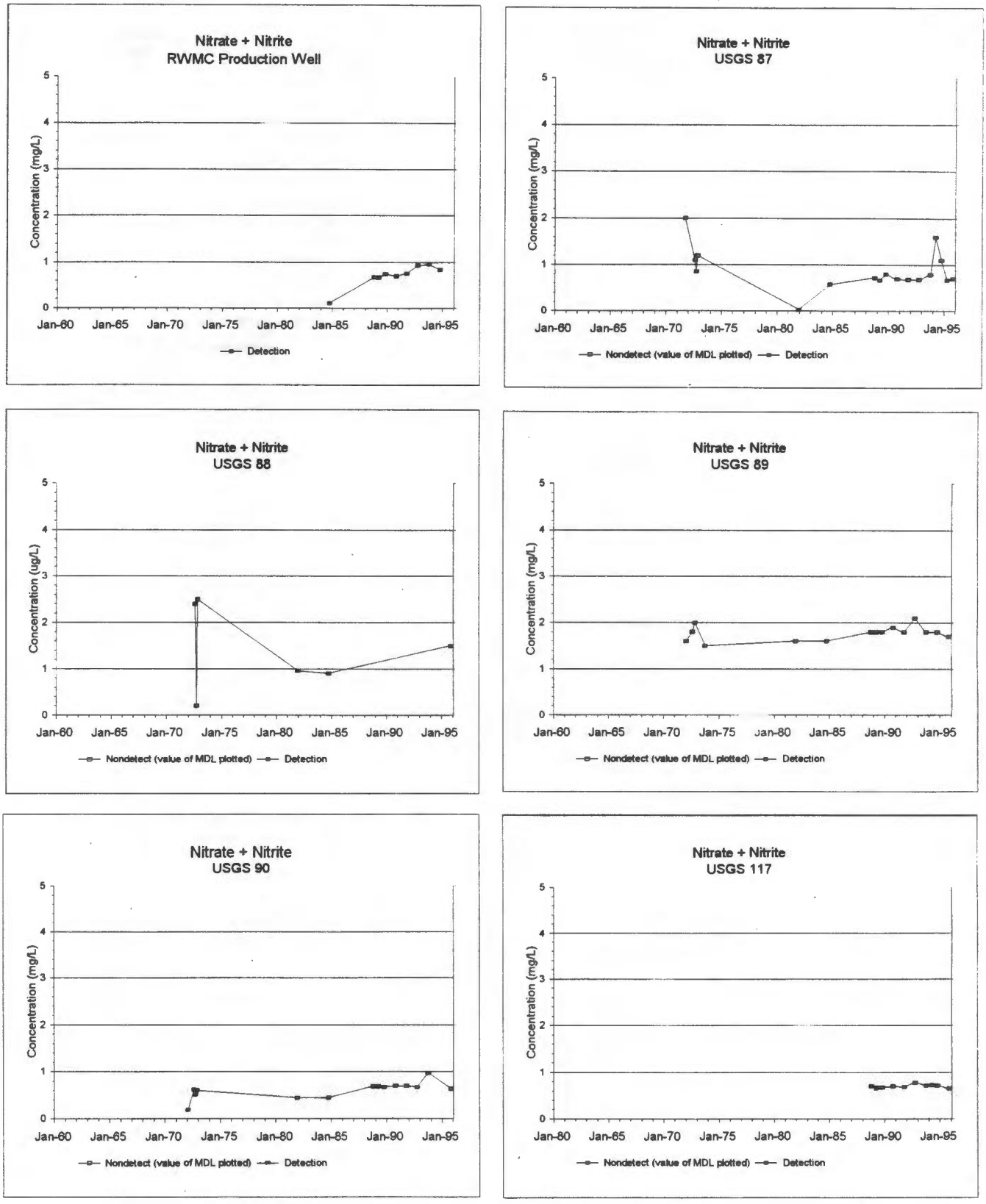
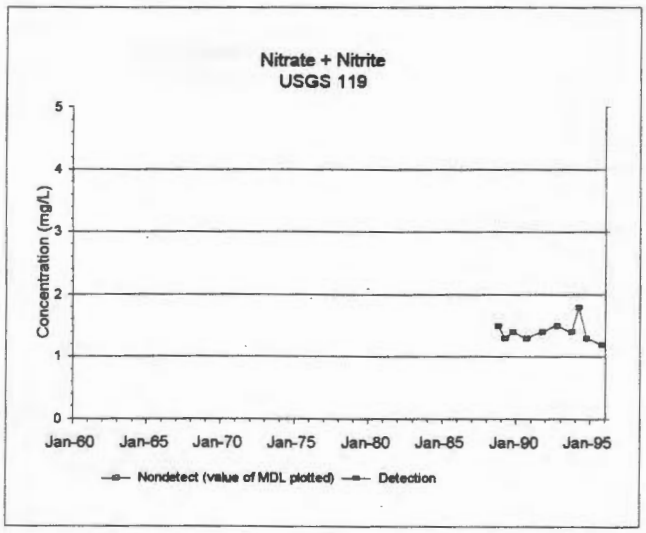


Figure J-5. Nitrate + Nitrite (as Nitrogen) Concentrations in Selected Wells in the RWMC Area.



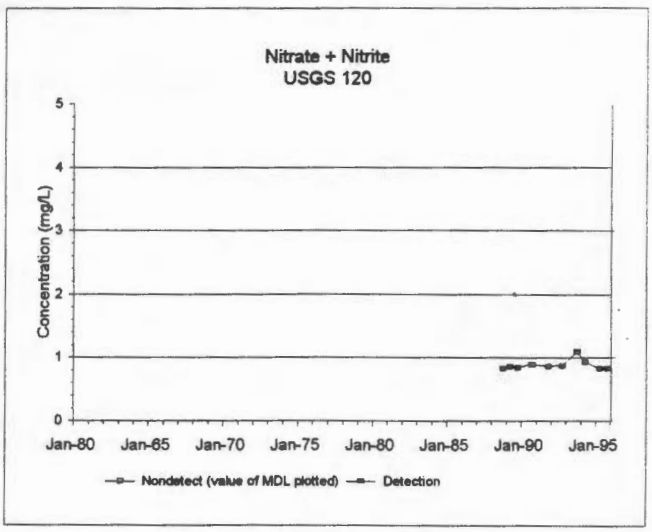


Figure J-5. Nitrate + Nitrite (as Nitrogen) Concentrations in Selected Wells in the RWMC Area (continued).

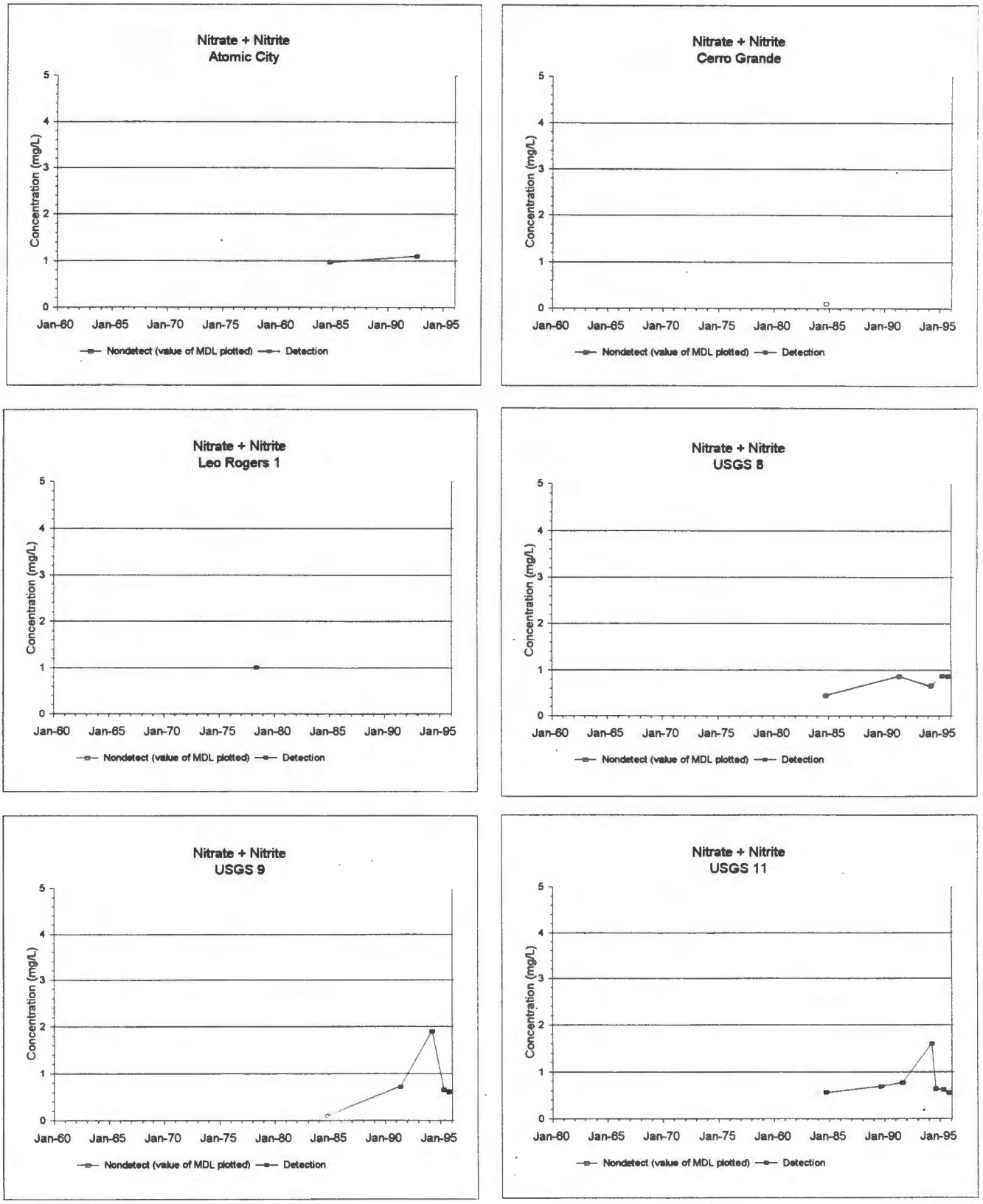


Figure J-6. Nitrate + Nitrite (as Nitrogen) Concentrations in Selected Wells near the INEEL Southern Boundary.

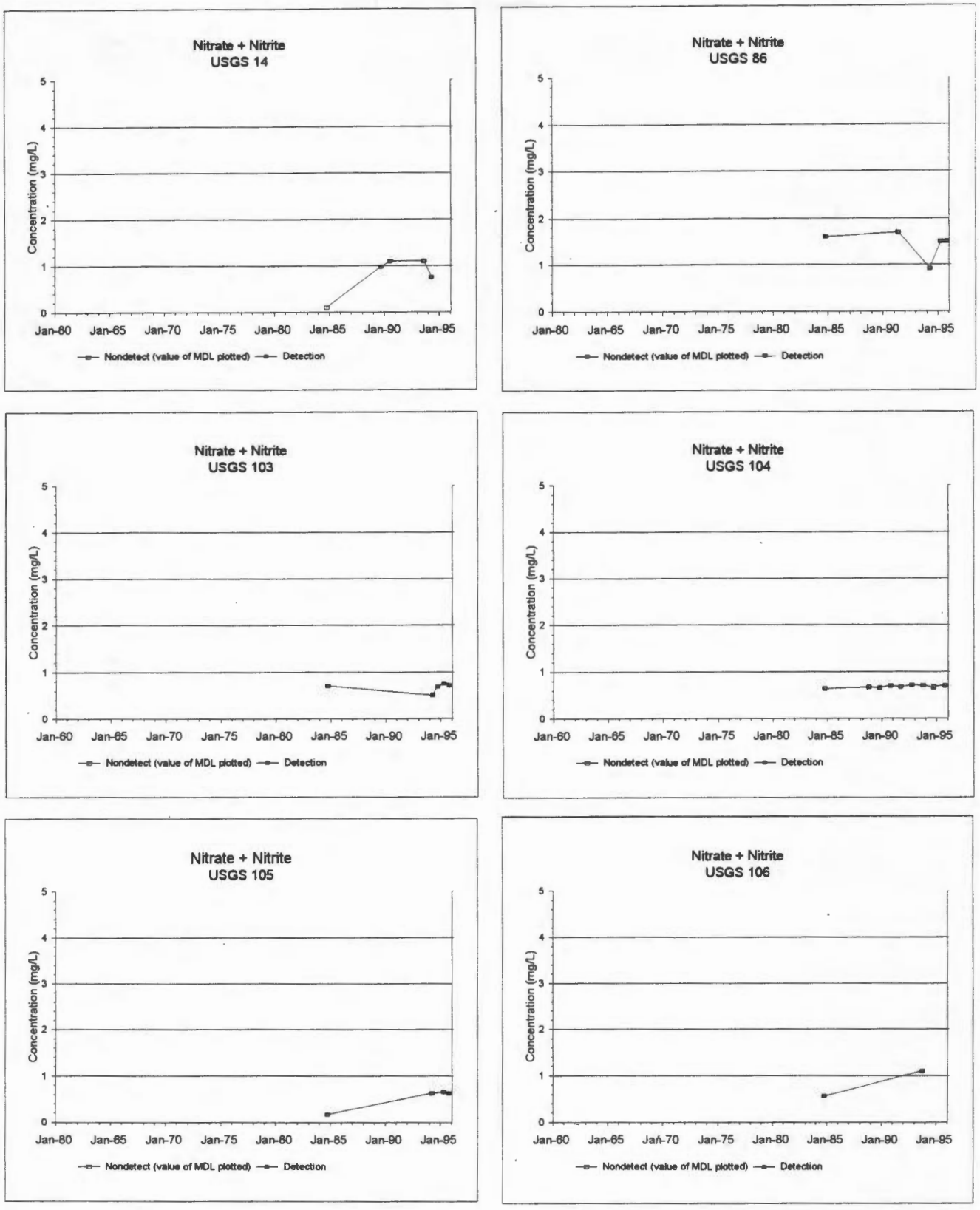
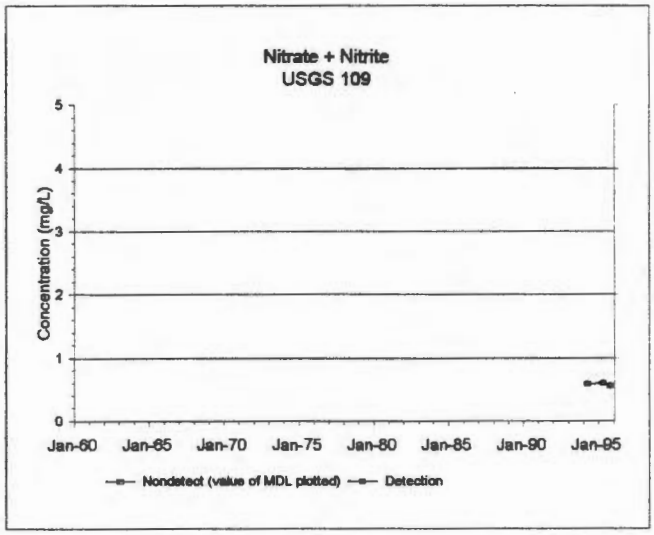


