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WASHINGTON PUBLIC POWER SUPPLY SYSTEM

P.O. Box 968 • 3000 George Washington Way • Richland, Washington 99352

April 26, 1991
PS-CJC-91-034

Applicable Regulation:
Washington Public Power
Supply System Technical
Specification 6.9.1.10

Docket No. 50-397

Director, Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Sir:

SUBJECT: 1990 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL REPORT

Enclosed are three (3) copies of the 1990 Radiological Environmental Monitoring Program Annual report. This report fulfills the reporting requirement stated in Washington Public Power Supply System Technical Specification 6.9.1.10.

If you have any questions or comments about this report, please contact Catherine J. Card at (509) 377-8066.

Sincerely

G. C. Sorensen, Manager
Regulatory Programs

GSC/CJC/lp

Enclosure

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Radiological Environmental Monitoring Program

1990 Annual Report For Nuclear Plant 2

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WASHINGTON PUBLIC POWER SUPPLY SYSTEM

NUCLEAR PLANT NUMBER 2

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

1990 ANNUAL REPORT

April 1991

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1990 ANNUAL REPORT

April 1991

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1.0 EXECUTIVE SUMMARY

The Washington Public Power Supply System Radiological Environmental Monitoring Program (REMP) activities during 1990 are discussed in this report. The REMP was conducted in accordance with a program plan which involves the collection of air, water, milk, soil, sediment, fish and garden produce samples on a regular basis from the region surrounding the plant. In addition, direct radiation from the plant and plant effluents was measured using thermoluminescent dosimeters (TLDs). The objective of assessing these samples and the TLDs was to determine the radiological impact, if any, of Plant 2 operations on the environment.

Determining whether plant operation affected the environment significantly involved comparison of samples taken in areas near the plant and in other regions which could be potentially affected by Plant 2 effluents to samples taken in an area that is highly unlikely to be affected. In addition, a comparison of the samples taken during 1990 at locations of potential impact to samples taken at the same location prior to plant operation and during previous periods of operation provided another mechanism for detecting changes in the environmental radioactivity that could be attributed to Plant 2 operations. Other methods used to evaluate the REMP results and to bring the results into perspective included comparison of the 1990 results to the lower limits of detection (LLDs) determined for each radionuclide, to the preoperational averages and to the applicable State of Washington or U.S. Nuclear Regulatory Commission investigation or reporting levels or standards.

Most of the REMP sample results during 1990 were below detection levels. However, some analyses, such as the determination of gross (total) beta, generated results that were above the LLD, i.e., detectable results, for nearly all samples of air and water. This was due to the low detection limit for the gross beta analysis and the abundance of naturally-occurring beta-emitting radionuclides in the environment. Other results above detection levels, such as cesium-137 in soil and sediment, reflected the effect of past Hanford activities or fallout from past nuclear weapons testing.

The 1990 thermoluminescent dosimeter (TLD) results were very consistent with the 1989 results. The average of the quarterly TLD results for 1990 was 0.26 mR/day; this can be compared to an average of 0.24 mR/day for the preoperational period and 0.25 mR/day for the operational period from 1984 through 1989. The techniques used to analyze the TLD results included log probability plotting, plotting the results by distance and location relative to Plant 2, and by comparison of individual TLD station results to the results of the control station. Inherent differences in the radiation background at individual locations accounted for variations among the TLD results. However, no trends were evident in the TLD data that would indicate an impact from Plant 2 on the environment.

The 1990 REMP data was consistent with the environmental data observed during the previous operational and the preoperational years. Based on the extensive comparisons and evaluations performed on the data, no radiological impacts of Plant 2 operations on the environment around the plant were detected by the REMP during 1990.

2.0 TERMINOLOGY

Becquerel (Bq): One disintegration per second. One picocurie (pCi) equals 0.037 becquerel.

Blank Sample: A sample of the same media as the field sample being analyzed but without the radionuclide(s) being measured. It enables correction for the inherent sample background.

Composite Sample: A series of single collected portions (aliquots) analyzed as one sample. The aliquots making up the sample are collected at time intervals that are very short compared to the composite period.

Control Station: A background sampling location, i.e., a location not likely to be affected by plant effluents due to its distance and/or direction from Plant 2.

Curie (Ci): 3.7×10^{10} disintegrations per second.

DOH: Washington State Department of Health.

Grab Sample: A single discrete sample drawn at one point in time.

Indicator Station: A sampling location that could be affected by plant effluents due to its proximity and/or direction from Plant 2.

Log Probability Plotting: A technique used to determine whether a set of data conforms to the log-normal distribution.

Lower Limit of Detection (LLD): Detection capability. The smallest concentration of radioactive material in a sample that will yield a net count (above system background) that will be detected with 95% probability and a 5% probability of a false conclusion that a blank observation represents a "real" signal.

Milliroentgen (mR): 1/1000 Roentgen; a unit of exposure to X or gamma radiation.

NRC: U.S. Nuclear Regulatory Commission.

Picocurie (pCi): 1×10^{-12} Curie or 2.22 disintegrations per minute.

REMP: Radiological Environmental Monitoring Program.

Site Certification Agreement (SCA): The Plant 2 licensing agreement with the State of Washington.

Spike Sample: A sample containing a known concentration of the radionuclide(s) being measured.

Standard Deviation: A measure of the scatter of a set of observations (or samples) around their mean value.

Standard Error: An estimate of the uncertainty associated with the mean of observation (or sample) averages.

TLD: Thermoluminescent dosimeter; A TLD contains a phosphor which stores energy from exposure to radiation and emits that energy in the form of light when heated.

TL: Thermoluminescence.

3.0 INTRODUCTION

The Radiological Environmental Monitoring Program (REMP) for Washington Public Power Supply System Plant 2 provides for the collection and analysis of samples of various environmental media, in order to assess the radiological impact of plant operations. The environmental media routinely sampled by the REMP include air, water, milk, soil, river sediment, fish, vegetables, fruits, and root crops. Other sample media, such as vegetation and animal products (for example, eggs and meat) are also sampled under special circumstances when additional information about particular radionuclides is needed. The direct radiation near the plant and at various distances from the plant is assessed through the use of thermoluminescent dosimeters.

This annual report is written to satisfy the requirements of Plant 2 Technical Specification 6.9.1.10. The results of environmental measurements made during CY 1990 are presented in the report. The results are discussed and interpreted by comparing them to similar measurements made during the preoperational and previous operational periods and to the detection capabilities associated with the current methods of analysis. The quality assurance and quality control aspects of the program are also discussed in this report.

3.1 Site Description

Washington Public Power Supply System Plant 2 is located in a sparsely populated shrub-steppe region within the Department of Energy-operated Hanford Site in southeastern Washington. The plant is approximately three miles west of the Columbia River and is surrounded on all sides by uninhabited desert land. The nearest population centers are Richland, Kennewick and Pasco, which are 12 miles south, 21 miles southeast, and 18 miles southeast, respectively. The nearest privately-owned lands are located approximately four miles ENE of the plant, across the Columbia River. Given the prevailing wind directions, shown in the 1990 wind frequency distribution in Figure 3-1, the focus of REMP sampling is this farming region across the river.

Because Plant 2 is located on the Hanford Site, other sources of radioactive effluents are in relatively close proximity to Plant 2. For this reason, sampling locations near the plant (near-plant locations) provide useful information for separating the potential environmental effects of Plant 2 from the effects of the other effluent sources on the Hanford Site.

3.2 Program Background

The REMP is designed to conform to the regulatory guidance provided by Regulatory Guides 4.1[1] and 4.8[2], including the Radiological Assessment Branch Technical Position (BTP)[3], while taking into account site specific characteristics. The quality assurance aspects of the program and the thermoluminescent dosimetry are conducted in accordance with Regulatory Guides 4.15[4] and 4.13[5]. The REMP also must adhere to the requirements of the Site Certification Agreement (SCA)[10] with the State of Washington and

the Plant 2 Technical Specifications. These requirements cover not only the environmental sampling and sample analysis aspects of the program, but also the reporting and quality assurance aspects of the program.

The preoperational phase of the program, which extended from March 1978 to January 19, 1984, the date of initial criticality, provided a baseline of environmental data. Variability in the background levels of radioactivity due to differences in geologic composition, nuclear weapons test fallout, meteorological conditions and seasonal changes is reflected in that preoperational data.

REMP environmental samples have always been analyzed by a contract analytical laboratory. Since June 1986, Teledyne Isotopes, Inc. in Westwood, New Jersey, has performed the analysis of REMP samples. The thermoluminescent dosimeters used in the REMP to assess the direct radiation are processed by the Supply System External Dosimetry Laboratory under the Plant Services Department.

3.3 Program Objectives

The REMP is the final stage in a series of monitoring programs that characterize and analyze the liquid and gaseous effluents from Plant 2. Figure 3-2 presents this monitoring hierarchy from the generation of the waste liquids and gases to the calculation of doses from these effluents and the measurement of radioactivity in the environment.

The REMP provides a mechanism for determining whether the levels of radioactivity in the plant environs are within established limits and for ensuring that the accumulation of radionuclides in the environment will not become significant as a result of plant operations. While in-plant monitoring programs are used to ensure that 10CFR20[7] and 10CFR50[8] criteria for releases of radioactive effluents are met, the REMP provides supplemental verification that the concentrations of radionuclides in the environment are not greater than anticipated.

Any radiological effect of Plant 2 on the environment must be distinguished from the normal variation in background radiation levels and from the effects of other sources of radioactive effluents in the area. The monitoring results obtained during each year of the plant's operation are compared to the preoperational data and to data from previous operating years, in order to determine whether a significant accumulation of plant-produced radionuclides has occurred in the environment. Should a significant accumulation be observed and be attributed to plant operation, steps would be taken to locate the release pathway and to prevent further releases.

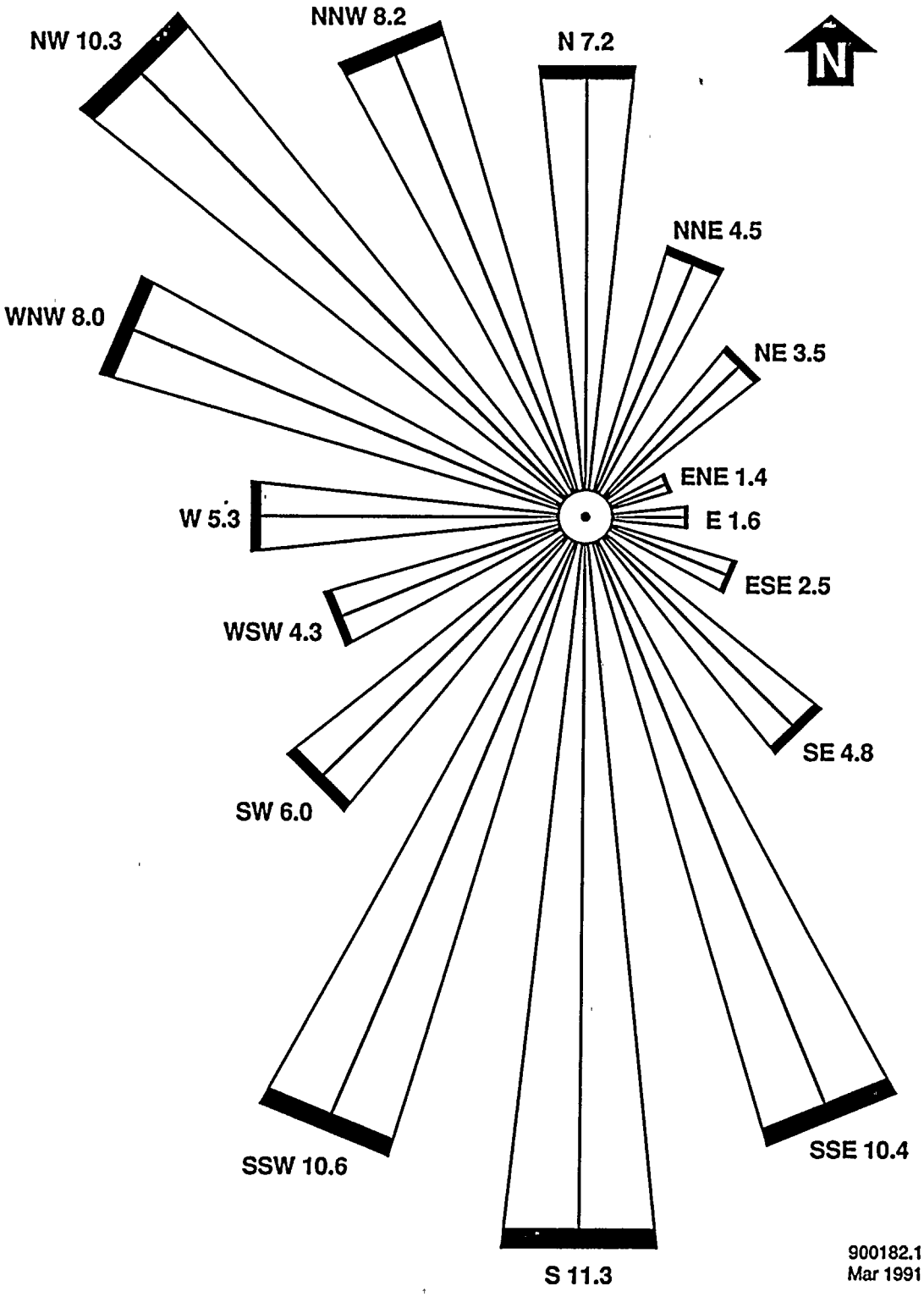

Figure 3-1
1990 WIND FREQUENCY DISTRIBUTION IN PERCENT FROM EACH DIRECTION
RELATIVE TO PLANT 2

MONITORING HIERARCHY

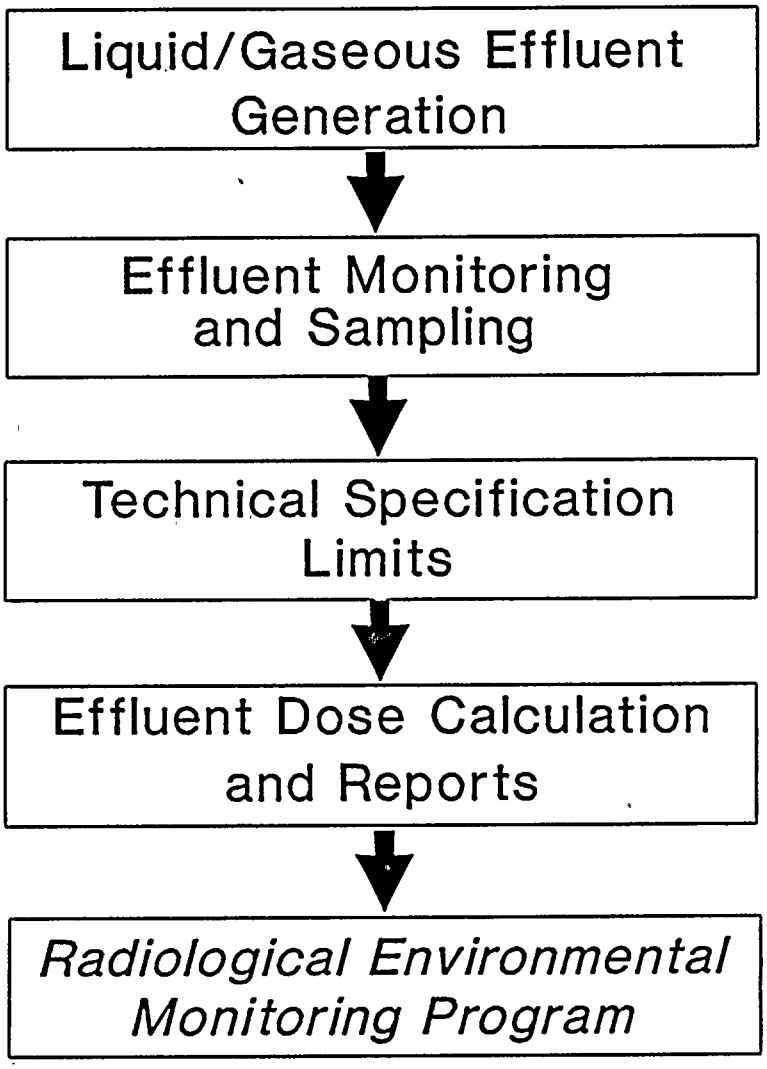

FIGURE 3-2
THE MONITORING HIERARCHY FROM THE GENERATION OF LIQUID AND GASEOUS EFFLUENTS TO THE MEASUREMENT OF RADIOACTIVITY TO THE ENVIRONMENT

4.0 PROGRAM DESCRIPTION

The REMP plan for Plant 2 is presented in Table 4-1. It summarizes the sample locations, collection frequency and types of analysis performed on the sample media. The methods of sampling and sampling frequencies utilized in the program have been determined by such factors as the half-lives and major exposure pathways for the radionuclides potentially released from the plant to the surrounding environment.

4.1 Sample Locations

Seventy-seven sample locations were included in the 1990 monitoring program. Seventy indicator and two control, i.e. background, locations were within 10 miles (16 kilometers) of the Plant 2 containment. Three additional control stations and two indicator stations were outside the 10-mile radius from the plant. Sample stations are listed in Table 4-2 by meteorological sector, sample media and approximate distance from the plant. The numbers and locations of sample stations are based not only on factors such as population distribution and meteorological conditions, but also on station accessibility, security throughout the year and the requirements of applicable regulations.

Maps of the REMP sampling locations described in Tables 4-1 and 4-2 are presented in Figure 4-1 for sampling locations within the 10-mile radius and Figure 4-2 for sampling locations outside the 10-mile radius. A more detailed presentation of sampling locations in the Sunnyside/Grandview area is given in Figure 4-3. Maps indicating the sampling locations for each specific type of sample media are presented in Section 4.3 as Figures 4-4 through 4-12.

4.2 Land Use Census

In August the annual land use census was performed, as required by the Plant 2 Technical Specifications.[9] One objective of the land use census is to identify the locations of the nearest milk animal, residence and garden greater than 50 m^2 (500 ft^2) producing broadleaf vegetation within a distance of 5 miles from the plant. Another objective is to determine whether any site located during the census has a calculated dose or dose commitment greater than the sites currently monitored for the same exposure pathway. If so, routine sampling of that dose pathway would be initiated at that new site.

The results of the 1990 land use census within 5 miles are given in Table 4-3. No milk animals are located within the 5-mile radius. The closest milk locations are at 6.4 miles SE and 7.2 miles ESE. One large garden containing broadleaf vegetation was located within 5 miles of the Plant during the 1990 land use census. Samples were not obtained at this location due to the owner's reluctance to participate in the sampling program.

4.3 Sampling Methods

The collection of environmental samples for the REMP was performed according to the schedule in Table 4-1. All samples were collected by Supply System personnel. Documented procedures contained in the Environmental Program Instruction Manual were used for sample collection and preparation. The following sections describe the Supply System's sampling and preparation methods.

4.3.1 Direct Radiation

During 1990, thermoluminescent dosimeters (TLDs) were used to determine the direct radiation levels at the fifty-seven (57) monitoring locations shown in Figures 4-4, 4-5 and 4-6. No new TLD locations were added to the program this year. The TLD located at Station 9A in Sunnyside served as the control, or background, TLD. The other 56 TLDs served as indicator TLDs.

The environmental dosimeter consists of a card containing $CaSO_4$:Dy (25%) phosphor in a Teflon matrix. Following oven annealing at 250°C for 2 hours, the 31.75 mm x 44.75 mm x 0.4 mm thick card was loaded into a plastic case (Teledyne Model EB-2) lined with 0.58 mm copper (520 mg/cm^2) to lessen the TLD's over-response to low energy photons.[11] The TLD was prepared for the field by first wrapping the case with aluminum foil, sealing it in two plastic bags and finally placing it in a cotton bag, which was hung from a metal post at each site. The TLDs were hung approximately three feet above the ground.

Two sets of TLDs were employed at each location. One set was exchanged on a quarterly basis and the other exchanged on an annual basis. Exposure of the field TLDs during transport to the TLD sites was monitored by a set of field control, or trip control, dosimeters that accompanied the field dosimeters to and from the field locations. Another set of TLDs was used as building control TLDs which were used to determine the exposure of the TLDs if they remained in the lead cave during the entire quarter. The TLD exposure during transport to and from the field was determined by subtracting the difference between the building control results and the trip control results.

The environmental dosimeters were processed on a Teledyne Isotopes Model 9100 Automatic Reader. Following the initial processing, the field dosimeters were annealed and given a calibration exposure of 100 mR of cesium-137 gamma, in order to determine response (i.e, calibration) factors for each dosimeter. The calibration factors were then used to determine the total exposure received by each TLD.

The exposure values determined for calibration exposures, as well as the exposures of the QA dosimeters (processing control dosimeters) and audit dosimeters (spiked dosimeters), were based on the calculated field strength of the encapsulated cesium-137 source. The calculated field strength of the source was determined from National Institute of Standards and Technology (NIST)-traceable ionization chamber measurements made over a period of

several years during the routine use and calibration of the source. Ionization chamber measurements made during TLD calibration were used to confirm the calculated exposure. If the calculated exposure and the ionization chamber reading differed by 5% or more, an investigation was done into the calibration exposure.

During 1990 a special test was performed to determine whether a particular set of TLDs that had been used as annual TLDs in the past had a higher TL signal fade rate over time than the other sets of TLDs used in the program. The results of these TLDs when used in the field had indicated that this might be a problem. TLDs from the suspect group were distributed to various TLD stations and left throughout the year. Another set of TLDs which had not shown indications of signal fade were distributed to the same stations and retrieved at the same time as the suspect group. The results of this study are presented in Section 5.1 and Appendix C.

Three Reuter Stokes pressurized ionization chambers (PICs) provide an additional capability for measuring direct radiation exposure. These units are maintained for use in special monitoring situations or as back-up monitoring systems and are no longer part of the routine monitoring program. Solar panels provide the power sources for the units in order to prevent equipment problems and damage caused by power surges and lightning.

4.3.2 Airborne Particulate/Iodine

Air particulate and air iodine (I-131) samples were obtained through the use of portable, low volume (1.5 cfm) constant flow-rate sampling units at each of twelve locations. The samples drawn at Station 9A (Figure 4-3) were considered control samples; the ones drawn at the other locations (Figure 4-7) were indicator samples. Air particulates were collected by drawing air through a 47mm-diameter glass fiber filter. Air iodine was collected by drawing air through a 57mm-diameter TEDA*-impregnated charcoal cartridge. The particulate air filter and charcoal cartridge were placed in tandem, particulate filter first, in a holder that attached to the air inlet of the sampler unit. The sampler units were placed in ventilated metal weatherproof housings mounted on elevated platforms at each air sample location.

The air sampler units were run continuously, with the filter and charcoal cartridge exchanged weekly for analysis. The total sample time for each filter and cartridge was recorded from the elapsed time indicator and the sample volume was calculated and recorded. The filters and cartridges were shipped or delivered to the analytical contractor within one or two days of collection.

4.3.3 Water

The water sampling network consisted of seven sampling locations: three for the evaluation of river/drinking water, one for the evaluation of discharge water and three for the evaluation of ground water. The locations of these sampling sites are shown in Figures 4-2 and 4-8. One river/drinking water

*TEDA: Triethylene diamine

location, Station 26, was used for evaluation of the plant intake water, i.e., the river water taken upstream of the plant discharge point. This Station 26 sample can be considered a drinking water sample since the site draws its drinking water from the intake water. It is considered the river/drinking water control sample because of its upstream location. Two additional locations, Stations 28 and 29, were used to evaluate the water at the two nearest drinking water locations, the Department of Energy 300 Area and the Richland Water Treatment Plant. These two stations were considered indicator stations.

The Technical Specification requirement for a downstream water sample "near but beyond the mixing zone" was met by sampling water from Station 27, the plant discharge line to the Columbia River. This sample reflects the radioactivity present in the plant discharge prior to any river dilution, rather than the concentrations that would be found after dilution in the mixing zone. Water is drawn at this location because it was not feasible to perform the flow-proportional composite sampling required by Technical Specifications in the mixing zone area of the river downstream from the plant discharge point. This Station 27 sample is also considered an indicator sample.

Collins Model 42 composite samplers are installed at the two drinking water locations (Stations 28 and 29) and the control location (Station 26) to periodically collect 25-ml aliquots of water at a regular time interval. These aliquots are added to large collection bottles. At the prescribed intervals, the sampler collects, alternately, an aliquot for the sample designated for gross beta and gamma isotopic analyses and an aliquot for the sample designated for tritium analysis. A Collins Model 42-2P6 composite sampler draws samples from the discharge line (Station 27). It operates in a flow-proportional mode through a complex system that adjusts the sampling frequency relative to the flow rate in the discharge line.

Prior to the start of each monthly sampling period, concentrated nitric acid was added to the large collection bottles receiving the gross beta and gamma isotopic water samples to inhibit biological growth and plateout of dissolved ions on the bottle wall. Acid was not added to the collection bottles receiving the water samples for tritium analysis. One gallon of each of the gross beta samples was poured into a clean plastic cubitainer each month. A 250-ml cubitainer was used to hold the monthly sample submitted for the quarterly tritium composite.

Nonroutine analyses on the water samples include strontium-90 analysis, when the gross beta activity in the drinking water exceeds 8 pCi/liter or ten times the mean of the previous three months' activity for a specific location, and iodine-131 analysis, when the dose calculated for the consumption of water exceeds one mrem per year. Neither of these analyses were required during 1990.

The three groundwater stations are located on Supply System property: one well on the Plant 2 site (0.1 mile north of the Reactor Building) and two wells on the WNP-1 site (1.2 miles downgradient from Plant 2). These locations are shown in Figure 4-9. Water from the Plant 2 well can be used

as a backup source for drinking and fire protection. Water from the WNP-1 wells supplies the drinking and fire protection water for the WNP-1 site. All three groundwater samples are considered indicator samples.

Quarterly grab samples were taken from each of these wells. One gallon was collected from each well for gamma analysis and 250 ml was drawn for tritium analysis. The gamma analysis samples were acidified with nitric acid. The tritium samples were left unacidified.

All the routine water samples were shipped to the analytical contractor within one to two days of collection.

4.3.4 Soil

Soil samples were collected once during 1990, as required by the Site Certification Agreement. Samples were taken from the four indicator locations (Stations 1, 7, 21 and 23) shown in Figure 4-10. One sample was taken at the control location, Station 9A (Figure 4-3). Each sample was taken from an area of approximately one square foot and a depth of approximately one inch. Approximately two kilograms of soil were used in each sample. Soil samples were shipped to the analytical contractor within ten working days after collection and analyzed for gamma activity.

If the gamma isotopic analysis indicated that cesium levels in any of the indicator samples exceeded ten (10) times the level in the control sample, a strontium analysis would have been performed on the sample(s). During 1990, no strontium analyses were required.

4.3.5 Shoreline Sediment

Two shoreline sediment samples were collected twice during 1990 in accordance with the routine sampling schedule. The upstream sediment sample (Station 33) was collected from a location approximately two miles up the Columbia River from the plant discharge point. The downstream sample location (Station 34) was collected from a location approximately one mile downstream of the discharge point (Figure 4-11). Samples were scooped from under water near the river shoreline. Each sample consisted of approximately two kilograms of the shallow surface sediment. The samples were placed in clean plastic bags and shipped to the analytical contractor within a day or two of collection.

4.3.6 Fish

Fish sampling was performed during May and October, when the likelihood of obtaining anadromous* species was high. Fish samples collected from the Columbia River (Station 30 in Figure 4-1) were indicator samples, while the fish collected on the Snake River (Stations 38 and 38A in Figure 4-2) were control samples.

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*Fish, such as salmonids, which ascend rivers from the sea for breeding.

Four separate fish samples, consisting of an anadromous species and three other species generally considered edible or potentially edible (such as carp, catfish and whitefish), were collected at each location. Most of the fish were collected through the use of electro-shock, but samples of the anadromous species were also collected from the Lyons Ferry Fish Hatchery on the Snake River. The fish were filleted to obtain one kilogram of edible flesh per sample. The fillets were placed in clean plastic bags, frozen until shipment to the analytical contractor. Fish samples were shipped within 14 days of collection.

3.3.7 Milk

Milk samples were collected monthly during January, February, March, October, November and December and semimonthly during the remaining six months when the cows were likely to be grazing. One gallon of raw milk was collected from each sampling location. The milk samples were chilled thoroughly and shipped to the analytical contractor within a day of collection.

Routine samples were collected from five indicator locations (Stations 36, 40, 59, 62 and 63) across the Columbia River in Franklin County, as shown in Figure 4-12. Milk samples were taken from Stations 40, 62 and 63 during only a part of 1990. Station 40 discontinued milk production in April, so Station 62, the Howard farm, (10.9 miles SE), was added. In July, milk sampling began at the Herr farm, Station 63, which is located at 6.4 miles SE. Addition of this sample was necessary to meet Technical Specification requirements for three milk sampling locations within 5 kilometers (9.9 miles) from the plant.

Samples were also collected at one indicator station (Station 9B) and one control location (Station 96) in the Sunnyside/ Grandview area (in Figure 3-3). Station 9B in Grandview continued to serve as an indicator station in 1990 because a portion of the feed for the cows at that location is hay from the north Pasco area of Franklin County. That factor makes it unsuitable for use as a control location.

4.3.8 Garden Produce

Samples of local garden produce were collected monthly from April to September, when the produce was readily available. When possible, three types of produce samples--a root crop, fruit and a leafy vegetable--were collected at each location. The indicator samples were collected from a region in a predominant downwind direction (Station 37 in Figure 4-2) where crops are irrigated with Columbia River water. The control samples were obtained from produce stands in the Sunnyside area (Station 9C in Figure 4-3), the direction least likely to be affected by plant effluents. In addition, apples were collected in August from Station 91, the Rio Vista Farms orchard, which is irrigated with Columbia River water and cherries were collected in June from Station 61, the Haymaker farm. These produce samples were shipped to the analytical contractor within one to two days of collection.

4.4 Analytical Procedures

The analytical procedures used for the 1990 REMP samples are described below. Teledyne Isotopes performed all analyses of REMP samples during 1990.

4.4.1 Gross Beta Activity on Particulate Filters

The particulate filters were counted in a gas-flow proportional counter after a delay of five or more days to allow for the radon-222 and radon-220 (thoron) daughter products to decay. An unused air particulate filter was counted as the blank with each weekly set of filters.

4.4.2 Measurement of Gamma Emitters

Milk and Water
A 1-liter Marinelli beaker was filled with a representative aliquot of the sample. The sample was then counted for at least 1000 minutes (16.7 hours) with a shielded Ge(Li) detector.

Foodstuff
As much of the edible portion of the sample as possible was loaded into a tared Marinelli beaker and weighed. The sample was then counted for at least 1000 minutes (16.7 hours) with a shielded Ge(Li) detector.

Soils and Sediments
A large quantity of the sample was dried at a temperature below 100°C. As much sample as possible was loaded into a tared 1-liter Marinelli beaker and weighed. The sample was then counted for at least 360 minutes (6 hours) with a shielded Ge(Li) detector.

Charcoal Cartridges (Air Iodine)
Charcoal filters were counted up to five at a time, with one positioned on the face of a Ge(Li) detector and up to four on the side of the Ge(Li) detector. Each Ge(Li) detector was calibrated for both positions. The detection limit for iodine-131 on each charcoal cartridge was determined (assuming no positive iodine-131) uniquely from the volume of air which passed through it. In the event that iodine-131 would have been observed in the initial counting of a set, each charcoal cartridge in the set was then positioned separately on the face of the detector and counted.

Air Particulate Filters
Four air particulate filters for a quarterly composite for each field station were aligned one in front of another and then counted for at least 360 minutes (6 hours) with a shielded Ge(Li) detector.

The shielded Ge(Li) detector was coupled to a mini-computer-based data acquisition system which performed pulse height analysis. A mini-computer software program defined peaks by certain changes in the slope of the spectrum. The program also compared the energy of each peak with a library of peaks for isotope identification and then performed the radioactivity calculation using the appropriate fractional gamma ray abundance, half-life, detector efficiency, and net counts in the peak region.

4.4.3 Gross Beta Activity in Water

One liter of each sample was evaporated to a small volume and transferred to a stainless steel planchet. The sample was dried under heat lamps, cooled, then counted on an automatic beta proportional counter. The results were calculated using empirical self-absorption curves which enabled the correction of effective counting efficiency, based on the sample residue mass.

4.4.4 Iodine-131 in Water

Two liters of sample were first equilibrated with stable iodide carrier. A batch treatment with anion exchange resin was used to remove iodine from the sample. The iodine was then stripped from the resin with sodium hypochlorite solution, reduced with hydroxylamine hydrochloride and extracted into carbon tetrachloride as free iodine. It was then back-extracted as iodide into sodium bisulfite solution and precipitated as palladium iodide. The precipitate was weighed for chemical yield and mounted on a nylon planchet for low level beta counting. The chemical yield was corrected by measuring the stable iodide content of the water with a specific ion electrode. During 1990, this procedure was used only on intercomparison samples, since the doses calculated via ODCM methodology for the consumption of drinking water did not exceed 1 mrem per year (Table 4-1, footnote n).

4.4.5 Tritium in Water

Approximately two milliliters of water were converted to hydrogen by passing the water, heated to its vapor state, over a granular zinc conversion column heated to 400°C. The hydrogen was loaded into a one-liter proportional detector and the volume was determined by recording the pressure. The proportional detector was passively shielded by lead and steel and an electronic, anti-coincidence system provided additional shielding from cosmic rays.

4.4.6 Strontium-89 and 90 in Water, Milk and Soil

During 1990, strontium analyses were not required for any routine REMP samples. They were used for intercomparison samples so the analytical techniques are described below.

<u>Water</u>
Stable strontium carrier was added to one liter of sample and the volume was reduced by evaporation. Strontium was precipitated as $Sr(NO_3)_2$ using nitric acid.

<u>Milk</u>
Stable strontium carrier was added to one liter of sample. The sample was then evaporated and ashed in a muffle furnace. The ash was dissolved and strontium was precipitated as a phosphate. It was then redissolved and strontium was precipitated as $Sr(NO_3)_2$ using fuming (90%) nitric acid.

Soil and Sediment

The sample was first dried under heat lamps and a 10-gram aliquot was taken. Stable strontium carrier was added and the sample was leached in hydrochloric acid. The mixture was filtered. Phosphates were then precipitated, collected by filtration and dissolved in nitric acid. Strontium was precipitated as $Sr(NO_3)_2$ using fuming nitric acid. A barium chromate scavenge and an iron (ferric hydroxide) scavenge were then performed. Stable yttrium carrier was added and the sample was allowed to stand for 5 days or more for yttrium ingrowth. Yttrium was then precipitated as hydroxide, dissolved and reprecipitated as oxalate. The yttrium oxalate was mounted on a nylon planchet and counted in a low-level beta counter to infer strontium-90 activity. Strontium-89 activity was determined by precipitating $SrCO_3$ from the sample after yttrium separation. This precipitate was mounted on a nylon planchet and covered with an 80 mg/cm^2 aluminum absorber for low-level beta counting.

4.4.7 Iodine-131 in Milk

Two liters of sample were first equilibrated with stable iodide carrier. A batch treatment with anion exchange resin was used to remove iodine from the sample. The iodine was then stripped from the resin with sodium hypochlorite solution, reduced with hydroxylamine hydrochloride and extracted into carbon tetrachloride as free iodine. It was then back-extracted as iodide into sodium bisulfite solution and precipitated as palladium iodide. The precipitate was weighed for chemical yield and mounted on a nylon planchet for low-level beta counting. The chemical yield was corrected by measuring the stable iodide content of the milk with a specific ion electrode.

4.5 Data Analysis Methods

Since mid-1984, the results of the REMP analyses have been given as net results calculated from the gross or total counts determined for each radionuclide minus the background counts of the counting or detection instrument. Consequently, for several sample types, the results range from negative to positive numbers. This manner of presenting environmental data prevents the bias and loss of individual results inherent in the use of "less than" (<) values, where the "less than" numbers can have a variety of meanings, such as "less than the lower limit of detection (LLD)" or "less than the two sigma uncertainty."

The net results for REMP samples are presented with an asterisk (*) in front, if the results are less than the LLD. A listing of the LLDs determined for each analysis is provided in Section 5.0 as a reference when reviewing the sample results.

Plots of the sample results versus time are used to represent the results for analyses such as gross beta on air particulate filters, where the results are normally above the lower limits of detection. In such cases, the indicator station results are plotted with the control station results

for easy comparison. Other data analysis techniques, such as log probability plotting and plotting the moving average, are also used to represent the data and to determine whether trends that could be attributed to the effect of Plant 2 operations are evident.

Thermoluminescent dosimeter (TLD) data is presented in terms of the net mR/day exposure rate. These results are determined from the total mR exposure calculated for each TLD from its total thermoluminescent output minus the TLD background, minus any transit (or trip) exposure received during distribution and retrieval, and divided by the number of days the TLD was in the field. Log probability plots and graphs of TLD data by meteorological sector and distance from the plant are used to interpret trends in the results.

TLD data summaries include the term "standard error," along with "standard deviation." The standard error, which is the estimate of the precision of the mean, is used for mean annual summaries of mean quarterly data. The standard deviation is used for the TLD data involving a single dosimeter result that has been determined from the four reader areas of the TLD. Both terms simply provide an indicator of the uncertainty associated with the results.

TABLE 4-1

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM PLAN

SAMPLE TYPE[a]	SAMPLE STATION NO.[b]	SAMPLING AND COLLECTION FREQUENCY[c]	TYPE AND FREQUENCY OF ANALYSIS
1. AIRBORNE			
Particulates and radioiodine (6/12)	1, 4-9A, 21, 23, 40, 48, and 57	Continuous sampling; weekly collection	Particulate: Weekly gross beta[d]; gamma isotopic[e] of quarterly composite (by location) Iodine: Weekly gamma analysis.
Soil[f] (0/5)	9A, 1, 7, 21 and 23	Annually	Gamma isotopic[e]; strontium-90[g]
2. DIRECT RADIATION			
TLD[h] (34/57)	1-9A, 10-25, 40-47, 49-51, 53-56, 61, 71-86 (1S-16S)[i]	Quarterly, annually	Thermoluminescent output; quarterly and annual processing.
PIC[j] (0/3)	1, 21, and 23	Continuous recording as needed	Accumulated on mag card and internal memory.
3. WATERBORNE			
Surface/ Drinking Water[k] (3/4)	26, 27, 28 and 29	Composite aliquots[l]; monthly collection	Gamma isotopic,[e] gross beta, quarterly; tritium composite; strontium-90[m]; iodine-131[n]

TABLE 4-1 (Cont.)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM PLAN

SAMPLE TYPE[a]	SAMPLE STATION NO.[b]	SAMPLING AND COLLECTION FREQUENCY[c]	TYPE AND FREQUENCY OF ANALYSIS
Ground Water (2/3)	31, 32, and 52	Quarterly	Gamma isotopic[e]; quarterly tritium grab sample
Sediment from shoreline (1/2)	33 and 34	Semiannually	Gamma isotopic[e]
4. INGESTION			
Milk[o] (4/6)	9B, 36, 40, 59, 62, 63 and 96[p]	Semimonthly during grazing season, monthly at other times	Gamma isotopic[e]; iodine-131; strontium-90[q]
Fish[r] (2/2)	30 and 38	Semiannually	Gamma isotopic[e]
Garden Produce[s] (1/3)	9C, 91[t] and 37	Monthly during growing season in the Riverview area of Pasco and a control near Grandview; annual collection at Station 91.	Gamma isotopic[e]

[a]The fraction in parentheses for each sample type indicates the ratio of Technical Specification-required sample locations to the total number of sample locations currently being monitored in the surveillance program.

[b]The underlined sample location designates a control station. None of the groundwater stations are control locations.

[c]Deviations are permitted if samples are unobtainable due to hazardous conditions, seasonal availability, malfunction of automatic sampling equipment, or other legitimate reasons. Such deviations are documented in Appendix D.

TABLE 4-1 (Cont.)

(d) Particulate sample filters will be analyzed for gross beta after at least 24 to 48 hours to allow for the decay of radon daughter products. If gross beta activity is greater than 10 times the mean of the result for the control, Station 9A, gamma isotopic analysis shall be performed on the individual sample.

(e) Gamma isotopic means identification and quantification of gamma-emitting radionuclides that may be attributable to the effluents of Plant 2.

(f) Soil samples are collected to satisfy the requirements of the Site Certification Agreement (SCA)[10] for Plant 2.

(g) Strontium-90 analysis shall be performed on any indicator soil sample having cesium results greater than ten times the results for the control location.

(h) TLD refers to thermoluminescent dosimeter. For purposes of the REMP, a TLD is a phosphor card (31.75mm x 44.75mm x 0.4mm) with eight individual read-out areas (four main dosimeter areas and four back-up dosimeter areas) in each badge case. TLDs used in the REMP meet the requirements of Regulatory Guide 4.13[5] and ANSI N545-1975[6], except for specified energy-dependence response. Correction factors are available for energy ranges with response outside of the specified tolerances.

(i) TLD Stations 71-86 are special interest stations and are not included among the 34 routine TLD stations required by the Plant Technical Specification Table 3.12-1. Their alternate designations are 1S-16S. Station 61 is also a special interest location. It was added to the program during the third quarter of 1989.

(j) Pressurized ion chambers (PICs) are no longer required as part of the routine monitoring program. They are used only as a supplemental or backup system.

(k) The term "river/drinking water," instead of "surface/drinking water", is used throughout this report because the surface water is taken from the Columbia River. Station 26, Plant 2 makeup water intake from the Columbia River is both an upstream surface, or river, water sample and the drinking water control sample location. Station 28 (300 Area) and Station 29 samples are drinking water samples. The Station 27 sample, which is drawn from the plant discharge line, is taken in place of a "downstream" water sample near but beyond the mixing zone. It reflects the radioactivity present in the plant discharge prior to any river dilution.

(l) Composite (integrated grab) samples are collected with equipment which collects an aliquot at time intervals that are short relative to the compositing period.

TABLE 4-1 (Cont.)

(m) When the gross beta activity in drinking water exceeds 8 pCi/liter, a strontium-90 analysis is performed.

(n) When the dose calculated via ODCM methodology for consumption of water exceeds 1 mrem per year, iodine-131 analyses are performed on the drinking water samples.

(o) Milk samples will be obtained from farms or individual milk animals which are located in the most prevalent wind directions from Plant 2. Routine milk samples are collected in areas of high dose potential instead of within 5 kilometers, due to the locations of milk animals.

(p) Station 96 is the control station for milk samples because it was determined that the cows at Station 9B in Sunnyside were given feed grown in the Franklin County area across the Columbia River from Plant 2. Stations 62 and 63 at 10.4 miles and 6.4 miles SE of the plant, respectively, were added during 1990 due to the unavailability of milk from Station 40 for part of the year.

(q) If cesium-134 or cesium-137 is measured in an individual milk sample in excess of 30 pCi/l, then the strontium-90 analysis will be performed.

(r) There are no commercially important species in the Hanford Reach of the Columbia River. Most recreationally important species in the area are anadromous (primarily salmonids), which ascend rivers from the sea for breeding. Four fish specimen will normally be collected by electroshock technique in the vicinity of the plant discharge (Station 30) and from the Snake River (Station 38). If electroshocking produces insufficient anadromous fish samples from the Snake River, samples may be obtained from the fish trap at Ice Harbor Dam, Lyons Ferry Fish Hatchery, or other similar facility (Station 38A). If insufficient anadromous fish samples are produced through electroshocking on the Columbia River, samples may be obtained at the Ringold Fish Hatchery (Station 39).

(s) Garden produce will routinely be obtained from farms or gardens using Columbia River water for irrigation. One sample of a root crop, leafy vegetable, and a fruit is collected each sample period, if available. The variety of the produce obtained will be dependent on seasonal availability.

(t) Station 91 is an apple orchard irrigated by the Columbia River. The apple crop from Station 91 is sampled annually.

TABLE 4-2

REMP SAMPLE LOCATIONS BY SECTOR

SECTOR[a]	STATION[b] NUMBER	ESTIMATED MILES	DISTANCE[c] METERS	SAMPLE TYPE[d]
N (1)	52	0.1	161	GW
	71(1S)	0.3	483	TLD
	47	0.5	805	TLD
	57	0.8	1201	AP/AI
	18	1.1	1770	TLD
	53	7.5	12068	TLD
NNE (2)	72(2S)[e]	0.4	644	TLD
	2	1.8	2896	TLD
	54	6.5	10459	TLD
NE (3)	73(3S)	0.5	805	TLD
	19	1.8	2896	TLD
	48	4.5	7241	AP/AI
	39	4.4	7084	FI
	46	5.0	8045	TLD
ENE (4)	74(4S)	0.4	644	TLD
	21	1.5	2414	AP/AI/SO/TLD
	20	1.9	3057	TLD
	11	3.1	4988	TLD
	33	3.6	5792	SE
	45	4.3	6919	TLD
	44	5.8	9332	TLD
E (5)	75(5S)	0.4	644	TLD
	22	2.1	3379	TLD
	10	3.1	4988	TLD
	26	3.2	5149	PW

TABLE 4-2 (Cont.)

REMP SAMPLE LOCATIONS BY SECTOR

SECTOR[a]	STATION[b] NUMBER	ESTIMATED MILES	DISTANCE[c] METERS	SAMPLE TYPE[d]
E (5) Cont.	27[e]	3.2	5149	DW
	30	3.3	5311	FI
	43	5.8	9332	TLD
ESE (6)	76(6S)	0.4	644	TLD
	31	1.1	1770	GW
	32	1.2	1931	GW
	51	2.1	3379	TLD
	23	3.0	4827	AP/AI/SO/TLD
	34	3.5	5632	SE
	8	4.5	7241	AP/AI/TLD
	42	5.6	9010	TLD
	36[e]	7.2	11585	MI
	5	7.7	12389	AP/AI/TLD
	38	26.5	42639	FI
	91	4.4	7079	FR
SE (7)	77(7S)	0.5	805	TLD
	24	1.9	3057	TLD
	3	2.0	3218	TLD
	41	5.8	9332	TLD
	40	6.4	10298	AP/AI/MI/TLD
	59	9.6	15443	MI
	61	6.5	10456	TLD
	62	10.9	16730	MI
	63	6.4	10298	MI

TABLE 4-2 (Cont.)

REMP SAMPLE LOCATIONS BY SECTOR

SECTOR[a]	STATION[b] NUMBER	ESTIMATED MILES	DISTANCE[c] METERS	SAMPLE TYPE[d]
SSE (8)	78(8S)	0.7	1126	TLD
	25	1.6	2574	TLD
	55	7.0	11263	TLD
	28	7.4	11907	PW
	4	9.3	14964	AI/AP/TLD
	29	11.0	17699	PW
	37[e]	16.0	25744	GP
S (9)	79(9S)	0.7	1126	TLD
	1	1.3	2092	AP/AI/SO/TLD
	6	7.7	12389	AP/AI/TLD
SSW (10)	80(10S)	0.8	1287	TLD
	50	1.2	1931	TLD
	56	7.0	11263	TLD
SW (11)	81(11S)	0.7	1126	TLD
	13	1.4	2253	TLD
	96	36.0	49250	MI
WSW (12)	82(12S)	0.5	805	TLD
	14	1.4	2253	TLD
	9A,9B,9C[e]	30.0	48270	AP/AI/MI/GP/ TLD/SO
W (13)	83(13S)	0.5	805	TLD
	15	1.4	2253	TLD

TABLE 4-2 (Cont.)

REMP SAMPLE LOCATIONS BY SECTOR

SECTOR[a]	STATION[b] NUMBER	ESTIMATED MILES	DISTANCE[c] METERS	SAMPLE TYPE[d]
WNW (14)	84(14S)	0.5	805	TLD
	16	1.4	2253	TLD
	7	2.7	4344	AP/AI/SO/TLD
NW (15)	85(15S)	0.5	805	TLD
	49	1.2	1931	TLD
NNW (16)	86(16S)	0.4	644	TLD
	17	1.2	1931	TLD
	12	6.1	9815	TLD

(a) The area in the vicinity of Plant 2 is separated into 16 separate sectors for reporting purposes. The 16 sectors cover 360 degrees in equal 22.5 degree sections, beginning with Sector 1 (N) at 348.75 to 11.25 degrees and continuing clockwise through Sector 16 (NNW).

(b) The alternate designations for TLD Stations 71-86 are given in parentheses, i.e. 1S-16S.

(c) Distances are estimated from map positions for each location as a radial distance from Plant 2 containment.

(d) Sample Type Key:

TLD	- Thermoluminescent Dosimeter	MI	- Milk
AP	- Air Particulate	PW	- Surface (River)/ Drinking Water
AI	- Air Iodine	GW	- Ground Water
SE	- Sediment	DW	- Discharge Water
FI	- Fish	GP	- Garden Produce
SO	- Soil	FR	- Fruit

Station 9 designates the Sunnyside-Grandview control area. It is actually three separate stations (Stations 9A for TLD, AI/AP and SO, 9B for milk, and 9C for GP) within a few miles of each other and all within 30-35 miles of Plant 2. Station 96, which is the control station for milk, is also located within the control area. It is 36 miles from Plant 2. Station 9B, which was the control location for milk until 1986, is now an indicator milk location.

(e) Duplicate samples, i.e., samples drawn at the same time as the routine samples and submitted for analysis as a quality assurance check, are collected at this location. The station designation for the duplicate of Station 27 is Station 72. The station designation for the duplicate of Station 36 is Station 37.

TABLE 4-3

DISTANCES[a] IN MILES TO NEAREST POINTS OF INTEREST WITHIN FIVE MILES OF PLANT 2 CONTAINMENT

SECTOR[b] PARAMETER	NEAREST RESIDENT	GARDEN ($>50M^2$)	DAIRY[c] ANIMALS	LIVESTOCK[g]
NE	4.3	0	0	0
ENE	3.9	3.9[d]	0	0
E	4.5	0[e]	0	0
ESE	4.2	4.2[f]	0	0
SE	4.8	0	0	0

[a] These are estimated distances; slight variations occur when the map used for the land use census is changed.

[b] Eleven of the sixteen meterological sectors within the five-mile radius of Plant 2 are on the federally-owned Hanford Site; the remaining land is comprised of 4.48 sq. miles of privately-owned farm land. Only those sectors containing points of interest are presented here.

[c] The closest dairy animal locations are at 6.4 miles, 8.3 miles, 9.6 miles and 10.6 miles SE and 7.2 miles ESE. The dairy at 8.3 miles SE is not used for milk sample collection due to the owner's reluctance to participate in the sampling program.

[d] Large garden with broadleaf; samples were not available due to owner's reluctance to participate in the sampling program.

[e] Large garden at 5.1 miles E, but no broadleaf vegetation observed.

[f] Large garden, but no broadleaf vegetation observed.

[g] The closest meat animals observed were at approximately 5.7 miles ENE.