Figure J-6. Nitrate + Nitrite (as Nitrogen) Concentrations in Selected Wells near the INEEL Southern Boundary (continued)



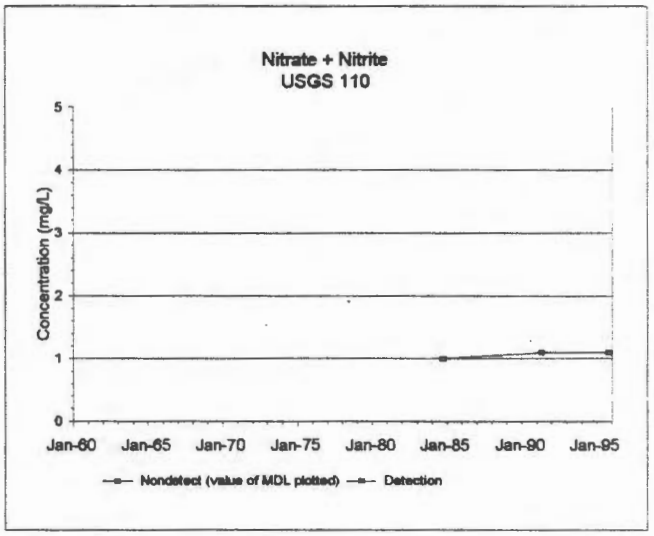


Figure J-6. Nitrate + Nitrite (as Nitrogen) Concentrations in Selected Wells near the INEEL Southern Boundary (continued).

ATTACHMENT K

Graphs of Sulfate Concentration Versus Time

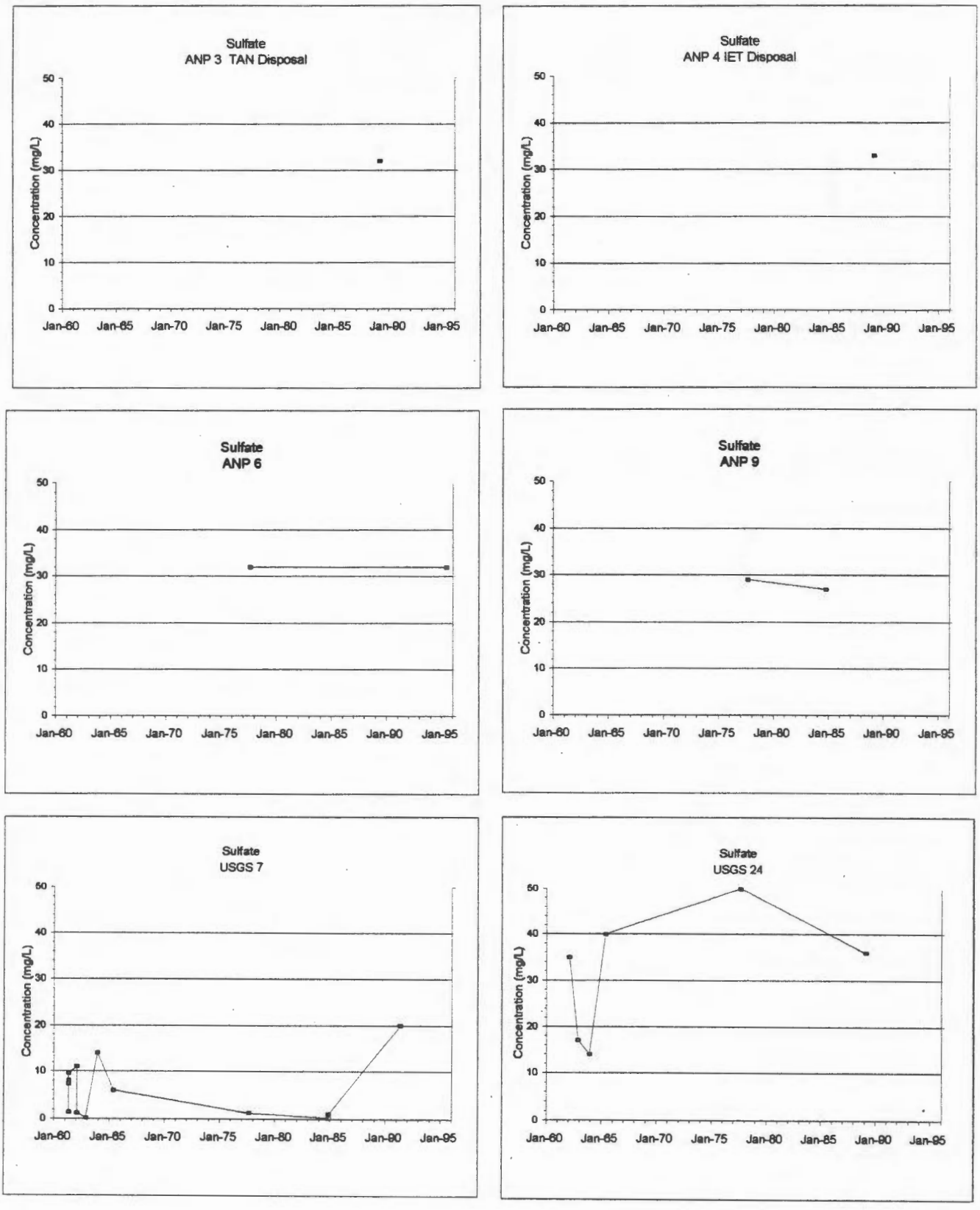


Figure K-1. Sulfate Concentrations in Selected Wells in the TAN Area.

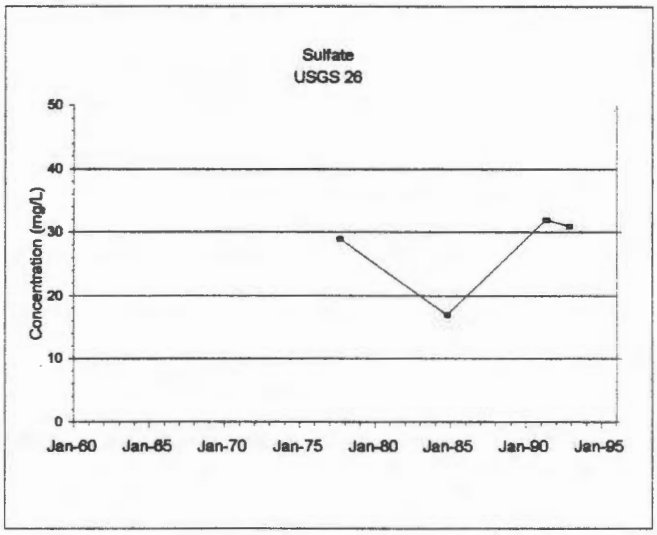


Figure K-1. Sulfate Concentrations in Selected Wells in the TAN Area (continued).

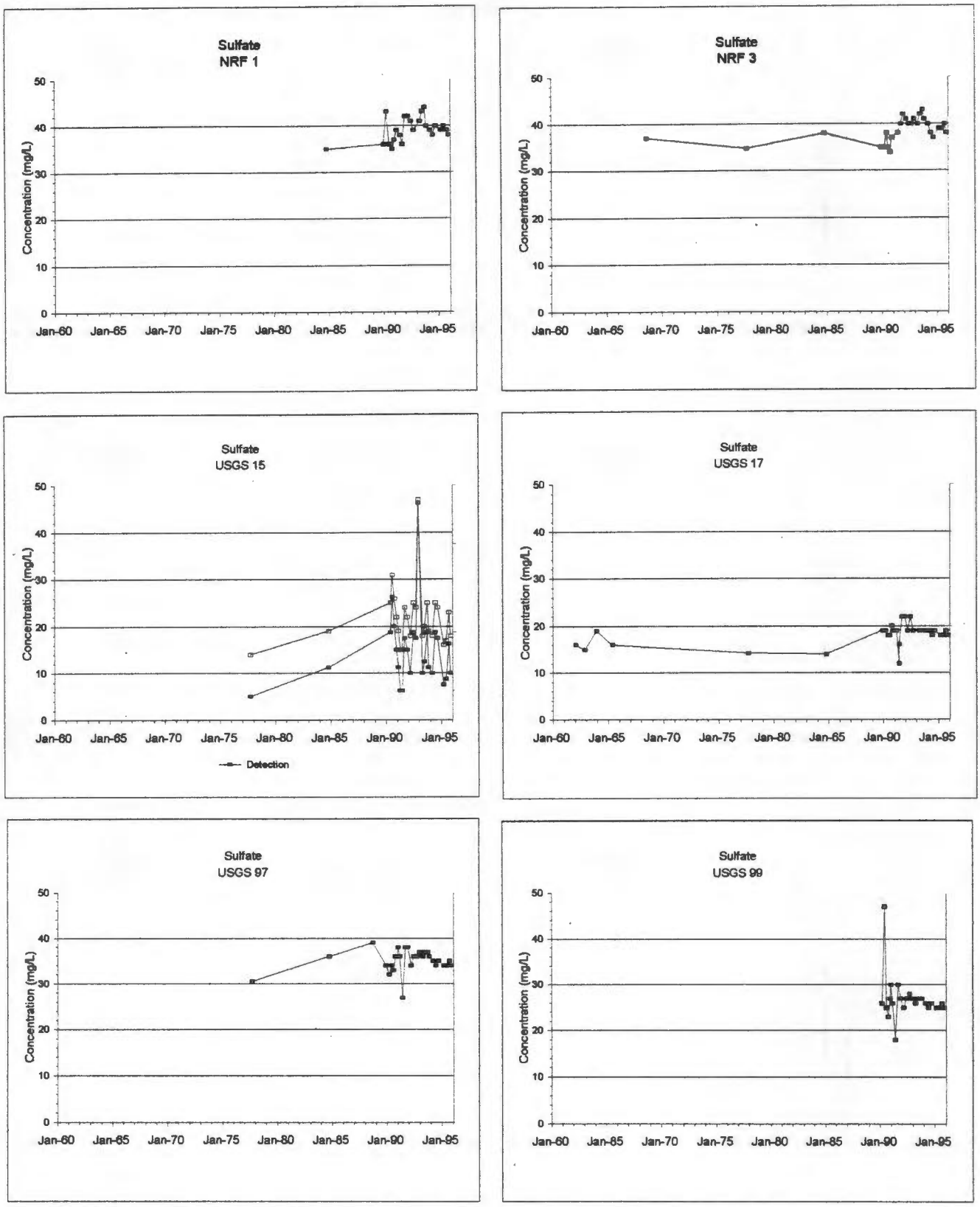


Figure K-2. Sulfate Concentrations in Selected Wells in the NRF Area.

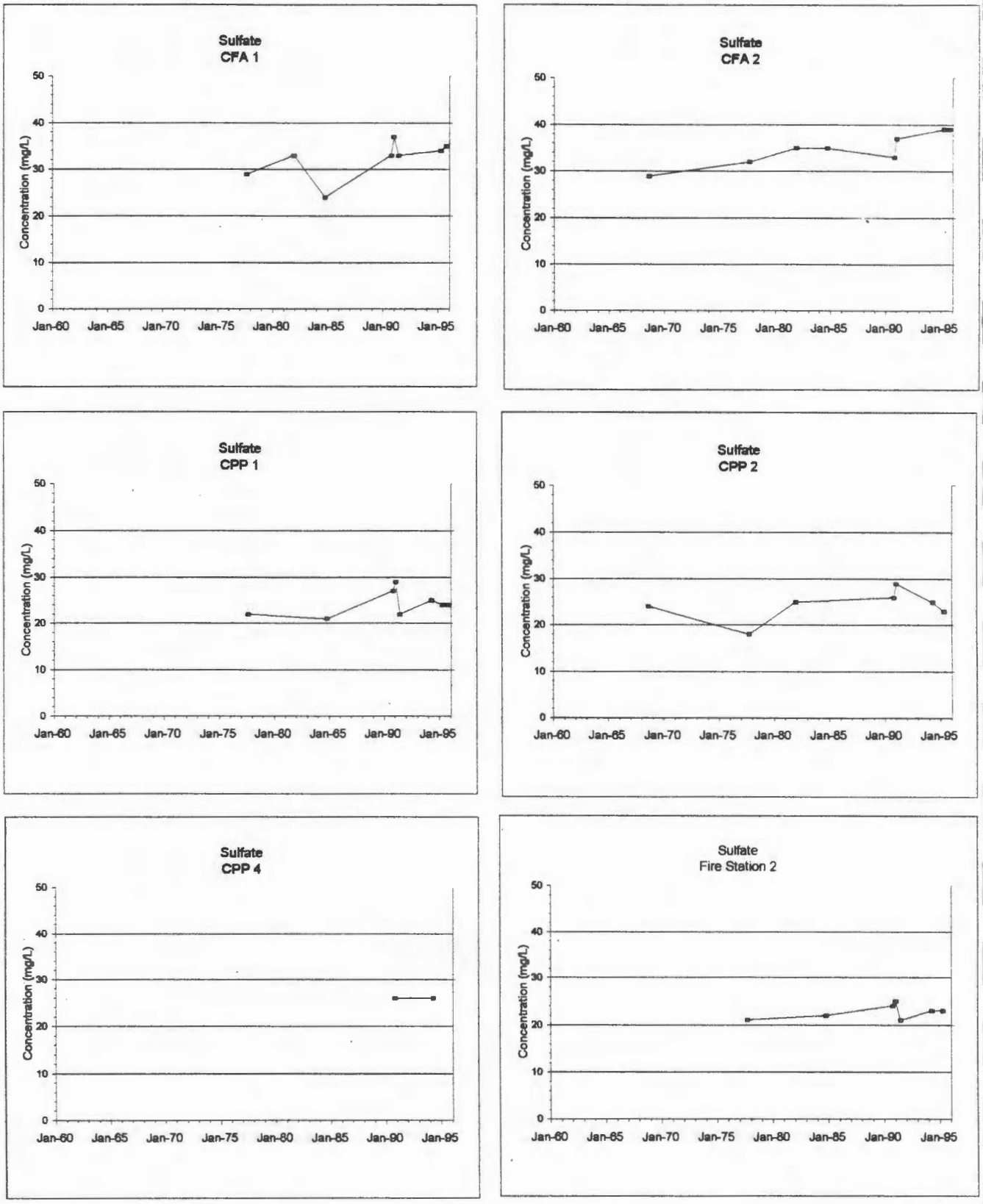


Figure K-3. Sulfate Concentrations in Selected Wells in the TRA/ICPP/CFA Area.

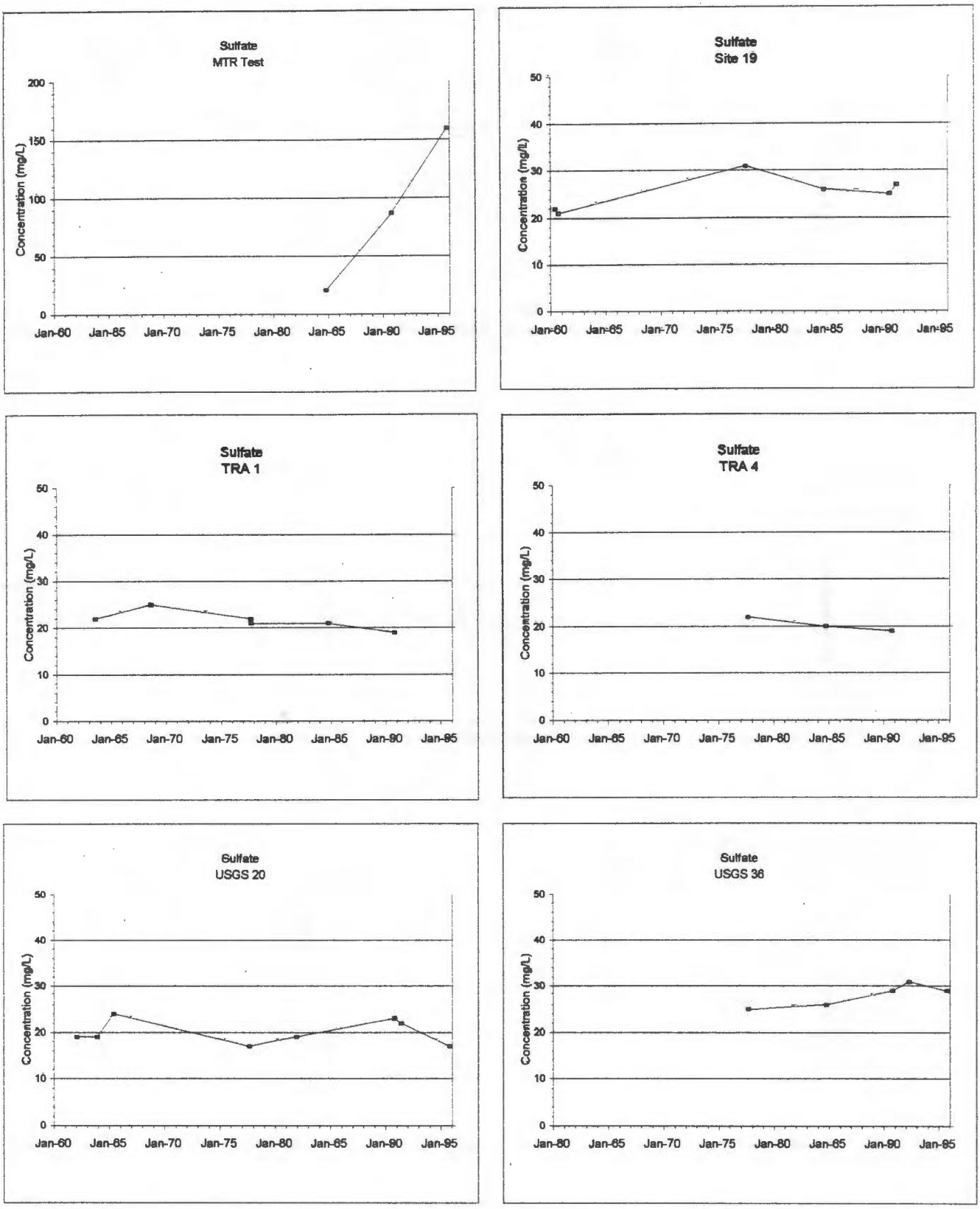


Figure K-3. Sulfate Concentrations in Selected Wells in the TRA/ICPP/CFA Area (continued).

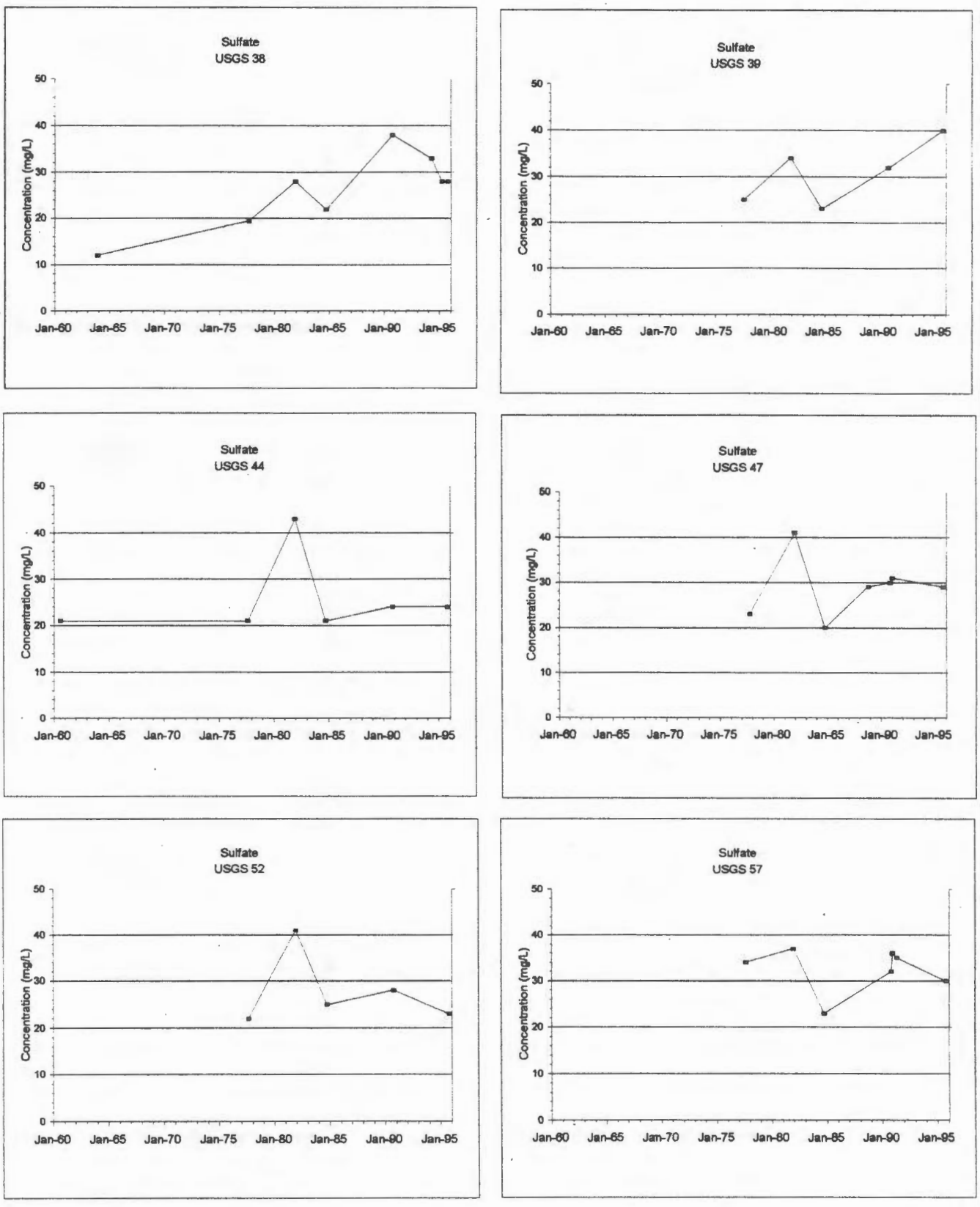


Figure K-3. Sulfate Concentrations in Selected Wells in the TRA/ICPP/CFA Area (continued).

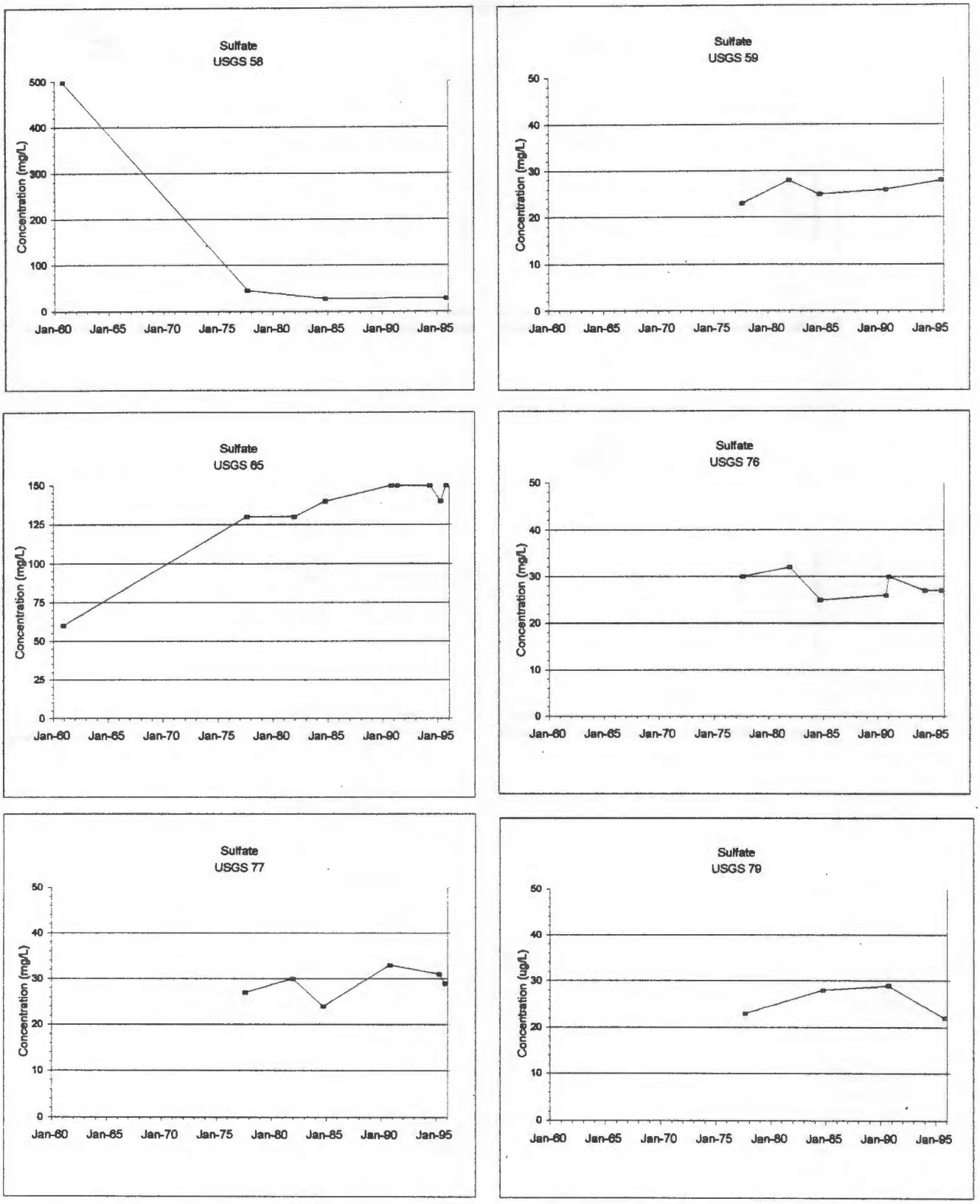


Figure K-3. Sulfate Concentrations in Selected Wells in the TRA/ICPP/CFA Area (continued).