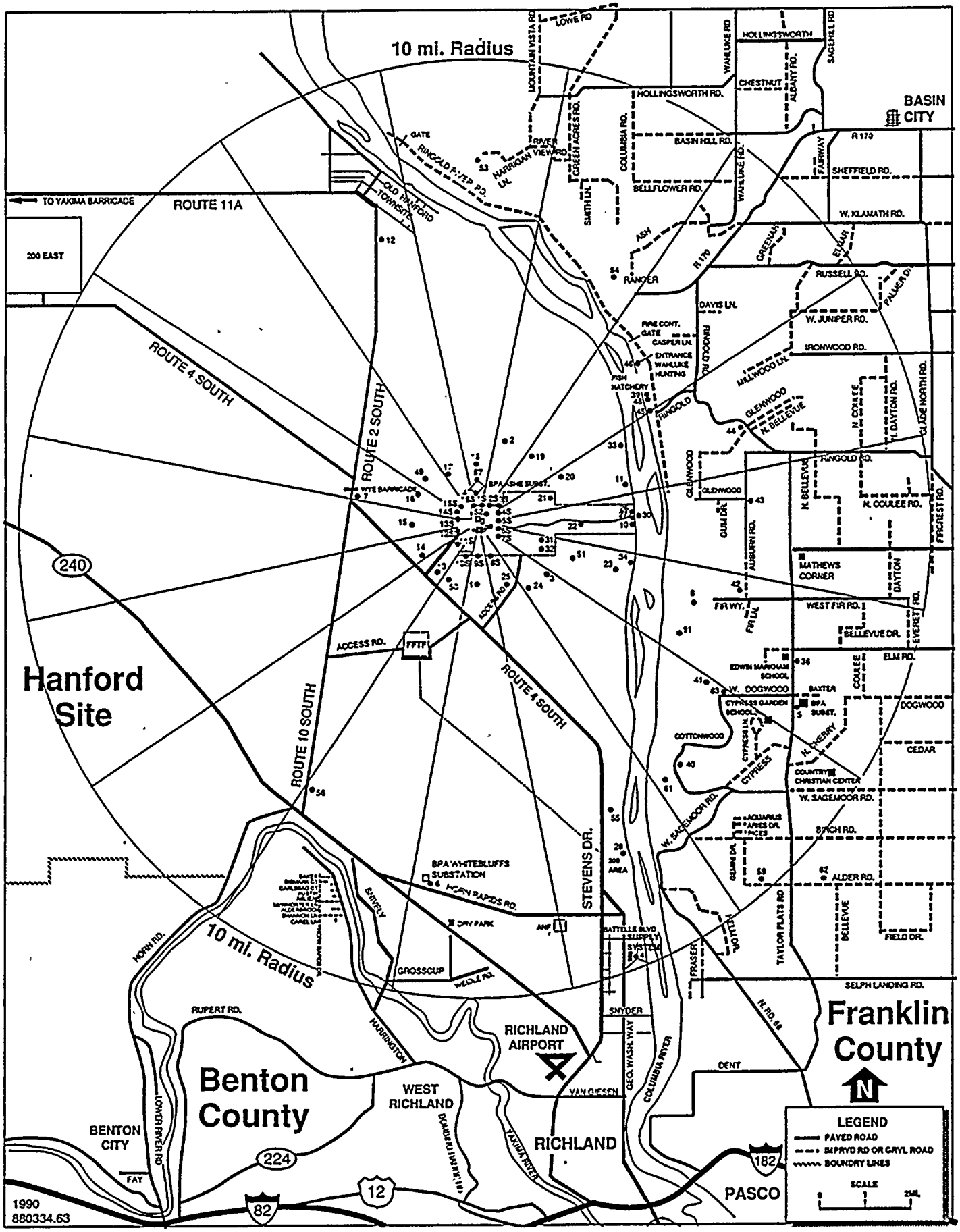
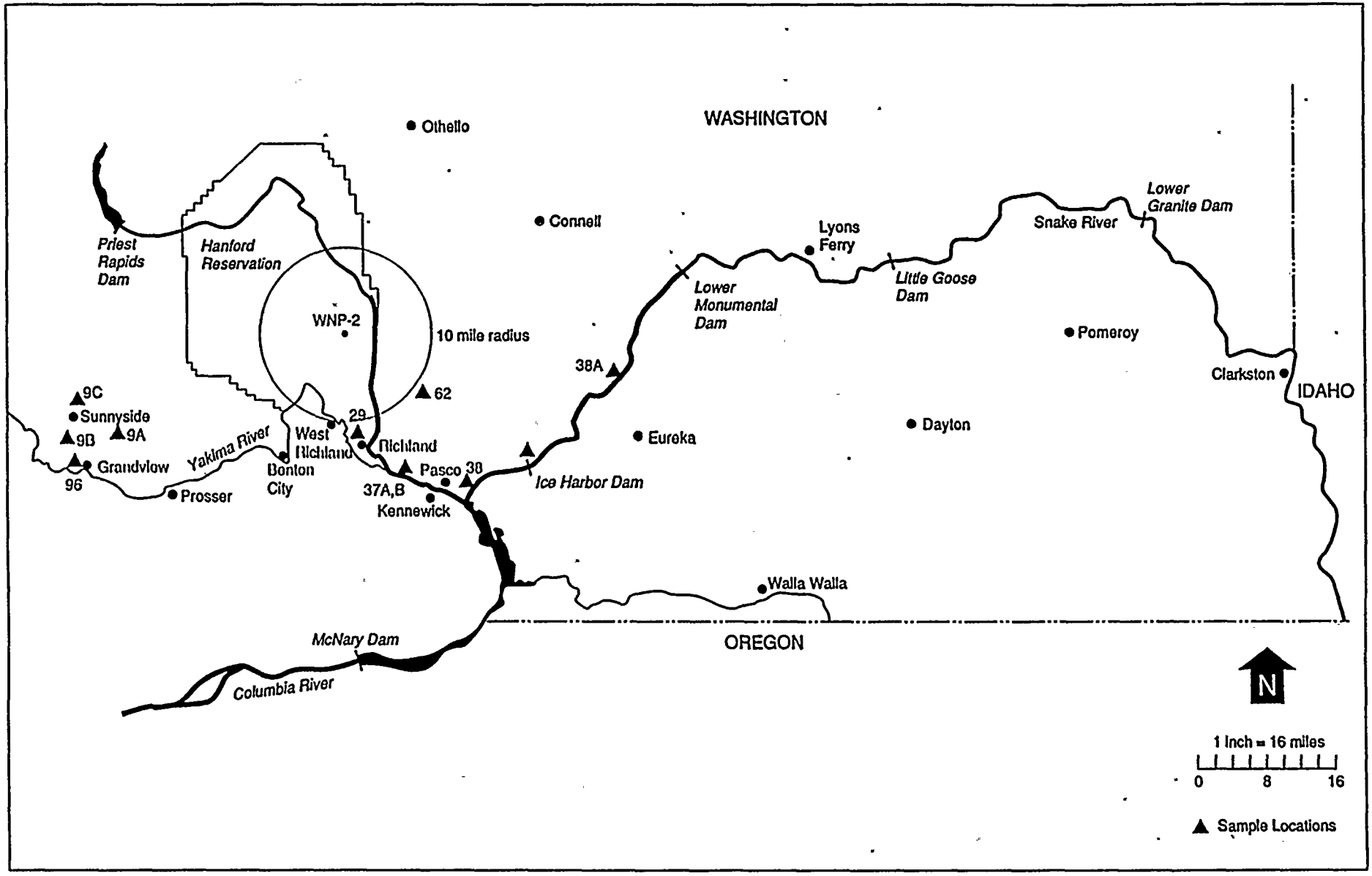


FIGURE 4-1
REMP SAMPLING LOCATIONS WITHIN THE 10-MILE RADIUS



900286A
April 1991

FIGURE 4-2
REMP SAMPLING LOCATIONS OUTSIDE THE 10-MILE RADIUS

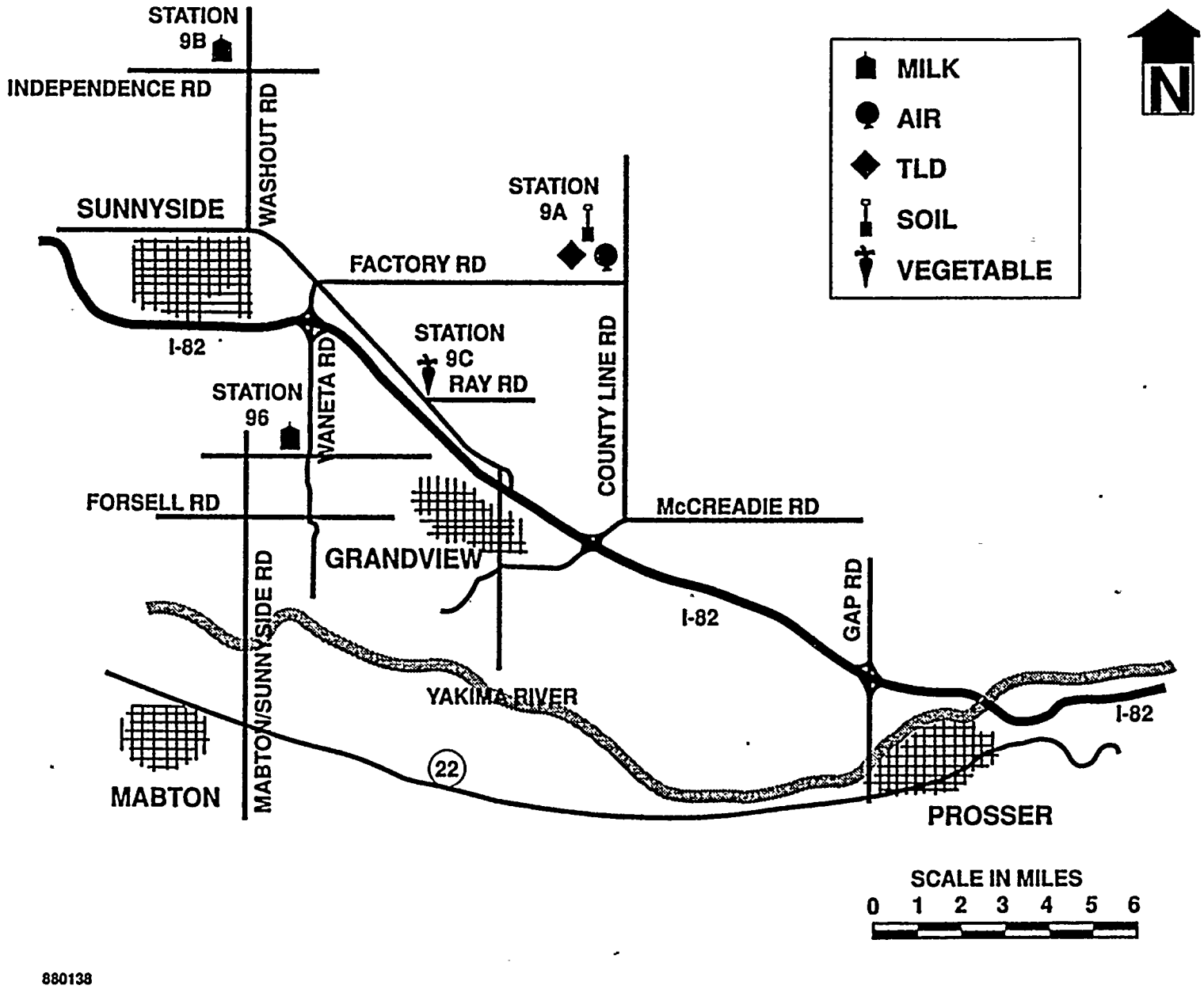


FIGURE 4-3
REMP SAMPLING LOCATIONS IN THE SUNNYSIDE/GRANDVIEW AREA

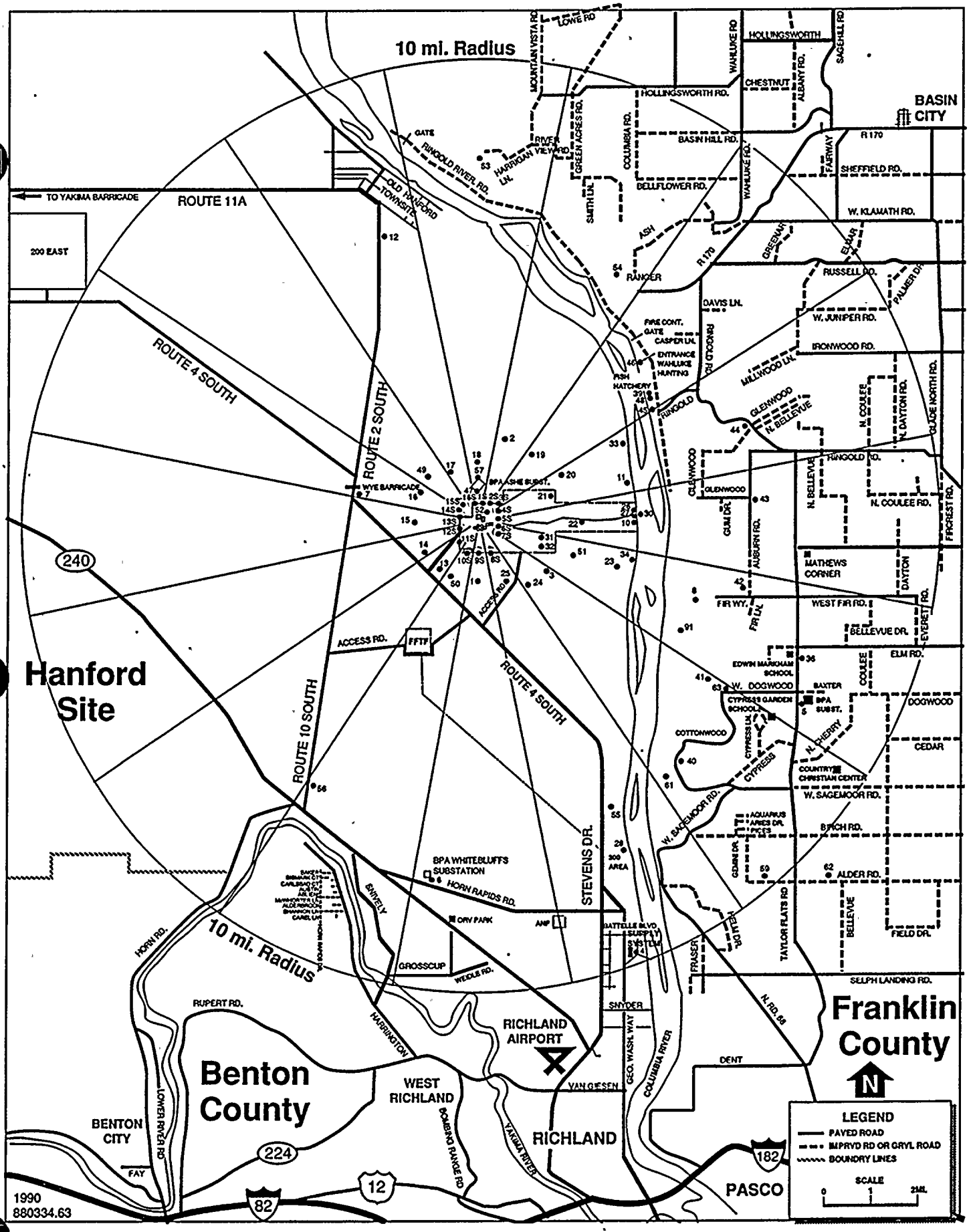


FIGURE 4-4
INNER CIRCLE TLD LOCATIONS

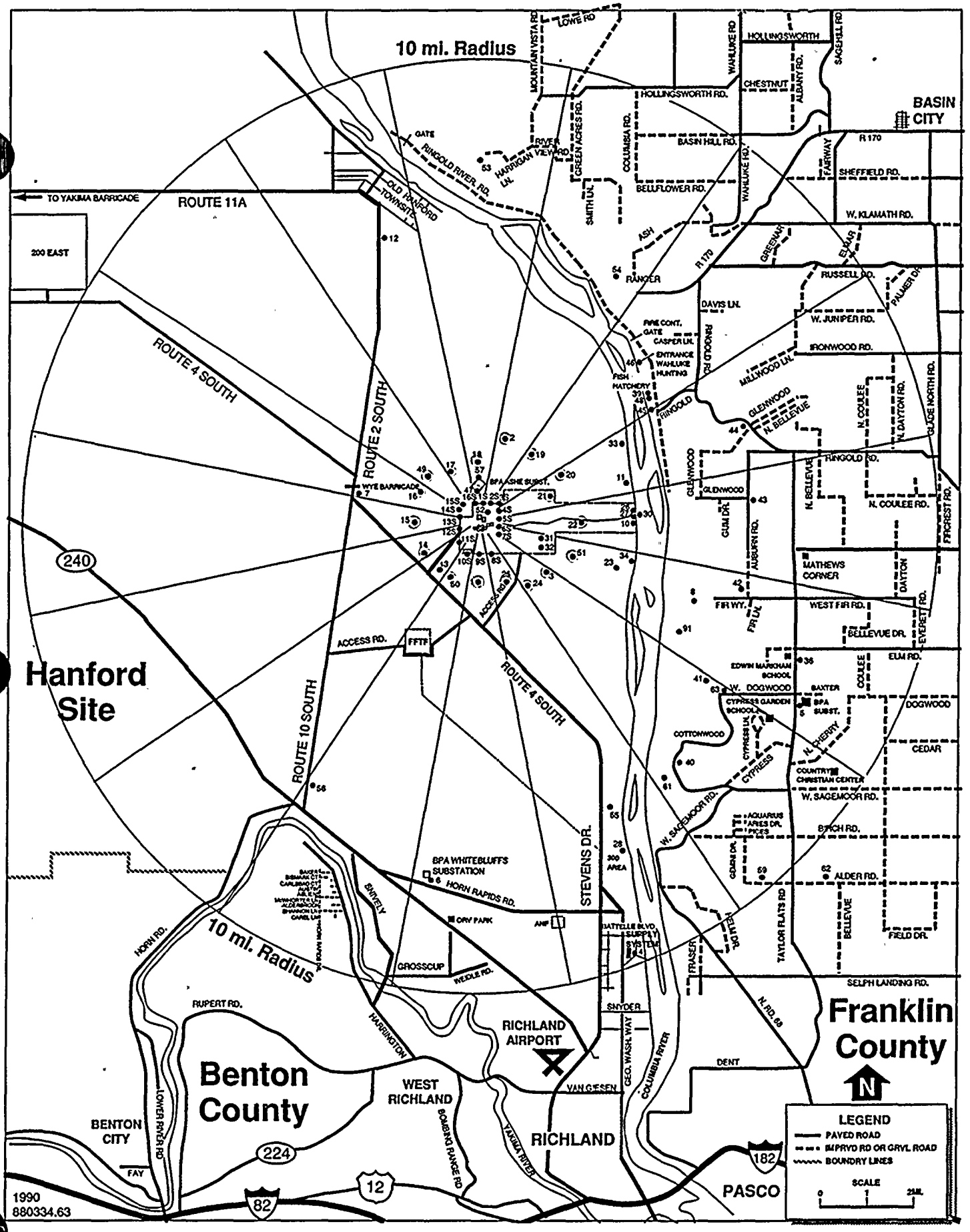


FIGURE 4-5
NEAR-PLANT TLD LOCATIONS

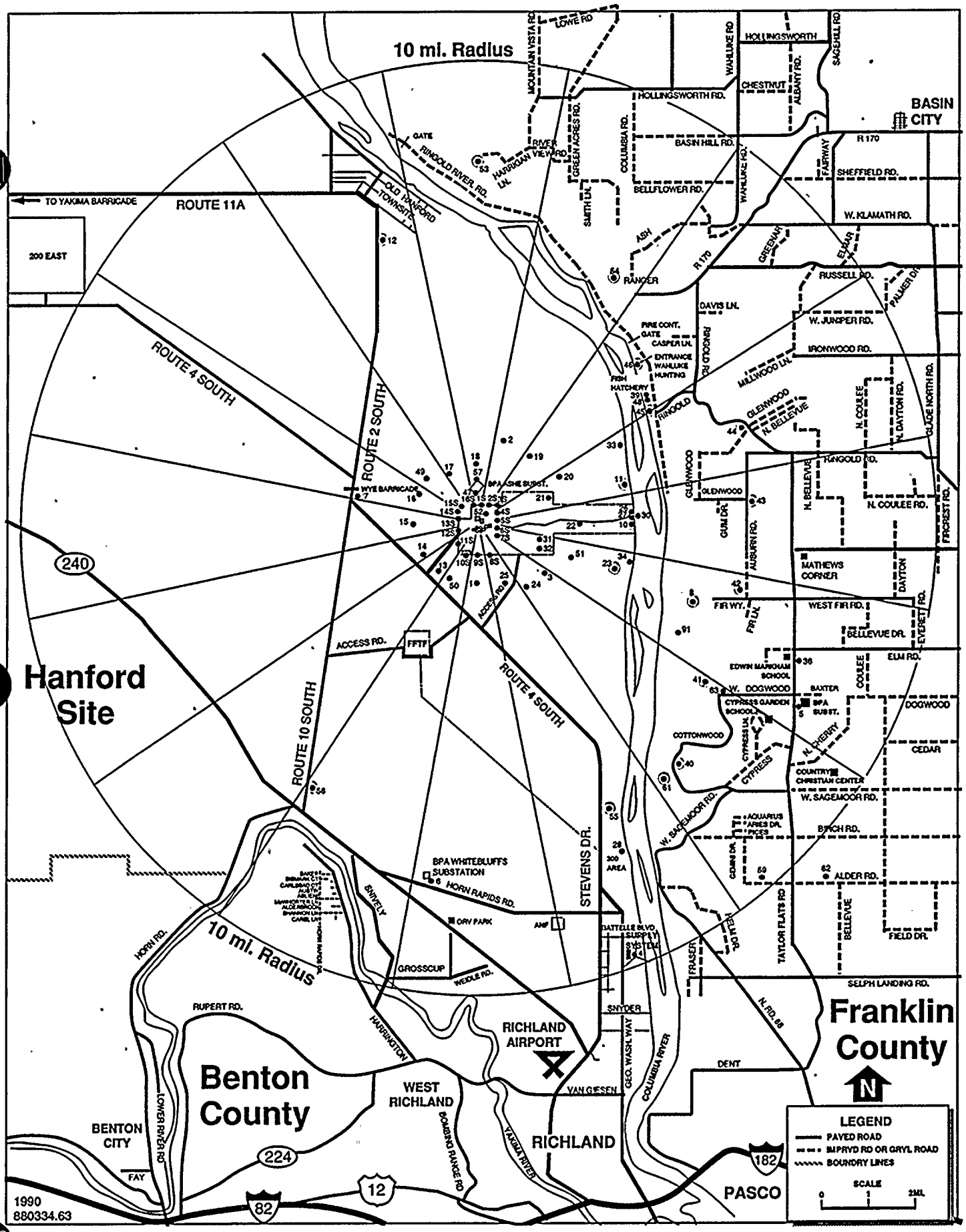


FIGURE 4-6
OUTLYING TLD LOCATIONS WITHIN THE 10-MILE RADIUS

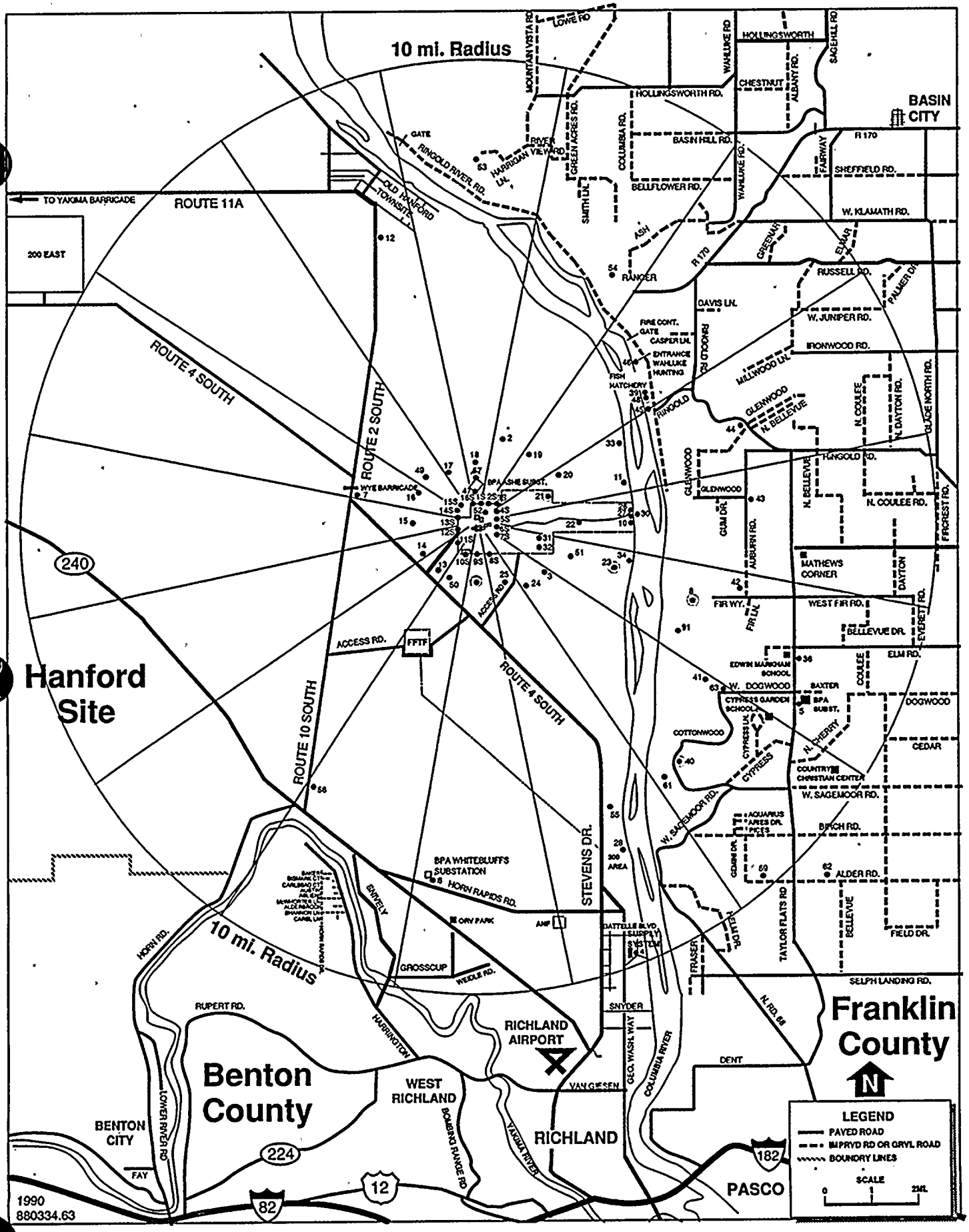


FIGURE 4-7
AIR SAMPLING LOCATIONS WITHIN THE 10-MILE RADIUS

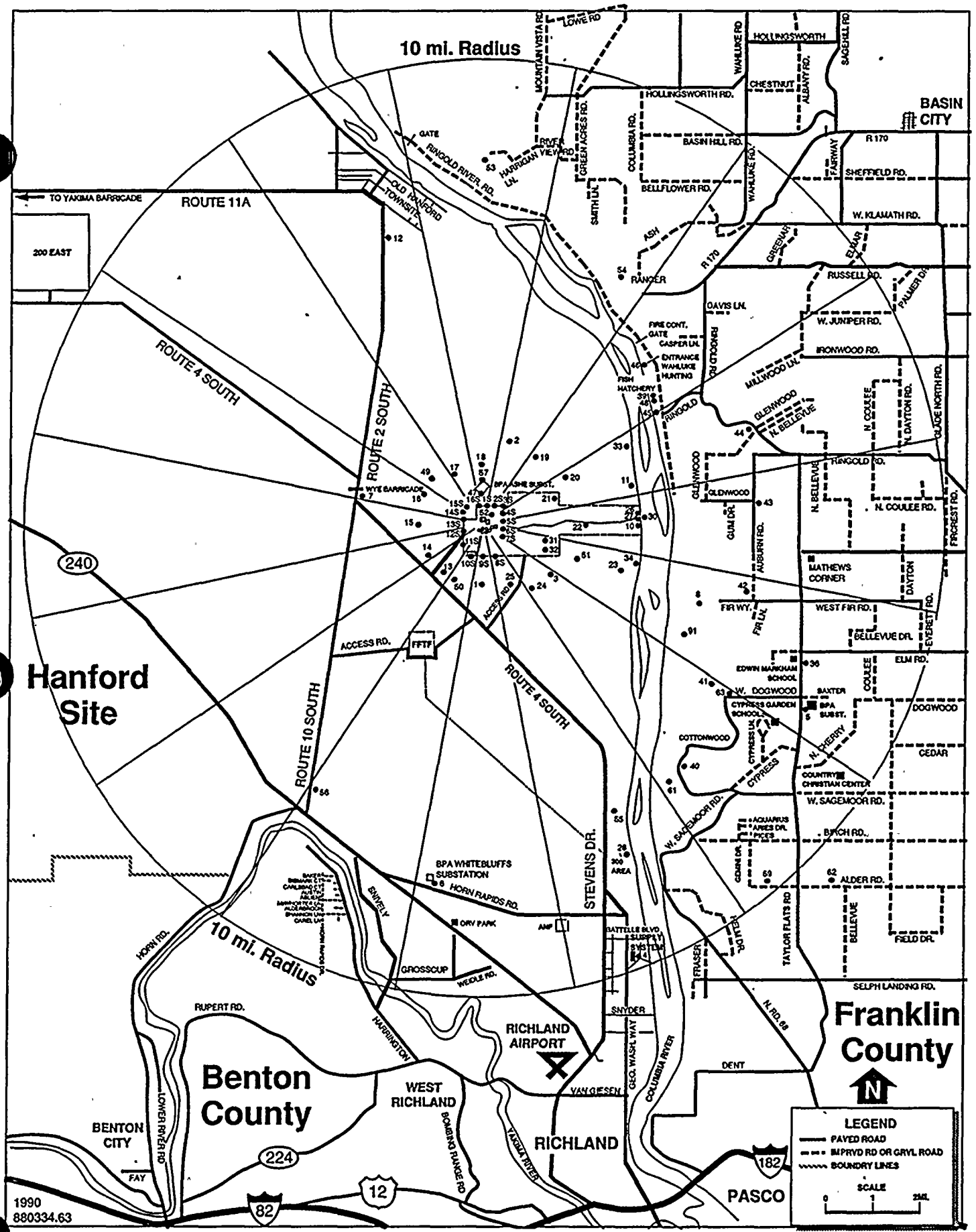


FIGURE 4-8
RIVER/DRINKING AND DISCHARGE WATER SAMPLING LOCATIONS
WITHIN THE 10-MILE RADIUS

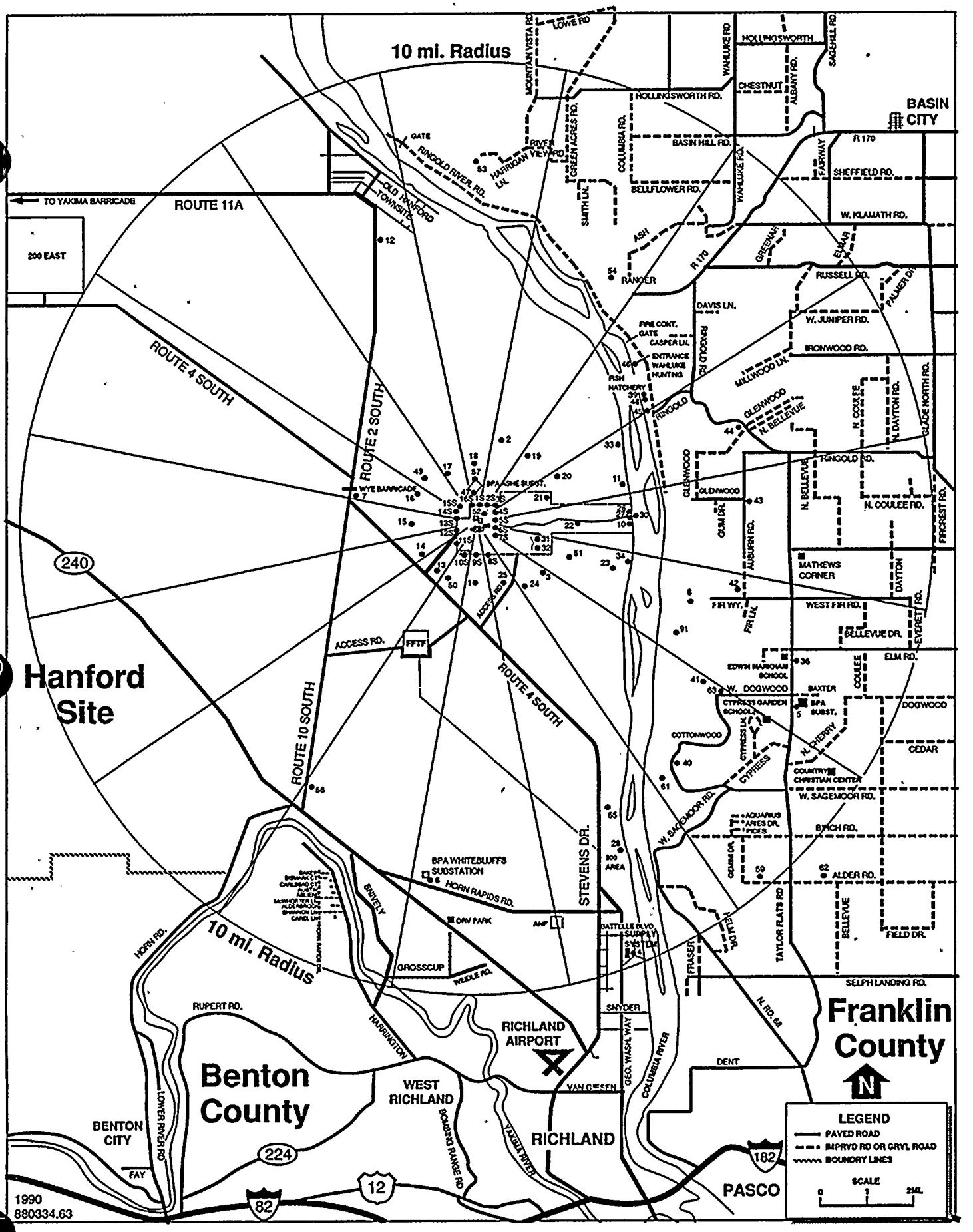


FIGURE 4-9
GROUNDWATER SAMPLING LOCATIONS

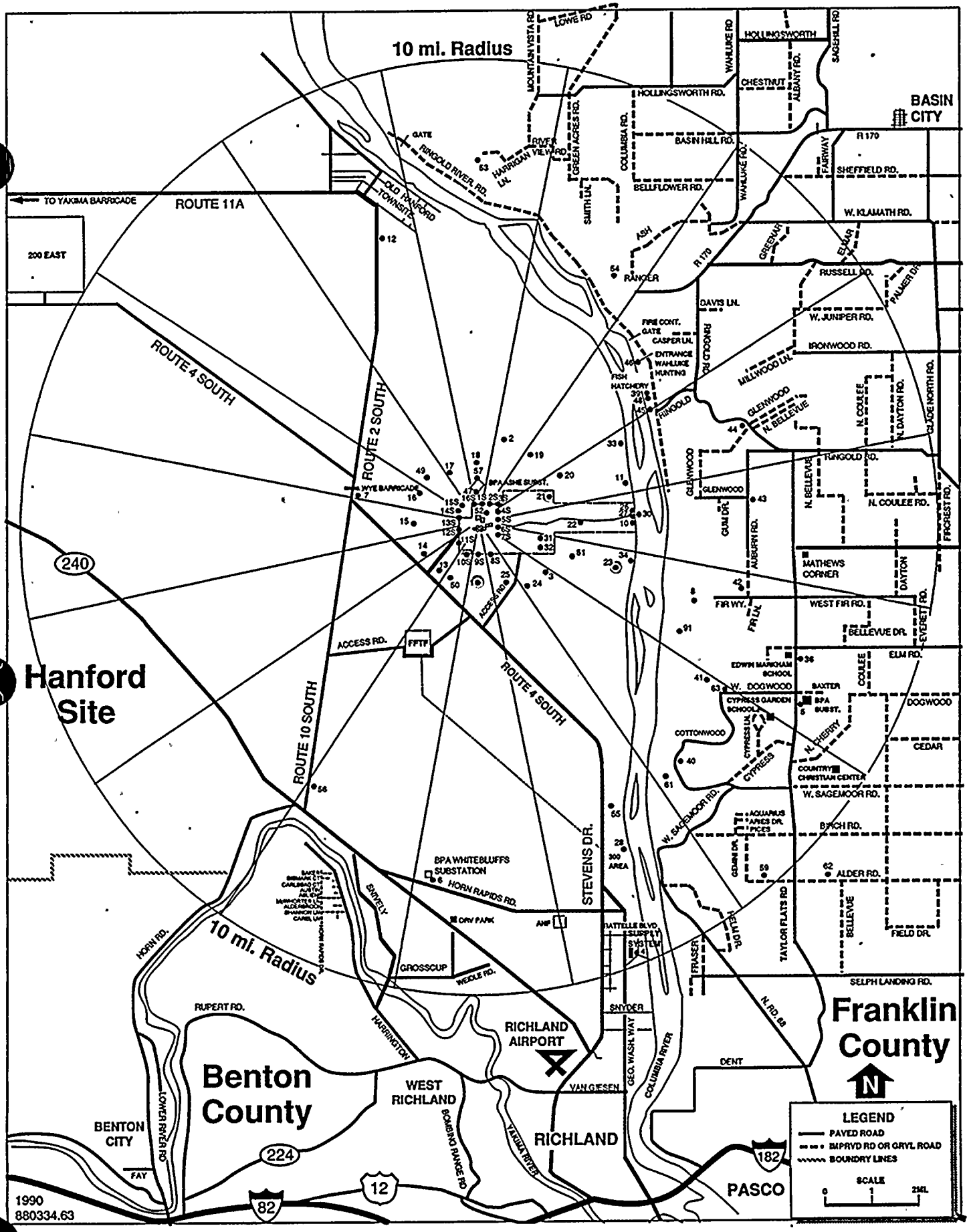


FIGURE 4-10
SOIL SAMPLING LOCATIONS WITHIN THE 10-MILE RADIUS

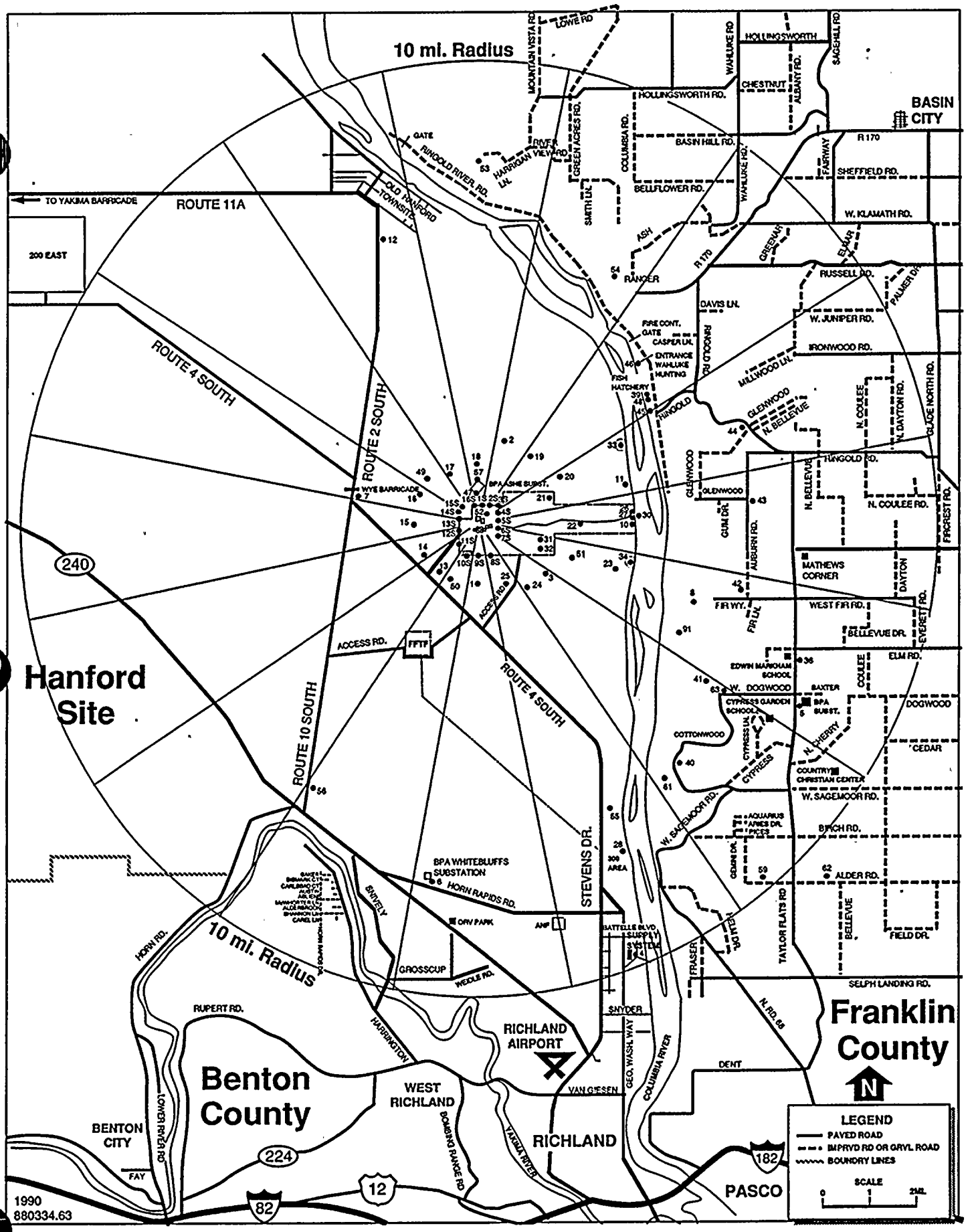


FIGURE 4-11
SEDIMENT SAMPLING LOCATIONS

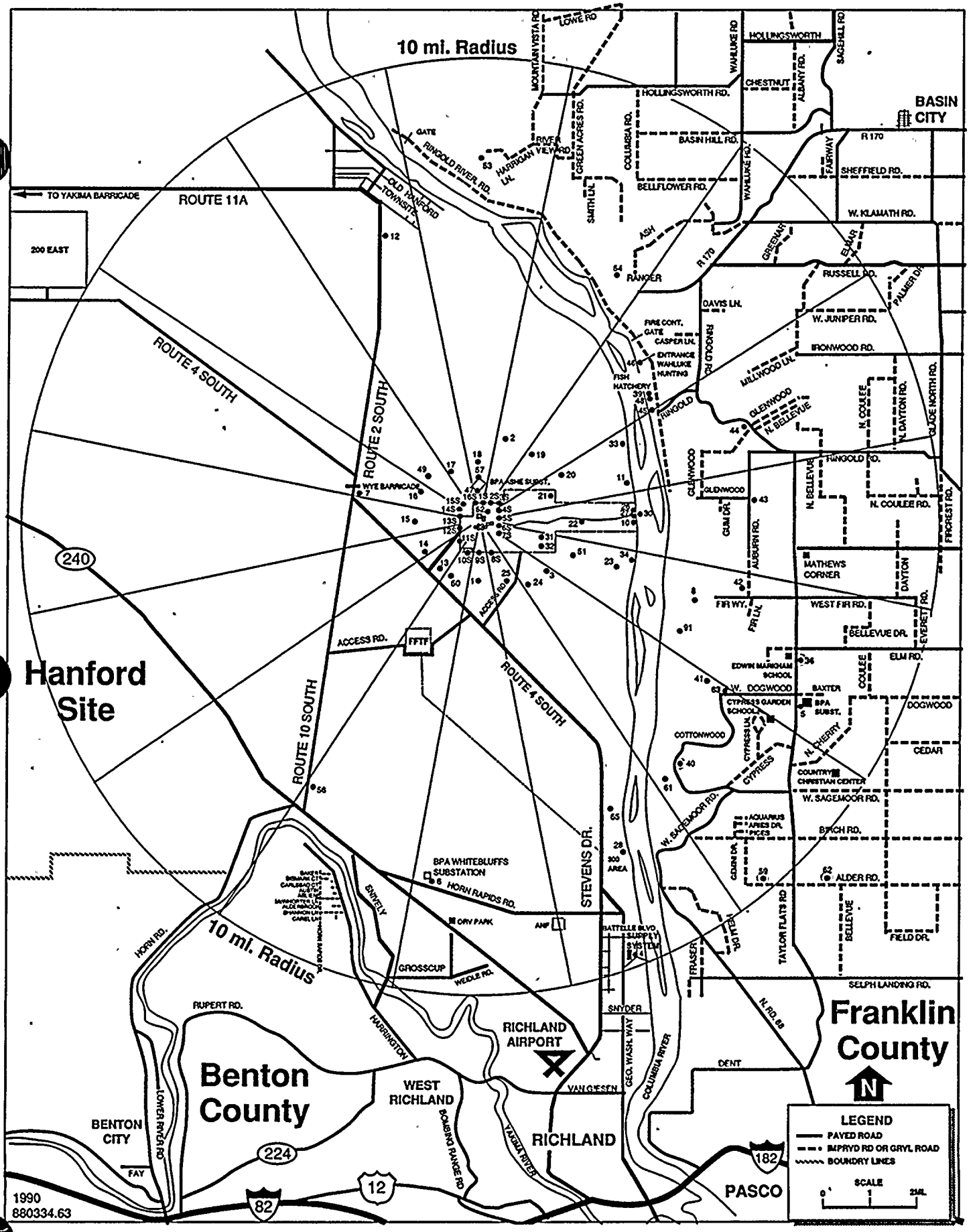


FIGURE 4-12
MILK SAMPLING LOCATIONS WITHIN THE 10-MILE RADIUS

5.0 RESULTS AND DISCUSSION

During 1990 the analyses of REMP samples were performed by Teledyne Isotopes in Westwood, New Jersey. The thermoluminescent dosimeters were processed by the Supply System External Dosimetry Laboratory. Table 5-1 presents the means and ranges of the 1990 results for each type of sample collected. The means and ranges of the preoperational and the previous operational data from 1984 to 1989 are also included in the table for comparison.

The data for the preoperational period and the first six months of 1984 included "less than" (<) designations for results below the actual LLD, the contractual LLD or the two sigma error, depending upon the convention employed by the analytical contractor. Consequently, the data averages using "less than" values are biased high.

The use of the "less than" designation was discontinued in mid 1984. Since then, REMP data have been reported as net results, i.e., total (gross) results minus the detector counting background. Comparison of the mean results for 1990 to the mean preoperational results is difficult due to the high bias resulting from the "less than" data. However, comparison of the range of results observed for each period to determine whether the 1990 results are significantly greater than the results for preoperational and previous operational periods, is a viable approach. Careful interpretation of the data ranges for the previous operational data is still required because of the effects of the Chernobyl accident in 1986. For this report only the data from the last six months of 1984 were included in the previous operational data in order to eliminate the "less than" values in that category of summary data.

The 1990 REMP data compares well to the ranges of data from previous periods. The quarterly TLD results for 1990 were very close to the 1989 results and slightly lower than the 1987 and 1988 results. These slight changes in the TLD results are certainly within the normal range of uncertainty expected for TLD systems.

The 1990 annual TLD results were about 5-10% lower than the mean quarterly results. This relationship between the two TLD distribution types has been observed in nearly all the previous years. It is apparently due to slight fading of the TLD signal on the TLDs kept in the field for the entire year.

The LLDs generally determined by Teledyne Isotopes for each analysis performed and each radionuclide of interest are listed in Table 5-2. Presented alongside the Teledyne LLDs are the LLDs required by the NRC Branch Technical Position (BTP).[3] The LLDs determined for analyses at Teledyne Isotopes have met the NRC requirements in all cases.

A summary of the REMP results relative to detection limits is presented in Table 5-3. If a particular radionuclide of interest was not detected in the 1990 samples, the term "LLD" is noted in the data mean and range columns. Aside from some naturally-occurring radionuclides, the radionuclides detected in the 1990 sample included cesium-137 in fish, soil and sediment,

and cobalt-60 in the discharge water; tritium was also detected in some water samples. Gross beta results in air and water were nearly all above the detection limits.

In general, the positive, or detected, 1990 results compare well with the results from previous years. Any significant differences or increases evident in the 1990 results are discussed in the following subsections.

5.1 Direct Radiation

Summaries of the environmental radiation exposure rates, determined by thermoluminescent dosimeters (TLDs) are presented in Tables 5-4 and 5-5. The individual quarterly and annual results for each TLD station are given in Tables A-1.1 and A-1.2 of Appendix A. Figures 5-1 and 5-2 show the mean quarterly results for near-plant and remote TLD locations for the preoperational period, 1984-1989 and 1990. Figures 5-3 and 5-4 show the annual TLD results for near-plant and remote locations for the same periods. In general, the quarterly and annual results for the control location (Station 9A) show the same fluctuations over time as the indicator locations and the relationships between the different locations remain very consistent over the three periods.

Figure 5-5 presents the mean 1990 results for each of the sixteen meteorological sectors, compared to the sector means for the preoperational and previous operational periods. The relationship of the mean 1990 results to the results for the preoperational and previous operational periods is very similar for each sector. This indicates that there were no significant directional effects observed in the 1990 TLD results. The annual TLD results for each sector also follow the same pattern as the mean quarterly results, except they are 5-10% lower.

In Figure 5-5, the apparent increase in the mean 1990 TLD results over the means of the preoperational and previous operational periods is due to the effect of averaging only the four quarters of 1990 data versus averaging numerous quarters for the other two sets of results. The differences between the data sets are generally within 10%, which is within the range of variation normally expected for TLD systems.

Station 46 in the Wahluke Reserve remained the location with the highest mean exposure rate, 0.31 mR/day. This is the same mean exposure rate determined for that station for 1989. Since the preoperational measurement phase, the results for this location have exceeded the results for all other locations. Variations in the ambient background due to variations in the soil and underlying rock composition account for such local differences in the TLD results. Figure 5-6 compares the Station 46 results to the results of Station 9A, the control location, from 1982 to 1990. The relationship between the results at these two locations has remained fairly consistent from the preoperational period (1982-1983) to the present.

A comparison of the 1990 annual and mean quarterly TLD results is presented in Table 5-6. The 1990 annual TLD results are generally 5-10% lower than the mean quarterly results because of the signal fading characteristics of $CaSo_4$. This difference is not significant, in light of the variability commonly observed in TLD results. In most cases, the annual result is within the uncertainty associated with the quarterly TLD results.

During 1990, a test was performed to determine whether one set of TLDs that had been used in the past for the annual measurements had a higher TL signal fade rate over time than the other sets used for the same purpose. The higher fade rate was suspected because during the years when the set was used, e.g. 1988, the mean quarterly results and the annual results differed by approximately 15-20%. As described in Section 4.0, the test involved collocating nine of the suspect TLDs with nine of the TLDs that had not exhibited a high fade rate. At the end of the year, when these two groups were processed, the mean result of the suspect TLD group was 12% lower than the other group. As discussed previously, all the TLD sets appear to exhibit some TL signal fading, normally amounting to about 5%. But the fading of the suspect group was significantly more than that, so the set will no longer be used.

The log probability plots of the 1990 and previous operational (1984-1989) quarterly TLD results are presented in Figure 5-7. The "slopes" of the lines in both plots are nearly the same, indicating that both sets of data are part of the same distribution.

The log probability plots of the 1990 annual results and the results from previous years of operation are presented in Figure 5-8. The 1990 results are consistent with results observed for the past monitoring periods. The slopes of the lines determined for this data are typical for ambient radiation measurements.

The log probability plots of the quarterly data for a near-plant locations, Stations 71-76, and the control location, Station 9A, from 1982 to 1990 are presented in Figure 5-9. The linearity of the plots indicates that the results are all within the same log normal distribution and that no significant increases or decreases indicating a change in the environmental radiation levels were evident.

The above comparisons of 1990 TLD results to preoperational and previous operational data and the analysis of results by meteorological sector and distance from the plant demonstrate that Plant 2 operations have not impacted the direct radiation levels in the environment around the plant.

5.2 Airborne Particulate/Iodine

The results of the 1990 gross beta in air analyses are presented in Tables A-2.1 and A-2.2 of Appendix A. The 1990 mean weekly results of all indicator stations are plotted in Figure 5-10. The gross beta in air results for 1990 were within the ranges observed during the preoperational

period and during previous operational periods, as shown in Table 5-1 and in Figure 5-11. As observed previously, gross beta levels increased during periods of inversion occurring in the fall and winter months. In fact, the gross beta results plotted over a period of several years (Figure 5-11) show a cyclic pattern of fall and winter increases. The increase, which was evident in the results of all the air sampling locations, including the control location at Station 9A, was likely due to an increase in radon and radon daughter concentrations during the inversions. In Figure 5-12, plots of the weekly gross beta results for near-plant and remote locations and for the control location at Station 9A illustrate the similarity of the results from all locations.

The quarterly gamma analyses of the particulate filter composites, in general, indicated only the presence of beryllium-7 and potassium-40, two naturally-occurring radionuclides, at levels above detection limits at indicator locations and the control location. The results of the gamma analysis of particulate filter composites are presented in Table A-3.1 and A-3.2 of Appendix A.

The results of the gamma analyses of charcoal cartridges for iodine-131 are presented in Table A-4.1. All iodine-131 in air results for 1990 were less than the 0.01 pCi/cubic meter LLD.

No evidence of any impact of plant operations on the environment was apparent in the particulate filter and charcoal cartridge results for 1990.

5.3 Water

During the first eight months of 1990 there were frequent periods when sampler inoperability prevented the continuous collection of composite water samples from the discharge line (Station 27). The focus of efforts to meet Technical Specification requirements during these periods was to put the composite samplers back in operation, at least by the end of the next sampling period. The major problems plaguing the system were resolved when sludge was cleared from the sampling line, which carries water from the discharge line to the sampler. From August to mid-December the sampler operated normally. The outage periods and corrective actions taken to remedy the equipment failures are presented in the sample deviations listing in Appendix D.

To resolve other operational problems associated with the discharge sampling system, two new samplers which do not rely on an external pump to supply sample water will be installed in the river pumphouses during the 1991 plant maintenance outage. The use of two samplers at this location will enable the continued collection of flow-proportional samples when one sampler is inoperable. In addition, a schedule will be developed for periodically clearing sludge from the sample line.

When these composite samplers were not operational, grab samples were often taken as a matter of "good practice," in order to estimate radionuclide

concentrations in the water when flow-proportional sampling was not feasible. The results of the grab samples taken during these periods are presented in Table C-1 of Appendix C.