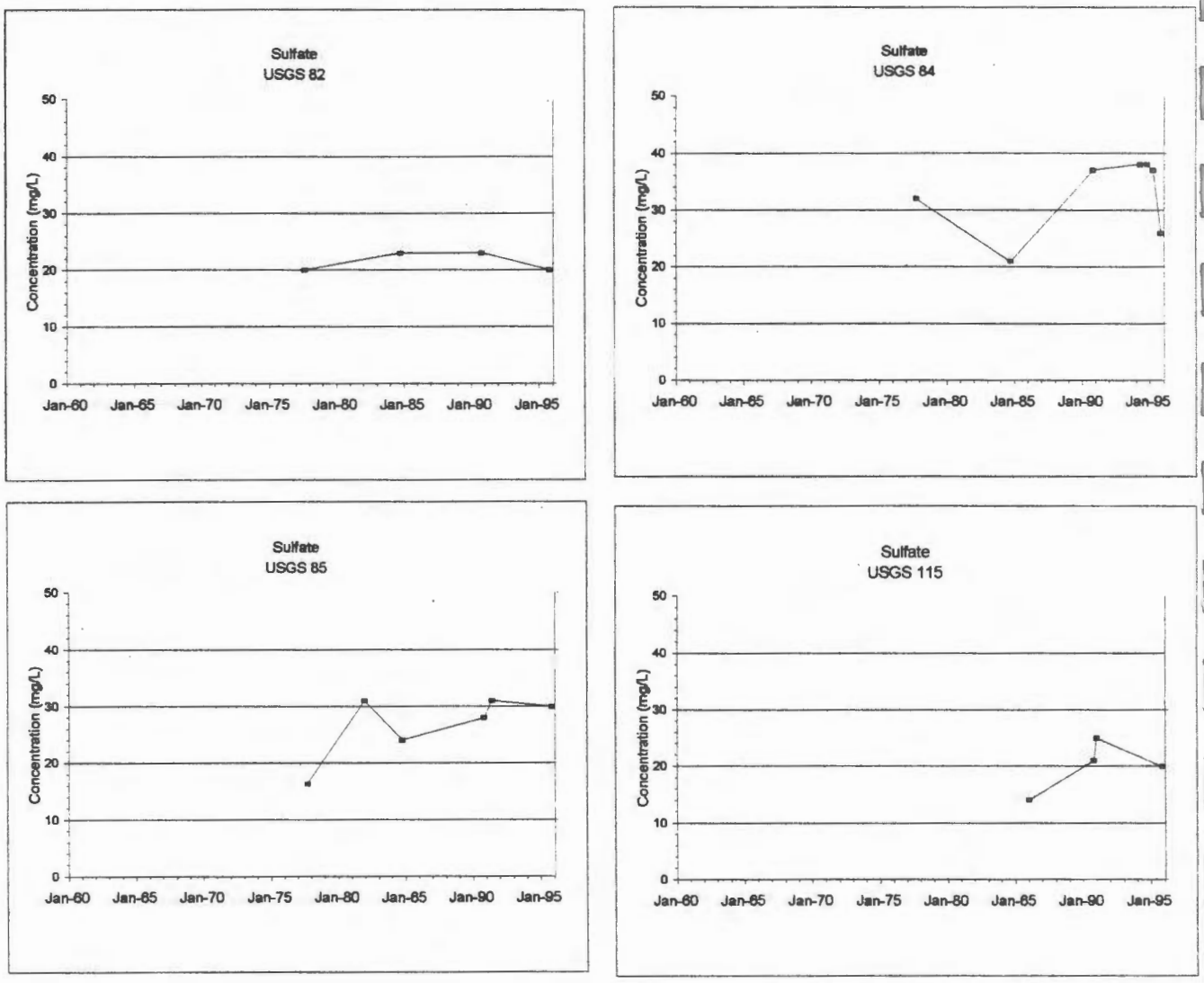
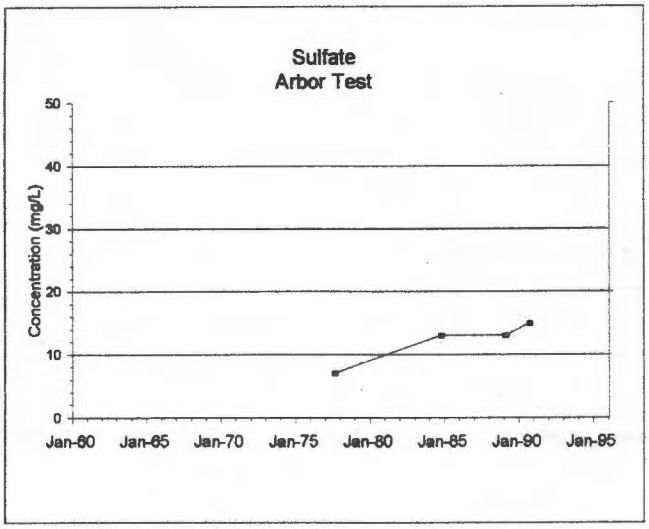
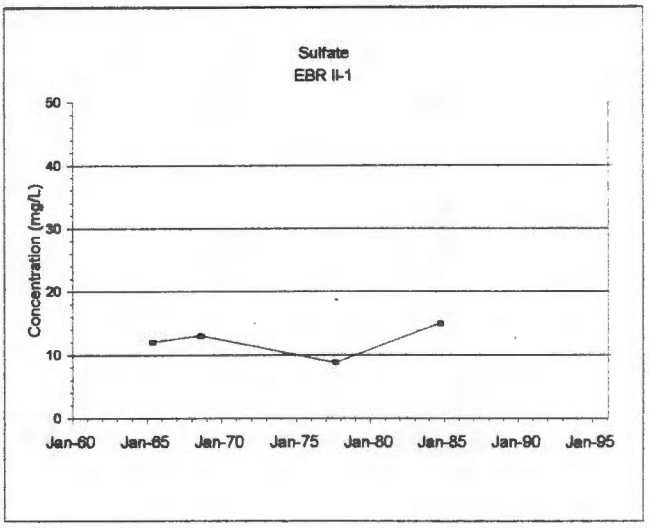


Figure K-3. Sulfate Concentrations in Selected Wells in the TRA/ICPP/CFA Area (continued).





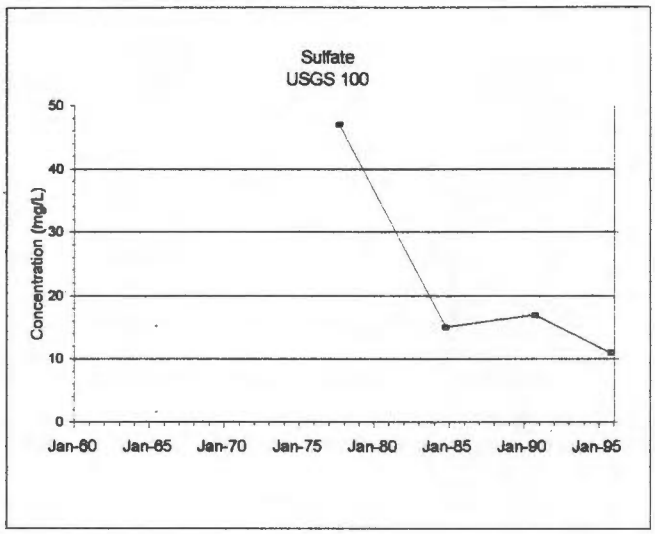


Figure K-4. Sulfate Concentrations in Selected Wells in the ANL-West Area.

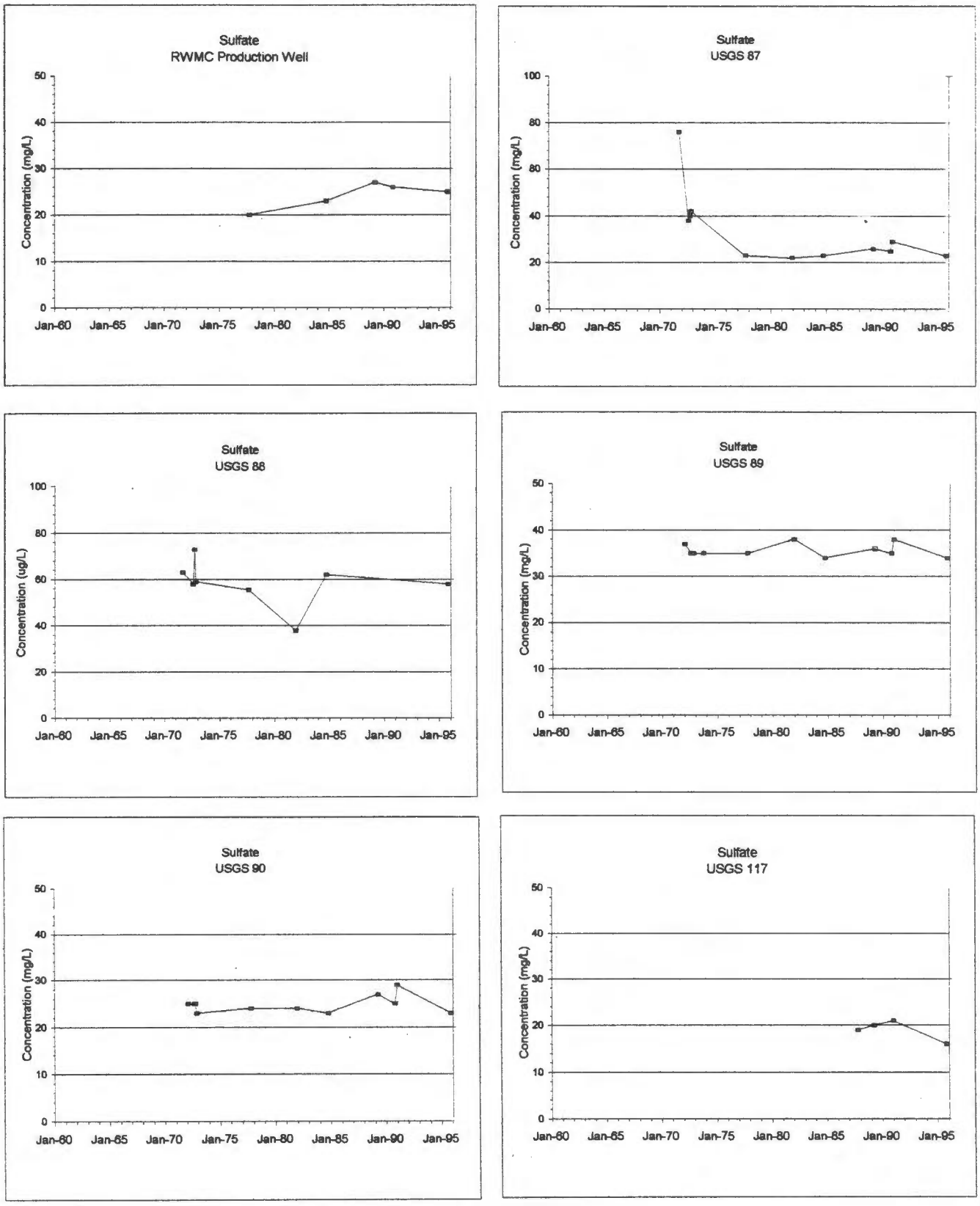
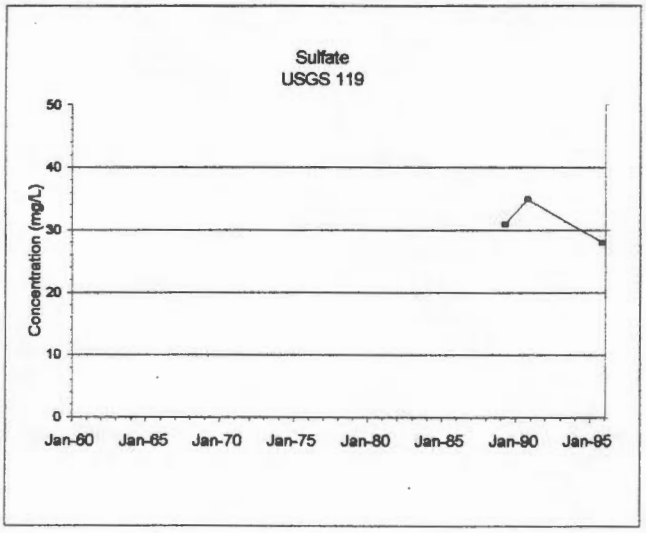


Figure K-5. Sulfate Concentrations in Selected Wells in the RWMC Area.



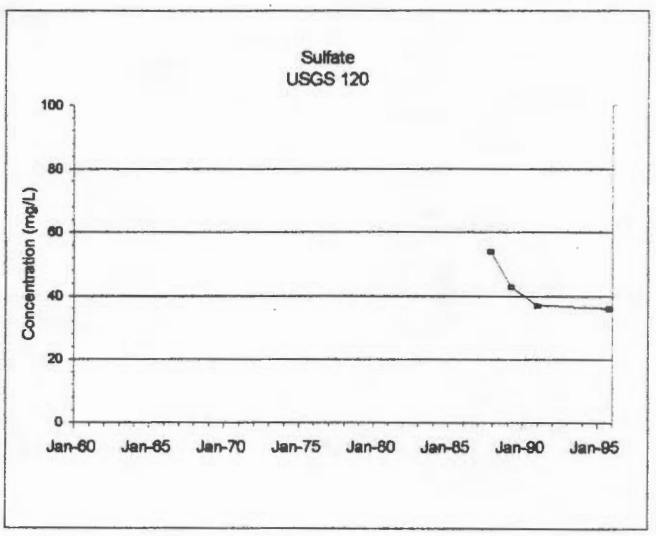


Figure K-5. Sulfate Concentrations in Selected Wells in the RWMC Area (continued).

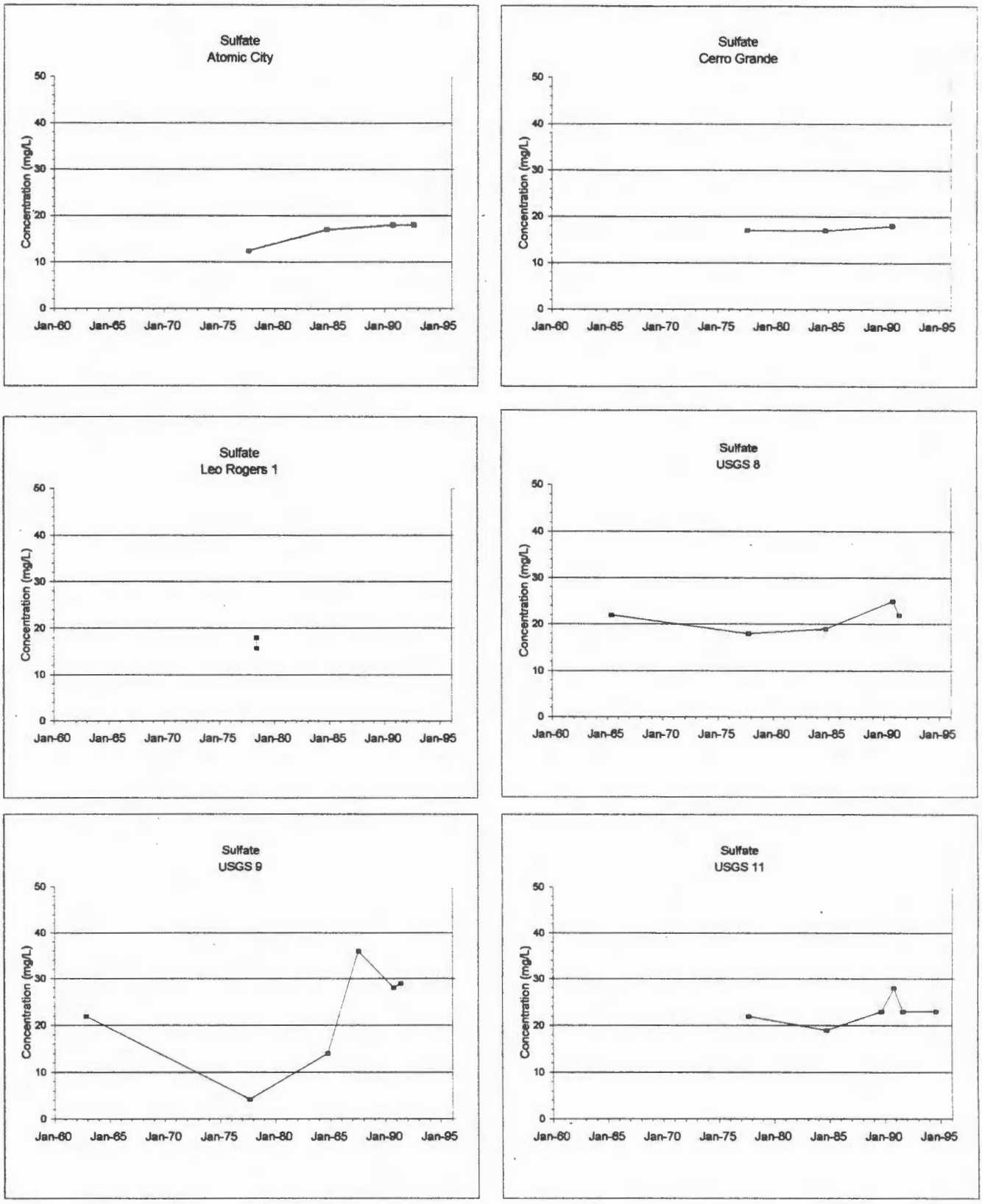


Figure K-6. Sulfate Concentrations in Selected Wells near the INEEL Southern Boundary.

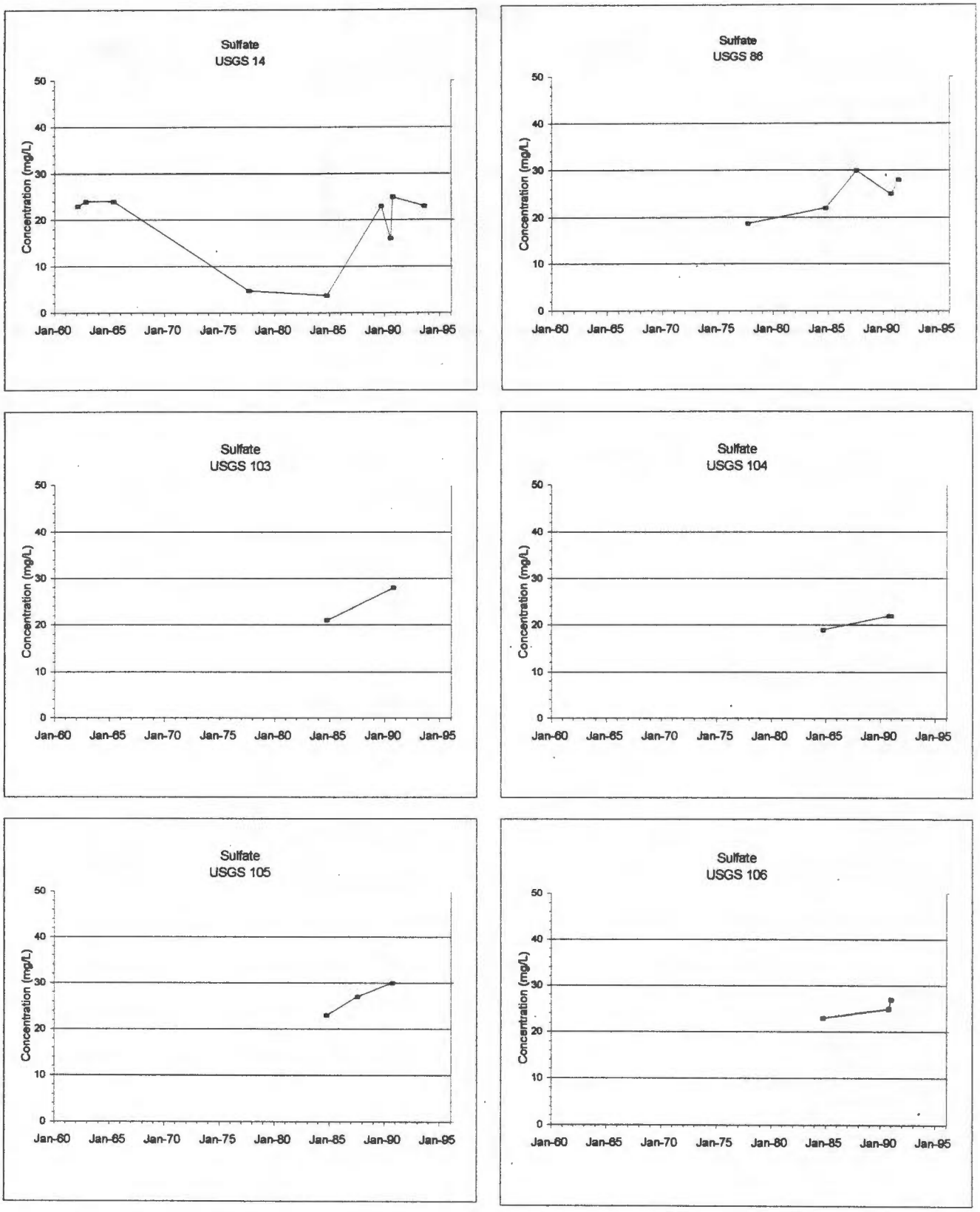
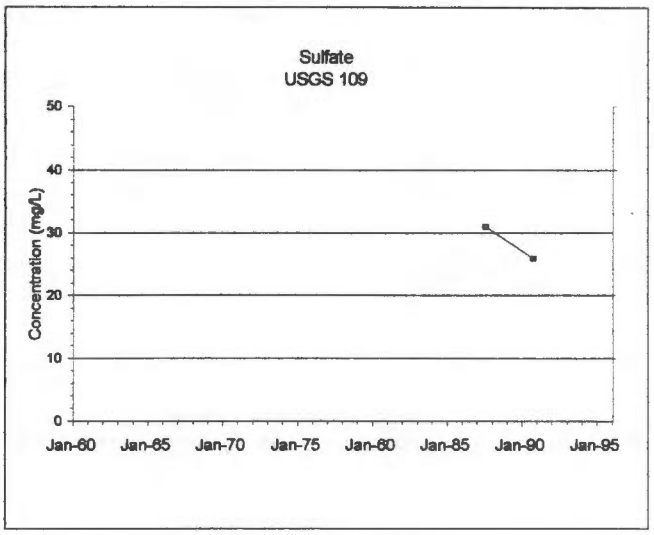


Figure K-6. Sulfate Concentrations in Selected Wells near the INEEL Southern Boundary (continued).



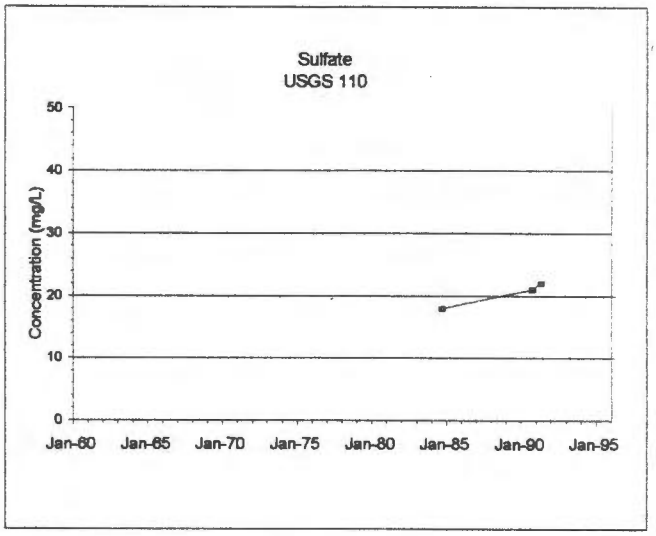


Figure K-6. Sulfate Concentrations in Selected Wells near the INEEL Southern Boundary (continued).

ATTACHMENT L

Graphs of Specific Conductance Versus Time

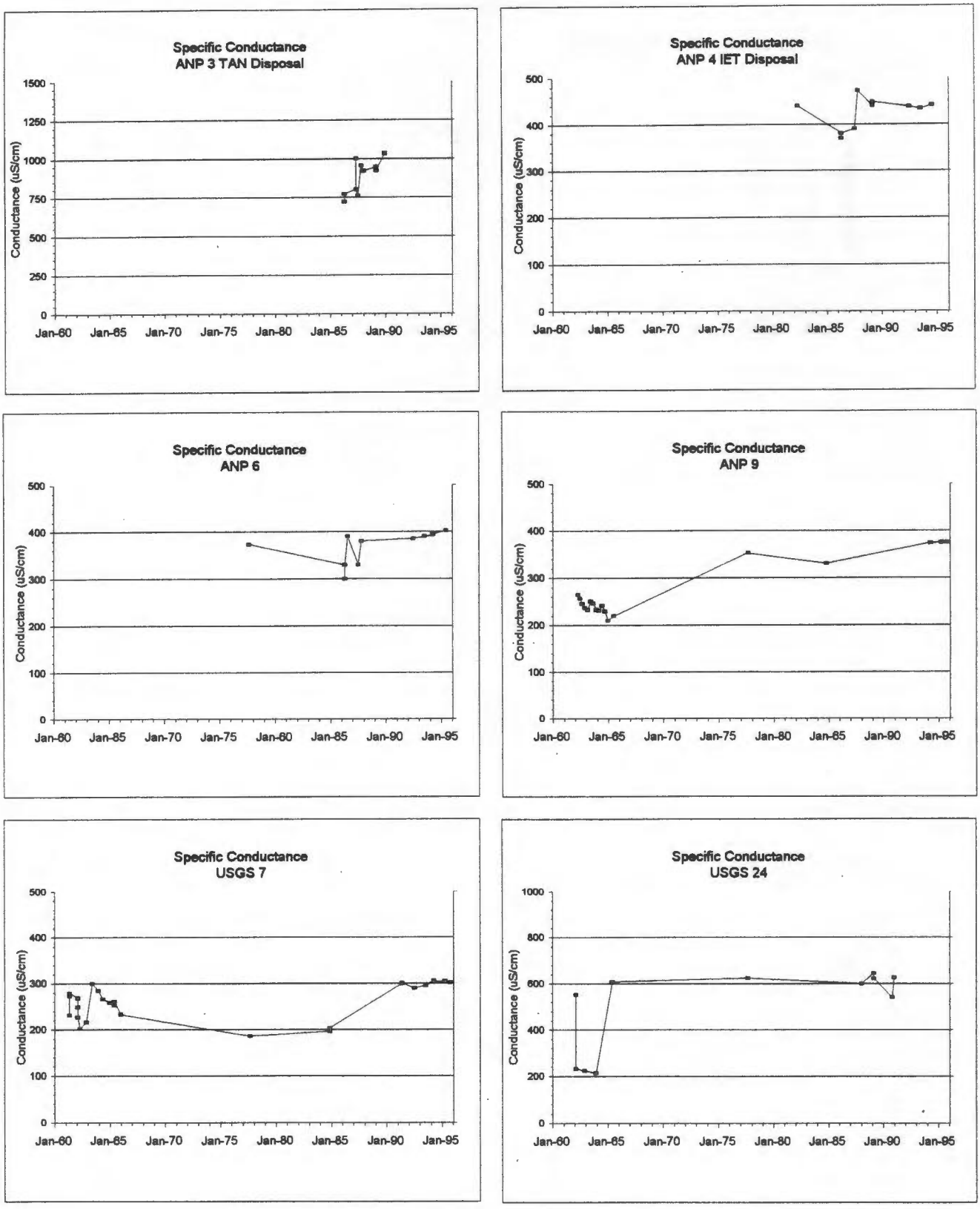


Figure L-1. Specific Conductance in Selected Wells in the TAN Area.

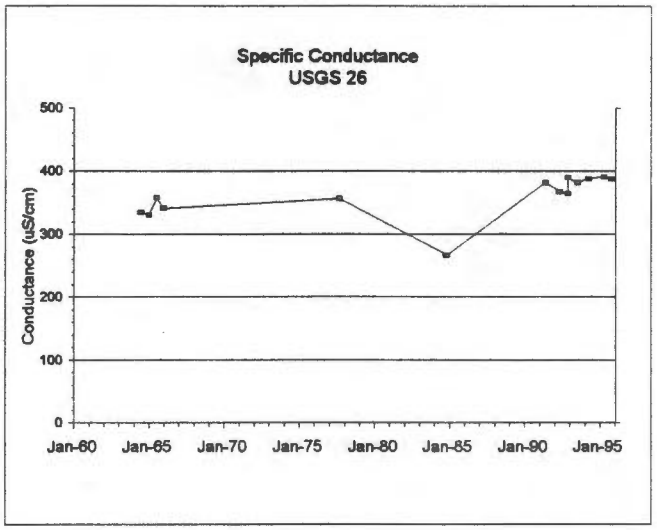


Figure L-1. Specific Conductance in Selected Wells in the TAN Area (continued).