The gross beta in river/drinking (including intake) and discharge water results are given in Tables A-5.1 and A-5.2 of Appendix A. All river/drinking water results were within the ranges normally observed and less than 8 pCi/liter, the level at which a strontium analysis is performed to verify compliance with the Washington State drinking water standard for strontium-90*. A graph of the gross beta in river/drinking water results during 1990 is presented in Figure 5-13. The gross beta in river/drinking water results from 1984 to 1990 are presented in Figure 5-14. The higher levels observed in the Richland water results in early 1986 and 1987 are due to the use of well water, instead of river water, during the annual maintenance outage of the Richland Water Treatment Plant.

The 1990 gross beta levels in the discharge water were slightly lower than most previous levels observed since the last half of 1986, as shown in Figure 5-15. The average gross beta result for 1990 was 15.8 pCi/liter, compared to the 1989 average of 30.9 pCi/liter. This lower gross beta level resulted from the current mode of plant operations using less concentrated circulating water, i.e., lower cycles of concentration. The gross beta levels in the discharge sample reflect the concentrations of naturally-occurring radionuclides, principally potassium-40, and any radionuclides from upstream sources or past Hanford activities present in the makeup water, in addition to radionuclides from Plant 2 discharges. The discharge sample results are representative of the radioactivity present in plant discharges before any mixing with river water occurs. Therefore, the sample is not indicative of the actual radionuclide concentrations in the river water downstream from Plant 2. This conservative approach of flow-proportional composite sampling from the discharge line in lieu of sampling from the river near the downstream edge of the mixing zone (as required by Technical Specifications) was considered to be the most feasible option. However, careful interpretation of the results from this sampling point is necessary, since they do not represent a true environmental sample.

The 1990 gross beta results for the discharge sample are presented in Figure 5-16. The temporary, or interim, DOH investigation level (75 pCi/liter) which prompts an investigation into the results is shown for comparison, so that these gross beta levels can be put into perspective. Also shown is the maximum annual average gross beta level in <u>drinking water</u> for compliance to the 4 mrem per year state dose limitation, 50 pCi/liter.

The tritium results for river/drinking water, discharge water and ground-water are presented in Tables A-6.1 and A-6.2 of Appendix A. The tritium levels in the river/drinking water were all at or slightly above the LLD for that analysis, as shown in Figure 5-17. All the results were within the range normally observed in such water and within the range of the pre-operational and previous operational results for the same stations.

*Strontium-90 is assumed to account for the gross beta result.

The tritium levels in the discharge water were higher than the levels observed for the river/drinking water samples because of plant releases. As shown in Figure 5-18, they were consistent with the levels observed for the past several years. The levels are reasonable for samples taken directly from the discharge line prior to any river dilution. Compared to the annual average concentration of less than 20,000 pCi/liter of tritium for drinking water to be in compliance with the state dose limitation, the results were low.[16] A graph of the discharge water tritium levels for 1990 alone is presented in Figure 5-19.

The tritium results for the quarterly groundwater samples were all below the LLD. They are presented in Table A-6.1 of Appendix A.

The results of gamma isotopic analyses on river/drinking water, discharge water and groundwater are listed in Tables A-7.1 and A-7.2 of Appendix A. The results of grab samples taken during composite sampler inoperability are presented in Appendix C. All results for the river/drinking water and ground water samples were less than detection limits. All results for discharge water samples were also below the detection levels, except the result for cobalt-60 in the 5/16-6/13 routine composite sample (8.6 pCi/liter) and cobalt-60, zinc-65, cesium-134 and cesium-137 (11.0, 21.0, 7.6 and 9.7 pCi/liter, respectively) in one composite of discharge water grab samples taken during May. Although above detection levels, these results were low and did not exceed any reporting levels.

5.4 Soil

Gamma spectrometry was performed on five soil samples collected in May. The cesium-137 levels in the samples ranged from 32.9 pCi/kilogram to 493 pCi/kilogram. Aside from cesium-137, the only radionuclides detected in the samples were potassium-40, radium-226 and thorium-228, which are part of the natural radioactivity typically found in soils. As shown in Table 5-1, the cesium-137 levels in the soil samples were well within the range observed during preoperational and previous operational sampling.

The gamma spectrometry results for the soil samples are given in Tables A-8.1 and A-8.2 in Appendix A. No indication of impact of Plant 2 operations on the environment was evident in these results.

5.5 Shoreline Sediment

The results of gamma spectrometry of shoreline sediment are presented in Tables A-9.1 and A-9.2 in Appendix A. Aside from the naturally-occurring radionuclides (potassium-40, radium-226 and thorium-228), only cesium-137 was detected downstream of the plant (Station 34). Cesium-137 was also detected in the control location (Station 33) sample. The cesium-137 concentrations upstream from the plant discharge point were 90.8 and 115 pCi/kilogram; the concentrations downstream from the discharge point were 182 and 197 pCi/kilogram. These are consistent with the concentrations observed previously. A graph of the cesium-137 results in sediment from 1984 to 1990 is presented in Figure 5-20.

Cesium-137 has been detected in preoperational samples and in samples taken since plant operation began. It has also been previously identified as a component of the Columbia River sediment originating from the operation of the old Hanford Reservation reactors.[17]

5.6 Fish

The gamma spectrometry results of fish samples collected in the vicinity of the Plant 2 discharge and at the control location on the Snake River are presented in Tables A-10.1 and A-10.2 of Appendix A. All results were below detection limits, except for potassium-40, a naturally-occurring radionuclide, and cesium-137. The detectable cesium-137 levels for the fish taken from the Columbia River were within the range observed during the preoperational and previous operational periods.

5.7 Milk

All the results of iodine-131 analyses of milk samples collected during 1990 were less than detection limits. The routine iodine-131 in milk results are listed in Tables A-11.1 and A-11.2 of Appendix A. A graph of the 1990 iodine in milk results is presented in Figure 5-21. The gamma spectrometry results for the same milk samples are listed in Tables A-12.1 and A-12.2. All results for the indicator and control locations were less than the detection limits.

5.8 Garden Produce

The gamma isotopic analysis results for all root, fruit and leafy vegetables were below detection limits. The results of all produce samples, including the apples collected from Station 91 and the cherries collected from Station 61, are listed in Tables A-13.1 through A-15.2 of Appendix A.

TABLE 5-1

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM COMPARATIVE SUMMARY

MEDIA/ANALYSIS	PREOPERATIONAL[a]		PREVIOUS OPERATIONAL[b][c]		1990[d]	
	MEAN	(RANGE)	MEAN	(RANGE)	MEAN	(RANGE)
Air: pCi/m^3						
Gross Beta	<0.02	(<0.003 - 0.130)	0.03	(0.00 - 0.74)	0.01	(0.02 - 0.04)
I-131[e]	<0.05	(<0.01 - 0.11)	0.01	(-0.04 - 0.82)	0.00	(-0.07 - 0.02)
Gamma						
Cs-134	<0.01	(<0.001 - 0.040)	0.001	(-0.002 - 0.015)	0.0000	(-0.0004 - 0.0003)
Cs-137	<0.01	(<0.001 - 0.040)	0.002	(-0.001 - 0.036)	0.0001	(-0.0004 - 0.0003)
Ru-103	Not Reported		0.001	(0.000 - 0.019)	0.0000	(-0.0006 - 0.0004)
River/Drinking Water: pCi/l						
Gross Beta	<3.0	(<1.0 - <6.0)	2.1	(-0.2 - 9.1)	1.7	(0.6 - 2.9)
Gamma						
Cs-134	<3.8	(<1.0 - <12.0)	0.5	(-3.6 - 5.2)	0.2	(-3.1 - 3.8)
Cs-137	<4.1	(<1.0 - <13.0)	1.2	(-4.0 - 5.1)	1.3	(-5.7 - 5.7)
Co-58	<5.1	(<1.0 - <25.0)	0.0	(-3.3 - 2.9)	-0.2	(-2.4 - 2.0)
Co-60	<4.7	(<1.0 - <13.0)	1.1	(-4.9 - 7.1)	1.0	(-4.7 - 5.4)
Fe-59	<13.3	(<2.0 - <93.0)	0.7	(6.4 - 6.6)	-1.0	(-5.5 - 3.9)
Zn-65	<8.3	(<2.0 - <27.0)	-2.3	(-16.0 - 3.9)	-1.5	(-10.5 - 8.2)
H-3	<481.7	(220 - <820)	177.0	(-52.0 - 596.0)	106.9	(-51.0 - 250)
Sr-90	<2.0		0.4	(0.3 - 0.7)	Not analyzed	
Groundwater: pCi/l						
Gamma						
Cs-134	<4.0	(<1.0 - <12.0)	0.6	(-4.1 - 5.4)	-0.1	(-2.2 - 2.9)
Cs-137	<3.8	(0.8 - <8.0)	1.1	(-3.1 - 4.9)	1.0	(0.0 - 2.0)
Co-58	<4.7	(<1.0 - <12.0)	-0.1	(-2.7 - 1.9)	-0.5	(-2.8 - 1.1)
Co-60	<4.1	(0.1 - <9.0)	1.3	(-1.7 - 8.4)	0.7	(-2.4 - 2.4)
Fe-59	<11.6	(<2.0 - <33.0)	0.7	(-4.5 - 5.7)	0.1	(-4.1 - 2.7)
Zn-65	<8.6	(<2.0 - 17.0)	-2.3	(-46.8 - 4.4)	-1.9	(-7.3 - 15.0)
H-3	<467.8	(<10.0 - 2600.0)	80.7	(-516.0 - 470.0)	20.3	(-100.0- 220.0)
Sr-90	<0.4	(<0.1 - 0.7)	Not analyzed		Not analyzed	

(a)All stations, all years.
(b)Indicator stations only for the years 1984 to 1989. Some of the data means and ranges are biased high due to the effects of the Chernobyl accident in 1986.
(c)The data used for these averages does not include the "less than" values reported in 1984.
(d)Indicator stations only.
(e)Charcoal cartridge results.

TABLE 5-1 (Cont.)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM COMPARATIVE SUMMARY

MEDIA/ANALYSIS	PREOPERATIONAL[a]		PREVIOUS OPERATIONAL[b][c]		1990[d]	
	MEAN	(RANGE)	MEAN	(RANGE)	MEAN	(RANGE)
Discharge Water: pCi/l						
Gross Beta	<2.8	(<1.9 - 4.0)	18.2	(0.6 - 48.0)	15.8	(6.1 - 35.0)
Gamma						
Cs-134	<3.7	(<1.0 - <8.0)	0.4	(-3.0 - 5.4)	0.8	(-0.9 - 4.4)
Cs-137	<4.7	(<1.0 - 16.0)	1.5	(-1.3 - 7.9)	2.2	(-1.6 - 5.6)
Co-58	<1.4	(1.0 - 13.0)	0.1	(-2.6 - 4.6)	-0.2	(-2.3 - 1.3)
Co-60	<5.0	(<1.9 - <13.0)	2.7	(-8.7 - 28.2)	1.3	(-1.1 - 8.6)
Fe-59	<11.9	(<3.0 - <38.0)	0.7	(-3.0 - 6.0)	1.3	(-0.4 - 2.7)
Zn-65	<8.6	(<2.0 - 27.0)	3.4	(-4.9 - 86.7)	-0.6	(-7.5 - 7.9)
H-3	<420.0	(<80.0 - 700.0)	1040.0	(60.0 - 4400.0)	1396.3	(55.0 - 3400.0)
Sr-90	<3.0		0.8	(0.5 - 1.1)	Not analyzed	
Sediment: pCi/kg						
Gamma						
Cs-134	<112.5	(<50.0 - <150.0)	57.7	(7.0 - 172.0)	74.4	(67.9 - 80.8)
Cs-137	<287.0	(<50.0 - <560.0)	368.0	(153.0 - 1890.0)	190.0	(182.0 - 197.0)
Co-60	<254.6	(130.0 - 610.0)	54.8	(27.1 - 129.0)	15.0	(14.8 - 15.2)
Co-57	Not Reported		46.0	(34.0 - 54.0)	0.5	(-11.6 - 12.5)
Eu-152	Not Reported		143.0	(140.0 - 146.0)	85.8	(5.6 - 166.0)
Soil: pCi/kg						
Gamma						
Cs-134	<65.3	(<20.0 - <150.0)	29.7	(7.1 - 53.2)	17.5	(13.9 - 23.3)
Cs-137	364.3	(<20.0 - <1880.0)	313.0	(9.4 - 735.0)	287.0	(32.9 - 493.0)
Sr-90	Analysis Not Performed		357.5	(260.0 - 455.0)	Analysis not performed	
Milk: pCi/l						
Gamma						
Cs-134	<3.7	(<0.9 - <14.0)	1.3	(-7.4 - 22.6)	0.4	(-3.3 - 3.0)
Cs-137	<3.8	(<1.0 - <12.0)	4.0	(-7.4 - 47.3)	1.6	(-2.5 - 6.8)
Ba-140	<72.1	(<6.0 - <2000.0)	0.5	(-44.3 - 55.0)	-0.6	(-12.0 - 9.9)
La-140	<33.3	(<5.0 - <1000.0)	-0.7	(-24.2 - 9.7)	-0.3	(-4.5 - 4.1)
I-131[e]	<0.5	(<0.1 - <1.0)	1.6	(-0.8 - 144.0)	0.0	(-0.3 - 0.4)
Sr-90	Not Reported		2.2	(-1.3 - 3.9)	Not Reported	

(a)All stations, all years.
(b)Indicator stations only for the years 1984 to 1989. Some of the data means and ranges are biased high due to the effects of the Chernobyl accident in 1986.
(c)The data used for these averages does not include the "less than" values reported in 1984.
(d)Indicator stations only.

TABLE 5-1 (Cont.)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM COMPARATIVE SUMMARY

MEDIA/ANALYSIS	PREOPERATIONAL[a]		PREVIOUS OPERATIONAL[b][c]		1990[d]	
	MEAN	(RANGE)	MEAN	(RANGE)	MEAN	(RANGE)
Fish: pCi/kg						
Gamma						
Cs-134	<61.2	(<6.0 - <130.0)	1.5	(-20.4 - 14.4)	7.5	(0.0 - 24.0)
Cs-137	<88.8	(<10.0 - <130.0)	13.1	(-35.1 - 54.9)	15.3	(2.5 - 31.4)
Co-58	<87.7	(<9.0 - <130.0)	1.5	(-16.8 - 25.8)	0.1	(-8.2 - 6.7)
Co-60	<80.6	(<9.0 - <130.0)	0.5	(-18.4 - 19.1)	-0.8	(-7.1 - 7.0)
Fe-59	<130.0	(<30.0 - <260.0)	-2.1	(-34.6 - 21.1)	7.2	(-10.2 - 30.0)
Mn-54	<88.3	(<8.0 - <130.0)	2.0	(-10.3 - 30.9)	1.0	(-7.4 - 7.9)
Produce: pCi/kg						
Gamma						
Cs-134	<49.1	(<10.0 - < 140.0)	1.4	(-24.8 - 19.8)	1.3	(-12.0 - 17.0)
Cs-137	<69.8	(<10.0 - < 140.0)	4.3	(-9.8 - 20.9)	5.6	(-3.6 - 15.0)
I-131	<105.6	(<10.0 - <1000.0)	1.2	(-21.3 - 59.0)	-4.0	(-12.0 - 3.5)
TLD: mR/day						
Quarterly	0.24	(0.11 - 0.32)	0.24	(0.16 - 0.35)	0.26	(0.23 - 0.32)
Annual	0.23	(0.20 - 0.31)	0:23	(0.18 - 0.32)	0.24	(0.22 - 0.29)

(a)All stations, all years.
(b)Indicator stations only for the years 1984 to 1989. Some of the data means and ranges are biased high due to the effects of the Chernobyl accident in 1986.
(c)The data used for these averages does not include the "less than" values reported in 1984.
(d)Indicator stations only.

TABLE 5-2

COMPARISON OF TELEDYNE NOMINAL LOWER LIMITS OF DETECTION WITH BRANCH TECHNICAL POSITION REQUIREMENTS

MEDIA (UNITS)	ANALYSIS	TELEDYNE LLDs	BTP REQUIRED LLDs
Air Particulates: (pCi/m^3)	Gross Beta	0.003	0.01
	Gamma Spectrometry	--	--
	Cs-134	0.001	0.05
	Cs-137	0.001	0.06
Air Iodine: (pCi/m^3)	I-131	0.01	0.07
Water: (pCi/l)	Gross Beta	4	4
	Tritium	100-200	2000
	I-131	1	1
	Sr-90	1	--
	Gamma Spectrometry		
	Mn-54	10	15
	Fe-59	20	30
	Co-58	10	15
	Co-60	10	15
	Zn-65	20	30
	Zr-95	20	30
	Nb-95	10	15
	Cs-134	10	15
	Cs-137	10	18
	Ba-140	20	60
	La-140	10	15
Soil/ Sediment: (pCi/kg)	Gamma Spectrometry		
	Co-57	120	--
	Co-60	30	--
	Cs-134	30	150
	Cs-137	40	180
	Sr-90	10	--
Fish: (pCi/kg)	Gamma Spectrometry		
	Mn-54	20	130
	Fe-59	30	260
	Co-58	20	130
	Co-60	20	130
	Zn-65	30	260
	Cs-134	20	130
	Cs-137	20	150

TABLE 5-2 (Cont.)

COMPARISON OF TELEDYNE NOMINAL LOWER LIMITS OF DETECTION WITH BRANCH TECHNICAL POSITION REQUIREMENTS

MEDIA (UNITS)	ANALYSIS	TELEDYNE LLDs	BTP REQUIRED LLDs
Milk: (pCi/l)	I-131	0.5	1
	Gamma Spectrometry		
	Cs-134	10	15
	Cs-137	10	18
	Ba-140	20	60
	La-140	10	15
	Sr-90	1	--
Garden Produce: (pCi/kg)	Gamma Spectrometry		
	Cs-134	20	60
	Cs-137	20	80
	I-131	30	60

TABLE 5-3

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

WASHINGTON PUBLIC POWER SUPPLY SYSTEM WNP-2 DOCKET NO. 50-397

HANFORD WASHINGTON JANUARY 1 to DECEMBER 31, 1990

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED	LOWER LIMIT OF DETECTION (LLD)	ALL INDICATOR LOCATIONS MEAN (b)[a] RANGE	LOCATION WITH HIGHEST MEAN NAME DISTANCE AND DIRECTION	MEAN (b)[a]	CONTROL LOCATION MEAN (b)[a] RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
AIR PARTICULATES (pCi/m^3)	Gross Beta 624	0.003	0.013(563/572) (0.002-0.059)	5	0.014(52/52) (0.004-0.059)	0.012(51/52) (0.002-0.03)	0
	Gamma (Quarterly) 48						
	Be-7	0.01	0.055(44/44) (0.034-0.091)	48 4.5 mi NE	0.068(4/4) (0.039-0.080)	0.047(4/4) (0.036-0.060)	0
	K-40	0.01	0.006(6/44) (0.005-0.008)	48 4.5 mi NE	0.008(1/4) -	0.005(1/4) -	0
	Cs-137	0.01	LLD			LLD	0
	Cs-134	0.001	LLD			LLD	0
AIR IODINE (pCi/m^3)	I-131 624	0.01	LLD			LLD	0

(a) "(b)" is the ratio of positive results above the LLD to the number of samples analyzed for the parameter of interest.

TABLE 5-3 (Continued)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

WASHINGTON PUBLIC POWER SUPPLY SYSTEM WNP-2 DOCKET NO. 50-397

HANFORD WASHINGTON JANUARY 1 to DECEMBER 31, 1990

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED		LOWER LIMIT OF DETECTION (LLD)	ALL INDICATOR LOCATIONS MEAN (b)[a] RANGE	LOCATION WITH HIGHEST MEAN NAME DISTANCE AND DIRECTION			MEAN (b)[a]	CONTROL LOCATION MEAN (b)[a] RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
WATER (River/Drinking) (pCi/liter)	Gross Beta	36	4	1.74(20/24) (0.64-2.90)	28	7.4 mi	SSE	1.93(10/12) (1.3-2.6)	1.78(10/12) (0.65-4.40)	0
	Tritium	12	200	210(3/8) (140-250)	28	7.4 mi	SSE	245(2/4) (240-250)	LLD	0
	Gamma	36								
	Mn-54		10	LLD					LLD	0
	Fe-59		20	LLD					LLD	0
	Co-58		10	LLD					LLD	0
	Co-60		10	LLD					LLD	0
	Zn-65		20	LLD					LLD	0
	Zr-95		20	LLD					LLD	0
	Nb-95		10	LLD					LLD	0
	Cs-134		10	LLD					LLD	0
	Cs-137		10	LLD					LLD	0
	Ba-140		20	LLD					LLD	0
	La-140		10	LLD					LLD	0

(a) "(b)" is the ratio of positive results above the LLD to the number of samples analyzed for the parameter of interest.

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

WASHINGTON PUBLIC POWER SUPPLY SYSTEM WNP-2 DOCKET NO. 50-397
HANFORD WASHINGTON JANUARY 1 to DECEMBER 31, 1990

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED	LOWER LIMIT OF DETECTION (LLD)	ALL INDICATOR LOCATIONS MEAN (b)[a] RANGE	LOCATION WITH HIGHEST MEAN NAME DISTANCE AND DIRECTION	MEAN (b)[a]	CONTROL LOCATION MEAN (b)[a] RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
WATER (Discharge) (pCi/liter)	Gross Beta 12	12	15.8(12/12) (6.1-35)	27 3.2 mi E	15.8(12/12) (6.1-35)	None	0
	Tritium 4	200	1843(3/4) (130-3400)	27 3.2 mi E	1843(3/4) (130-3400)	None	0
	Gamma 12						
	Mn-54	10	LLD			LLD	0
	Fe-59	20	LLD			LLD	0
	Co-58	10	LLD			LLD	0
	Co-60	10	8.60(1/12)	27 3.2 mi E	8.60(1/12)	LLD	0
	Zn-65	20	LLD			LLD	0
	Zr-95	20	LLD			LLD	0
	Nb-95	10	LLD			LLD	0
	Cs-134	10	LLD			LLD	0
	Cs-137	10	LLD			LLD	0
	Ba-140	20	LLD			LLD	0
	La-140	10	LLD			LLD	0

(a) "(b)" is the ratio of positive results above the LLD to the number of samples analyzed for the parameter of interest.

TABLE 5-3 (Continued)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

WASHINGTON PUBLIC POWER SUPPLY SYSTEM WNP-2 DOCKET NO. 50-397

HANFORD WASHINGTON JANUARY 1 to DECEMBER 31, 1990

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED		LOWER LIMIT OF DETECTION (LLD)	ALL INDICATOR LOCATIONS MEAN (b)[a] RANGE	LOCATION WITH HIGHEST MEAN NAME DISTANCE AND DIRECTION		MEAN (b)[a]	CONTROL LOCATION MEAN (b)[a] RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
WATER (Ground) (pCi/liter)	Tritium	12	200	220(1/12)	52	0.1 mi N	220(1/4)	None	0
	Gamma	12							
	Mn-54		10	LLD				LLD	0
	Fe-59		20	LLD				LLD	0
	Co-58		10	LLD				LLD	0
	Co-60		10	LLD				LLD	0
	Zn-65		20	LLD				LLD	0
	Zr-95		20	LLD				LLD	0
	Nb-95		10	LLD				LLD	0
	Cs-134		10	LLD				LLD	0
	Cs-137		10	LLD				LLD	0
	Ba-140		20	LLD				LLD	0
	La-140		10	LLD				LLD	0

(a) "(b)" is the ratio of positive results above the LLD to the number of samples analyzed for the parameter of interest.

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

WASHINGTON PUBLIC POWER SUPPLY SYSTEM WNP-2 DOCKET NO. 50-397

HANFORD WASHINGTON JANUARY 1 to DECEMBER 31, 1990

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED	LOWER LIMIT OF DETECTION (LLD)	ALL INDICATOR LOCATIONS MEAN (b)[a] RANGE	LOCATION WITH HIGHEST MEAN NAME DISTANCE AND DIRECTION	MEAN (b)[a]	CONTROL LOCATION MEAN (b)[a] RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
SOIL (pCi/kg dry)	Gamma 5						
	K-40		17825(4/4) (12100-21400)	23 3.0 mi ESE	21400(1/1)	12100(1/1)	0
	Cs-134	30	LLD			LLD	0
	Cs-137	40	287(4/4) (32.9-493)	7	493(1/1)	121(1/1)	0
	Ra-226	400	751(2/4) (615-886)	7	886(1/1)	1320(1/1)	0
	Th-228	50	725(4/4) (553-837)	7	837(1/1)	639(1/1)	0

(a) "(b)" is the ratio of positive results above the LLD to the number of samples analyzed for the parameter of interest.

TABLE 5-3 (Continued)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

WASHINGTON PUBLIC POWER SUPPLY SYSTEM WNP-2 DOCKET NO. 50-397

HANFORD WASHINGTON JANUARY 1 to DECEMBER 31, 1990

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED	LOWER LIMIT OF DETECTION (LLD)	ALL INDICATOR LOCATIONS MEAN (b)[a] RANGE	LOCATION WITH HIGHEST MEAN NAME DISTANCE AND DIRECTION	MEAN (b)[a]	CONTROL LOCATION MEAN (b)[a] RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
SEDIMENT (pCi/kg dry)	Gamma 4						
	K-40	700	13900(2/2) (13800-14000)	33 3.6 mi ENE	15350(2/2) (14600-16100)	15350(2/2) (14600-16100)	0
	Co-60	30	LLD			LLD	0
	Cs-134	30	LLD			LLD	0
	Cs-137	40	190(2/2) (182-197)	34 3.5 mi ENE	190(2/2) (182-197)	115(1/2) -	0
	Ra-226	400	1665(2/2) (1380-1950)	34 3.5 mi ENE	1665(2/2) (1380-1950)	1400(2/2) (1050-1750)	0
	Th-228	50	1875(2/2) (1290-2460)	34 3.5 mi ENE	1875(2/2) (1290-2460)	1355(2/2) (789-1920)	0

(a) "(b)" is the ratio of positive results above the LLD to the number of samples analyzed for the parameter of interest.

TABLE 5-3 (Continued)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

WASHINGTON PUBLIC POWER SUPPLY SYSTEM WNP-2 DOCKET NO. 50-397
HANFORD WASHINGTON JANUARY 1 to DECEMBER 31, 1990

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED		LOWER LIMIT OF DETECTION (LLD)	ALL INDICATOR LOCATIONS MEAN (b)[a] RANGE	LOCATION WITH HIGHEST MEAN NAME DISTANCE AND DIRECTION	MEAN (b)[a]	CONTROL LOCATION MEAN (b)[a] RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
MILK (pCi/liter)	I-131	97	1	LLD			LLD	0
	Gamma	97						
	K-40	97	-	1270(79/79) (934-1640)	59 6.6 mi SE	1366(18/18) (1200-1640)	1340(18/18) (1170-1470)	0
	Cs-134	97	10	LLD			LLD	0
	Cs-137	97	10	LLD			LLD	0

(a) "(b)" is the ratio of positive results above the LLD to the number of samples analyzed for the parameter of interest.

TABLE 5-3 (Continued)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

WASHINGTON PUBLIC POWER SUPPLY SYSTEM WNP-2 DOCKET NO. 50-397

HANFORD WASHINGTON JANUARY 1 to DECEMBER 31, 1990

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED	LOWER LIMIT OF DETECTION (LLD)	ALL INDICATOR LOCATIONS MEAN (b)[a] RANGE	LOCATION WITH HIGHEST MEAN NAME DISTANCE AND DIRECTION	MEAN (b)[a]	CONTROL LOCATION MEAN (b)[a] RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
FISH (pCi/kg wet)	Gamma 17						
	K-40	1000	3778(8/8) (2550-4960)	38 26.5 mi ESE	4133(9/9) (2850-7710)	4133(9/9) (2850-7710)	0
	Mn-54	20	LLD			LLD	0
	Fe-59	30	LLD			LLD	0
	Co-58	20	LLD			LLD	0
	Co-60	20	LLD			LLD	0
	Zn-65	30	LLD			LLD	0
	Cs-134	20	LLD			LLD	0
	Cs-137	20	30.4(1/8)	30 3.3 mi E	30.4(1/8)	LLD	0

(a) "(b)" is the ratio of positive results above the LLD to the number of samples analyzed for the parameter of interest.

TABLE 5-3 (Continued)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

WASHINGTON PUBLIC POWER SUPPLY SYSTEM WNP-2 DOCKET NO. 50-397

HANFORD WASHINGTON JANUARY 1 to DECEMBER 31, 1990

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED		LOWER LIMIT OF DETECTION (LLD)	ALL INDICATOR LOCATIONS MEAN (b)[a] RANGE	LOCATION WITH HIGHEST MEAN NAME DISTANCE AND DIRECTION	MEAN (b)[a]	CONTROL LOCATION MEAN (b)[a] RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
ROOTS (pCi/kg wet)	Gamma	8						
	I-131		50	LLD			LLD	0
	Cs-134		50	LLD			LLD	0
	Cs-137		50	LLD			LLD	0
FRUITS (pCi/kg wet)	Gamma	10						
	I-131		50	LLD			LLD	0
	Cs-134		50	LLD			LLD	0
	Cs-137		50	LLD			LLD	0
VEGETABLES (pCi/kg wet)	Gamma	12						
	I-131		50	LLD			LLD	0
	Cs-134		50	LLD			LLD	0
	Cs-137		50	LLD			LLD	0

(a) "(b)" is the ratio of positive results above the LLD to the number of samples analyzed for the parameter of interest.

TABLE 5-3 (Continued)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

WASHINGTON PUBLIC POWER SUPPLY SYSTEM WNP-2 DOCKET NO. 50-397

HANFORD WASHINGTON JANUARY 1 to DECEMBER 31, 1990

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSES PERFORMED		LOWER LIMIT OF DETECTION (LLD)	ALL INDICATOR LOCATIONS MEAN (b)[a] RANGE	LOCATION WITH HIGHEST MEAN NAME DISTANCE AND DIRECTION			MEAN (b)[a]	CONTROL LOCATION MEAN (b)[a] RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
DIRECT RADIATION Quarterly TLD's (mR/day)	TLD	224	-	0.26(223/223) (0.23-0.32)	46	4.7 mi	NE	0.31(4/4) (0.30-0.32)	0.24(4/4) (0.23-0.24)	0
DIRECT RADIATION Annual TLD's (mR/day)	TLD	57	-	0.24(56/56) (0.22-0.29)	46	4.7 mi	NE	0.29(1/1) -	0.22(1/1) -	0

(a) "(b)" is the ratio of positive results above the LLD to the number of samples analyzed for the parameter of interest.

TABLE 5-4
MEAN QUARTERLY TLD DATA SUMMARY FOR THE PREOPERATIONAL AND OPERATIONAL PERIODS
Results in mR/day

STATION	PREOPERATIONAL		1984 - 1989 OPERATIONAL		1990 OPERATIONAL	
	MEAN	STANDARD ERROR	MEAN	STANDARD ERROR	MEAN	STANDARD ERROR
1	0.24	0.02	0.25	0.01	0.25	0.01
2	0.23	0.02	0.24	0.01	0.25	0.01
3	0.22	0.01	0.23	0.01	0.25	0.01
4	0.22	0.02	0.22	0.01	0.23	0.01
5	0.23	0.01	0.23	0.01	0.24	0.01
6	0.22	0.01	0.23	0.01	0.24	0.01
7	0.23	0.01	0.24	0.01	0.25	0.01
8	0.26	0.01	0.26	0.01	0.27	0.01
9	0.22	0.01	0.22	0.01	0.24	0.01
10	0.23	0.01	0.23	0.01	0.25	0.01
11	0.24	0.01	0.24	0.01	0.25	0.00
12	0.25	0.01	0.26	0.01	0.27	0.00
13	0.24	0.01	0.24	0.01	0.25	0.01
14	0.24	0.02	0.24	0.01	0.25	0.01
15	0.25	0.01	0.26	0.01	0.27	0.01
16	0.24	0.01	0.25	0.01	0.26	0.01
17	0.25	0.01	0.25	0.01	0.26	0.01
18	0.24	0.01	0.25	0.01	0.26	0.01
19	0.24	0.01	0.25	0.01	0.26	0.01
20	0.24	0.01	0.24	0.01	0.25	0.01
21	0.23	0.01	0.22	0.01	0.24	0.01
22	0.24	0.01	0.24	0.01	0.25	0.01
23	0.24	0.01	0.24	0.01	0.25	0.01
24	0.24	0.01	0.24	0.01	0.26	0.01
25	0.25	0.01	0.26	0.01	0.27	0.01
40	0.22	0.01	0.23	0.01	0.25	0.01
41	0.26	0.02	0.26	0.01	0.27	0.01
42	0.25	0.01	0.25	0.01	0.26	0.01
43	0.25	0.01	0.25	0.01	0.27	0.00
44	0.23	0.01	0.24	0.01	0.25	0.01
45	0.23	0.01	0.24	0.01	0.25	0.00
46	0.28	0.02	0.29	0.02	0.31	0.01
47	0.22	0.02	0.22	0.01	0.24	0.01
49	0.24	0.00	0.24	0.01	0.25	0.01
50	0.22	0.00	0.24	0.01	0.26	0.01
51	0.23	0.01	0.24	0.01	0.25	0.01
53	0.27	0.00	0.27	0.01	0.28	0.02
54	0.26	0.00	0.25	0.01	0.27	0.01
55	0.23	0.00	0.24	0.01	0.25	0.01
56	0.24	0.00	0.24	0.01	0.25	0.01

TABLE 5-4 (Cont.)
MEAN QUARTERLY TLD DATA SUMMARY FOR THE PREOPERATIONAL AND OPERATIONAL PERIODS
Results in mR/day

STATION	PREOPERATIONAL		1984 - 1989 OPERATIONAL		1990 OPERATIONAL	
	MEAN	STANDARD ERROR	MEAN	STANDARD ERROR	MEAN	STANDARD ERROR
61	(a)		0.28	0.02	0.27	0.01
71(1S)	0.24	0.02	0.27	0.02	0.28	0.02
72(2S)	0.25	0.01	0.26	0.01	0.28	0.01
73(3S)	0.23	0.01	0.23	0.01	0.25	0.01
74(4S)	0.26	0.01	0.26	0.01	0.28	0.01
75(5S)	0.22	0.02	0.24	0.01	0.26	0.01
76(6S)	0.24	0.01	0.24	0.01	0.26	0.01
77(7S)	0.25	0.01	0.25	0.01	0.25	0.01
78(8S)	0.25	0.01	0.24	0.01	0.25	0.01
79(9S)	0.25	0.01	0.25	0.01	0.25	0.01
80(10S)	0.24	0.01	0.24	0.01	0.25	0.01
81(11S)	0.24	0.02	0.24	0.01	0.25	0.00
82(12S)	0.25	0.02	0.25	0.01	0.26	0.01
83(13S)	0.25	0.01	0.25	0.01	0.26	0.01
84(14S)	0.24	0.01	0.24	0.01	0.26	0.01
85(15S)	0.26	0.01	0.26	0.02	0.27	0.01
86(16S)	0.25	0.01	0.27	0.02	0.29	0.02
All	0.24	0.00	0.25	0.00	0.26	0.02

(a) Station 61 was added in 1989.

TABLE 5-5

ANNUAL TLD DATA SUMMARY FOR THE PREOPERATIONAL AND OPERATIONAL PERIODS
Results in mR/day

STATION	PREOPERATIONAL		1984 - 1989 OPERATIONAL		1990 OPERATIONAL	
	MEAN[a]	STANDARD ERROR	MEAN	STANDARD ERROR	MEAN	STANDARD DEVIATION(2σ)
1	0.23	0.04	0.23	0.02	0.24	0.02
2	0.22	0.04	0.22	0.02	0.23	0.02
3	0.21	0.04	0.21	0.01	0.22	0.01
4	0.22	0.06	0.20	0.01	0.22	0.02
5	0.22	0.04	0.21	0.01	0.22	0.02
6	0.21	0.04	0.21	0.02	0.22	0.02
7	0.22	0.02	0.22[b]	0.01	0.23	0.01
8	0.25	0.04	0.25[b]	0.02	0.26	0.02
9	0.20	0.02	0.20	0.01	0.22	0.02
10	0.22	0.04	0.22	0.01	0.23	0.03
11	0.22	0.04	0.22	0.02	0.23	0.02
12	0.24	0.04	0.24	0.02	0.25	0.02
13	0.22	0.04	0.22	0.01	0.24	0.02
14	0.22	0.04	0.22	0.02	0.23	0.01
15	0.23	0.06	0.24	0.02	0.25	0.02
16	0.23	0.04	0.23	0.02	0.24	0.02
17	0.23	0.02	0.23[b]	0.02	0.24	0.01
18	0.25	0.02	0.23	0.02	0.24	0.02
19	0.22	0.04	0.23	0.01	0.24	0.02
20	0.23	0.04	0.23	0.02	0.24	0.03
21	0.23	0.02	0.21	0.01	0.22	0.02
22	0.22	0.02	0.22	0.02	0.23	0.01
23	0.24	0.02	0.22	0.01	0.23	0.01
24	0.22	0.02	0.23	0.02	0.24	0.01
25	0.24	0.02	0.24	0.02	0.25	0.01
40	0.21[c]	0.02	0.22	0.02	0.23	0.02
41	0.26[c]	0.04	0.24	0.02	0.25	0.02
42	0.24(c)	0.02	0.23	0.02	0.24	0.02
43	0.24(c)	0.02	0.24	0.02	0.25	0.02
44	0.24	0.02	0.22	0.01	0.23	0.01
45	0.24	0.01	0.22	0.02	0.23	0.01
46	0.29	0.01	0.28	0.02	0.29	0.02
47	0.22(c)	0.03	0.21	0.02	0.22	0.01
49	(d)		0.22	0.01	0.23	0.03
50	(d)		0.23	0.02	0.23	0.02
51	(d)		0.22	0.02	0.23	0.02
53	(d)		0.25	0.02	0.26	0.03

(a) This preoperational mean is for 1982 - 1983 data only.
(b) 1985 TLD missing
(c) There was only one annual exchange during the preoperational period.
(d) Stations 49-56 were first monitored during Fourth Quarter 1983. Station 61 was added in 1989.

TABLE 5-5 (Cont.)

ANNUAL TLD DATA SUMMARY FOR THE PREOPERATIONAL AND OPERATIONAL PERIODS
Results in mR/day

STATION	PREOPERATIONAL		OPERATIONAL		1984 - 1989 1990 OPERATIONAL	
	MEAN[a]	STANDARD ERROR	MEAN	STANDARD ERROR	MEAN	STANDARD DEVIATION(2σ)
54	(d)		0.24	0.01	0.25	0.02
55	(d)		0.22	0.01	0.23	0.01
56	(d)		0.22	0.01	0.23	0.01
61	(d)		0.27(d)	0.00	0.25	0.02
71	0.24(c)	0.02	0.25	0.02	0.27	0.02
72	0.25(c)	0.02	0.25	0.02	0.26	0.02
73	0.23(c)	0.01	0.22	0.02	0.23	0.01
74	0.24(c)	0.01	0.24	0.02	0.25	0.02
75	0.24(c)	0.01	0.22	0.02	0.24	0.02
76	0.24(c)	0.02	0.23	0.01	0.24	0.02
77	0.25(c)	0.02	0.23	0.01	0.24	0.02
78	0.25(c)	0.04	0.23	0.02	0.23	0.01
79	0.25(c)	0.02	0.23	0.01	0.23	0.01
80	0.23(c)	0.05	0.22	0.02	0.23	0.01
81	0.23(c)	0.02	0.22	0.02	0.23	0.02
82	0.25(c)	0.03	0.24	0.01	0.24	0.02
83	0.25(c)	0.02	0.24	0.02	0.24	0.02
84	0.23(c)	0.02	0.23	0.02	0.24	0.02
85	0.26(c)	0.02	0.24	0.02	0.25	0.02
86	0.24	0.02	0.26	0.02	0.27	0.02
All	0.23	0.02	0.24	0.00	0.24	0.03

(a) This preoperational mean is for 1982 - 1983 data only.
(b) 1985 TLD missing
(c) There was only one annual exchange during the preoperational period.
(d) Stations 49-56 were first monitored during Fourth Quarter 1983.

Station 61 was added in 1989.

TABLE 5-6

1990 MEAN QUARTERLY VERSUS ANNUAL TLD DATA
Results in mR/day

STATION	QUARTERLY TLDS		ANNUAL TLDS	
	MEAN*	STANDARD ERROR	MEAN**	STANDARD DEVIATION(2σ)
1	0.25	0.01	0.24	0.02
2	0.25	0.01	0.23	0.02
3	0.25	0.01	0.22	0.01
4	0.23	0.01	0.22	0.02
5	0.24	0.01	0.22	0.02
6	0.24	0.01	0.22	0.02
7	0.25	0.01	0.23	0.01
8	0.27	0.01	0.26	0.02
9	0.24	0.01	0.22	0.02
10	0.25	0.01	0.23	0.03
11	0.25	0.00	0.23	0.02
12	0.27	0.00	0.25	0.02
13	0.25	0.01	0.24	0.02
14	0.25	0.01	0.23	0.01
15	0.27	0.01	0.25	0.02
16	0.26	0.01	0.24	0.02
17	0.26	0.01	0.24	0.01
18	0.26	0.01	0.24	0.02
19	0.26	0.01	0.24	0.02
20	0.25	0.01	0.24	0.03
21	0.24	0.01	0.22	0.02
22	0.25	0.01	0.23	0.01
23	0.25	0.01	0.23	0.01
24	0.26	0.01	0.24	0.01
25	0.27	0.01	0.25	0.01
40	0.25	0.01	0.23	0.02
41	0.27	0.01	0.25	0.02
42	0.26	0.01	0.24	0.02
43	0.27	0.00	0.25	0.02
44	0.25	0.01	0.23	0.01
45	0.25	0.00	0.23	0.01
46	0.31	0.01	0.29	0.02
47	0.24	0.01	0.22	0.01
49	0.25	0.01	0.23	0.03
50	0.26	0.01	0.23	0.02
51	0.25	0.01	0.23	0.02
53	0.28	0.02	0.26	0.03
54	0.27	0.01	0.25	0.02
55	0.25	0.01	0.23	0.01
56	0.25	0.01	0.23	0.01
61	0.27	0.01	0.25	0.02

*Mean of the quarterly results.
**Mean of four readout areas on each TLD.

TABLE 5-6 (Cont.)

1990 MEAN QUARTERLY VERSUS ANNUAL TLD DATA
Results in mR/day

STATION	QUARTERLY TLDS		ANNUAL TLDS	
	MEAN*	STANDARD ERROR	MEAN**	STANDARD DEVIATION(2σ)
71 (1S)	0.28	0.02	0.27	0.02
72 (2S)	0.28	0.01	0.26	0.02
73 (3S)	0.25	0.01	0.23	0.01
74 (4S)	0.28	0.01	0.25	0.02
75 (5S)	0.26	0.01	0.24	0.02
76 (6S)	0.26	0.01	0.24	0.02
77 (7S)	0.25	0.01	0.24	0.02
78 (8S)	0.25	0.01	0.23	0.01
79 (9S)	0.25	0.01	0.23	0.01
80 (10S)	0.25	0.01	0.23	0.01
81 (11S)	0.25	0.00	0.23	0.02
82 (12S)	0.26	0.01	0.24	0.02
83 (13S)	0.26	0.01	0.24	0.02
84 (14S)	0.26	0.01	0.24	0.02
85 (15S)	0.27	0.01	0.25	0.02
86 (16S)	0.29	0.02	0.27	0.02

*Mean of the quarterly mean results.
**Mean of four readout areas on each TLD.

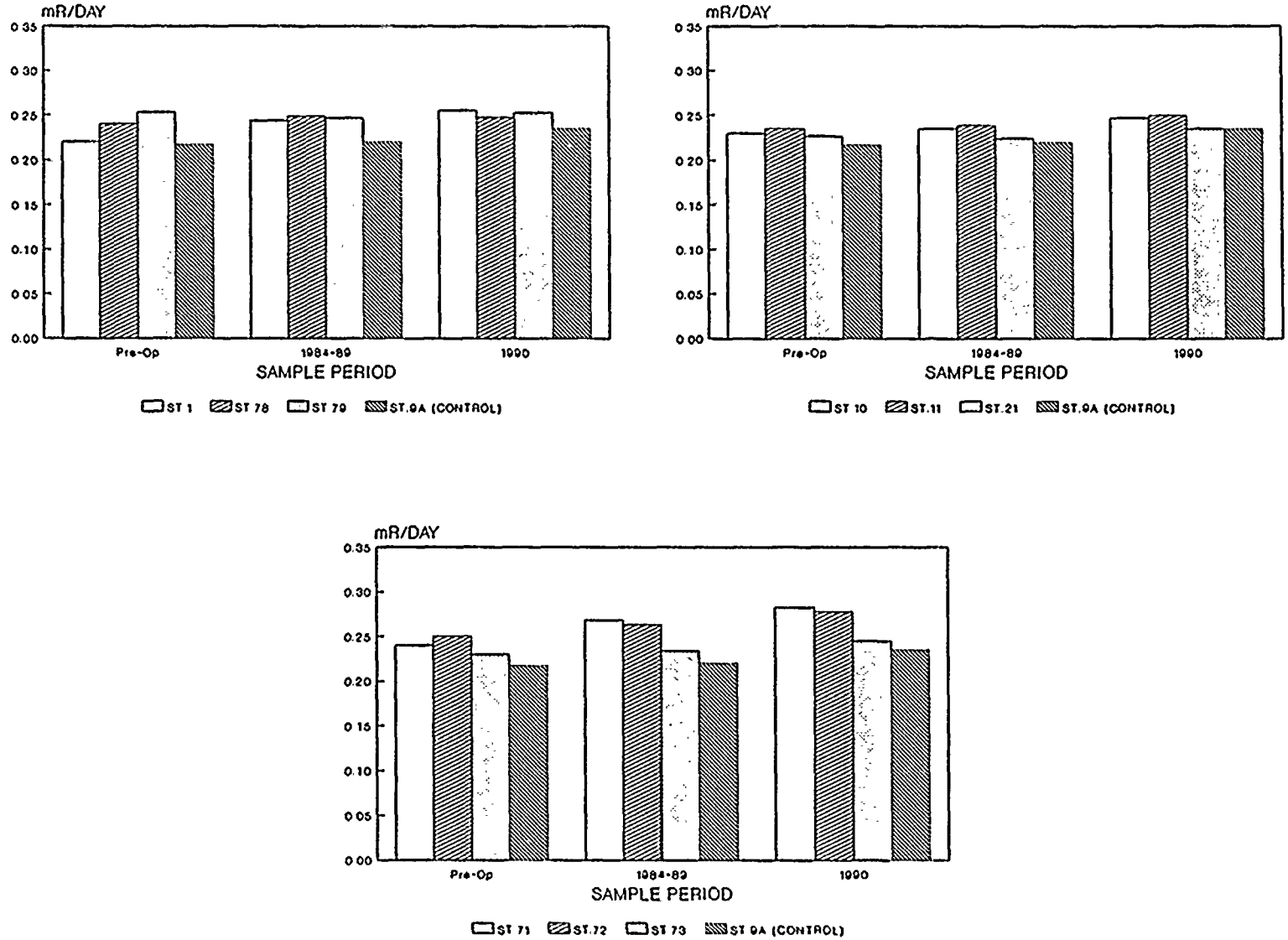
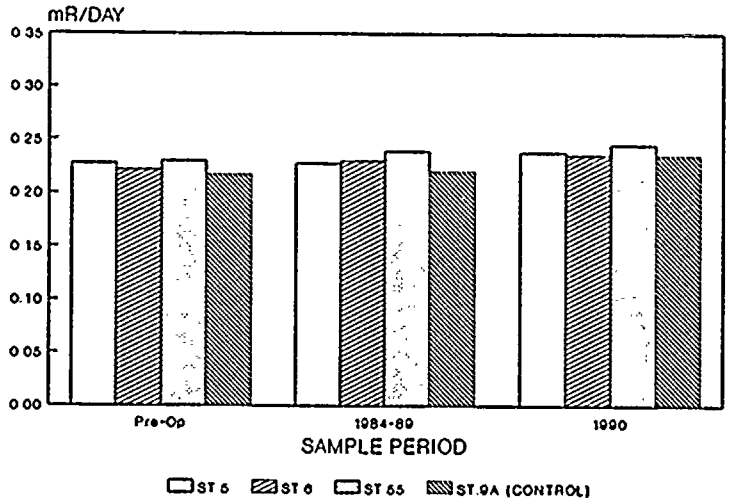
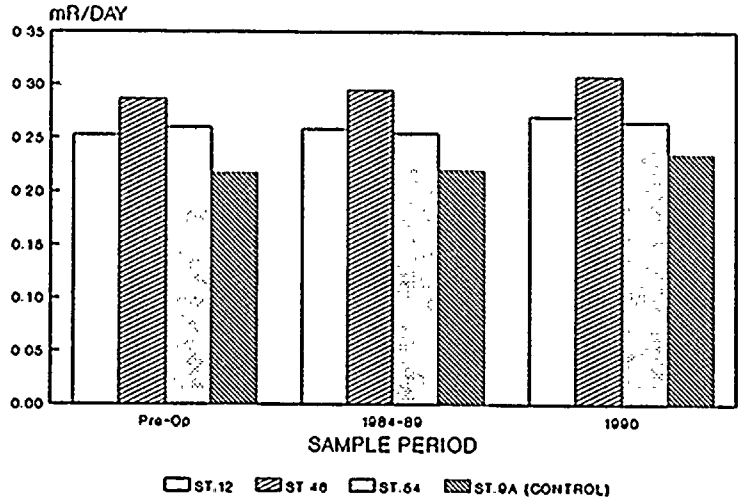


FIGURE 5-1
AVERAGE QUARTERLY TLD RESULTS FOR NEAR-PLANT LOCATIONS
AND THE CONTROL LOCATION (STATION 9A) FOR THE PREOPERATIONAL PERIOD, 1984-1989, AND 1990





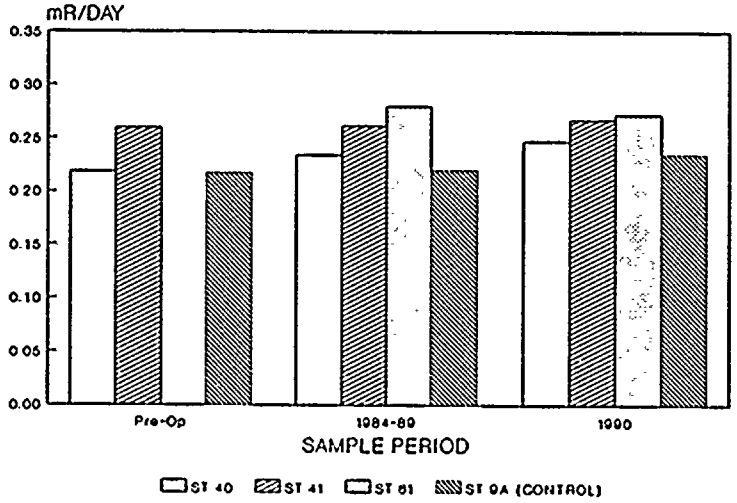
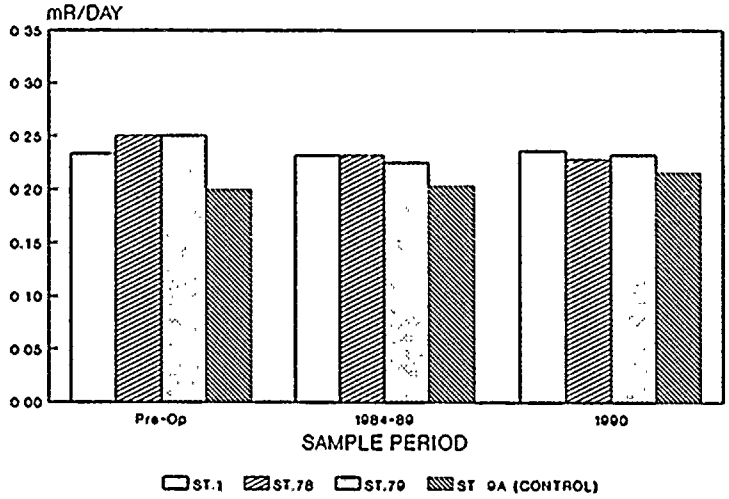
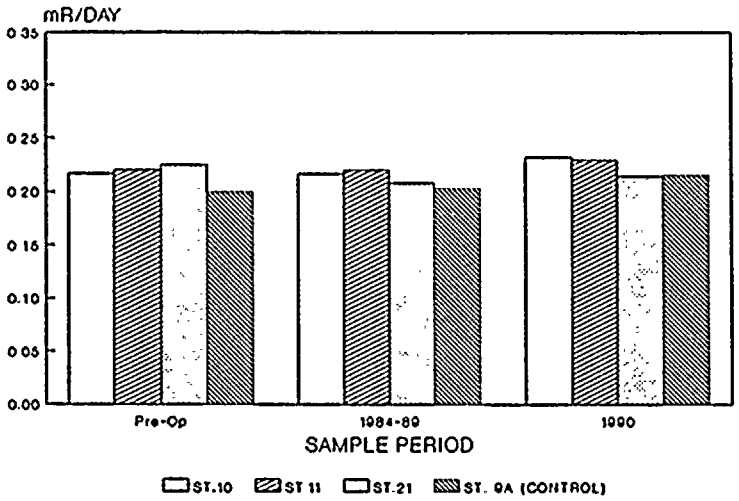


FIGURE 5-2
AVERAGE QUARTERLY TLD RESULTS FOR REMOTE LOCATIONS
AND THE CONTROL LOCATION (STATION 9A) FOR THE PREOPERATIONAL PERIOD, 1984-1989, AND 1990





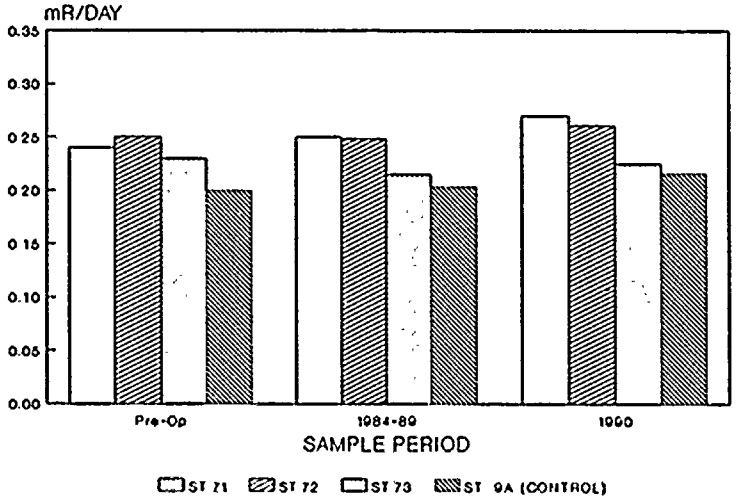


FIGURE 5-3
ANNUAL TLD RESULTS FOR NEAR-PLANT LOCATIONS
AND THE CONTROL LOCATION (STATION 9A) FOR THE PREOPERATIONAL PERIOD, 1984-1989, AND 1990

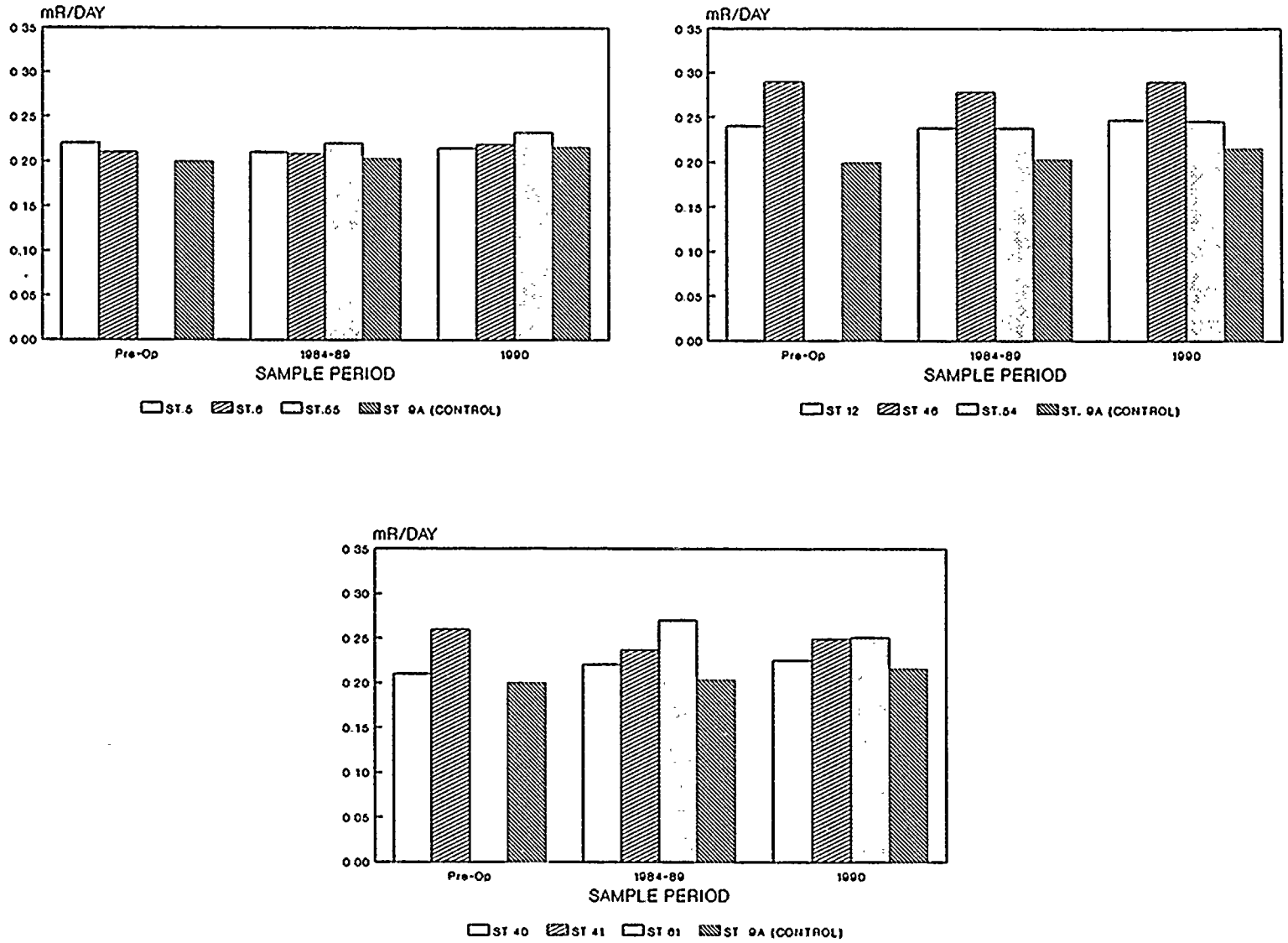


FIGURE 5-4
ANNUAL TLD RESULTS FOR REMOTE LOCATIONS AND THE CONTROL (STATION 9A)
FOR THE PREOPERATIONAL PERIOD, 1984-1989, AND 1990

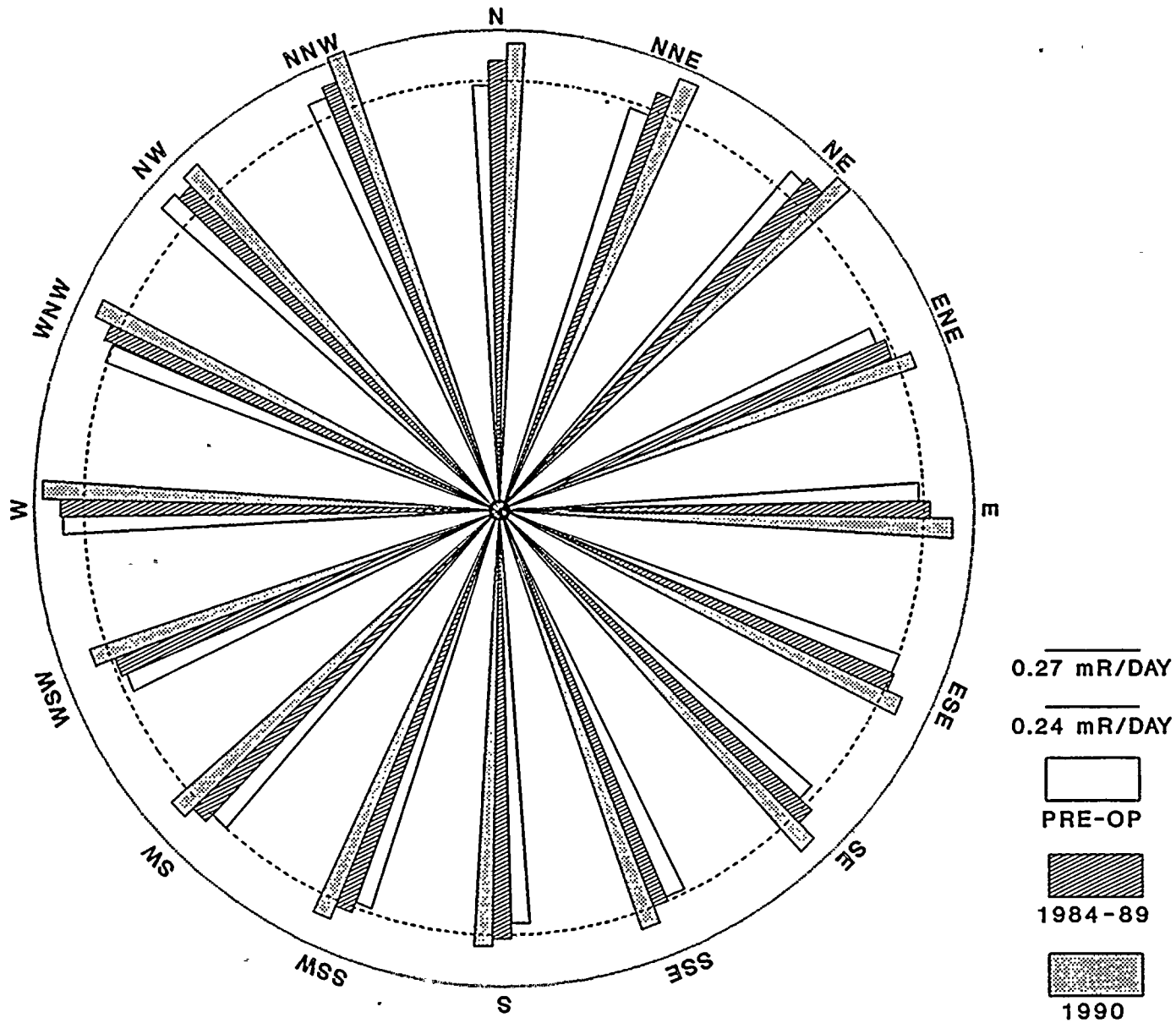


FIGURE 5-5
MEAN 1990 QUARTERLY TLD RESULTS FOR LOCATIONS IN EACH METEOROLOGICAL SECTOR COMPARED TO THE MEAN PREOPERATIONAL AND PREVIOUS OPERATIONAL RESULTS

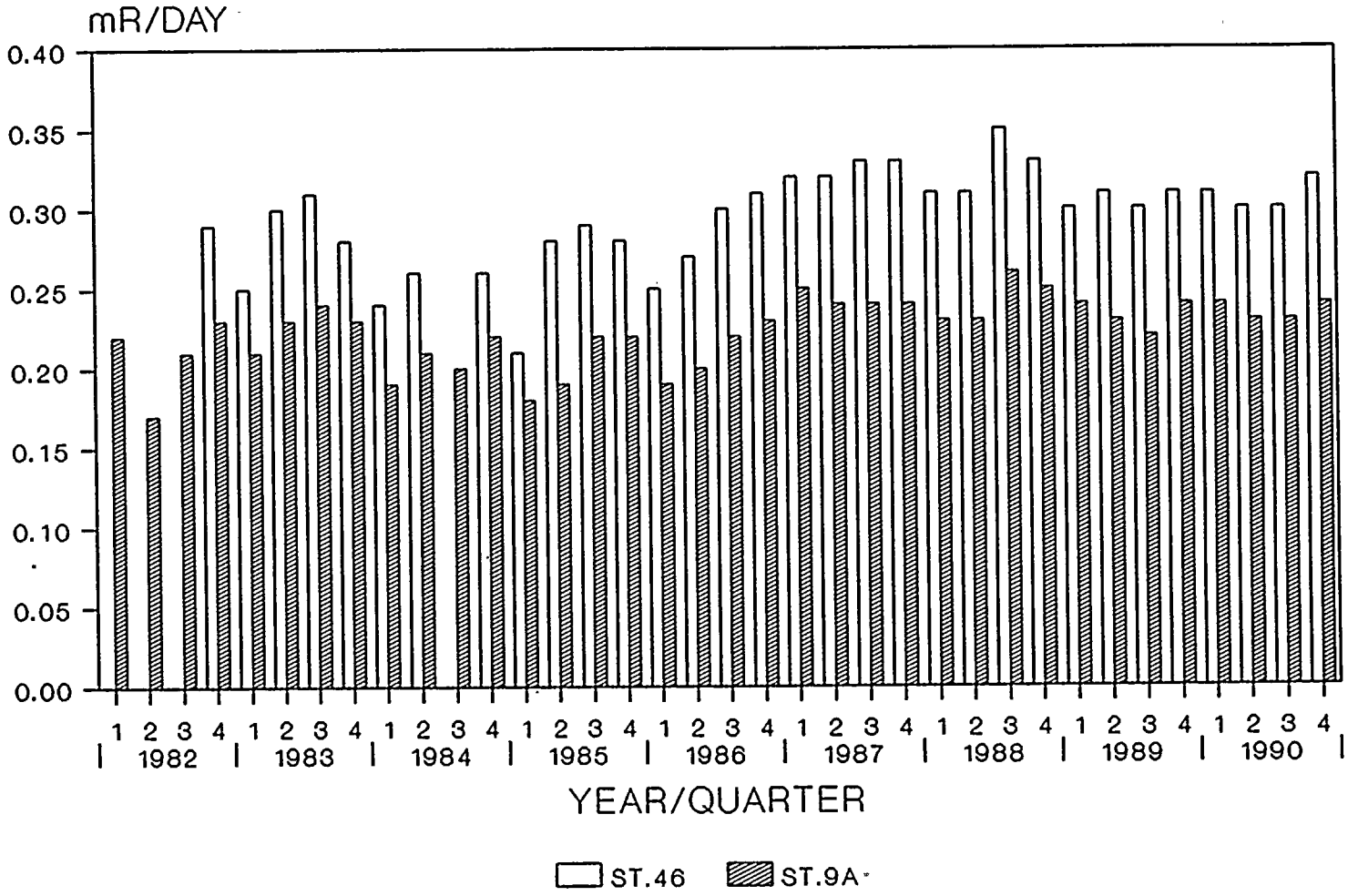
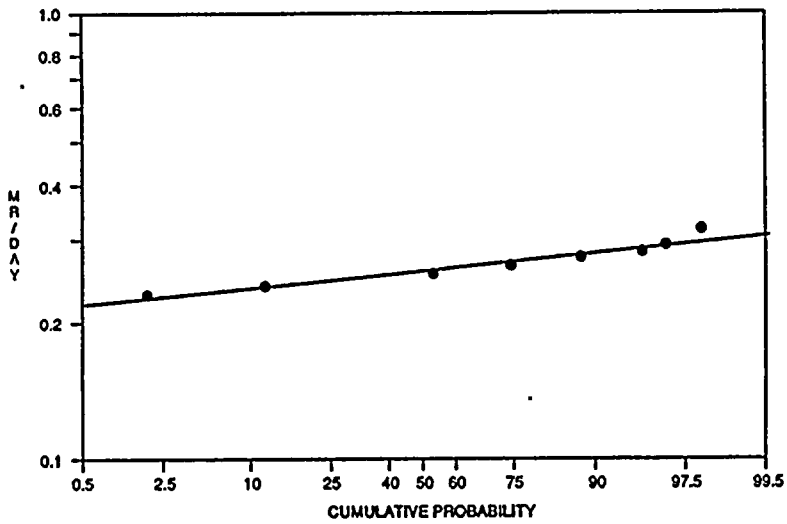
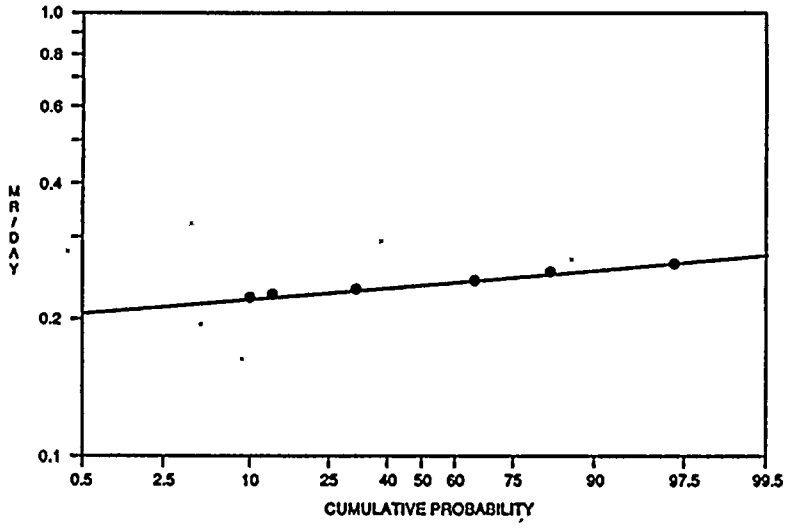


FIGURE 5-6
QUARTERLY TLD RESULTS FOR STATION 46 AND THE CONTROL LOCATION
(STATION 9A) FOR THE PERIOD 1982-1990

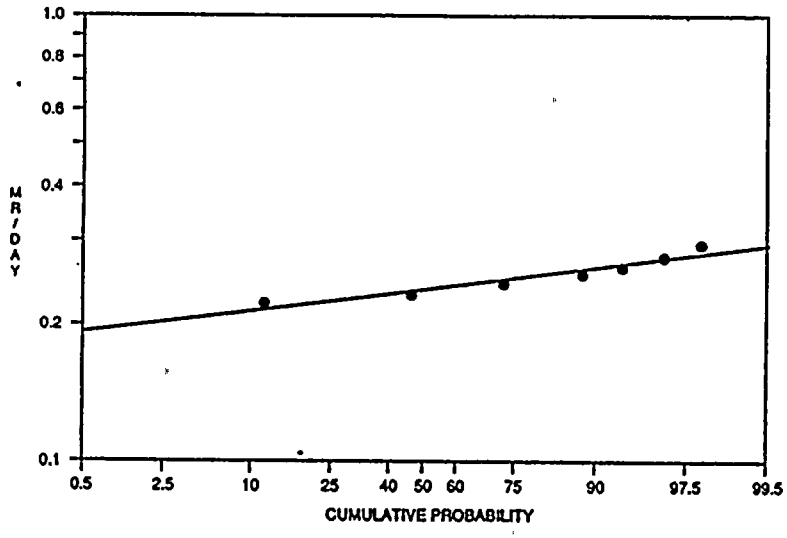


Quarterly 1990

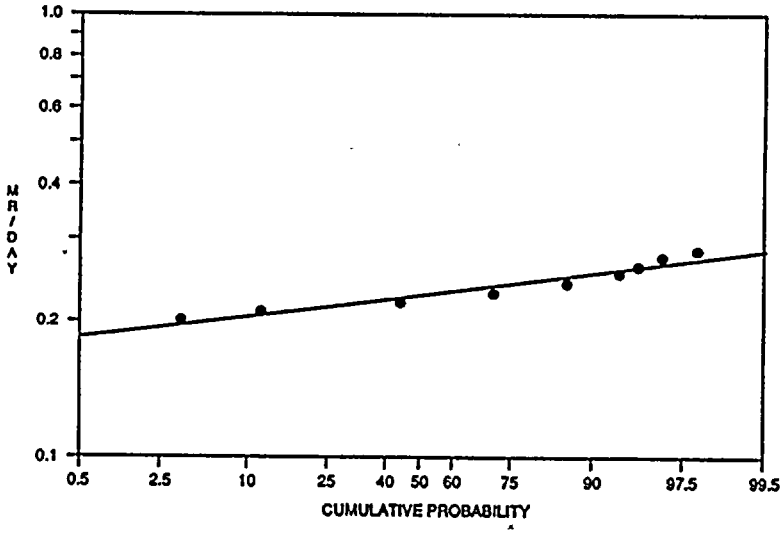


Quarterly 1984-1989

FIGURE 5-7
LOG PROBABILITY PLOTS OF THE 1990 AND 1984-1989 QUARTERLY TLD RESULTS

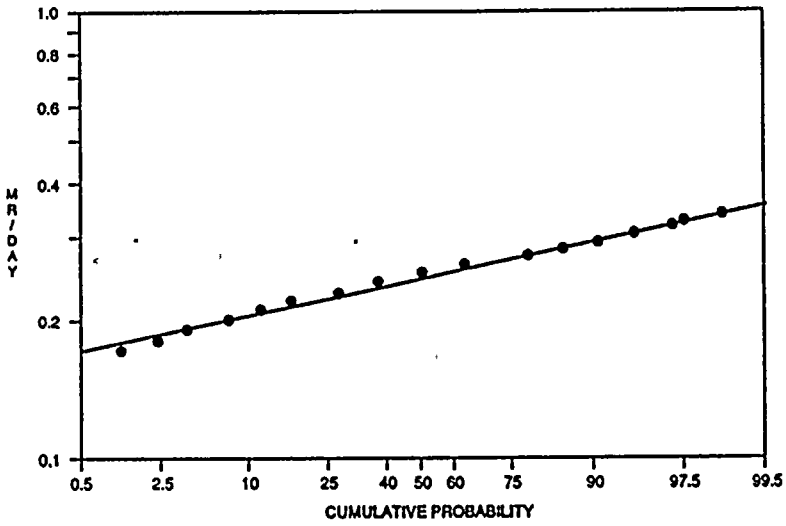


Annual 1990

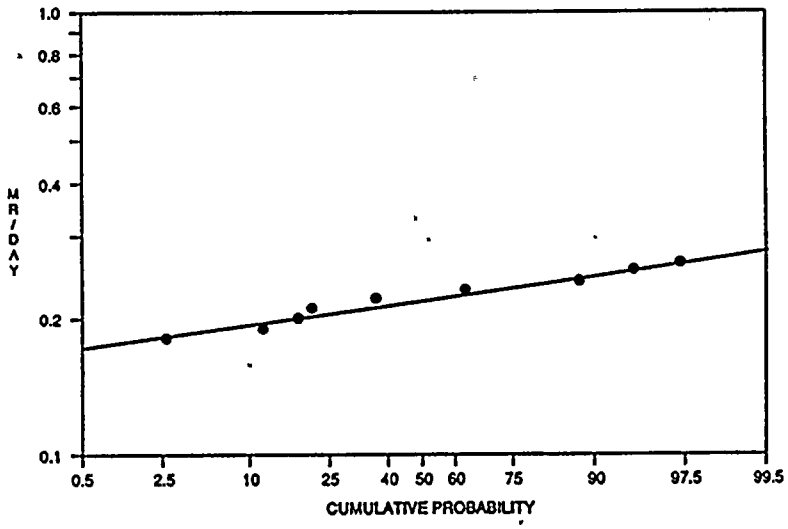


Annual 1984-1989

FIGURE 5-8
LOG PROBABILITY PLOTS OF THE 1990 AND 1984-1989 ANNUAL TLD RESULTS



Stations 71-76 (S1-S6)



Station 9A

FIGURE 5-9
LOG PROBABILITY PLOTS OF THE QUARTERLY TLD DATA FOR NEAR-PLANT LOCATIONS (STATION 71-76) AND THE CONTROL LOCATION (STATION 9A) FOR THE PERIOD 1982-1990

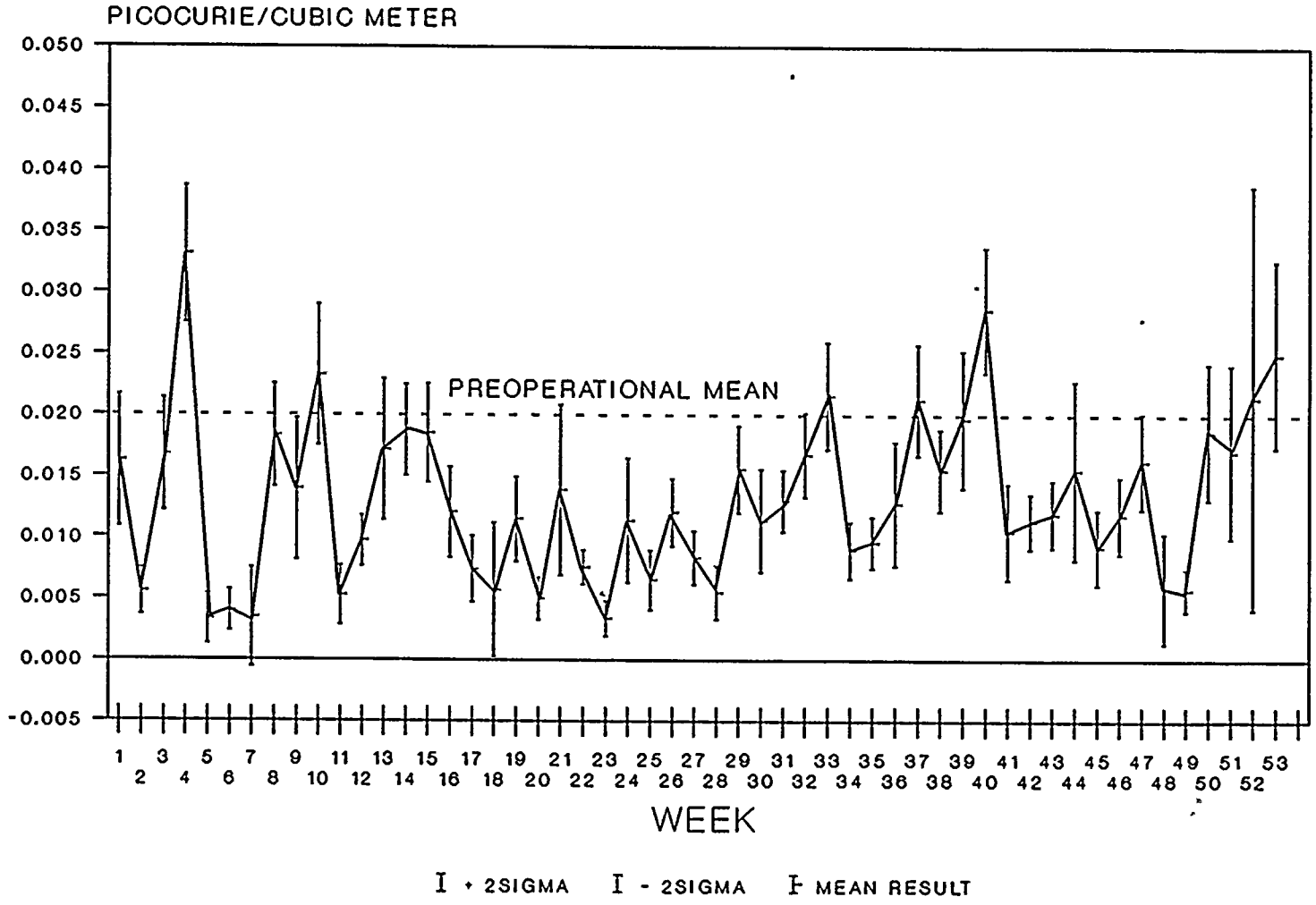
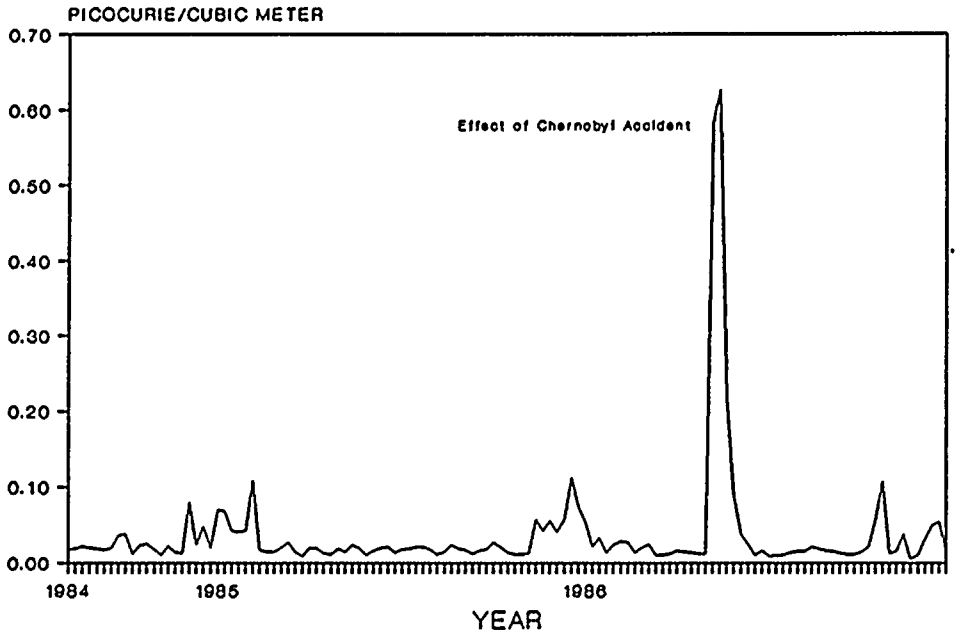


FIGURE 5-10
MEAN WEEKLY 1990 GROSS BETA IN AIR RESULTS



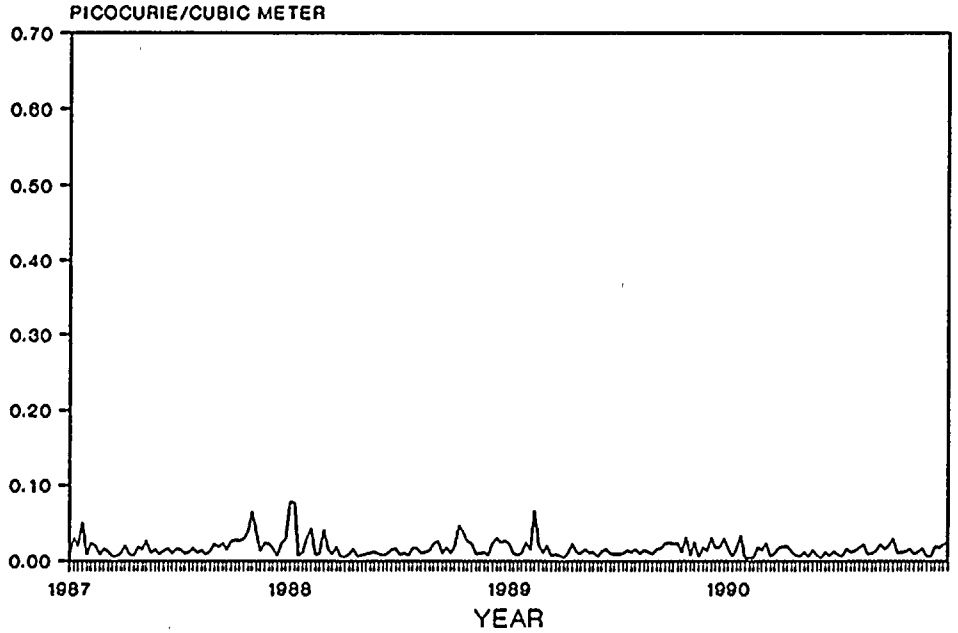


FIGURE 5-11
MEAN WEEKLY GROSS BETA IN AIR RESULTS FROM 1984 TO 1990

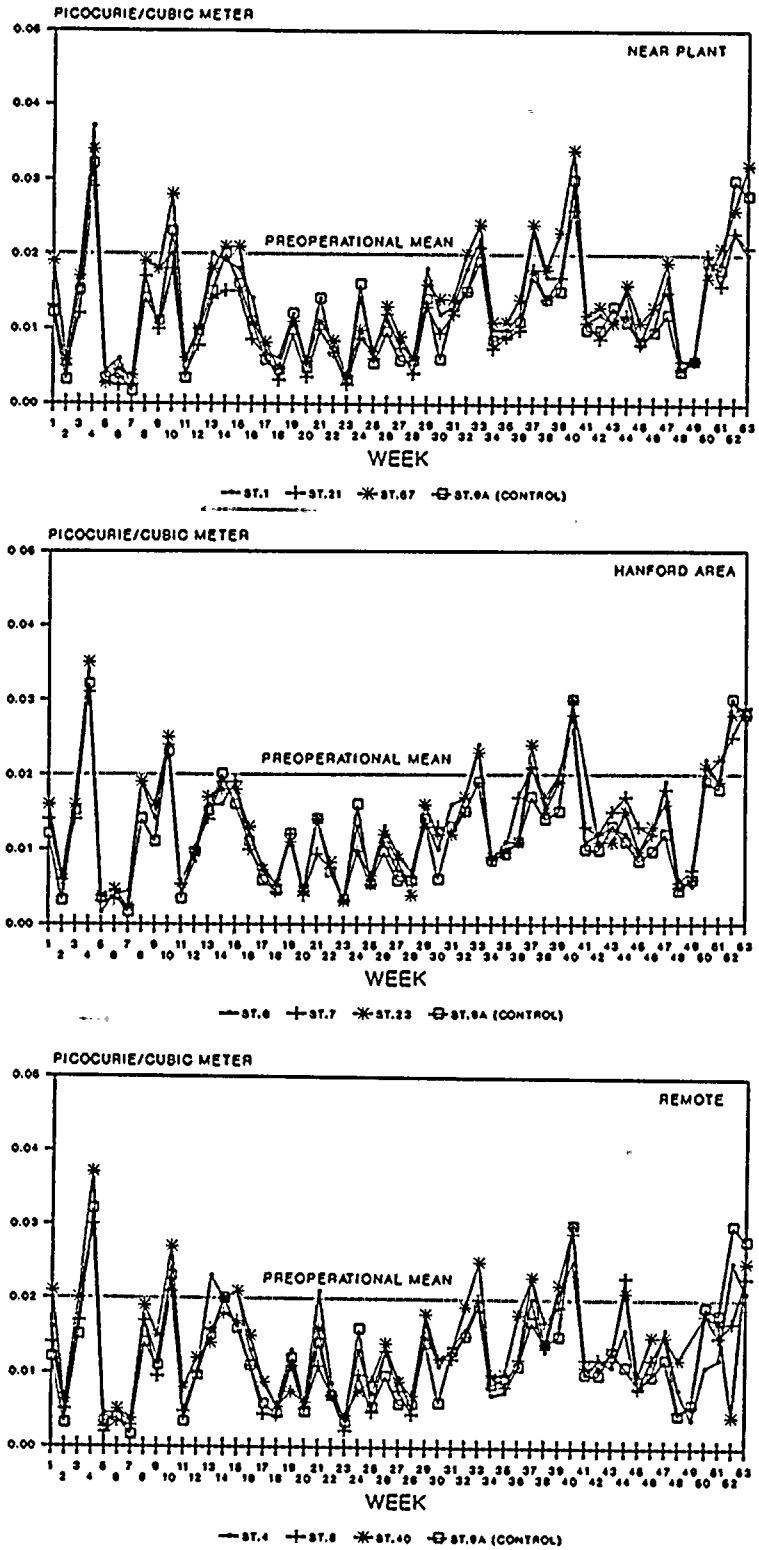
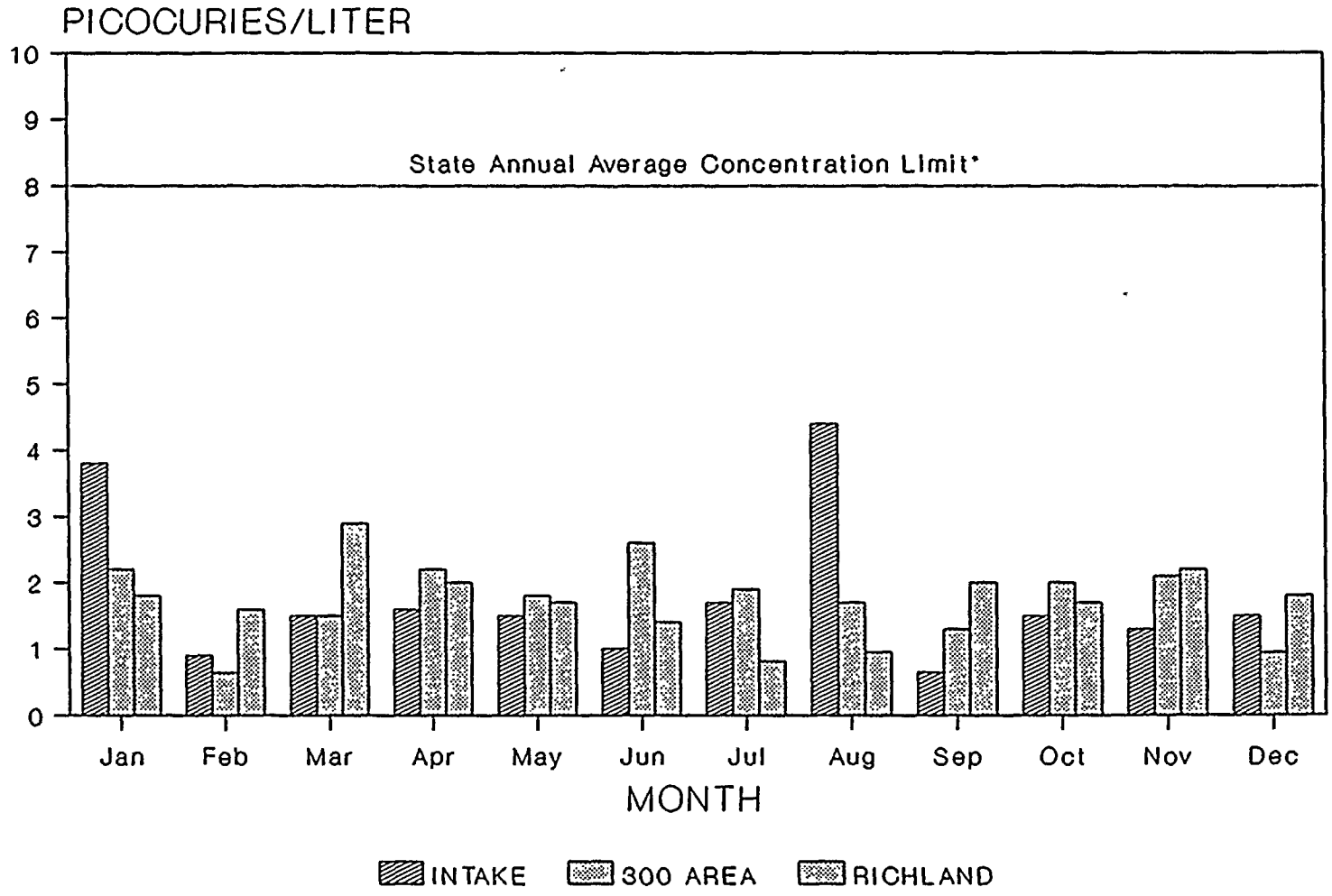
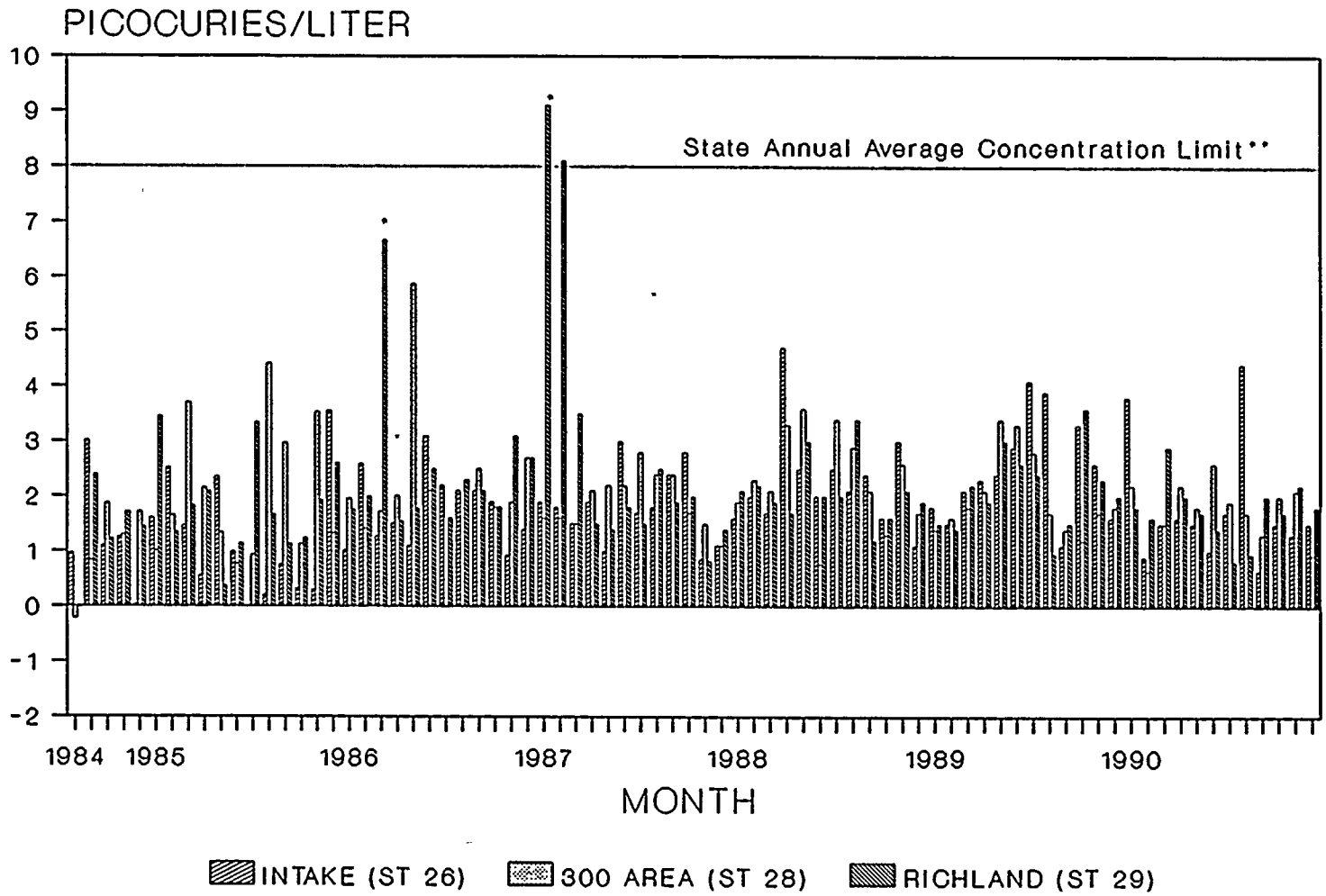


FIGURE 5-12
WEEKLY GROSS BETA IN AIR RESULTS FOR NEAR-PLANT AND REMOTE SAMPLING LOCATIONS VERSUS THE RESULTS FOR THE CONTROL LOCATION (STATION 9A)



*NOTE: The maximum average annual concentration of strontium-90 for compliance to the 4 mrem/year dose limitation for drinking water is 8 pCi/liter.

FIGURE 5-13
1990 GROSS BETA IN RIVER/DRINKING WATER RESULTS



*Well water used, instead of river water, during water treatment plant maintenance outages.

**Assuming strontion-90, the maximum average annual concentration for compliance to state dose limitations is 8 pCi/liter.

FIGURE 5-14
GROSS BETA IN RIVER/DRINKING WATER FROM 1984 TO 1990

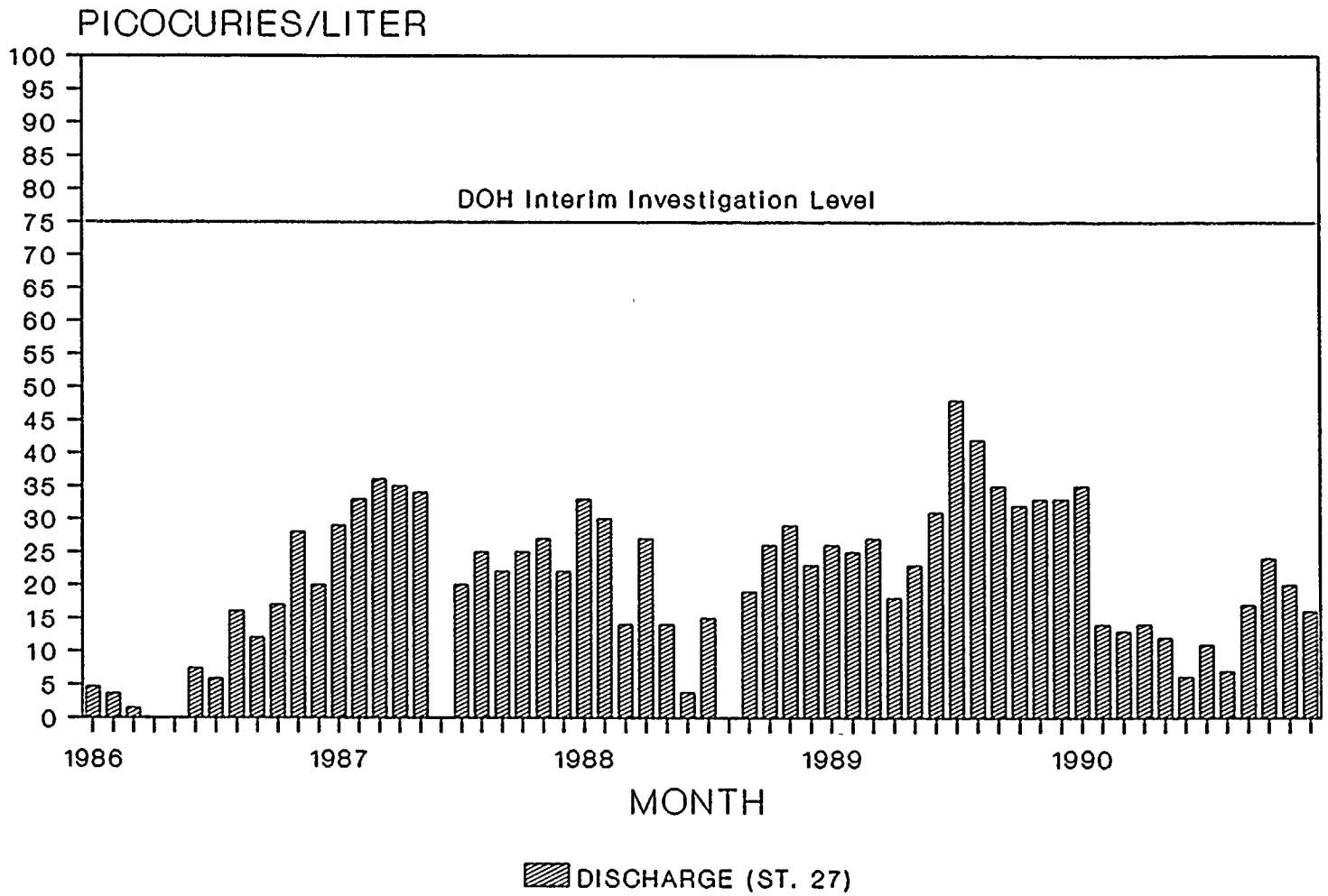
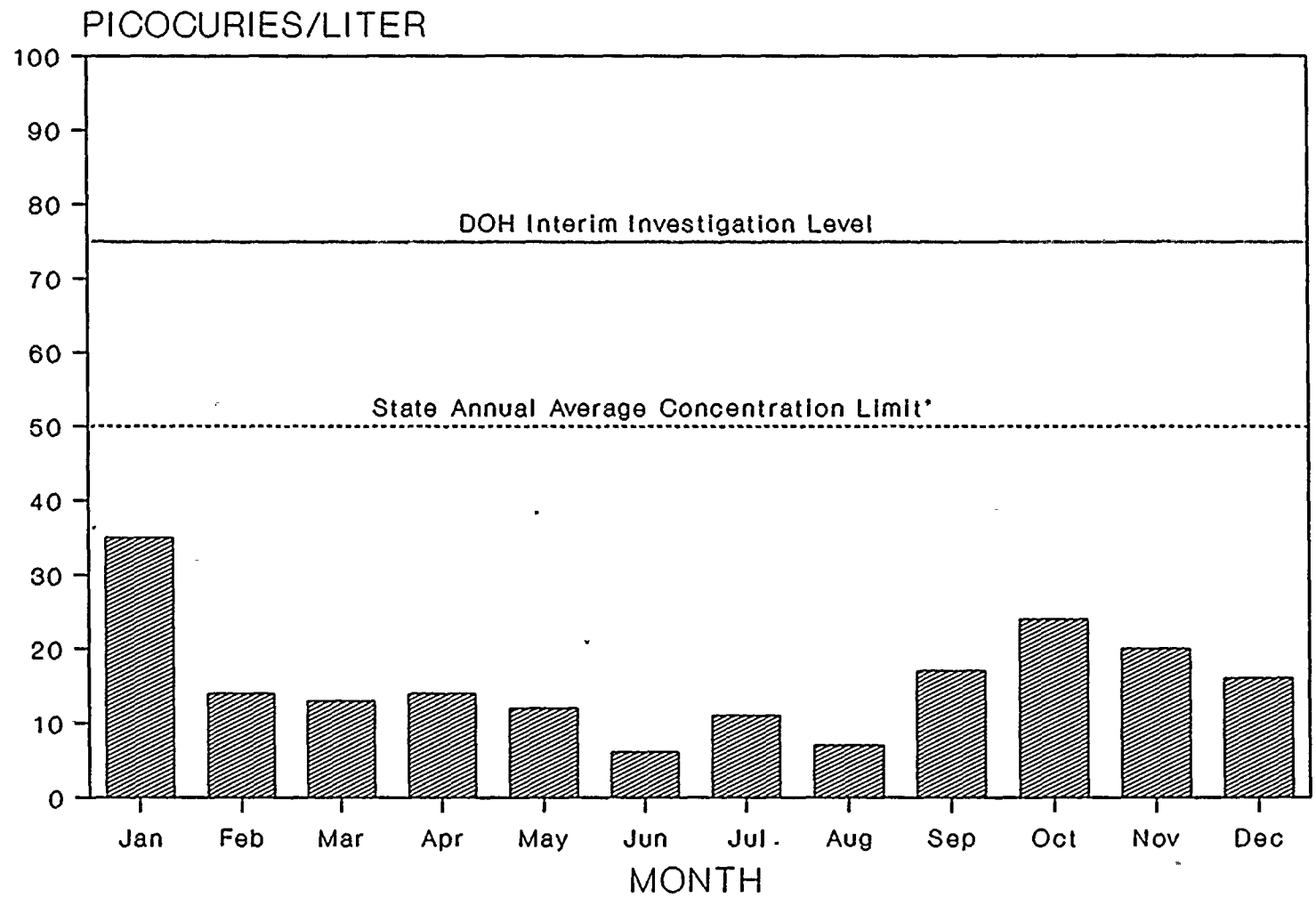


FIGURE 5-15
GROSS BETA IN DISCHARGE WATER RESULTS FROM 1986 to 1990



*NOTE: For compliance to the 4 mrem/year state dose limitation, the annual average concentration of gross beta in drinking water is 50 pCi/liter.