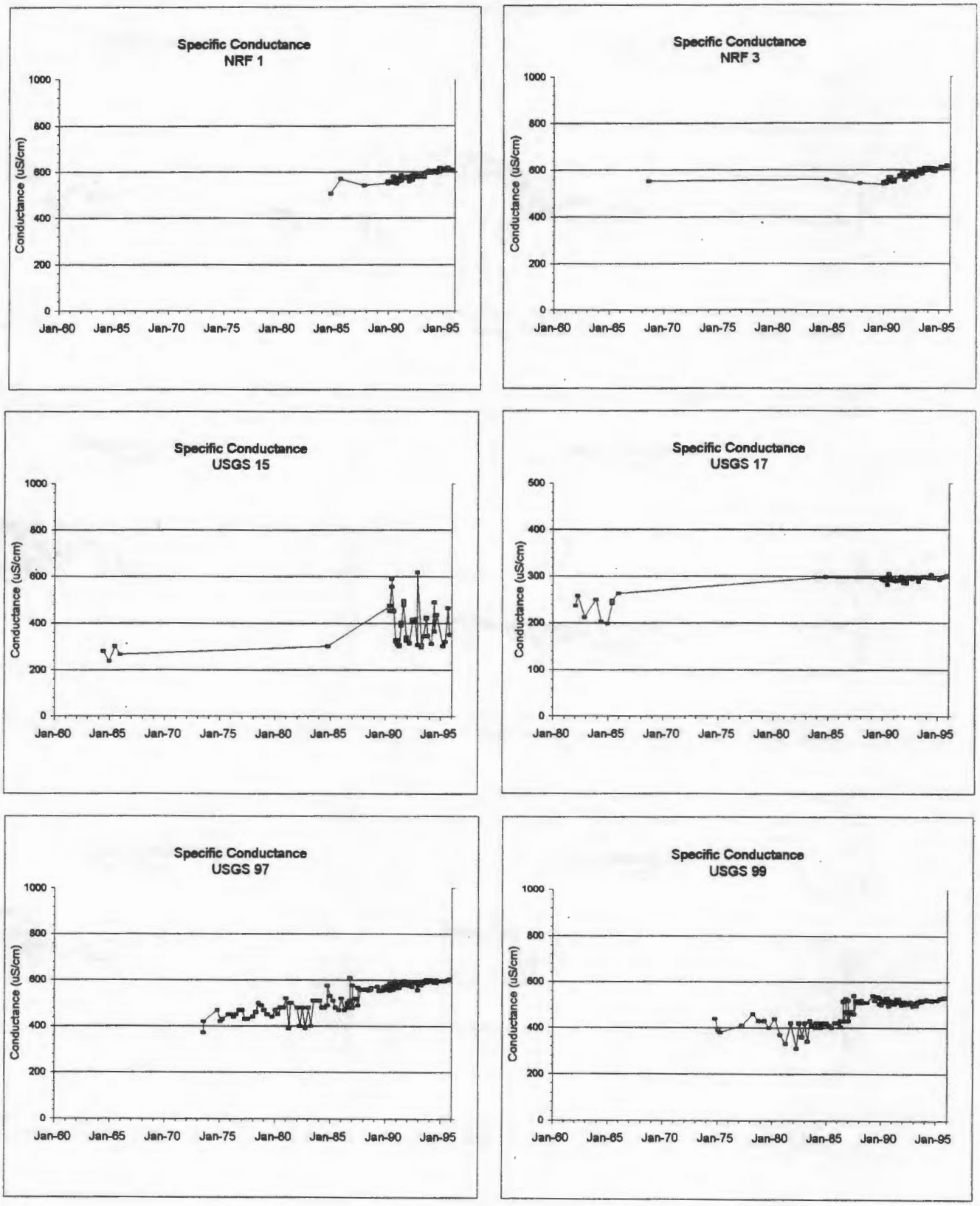


Figure L-2. Specific Conductance in Selected Wells in the NRF Area.

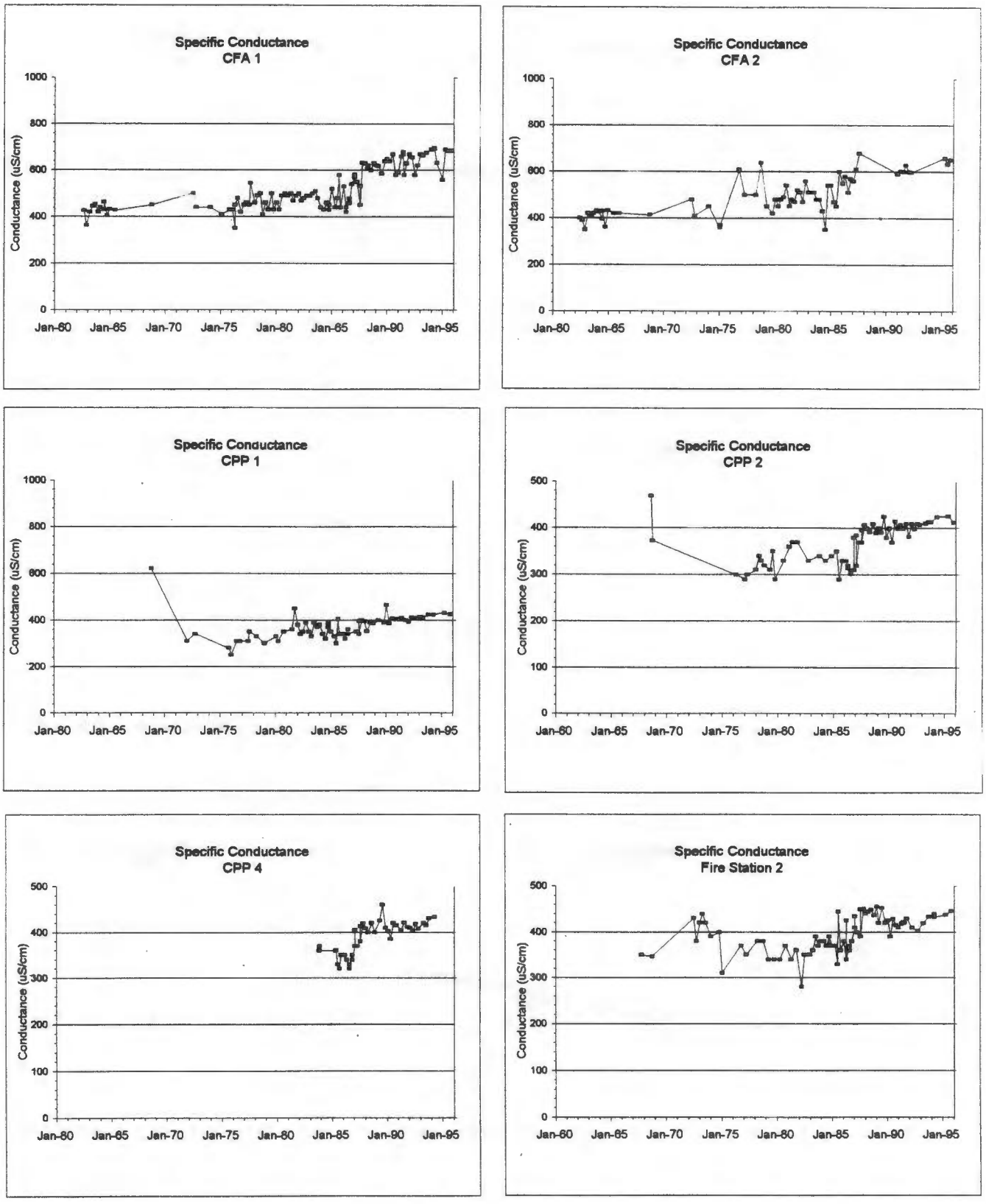


Figure L-3. Specific Conductance in Selected Wells in the TRA/ICPP/CFA Area.

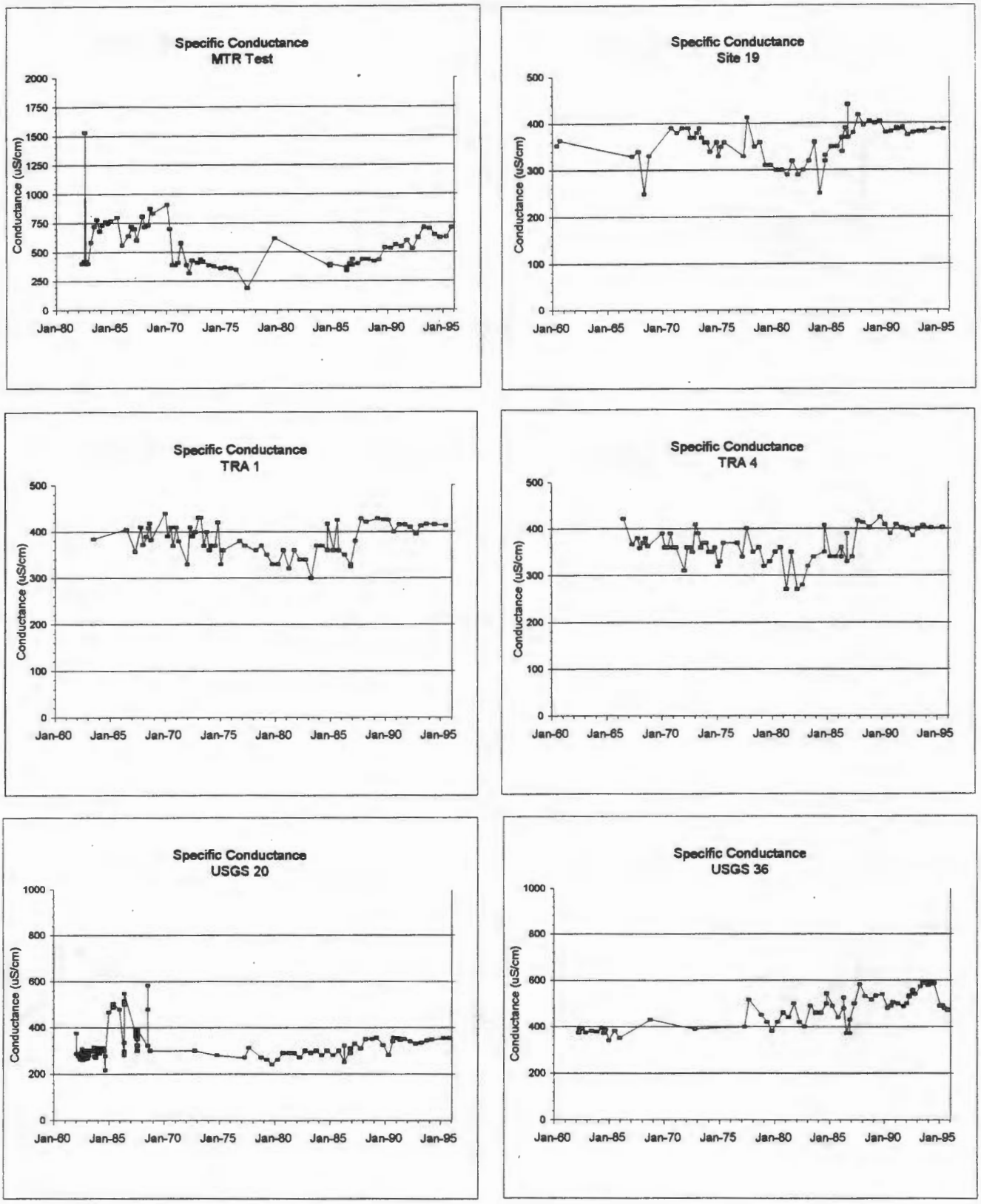


Figure L-3. Specific Conductance in Selected Wells in the TRA/ICPP/CFA Area (continued).

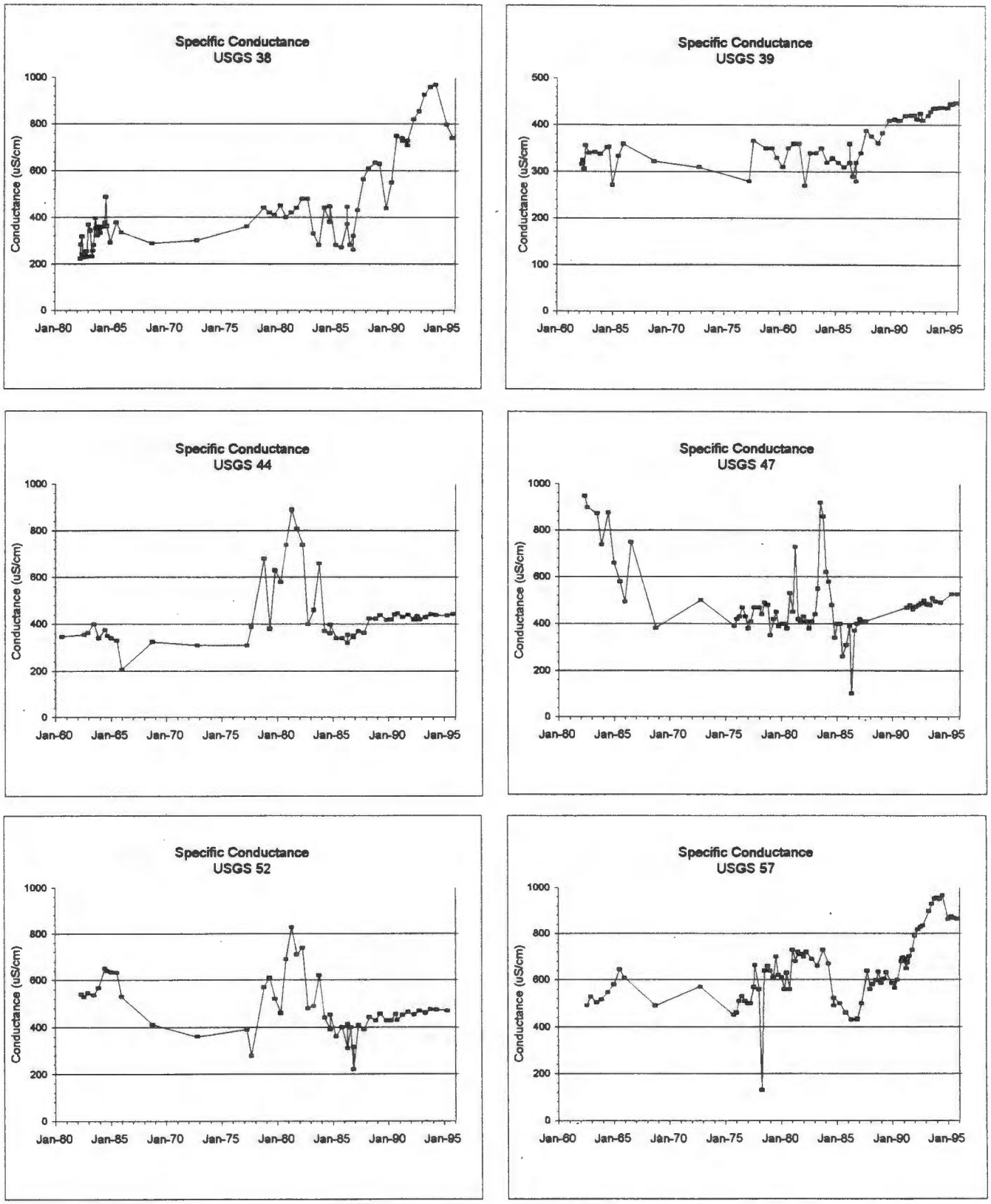


Figure L-3. Specific Conductance in Selected Wells in the TRA/ICPP/CFA Area (continued).

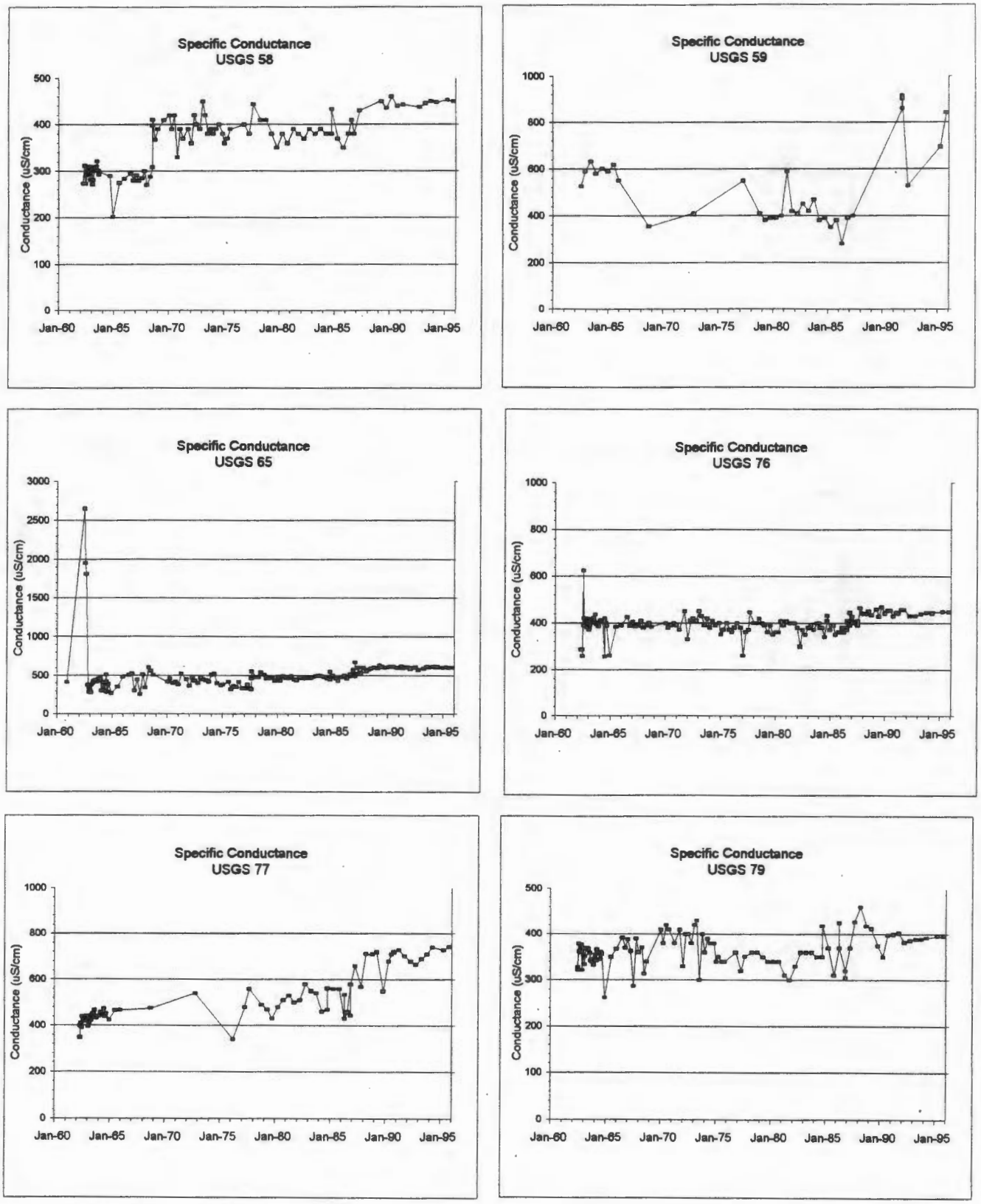
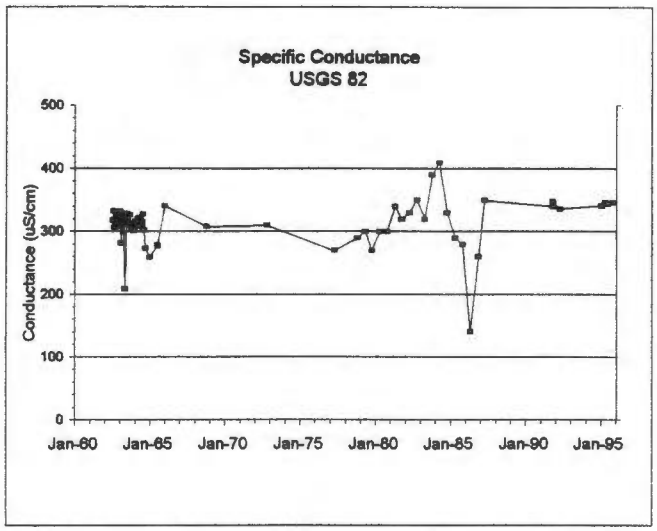
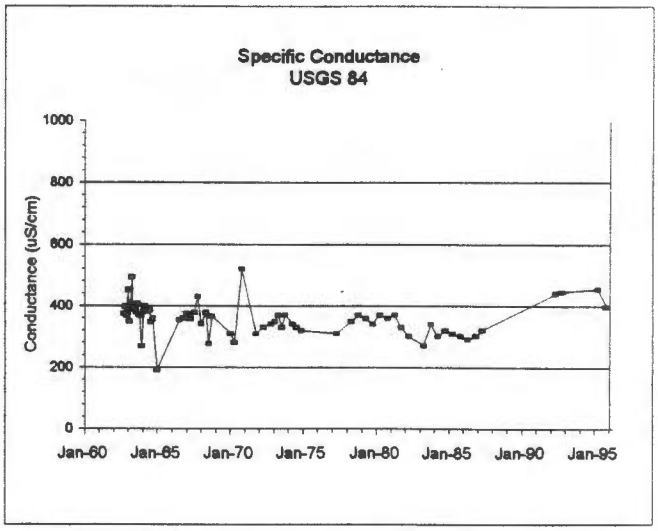
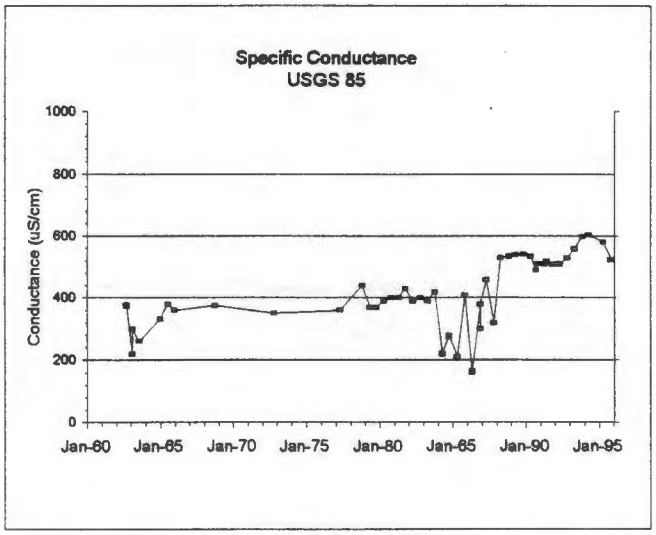


Figure L-3. Specific Conductance in Selected Wells in the TRA/ICPP/CFA Area (continued).







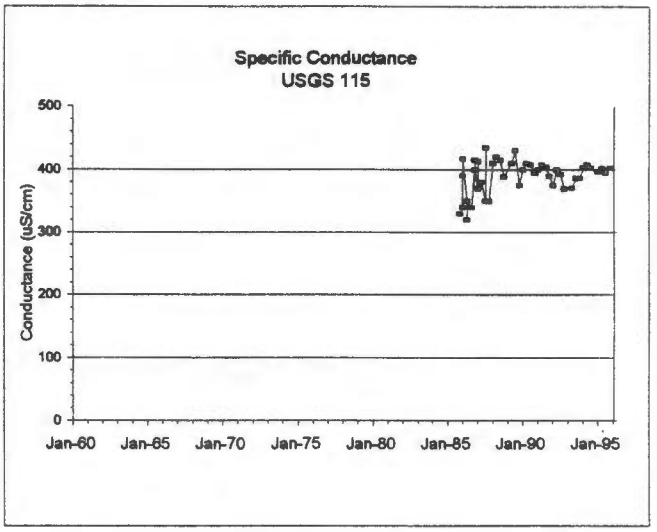
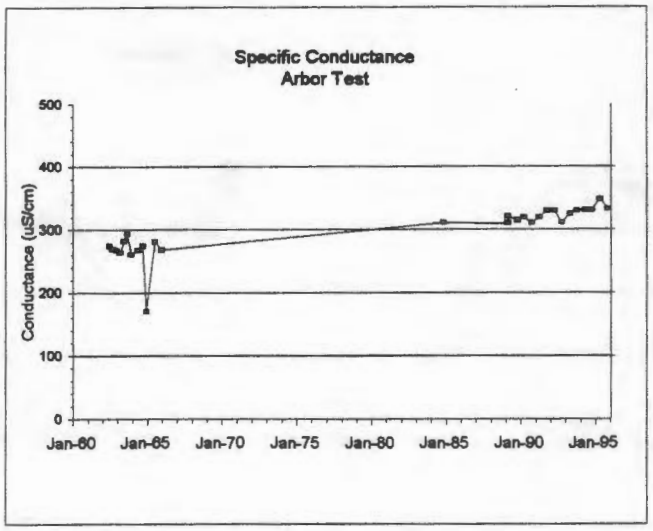
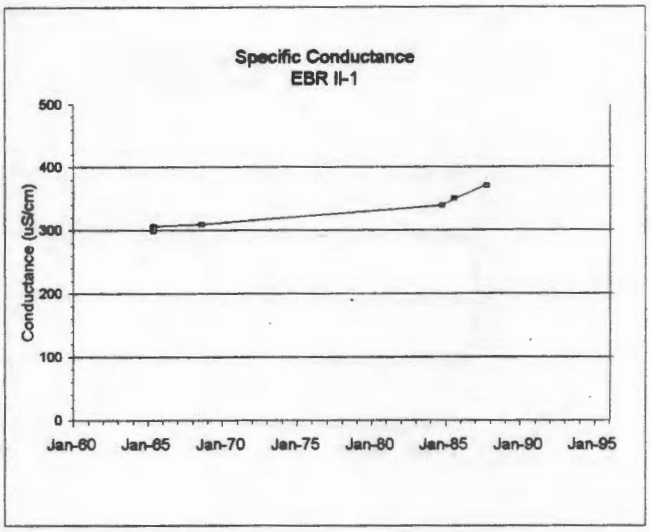


Figure L-3. Specific Conductance in Selected Wells in the TRA/ICPP/CFA Area (continued).





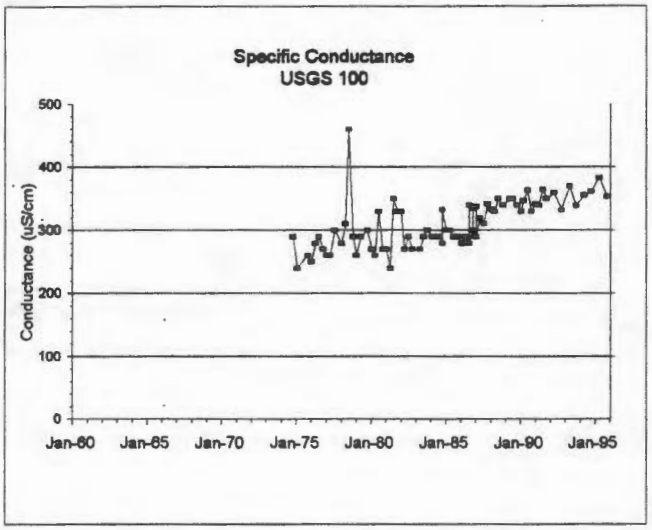


Figure L-4. Specific Conductance in Selected Wells in the ANL-West Area.