FIGURE 5-16
1990 GROSS BETA IN DISCHARGE WATER RESULTS

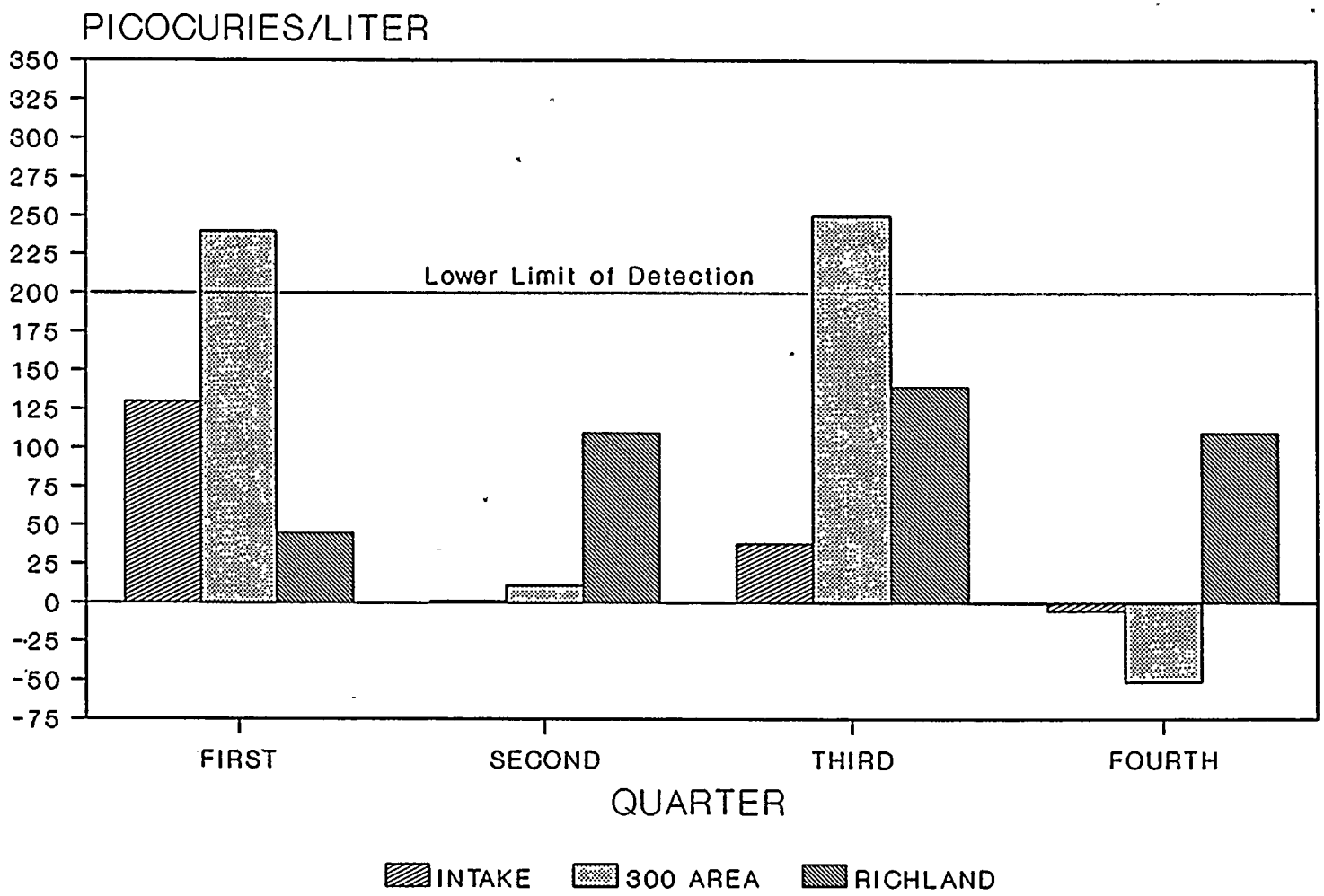


FIGURE 5-17
1990 TRITIUM IN RIVER/DRINKING WATER RESULTS

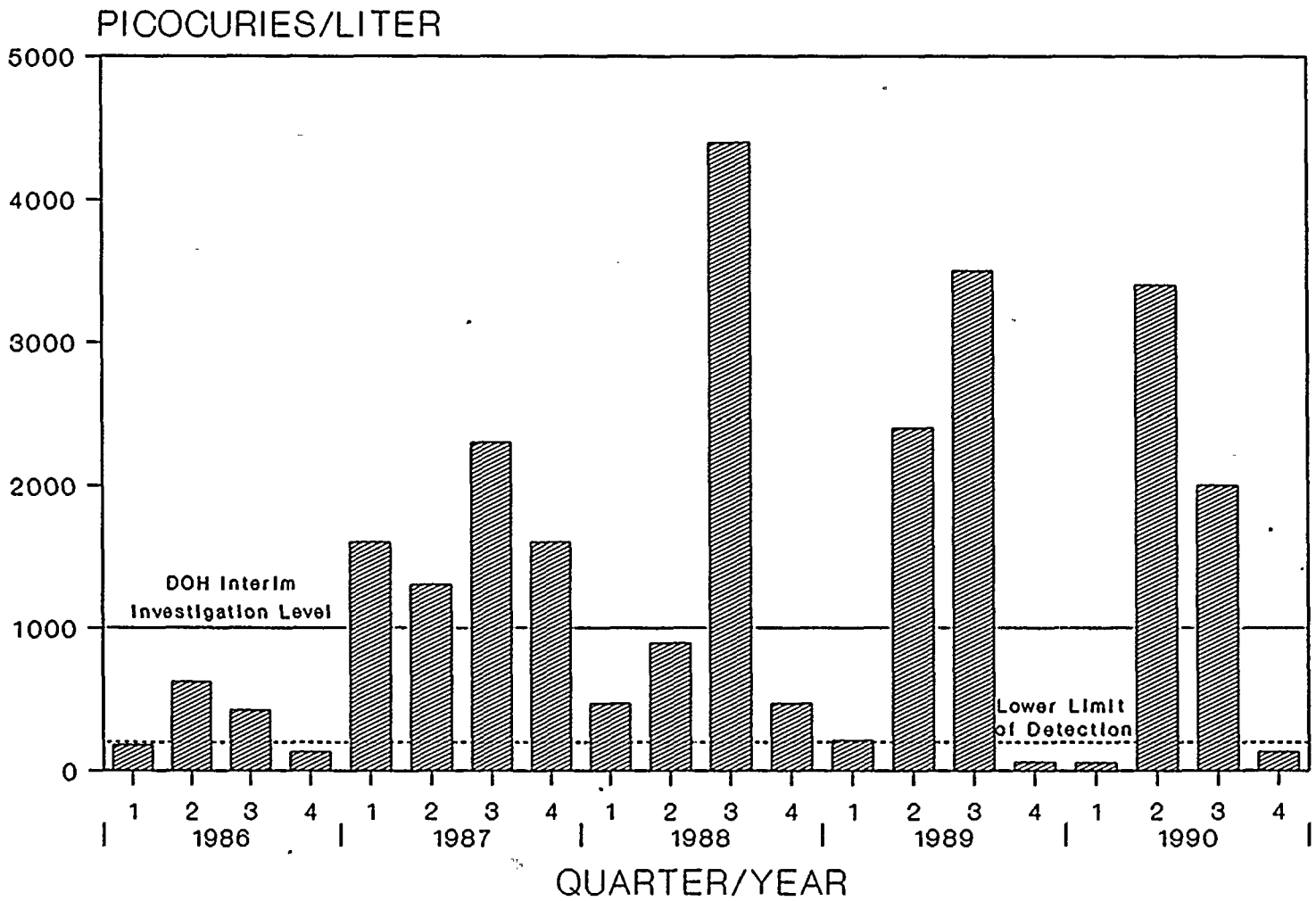
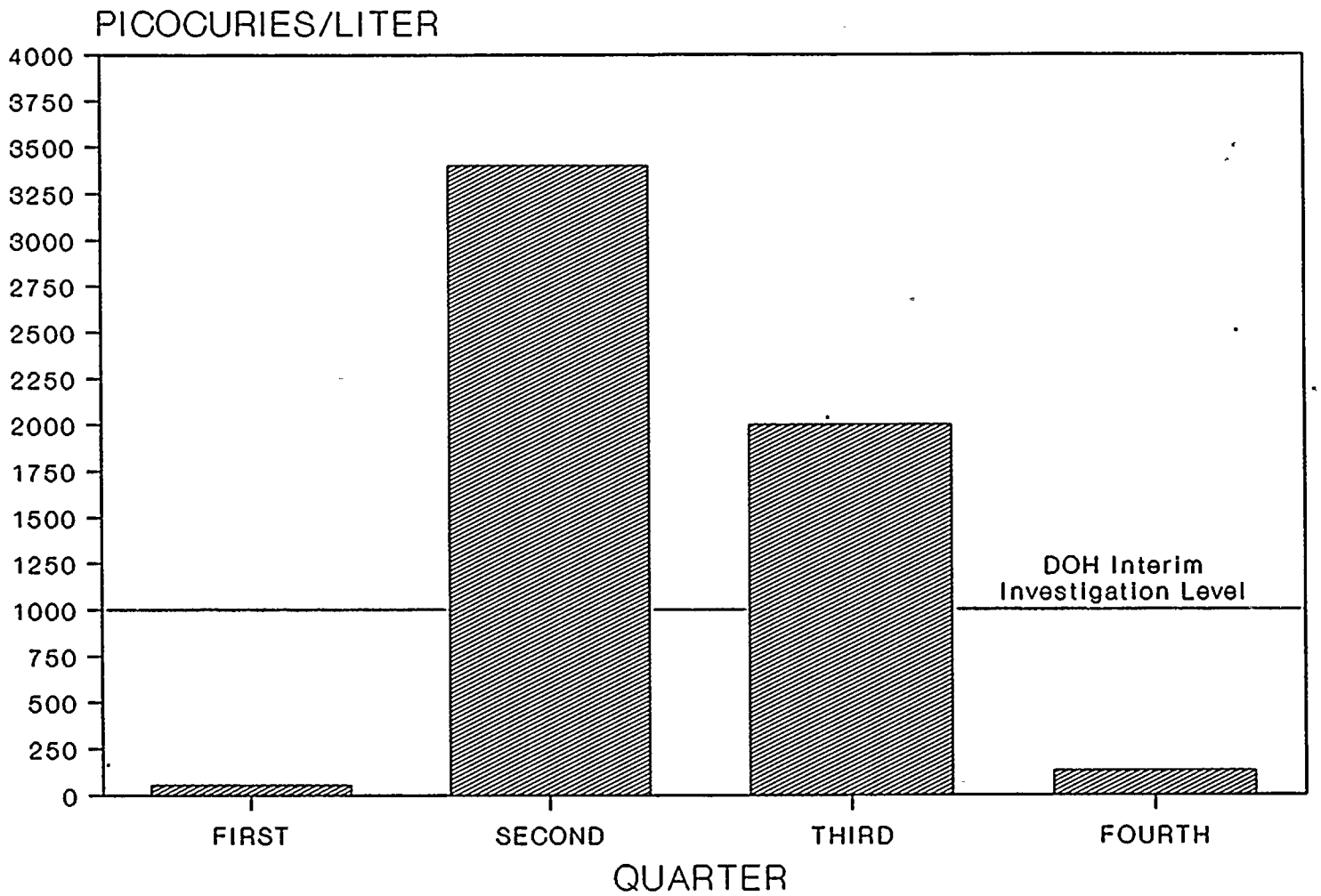
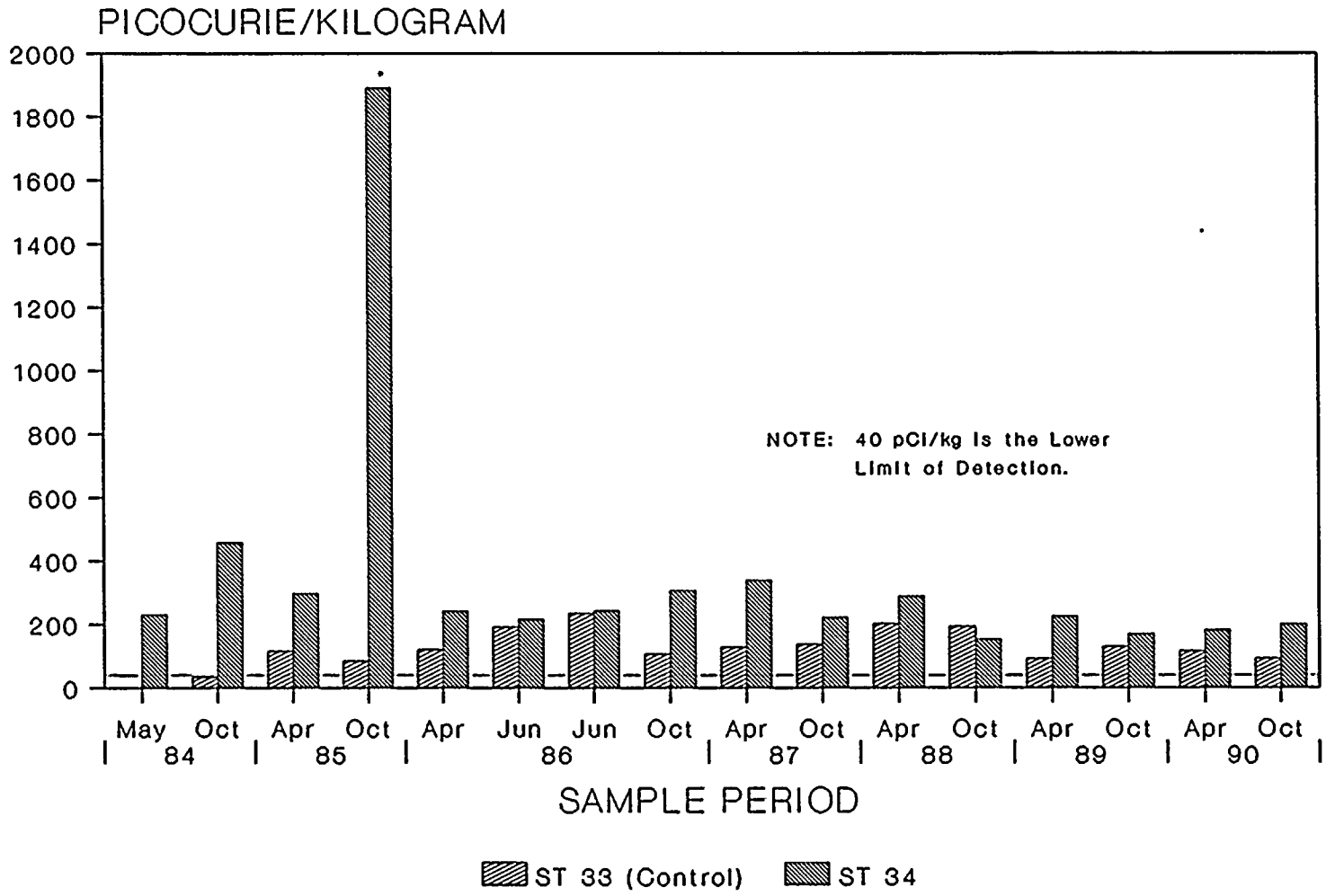


FIGURE 5-18
TRITIUM IN DISCHARGE WATER RESULTS FROM 1986 TO 1990



*NOTE: These results are low when considering that for compliance to the 4 mrem/per year state dose limitation, the annual average concentration of tritium in drinking water is less than 20,000 pCi/liter.

FIGURE 5-19
1990 TRITIUM IN DISCHARGE WATER RESULTS



* Anomalous result obtained in 1985; see reference 12.

FIGURE 5-20
CESIUM-137 IN SEDIMENT RESULTS FROM 1984 TO 1990

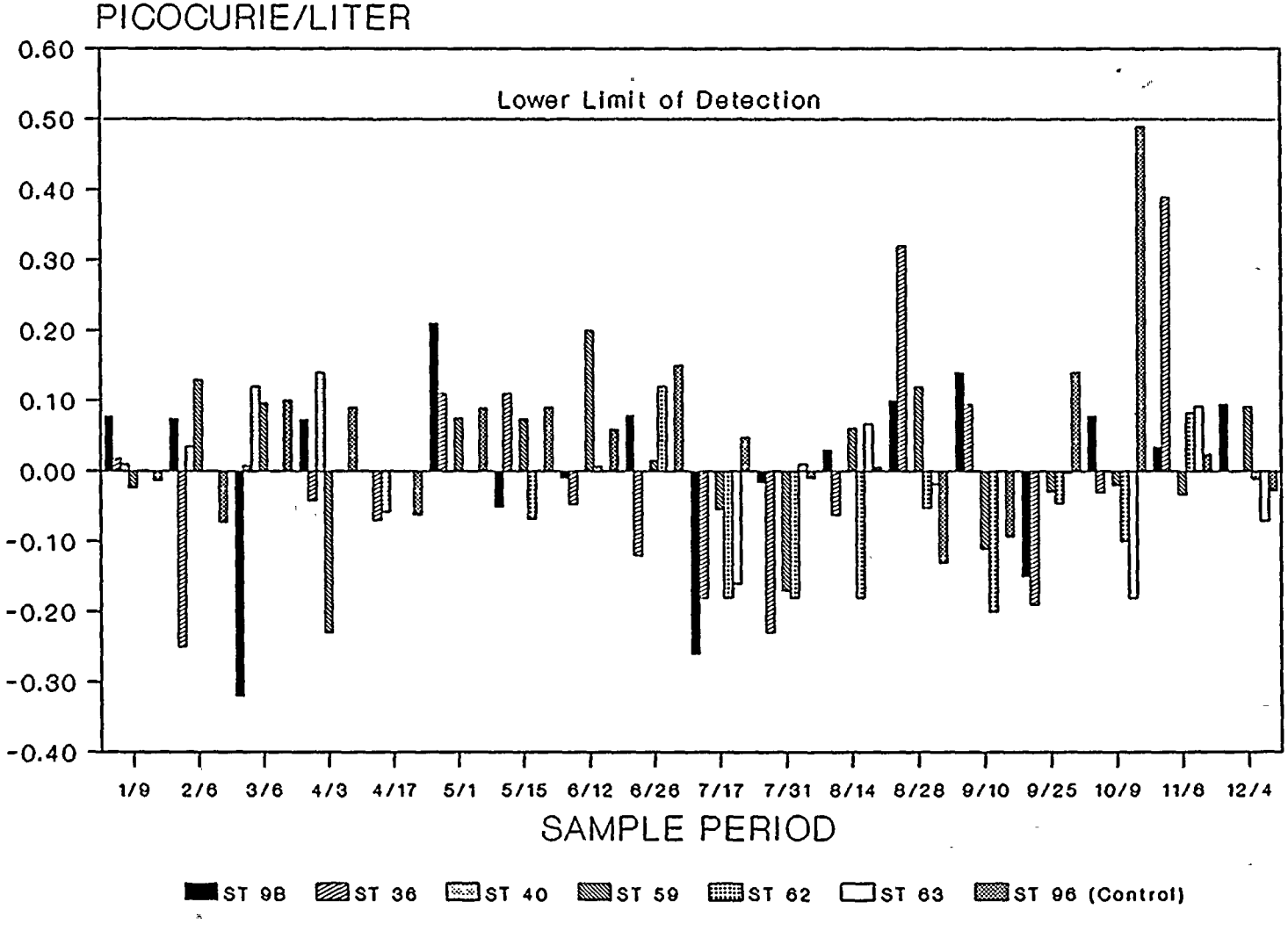


FIGURE 5-21
1990 IODINE-131 IN MILK RESULTS

6.0 QUALITY ASSURANCE AND QUALITY CONTROL

The REMP is designed to meet the quality assurance and quality control criteria of Regulatory Guide 4.15. To accomplish this, the REMP requires that its analytical contractors meet these criteria also. In-depth audits are performed of the REMP records and activities and the records and activities of its support organizations at least annually by the Supply System Corporate Licensing and Assurance group.

Quality assurance and technical audits of the analytical contractor, Teledyne Isotopes, are also conducted annually to verify their compliance to regulatory and contractual requirements. The adequacy of their quality assurance program is also assessed during the audits.

Intercomparison programs, which involve the comparison of Supply System analytical results for samples containing known concentrations of various radionuclides with the known values and with the results reported by other monitoring programs, are also a major component of the quality assurance activities of the REMP. The program participates in the Environmental Protection Agency (EPA) and Environmental Measurements Laboratory (EML) intercomparison programs. It also participates in local and regional intercomparison studies. The following sections summarize the quality assurance and quality control aspects of the TLD and analytical components of the REMP.

6.1 Quality Control For the Supply System Environmental TLD Program

The Quality Control Program for the environmental TLD preparation, processing and evaluation is described in Figures 6-1 and 6-2. QA dosimeters, which are annealed just prior to being given a known exposure to 100 mR of cesium-137 gamma radiation and processed among the field dosimeters, serve as indicators that the readout, calibration and evaluation of the field dosimeters were properly performed. The number of QA dosimeters used during each processing is generally 10% of the number of field dosimeters. Since 1987 the same QA dosimeters have been used repeatedly throughout the year in order to track their sensitivity and to provide consistency from run to run.

If the mean QA dosimeter results are greater than ± 5% (or 5 mR) of the given exposure, an investigation into the source of the discrepancy is initiated. Evaluation of the 1990 QA dosimeter results indicated only small biases for the four quarters.

Control dosimeters (trip controls) are used for each set of field dosimeters to monitor the contribution of the exposure received by the field TLDs while in transit. The radiation background in the storage area is also monitored by a separate set of control dosimeters (building controls). If the trip control results are significantly greater than the building control results, the difference between the two is subtracted from the field dosimeters.

Audit dosimeters, which are exposed to known levels of radiation below the 100 mR given to the QA dosimeters, were processed with the field dosimeters during each run to verify the accuracy of the environmental TLD evaluations. The results of these audit dosimeters processed during 1990 are presented in Table 6-1. The close agreement between the given audit exposures and the reported results provided another indication that the dosimeter evaluations were performed accurately.

During each environmental TLD processing, individual calibration factors are determined for each TLD by exposing the TLDs to 100 mR from an encapsulated cesium-137 source. The calibration exposure is determined from the exposure duration and the assessed source strength at 55 centimeters. As a quality control check for each calibration exposure, an NIST-traceable ionization chamber is also used to determine the calibration exposure. If the ionization chamber measurement does not agree with the calculated exposure to within ± 5% of the calculated value, an investigation is performed into the discrepancy and the TLD calibration is repeated, if necessary.

An additional aspect of the Quality Control Program for the TLDs is participation in intercomparison studies. The Supply System participated in the last International Intercomparison of Environmental Dosimeters, which was held in 1986 and in a local TLD intercomparison involving other environmental monitoring programs in the region. The Supply System results were reported in previous annual reports.[13][15] In each comparison, the Supply System environmental TLD performed well. The TLD appears to be quite sensitive to fluctuations in environmental radiation, as evidenced by its over-response to lower energy gamma emitters, such as Ra-226.[15]

6.2 Quality Control For the Analytical Program

Quality control for the analytical program involves two components: the quality control activities performed by the Supply System and the quality control program of the analytical contractor, Teledyne Isotopes. Both of these components are described in the following sections.

6.2.1 Supply System Quality Control Activities

During 1990, several environmental samples were submitted to Teledyne Isotopes for intercomparison with other analytical laboratories. One set of intercomparison samples consisted of ground water, surface water, and water distilled from vegetation collected on the Department of Energy Hanford Site for the 1990 Hanford/Columbia River Sampling Intercomparison. The samples were split among the States of Washington and Oregon, US DOE, the Hanford Education Action League (HEAL), and the Supply System. The results of this intercomparison that are available by the publication of this report are presented in Table 6-2. In general, the Supply System results compared well with the results of the other participants.

The Supply System has participated in the U.S. Department of Energy Environmental Measurements Laboratory (EML) Quality Assessment Program since 1987. The Supply System results for the samples sent out in March and September of 1990 are listed on Table 6-3. Once again, Supply System results agreed well with the EML expected results. The consistent low bias observed in the air particulate filter results is due to the differences in size between the filter used by EML (7 cm) and the filters routinely analyzed at Teledyne (4.7 cm).

In addition to the intercomparison samples, duplicate milk and discharge water samples were submitted to Teledyne Isotopes during the year to check the consistency of the analyses. The results of these duplicate samples taken at the same times and in the same locations as the routine samples are presented in Table 6-4. Most of the gamma isotopic results and the iodine-131 results for milk were below detection limits, so comparison is somewhat difficult. Comparison of the potassium-40 results, however, gives an indication of the consistency of the milk data. In the water samples, the gross beta results are easily compared. Considering the uncertainty associated with the results below detection levels, the milk and water duplicate results compare well.

6.2.2 Teledyne Isotopes Quality Control Program

The goal of the quality control program at Teledyne Isotopes is to produce analytical results which are accurate, precise and supported by adequate documentation. The program is based on the requirements of 10CFR50, Appendix B, Regulatory Guide 4.15 and the program, as described in Quality Assurance Manual IWL-0032-395 and Quality Control Manual IWL-0032-365.

All measuring equipment is calibrated for efficiency yearly using standard reference material traceable to the National Institute of Standards and Technology (NIST), formerly the National Bureau of Standards (NBS). For beta counting, check sources are prepared and counted every week day except holidays. Control charts are maintained with three-sigma limits specified. Backgrounds are usually measured at least once per week.

The efficiency of the gamma spectrometers is calibrated yearly with a NIST traceable standard reference material selected to cover the energy range of the nuclides to be monitored and to include all of the geometries measured. Backgrounds are determined every other week and check sources are counted weekly. The energy resolution and efficiency are plotted at two energy levels (125.1 and 1274.4 Kev) on charts and held within three-sigma control limits.

Efficiency calibration factors of the tritium gas counters are determined monthly by counting a NIST standard. This data is plotted on control charts with three-sigma limits. A background measurement is performed daily.

The flow-chart of sample control from the time of receipt to reporting of results is presented in Figure 6-3. Several of the quality control check-points are listed below and the corresponding numbers are shown on the flow chart, indicating the hold-points at which results are checked.

1. Check of Sample Receipt Form for completeness and conformance with the program of the customer by supervisor or qualified designate.

2. Preparation of all composites required by customer and designation of analyses by supervisor or qualified designate.

3. Monthly inspection of notebooks of technicians for completeness and any errors in computing yields, etc. by supervisor or qualified designate.

4. Review of all worksheets by the quality assurance manager or a qualified designate.

5. Editing of discs to remove all unapproved data before entry into computer.

6. Inspection of all final reports by quality assurance manager and technical vice president or qualified designates before being signed and mailed to the customer.

Control of sample identity is maintained by the assignment of a unique five-digit number which is maintained throughout the sample's history from sample receipt, log-in number assignment and designation of analysis to reporting the final analytical result. Besides ensuring sample accountability, Teledyne procedures also ensure the maintenance of sample integrity by controlling sample storage and taking steps to prevent contamination of samples.

Results and associated parameters, such as decay, background, efficiency, etc. are reviewed internally for reasonableness before being entered into the data system. Any results which are suspect, i.e., which are higher or lower than results in the past, are returned to the laboratory for recount. If a longer count, decay check, recount on another system or recalculation does not give acceptable results based on experience, a new aliquot is analyzed. The complete information about the sample is contained on the worksheets accompanying the sample results.

No deviations from written procedures occurred during 1990. A summary of the quality control blank and spiked sample results of analyses follows. Summaries or the results of internal blanks and spike samples are presented in Tables 6-5 and 6-6. A summary of the EPA cross-check samples is presented in Table B-1 of Appendix B. Any results above the ± three-sigma normalized deviation from the known is explained, giving the reason for the deviation and the corrective action to be taken.

Iodine-131 Cartridges

One blank charcoal cartridge was analyzed with each set of cartridges, for a total of fifty-one blanks. The average result was 3.8±12.7E-01 pCi per cartridge. This was calculated from the results of quality control samples without considering detection limits.

Gross-Beta - Filters

One blank filter was measured with each set of filters. Fifty-two blanks were counted. The average activity in total pCi was 9.3±2.9E-01, which indicated a relatively stable background for the filter, including the background of the gross beta proportional counters.

I-131 - Milk

A blank milk was analyzed with each group of samples assayed. The results show that there was no contamination in the laboratory or counting area. The measurements of the blank samples (Table 6-5)(a) indicated that there was no bias on the low background counters. The average activity for fourteen samples was 7.5±17.0E-02 pCi/liter. This was calculated from quality control samples without considering detection limits. A total of fifty-six in-house blank milk samples were processed throughout 1990, with the highest detection level being 6.0E-01 pCi/liter.

Sr-90 - Milk and Water

Bimonthly blank and spike milk and weekly water samples were analyzed for strontium-90. The highest detection level of the blank water samples was less than 1.0 pCi/liter. Fifty-one spiked water samples were analyzed with an average level of 4.0±0.4E+01 pCi/liter, compared with a spike level of 4.1±0.7E+01 pCi/liter. A total of 26 milk samples were spiked to a level of 4.1±0.7E+01 pCi/liter. The average activity determined for the spikes was 3.9±0.4E+01 pCi/liter, which was within the limits specified by the EPA Intercomparison Studies Program. A total of 24 blank milk samples were analyzed with an average activity of 1.3±0.4E+00 pCi/liter of strontium-90.

Gross Beta - Water

Fifty-two blanks were prepared from distilled water. The highest detection level measured was 1.0 pCi/liter. No contamination was indicated and the background level was low and stable. During 1990 fifty-two gross beta spike samples were analyzed. The average result was 1.8±0.1E+01 pCi/liter with a spike level of 2.1±0.5E+01 pCi/liter. This was well within the guidelines of the EPA Intercomparison Studies Program.

Tritium in Water

Fifty-two blank samples were analyzed by gas counting. The highest result was less than 200 pCi/liter. A total of 52 spiked tritium samples were analyzed. The average result was 2.6±0.1E+03 pCi/liter, compared with a spike level of 2.7±0.3E+03 pCi/liter.

Gamma Spectroscopy

A blank water sample was analyzed on a weekly basis in the gamma spectroscopy laboratory. All nuclides were less than the normal level of detection, indicating no contamination. Spike samples were measured weekly using the Eu-154 peak at 1274.5 KeV. The average activity of 52 measurements was 1.41±0.02E+05 pCi/liter, compared with a spike level of 1.40±0.2E+05 pCi/liter.

TABLE 6-1

1990 ENVIRONMENTAL AUDIT DOSIMETER RESULTS

TLD DISTRIBUTION	GIVEN EXPOSURE (mR)	REPORTED EXPOSURE (mR)	BIAS (%)
First Quarter	30.0	30.5	1.7
		30.4	1.3
		29.8	-0.6
Second Quarter	30.0	29.9	-0.3
		30.7	2.3
		29.0	-3.3
Third Quarter	50.0	47.8	-4.4
		47.3	-5.4
		42.0	-6.0
Fourth Quarter	25.0	25.0	0.0
		25.5	2.0
		25.4	2.0
Annual	90.0	91.7	1.9
		90.1	0.3
		89.8	-0.2

TABLE 6-2

HANFORD/COLUMBIA RIVER SAMPLING INTERCOMPARISON RESULTS

	Oregon State	Washington State	Supply System
Well 699-43-3 (pCi/l)			
Gr.B	9.8±3.3E+01	3.9±0.2E+01	6.9±0.3E+01
H-3	20.9±0.1E+04	22.0±0.1E+04	23.0±1.0E+04
Sr-89	NR	0.7±2.0E+00	NA
Sr-90	7.0±3.0E-01	2.2±4.5E-01	3.2±5.9E-01
Co-60	6.5±1.7E+00	6.0±2.0E+00	9.0±2.9E+00
Cr-51	NR	0.7±1.4E+00	NR
Mn-54	NR	0.0±1.0E+00	-1.2±2.4E+00
Zn-65	NR	0.0±2.0E+00	0.0±5.9E+00
Ru-103	NR	-1.0±2.0E+00	3.3±4.8E+00
Ru-106	NR	0.3±1.0E+01	1.2±2.4E+01
Sb-125	NR	2.0±3.0E+00	NR
Cs-137	NR	1.0±1.0E+00	2.2±2.7E+00
Ra-226	3.9±5.3E+00	6.0±8.0E-02	-5.8±5.5E+01 (1)
N-8T (pCi/l)			
Gr.B	9.2±0.1E+03	10.4±0.1E+03	12.0±1.0E+03
H-3	37.8±0.4E+03	38.9±0.4E+03	45.0±1.0E+03
Sr-89	NR	-1.3±0.8E+03	NA
Sr-90	56.0±1.0E+02	52.8±0.8E+02	58.0±1.0E+02
Co-60	14.1±1.7E+00	13.0±3.0E+00	14.0±4.0E+00
Cr-51	NR	-1.0±1.7E+01	NR
Mn-54	NR	-1.0±1.0E+00	3.8±3.0E+00
Zn-65	NR	1.0±3.0E+00	-1.1±0.7E+01
Ru-103	NR	0.0±2.0E+00	3.2±5.3E+00
Ru-106	NR	0.6±1.2E+01	0.1±2.7E+01
Sb-125	21.8±4.7E+00	24.0±6.0E+00	NR
Cs-137	NR	1.0±1.0E+00	1.2±2.9E+00
Ra-226	NR	NA	-3.3±5.7E+01 (1)
Mile 42-2 Seep (pCi/l)			
Gr.B	7.1±0.7E+00	6.0±1.0E+00	8.0±1.2E+00
H-3	1.7±1.2E+02	33.2±8.8E+01	2.9±1.2E+02
Sr-89	NR	-0.3±2.4E+03	NA
Sr-90	1.5±0.4E+00	2.2±4.7E-01	-2.3±8.7E-01
Co-60	NR	1.0±1.0E+00	0.2±2.6E+00
Cr-51	NR	0.2±1.2E+01	NR

NR = Not reported
NA = Not analyzed
(1) From gamma isotopic analysis

TABLE 6-2 (Contd)

HANFORD/COLUMBIA RIVER SAMPLING INTERCOMPARISON RESULTS

	Oregon State	Washington State	Supply System
Mile 42-2 Seep (Contd) (pCi/l)			
Mn-54	NR	-0.9±1.0E+00	-0.5±2.6E+00
Zn-65	NR	-1.0±2.0E+00	-0.3±6.2E+00
Ru-103	NR	0.0±1.0E+00	3.5±4.8E+00
Ru-106	NR	-4.0±9.0E+00	1.0±2.4E+01
Sb-125	NR	-1.0±3.0E+00	NR
Cs-137	0.3±1.5E+00	0.0±1.0E+00	4.8±2.7E+00
Ra-226	1.7±2.3E+00	6.0±9.0E-02	-5-0±5.9E+01 (1)
Hanford Ferry Landing (pCi/l)			
Gr.B	1.6±0.5E+00	1.0±1.0E+00	2.5±0.8E+00
H-3	NR	2.2±0.9E+02	-0.7±3.4E+01
Sr-89	NR	9.0±2.0E-01	NA
Sr-90	5.0±3.0E-01	3.0±4.0E-01	3.9±0.9E+00
Co-60	NR	0.8±1.5E+00	1.1±2.1E+00
Cr-51	NR	0.2±1.5E+01	NR
Mn-54	2.1±1.2E+00	-0.1±1.3E+00	0.0±2.1E+00
Zn-65	NR	0.8±2.6E+00	-2.8±4.6E+00
Ru-103	NR	-2.0±2.0E+00	3.1±3.9E+00
Ru-106	NR	-0.8±1.3E+01	-0.1±1.9E+01
Sb-125	NR	2.0±4.0E+00	NR
Cs-137	NR	0.6±1.4E+00	2.2±2.7E+00
Ra-226	3.9±3.0E+00	NA	4.5±4.7E+01 (1)
Port of Benton (pCi/l)			
Gr.B	2.4±0.5E+00	2.0±1.0E+00	2.3±0.8E+00
H-3	1.8±1.2E+02	5.7±0.9E+02	5.1±0.9E+02
Sr-89	NR	0.1±2.6E+00	NA
Sr-90	8.0±4.0E-01	0.1±5.0E-01	3.3±4.9E-01
Co-60	NR	1.0±1.0E+00	1.1±2.0E+00
Cr-51	NR	1.3±1.2E+01	NR
Mn-54	NR	1.0±1.0E+00	0.4±1.8E+00
Zn-65	NR	-1.0±2.0E+00	3.1±4.2E+00
Ru-103	NR	-2.0±1.0E+00	1.1±3.5E+00
Ru-106	NR	-4.0±9.0E+00	0.4±1.8E+01
Sb-125	NR	3.0±3.0E+00	NR
Cs-137	NR	-4.0±9.0E-01	0.0±1.9E+00
Ra-226	NR	NA	0.7±4.1E+01 (1)

NR = Not reported
NA = Not analyzed
(1) From gamma isotopic analysis

TABLE 6-2 (Contd)

HANFORD/COLUMBIA RIVER SAMPLING INTERCOMPARISON RESULTS

	Oregon State	Washington State	Supply System
Mile 28.2 Seep (pCi/l)			
Gr.B	53.9±1.9E+00	29.0±2.0E+00	53.0±3.0E+00
H-3	128.9±0.7E+03	135.0±1.0E+03	14.0±1.0E+04
Sr-89	NR	0.5±2.1E+00	NA
Sr-90	NR	0.2±4.3E-01	4.0±7.2E-01
Co-60	4.6±1.6E+00	4.0±2.0E+00	1.2±2.3E+00
Cr-51	NR	0.1±1.7E+01	NR
Mn-54	NR	1.0±1.0E+00	2.0±2.1E+00
Zn-65	NR	-1.0±3.0E+00	-4.7±5.0E+00
Ru-103	NR	-3.0±2.0E+00	0.2±4.1E+00
Ru-106	NR	0.1±1.3E+01	1.2±2.1E+01
Sb-125	NR	-4.0±5.0E+00	NR
Cs-137	NR	2.0±2.0E+00	3.7±2.5E+00
Ra-226	1.3±3.3E+00	7.0±9.0E-02	0.6±4.9E+01 (1)
Mile 28.2 Vegetation (pCi/gr dry)			
Sr-89	NR	-1.0±3.0E-01	NA
Sr-90	5.0±3.0E-02	4.0±3.0E-02	NA
Co-60	NR	3.0±3.0E-02	2.0±3.1E+01
Cr-51	NR	-0.6±5.7E+00	NR
Mn-54	NR	2.0±4.0E-02	-6.5±3.3E+01
Zn-65	NR	-0.1±1.2E-01	-7.7±9.6E+01
Ru-103	NR	1.0±3.0E-01	-0.4±1.9E+02
Ru-106	NR	2.0±4.0E-01	0.2±3.1E+02
Sb-125	NR	-0.2±3.2E-01	NR
Cs-137	1.0±0.3E-01	7.6±5.3E-02	8.6±3.3E+01
Ra-226	1.0±1.0E-01	NA	0.7±6.1E+02 (1)
Mile 28.2 Vegetation (pCi/l)			
H-3	23.5±0.3E+03	22.7±0.3E+03	22.0±1.0E+03

NR = Not reported
NA = Not analyzed
(1) From gamma isotopic analysis

TABLE 6-3
1990 ENVIRONMENTAL MEASUREMENTS LABORATORY (EML)
QUALITY ASSESSMENT PROGRAM RESULTS

Date	Sample Type	Nuclide	Teledyne Reported Result	Percent Error (2σ)	EML Value	Ratio Reported/EML	+/-
9003	Particulate Filter[1] (total Bq)[2]	Be-7	4.66E+01	10	5.14E+01	0.91	0.12
		Mn-54	9.10E+01	9	9.60E+00	0.95	0.10
		Co-57	6.00E+00	10	6.50E+00	0.92	0.11
		Co-60	8.30E+00	9	9.40E+00	0.88	0.10
		Cs-134	1.44E+01	9	1.82E+01	0.79	0.10
		Cs-137	1.87E+01	10	2.04E+02	0.92	0.10
		Ce-144	2.82E+01	9	3.12E+02	0.90	0.10
9003	Soil (Bq/kg)	K-40	6.40E+02	9	6.08E+02	1.05	0.10
		Cs-137	1.95E+04	10	1.75E+04	1.11	0.11
		Sr-90	7.40E+02	5	6.65E+02	1.11	0.06
9003	Vegetation (Bq/kg)	K-40	3.25E+02	10	3.23E+02	1.01	0.13
		Cs-137	3.41E+01	9	2.85E+01	1.20	0.13
		Sr-90	7.03E+01	5	7.02E+01	1.00	0.06
9003	Water (Bq/l)	H-3	1.89E+03	1	1.96E+04	0.96	0.03
		Mn-54	1.06E+02	10	1.03E+02	1.03	0.12
		Co-57	2.00E+02	9	1.98E+02	1.01	0.11
		Co-60	1.89E+02	10	2.06E+02	0.92	0.10
		Sr-90	9.99E+01	3	1.11E+02	0.90	0.05
		Cs-134	4.29E+02	10	4.62E+02	0.93	0.11
		Cs-137	2.03E+02	10	1.98E+02	1.03	0.12
		Ce-144	6.18E+02	10	4.03E+02	1.53	0.17
9009	Particulate Filter[1] (total Bq)	Mn-54	0.289E+02	10	0.333E+02	0.87	0.09
		Co-57	0.880E+01	10	0.114E+02	0.77	0.08
		Co-60	0.195E+02	10	0.254E+02	0.77	0.08
		Cs-134	0.129E+02	10	0.163E+02	0.79	0.08
		Cs-137	0.137E+02	10	0.157E+02	0.87	0.09
		Ce-144	0.122E+02	9	0.165E+02	0.74	0.08
9009	Soil (Bq/kg)[3]	K-40	0.533E+03	9	0.513E+03	1.04	0.12
		Sr-90	0.100E+02	15	0.833E+01	1.20	0.28
		Cs-137	0.226E+03	10	0.196E+03	1.15	--
9009	Vegetation (Bq/kg)	K-40	0.113E+04	10	0.103E+04	1.10	0.13
		Cs-137	0.205E+02	9	0.182E+02	1.13	0.13
9009	Water (Bq/l)	H-3	0.444E+04	8	0.390E+04	1.14	0.14
		Mn-54	0.299E+03	10	0.301E+03	0.99	0.10
		Co-57	0.127E+04	9	0.130E+04	0.98	0.10
		Co-60	0.488E+03	9	0.491E+03	0.99	0.10
		Sr-90	0.850E+01	4	0.933E+01	0.86	0.06
		Cs-134	0.349E+03	10	0.355E+03	0.98	0.98
		Cs-137	0.414E+03	9	0.390E+03	1.06	0.11
		Ce-144	0.870E+03	10	0.923E+03	0.94	0.10

[1]The EML filter is larger than the standard filter geometry used at Teledyne. This difference is believed to account for the bias observed in the results.

[2]Bq = becquerel; the EML results are now reported in becquerels instead of picocuries. One picocurie equals 0.037 becquerel.

[3]The Cs-137 result was inadvertently omitted from results submitted to EML.

TABLE 6-4

COMPARISON OF ANALYTICAL RESULTS

FOR 1990 DUPLICATE MILK AND WATER SAMPLES

Results in pCi/liter

MEDIA	COLLECTION DATE	RADIONUCLIDE	RESULTS	
			STATION 36	STATION 37
Milk	900306	Cs-134	* 1.2± 2.0E-01	* 6.3± 2.3E-01
		Cs-137	* 0.8± 2.1E-00	* 1.5± 2.3E+00
		I-131[a]	* 0.7± 9.5E-02	* 2.7± 9.5E-02
		Ba-140	* 1.7± 6.1E+00	* -0.9± 6.2E+00
		La-140	* -7.2±25.4E-01	* -7.0±25.4E-01
		K-40	12.6± 1.3E+02	13.0± 1.3E+02
	900925	Cs-134	* 8.6±24.7E-01	* 1.5±24.3E-01
		Cs-137	* 6.8± 2.8E+00	* 0.3± 2.3E+00
		I-131[a]	* -1.9± 1.1E-01	* -0.6± 1.1E-01
		Ba-140	* -7.9± 8.4E+00	* -1.1± 8.9E+00
		La-140	* 1.2± 3.6E+00	* -0.4± 3.5E+00
		K-40	12.0± 1.2E+02	11.4± 1.1E+02
			STATION 27	STATION 72
Water	901107 to 901205	Gr-B	1.6± 0.2E+01	1.9± 0.2E+01
		Mn-54	* 9.4±18.8E-01	* 7.1±16.3E-01
		Fe-59	* 2.0± 4.4E+00	* 2.0± 3.7E+00
		Co-60	* -4.6±23.2E-01	* -1.3±17.4E-01
		Co-58	* -2.0±20.0E-01	* 5.2±17.1E-01
		Zn-65	* -2.9± 4.5E+00	* 1.3± 3.6E+00
		Cs-134	* -6.1±22.1E-01	* 7.2±18.3E-01
		Cs-137	* 1.8± 2.1E+00	* -1.2± 1.8E+00
		Ba-140	* -2.8± 7.2E+00	* 0.3± 7.3E+00
		La-140	* 2.2± 3.5E+00	* -3.4± 3.5E+00
		K-40	* 2.6± 2.6E+01	* 3.5± 2.3E+01
	900313 to 900613	H-3[b]	3.4± 0.1E+03	2.3± 0.1E+03

* Denotes a result less than the detection limit.

(a) Resin Method

(b) Station 27 sample was composited at Teledyne; Station 72 sample was composited at Supply System. The difference in results was caused by a slight discrepancy in the volume taken from one of the three samples used in the Supply System sample. Because that sample contained much more tritium (8,200 pCi/liter)than the other two samples (210 and 560 pCi/liter), the slight discrepancy had a significant effect on the composite result.

TABLE 6-5

SUMMARY OF 1990 QUALITY CONTROL DATA: BLANKS

NUCLIDE	MEDIUM	BLANKS NUMBER		AVERAGE BLANK	UNITS
I-131	Milk	14	(a)	7.5±17.0E-02	pCi/l
		56	(d)	<6.0E-01	pCi/l
Sr-90	Milk	24	(d)	1.3±0.4E+00	pCi/l
Sr-90	Water	48	(d)	<2.0E+00	pCi/l
H-3 (Gas Counting)	Water	52	(d)	<2.0E+02	pCi/l
Gross Beta	Water	52	(d)	<1.0E+00	pCi/l
Gamma	Water	52		*	pCi/l
Gross Beta	AP Filter	52	(c)(b)	9.3±2.9E-01	Total pCi
I-131	Charcoal	51	(a)	3.8±12.7E-01	Total pCi

*All nuclides less than minimum detection level.

(a) This average is calculated from the Supply System quality control samples without considering detection limits.

(b) The in-house weekly quality control blanks for AP filters and charcoals are calculated in total pCi.

(c) This average includes only the blank AP filters analyzed for the Supply System. A blank planchet (counter background) and a blank filter are counted with each set of filters analyzed (approximately 10 sets per week).

(d) The highest detection level was used as the average of these samples.

TABLE 6-6

SUMMARY OF 1990 QUALITY CONTROL DATA: SPIKES

NUCLIDE	MEDIUM	SPIKED SAMPLES NUMBER	AVERAGE RESULT (pCi/l)	SPIKE LEVEL (pCi/l)
Gross Beta	Water	52	1.8±0.1E+01	2.1±0.5E+01
H-3 (Gas Counting)	Water	52	2.6±0.1E+03	2.7±0.3E+03
Sr-90	Water	51	4.0±0.4E+01	4.1±0.7E+01
Sr-90	Milk	26	3.9±0.4E+01	4.1±0.7E+01
Eu-154	Water	52	1.4±0.2E+05	1.4±0.2E+05

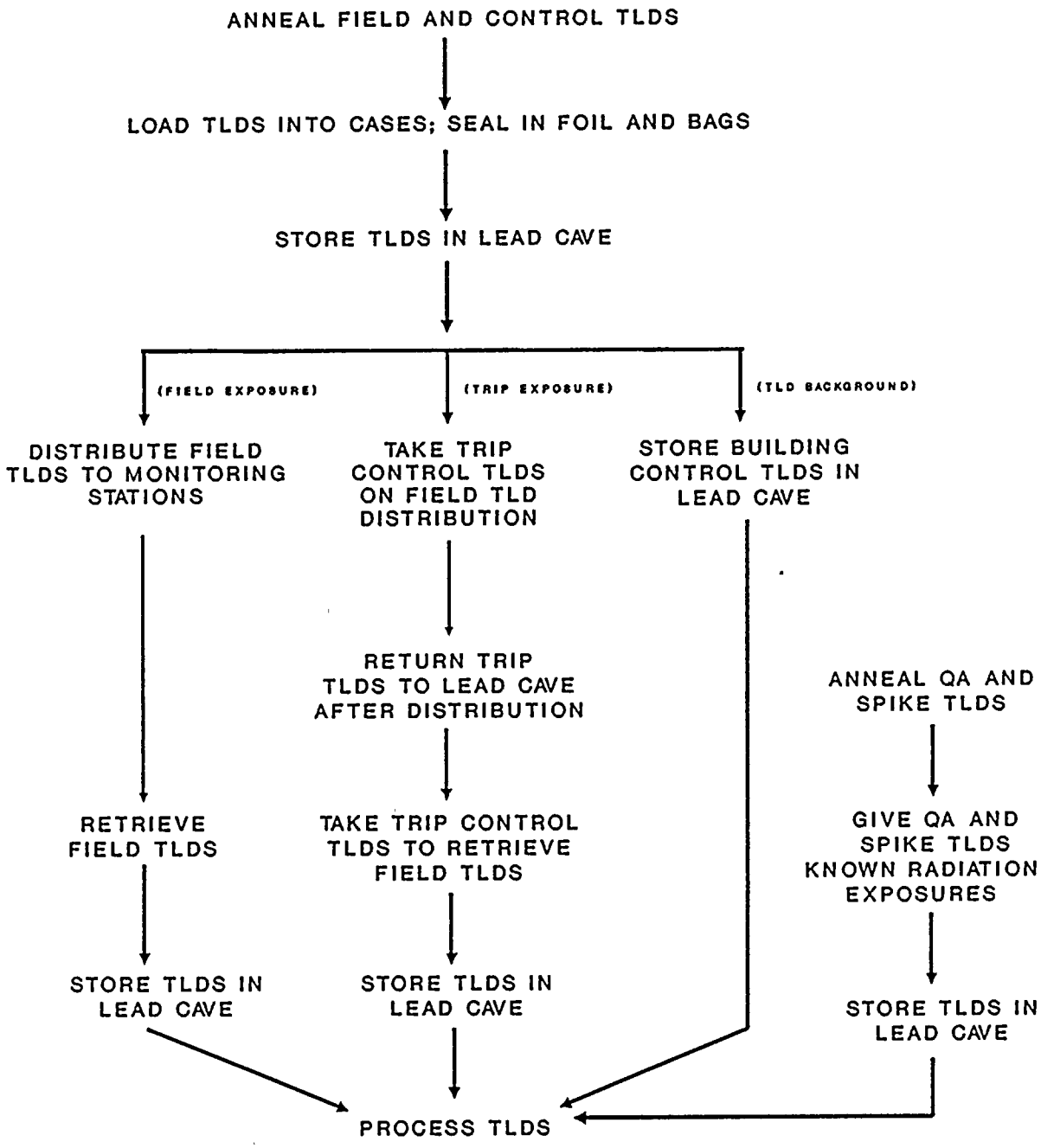


FIGURE 6-1
SUPPLY SYSTEM ENVIRONMENTAL TLD PREPARATION - USE CYCLE

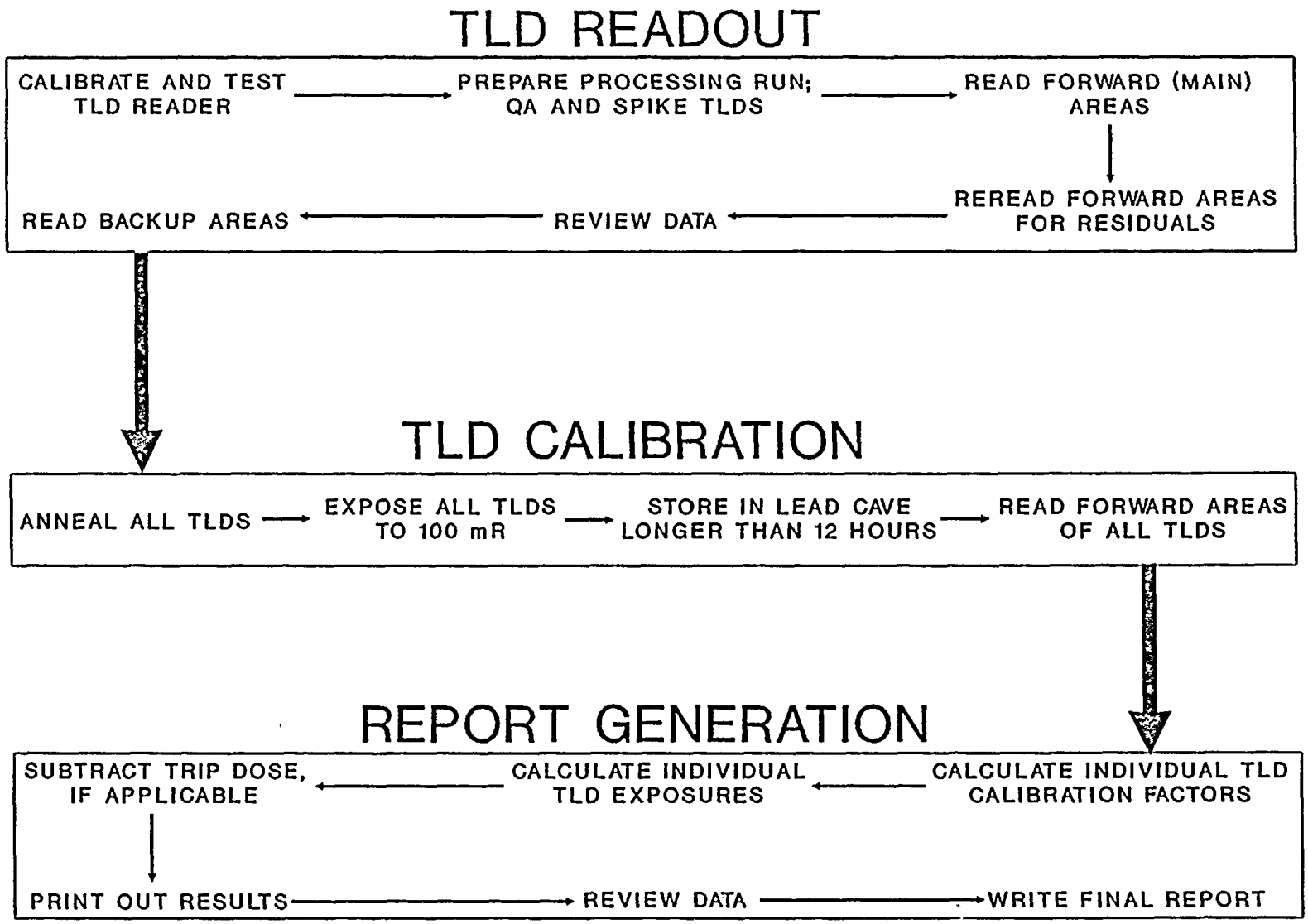


FIGURE 6-2
SUPPLY SYSTEM TLD EVALUATION

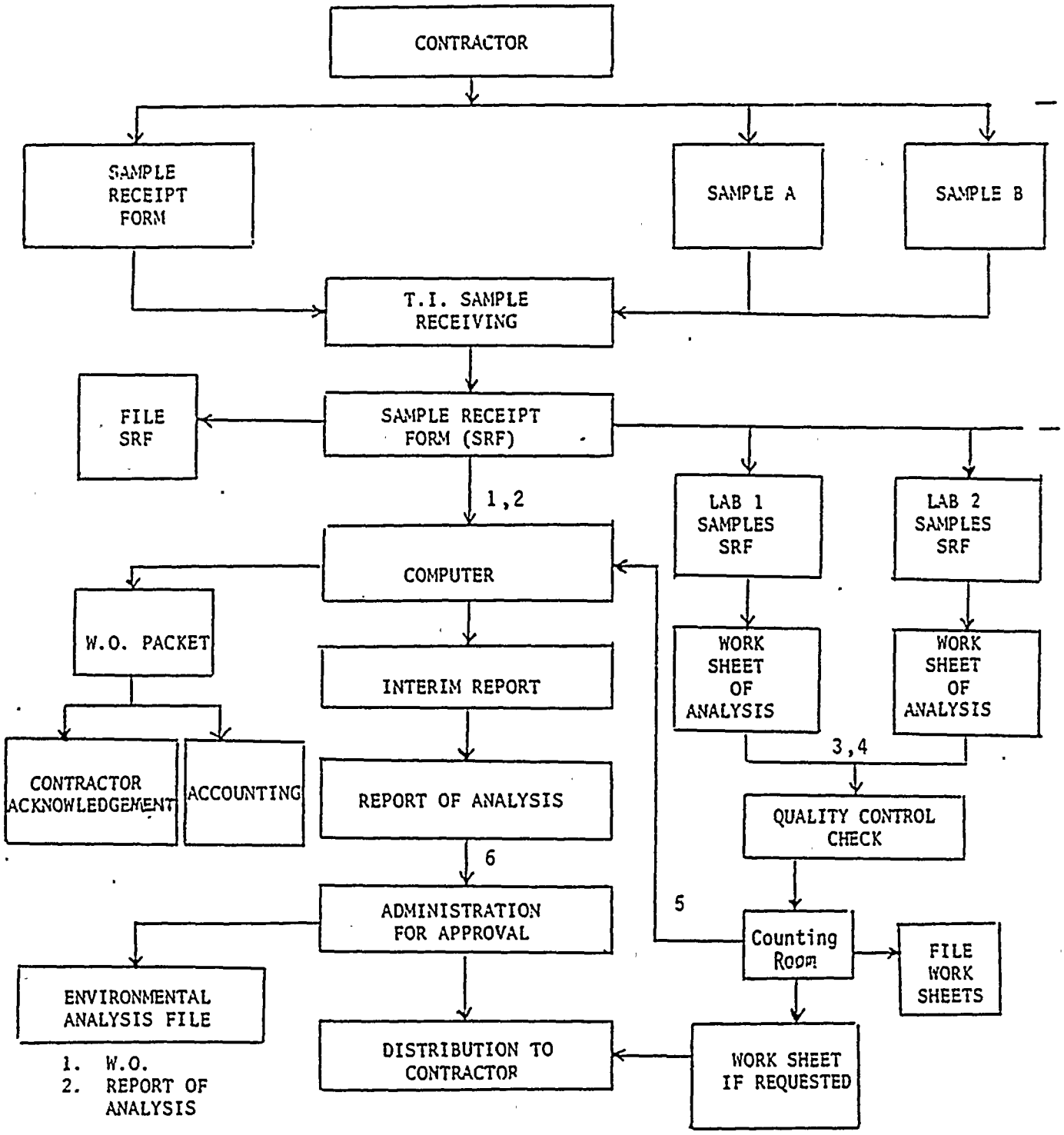


FIGURE 6-3
Flow Chart For Teledyne Isotopes Samples

7.0 REFERENCES

1. U.S. Nuclear Regulatory Commission, "Programs For Monitoring Radioactivity in the Environs of Nuclear Power Plants," Regulatory Guide 4.1, Revision 1, April 1975.

2. U.S. Nuclear Regulatory Commission, "Environmental Technical Specifications For Nuclear Power Plants," Regulatory Guide 4.8, December 1975.

3. U.S. Nuclear Regulatory Commission, "An Acceptable Radiological Environmental Monitoring Program," Assessment Branch Technical Position; Revision 1, November 1979.

4. U.S. Nuclear Regulatory Commission, "Quality Assurance For Radiological Environmental Monitoring Program (Normal Operations), Effluent Streams and the Environment," Regulatory Guide 4.15, Revision 1, February 1979.

5. U.S. Nuclear Regulatory Commission, "Performance, Testing and Procedural Specifications For Thermoluminescence Dosimetry-Environmental Applications," Regulatory Guide 4.13, Revision 1, July 1977.

6. American National Standard: ANSI N545-1975, "Performance Testing and Procedural Specifications for Thermoluminescent Dosimetry (Environmental Applications)."

7. Code of Federal Regulations, Title 10 Part 20, Standards For Protection Against Radiation.

8. Code of Federal Regulations, Title 10 Part 50, Domestic Licensing of Production and Utilization Facilities.

9. Washington Public Power Supply System Nuclear Plant No. 2, Operating License NSF-21, Technical Specifications 3/4.12.1, Table 3.13.1.

10. Attachment I to the Site Certification Agreement Between the State of Washington and the Washington Public Power Supply System, May 17, 1972 (with revision dated January 1978).

11. "Teledyne Isotopes TLD System For Personnel and Environmental Monitoring," Teledyne Isotopes, Westwood, New Jersey, February 2, 1981.

12. Washington Public Power Supply System, Radiological Environmental Monitoring Program Annual Report Plant 2, 1985, April 1986.

13. Washington Public Power Supply System, Radiological Environmental Monitoring Program Annual Report Plant 2, 1986, April 1987.

14. Washington Public Power Supply System, Radiological Environmental Monitoring Program Annual Report Plant 2, 1987, April 1988.

15. Washington Public Power Supply System, Radiological Environmental Monitoring Program Annual Report Plant 2, 1988, April 1989.

16. Washington State Department of Health, Rules and Regulations of the State Board of Health Regarding Public Drinking Water Systems, Chapter 246-290, Washington Administrative Code, April 1991.

17. Robertson, D. E., and J. J. Fix, Association of Hanford Origin Radionuclides With Columbia River Sediment, BNWL-2305, August 1977.

APPENDIX A: 1990 ROUTINE RESULTS

TABLE A-1.1

1990 QUARTERLY TLD RESULTS

Results in mR/day

LOCATION	COLLECTION PERIOD	RESULT	UNCERTAINTY 2σ
1	891228 to 900329	0.24	0.02
	900329 to 900628	0.24	0.01
	900628 to 900927	0.25	0.01
	900927 to 901227	0.26	0.00
2	891228 to 900329	0.25	0.01
	900329 to 900628	0.25	0.01
	900628 to 900927	0.24	0.02
	900927 to 901227	0.26	0.01
3	891228 to 900329	0.24	0.01
	900329 to 900628	0.25	0.01
	900628 to 900927	0.24	0.02
	900927 to 901227	0.25	0.01
4	891228 to 900329	0.24	0.01
	900329 to 900628	0.23	0.00
	900628 to 900927	0.23	0.01
	900927 to 901227 (a)		
5	891228 to 900329	0.24	0.01
	900329 to 900628	0.23	0.01
	900628 to 900927	0.24	0.01
	900927 to 901227	0.24	0.01
6	891228 to 900329	0.24	0.01
	900329 to 900628	0.23	0.01
	900628 to 900927	0.23	0.01
	900927 to 901227	0.24	0.01
7	891228 to 900329	0.24	0.03
	900329 to 900628	0.25	0.01
	900628 to 900927	0.24	0.01
	900927 to 901227	0.25	0.01
8	891228 to 900329	0.27	0.00
	900329 to 900628	0.27	0.01
	900628 to 900927	0.27	0.01
	900927 to 901227	0.28	0.01

(a) TLD lost in the field.

TABLE A-1.1 (Cont.)

1990 QUARTERLY TLD RESULTS

Results in mR/day

LOCATION	COLLECTION PERIOD	RESULT	UNCERTAINTY 2σ
9A	891228 to 900329	0.24	0.01
	900329 to 900628	0.23	0.01
	900628 to 900927	0.23	0.01
	900927 to 901227	0.24	0.01
10	891228 to 900329	0.25	0.01
	900329 to 900628	0.25	0.04
	900628 to 900927	0.24	0.01
	900927 to 901227	0.25	0.00
11	891228 to 900329	0.25	0.02
	900329 to 900628	0.25	0.01
	900628 to 900927	0.25	0.01
	900927 to 901227	0.25	0.01
12	891228 to 900329	0.27	0.01
	900329 to 900628	0.27	0.01
	900628 to 900927	0.27	0.01
	900927 to 901227	0.27	0.00
13	891228 to 900329	0.24	0.01
	900329 to 900628	0.25	0.01
	900628 to 900927	0.25	0.01
	900927 to 901227	0.25	0.01
14	891228 to 900329	0.25	0.01
	900329 to 900628	0.24	0.01
	900628 to 900927	0.25	0.01
	900927 to 901227	0.26	0.01
15	891228 to 900329	0.27	0.02
	900329 to 900628	0.27	0.01
	900628 to 900927	0.26	0.01
	900927 to 901227	0.27	0.01
16	891228 to 900329	0.25	0.02
	900329 to 900628	0.27	0.00
	900628 to 900927	0.25	0.01
	900927 to 901227	0.27	0.01

TABLE A-1.1 (Cont.)

1990 QUARTERLY TLD RESULTS

Results in mR/day

LOCATION	COLLECTION PERIOD	RESULT	UNCERTAINTY 2σ
17	891228 to 900329	0.25	0.01
	900329 to 900628	0.25	0.01
	900628 to 900927	0.26	0.01
	900927 to 901227	0.27	0.01
18	891228 to 900329	0.26	0.01
	900329 to 900628	0.25	0.01
	900628 to 900927	0.25	0.01
	900927 to 901227	0.27	0.01
19	891228 to 900329	0.25	0.01
	900329 to 900628	0.26	0.01
	900628 to 900927	0.26	0.02
	900927 to 901227	0.26	0.01
20	891228 to 900329	0.25	0.01
	900329 to 900628	0.25	0.01
	900628 to 900927	0.25	0.01
	900927 to 901227	0.26	0.01
21	891228 to 900329	0.24	0.01
	900329 to 900628	0.23	0.00
	900628 to 900927	0.23	0.01
	900927 to 901227	0.24	0.01
22	891228 to 900329	0.25	0.01
	900329 to 900628	0.25	0.01
	900628 to 900927	0.25	0.01
	900927 to 901227	0.26	0.01
23	891228 to 900329	0.25	0.01
	900329 to 900628	0.24	0.01
	900628 to 900927	0.24	0.01
	900927 to 901227	0.25	0.01
24	891228 to 900329	0.26	0.01
	900329 to 900628	0.26	0.01
	900628 to 900927	0.25	0.02
	900927 to 901227	0.26	0.01.

TABLE A-1.1 (Cont.)

1990 QUARTERLY TLD RESULTS

Results in mR/day

LOCATION	COLLECTION PERIOD	RESULT	UNCERTAINTY 2σ
25	891228 to 900329	0.27	0.03
	900329 to 900628	0.26	0.02
	900628 to 900927	0.27	0.01
	900927 to 901227	0.27	0.01
40	891228 to 900329	0.24	0.01
	900329 to 900628	0.25	0.01
	900628 to 900927	0.25	0.02
	900927 to 901227	0.25	0.01
41	891228 to 900329	0.27	0.00
	900329 to 900628	0.26	0.00
	900628 to 900927	0.27	0.01
	900927 to 901227	0.27	0.00
42	891228 to 900329	0.26	0.01
	900329 to 900628	0.25	0.00
	900628 to 900927	0.25	0.01
	900927 to 901227	0.27	0.01
43	891228 to 900329	0.27	0.01
	900329 to 900628	0.27	0.01
	900628 to 900927	0.27	0.01
	900927 to 901227	0.27	0.01
44	891228 to 900329	0.25	0.02
	900329 to 900628	0.25	0.00
	900628 to 900927	0.24	0.01
	900927 to 901227	0.25	0.01
45	891228 to 900329	0.25	0.01
	900329 to 900628	0.25	0.01
	900628 to 900927	0.25	0.01
	900927 to 901227	0.25	0.01
46	891228 to 900329	0.31	0.02
	900329 to 900628	0.30	0.01
	900628 to 900927	0.30	0.01
	900927 to 901227	0.32	0.01

TABLE A-1.1 (Cont.)

1990 QUARTERLY TLD RESULTS

Results in mR/day

LOCATION	COLLECTION PERIOD	RESULT	UNCERTAINTY 2σ
47	891228 to 900329	0.24	0.01
	900329 to 900628	0.23	0.01
	900628 to 900927	0.23	0.01
	900927 to 901227	0.24	0.01
49	891228 to 900329	0.26	0.01
	900329 to 900628	0.24	0.01
	900628 to 900927	0.25	0.01
	900927 to 901227	0.26	0.01
50	891228 to 900329	0.25	0.01
	900329 to 900628	0.26	0.01
	900628 to 900927	0.25	0.01
	900927 to 901227	0.26	0.01
51	891228 to 900329	0.25	0.01
	900329 to 900628	0.24	0.01
	900628 to 900927	0.24	0.01
	900927 to 901227	0.25	0.01
53	891228 to 900329	0.27	0.02
	900329 to 900628	0.28	0.01
	900628 to 900927	0.28	0.01
	900927 to 901227	0.29	0.00
54	891228 to 900329	0.27	0.00
	900329 to 900628	0.26	0.01
	900628 to 900927	0.26	0.01
	900927 to 901227	0.27	0.01
55	891228 to 900329	0.25	0.02
	900329 to 900628	0.24	0.04
	900628 to 900927	0.24	0.01
	900927 to 901227	0.25	0.01
56	891228 to 900329	0.26	0.01
	900329 to 900628	0.25	0.01
	900628 to 900927	0.23	0.01
	900927 to 901227	0.26	0.01

TABLE A-1.1 (Cont.)

1990 QUARTERLY TLD RESULTS

Results in mR/day

LOCATION	COLLECTION PERIOD	RESULT	UNCERTAINTY 2σ
61	891228 to 900329	0.27	0.02
	900329 to 900628	0.27	0.02
	900628 to 900927	0.27	0.01
	900927 to 901227	0.28	0.01
71	891228 to 900329	0.30	0.02
	900329 to 900628	0.26	0.00
	900628 to 900927	0.27	0.01
	900927 to 901227	0.30	0.01
72	891228 to 900329	0.28	0.04
	900329 to 900628	0.27	0.01
	900628 to 900927	0.27	0.01
	900927 to 901227	0.29	0.01
73	891228 to 900329	0.25	0.02
	900329 to 900628	0.24	0.01
	900628 to 900927	0.24	0.01
	900927 to 901227	0.25	0.00
74	891228 to 900329	0.27	0.02
	900329 to 900628	0.27	0.01
	900628 to 900927	0.27	0.01
	900927 to 901227	0.29	0.01
75	891228 to 900329	0.27	0.01
	900329 to 900628	0.25	0.01
	900628 to 900927	0.25	0.01
	900927 to 901227	0.27	0.01
76	891228 to 900329	0.26	0.00
	900329 to 900628	0.26	0.01
	900628 to 900927	0.25	0.00
	900927 to 901227	0.26	0.01
77	891228 to 900329	0.25	0.01
	900329 to 900628	0.25	0.01
	900628 to 900927	0.25	0.01
	900927 to 901227	0.26	0.01

TABLE A-1.1 (Cont.)

1990 QUARTERLY TLD RESULTS

Results in mR/day

LOCATION	COLLECTION PERIOD	RESULT	UNCERTAINTY 2σ
78	891228 to 900329	0.24	0.01
	900329 to 900628	0.24	0.01
	900628 to 900927	0.25	0.02
	900927 to 901227	0.26	0.01
79	891228 to 900329	0.25	0.01
	900329 to 900628	0.25	0.01
	900628 to 900927	0.25	0.02
	900927 to 901227	0.26	0.01
80	891228 to 900329	0.24	0.01
	900329 to 900628	0.25	0.00
	900628 to 900927	0.24	0.01
	900927 to 901227	0.25	0.01
81	891228 to 900329	0.25	0.01
	900329 to 900628	0.25	0.01
	900628 to 900927	0.25	0.01
	900927 to 901227	0.25	0.01
82	891228 to 900329	0.26	0.01
	900329 to 900628	0.26	0.01
	900628 to 900927	0.25	0.01
	900927 to 901227	0.27	0.01
83	891228 to 900329	0.27	0.01
	900329 to 900628	0.25	0.01
	900628 to 900927	0.26	0.01
	900927 to 901227	0.27	0.00
84	891228 to 900329	0.26	0.01
	900329 to 900628	0.25	0.01
	900628 to 900927	0.25	0.01
	900927 to 901227	0.26	0.01
85	891228 to 900329	0.26	0.01
	900329 to 900628	0.25	0.02
	900628 to 900927	0.27	0.02
	900927 to 901227	0.28	0.01

TABLE A-1.1 (Cont.)

1990 QUARTERLY TLD RESULTS

Results in mR/day

LOCATION	COLLECTION PERIOD	RESULT	UNCERTAINTY 2σ
86	891228 to 900329	0.30	0.02
	900329 to 900628	0.26	0.03
	900628 to 900927	0.28	0.02
	900927 to 901227	0.31	0.01

TABLE A-1.2

1990 ANNUAL TLD RESULTS

Results in mR/day

LOCATION	COLLECTION PERIOD	RESULT	UNCERTAINTY 2σ
1	891228 to 901227	0.24	0.01
2	891228 to 901227	0.23	0.01
3	891228 to 901227	0.22	0.01
4	891228 to 901227	0.22	0.01
5	891228 to 901227	0.22	0.01
6	891228 to 901227	0.22	0.01
7	891228 to 901227	0.23	0.00
8	891228 to 901227	0.26	0.01
9A	891228 to 901227	0.22	0.01
10	891228 to 901227	0.23	0.01
11	891228 to 901227	0.23	0.01
12	891228 to 901227	0.25	0.01
13	891228 to 901227	0.24	0.01
14	891228 to 901227	0.23	0.01
15	891228 to 901227	0.25	0.01
16	891228 to 901227	0.24	0.01
17	891228 to 901227	0.24	0.01
18	891228 to 901227	0.24	0.00
19	891228 to 901227	0.24	0.01
20	891228 to 901227	0.24	0.01
21	891228 to 901227	0.22	0.01
22	891228 to 901227	0.23	0.00
23	891228 to 901227	0.23	0.00
24	891228 to 901227	0.24	0.00
25	891228 to 901227	0.25	0.01
40	891228 to 901227	0.23	0.01
41	891228 to 901227	0.25	0.01
42	891228 to 901227	0.24	0.01
43	891228 to 901227	0.25	0.01

TABLE A-1.2 (Cont.)

1989 ANNUAL TLD RESULTS

Results in mR/day

LOCATION	COLLECTION PERIOD	RESULT	UNCERTAINTY 2σ
44	891228 to 901227	0.23	0.01
45	891228 to 901227	0.23	0.01
46	891228 to 901227	0.29	0.01
47	891228 to 901227	0.22	0.01
49	891228 to 901227	0.23	0.01
50	891228 to 901227	0.23	0.01
51	891228 to 901227	0.23	0.01
53	891228 to 901227	0.26	0.01
54	891228 to 901227	0.25	0.01
55	891228 to 901227	0.23	0.00
56	891228 to 901227	0.23	0.01
61	891228 to 901227	0.25	0.01
71	891228 to 901227	0.27	0.01
72	891228 to 901227	0.26	0.01
73	891228 to 901227	0.23	0.01
74	891228 to 901227	0.25	0.01
75	891228 to 901227	0.24	0.01
76	891228 to 901227	0.24	0.01
77	891228 to 901227	0.24	0.01
78	891228 to 901227	0.23	0.01
79	891228 to 901227	0.23	0.01
80	891228 to 901227	0.23	0.00
81	891228 to 901227	0.23	0.01
82	891228 to 901227	0.24	0.01
83	891228 to 901227	0.24	0.01
84	891228 to 901227	0.24	0.01
85	891228 to 901227	0.25	0.01
86	891228 to 901227	0.27	0.01

TABLE A-1.3

1990 TLD RESULTS - SUMMARY

Results in mR/day

NUCLIDE		AVERAGE	LOW	HIGH	NUMBER SAMPLES	NUMBER POSITIVE
			QUARTERLY TLD RESULTS			
TLD	(I)	0.26	0.23	0.32	223	223
TLD	(C)	0.24	0.23	0.24	4	4
			ANNUAL TLD RESULTS			
TLD	(I)	0.24	0.22	0.29	56	56
TLD	(C)	0.22	0.22	0.22	1	1

(I) Indicator Stations
(C) Control Station

TABLE A-2.1

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
1	891227 to 900102	1.9 E-02	3.0 E-03
	900102 to 900108	6.2 E-03	1.8 E-03
	900108 to 900115	1.8 E-02	2.0 E-03
	900115 to 900122	3.7 E-02	3.0 E-03
	900122 to 900129	4.4 E-03	1.6 E-03
	900129 to 900205	5.9 E-03	1.8 E-03
	900205 to 900212 (a)	* 2.3 E-03	1.7 E-03
	900212 to 900220	1.9 E-02	2.0 E-03
	900220 to 900226	1.8 E-02	3.0 E-03
	900226 to 900305	2.0 E-02	2.0 E-03
	900305 to 900312	5.6 E-03	1.7 E-03
	900312 to 900319	1.0 E-02	2.0 E-03
	900319 to 900326	2.0 E-02	2.0 E-03
	900326 to 900402	1.9 E-02	2.0 E-03
	900402 to 900409	1.8 E-02	2.0 E-03
	900409 to 900416	1.4 E-02	2.0 E-03
	900416 to 900423	6.9 E-03	1.8 E-03
	900423 to 900430	6.2 E-03	1.8 E-03
	900430 to 900507 (b)	1.2 E-02	2.0 E-03
	900507 to 900514 (b)	5.7 E-03	2.1 E-03
	900514 to 900521 (b)	1.4 E-02	2.0 E-03
	900521 to 900529	6.9 E-03	1.5 E-03
	900529 to 900604 (a)	* 2.6 E-03	1.8 E-03
	900604 to 900611	1.4 E-02	2.0 E-03
	900611 to 900618	7.1 E-03	1.7 E-03
	900618 to 900625	1.1 E-02	2.0 E-03
	900625 to 900702	8.3 E-03	1.9 E-03
	900702 to 900709	6.0 E-03	1.8 E-03
	900709 to 900716	1.8 E-02	2.0 E-03
	900716 to 900723	1.2 E-02	2.0 E-03
	900723 to 900730	1.3 E-02	2.0 E-03
	900730 to 900806	1.8 E-02	2.0 E-03
	900806 to 900813	2.2 E-02	2.0 E-03
	900813 to 900820	1.0 E-02	2.0 E-03
	900820 to 900827	1.0 E-02	2.0 E-03
	900827 to 900904	1.2 E-02	2.0 E-03
	900904 to 900910	2.3 E-02	3.0 E-03
	900910 to 900917	1.7 E-02	2.0 E-03
	900917 to 900924	1.7 E-02	2.0 E-03

(a) Deposition on filter was light, but there was no equipment malfunction or shortened sampling time.
(b) Power outage; shortened sampling time.
* Denotes a result less than the detection limit.

TABLE A-2.1 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
1	900924 to 901001	2.9 E-02	3.0 E-03
	901001 to 901008	1.1 E-02	2.0 E-03
	901008 to 901015	1.2 E-02	2.0 E-03
	901015 to 901022	1.1 E-02	2.0 E-03
	901022 to 901029	1.5 E-02	2.0 E-03
	901029 to 901105	7.8 E-03	1.8 E-03
	901105 to 901112	1.0 E-02	2.0 E-03
	901112 to 901119	1.7 E-02	2.0 E-03
	901119 to 901126	5.9 E-03	1.7 E-03
	901126 to 901203	5.4 E-03	1.6 E-03
	901203 to 901210	1.9 E-02	2.0 E-03
	901210 to 901217	1.9 E-02	2.0 E-03
	901217 to 901226	2.3 E-02	2.0 E-03

TABLE A-2.1 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
4	891227 to 900102	1.6 E-02	3.0 E-03
	900102 to 900108	5.7 E-03	1.8 E-03
	900108 to 900115	2.0 E-02	2.0 E-03
	900115 to 900122	2.9 E-02	3.0 E-03
	900122 to 900129	4.5 E-03	1.6 E-03
	900129 to 900205	4.6 E-03	1.7 E-03
	900205 to 900212	3.3 E-03	1.7 E-03
	900212 to 900220	1.7 E-02	2.0 E-03
	900220 to 900226	1.2 E-02	2.0 E-03
	900226 to 900305	2.4 E-02	3.0 E-03
	900305 to 900312	4.7 E-03	1.6 E-03
	900312 to 900319	9.4 E-03	1.9 E-03
	900319 to 900326	2.3 E-02	3.0 E-03
	900326 to 900402	2.0 E-02	2.0 E-03
	900402 to 900409	2.1 E-02	2.0 E-03
	900409 to 900416	1.3 E-02	2.0 E-03
	900416 to 900423	8.9 E-03	1.9 E-03
	900423 to 900430	5.7 E-03	1.8 E-03
	900430 to 900507	1.3 E-02	2.0 E-03
	900507 to 900514	5.9 E-03	1.8 E-03
	900514 to 900521	2.1 E-02	3.0 E-03
	900521 to 900529	8.6 E-03	1.6 E-03
	900529 to 900604	3.5 E-03	1.9 E-03
	900604 to 900611	1.3 E-02	2.0 E-03
	900611 to 900618	7.2 E-03	1.7 E-03
	900618 to 900625	1.3 E-02	2.0 E-03
	900625 to 900702	9.4 E-03	2.0 E-03
	900702 to 900709	5.4 E-03	1.8 E-03
	900709 to 900716	1.7 E-02	2.0 E-03
	900716 to 900723	1.1 E-02	2.0 E-03
	900723 to 900730 (a)	1.1 E-02	6.0 E-03
	900730 to 900806	1.6 E-02	2.0 E-03
	900806 to 900813	1.9 E-02	2.0 E-03
	900813 to 900820	7.1 E-03	1.9 E-03
	900820 to 900827	7.5 E-03	1.9 E-03
	900827 to 900904	1.1 E-02	2.0 E-03
	900904 to 900910	2.0 E-02	3.0 E-03
	900910 to 900917	1.3 E-02	2.0 E-03
	900917 to 900924	2.1 E-02	2.0 E-03

(a) Sampler malfunction, so low sample volume; result not included in summary.

TABLE A-2.1 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
4	900924 to 901001	2.5 E-02	3.0 E-03
	901001 to 901008	1.0 E-02	2.0 E-03
	901008 to 901015	1.2 E-02	2.0 E-03
	901015 to 901022	1.1 E-02	2.0 E-03
	901022 to 901029	1.6 E-02	2.0 E-03
	901029 to 901105	8.0 E-03	1.8 E-03
	901105 to 901112	1.0 E-02	2.0 E-03
	901112 to 901119	1.6 E-02	2.0 E-03
	901119 to 901126	7.9 E-03	1.8 E-03
	901126 to 901203	3.9 E-03	1.5 E-03
	901203 to 901210	1.1 E-02	2.0 E-03
	901210 to 901217	1.2 E-02	2.0 E-03
	901217 to 901226	2.5 E-02	2.0 E-03

TABLE A-2.1 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
5	891227 to 900102	1.7 E-02	3.0 E-03
	900102 to 900108	5.1 E-03	1.7 E-03
	900108 to 900115	1.7 E-02	2.0 E-03
	900115 to 900122	3.3 E-02	3.0 E-03
	900122 to 900129	5.1 E-03	1.7 E-03
	900129 to 900205	4.1 E-03	1.7 E-03
	900205 to 900212	9.4 E-03	2.0 E-03
	900212 to 900220	1.8 E-02	2.0 E-03
	900220 to 900226	1.3 E-02	2.0 E-03
	900226 to 900305	2.1 E-02	2.0 E-03
	900305 to 900312	6.2 E-03	1.7 E-03
	900312 to 900319	1.0 E-02	2.0 E-03
	900319 to 900326	1.9 E-02	2.0 E-03
	900326 to 900402	1.8 E-02	2.0 E-03
	900402 to 900409	1.7 E-02	2.0 E-03
	900409 to 900416	1.2 E-02	2.0 E-03
	900416 to 900423	7.7 E-03	1.9 E-03
	900423 to 900430	1.4 E-02	2.0 E-03
	900430 to 900507	1.4 E-02	2.0 E-03
	900507 to 900514	5.2 E-03	1.8 E-03
	900514 to 900521	1.9 E-02	3.0 E-03
	900521 to 900529	7.7 E-03	1.6 E-03
	900529 to 900604	3.7 E-03	2.2 E-03
	900604 to 900611	1.4 E-02	2.0 E-03
	900611 to 900618	5.4 E-03	1.6 E-03
	900618 to 900625	1.0 E-02	2.0 E-03
	900625 to 900702	9.2 E-03	2.0 E-03
	900702 to 900709	5.1 E-03	1.8 E-03
	900709 to 900716	1.6 E-02	2.0 E-03
	900716 to 900723	1.2 E-02	2.0 E-03
	900723 to 900730	1.4 E-02	2.0 E-03
	900730 to 900806	1.6 E-02	2.0 E-03
	900806 to 900813	2.0 E-02	2.0 E-03
	900813 to 900820	8.7 E-03	2.0 E-03
	900820 to 900827	1.1 E-02	2.0 E-03
	900827 to 900904	1.2 E-02	2.0 E-03
	900904 to 900910	2.0 E-02	3.0 E-03
	900910 to 900917	1.7 E-02	2.0 E-03
	900917 to 900924	2.5 E-02	3.0 E-03

TABLE A-2.1 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
5	900924 to 901001	3.0 E-02	3.0 E-03
	901001 to 901008	5.9 E-02	5.0 E-03
	901008 to 901015	1.1 E-02	2.0 E-03
	901015 to 901022	1.2 E-02	2.0 E-03
	901022 to 901029	1.6 E-02	2.0 E-03
	901029 to 901105	8.5 E-03	1.8 E-03
	901105 to 901112	1.1 E-02	2.0 E-03
	901112 to 901119	1.7 E-02	2.0 E-03
	901119 to 901126	3.8 E-03	1.5 E-03
	901126 to 901203	5.4 E-03	1.6 E-03
	901203 to 901210	2.0 E-02	2.0 E-03
	901210 to 901217	9.7 E-03	1.9 E-03
	901217 to 901226	2.1 E-02	2.0 E-03

TABLE A-2.1 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
6	891227 to 900102	1.6 E-02	3.0 E-03
	900102 to 900108	6.6 E-03	1.8 E-03
	900108 to 900115	1.7 E-02	2.0 E-03
	900115 to 900122	3.5 E-02	3.0 E-03
	900122 to 900129 (a)	* 1.6 E-03	1.6 E-03
	900129 to 900205	4.0 E-03	1.7 E-03
	900205 to 900212	4.4 E-03	1.8 E-03
	900212 to 900220	1.9 E-02	2.0 E-03
	900220 to 900226	1.4 E-02	2.0 E-03
	900226 to 900305	2.4 E-02	3.0 E-03
	900305 to 900312	4.2 E-03	1.6 E-03
	900312 to 900319	8.3 E-03	1.9 E-03
	900319 to 900326	1.6 E-02	2.0 E-03
	900326 to 900402	1.6 E-02	2.0 E-03
	900402 to 900409	1.9 E-02	2.0 E-03
	900409 to 900416	1.2 E-02	2.0 E-03
	900416 to 900423	7.9 E-03	1.9 E-03
	900423 to 900430	5.4 E-03	1.7 E-03
	900430 to 900507	1.2 E-02	2.0 E-03
	900507 to 900514	4.0 E-03	1.7 E-03
	900514 to 900521	1.4 E-02	2.0 E-03
	900521 to 900529	7.0 E-03	1.5 E-03
	900529 to 900604	3.1 E-03	1.9 E-03
	900604 to 900611	1.3 E-02	2.0 E-03
	900611 to 900618	6.3 E-03	1.7 E-03
	900618 to 900625	1.3 E-02	2.0 E-03
	900625 to 900702	9.5 E-03	2.0 E-03
	900702 to 900709	7.1 E-03	1.9 E-03
	900709 to 900716	1.4 E-02	2.0 E-03
	900716 to 900723	1.0 E-02	2.0 E-03
	900723 to 900730	1.6 E-02	2.0 E-03
	900730 to 900806	1.7 E-02	2.0 E-03
	900806 to 900813	2.4 E-02	3.0 E-03
	900813 to 900820	8.4 E-03	2.0 E-03
	900820 to 900827	1.1 E-02	2.0 E-03
	900827 to 900904	1.1 E-02	2.0 E-03
	900904 to 900910	2.1 E-02	3.0 E-03
	900910 to 900917	1.6 E-02	2.0 E-03
	900917 to 900924	2.0 E-02	2.0 E-03

(a) Low sample volume; results not included in averages.
* Denotes a result less than the detection limit.

TABLE A-2.1 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
6	900924 to 901001	2.6 E-02	3.0 E-03
	901001 to 901008	1.1 E-02	2.0 E-03
	901008 to 901015	1.2 E-02	2.0 E-03
	901015 to 901022	1.3 E-02	2.0 E-03
	901022 to 901029	1.2 E-02	2.0 E-03
	901029 to 901105	9.5 E-03	1.8 E-03
	901105 to 901112	1.2 E-02	2.0 E-03
	901112 to 901119	1.9 E-02	2.0 E-03
	901119 to 901126	6.1 E-03	1.7 E-03
	901126 to 901203	5.1 E-03	1.6 E-03
	901203 to 901210	2.2 E-02	2.0 E-03
	901210 to 901217	1.9 E-02	2.0 E-03
	901217 to 901226	3.0 E-02	2.0 E-03

TABLE A-2.1 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
7	891227 to 900102	1.4 E-02	3.0 E-03
	900102 to 900108 (a)	5.9 E-03	1.9 E-03
	900108 to 900115 (a)	1.4 E-02	2.0 E-03
	900115 to 900122	3.1 E-02	3.0 E-03
	900122 to 900129	3.0 E-03	1.6 E-03
	900129 to 900205	3.4 E-03	1.7 E-03
	900205 to 900212	2.5 E-03	1.7 E-03
	900212 to 900220	1.9 E-02	2.0 E-03
	900220 to 900226	1.6 E-02	3.0 E-03
	900226 to 900305	2.4 E-02	3.0 E-03
	900305 to 900312	5.3 E-03	1.7 E-03
	900312 to 900319	1.0 E-02	2.0 E-03
	900319 to 900326	1.4 E-02	2.0 E-03
	900326 to 900402	1.9 E-02	2.0 E-03
	900402 to 900409	1.9 E-02	2.0 E-03
	900409 to 900416	1.0 E-02	2.0 E-03
	900416 to 900423	7.3 E-03	1.9 E-03
	900423 to 900430	4.3 E-03	1.7 E-03
	900430 to 900507	1.2 E-02	2.0 E-03
	900507 to 900514	3.9 E-03	1.7 E-03
	900514 to 900521	9.4 E-03	2.2 E-03
	900521 to 900529	7.5 E-03	1.6 E-03
	900529 to 900604	3.3 E-03	1.9 E-03
	900604 to 900611	9.8 E-03	1.8 E-03
	900611 to 900618	6.5 E-03	1.7 E-03
	900618 to 900625	1.1 E-02	2.0 E-03
	900625 to 900702	7.2 E-03	1.9 E-03
	900702 to 900709	6.3 E-03	1.8 E-03
	900709 to 900716	1.3 E-02	2.0 E-03
	900716 to 900723 (a)	1.3 E-02	3.0 E-03
	900723 to 900730	1.2 E-02	2.0 E-03
	900730 to 900806	1.5 E-02	2.0 E-03
	900806 to 900813	1.9 E-02	2.0 E-03
	900813 to 900820	8.6 E-03	2.0 E-03
	900820 to 900827	9.5 E-03	2.0 E-03
	900827 to 900904 (a)	1.7 E-02	3.0 E-03
	900904 to 900910	2.1 E-02	3.0 E-03
	900910 to 900917 (a)	1.7 E-02	3.0 E-03
	900917 to 900924	2.0 E-02	2.0 E-03

(a) Power outage; shortened sampling time.

TABLE A-2.1 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
7	900924 to 901001	2.8 E-02	3.0 E-03
	901001 to 901008	1.3 E-02	2.0 E-03
	901008 to 901015	1.2 E-02	2.0 E-03
	901015 to 901022	1.5 E-02	2.0 E-03
	901022 to 901029	1.7 E-02	2.0 E-03
	901029 to 901105	1.3 E-02	2.0 E-03
	901105 to 901112	1.2 E-02	2.0 E-03
	901112 to 901119	1.8 E-02	2.0 E-03
	901119 to 901126	5.6 E-03	1.6 E-03
	901126 to 901203	7.3 E-03	1.7 E-03
	901203 to 901210	2.0 E-02	2.0 E-03
	901210 to 901217 (a)	2.2 E-02	3.0 E-03
	901217 to 901226	2.5 E-02	2.0 E-03

(a) Power outage, shortened sampling time.

TABLE A-2.1 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
8	891227 to 900102	1.4 E-02	3.0 E-03
	900102 to 900108	5.1 E-03	1.8 E-03
	900108 to 900115	1.7 E-02	2.0 E-03
	900115 to 900122	3.0 E-02	3.0 E-03
	900122 to 900129 (a)	* 1.9 E-03	1.7 E-03
	900129 to 900205	3.4 E-03	1.7 E-03
	900205 to 900212	2.9 E-03	1.7 E-03
	900212 to 900220	1.7 E-02	2.0 E-03
	900220 to 900226	9.5 E-03	2.2 E-03
	900226 to 900305	2.1 E-02	3.0 E-03
	900305 to 900312	4.8 E-03	1.6 E-03
	900312 to 900319	1.0 E-02	2.0 E-03
	900319 to 900326	1.6 E-02	2.0 E-03
	900326 to 900402	1.8 E-02	2.0 E-03
	900402 to 900409	1.7 E-02	2.0 E-03
	900409 to 900416 (c)	1.1 E-02	3.0 E-03
	900416 to 900423 (b)	4.5 E-03	2.8 E-03
	900423 to 900430	4.2 E-03	1.7 E-03
	900430 to 900507	1.1 E-02	2.0 E-03
	900507 to 900514	5.2 E-03	1.8 E-03
	900514 to 900521	1.1 E-02	2.0 E-03
	900521 to 900529	7.0 E-03	1.5 E-03
	900529 to 900604 (a)	* 2.3 E-03	1.8 E-03
	900604 to 900611	9.8 E-03	1.9 E-03
	900611 to 900618	4.8 E-03	1.6 E-03
	900618 to 900625	1.3 E-02	2.0 E-03
	900625 to 900702	7.7 E-03	1.9 E-03
	900702 to 900709	4.5 E-03	1.7 E-03
	900709 to 900716	1.5 E-02	2.0 E-03
	900716 to 900723	1.2 E-02	2.0 E-03
	900723 to 900730	1.2 E-02	2.0 E-03
	900730 to 900806	1.5 E-02	2.0 E-03
	900806 to 900813	2.0 E-02	2.0 E-03
	900813 to 900820	1.0 E-02	5.0 E-03
	900820 to 900827	8.3 E-03	2.0 E-03
	900827 to 900904	1.2 E-02	2.0 E-03
	900904 to 900910	2.3 E-02	3.0 E-03
	900910 to 900917	1.7 E-02	2.0 E-03
	900917 to 900924	1.9 E-02	2.0 E-03

(a) Deposition on filter was light, but there was no equipment malfunction or shortened sampling time.
(b) Shortened sampling time, result not included in averages.
(c) Shortened sampling time.
* Denotes a result less than the detection limit.

TABLE A-2.1 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
8	900924 to 901001	2.9 E-02	3.0 E-03
	901001 to 901008	1.2 E-02	2.0 E-03
	901008 to 901015	1.2 E-02	2.0 E-03
	901015 to 901022	1.2 E-02	2.0 E-03
	901022 to 901029	2.3 E-02	3.0 E-03
	901029 to 901105	8.1 E-03	1.8 E-03
	901105 to 901112	1.2 E-02	2.0 E-03
	901112 to 901119	1.5 E-02	2.0 E-03
	901119 to 901126	5.0 E-03	1.6 E-03
	901126 to 901203	5.7 E-03	1.6 E-03
	901203 to 901210	1.8 E-02	2.0 E-03
	901210 to 901217	1.5 E-02	2.0 E-03
	901217 to 901226	1.7 E-02	2.0 E-03

TABLE A-2.1 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
9	891227 to 900102	1.2 E-02	2.0 E-03
	900102 to 900108	3.1 E-03	1.6 E-03
	900108 to 900115	1.5 E-02	2.0 E-03
	900115 to 900122	3.2 E-02	3.0 E-03
	900122 to 900129	3.4 E-03	1.6 E-03
	900129 to 900205	3.9 E-03	1.7 E-03
	900205 to 900212 (a)	* 1.6 E-03	1.6 E-03
	900212 to 900220	1.4 E-02	2.0 E-03
	900220 to 900226	1.1 E-02	2.0 E-03
	900226 to 900305	2.3 E-02	3.0 E-03
	900305 to 900312	3.4 E-03	1.6 E-03
	900312 to 900319	9.6 E-03	2.0 E-03
	900319 to 900326	1.5 E-02	2.0 E-03
	900326 to 900402	2.0 E-02	2.0 E-03
	900402 to 900409	1.6 E-02	2.0 E-03
	900409 to 900416	1.1 E-02	2.0 E-03
	900416 to 900423	5.8 E-03	1.8 E-03
	900423 to 900430	4.5 E-03	1.7 E-03
	900430 to 900507	1.2 E-02	2.0 E-03
	900507 to 900514 (b)	4.7 E-03	1.8 E-03
	900514 to 900521	1.4 E-02	2.0 E-03
	900521 to 900529 (b)	6.9 E-03	2.3 E-03
	900529 to 900604	3.3 E-03	1.9 E-03
	900604 to 900611	1.6 E-02	2.0 E-03
	900611 to 900618	5.4 E-03	1.6 E-03
	900618 to 900625	9.6 E-03	1.9 E-03
	900625 to 900702	5.8 E-03	1.8 E-03
	900702 to 900709	5.8 E-03	1.8 E-03
	900709 to 900716	1.4 E-02	2.0 E-03
	900716 to 900723 (b)	6.0 E-03	1.8 E-03
	900723 to 900730 (b)	1.3 E-02	2.0 E-03
	900730 to 900806	1.5 E-02	2.0 E-03
	900806 to 900813	1.9 E-02	2.0 E-03
	900813 to 900820	8.5 E-03	2.0 E-03
	900820 to 900827	9.4 E-03	2.0 E-03
	900827 to 900904	1.1 E-02	2.0 E-03
	900904 to 900910	1.7 E-02	3.0 E-03
	900910 to 900917	1.4 E-02	2.0 E-03
	900917 to 900924	1.5 E-02	2.0 E-03

(a) Deposition on filter was light, but there was no equipment malfunction or shortened sampling time.
(b) Power outage; shortened sampling time.
* Denotes a result less than the detection limit.

TABLE A-2.1 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
9	900924 to 901001	3.0 E-02	3.0 E-03
	901001 to 901008	1.0 E-02	2.0 E-03
	901008 to 901015	9.9 E-03	1.8 E-03
	901015 to 901022	1.3 E-02	2.0 E-03
	901022 to 901029	1.1 E-02	2.0 E-03
	901029 to 901105	8.4 E-03	1.8 E-03
	901105 to 901112	9.7 E-03	1.8 E-03
	901112 to 901119	1.2 E-02	2.0 E-03
	901119 to 901126	4.5 E-03	1.6 E-03
	901126 to 901203	5.9 E-03	1.6 E-03
	901203 to 901210	1.9 E-02	2.0 E-03
	901210 to 901217	1.8 E-02	2.0 E-03
	901217 to 901226	3.0 E-02	2.0 E-03

TABLE A-2.1 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
21	891227 to 900102	1.3 E-02	2.0 E-03
	900102 to 900108	5.0 E-03	1.8 E-03
	900108 to 900115	1.2 E-02	2.0 E-03
	900115 to 900122	2.9 E-02	3.0 E-03
	900122 to 900129	2.7 E-03	1.5 E-03
	900129 to 900205	2.4 E-03	1.6 E-03
	900205 to 900212 (a) *	2.5 E-03	1.8 E-03
	900212 to 900220	1.7 E-02	2.0 E-03
	900220 to 900226	1.0 E-02	2.0 E-03
	900226 to 900305	1.8 E-02	2.0 E-03
	900305 to 900312	4.0 E-03	1.6 E-03
	900312 to 900319	7.8 E-03	1.9 E-03
	900319 to 900326	1.4 E-02	2.0 E-03
	900326 to 900402	1.5 E-02	2.0 E-03
	900402 to 900409	1.5 E-02	2.0 E-03
	900409 to 900416	8.6 E-03	2.0 E-03
	900416 to 900423	6.5 E-03	1.8 E-03
	900423 to 900430	3.2 E-03	1.6 E-03
	900430 to 900507	9.3 E-03	1.8 E-03
	900507 to 900514	3.6 E-03	1.7 E-03
	900514 to 900521	1.0 E-02	2.0 E-03
	900521 to 900529	6.8 E-03	1.5 E-03
	900529 to 900604 (b) *	2.6 E-03	1.8 E-03
	900604 to 900611	8.8 E-03	1.8 E-03
	900611 to 900618	7.1 E-03	1.7 E-03
	900618 to 900625	1.2 E-02	2.0 E-03
	900625 to 900702	7.5 E-03	1.9 E-03
	900702 to 900709	4.1 E-03	1.7 E-03
	900709 to 900716	1.3 E-02	2.0 E-03
	900716 to 900723	9.5 E-03	2.0 E-03
	900723 to 900730	1.2 E-02	2.0 E-03
	900730 to 900806	1.5 E-02	2.0 E-03
	900806 to 900813	2.1 E-02	2.0 E-03
	900813 to 900820	7.5 E-03	1.9 E-03
	900820 to 900827	9.0 E-03	2.0 E-03
	900827 to 900904	1.0 E-02	2.0 E-03
	900904 to 900910	1.8 E-02	3.0 E-03
	900910 to 900917	1.4 E-02	2.0 E-03
	900917 to 900924	1.7 E-02	2.0 E-03

(a) Deposition on filter was light, but there was no equipment malfunction or shortened sampling time.
(b) Power outage; shortened sampling time.
* Denotes a result less than the detection limit.

TABLE A-2.1 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
21	900924 to 901001	2.6 E-02	3.0 E-03
	901001 to 901008	1.1 E-02	2.0 E-03
	901008 to 901015	8.9 E-03	1.8 E-03
	901015 to 901022	1.1 E-02	2.0 E-03
	901022 to 901029	1.2 E-02	2.0 E-03
	901029 to 901105	8.1 E-03	1.8 E-03
	901105 to 901112	1.3 E-02	2.0 E-03
	901112 to 901119	1.5 E-02	2.0 E-03
	901119 to 901126	5.9 E-03	1.6 E-03
	901126 to 901203	6.1 E-03	1.6 E-03
	901203 to 901210	2.0 E-02	2.0 E-03
	901210 to 901217	1.6 E-02	2.0 E-03
	901217 to 901226	2.3 E-02	2.0 E-03

TABLE A-2.1 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
23	891227 to 900102	1.6 E-02	3.0 E-03
	900102 to 900108	6.5 E-03	1.9 E-03
	900108 to 900115	1.6 E-02	2.0 E-03
	900115 to 900122	3.5 E-02	3.0 E-03
	900122 to 900129	3.8 E-03	1.6 E-03
	900129 to 900205	4.6 E-03	1.7 E-03
	900205 to 900212 (a)	* 2.3 E-03	1.7 E-03
	900212 to 900220	1.9 E-02	2.0 E-03
	900220 to 900226	1.6 E-02	3.0 E-03
	900226 to 900305	2.5 E-02	3.0 E-03
	900305 to 900312	5.4 E-03	1.7 E-03
	900312 to 900319 (b)	9.5 E-03	2.0 E-03
	900319 to 900326	1.7 E-02	2.0 E-03
	900326 to 900402	1.8 E-02	2.0 E-03
	900402 to 900409	1.8 E-02	2.0 E-03
	900409 to 900416	1.3 E-02	2.0 E-03
	900416 to 900423	7.3 E-03	1.8 E-03
	900423 to 900430	5.3 E-03	1.7 E-03
	900430 to 900507	1.1 E-02	2.0 E-03
	900507 to 900514	4.4 E-03	1.7 E-03
	900514 to 900521	1.4 E-02	2.0 E-03
	900521 to 900529	8.3 E-03	1.6 E-03
	900529 to 900604	3.0 E-03	1.9 E-03
	900604 to 900611	9.7 E-03	1.9 E-03
	900611 to 900618	5.3 E-03	1.6 E-03
	900618 to 900625	1.2 E-02	2.0 E-03
	900625 to 900702	8.8 E-03	2.0 E-03
	900702 to 900709	3.9 E-03	1.7 E-03
	900709 to 900716	1.6 E-02	2.0 E-03
	900716 to 900723	1.2 E-02	2.0 E-03
	900723 to 900730	1.2 E-02	2.0 E-03
	900730 to 900806	1.7 E-02	2.0 E-03
	900806 to 900813	2.3 E-02	3.0 E-03
	900813 to 900820	9.0 E-03	2.0 E-03
	900820 to 900827	9.9 E-03	2.0 E-03
	900827 to 900904	1.1 E-02	2.0 E-03
	900904 to 900910	2.4 E-02	3.0 E-03
	900910 to 900917	1.5 E-02	2.0 E-03
	900917 to 900924	1.9 E-02	2.0 E-03

(a) Deposition on filter was light, but there was no equipment malfunction or shortened sampling time.
(b) Sampler malfunction; shortened sampling time.
* Denotes a result less than the detection limit.

TABLE A-2.1 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
23	900924 to 901001	3.0 E-02	3.0 E-03
	901001 to 901008 (a)	1.5 E-02	5.0 E-03
	901008 to 901015	1.1 E-02	2.0 E-03
	901015 to 901022	1.1 E-02	2.0 E-03
	901022 to 901029	1.5 E-02	2.0 E-03
	901029 to 901105	9.7 E-03	1.8 E-03
	901105 to 901112	1.3 E-02	2.0 E-03
	901112 to 901119	1.6 E-02	2.0 E-03
	901119 to 901126	5.0 E-03	1.6 E-03
	901126 to 901203	6.1 E-03	1.6 E-03
	901203 to 901210	2.1 E-02	2.0 E-03
	901210 to 901217	1.9 E-02	2.0 E-03
	901217 to 901226	2.8 E-02	2.0 E-03

(a) Shortened sampling time; result not included in averages.

TABLE A-2.1 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
40	891227 to 900102	2.1 E-02	3.0 E-03
	900102 to 900108	6.3 E-03	1.8 E-03
	900108 to 900115	2.0 E-02	2.0 E-03
	900115 to 900122	3.7 E-02	3.0 E-03
	900122 to 900129	2.6 E-03	1.5 E-03
	900129 to 900205	5.1 E-03	1.8 E-03
	900205 to 900212	3.8 E-03	1.7 E-03
	900212 to 900220	1.9 E-02	2.0 E-03
	900220 to 900226	1.5 E-02	3.0 E-03
	900226 to 900305	2.7 E-02	3.0 E-03
	900305 to 900312	8.0 E-03	1.8 E-03
	900312 to 900319	1.2 E-02	2.0 E-03
	900319 to 900326	1.4 E-02	2.0 E-03
	900326 to 900402	2.0 E-02	2.0 E-03
	900402 to 900409	2.1 E-02	2.0 E-03
	900409 to 900416	1.5 E-02	2.0 E-03
	900416 to 900423	8.8 E-03	1.9 E-03
	900423 to 900430 (a)	5.5 E-03	1.9 E-03
	900430 to 900507	7.5 E-03	1.6 E-03
	900507 to 900514	6.1 E-03	1.8 E-03
	900514 to 900521	1.6 E-02	2.0 E-03
	900521 to 900529	6.9 E-03	1.5 E-03
	900529 to 900604	4.3 E-03	1.9 E-03
	900604 to 900611 (b)	7.6 E-03	2.2 E-03
	900611 to 900618	9.0 E-03	1.8 E-03
	900618 to 900625	1.4 E-02	2.0 E-03
	900625 to 900702	8.9 E-03	2.0 E-03
	900702 to 900709	7.0 E-03	1.9 E-03
	900709 to 900716	1.8 E-02	2.0 E-03
	900716 to 900723	1.2 E-02	2.0 E-03
	900723 to 900730	1.3 E-02	2.0 E-03
	900730 to 900806	1.9 E-02	2.0 E-03
	900806 to 900813	2.5 E-02	3.0 E-03
	900813 to 900820	9.6 E-03	2.1 E-03
	900820 to 900827	1.0 E-02	2.0 E-03
	900827 to 900904	1.8 E-02	2.0 E-03
	900904 to 900910	2.3 E-02	3.0 E-03
	900910 to 900917	1.4 E-02	2.0 E-03
	900917 to 900924	2.2 E-02	2.0 E-03

(a) Brief power outage; shortened sampling time.
(b) Sampler malfunction; shortened sampling time.