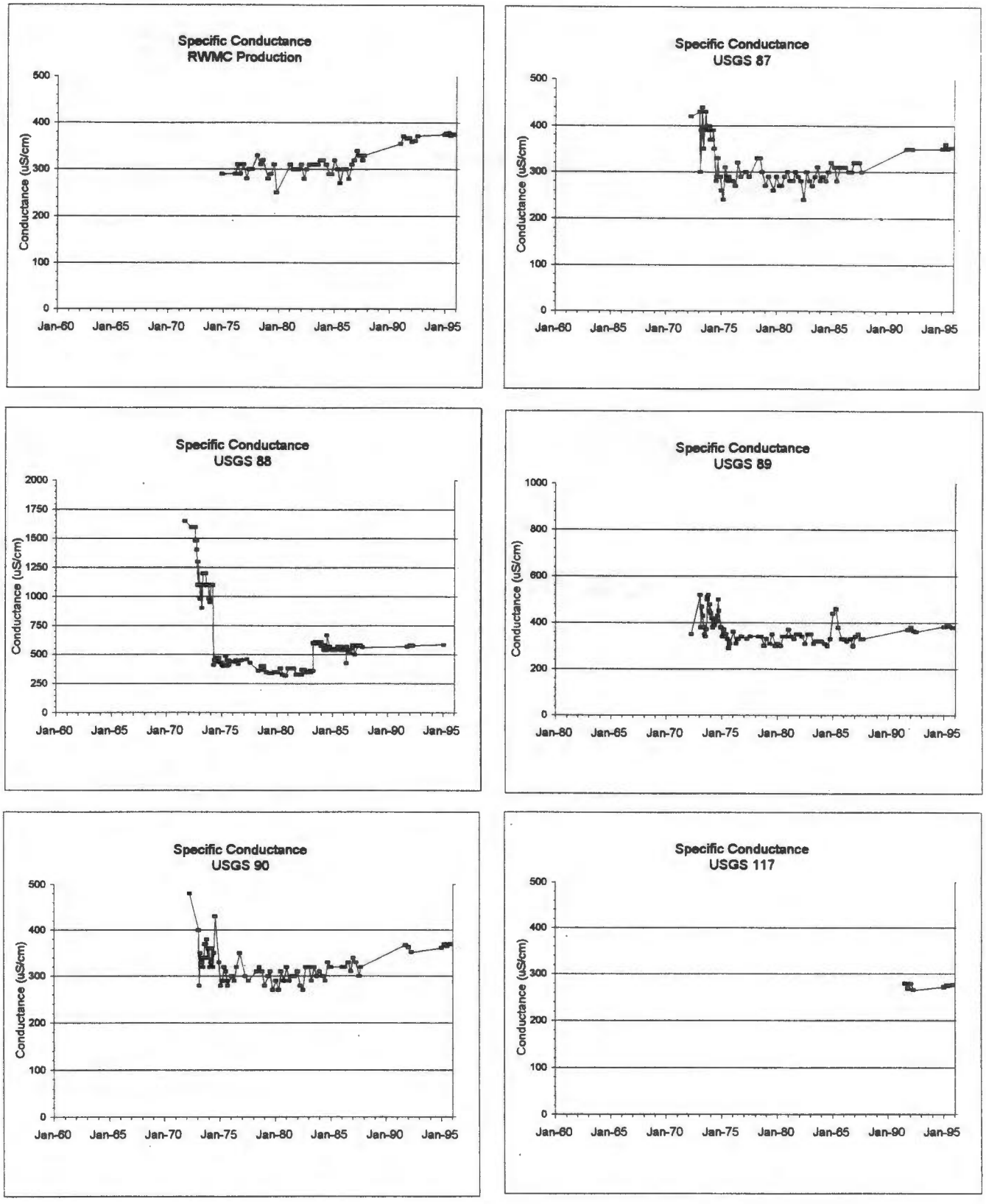
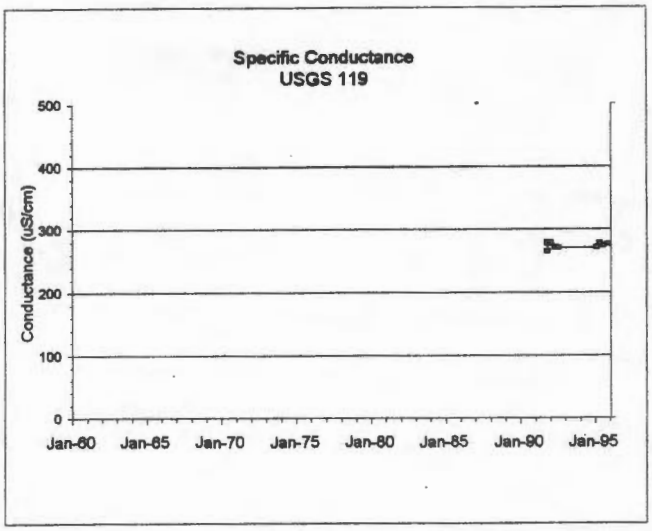


Figure L-5. Specific Conductance in Selected Wells in the RWMC Area.



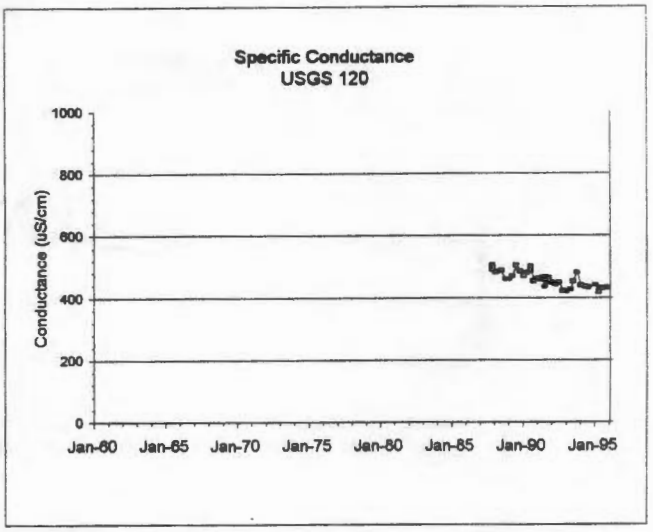


Figure L-5. Specific Conductance in Selected Wells in the RWMC Area (continued).

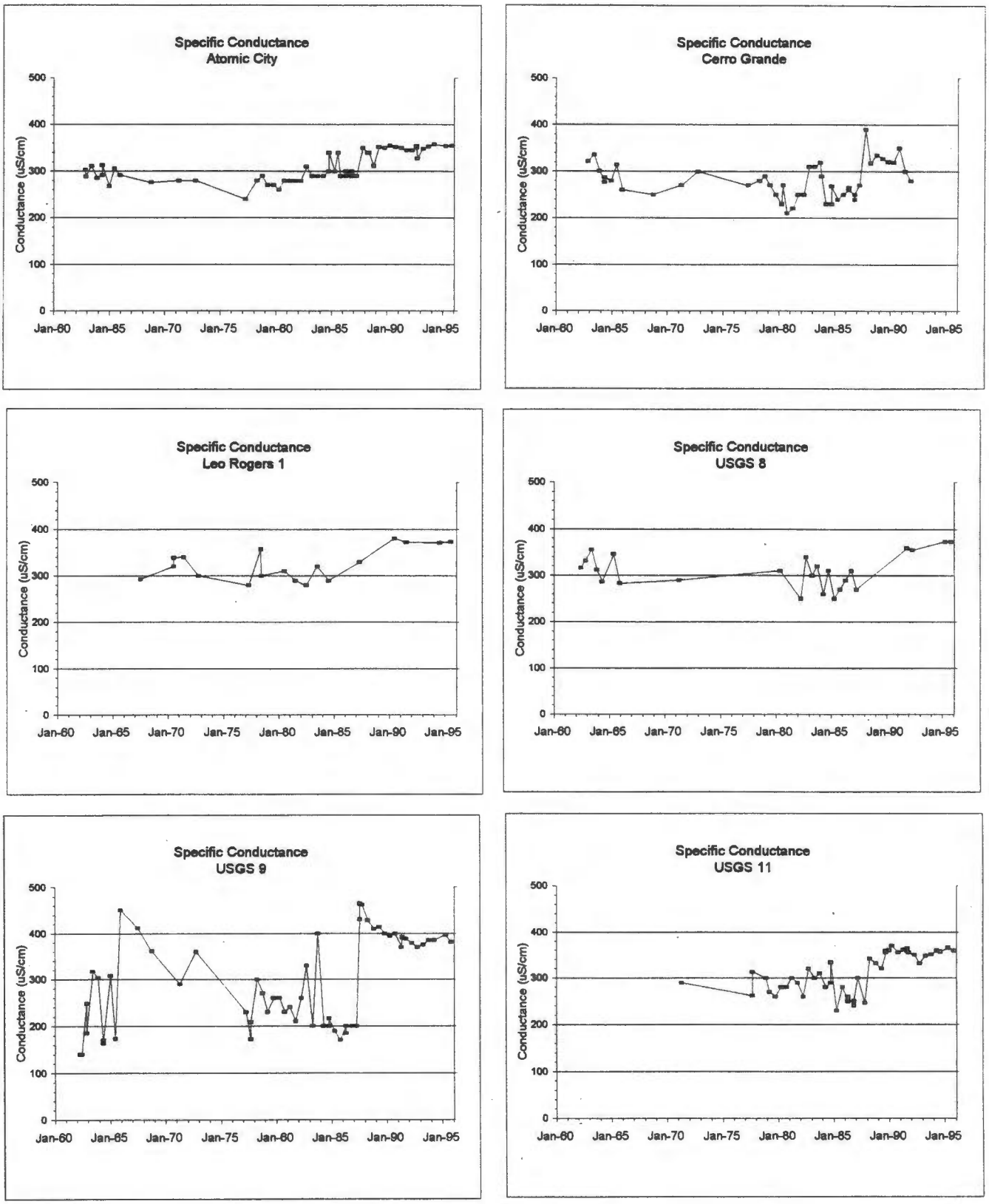


Figure L-6. Specific Conductance in Selected Wells near the INEEL Southern Boundary.

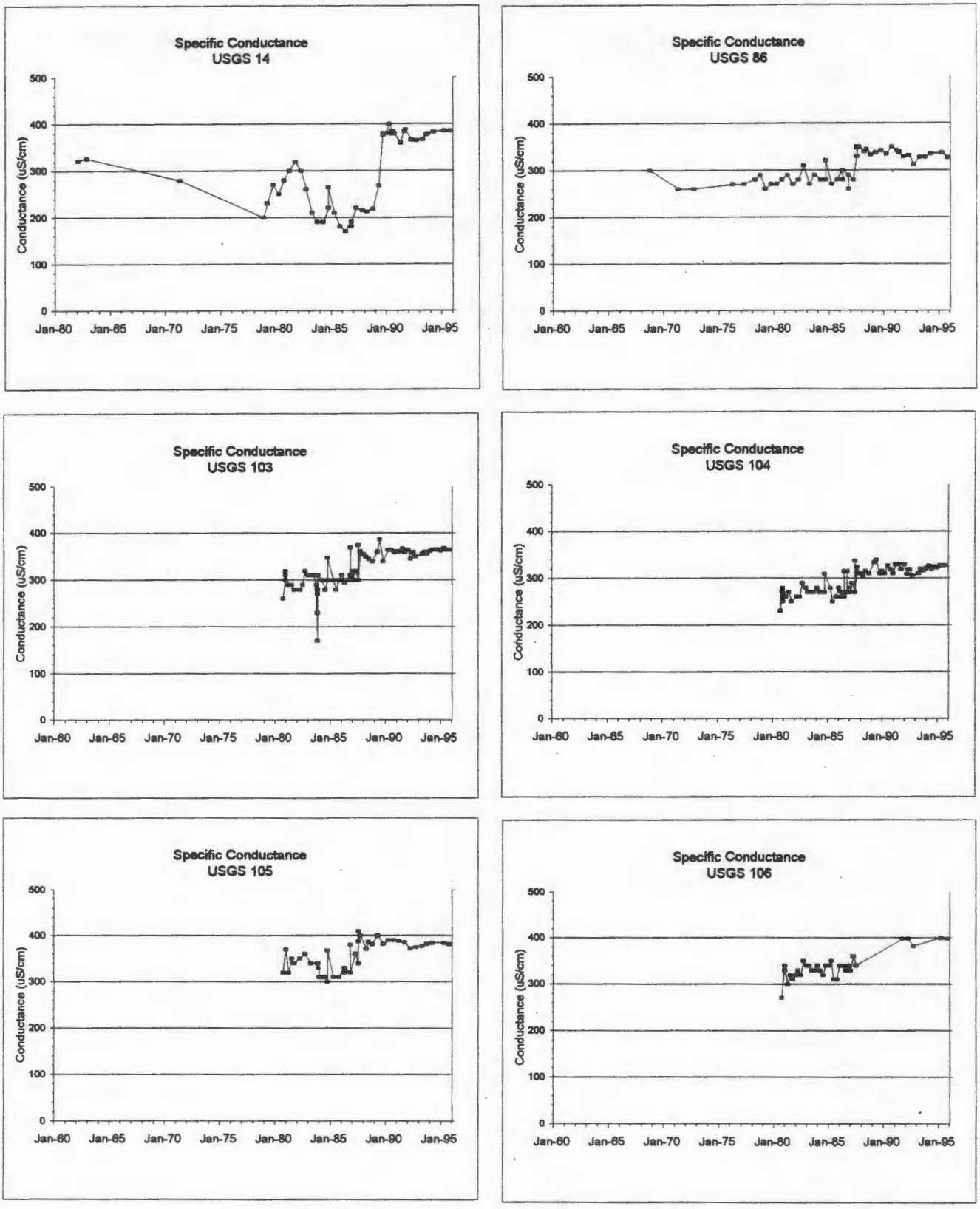
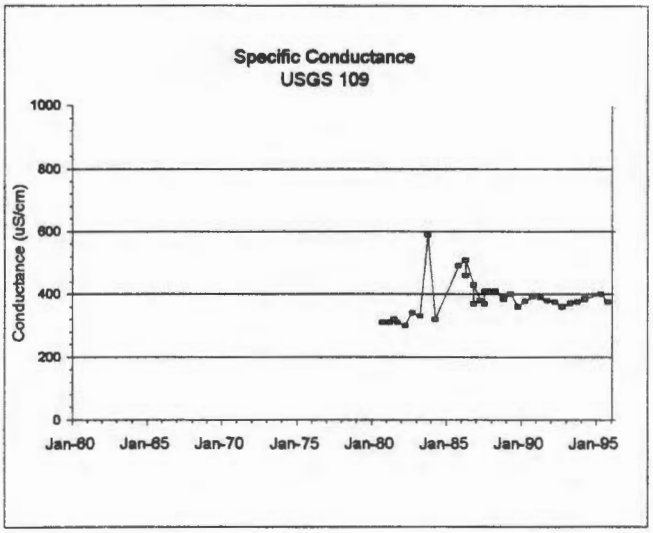


Figure L-6. Specific Conductance in Selected Wells near the INEEL Southern Boundary (continued).



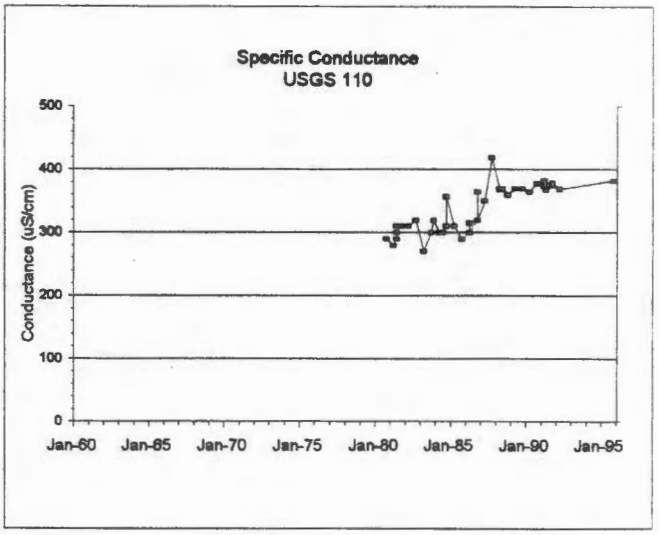


Figure L-6. Specific Conductance in Selected Wells near the INEEL Southern Boundary (continued).