TABLE A-2.1 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
40	900924 to 901001	3.0 E-02	3.0 E-03
	901001 to 901008	1.1 E-02	2.0 E-03
	901008 to 901015	1.1 E-02	2.0 E-03
	901015 to 901022	1.3 E-02	2.0 E-03
	901022 to 901029	2.1 E-02	2.0 E-03
	901029 to 901105	9.8 E-03	1.9 E-03
	901105 to 901112	1.5 E-02	2.0 E-03
	901112 to 901119	1.5 E-02	2.0 E-03
	901119 to 901126 (a)	1.2 E-02	2.0 E-03
	901126 to 901203 (a)	*-7.0 E-03	8.5 E-02
	901203 to 901210 (a)	1.8 E-02	3.0 E-03
	901210 to 901217	1.7 E-02	2.0 E-03
	901217 to 901226	4.3 E-03	1.4 E-03

(a) Sampler malfunction; shortened sampling time.
* Denotes a result less than the detection limit.

TABLE A-2.1 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
48	891227 to 900102	1.8 E-02	3.0 E-03
	900102 to 900108	5.3 E-03	1.8 E-03
	900108 to 900115	1.8 E-02	2.0 E-03
	900115 to 900122	3.2 E-02	3.0 E-03
	900122 to 900129	2.7 E-03	1.7 E-03
	900129 to 900205	4.7 E-03	1.7 E-03
	900205 to 900212	2.8 E-03	1.7 E-03
	900212 to 900220	2.3 E-02	2.0 E-03
	900220 to 900226	1.5 E-02	3.0 E-03
	900226 to 900305 (a)	2.4 E-02	4.0 E-03
	900306 to 900312 (b)	5.4 E-03	1.9 E-03
	900312 to 900319	1.0 E-02	2.0 E-03
	900319 to 900326	2.0 E-02	2.0 E-03
	900326 to 900402	2.1 E-02	2.0 E-03
	900402 to 900409	2.0 E-02	2.0 E-03
	900409 to 900416	1.4 E-02	2.0 E-03
	900416 to 900423 (b)	9.1 E-03	1.9 E-03
	900423 to 900430	5.6 E-03	1.8 E-03
	900430 to 900507	1.3 E-02	2.0 E-03
	900507 to 900514	5.7 E-03	1.8 E-03
	900514 to 900521	1.3 E-02	2.0 E-03
	900521 to 900529	8.2 E-03	1.6 E-03
	900529 to 900604	4.8 E-03	2.6 E-03
	900604 to 900611	1.1 E-02	2.0 E-03
	900611 to 900618	7.9 E-03	1.8 E-03
	900618 to 900625	1.3 E-02	2.0 E-03
	900625 to 900702	8.7 E-03	2.0 E-03
	900702 to 900709	4.6 E-03	1.7 E-03
	900709 to 900716	1.7 E-02	2.0 E-03
	900716 to 900723	1.3 E-02	2.0 E-03
	900723 to 900730	1.2 E-02	2.0 E-03
	900730 to 900806	1.8 E-02	2.0 E-03
	900806 to 900813	2.3 E-02	3.0 E-03
	900813 to 900820	9.3 E-03	2.0 E-03
	900820 to 900827	1.0 E-02	2.0 E-03
	900827 to 900904	1.4 E-02	2.0 E-03
	900904 to 900910	2.1 E-02	3.0 E-03
	900910 to 900917	1.4 E-02	2.0 E-03
	900917 to 900924	1.8 E-02	2.0 E-03

(a) Shortened sampling time; result not included in averages.
(b) Equipment inoperability; shortened sampling time.

TABLE A-2.1 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
48	900924 to 901001	2.6 E-02	3.0 E-03
	901001 to 901008	8.3 E-03	1.9 E-03
	901008 to 901015	1.1 E-02	2.0 E-03
	901015 to 901022	1.0 E-02	2.0 E-03
	901022 to 901029	1.2 E-02	2.0 E-03
	901029 to 901105	8.7 E-03	1.8 E-03
	901105 to 901112	1.1 E-02	2.0 E-03
	901112 to 901119	1.6 E-02	2.0 E-03
	901119 to 901126	3.8 E-03	1.5 E-03
	901126 to 901203	6.5 E-03	1.7 E-03
	901203 to 901210	1.9 E-02	2.0 E-03
	901210 to 901217	1.7 E-02	2.0 E-03
	901217 to 901226	5.1 E-03	1.4 E-03

TABLE A-2.1 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
57	891227 to 900102	1.9 E-02	3.0 E-03
	900102 to 900108	5.8 E-03	1.8 E-03
	900108 to 900115	1.7 E-02	2.0 E-03
	900115 to 900122	3.4 E-02	3.0 E-03
	900122 to 900129	2.8 E-03	1.5 E-03
	900129 to 900205	4.5 E-03	1.7 E-03
	900205 to 900212	3.8 E-03	1.7 E-03
	900212 to 900220	1.9 E-02	2.0 E-03
	900220 to 900226	1.8 E-02	3.0 E-03
	900226 to 900305	2.8 E-02	3.0 E-03
	900305 to 900312	6.2 E-03	1.7 E-03
	900312 to 900319	1.0 E-02	2.0 E-03
	900319 to 900326	1.8 E-02	2.0 E-03
	900326 to 900402	2.1 E-02	2.0 E-03
	900402 to 900409	2.1 E-02	2.0 E-03
	900409 to 900416	1.1 E-02	2.0 E-03
	900416 to 900423	8.2 E-03	1.9 E-03
	900423 to 900430	4.7 E-03	1.7 E-03
	900430 to 900507	1.1 E-02	2.0 E-03
	900507 to 900514	5.7 E-03	1.8 E-03
	900514 to 900521	1.1 E-02	2.0 E-03
	900521 to 900529	8.4 E-03	1.6 E-03
	900529 to 900604	3.8 E-03	1.9 E-03
	900604 to 900611	9.9 E-03	1.9 E-03
	900611 to 900618	6.2 E-03	1.7 E-03
	900618 to 900625	1.3 E-02	2.0 E-03
	900625 to 900702	9.0 E-03	2.0 E-03
	900702 to 900709	6.3 E-03	1.8 E-03
	900709 to 900716	1.6 E-02	2.0 E-03
	900716 to 900723	1.4 E-02	2.0 E-03
	900723 to 900730	1.4 E-02	2.0 E-03
	900730 to 900806	2.0 E-02	2.0 E-03
	900806 to 900813	2.4 E-02	3.0 E-03
	900813 to 900820	1.1 E-02	2.0 E-03
	900820 to 900827	1.1 E-02	2.0 E-03
	900827 to 900904	1.4 E-02	2.0 E-03
	900904 to 900910	2.4 E-02	3.0 E-03
	900910 to 900917	1.8 E-02	2.0 E-03
	900917 to 900924	2.3 E-02	2.0 E-03

TABLE A-2.1 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
57	900924 to 901001	2.9 E-02	3.0 E-03
	901001 to 901008	1.2 E-02	2.0 E-03
	901008 to 901015	1.2 E-02	2.0 E-03
	901015 to 901022	1.2 E-02	2.0 E-03
	901022 to 901029	2.3 E-02	3.0 E-03
	901029 to 901105	8.1 E-03	1.8 E-03
	901105 to 901112	1.2 E-02	2.0 E-03
	901112 to 901119	1.5 E-02	2.0 E-03
	901119 to 901126	4.8 E-03	1.6 E-03
	901126 to 901203	5.9 E-03	1.6 E-03
	901203 to 901210	1.7 E-02	2.0 E-03
	901210 to 901217	2.1 E-02	2.0 E-03
	901217 to 901226	2.6 E-02	2.0 E-03

TABLE A-2.2

GROSS BETA ON AIR PARTICULATE FILTERS- SUMMARY

Results in pCi/cubic meter

NUCLIDE	AVERAGE	LOW	HIGH	NUMBER SAMPLES	NUMBER POSITIVE
Gr-Beta (I)	1.30E-02	1.60E-03	5.90E-02	572	563
Gr-Beta (C)	1.18E-02	1.60E-03	3.20E-02	52	51

(I) Indicator Stations
(C) Control Station

TABLE A-3.1

GAMMA SPECTROMETRY OF PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
1	900102 to 900402 (a)	Be-7	4.66 E-02	3.40 E-03
		K-40	*-1.55 E-01	4.11 E-03
		Ru-103	* 3.26 E-06	2.27 E-04
		Ru-106	*-9.60 E-05	1.38 E-03
		Cs-134	* 3.44 E-04	1.72 E-04
		Cs-137	* 5.07 E-05	1.55 E-04
		Ra-226	*-4.18 E-03	2.56 E-03
		Th-228	*-4.18 E-04	2.20 E-04
	900402 to 900702 (a)	Be-7	4.22 E-02	3.97 E-03
		K-40	* 2.39 E-03	2.65 E-03
		Ru-103	* 2.42 E-05	2.18 E-04
		Ru-106	*-5.82 E-04	1.62 E-03
		Cs-134	*-4.15 E-05	1.86 E-04
		Cs-137	* 8.39 E-06	2.02 E-04
		Ra-226	*-5.41 E-05	3.59 E-03
		Th-228	*-1.11 E-05	2.96 E-04
	900702 to 901001	Be-7	7.21 E-02	4.23 E-03
		K-40	* 2.93 E-03	2.30 E-03
		Ru-103	*-4.96 E-05	1.82 E-04
		Ru-106	* 7.45 E-04	1.30 E-03
		Cs-134	* 1.19 E-04	1.50 E-04
		Cs-137	* 1.72 E-04	1.50 E-04
		Ra-226	* 1.73 E-03	2.92 E-03
		Th-228	* 3.43 E-04	2.34 E-04
	901001 to 901231	Be-7	5.24 E-02	6.89 E-03
		K-40	* 2.31 E-03	2.86 E-03
		Ru-103	* 2.30 E-04	5.76 E-04
		Ru-106	*-7.12 E-04	1.77 E-03
		Cs-134	*-8.55 E-05	1.76 E-04
		Cs-137	* 2.75 E-04	2.00 E-04
		Ra-226	*-2.86 E-03	3.52 E-03
		Th-228	* 6.41 E-04	3.15 E-04

(a) Shortened sampling time during part of this period.
* Denotes a result less than the detection limit.

TABLE A-3.1 (Cont.)

GAMMA SPECTROMETRY OF PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
4	900102 to 900402	Be-7	5.23 E-02	5.43 E-03
		K-40	* 1.90 E-03	3.04 E-03
		Ru-103	* 4.90 E-05	3.11 E-04
		Ru-106	*-2.66 E-03	1.70 E-03
		Cs-134	*-1.25 E-05	1.86 E-04
		Cs-137	*-3.64 E-06	2.05 E-04
		Ra-226	* 1.80 E-03	3.89 E-03
		Th-228	* 3.79 E-04	3.24 E-04
	900402 to 900702	Be-7	4.44 E-02	3.83 E-03
		K-40	8.03 E-03	2.88 E-03
		Ru-103	*-6.50 E-05	1.91 E-04
		Ru-106	*-8.45 E-04	1.28 E-03
		Cs-134	* 5.55 E-05	1.43 E-04
		Cs-137	* 3.12 E-05	1.56 E-04
		Ra-226	*-2.40 E-04	2.95 E-03
		Th-228	* 2.36 E-04	2.50 E-04
	900702 to 901001 (a)	Be-7	7.06 E-02	3.45 E-03
		K-40	*-2.91 E-03	4.38 E-03
		Ru-103	*-4.46 E-05	2.11 E-04
		Ru-106	* 3.67 E-04	1.52 E-03
		Cs-134	* 1.08 E-04	1.79 E-04
		Cs-137	* 7.27 E-05	1.62 E-04
		Ra-226	*-6.02 E-03	2.69 E-03
		Th-228	*-6.85 E-04	2.29 E-04
	901001 to 901231	Be-7	3.88 E-02	6.75 E-03
		K-40	*-7.33 E-04	3.56 E-03
		Ru-103	*-1.07 E-04	6.34 E-04
		Ru-106	*-1.61 E-03	2.07 E-03
		Cs-134	* 9.14 E-05	2.49 E-04
		Cs-137	*-4.14 E-04	2.07 E-04
		Ra-226	*-1.69 E-03	3.44 E-03
		Th-228	*-3.48 E-04	3.31 E-04

(a) Shortened sampling time during part of this period.
* Denotes a result less than the detection limit.

TABLE A-3.1 (Cont.)

GAMMA SPECTROMETRY OF PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
5	900102 to 900402	Be-7	4.45 E-02	5.10 E-03
		K-40	*-2.72 E-03	3.90 E-03
		Ru-103	*-1.77 E-05	3.45 E-04
		Ru-106	*-3.30 E-04	2.08 E-03
		Cs-134	* 5.73 E-05	2.58 E-04
		Cs-137	*-4.67 E-05	2.29 E-04
		Ra-226	*-2.04 E-03	3.99 E-03
		Th-228	*-3.52 E-04	3.57 E-04
	900402 to 900702	Be-7	3.40 E-02	3.60 E-03
		K-40	*-1.02 E-02	3.22 E-03
		Ru-103	*-1.60 E-04	2.34 E-04
		Ru-106	*-6.89 E-04	1.77 E-03
		Cs-134	*-6.93 E-05	2.32 E-04
		Cs-137	* 4.90 E-05	2.24 E-04
		Ra-226	* 1.20 E-03	3.54 E-03
		Th-228	* 1.66 E-04	3.17 E-04
	900702 to 901001	Be-7	6.66 E-02	3.61 E-03
		K-40	6.50 E-03	3.20 E-03
		Ru-103	* 1.60 E-05	1.94 E-04
		Ru-106	*-5.54 E-04	1.40 E-03
		Cs-134	* 1.52 E-04	1.75 E-04
		Cs-137	* 1.33 E-04	1.56 E-04
		Ra-226	*-1.04 E-03	2.74 E-03
		Th-228	*-3.86 E-04	2.46 E-04
	901001 to 901231	Be-7	4.66 E-02	6.83 E-03
		K-40	* 4.28 E-03	3.91 E-03
		Ru-103	*-1.01 E-04	6.19 E-04
		Ru-106	* 0.00 E+00	1.89 E-03
		Cs-134	* 2.06 E-04	2.21 E-04
		Cs-137	* 2.37 E-04	2.06 E-04
		Ra-226	*-1.70 E-03	3.52 E-03
		Th-228	* 9.05 E-05	3.01 E-04

* Denotes a result less than the detection limit.

TABLE A-3.1 (Cont.)

GAMMA SPECTROMETRY OF PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
6	900102 to 900402 (a)	Be-7	4.39 E-02	4.68 E-03
		K-40	*-4.05 E-03	3.97 E-03
		Ru-103	* 8.65 E-06	3.32 E-04
		Ru-106	* 6.89 E-04	1.93 E-03
		Cs-134	*-8.80 E-06	2.24 E-04
		Cs-137	* 5.86 E-05	2.31 E-04
		Ra-226	* 1.43 E-03	4.06 E-03
		Th-228	*-9.41 E-05	3.29 E-04
	900402 to 900702	Be-7	3.47 E-02	3.43 E-03
		K-40	*-8.03 E-03	3.12 E-03
		Ru-103	* 9.83 E-05	2.37 E-04
		Ru-106	*-2.11 E-03	1.64 E-03
		Cs-134	*-7.70 E-05	1.85 E-04
		Cs-137	* 2.95 E-05	2.05 E-04
		Ra-226	*-2.88 E-03	3.43 E-03
		Th-228	* 2.78 E-04	2.84 E-04
	900702 to 901001	Be-7	7.16 E-02	3.49 E-03
		K-40	* 2.45 E-03	3.05 E-03
		Ru-103	*-5.70 E-05	1.92 E-04
		Ru-106	*-1.60 E-04	1.35 E-03
		Cs-134	* 1.37 E-05	1.51 E-04
		Cs-137	* 5.35 E-05	1.55 E-04
		Ra-226	*-5.52 E-03	2.67 E-03
		Th-228	*-1.59 E-04	2.18 E-04
	901001 to 901231	Be-7	5.34 E-02	6.60 E-03
		K-40	* 2.74 E-03	2.55 E-03
		Ru-103	* 2.09 E-04	4.11 E-04
		Ru-106	*-7.36 E-04	1.30 E-03
		Cs-134	* 0.00 E+00	1.68 E-04
		Cs-137	* 9.64 E-05	1.47 E-04
		Ra-226	* 1.16 E-03	2.29 E-03
		Th-228	* 1.65 E-04	2.27 E-04

(a) Shortened sampling time during part of this period.
* Denotes a result less than the detection limit.

TABLE A-3.1 (Cont.)

GAMMA SPECTROMETRY OF PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
7	900102 to 900402 (a)	Be-7	5.73 E-02	4.89 E-03
		K-40	* 3.48 E-03	3.07 E-03
		Ru-103	*-1.13 E-05	2.25 E-04
		Ru-106	* 6.68 E-04	1.39 E-03
		Cs-134	* 6.01 E-05	1.56 E-04
		Cs-137	* 9.83 E-05	1.57 E-04
		Ra-226	* 1.05 E-03	2.52 E-03
		Th-228	*-1.78 E-05	2.28 E-04
	900402 to 900702	Be-7	3.86 E-02	3.78 E-03
		K-40	* 2.12 E-03	2.47 E-03
		Ru-103	*-1.23 E-04	1.58 E-04
		Ru-106	*-6.63 E-04	1.17 E-03
		Cs-134	*-3.87 E-05	1.32 E-04
		Cs-137	* 3.20 E-05	1.28 E-04
		Ra-226	*-1.35 E-03	2.30 E-03
		Th-228	* 2.76 E-05	2.06 E-04
	900702 to 901001 (a)	Be-7	7.13 E-02	3.75 E-03
		K-40	*-1.58 E-03	1.78 E-03
		Ru-103	*-4.77 E-05	1.49 E-04
		Ru-106	* 2.28 E-04	9.96 E-04
		Cs-134	*-5.97 E-05	1.04 E-04
		Cs-137	* 0.00 E+00	1.06 E-04
		Ra-226	*-2.62 E-03	2.00 E-03
		Th-228	* 2.35 E-04	1.83 E-04
	901001 to 901231 (a)	Be-7	5.30 E-02	7.63 E-03
		K-40	* 4.59 E-03	7.51 E-03
		Ru-103	* 1.06 E-04	7.72 E-04
		Ru-106	* 2.67 E-04	2.49 E-03
		Cs-134	*-3.49 E-04	2.69 E-04
		Cs-137	* 9.73 E-05	2.58 E-04
		Ra-226	*-5.67 E-03	4.84 E-03
		Th-228	*-9.03 E-04	4.11 E-04

(a) Shortened sampling time during part of this period.
* Denotes a result less than the detection limit.

TABLE A-3.1 (Cont.)

GAMMA SPECTROMETRY OF PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
8	900102 to 900402	Be-7	4.69 E-02	5.35 E-03
		K-40	* 2.29 E-03	3.19 E-03
		Ru-103	* 3.45 E-05	2.73 E-04
		Ru-106	*-7.61 E-04	1.53 E-03
		Cs-134	* 0.00 E+00	1.86 E-04
		Cs-137	* 6.95 E-05	1.72 E-04
		Ra-226	*-7.17 E-05	3.19 E-03
		Th-228	* 1.53 E-05	2.86 E-04
	900402 to 900702 (a)	Be-7	4.22 E-02	4.61 E-03
		K-40	*-8.10 E-03	7.67 E-03
		Ru-103	* 1.42 E-04	3.12 E-04
		Ru-106	* 8.29 E-04	2.31 E-03
		Cs-134	*-8.13 E-05	2.72 E-04
		Cs-137	*-1.97 E-04	2.81 E-04
		Ra-226	*-5.86 E-03	4.99 E-03
		Th-228	*-7.47 E-04	4.08 E-04
	900702 to 901001 (a)	Be-7	7.74 E-02	4.46 E-03
		K-40	* 9.56 E-03	3.29 E-03
		Ru-103	* 9.85 E-06	2.65 E-04
		Ru-106	*-6.20 E-04	1.80 E-03
		Cs-134	* 4.08 E-05	2.14 E-04
		Cs-137	* 8.86 E-05	2.13 E-04
		Ra-226	*-4.28 E-03	4.07 E-03
		Th-228	*-6.94 E-04	3.31 E-04
	901001 to 901231	Be-7	5.00 E-02	6.84 E-03
		K-40	* 6.91 E-03	3.11 E-03
		Ru-103	* 9.80 E-05	5.47 E-04
		Ru-106	* 6.78 E-04	1.62 E-03
		Cs-134	*-4.14 E-05	1.80 E-04
		Cs-137	* 8.21 E-06	1.73 E-04
		Ra-226	*-6.31 E-04	2.89 E-03
		Th-228	*-2.31 E-04	2.56 E-04

(a) Shortened sampling time during part of this period.
* Denotes a result less than the detection limit.

TABLE A-3.1 (Cont.)

GAMMA SPECTROMETRY OF PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
9	900102 to 900402	Be-7	4.68 E-02	5.40 E-03
		K-40	* 5.00 E-03	3.44 E-03
		Ru-103	*-8.74 E-05	2.75 E-04
		Ru-106	* 1.80 E-04	1.72 E-03
		Cs-134	* 8.77 E-05	1.89 E-04
		Cs-137	* 3.15 E-05	1.79 E-04
		Ra-226	* 3.15 E-04	3.31 E-03
		Th-228	*-5.68 E-05	3.09 E-04
	900402 to 900702 (a)	Be-7	3.57 E-02	3.98 E-03
		K-40	* 2.62 E-03	2.97 E-03
		Ru-103	*-6.17 E-05	1.96 E-04
		Ru-106	*-7.76 E-04	1.41 E-03
		Cs-134	* 3.06 E-05	1.67 E-04
		Cs-137	* 5.95 E-05	1.62 E-04
		Ra-226	*-6.12 E-04	3.02 E-03
		Th-228	* 1.49 E-04	2.54 E-04
	900702 to 901001 (a)	Be-7	5.98 E-02	3.58 E-03
		K-40	4.84 E-03	2.32 E-03
		Ru-103	* 8.36 E-05	1.63 E-04
		Ru-106	*-3.13 E-04	1.17 E-03
		Cs-134	* 6.46 E-06	1.34 E-04
		Cs-137	* 3.21 E-05	1.27 E-04
		Ra-226	* 6.86 E-04	2.43 E-03
		Th-228	*-5.31 E-04	2.03 E-04
	901001 to 901231	Be-7	4.68 E-02	6.20 E-03
		K-40	*-6.51 E-04	2.23 E-03
		Ru-103	*-3.11 E-04	4.55 E-04
		Ru-106	*-6.99 E-04	1.47 E-03
		Cs-134	* 8.60 E-05	1.65 E-04
		Cs-137	* 6.85 E-05	1.72 E-04
		Ra-226	* 6.04 E-04	2.90 E-03
		Th-228	* 4.22 E-04	2.49 E-04

(a) Shortened sampling time during part of this period.
* Denotes a result less than the detection limit.

TABLE A-3.1 (Cont.)

GAMMA SPECTROMETRY OF PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
21	900102 to 900402 (a)	Be-7	4.13 E-02	5.07 E-03
		K-40	* 3.99 E-03	3.18 E-03
		Ru-103	* 0.00 E+00	2.35 E-04
		Ru-106	*-4.60 E-04	1.42 E-03
		Cs-134	*-5.23 E-05	1.77 E-04
		Cs-137	* 9.72 E-05	1.62 E-04
		Ra-226	* 2.30 E-04	3.14 E-03
		Th-228	*-3.35 E-05	2.90 E-04
	900402 to 900702	Be-7	3.49 E-02	3.75 E-03
		K-40	* 3.06 E-03	2.99 E-03
		Ru-103	* 7.87 E-06	2.10 E-04
		Ru-106	* 6.82 E-05	1.52 E-03
		Cs-134	* 0.00 E+00	1.65 E-04
		Cs-137	* 6.52 E-05	1.83 E-04
		Ra-226	* 5.26 E-04	2.91 E-03
		Th-228	* 2.45 E-04	2.74 E-04
	900702 to 901001	Be-7	6.85 E-02	3.61 E-03
		K-40	* 1.73 E-03	2.00 E-03
		Ru-103	* 6.12 E-05	1.52 E-04
		Ru-106	* 7.63 E-04	1.03 E-03
		Cs-134	* 3.46 E-05	1.25 E-04
		Cs-137	* 0.00 E+00	1.23 E-04
		Ra-226	* 2.09 E-03	2.32 E-03
		Th-228	* 1.74 E-04	1.96 E-04
	901001 to 901231	Be-7	4.60 E-02	7.43 E-03
		K-40	* 1.87 E-03	3.22 E-03
		Ru-103	*-3.17 E-04	5.97 E-04
		Ru-106	*-5.99 E-04	1.83 E-03
		Cs-134	* 2.70 E-05	2.12 E-04
		Cs-137	* 9.75 E-05	2.01 E-04
		Ra-226	*-3.09 E-03	3.79 E-03
		Th-228	* 4.26 E-04	3.43 E-04

(a) Shortened sampling time during part of this period.
* Denotes a result less than the detection limit.

TABLE A-3.1 (Cont.)

GAMMA SPECTROMETRY OF PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
23	900102 to 900402 (a)	Be-7	3.39 E-02	4.49 E-03
		K-40	* 6.93 E-04	2.59 E-03
		Ru-103	* 8.28 E-05	2.19 E-04
		Ru-106	*-8.37 E-04	1.51 E-03
		Cs-134	* 2.29 E-04	1.92 E-04
		Cs-137	* 1.79 E-04	1.76 E-04
		Ra-226	*-3.34 E-04	2.88 E-03
		Th-228	*-2.40 E-04	2.53 E-04
	900402 to 900702	Be-7	4.03 E-02	3.96 E-03
		K-40	* 4.25 E-03	2.87 E-03
		Ru-103	* 1.32 E-04	2.26 E-04
		Ru-106	*-1.14 E-03	1.61 E-03
		Cs-134	*-1.01 E-05	1.82 E-04
		Cs-137	* 1.34 E-04	1.92 E-04
		Ra-226	* 8.79 E-04	3.52 E-03
		Th-228	*-3.21 E-04	2.85 E-04
	900702 to 901001	Be-7	7.47 E-02	4.71 E-03
		K-40	* 2.81 E-03	2.56 E-03
		Ru-103	*-4.76 E-05	1.88 E-04
		Ru-106	*-4.59 E-04	1.27 E-03
		Cs-134	*-2.44 E-05	1.41 E-04
		Cs-137	* 4.10 E-05	1.47 E-04
		Ra-226	*-7.32 E-04	3.06 E-03
		Th-228	* 8.83 E-04	2.90 E-04
	901001 to 901231 (a)	Be-7	7.91 E-02	9.51 E-03
		K-40	* 1.51 E-03	3.82 E-03
		Ru-103	*-1.77 E-04	8.31 E-04
		Ru-106	*-1.32 E-03	2.47 E-03
		Cs-134	*-9.90 E-05	2.58 E-04
		Cs-137	* 1.16 E-04	3.39 E-04
		Ra-226	* 2.98 E-04	4.22 E-03
		Th-228	* 5.72 E-04	4.37 E-04

(a) Shortened sampling time during part of this period.
* Denotes a result less than the detection limit.

TABLE A-3.1 (Cont.)

GAMMA SPECTROMETRY OF PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
40	900102 to 900402	Be-7	5.20 E-02	4.59 E-03
		K-40	4.90 E-03	2.23 E-03
		Ru-103	*-9.02 E-05	2.01 E-04
		Ru-106	*-2.61 E-04	1.32 E-03
		Cs-134	* 7.43 E-05	1.64 E-04
		Cs-137	* 9.93 E-05	1.41 E-04
		Ra-226	* 2.80 E-04	2.16 E-03
		Th-228	*-4.23 E-05	1.89 E-04
	900402 to 900702 (a)	Be-7	4.92 E-02	4.18 E-03
		K-40	* 4.53 E-03	2.65 E-03
		Ru-103	*-7.75 E-06	1.92 E-04
		Ru-106	*-1.99 E-04	1.37 E-03
		Cs-134	* 5.66 E-05	1.61 E-04
		Cs-137	* 1.59 E-04	1.66 E-04
		Ra-226	* 1.40 E-03	3.13 E-03
		Th-228	* 1.82 E-04	2.58 E-04
	900702 to 901001	Be-7	7.86 E-02	4.06 E-03
		K-40	*-1.72 E-03	4.80 E-03
		Ru-103	* 0.00 E+00	2.20 E-04
		Ru-106	* 7.91 E-04	1.63 E-03
		Cs-134	*-1.81 E-04	2.00 E-04
		Cs-137	* 1.55 E-04	1.88 E-04
		Ra-226	* 1.41 E-04	2.70 E-03
		Th-228	* 1.61 E-04	1.39 E-04
	901001 to 901231 (a)	Be-7	4.88 E-02	7.59 E-03
		K-40	* 1.27 E-02	3.69 E-03
		Ru-103	* 2.40 E-05	6.45 E-04
		Ru-106	*-1.64 E-03	2.06 E-03
		Cs-134	*-8.62 E-05	2.37 E-04
		Cs-137	* 9.65 E-05	2.62 E-04
		Ra-226	*-3.82 E-04	3.44 E-03
		Th-228	*-2.80 E-03	3.35 E-04

(a) Shortened sampling time during part of this period.
* Denotes a result less than the detection limit.

TABLE A-3.1 (Cont.)

GAMMA SPECTROMETRY OF PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
48	900102 to 900402 (a)	Be-7	8.01 E-02	7.03 E-03
		K-40	6.57 E-03	3.47 E-03
		Ru-103	*-1.27 E-05	3.37 E-04
		Ru-106	*-1.57 E-03	2.00 E-03
		Cs-134	* 1.31 E-04	2.34 E-04
		Cs-137	* 0.00 E+00	2.41 E-04
		Ra-226	* 1.28 E-03	3.22 E-03
		Th-228	* 2.62 E-04	3.28 E-04
	900402 to 900702 (a)	Be-7	3.88 E-02	4.21 E-03
		K-40	*-9.56 E-03	3.05 E-03
		Ru-103	* 1.44 E-04	2.49 E-04
		Ru-106	* 3.70 E-04	1.85 E-03
		Cs-134	*-2.02 E-04	2.16 E-04
		Cs-137	*-4.14 E-05	2.09 E-04
		Ra-226	* 1.61 E-03	3.49 E-03
		Th-228	*-3.29 E-04	3.04 E-04
	900702 to 901001	Be-7	7.61 E-02	4.04 E-03
		K-40	6.34 E-03	2.60 E-03
		Ru-103	* 2.19 E-05	1.77 E-04
		Ru-106	*-4.13 E-04	1.11 E-03
		Cs-134	* 1.03 E-04	1.39 E-04
		Cs-137	* 5.46 E-05	1.31 E-04
		Ra-226	*-6.03 E-04	2.35 E-03
		Th-228	* 1.92 E-04	2.24 E-04
	901001 to 901231	Be-7	7.85 E-02	1.21 E-02
		K-40	*-1.48 E-02	7.12 E-03
		Ru-103	*-5.49 E-04	1.21 E-03
		Ru-106	*-5.20 E-04	3.13 E-03
		Cs-134	* 3.39 E-05	3.46 E-04
		Cs-137	* 2.84 E-05	3.30 E-04
		Ra-226	*-7.35 E-03	4.68 E-03
		Th-228	*-1.55 E-03	4.67 E-04

(a) Shortened sampling time during part of this period.
* Denotes a result less than the detection limit.

TABLE A-3.1 (Cont.)

GAMMA SPECTROMETRY OF PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
57	900102 to 900402	Be-7	5.77 E-02	4.02 E-03
		K-40	*-1.47 E-03	3.55 E-03
		Ru-103	*-1.62 E-04	2.55 E-04
		Ru-106	*-9.88 E-04	1.55 E-03
		Cs-134	* 1.42 E-04	1.92 E-04
		Cs-137	* 5.80 E-05	1.79 E-04
		Ra-226	*-2.43 E-03	2.37 E-03
		Th-228	*-1.80 E-04	2.23 E-04
	900402 to 900702	Be-7	4.40 E-02	3.99 E-03
		K-40	6.22 E-03	3.28 E-03
		Ru-103	* 1.14 E-05	2.46 E-04
		Ru-106	* 4.90 E-05	1.73 E-03
		Cs-134	*-1.18 E-04	1.90 E-04
		Cs-137	* 1.05 E-04	2.00 E-04
		Ra-226	*-2.61 E-03	3.50 E-03
		Th-228	* 1.38 E-04	2.84 E-04
	900702 to 901001	Be-7	9.12 E-02	4.06 E-03
		K-40	*-2.52 E-03	3.87 E-03
		Ru-103	*-3.70 E-05	2.28 E-04
		Ru-106	*-2.39 E-04	1.51 E-03
		Cs-134	*-1.30 E-05	1.84 E-04
		Cs-137	* 2.35 E-05	1.76 E-04
		Ra-226	*-4.83 E-04	3.09 E-03
		Th-228	* 1.90 E-04	2.65 E-04
	901001 to 901231	Be-7	5.12 E-02	7.70 E-03
		K-40	*-4.23 E-04	6.04 E-03
		Ru-103	* 3.65 E-04	6.69 E-04
		Ru-106	*-2.75 E-04	2.22 E-03
		Cs-134	*-2.77 E-05	2.44 E-04
		Cs-137	* 1.64 E-04	2.32 E-04
		Ra-226	* 4.63 E-03	3.34 E-03
		Th-228	*-4.33 E-05	3.14 E-04

* Denotes a result less than the detection limit.

TABLE A-3.2

GAMMA SPECTROMETRY OF PARTICULATE FILTERS - SUMMARY

Results in pCi/cubic meter

NUCLIDE	AVERAGE	LOW	HIGH	NUMBER SAMPLES	NUMBER POSITIVE
Ru-103 (I)	6.25E-06	-5.49E-04	6.78E-04	44	0
Ru-103 (C)	-9.41E-05	-3.11E-04	8.36E-05	4	0
Ru-106 (I)	-3.99E-04	-2.66E-03	8.29E-04	44	0
Ru-106 (C)	-4.02E-04	-7.76E-04	1.80E-04	4	0
Cs-134 (I)	9.11E-06	-3.49E-04	3.44E-04	44	0
Cs-134 (C)	5.27E-05	6.46E-06	8.77E-05	4	0
Cs-137 (I)	5.98E-05	-4.14E-04	2.75E-04	44	0
Cs-137 (C)	4.79E-05	3.15E-05	6.85E-05	4	0
Be-7 (I)	5.46E-02	3.39E-02	9.12E-02	44	44
Be-7 (C)	4.73E-02	3.57E-02	5.98E-02	4	4
K-40 (I)	-2.28E-03	-1.55E-01	1.27E-02	44	6
K-40 (C)	2.95E-03	-6.51E-04	5.00E-03	4	1

(I) Indicator Stations
(C) Control Station

TABLE A-4.1

I-131 IN CHARCOAL FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
1	891227 to 900102	* 7.84 E-03	1.11 E-02
	900102 to 900108	* 5.38 E-03	1.70 E-02
	900108 to 900115	* 1.49 E-03	7.91 E-03
	900115 to 900122	*-6.84 E-03	1.02 E-02
	900122 to 900129	* 6.76 E-03	1.08 E-02
	900129 to 900205	* 1.63 E-03	9.14 E-03
	900205 to 900212	* 1.53 E-03	9.26 E-03
	900212 to 900220	*-4.38 E-03	8.05 E-03
	900220 to 900226	*-4.53 E-03	1.73 E-02
	900226 to 900305	* 4.81 E-03	9.15 E-03
	900305 to 900312	* 7.81 E-04	7.71 E-03
	900312 to 900319	* 1.66 E-03	1.01 E-02
	900319 to 900326	*-6.58 E-03	9.09 E-03
	900326 to 900402	* 1.88 E-03	1.02 E-02
	900402 to 900409	* 1.42 E-03	9.22 E-03
	900409 to 900416	* 5.69 E-03	9.79 E-03
	900416 to 900423	* 2.92 E-03	9.34 E-03
	900423 to 900430	*-4.76 E-03	8.74 E-03
	900430 to 900507 (a)	*-4.25 E-04	9.10 E-03
	900507 to 900514 (a)	* 4.04 E-04	1.21 E-02
	900514 to 900521 (a)	* 1.35 E-03	1.24 E-02
	900521 to 900529	*-3.53 E-03	7.09 E-03
	900529 to 900604	*-4.61 E-03	1.19 E-02
	900604 to 900611	*-5.82 E-03	8.32 E-03
	900611 to 900618	*-2.83 E-03	1.01 E-02
	900618 to 900625	* 0.00 E+00	1.13 E-02
	900625 to 900702	*-3.88 E-04	8.33 E-03
	900702 to 900709	* 1.93 E-03	9.32 E-03
	900709 to 900716	* 6.34 E-03	1.08 E-02
	900716 to 900723	*-6.53 E-03	1.07 E-02
	900723 to 900730	*-3.10 E-03	1.18 E-02
	900730 to 900806	* 4.09 E-03	1.01 E-02
	900806 to 900813	* 1.04 E-02	1.08 E-02
	900813 to 900820	*-4.25 E-03	1.02 E-02
	900820 to 900827	* 6.30 E-04	1.07 E-02
	900827 to 900904	*-4.05 E-03	6.12 E-03
	900904 to 900910	* 1.02 E-03	1.10 E-02
	900910 to 900917	*-1.35 E-03	8.00 E-03
	900917 to 900924	* 4.56 E-03	1.62 E-02

(a) Power outage; shortened sampling time.
* Denotes a result less than the detection limit.

TABLE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
1	900924 to 901001	* 1.30 E-02	1.34 E-02
	901001 to 901008	* 8.55 E-03	1.47 E-02
	901008 to 901015	*-4.39 E-03	1.27 E-02
	901015 to 901022	*-1.54 E-03	1.88 E-02
	901022 to 901029	* 1.51 E-03	1.50 E-02
	901029 to 901105	*-1.05 E-02	1.43 E-02
	901105 to 901112	* 6.31 E-03	1.47 E-02
	901112 to 901119	* 1.55 E-03	1.43 E-02
	901119 to 901126	*-3.18 E-03	1.32 E-02
	901126 to 901203	*-3.20 E-03	1.28 E-02
	901203 to 901210	*-4.02 E-03	1.42 E-02
	901210 to 901217	* 1.39 E-03	1.49 E-02
	901217 to 901226	*-8.97 E-03	1.55 E-02

* Denotes a result less than the detection limit.

TABLE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
4	891227 to 900102	* 7.71 E-03	1.09 E-02
	900102 to 900108	* 5.24 E-03	1.66 E-02
	900108 to 900115	* 1.47 E-03	7.76 E-03
	900115 to 900122	*-6.71 E-03	9.97 E-03
	900122 to 900129	* 6.64 E-03	1.06 E-02
	900129 to 900205	* 1.61 E-03	9.01 E-03
	900205 to 900212	* 1.49 E-03	9.00 E-03
	900212 to 900220	*-4.34 E-03	7.96 E-03
	900220 to 900226	*-4.42 E-03	1.69 E-02
	900226 to 900305	* 4.74 E-03	9.01 E-03
	900305 to 900312	* 7.67 E-04	7.57 E-03
	900312 to 900319	* 1.63 E-03	9.93 E-03
	900319 to 900326	*-6.44 E-03	8.88 E-03
	900326 to 900402	* 1.85 E-03	1.00 E-02
	900402 to 900409	* 1.39 E-03	9.06 E-03
	900409 to 900416	* 5.58 E-03	9.60 E-03
	900416 to 900423	* 2.88 E-03	9.22 E-03
	900423 to 900430	*-4.66 E-03	8.56 E-03
	900430 to 900507	*-3.90 E-04	8.34 E-03
	900507 to 900514	* 3.29 E-04	9.89 E-03
	900514 to 900521	* 1.25 E-03	1.14 E-02
	900521 to 900529	*-3.47 E-03	6.95 E-03
	900529 to 900604	*-4.51 E-03	1.16 E-02
	900604 to 900611	*-5.73 E-03	8.19 E-03
	900611 to 900618	*-2.77 E-03	9.91 E-03
	900618 to 900625	* 0.00 E+00	1.12 E-02
	900625 to 900702	*-3.81 E-04	8.18 E-03
	900702 to 900709	* 1.88 E-03	9.09 E-03
	900709 to 900716	* 6.09 E-03	1.04 E-02
	900716 to 900723	*-6.46 E-03	1.06 E-02
	900723 to 900730 (a)	*-1.18 E-02	4.52 E-02
	900730 to 900806	* 4.00 E-03	9.84 E-03
	900806 to 900813	* 1.02 E-02	1.06 E-02
	900813 to 900820	*-4.16 E-03	9.97 E-03
	900820 to 900827	* 6.17 E-04	1.05 E-02
	900827 to 900904	*-3.97 E-03	6.00 E-03
	900904 to 900910	* 1.01 E-03	1.09 E-02
	900910 to 900917	*-1.32 E-03	7.84 E-03
	900917 to 900924	* 4.51 E-03	1.60 E-02

(a) Sampler malfunction, so low sample volume; result not included in summary.

* Denotes a result less than the detection limit.

TABLE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
4	900924 to 901001	* 1.27 E-02	1.31 E-02
	901001 to 901008	* 8.35 E-03	1.44 E-02
	901008 to 901015	*-4.33 E-03	1.25 E-02
	901015 to 901022	*-1.51 E-03	1.85 E-02
	901022 to 901029	* 1.60 E-03	1.60 E-02
	901029 to 901105	*-1.04 E-02	1.41 E-02
	901105 to 901112	* 6.18 E-03	1.44 E-02
	901112 to 901119	* 1.52 E-03	1.40 E-02
	901119 to 901126	*-3.12 E-03	1.30 E-02
	901126 to 901203	*-3.13 E-03	1.26 E-02
	901203 to 901210	*-4.98 E-03	1.76 E-02
	901210 to 901217	* 1.37 E-03	1.46 E-02
	901217 to 901226	*-8.83 E-03	1.52 E-02

* Denotes a result less than the detection limit.

TABLE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
5	891227 to 900102	* 7.78 E-03	1.10 E-02
	900102 to 900108	* 5.26 E-03	1.66 E-02
	900108 to 900115	* 1.47 E-03	7.80 E-03
	900115 to 900122	*-6.75 E-03	1.00 E-02
	900122 to 900129	* 6.68 E-03	1.07 E-02
	900129 to 900205	* 1.62 E-03	9.06 E-03
	900205 to 900212	* 1.49 E-03	9.03 E-03
	900212 to 900220	*-4.36 E-03	8.00 E-03
	900220 to 900226	*-4.48 E-02	1.71 E-01
	900226 to 900305	* 4.74 E-03	9.02 E-03
	900305 to 900312	* 7.71 E-04	7.61 E-03
	900312 to 900319	* 1.64 E-03	9.99 E-03
	900319 to 900326	*-6.47 E-03	8.93 E-03
	900326 to 900402	* 1.86 E-03	1.01 E-02
	900402 to 900409	* 1.40 E-03	9.10 E-03
	900409 to 900416	* 5.61 E-03	9.65 E-03
	900416 to 900423	* 2.90 E-03	9.27 E-03
	900423 to 900430	*-4.68 E-03	8.61 E-03
	900430 to 900507	*-3.92 E-04	8.38 E-03
	900507 to 900514	* 3.31 E-04	9.94 E-03
	900514 to 900521	* 1.26 E-03	1.15 E-02
	900521 to 900529	*-3.49 E-03	6.99 E-03
	900529 to 900604	*-4.53 E-03	1.17 E-02
	900604 to 900611	*-5.76 E-03	8.23 E-03
	900611 to 900618	*-2.80 E-03	1.00 E-02
	900618 to 900625	* 0.00 E+00	1.12 E-02
	900625 to 900702	*-3.84 E-04	8.24 E-03
	900702 to 900709	* 1.89 E-03	9.15 E-03
	900709 to 900716	* 6.12 E-03	1.05 E-02
	900716 to 900723	*-6.49 E-03	1.06 E-02
	900723 to 900730	*-3.07 E-03	1.17 E-02
	900730 to 900806	* 4.04 E-03	9.94 E-03
	900806 to 900813	* 1.03 E-02	1.07 E-02
	900813 to 900820	*-4.19 E-03	1.00 E-02
	900820 to 900827	* 6.21 E-04	1.06 E-02
	900827 to 900904	*-3.98 E-03	6.02 E-03
	900904 to 900911	* 1.01 E-03	1.09 E-02
	900911 to 900917	*-1.33 E-03	7.90 E-03
	900917 to 900924	* 4.52 E-03	1.61 E-02

* Denotes a result less than the detection limit.

TABLE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
5	900924 to 901001	* 1.28 E-02	1.32 E-02
	901001 to 901008	* 9.15 E-03	1.57 E-02
	901008 to 901015	*-4.35 E-03	1.26 E-02
	901015 to 901022	*-1.52 E-03	1.86 E-02
	901022 to 901029	* 1.48 E-03	1.48 E-02
	901029 to 901105	*-1.04 E-02	1.42 E-02
	901105 to 901112	* 6.23 E-03	1.45 E-02
	901112 to 901119	* 1.53 E-03	1.40 E-02
	901119 to 901126	*-3.14 E-03	1.31 E-02
	901126 to 901203	*-3.15 E-03	1.26 E-02
	901203 to 901210	*-3.99 E-03	1.41 E-02
	901210 to 901217	* 1.37 E-03	1.47 E-02
	901217 to 901226	*-8.89 E-03	1.53 E-02

* Denotes a result less than the detection limit.

TABLE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
6	891227 to 900102	* 7.83 E-03	1.11 E-02
	900102 to 900108	* 5.33 E-03	1.69 E-02
	900108 to 900115	* 1.49 E-03	7.88 E-03
	900115 to 900122	*-6.82 E-03	1.01 E-02
	900122 to 900129 (a)	* 9.61 E-03	1.53 E-02
	900129 to 900205	* 1.63 E-03	9.15 E-03
	900205 to 900212	* 1.53 E-03	9.21 E-03
	900212 to 900220	*-4.39 E-03	8.05 E-03
	900220 to 900226	*-4.47 E-03	1.71 E-02
	900226 to 900305	* 4.80 E-03	9.14 E-03
	900305 to 900312	* 7.81 E-04	7.70 E-03
	900312 to 900319	* 1.65 E-03	1.01 E-02
	900319 to 900326	*-6.58 E-03	9.09 E-03
	900326 to 900402	* 1.87 E-03	1.02 E-02
	900402 to 900409	* 1.41 E-03	9.20 E-03
	900409 to 900416	* 5.65 E-03	9.73 E-03
	900416 to 900423	* 2.92 E-03	9.33 E-03
	900423 to 900430	*-4.74 E-03	8.71 E-03
	900430 to 900507	*-3.96 E-04	8.47 E-03
	900507 to 900514	* 3.34 E-04	1.00 E-02
	900514 to 900521	* 1.27 E-03	1.16 E-02
	900521 to 900529	*-3.52 E-03	7.06 E-03
	900529 to 900604	*-4.61 E-03	1.19 E-02
	900604 to 900611	*-5.80 E-03	8.29 E-03
	900611 to 900618	*-2.82 E-03	1.01 E-02
	900618 to 900625	* 0.00 E+00	1.13 E-02
	900625 to 900702	*-3.88 E-04	8.32 E-03
	900702 to 900709	* 1.91 E-03	9.25 E-03
	900709 to 900716	* 6.31 E-03	1.08 E-02
	900716 to 900723	*-6.52 E-03	1.07 E-02
	900723 to 900730	*-3.08 E-03	1.18 E-02
	900730 to 900806	* 4.08 E-03	1.00 E-02
	900806 to 900813	* 1.04 E-02	1.08 E-02
	900813 to 900820	*-4.25 E-03	1.02 E-02
	900820 to 900827	* 6.26 E-04	1.07 E-02
	900827 to 900904	*-4.03 E-03	6.10 E-03
	900904 to 900910	* 1.02 E-03	1.10 E-02
	900910 to 900917	*-1.35 E-03	7.98 E-03
	900917 to 900924	* 4.55 E-03	1.62 E-02

(a) Low sample volume; results not included in average.
* Denotes a result less than the detection limit.

TABLE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
6	900924 to 901001	* 1.29 E-02	1.33 E-02
	901001 to 901008	* 8.48 E-03	1.46 E-02
	901008 to 901015	*-4.39 E-03	1.27 E-02
	901015 to 901022	*-1.53 E-03	1.87 E-02
	901022 to 901029	* 1.49 E-03	1.49 E-02
	901029 to 901105	*-1.05 E-02	1.43 E-02
	901105 to 901112	* 6.28 E-03	1.46 E-02
	901112 to 901119	* 1.54 E-03	1.42 E-02
	901119 to 901126	*-3.17 E-03	1.32 E-02
	901126 to 901203	*-3.19 E-03	1.28 E-02
	901203 to 901210	*-4.02 E-03	1.42 E-02
	901210 to 901217	* 1.39 E-03	1.48 E-02
	901217 to 901226	*-8.97 E-03	1.55 E-02

* Denotes a result less than the detection limit.

TABLE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
7	891227 to 900102	* 6.59 E-03	9.32 E-03
	900102 to 900108 (a)	* 3.93 E-03	1.24 E-02
	900108 to 900115 (a)	* 1.16 E-03	6.14 E-03
	900115 to 900122	*-5.74 E-03	8.53 E-03
	900122 to 900129	* 5.68 E-03	9.06 E-03
	900129 to 900205	* 1.35 E-03	7.60 E-03
	900205 to 900212	* 1.27 E-03	7.65 E-03
	900212 to 900220	*-3.70 E-03	6.80 E-03
	900220 to 900226	*-3.75 E-03	1.43 E-02
	900226 to 900305	* 4.04 E-03	7.69 E-03
	900305 to 900312	* 5.49 E-04	5.42 E-03
	900312 to 900319	* 1.39 E-03	8.48 E-03
	900319 to 900326	*-5.54 E-03	7.65 E-03
	900326 to 900402	* 1.57 E-03	8.54 E-03
	900402 to 900409	* 1.19 E-03	7.75 E-03
	900409 to 900416	* 4.77 E-03	8.21 E-03
	900416 to 900423	* 2.42 E-03	7.75 E-03
	900423 to 900430	*-3.94 E-03	7.24 E-03
	900430 to 900507	*-3.29 E-04	7.03 E-03
	900507 to 900514	* 2.81 E-04	8.45 E-03
	900514 to 900521	* 7.27 E-04	6.66 E-03
	900521 to 900529	*-2.92 E-03	5.87 E-03
	900529 to 900604	*-3.88 E-03	9.99 E-03
	990604 to 900611	*-4.82 E-03	6.88 E-03
	900611 to 900618	*-2.83 E-03	1.01 E-02
	900618 to 900625	* 0.00 E+00	9.55 E-03
	900625 to 900702	*-3.22 E-04	6.91 E-03
	900702 to 900709	* 1.59 E-03	7.68 E-03
	900709 to 900716	* 5.31 E-03	9.07 E-03
	900716 to 900723 (a)	*-7.16 E-03	1.17 E-02
	900723 to 900730	*-2.56 E-03	9.80 E-03
	900730 to 900806	* 3.43 E-03	8.45 E-03
	900806 to 900813	* 7.57 E-03	7.86 E-03
	900813 to 900820	*-3.57 E-03	8.56 E-03
	900820 to 900827	* 4.56 E-04	7.76 E-03
	900827 to 900904 (a)	*-3.65 E-03	5.52 E-03
	900904 to 900911	* 8.50 E-04	9.14 E-03
	900911 to 900917 (a)	*-1.15 E-03	6.84 E-03
	900917 to 900924	* 3.83 E-03	1.36 E-02

(a) Power outage; shortened sampling time.
* Denotes a result less than the detection limit.

TABLE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
7	900924 to 901001	* 1.07 E-02	1.11 E-02
	901001 to 901008	* 7.13 E-03	1.23 E-02
	901008 to 901015	*-3.64 E-03	1.05 E-02
	901015 to 901022	*-8.78 E-04	1.07 E-02
	901022 to 901029	* 1.26 E-03	1.25 E-02
	901029 to 901105	*-7.64 E-03	1.04 E-02
	901105 to 901112	* 5.29 E-03	1.23 E-02
	901112 to 901119	* 1.12 E-03	1.03 E-02
	901119 to 901126	*-2.30 E-03	9.58 E-03
	901126 to 901203	*-2.61 E-03	1.05 E-02
	901203 to 901210	*-2.92 E-03	1.03 E-02
	901210 to 901217 (a)	* 1.18 E-03	1.26 E-02
	901217 to 901226	*-7.35 E-03	1.27 E-02

(a) Power outage; shortened sampling time.
* Denotes a result less than the detection limit.

TABLE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
8	891227 to 900102	* 5.54 E-03	1.00 E-02
	900102 to 900108	* 0.00 E+00	3.01 E-02
	900108 to 900115	* 9.49 E-04	1.39 E-02
	900115 to 900122	*-1.72 E-03	9.18 E-03
	900122 to 900129	*-2.56 E-03	9.86 E-03
	900129 to 900205	*-1.50 E-03	7.91 E-03
	900205 to 900212	*-2.94 E-03	1.36 E-02
	900212 to 900220	*-5.46 E-04	7.30 E-03
	900220 to 900226	* 9.17 E-03	1.53 E-02
	900226 to 900305	* 2.20 E-03	8.71 E-03
	900305 to 900312	* 1.34 E-02	1.36 E-02
	900312 to 900319	* 2.90 E-03	9.21 E-03
	900319 to 900326	* 2.40 E-03	8.56 E-03
	900326 to 900402	* 6.65 E-03	9.52 E-03
	900402 to 900409	* 3.75 E-04	8.29 E-03
	900409 to 900416 (a)	*-2.46 E-03	9.99 E-03
	900416 to 900423 (a)	*-1.03 E-02	1.36 E-02
	900423 to 900430	*-4.88 E-03	7.61 E-03
	900430 to 900507	* 1.23 E-03	7.11 E-03
	900507 to 900514	*-1.38 E-04	8.72 E-03
	900514 to 900521	* 5.74 E-03	9.80 E-03
	900521 to 900529	* 1.28 E-03	5.83 E-03
	900529 to 900604	*-4.11 E-03	1.02 E-02
	900604 to 900611	*-4.14 E-03	7.36 E-03
	900611 to 900618	*-7.07 E-03	1.20 E-02
	900625 to 900702	*-1.19 E-03	1.26 E-02
	900702 to 900709	* 6.92 E-03	7.94 E-03
	900709 to 900716	*-3.48 E-04	9.31 E-03
	900716 to 900723	*-1.35 E-03	9.24 E-03
	900723 to 900730	* 9.68 E-04	9.86 E-03
	900730 to 900806	*-6.31 E-04	8.51 E-03
	900806 to 900813	* 1.42 E-03	7.43 E-03
	900813 to 900820 (a)	* 4.51 E-03	2.26 E-02
	900820 to 900827	* 3.69 E-03	1.06 E-02
	900827 to 900904	* 2.15 E-03	1.09 E-02
	900904 to 900911	*-6.81 E-03	9.60 E-03
	900911 to 900917	*-2.68 E-03	1.38 E-02
	900917 to 900924	*-7.07 E-04	1.35 E-02

(a) Sampler malfunction; shortened sampling time.
* Denotes a result less than the detection limit.

TABLE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
8	900924 to 901001	* 8.47 E-03	1.13 E-02
	901001 to 901008	*-7.33 E-02	1.15 E-01
	901008 to 901015	*-4.25 E-03	1.58 E-02
	901015 to 901022	*-5.99 E-03	1.28 E-02
	901022 to 901029	* 1.11 E-02	1.19 E-02
	901029 to 901105	*-4.65 E-02	1.22 E-02
	901105 to 901112	*-1.13 E-02	1.24 E-02
	901112 to 901119	*-6.22 E-03	1.46 E-02
	901119 to 901126	*-1.03 E-02	1.33 E-02
	901126 to 901203	* 4.28 E-03	1.59 E-02
	901203 to 901210	*-1.53 E-04	1.48 E-02
	901210 to 901217	*-4.35 E-03	1.31 E-02
	901217 to 901226	* 0.00 E+00	1.31 E-02

* Denotes a result less than the detection limit.

TABLE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
9	891227 to 900102	* 5.57 E-03	1.01 E-02
	900102 to 900108	* 0.00 E+00	3.01 E-02
	900108 to 900115	* 9.56 E-04	1.40 E-02
	900115 to 900122	*-1.73 E-03	9.24 E-03
	900122 to 900129	*-2.58 E-03	9.92 E-03
	900129 to 900205	*-1.51 E-03	7.95 E-03
	900205 to 900212	*-2.98 E-03	1.38 E-02
	900212 to 900220	*-5.47 E-04	7.31 E-03
	900220 to 900226	* 9.22 E-03	1.54 E-02
	900226 to 900305	* 2.21 E-03	8.76 E-03
	900305 to 900312	* 1.34 E-02	1.37 E-02
	900312 to 900319	* 2.92 E-03	9.28 E-03
	900319 to 900326	* 2.41 E-03	8.59 E-03
	900326 to 900402	* 6.69 E-03	9.58 E-03
	900402 to 900409	* 3.77 E-04	8.34 E-03
	900409 to 900416	*-2.19 E-03	8.88 E-03
	900416 to 900423	*-6.08 E-03	8.02 E-03
	900423 to 900430	*-4.91 E-03	7.65 E-03
	900430 to 900507	* 1.24 E-03	7.16 E-03
	900507 to 900514 (b)	*-1.44 E-04	9.08 E-03
	900514 to 900521	* 5.78 E-03	9.87 E-03
	900521 to 900529 (a)	* 2.11 E-03	9.59 E-03
	900529 to 900604	*-4.19 E-03	1.04 E-02
	900604 to 900611	*-4.15 E-03	7.37 E-03
	900611 to 900618	*-7.18 E-03	1.22 E-02
	900618 to 900625	*-8.67 E-04	9.12 E-03
	900625 to 900702	*-1.20 E-03	1.27 E-02
	900702 to 900709	* 6.95 E-03	7.97 E-03
	900709 to 900716	*-3.58 E-04	9.55 E-03
	900716 to 900723 (a)	*-1.36 E-03	9.27 E-03
	900723 to 900730 (a)	* 1.12 E-03	1.14 E-02
	900730 to 900806	*-6.36 E-04	8.58 E-03
	900806 to 900813	* 1.42 E-03	7.45 E-03
	900813 to 900820	* 1.65 E-03	8.25 E-03
	900820 to 900827	* 3.70 E-03	1.07 E-02
	900827 to 900904	* 2.17 E-03	1.10 E-02
	900904 to 900911	*-6.74 E-03	9.51 E-03
	900911 to 900917	*-2.68 E-03	1.38 E-02
	900917 to 900924	*-7.11 E-04	1.36 E-02

(a) Sampler malfunction; shortened sampling time.
(b) Power outage; shortened sampling time.
* Denotes a result less than the detection limit.

TABLE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
9	900924 to 901001	* 8.52 E-03	1.14 E-02
	901001 to 901008	*-7.83 E-03	1.23 E-02
	901008 to 901015	*-4.26 E-03	1.59 E-02
	901015 to 901022	*-6.03 E-03	1.29 E-02
	901022 to 901029	* 1.03 E-02	1.10 E-02
	901029 to 901105	*-4.67 E-03	1.22 E-02
	901105 to 901112	*-1.13 E-02	1.24 E-02
	901112 to 901119	*-6.30 E-03	1.48 E-02
	901119 to 901126	*-1.03 E-02	1.34 E-02
	901126 to 901203	* 4.32 E-03	1.61 E-02
	901203 to 901210	*-1.58 E-04	1.53 E-02
	901210 to 901217	*-4.38 E-03	1.31 E-02
	901217 to 901226	* 0.00 E+00	1.32 E-02

* Denotes a result less than the detection limit.

TABLE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
21	891227 to 900102	* 5.60 E-03	1.02 E-02
	900102 to 900108	* 0.00 E+00	3.06 E-02
	900108 to 900115	* 9.65 E-04	1.42 E-02
	900115 to 900122	*-1.75 E-03	9.32 E-03
	900122 to 900129	*-2.60 E-03	1.00 E-02
	900129 to 900205	*-1.53 E-03	8.03 E-03
	900205 to 900212 (a)	*-3.18 E-03	1.47 E-02
	900212 to 900220	*-5.54 E-04	7.41 E-03
	900220 to 900226	* 9.33 E-03	1.55 E-02
	900226 to 900305	* 2.22 E-03	8.82 E-03
	900305 to 900312	* 1.36 E-02	1.38 E-02
	900312 to 900319	* 2.96 E-03	9.39 E-03
	900319 to 900326	* 2.45 E-03	8.75 E-03
	900326 to 900402	* 6.73 E-03	9.63 E-03
	900402 to 900409	* 3.82 E-04	8.46 E-03
	900409 to 900416	*-2.21 E-03	8.98 E-03
	900416 to 900423	*-6.11 E-03	8.07 E-03
	900423 to 900430	*-4.97 E-03	7.75 E-03
	900430 to 900507	* 1.26 E-03	7.24 E-03
	900507 to 900514	*-1.39 E-04	8.80 E-03
	900514 to 900521	* 5.88 E-03	1.00 E-02
	900521 to 900529	* 1.30 E-03	5.92 E-03
	900529 to 900604	*-4.20 E-03	1.04 E-02
	900604 to 900611	*-4.20 E-03	7.46 E-03
	900611 to 900618	*-7.18 E-03	1.22 E-02
	900618 to 900625	*-8.73 E-04	9.18 E-03
	900625 to 900702	*-1.21 E-03	1.28 E-02
	900702 to 900709	* 7.05 E-03	8.09 E-03
	900709 to 900716	*-3.61 E-04	9.64 E-03
	900716 to 900723	*-1.37 E-03	9.32 E-03
	900723 to 900730	* 9.78 E-04	9.96 E-03
	900730 to 900806	*-6.42 E-04	8.67 E-03
	900806 to 900813	* 1.43 E-03	7.50 E-03
	900813 to 900820	* 1.67 E-03	8.35 E-03
	900820 to 900827	* 3.75 E-03	1.08 E-02
	900827 to 900904	* 2.19 E-03	1.11 E-02
	900904 to 900911	*-6.75 E-03	9.52 E-03
	900911 to 900917	*-2.72 E-03	1.41 E-02
	900917 to 900924	*-7.15 E-04	1.37 E-02

(a) Power outage; shortened sampling time.
* Denotes a result less than the detection limit.

TABLE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
21	900924 to 901001	* 8.62 E-03	1.16 E-02
	901001 to 901008	*-7.94 E-03	1.25 E-02
	901008 to 901015	*-4.30 E-03	1.60 E-02
	901015 to 901022	*-6.06 E-03	1.30 E-02
	901022 to 901029	* 1.04 E-02	1.11 E-02
	901029 to 901105	*-4.70 E-03	1.23 E-02
	901105 to 901112	*-1.14 E-02	1.26 E-02
	901112 to 901119	*-6.35 E-03	1.49 E-02
	901119 to 901126	*-1.04 E-02	1.35 E-02
	901126 to 901203	* 4.36 E-03	1.62 E-02
	901203 to 901210	*-1.54 E-04	1.50 E-02
	901210 to 901217	*-4.42 E-03	1.33 E-02
	901217 to 901226	* 0.00 E+00	1.32 E-02

* Denotes a result less than the detection limit.

TABLE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
23	891227 to 900102	* 5.60 E-03	1.01 E-02
	900102 to 900108	* 0.00 E+00	3.06 E-02
	900108 to 900115	* 9.64 E-04	1.41 E-02
	900115 to 900122	*-1.75 E-03	9.32 E-03
	900122 to 900129	*-2.60 E-03	1.00 E-02
	900129 to 900205	*-1.53 E-03	8.05 E-03
	900205 to 900212	*-3.01 E-03	1.39 E-02
	900212 to 900220	*-5.54 E-04	7.40 E-03
	900220 to 900226	* 9.32 E-03	1.55 E-02
	900226 to 900305	* 2.22 E-03	8.82 E-03
	900305 to 900312	* 1.36 E-02	1.38 E-02
	900312 to 900319 (a)	* 2.99 E-03	9.49 E-03
	900319 to 900326	* 2.45 E-03	8.73 E-03
	900326 to 900402	* 6.72 E-03	9.63 E-03
	900402 to 900409	* 3.82 E-04	8.45 E-03
	900409 to 900416	*-2.21 E-03	8.97 E-03
	900416 to 900423	*-6.08 E-03	8.02 E-03
	900423 to 900430	*-4.97 E-03	7.74 E-03
	900430 to 900507	* 1.25 E-03	7.22 E-03
	900507 to 900514	*-1.40 E-04	8.82 E-03
	900514 to 900521	* 5.85 E-03	9.98 E-03
	900521 to 900529	* 1.30 E-03	5.92 E-03
	900529 to 900604	*-4.19 E-03	1.04 E-02
	900604 to 900611	*-4.20 E-03	7.46 E-03
	900611 to 900618	*-7.17 E-03	1.22 E-02
	900618 to 900625	*-8.72 E-04	9.18 E-03
	900625 to 900702	*-1.21 E-03	1.28 E-02
	900702 to 900709	* 7.05 E-03	8.08 E-03
	900709 to 900716	*-3.61 E-04	9.64 E-03
	900716 to 900723	*-1.37 E-03	9.31 E-03
	900723 to 900730	* 9.77 E-04	9.95 E-03
	900730 to 900806	*-6.41 E-04	8.64 E-03
	900806 to 900813	* 1.43 E-03	7.50 E-03
	900813 to 900820	* 1.67 E-03	8.34 E-03
	900820 to 900827	* 3.75 E-03	1.08 E-02
	900827 to 900904	* 2.19 E-03	1.11 E-02
	900904 to 900910	*-6.75 E-03	9.52 E-03
	900910 to 900917	*-2.72 E-03	1.40 E-02
	900917 to 900924	*-7.15 E-04	1.37 E-02

(a) Sampler malfunction; shortened sampling time.
* Denotes a result less than the detection limit.

TABLE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
23	900924 to 901001	* 8.61 E-03	1.15 E-02
	901001 to 901008	*-2.62 E-02	4.12 E-02
	901008 to 901015 (a)	*-4.29 E-03	1.60 E-02
	901015 to 901022	*-6.06 E-03	1.30 E-02
	901022 to 901029	* 1.04 E-02	1.12 E-02
	901029 to 901105	*-4.70 E-03	1.23 E-02
	901105 to 901112	*-1.14 E-02	1.25 E-02
	901112 to 901119	*-6.34 E-03	1.49 E-02
	901119 to 901126	*-1.04 E-02	1.35 E-02
	901126 to 901203	* 4.36 E-03	1.62 E-02
	901203 to 901210	*-1.54 E-04	1.49 E-02
	901210 to 901217	*-4.43 E-03	1.33 E-02
	901217 to 901226	* 0.00 E+00	1.32 E-02

(a) Shortened sampling time; results not included in average.
* Denotes a result less than the detection limit.

TABLE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
40	891227 to 900102	* 4.61 E-03	8.35 E-03
	900102 to 900108	* 0.00 E+00	1.72 E-02
	900108 to 900115	* 5.45 E-04	7.99 E-03
	900115 to 900122	*-1.43 E-03	7.63 E-03
	900122 to 900129	*-2.13 E-03	8.19 E-03
	900129 to 900205	*-1.06 E-03	5.56 E-03
	900205 to 900212	*-1.68 E-03	7.77 E-03
	900212 to 900220	*-4.53 E-04	6.06 E-03
	900220 to 900226	* 7.62 E-03	1.27 E-02
	900226 to 900305	* 1.82 E-03	7.24 E-03
	900305 to 900312	* 7.66 E-03	7.80 E-03
	900312 to 900319	* 2.41 E-03	7.66 E-03
	900319 to 900326	* 1.99 E-03	7.12 E-03
	900326 to 900402	* 5.52 E-03	7.90 E-03
	900402 to 900409	* 3.12 E-04	6.89 E-03
	900409 to 900416	*-1.81 E-03	7.33 E-03
	900416 to 900423	*-4.25 E-03	5.61 E-03
	900423 to 900430 (a)	*-3.76 E-03	5.86 E-03
	900430 to 900507	* 8.68 E-04	5.01 E-03
	900507 to 900514	*-1.15 E-04	7.24 E-03
	900514 to 900521	* 4.84 E-03	8.26 E-03
	900521 to 900529	* 9.03 E-04	4.11 E-03
	900529 to 900604	*-3.42 E-03	8.49 E-03
	900604 to 900611 (b)	*-3.83 E-03	6.81 E-03
	900611 to 900618	*-4.05 E-03	6.87 E-03
	900618 to 900625	*-7.14 E-04	7.52 E-03
	900625 to 900702	*-6.83 E-04	7.22 E-03
	900702 to 900709	* 4.86 E-03	5.57 E-03
	900709 to 900716	*-2.89 E-04	7.74 E-03
	900716 to 900723	*-1.13 E-03	7.68 E-03
	900723 to 900730	* 6.80 E-04	6.93 E-03
	900730 to 900806	*-5.25 E-04	7.08 E-03
	900806 to 900813	* 9.96 E-04	5.21 E-03
	900813 to 900820	* 1.36 E-03	6.81 E-03
	900820 to 900827	* 3.11 E-03	8.94 E-03
	900827 to 900904	* 1.23 E-03	6.24 E-03
	900904 to 900911	*-4.72 E-03	6.66 E-03
	900911 to 900917	*-1.54 E-03	7.92 E-03
	900917 to 900924	*-5.88 E-04	1.12 E-02

(a) Brief power outage; shortened sampling time.
(b) Sampler malfunction; shortened sampling time.
* Denotes a result less than the detection limit.

TABLE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
40	900924 to 901001	* 5.96 E-03	7.99 E-03
	901001 to 901008	*-7.03 E-03	1.11 E-02
	901008 to 901015	*-3.09 E-03	1.15 E-02
	901015 to 901022	*-4.38 E-03	9.37 E-03
	901022 to 901029	* 7.19 E-03	7.69 E-03
	901029 to 901105	*-2.56 E-03	6.70 E-03
	901105 to 901112	*-9.22 E-03	1.01 E-02
	901112 to 901119	*-5.24 E-03	1.23 E-02
	901119 to 901126 (a)	*-9.54 E-03	1.23 E-02
	901126 to 901203 (a)	* 2.21 E-02	8.22 E-02
	901203 to 901210 (a)	*-1.48 E-04	1.44 E-02
	901210 to 901217	*-3.57 E-03	1.07 E-02
	901217 to 901226	* 0.00 E+00	9.21 E-03

(a) Sampler malfunction; shortened sampling time.
* Denotes a result less than the detection limit.

TABLE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
48	891227 to 900102	* 6.62 E-03	1.14 E-02
	900102 to 900108	*-1.40 E-02	3.72 E-02
	900108 to 900115	* 1.05 E-02	1.49 E-02
	900115 to 900122	* 1.72 E-03	7.83 E-03
	900122 to 900129	*-1.75 E-03	8.26 E-03
	900129 to 900205	* 1.15 E-02	1.42 E-02
	900205 to 900212	* 3.48 E-03	9.02 E-03
	900212 to 900220	* 2.15 E-03	6.03 E-03
	900220 to 900226	* 5.12 E-04	2.27 E-02
	900226 to 900305	* 3.55 E-03	1.53 E-02
	900306 to 900312 (a)	* 8.34 E-03	1.10 E-02
	900312 to 900319	* 5.24 E-03	7.51 E-03
	900319 to 900326	* 1.38 E-03	9.64 E-03
	900326 to 900402	*-6.54 E-04	7.84 E-03
	900402 to 900409	* 1.04 E-03	5.08 E-03
	900409 to 900416	* 6.22 E-04	1.30 E-02
	900416 to 900423 (a)	* 1.30 E-02	1.34 E-02
	900423 to 900430	* 6.40 E-04	1.28 E-02
	900430 to 900507	* 6.80 E-03	1.23 E-02
	900507 to 900514	*-2.18 E-04	7.23 E-03
	900514 to 900521	*-4.90 E-04	8.50 E-03
	900521 to 900529	* 4.86 E-03	1.03 E-02
	900529 to 900604	*-1.69 E-03	9.22 E-03
	900604 to 900611	*-6.88 E-03	1.23 E-02
	900611 to 900618	* 5.54 E-03	7.69 E-03
	900618 to 900625	* 4.48 E-03	1.40 E-02
	900625 to 900702	*-4.86 E-03	8.88 E-03
	900702 to 900709	*-6.41 E-03	1.34 E-02
	900709 to 900716	*-2.47 E-03	7.71 E-03
	900716 to 900723	*-1.87 E-03	7.60 E-03
	900723 to 900730	*-8.95 E-03	1.75 E-02
	900730 to 900806	* 2.12 E-03	7.20 E-03
	900806 to 900813	*-5.08 E-03	1.07 E-02
	900813 to 900820	*-1.03 E-03	7.02 E-03
	900820 to 900827	*-3.25 E-03	1.36 E-02
	900827 to 900904	* 2.51 E-03	1.62 E-02
	900904 to 900910	*-2.88 E-03	1.60 E-02
	900910 to 900917	* 4.10 E-03	9.09 E-03
	900917 to 900924	* 1.72 E-03	1.09 E-02

(a) Sampler malfunction; shortened sampling time.
* Denotes a result less than the detection limit.

TABLE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
48	900924 to 901001	* 2.50 E-03	2.08 E-02
	901001 to 901008	* 1.26 E-02	1.90 E-02
	901008 to 901015	*-8.02 E-03	1.60 E-02
	901015 to 901022	*-2.68 E-03	1.47 E-02
	901022 to 901029	*-1.16 E-03	1.46 E-02
	901029 to 901105	*-5.99 E-03	1.09 E-02
	901105 to 901112	* 1.46 E-04	1.04 E-02
	901112 to 901119	*-1.15 E-02	1.37 E-02
	901119 to 901126	* 7.72 E-03	1.02 E-02
	901126 to 901203	* 1.06 E-02	1.42 E-02
	901203 to 901210	*-8.52 E-03	1.86 E-02
	901210 to 901217	*-6.04 E-03	1.60 E-02
	901217 to 901226	*-6.17 E-03	1.23 E-02

* Denotes a result less than the detection limit.

TABLE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
57	891227 to 900102	* 6.70 E-03	1.15 E-02
	900102 to 900108	*-1.44 E-02	3.81 E-02
	900108 to 900115	* 1.07 E-02	1.52 E-02
	900115 to 900122	* 1.76 E-03	7.97 E-03
	900122 to 900129	*-1.78 E-03	8.40 E-03
	900129 to 900205	* 1.16 E-02	1.44 E-02
	900205 to 900212	* 3.59 E-03	9.29 E-03
	900212 to 900220	* 2.19 E-03	6.14 E-03
	900220 to 900226	* 5.27 E-04	2.34 E-02
	900226 to 900305	* 1.75 E-03	7.56 E-03
	900305 to 900312	* 7.48 E-03	9.86 E-03
	900312 to 900319	* 5.35 E-03	7.67 E-03
	900319 to 900326	* 1.41 E-03	9.86 E-03
	900326 to 900402	*-6.63 E-04	7.94 E-03
	900402 to 900409	* 1.23 E-03	7.23 E-03
	900409 to 900416	* 6.34 E-04	1.32 E-02
	900416 to 900423	* 1.31 E-02	1.36 E-02
	900423 to 900430	* 6.54 E-04	1.31 E-02
	900430 to 900507	* 6.95 E-03	1.26 E-02
	900507 to 900514	*-2.21 E-04	7.34 E-03
	900514 to 900521	*-5.02 E-04	8.70 E-03
	900521 to 900529	* 4.95 E-03	1.05 E-02
	900529 to 900604	*-1.73 E-03	9.43 E-03
	900604 to 900611	*-6.99 E-03	1.25 E-02
	900611 to 900618	* 5.63 E-03	7.82 E-03
	900618 to 900625	* 4.56 E-03	1.42 E-02
	900625 to 900702	*-4.97 E-03	9.07 E-03
	900702 to 900709	*-6.54 E-03	1.37 E-02
	900709 to 900716	*-2.56 E-03	8.00 E-03
	900716 to 900723	*-1.89 E-03	7.68 E-03
	900723 to 900730	*-9.06 E-03	1.77 E-02
	900730 to 900806	* 2.15 E-03	7.33 E-03
	900806 to 900813	*-5.14 E-03	1.08 E-02
	900813 to 900820	*-1.05 E-03	7.18 E-03
	900820 to 900827	*-3.31 E-03	1.38 E-02
	900827 to 900904	* 2.57 E-03	1.65 E-02
	900904 to 900910	*-2.91 E-03	1.61 E-02
	900910 to 900917	* 4.18 E-03	9.27 E-03
	900917 to 900924	* 1.74 E-03	1.10 E-02

* Denotes a result less than the detection limit.

TABLE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
57	900924 to 901001	* 2.34 E-03	1.95 E-02
	901001 to 901008	* 1.29 E-02	1.95 E-02
	901008 to 901015	*-8.12 E-03	1.62 E-02
	901015 to 901022	*-2.68 E-03	1.46 E-02
	901022 to 901029	*-1.19 E-03	1.49 E-02
	901029 to 901105	*-6.07 E-03	1.11 E-02
	901105 to 901112	* 1.49 E-04	1.06 E-02
	901112 to 901119	*-9.92 E-03	1.18 E-02
	901119 to 901126	* 7.84 E-03	1.03 E-02
	901126 to 901203	* 1.08 E-02	1.45 E-02
	901203 to 901210	*-8.64 E-03	1.89 E-02
	901210 to 901217	*-6.15 E-03	1.63 E-02
	901217 to 901226	*-6.20 E-03	1.23 E-02

* Denotes a result less than the detection limit.

TABLE A-4.2

I-131 IN CHARCOAL FILTERS- SUMMARY

Results in pCi/cubic meter

NUCLIDE		AVERAGE	LOW	HIGH	NUMBER SAMPLES	NUMBER POSITIVE
I-131	(I)	1.06E-02	-7.33E-02	6.18E+00	572	0
I-131	(C)	-2.87E-04	-1.13E-02	1.34E-02	52	0

(I) Indicator Stations
(C) Control Station

TABLE A-5.1

GROSS BETA IN WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
		River/Drinking	
26	891213 to 900110 (a)	3.8 E+00	9.0 E-01
	900110 to 900213	* 9.0 E-01	6.5 E-01
	900213 to 900313	1.5 E+00	7.0 E-01
	900313 to 900418	1.6 E+00	7.0 E-01
	900418 to 900516	1.5 E+00	7.0 E-01
	900516 to 900613	1.0 E+00	7.0 E-01
	900613 to 900702 (a)	1.7 E+00	9.0 E-01
	900702 to 900815 (a)	4.4 E+00	1.0 E+00
	900815 to 900912	* 6.5 E-01	6.0 E-01
	900912 to 901010	1.5 E+00	7.0 E-01
	901010 to 901107	1.3 E+00	6.0 E-01
	901107 to 901205	1.5 E+00	7.0 E-01
28	891213 to 900110	2.2 E+00	7.0 E-01
	900110 to 900213	* 6.4 E-01	6.2 E-01
	900213 to 900313	1.5 E+00	7.0 E-01
	900313 to 900418	2.2 E+00	7.0 E-01
	900418 to 900516	1.8 E+00	7.0 E-01
	900516 to 900613	2.6 E+00	8.0 E-01
	900613 to 900710	1.9 E+00	9.0 E-01
	900710 to 900815	1.7 E+00	8.0 E-01
	900815 to 900912	1.3 E+00	7.0 E-01
	900912 to 901010	2.0 E+00	7.0 E-01
	901010 to 901107	2.1 E+00	7.0 E-01
	901107 to 901205	* 9.4 E-01	6.7 E-01
29	891213 to 900110	1.8 E+00	7.0 E-01
	900110 to 900213	1.6 E+00	7.0 E-01
	900213 to 900313	2.9 E+00	8.0 E-01
	900313 to 900418	2.0 E+00	7.0 E-01
	900418 to 900516	1.7 E+00	7.0 E-01
	900516 to 900613	1.4 E+00	7.0 E-01
	900613 to 900711	* 8.1 E-01	8.1 E-01
	900710 to 900815	* 9.5 E-01	7.1 E-01
	900815 to 900912	2.0 E+00	7.0 E-01
	900912 to 901010	1.7 E+00	7.0 E-01
	901010 to 901107	2.2 E+00	7.0 E-01
	901107 to 901205	1.8 E+00	8.0 E-01

(a) Sampler not operational during part of the period.
* Denotes a result less than the detection limit.

TABLE A-5.1 (Cont.)

GROSS BETA IN WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
		Discharge	
27	891213 to 900110	3.5 E+01	3.0 E+00
	900110 to 900213 (a)	1.4 E+01	2.0 E+00
	900213 to 900313 (a)	1.3 E+01	2.0 E+00
	900313 to 900418 (a)	1.4 E+01	2.0 E+00
	900418 to 900516 (a)	1.2 E+01	2.0 E+00
	900516 to 900613 (a)	6.1 E+00	1.1 E+00
	900613 to 900710	1.1 E+01	1.0 E+00
	900710 to 900807 (a)	7.0 E+00	1.2 E+00
	900815 to 900912 (a)	1.7 E+01	2.0 E+00
	900912 to 901010	2.4 E+01	3.0 E+00
	901010 to 901107	2.0 E+01	2.0 E+00
	901107 to 901205 (a)	1.6 E+01	2.0 E+00

(a) Sampler not operational during part of the period.
* Denotes a result less than the detection limit.

TABLE A-5.2

GROSS BETA IN WATER - SUMMARY

Results in pCi/liter

NUCLIDE	AVERAGE	LOW	HIGH	NUMBER SAMPLES	NUMBER POSITIVE
		River/Drinking			
Gr-Beta (I)	1.74E+00	6.40E-01	2.90E+00	24	20
Gr-Beta (C)	1.78E+00	6.50E-01	4.40E+00	12	10
		Discharge (a)			
Gr-Beta (I)	1.58E+01	6.10E+00	3.50E+01	12	12

(a) Duplicate station 72 not included in averages.
(I) Indicator Stations
(C) Control Station

TABLE A-6.1

TRITIUM IN WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
	River/Drinking		
26	891213 to 900313 (b)	* 1.3 E+02	9.2 E+01
	900313 to 900613	* 1.3 E+00	8.0 E+02
	900613 to 900912	* 3.8 E+01	1.4 E+02
	900912 to 901205	*-5.5 E+00	7.3 E+01
28	891213 to 900313	2.4 E+02	1.3 E+02
	900313 to 900613	* 1.1 E+01	8.7 E+01
	900613 to 900912	2.5 E+02	8.0 E+01
	900912 to 901205 (b)	*-5.1 E+01	1.3 E+02
29	891213 to 900313	* 4.5 E+01	9.3 E+01
	900313 to 900613	* 1.1 E+02	1.1 E+02
	900613 to 900912	1.4 E+02	7.0 E+01
	900912 to 901205	* 1.1 E+02	1.2 E+02
	Discharge		
27	891213 to 900313 (b)	* 5.5 E+01	1.2 E+02
	900313 to 900613 (a)(b)	3.4 E+03	1.0 E+02
	900613 to 900912 (b)	2.0 E+03	1.0 E+02
	900912 to 901205 (b)	1.3 E+02	7.0 E+01

(a) Confirmed by recount.
(b) Sampler not operational during part of this period.
* Denotes a result less than the detection limit.

TABLE A-6.1 (Cont.)

TRITIUM IN WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
		Ground	
31 (Well 1)	900313	* 1.6 E+01	1.2 E+02
	900614	*-1.9 E+00	1.0 E+02
	900912	* 1.5 E+02	1.2 E+02
	901205	*-1.7 E+01	8.4 E+01
32 (Well 2)	900313	*-6.7 E+01	8.3 E+01
	900614	*-5.3 E+01	1.5 E+02
	900912	*-1.0 E+02	9.0 E+01
	901205	* 2.8 E+01	1.5 E+02
33 (Well 3)	900313	* 7.0 E+01	1.0 E+02
	900613	*-3.2 E+01	7.7 E+01
	900912	* 3.1 E+01	9.0 E+01
	901205	2.2 E+02	1.1 E+02

* Denotes a result less than the detection limit.

TABLE A-6.2

TRITIUM IN WATER - SUMMARY

Results in pCi/liter

NUCLIDE		AVERAGE	LOW	HIGH	NUMBER SAMPLES	NUMBER POSITIVE
			River/Drinking			
H-3	(I)	1.07E+02	-5.10E+01	2.50E+02	8	3
H-3	(C)	4.10E+01	-5.50E+00	1.30E+02	4	0
			Discharge (a)			
H-3	(I)	1.40E+03	5.50E+01	3.40E+03	4	3
			Ground			
H-3	(I)	2.03E+01	-1.00E+02	2.20E+02	12	1

(a) Duplicate station 72 not included in averages.
(I) Indicator Stations
(C) Control Station

TABLE A-7.1

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
		River/Drinking		
26	891213 to 900110 (a)	Be-7	*-3.96 E+00	1.66 E+01
		K-40	* 9.31 E+01	2.29 E+01
		Mn-54	* 9.35 E-02	1.58 E+00
		Co-58	*-1.15 E+00	1.70 E+00
		Fe-59	* 9.91 E-01	3.62 E+00
		Co-60	*-8.46 E-01	1.67 E+00
		Zn-65	* 1.70 E+00	3.74 E+00
		Zr-95	* 5.68 E+00	3.73 E+00
		Nb-95	* 2.32 E+00	1.84 E+00
		Cs-134	*-5.01 E-01	1.73 E+00
		Cs-137	*-2.17 E-01	1.89 E+00
		Ba-140	*-3.04 E+00	7.45 E+00
		La-140	*-7.74 E-01	3.46 E+00
		Ra-226	* 1.08 E+02	3.52 E+01
		Th-228	* 1.08 E+01	3.00 E+00
	900110 to 900213	Be-7	*-3.50 E+00	1.81 E+01
		K-40	*-1.42 E+01	2.29 E+01
		Mn-54	* 1.19 E+00	1.76 E+00
		Co-58	* 8.21 E-01	1.99 E+00
		Fe-59	*-3.58 E+00	4.46 E+00
		Co-60	* 1.09 E+00	2.00 E+00
		Zn-65	*-8.00 E-01	4.36 E+00
		Zr-95	*-2.42 E+00	4.11 E+00
		Nb-95	* 0.00 E+00	2.06 E+00
		Cs-134	*-1.41 E+00	2.13 E+00
		Cs-137	* 1.18 E-01	1.97 E+00
		Ba-140	*-1.54 E+00	8.90 E+00
		La-140	* 9.21 E-01	4.51 E+00
		Ra-226	*-1.20 E+01	3.53 E+01
		Th-228	* 2.00 E+00	3.03 E+00

(a) Sampler not operational during part of this period.
* Denotes a result less than the detection limit.

TABLE A-7.1 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
		River/Drinking		
26	900213 to 900313	Be-7	* 0.00 E+00	1.71 E+01
		K-40	*-5.92 E+00	2.34 E+01
		Mn-54	* 2.96 E-01	1.58 E+00
		Co-58	* 1.05 E-01	1.71 E+00
		Fe-59	* 2.86 E+00	3.87 E+00
		Co-60	* 1.33 E+00	1.73 E+00
		Zn-65	*-3.69 E+00	3.65 E+00
		Zr-95	* 3.29 E+00	3.59 E+00
		Nb-95	* 2.00 E-01	1.70 E+00
		Cs-134	*-5.29 E-01	1.76 E+00
		Cs-137	* 2.30 E-01	1.81 E+00
		Ba-140	* 7.49 E+00	7.91 E+00
		La-140	*-1.61 E-01	3.55 E+00
		Ra-226	*-3.82 E+01	3.89 E+01
		Th-228	* 3.59 E+00	3.24 E+00
	900313 to 900418	Be-7	* 6.92 E+00	1.70 E+01
		K-40	*-3.03 E+01	2.40 E+01
		Mn-54	* 2.17 E-01	1.69 E+00
		Co-58	* 6.08 E-01	1.77 E+00
		Fe-59	* 3.17 E+00	3.75 E+00
		Co-60	*-1.10 E+00	1.79 E+00
		Zn-65	*-1.69 E+00	4.08 E+00
		Zr-95	* 6.97 E-01	3.93 E+00
		Nb-95	* 2.88 E-01	1.83 E+00
		Cs-134	* 2.34 E-01	1.79 E+00
		Cs-137	* 6.76 E-02	1.82 E+00
		Ba-140	*-6.89 E+00	6.88 E+00
		La-140	*-3.23 E+00	3.32 E+00
		Ra-226	* 1.03 E+01	3.97 E+01
		Th-228	*-2.93 E+00	3.32 E+00

* Denotes a result less than the detection limit.

TABLE A-7.1 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
		River/Drinking		
26	900418 to 900516	Be-7	*-5.45 E+00	1.68 E+01
		K-40	* 3.43 E+01	2.42 E+01
		Mn-54	* 1.82 E+00	1.68 E+00
		Co-58	*-6.77 E-01	1.69 E+00
		Fe-59	* 2.30 E+00	3.80 E+00
		Co-60	* 3.68 E-01	1.83 E+00
		Zn-65	*-3.81 E-01	3.57 E+00
		Zr-95	* 7.66 E-01	3.58 E+00
		Nb-95	* 6.91 E-01	1.79 E+00
		Cs-134	* 3.70 E-01	1.80 E+00
		Cs-137	* 2.40 E+00	1.82 E+00
		Ba-140	*-2.89 E+00	7.26 E+00
		La-140	*-1.67 E+00	2.94 E+00
		Ra-226	*-6.38 E+01	3.88 E+01
		Th-228	*-2.50 E+00	3.25 E+00
	900516 to 900613 (a)	Be-7	*-3.13 E+00	1.63 E+01
		K-40	* 2.91 E+00	2.26 E+01
		Mn-54	* 2.33 E-01	1.50 E+00
		Co-58	* 8.94 E-01	1.68 E+00
		Fe-59	* 2.42 E-01	3.64 E+00
		Co-60	* 4.11 E-01	1.78 E+00
		Zn-65	*-3.69 E+00	3.61 E+00
		Zr-95	* 8.27 E-01	3.40 E+00
		Nb-95	* 1.18 E+00	1.66 E+00
		Cs-134	* 1.25 E+00	1.79 E+00
		Cs-137	* 8.79 E-01	1.80 E+00
		Ba-140	* 3.55 E+00	7.63 E+00
		La-140	* 2.93 E-01	3.42 E+00
		Ra-226	*-1.75 E+01	4.02 E+01
		Th-228	*-3.34 E+00	3.22 E+00

(a) Sampler not operational during part of this period.
* Denotes a result less than the detection limit.

TABLE A-7.1 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
		River/Drinking		
26	900613 to 900702 (a)	Be-7	*-4.49 E+00	1.95 E+01
		K-40	* 2.65 E+00	2.65 E+01
		Mn-54	* 6.54 E-01	1.94 E+00
		Co-58	*-1.95 E+00	1.96 E+00
		Fe-59	*-3.70 E-01	4.25 E+00
		Co-60	* 1.95 E-01	2.21 E+00
		Zn-65	*-1.19 E+00	4.44 E+00
		Zr-95	*-3.20 E+00	4.28 E+00
		Nb-95	* 1.93 E+00	2.22 E+00
		Cs-134	*-6.97 E-02	1.95 E+00
		Cs-137	* 5.51 E-01	2.18 E+00
		Ba-140	*-2.02 E+00	1.10 E+01
		La-140	*-2.51 E+00	5.23 E+00
		Ra-226	*-1.44 E+01	4.07 E+01
		Th-228	*-4.89 E+00	3.52 E+00
	900710 to 900815	Be-7	* 1.22 E+01	1.73 E+01
		K-40	* 9.49 E-01	2.47 E+01
		Mn-54	* 8.30 E-01	1.94 E+00
		Co-58	*-3.35 E-01	1.98 E+00
		Fe-59	* 4.03 E+00	4.33 E+00
		Co-60	* 8.42 E-01	2.15 E+00
		Zn-65	* 3.25 E-01	4.07 E+00
		Zr-95	* 1.49 E+00	3.83 E+00
		Nb-95	* 3.18 E-01	1.93 E+00
		Cs-134	*-1.31 E+00	2.15 E+00
		Cs-137	* 1.58 E+00	2.15 E+00
		Ba-140	*-6.00 E-01	7.53 E+00
		La-140	*-1.79 E+00	3.66 E+00
		Ra-226	* 4.90 E+00	3.64 E+01
		Th-228	* 7.85 E-01	3.16 E+00

(a) Sampler not operational during part of this period.
* Denotes a result less than the detection limit.

TABLE A-7.1 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
		River/Drinking		
26	900815 to 900912	Be-7	* 3.93 E-01	2.64 E+01
		K-40	*-1.41 E+02	4.10 E+01
		Mn-54	* 5.05 E-01	2.35 E+00
		Co-58	*-6.16 E-01	2.64 E+00
		Fe-59	* 3.08 E-01	5.40 E+00
		Co-60	* 2.21 E+00	2.52 E+00
		Zn-65	* 1.01 E+00	5.30 E+00
		Zr-95	* 2.75 E+00	5.29 E+00
		Nb-95	* 1.37 E+00	2.67 E+00
		Cs-134	* 1.32 E+00	2.70 E+00
		Cs-137	* 4.24 E+00	2.75 E+00
		Ba-140	*-1.90 E+01	1.40 E+01
		La-140	*-2.40 E+00	5.37 E+00
		Ra-226	*-1.02 E+02	5.57 E+01
		Th-228	*-4.62 E+00	4.50 E+00
	900912 to 901010	Be-7	* 1.55 E+00	2.17 E+01
		K-40	*-8.63 E+00	3.00 E+01
		Mn-54	*-7.54 E-01	2.05 E+00
		Co-58	* 1.32 E+00	2.30 E+00
		Fe-59	* 1.04 E+00	4.92 E+00
		Co-60	* 1.68 E+00	2.37 E+00
		Zn-65	*-2.34 E+00	4.58 E+00
		Zr-95	* 7.65 E-01	4.75 E+00
		Nb-95	* 0.00 E+00	2.24 E+00
		Cs-134	* 9.65 E-01	2.21 E+00
		Cs-137	* 1.40 E+00	2.39 E+00
		Ba-140	*-6.37 E+00	1.19 E+01
		La-140	* 1.81 E+00	5.50 E+00
		Ra-226	* 5.04 E+01	4.87 E+01
		Th-228	* 2.86 E+00	4.09 E+00

* Denotes a result less than the detection limit.

TABLE A-7.1 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
		River/Drinking		
26	901010 to 901107	Be-7	*-3.52 E+00	1.52 E+01
		K-40	*-4.50 E+01	2.26 E+01
		Mn-54	* 6.77 E-01	1.57 E+00
		Co-58	* 4.38 E-01	1.64 E+00
		Fe-59	*-2.02 E+00	3.39 E+00
		Co-60	*-2.75 E-01	1.74 E+00
		Zn-65	*-4.78 E+00	3.65 E+00
		Zr-95	* 1.18 E+00	3.42 E+00
		Nb-95	* 1.55 E+00	1.74 E+00
		Cs-134	*-1.21 E-01	1.82 E+00
		Cs-137	*-1.72 E-01	2.09 E+00
		Ba-140	*-2.38 E+00	6.89 E+00
		La-140	*-3.27 E+00	3.18 E+00
		Ra-226	*-4.57 E+01	3.63 E+01
		Th-228	* 5.32 E+00	3.06 E+00
	901107 to 901205	Be-7	* 2.85 E+00	2.59 E+01
		K-40	*-8.83 E+01	6.33 E+01
		Mn-54	* 1.24 E+00	2.70 E+00
		Co-58	*-1.75 E+00	2.75 E+00
		Fe-59	* 3.26 E+00	5.86 E+00
		Co-60	* 9.13 E-02	2.90 E+00
		Zn-65	*-4.42 E+00	6.45 E+00
		Zr-95	*-4.79 E-01	5.75 E+00
		Nb-95	* 4.37 E+00	2.91 E+00
		Cs-134	*-1.48 E+00	2.96 E+00
		Cs-137	* 4.38 E+00	2.93 E+00
		Ba-140	* 1.04 E+01	1.07 E+01
		La-140	*-8.33 E-01	4.39 E+00
		Ra-226	* 2.04 E+01	5.56 E+01
		Th-228	* 2.69 E+00	4.76 E+00

* Denotes a result less than the detection limit.

TABLE A-7.1 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
		Discharge		
27	891213 to 900110	Be-7	*-3.81 E+00	1.79 E+01
		K-40	* 1.34 E+02	2.61 E+01
		Mn-54	* 1.04 E+00	1.79 E+00
		Co-58	* 0.00 E+00	1.76 E+00
		Fe-59	* 2.72 E+00	4.03 E+00
		Co-60	* 1.15 E+00	1.90 E+00
		Zn-65	* 6.65 E-01	3.92 E+00
		Zr-95	* 0.00 E+00	3.69 E+00
		Nb-95	* 1.63 E+00	1.90 E+00
		Cs-134	* 7.25 E-01	1.87 E+00
		Cs-137	*-1.46 E-01	1.81 E+00
		Ba-140	* 3.08 E+00	8.24 E+00
		La-140	* 8.35 E-01	3.76 E+00
		Ra-226	* 7.83 E+01	4.14 E+01
		Th-228	* 1.10 E+01	3.41 E+00
	900110 to 900213 (a)	Be-7	* 6.63 E+00	1.93 E+01
		K-40	*-3.01 E+01	2.46 E+01
		Mn-54	*-5.52 E-01	1.66 E+00
		Co-58	*-4.12 E-01	1.75 E+00
		Fe-59	* 1.44 E-01	3.95 E+00
		Co-60	* 0.00 E+00	1.98 E+00
		Zn-65	*-9.91 E-01	4.14 E+00
		Zr-95	* 8.70 E-01	3.88 E+00
		Nb-95	* 1.79 E+00	2.01 E+00
		Cs-134	*-8.60 E-01	1.93 E+00
		Cs-137	*-1.56 E-01	1.98 E+00
		Ba-140	* 1.91 E+00	8.30 E+00
		La-140	*-3.53 E+00	3.70 E+00
		Ra-226	* 4.03 E+01	4.33 E+01
		Th-228	*-3.37 E+00	3.57 E+00

(a) Sampler not operational during part of this period.
* Denotes a result less than the detection limit.

TABLE A-7.1 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
		Discharge		
27	900213 to 900313 (a)	Be-7	* 4.82 E+00	2.35 E+01
		K-40	*-1.92 E+02	5.72 E+01
		Mn-54	* 1.68 E+00	2.42 E+00
		Co-58	*-2.28 E+00	2.54 E+00
		Fe-59	* 1.98 E+00	5.74 E+00
		Co-60	* 1.48 E-01	2.59 E+00
		Zn-65	* 7.89 E+00	5.89 E+00
		Zr-95	*-5.84 E+00	5.29 E+00
		Nb-95	* 8.78 E-01	2.65 E+00
		Cs-134	*-5.47 E-02	2.67 E+00
		Cs-137	* 3.12 E+00	2.73 E+00
		Ba-140	*-2.68 E+00	1.10 E+01
		La-140	*-3.20 E+00	4.55 E+00
		Ra-226	*-6.63 E+01	4.80 E+01
		Th-228	*-7.45 E+00	3.97 E+00
	900313 to 900418 (a)	Be-7	* 5.13 E+00	2.04 E+01
		K-40	*-1.47 E+01	2.87 E+01
		Mn-54	* 5.07 E-01	2.13 E+00
		Co-58	*-3.80 E-01	2.01 E+00
		Fe-59	* 1.48 E+00	4.60 E+00
		Co-60	* 3.26 E-01	2.13 E+00
		Zn-65	*-1.12 E+00	4.75 E+00
		Zr-95	* 0.00 E+00	4.16 E+00
		Nb-95	* 6.48 E-01	2.10 E+00
		Cs-134	* 7.01 E-01	2.27 E+00
		Cs-137	* 2.31 E+00	2.33 E+00
		Ba-140	* 1.79 E+00	8.55 E+00
		La-140	*-1.27 E+00	4.28 E+00
		Ra-226	* 4.16 E+01	4.78 E+01
		Th-228	*-7.73 E+00	3.95 E+00

(a) Sampler not operational during part of this period.
* Denotes a result less than the detection limit.

TABLE A-7.1 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
		Discharge		
27	900418 to 900516 (a)	Be-7	*-5.57 E+00	1.60 E+01
		K-40	* 1.21 E+01	2.16 E+01
		Mn-54	* 1.58 E-00	1.59 E+00
		Co-58	*-4.93 E-01	1.56 E+00
		Fe-59	*-3.59 E-01	3.29 E+00
		Co-60	* 3.42 E-01	1.76 E+00
		Zn-65	*-2.73 E+00	3.55 E+00
		Zr-95	*-6.38 E-01	3.25 E+00
		Nb-95	* 1.64 E+00	1.62 E+00
		Cs-134	* 1.50 E-01	1.68 E+00
		Cs-137	* 1.93 E+00	1.83 E+00
		Ba-140	*-3.40 E+00	7.01 E+00
		La-140	* 1.40 E-01	2.95 E+00
		Ra-226	*-2.14 E+01	3.91 E+01
		Th-228	* 4.08 E+00	3.25 E+00
	900516 to 900613 (a)	Be-7	*-1.10 E+01	1.76 E+01
		K-40	*-4.76 E+01	2.48 E+01
		Mn-54	* 1.81 E+00	1.76 E+00
		Co-58	* 1.26 E+00	1.81 E+00
		Fe-59	* 0.00 E+00	3.73 E+00
		Co-60	8.60 E+00	3.38 E+00
		Zn-65	* 2.88 E+00	4.40 E+00
		Zr-95	*-1.11 E+00	3.59 E+00
		Nb-95	* 1.26 E+00	2.02 E+00
		Cs-134	* 4.38 E+00	2.16 E+00
		Cs-137	* 5.55 E+00	2.23 E+00
		Ba-140	* 1.57 E+00	7.92 E+00
		La-140	* 1.77 E+00	3.67 E+00
		Ra-226	* 4.50 E+01	4.55 E+01
		Th-228	* 3.26 E-01	3.77 E+00

(a) Sampler not operational during part of this period.
* Denotes a result less than the detection limit.

TABLE A-7.1 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
		Discharge		
27	900613 to 900710	Be-7	*-2.30 E+00	1.98 E+01
		K-40	* 1.53 E+01	2.88 E+01
		Mn-54	* 6.42 E-01	1.98 E+00
		Co-58	*-7.44 E-01	2.16 E+00
		Fe-59	* 2.15 E+00	4.29 E+00
		Co-60	* 3.81 E+00	2.57 E+00
		Zn-65	*-3.29 E+00	4.74 E+00
		Zr-95	* 1.92 E+00	4.19 E+00
		Nb-95	* 1.20 E+00	2.16 E+00
		Cs-134	* 3.69 E+00	2.37 E+00
		Cs-137	* 2.50 E+00	2.39 E+00
		Ba-140	*-6.36 E+00	8.11 E+00
		La-140	* 7.81 E-01	3.61 E+00
		Ra-226	* 4.37 E+01	4.99 E+01
		Th-228	* 2.75 E+00	3.98 E+00
	900710 to 900807 (a)	Be-7	*-2.95 E+00	1.92 E+01
		K-40	*-7.77 E+00	2.27 E+01
		Mn-54	*-5.21 E-01	1.78 E+00
		Co-58	* 1.17 E+00	2.05 E+00
		Fe-59	* 1.15 E+00	4.46 E+00
		Co-60	* 3.00 E+00	2.41 E+00
		Zn-65	*-1.18 E+00	4.25 E+00
		Zr-95	* 3.63 E+00	4.42 E+00
		Nb-95	* 1.37 E+00	2.08 E+00
		Cs-134	* 2.28 E+00	2.07 E+00
		Cs-137	* 1.94 E+00	2.01 E+00
		Ba-140	*-1.04 E+01	1.19 E+01
		La-140	* 2.34 E+00	5.48 E+00
		Ra-226	*-2.71 E+01	3.53 E+01
		Th-228	* 2.95 E-01	3.09 E+00

(a) Sampler not operational during part of this period.
* Denotes a result less than the detection limit.

TABLE A-7.1 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
		Discharge		
27	900815 to 900912 (a)	Be-7	*-9.61 E+00	1.90 E+01
		K-40	*-1.72 E-01	2.48 E+01
		Mn-54	* 1.49 E-01	1.72 E+00
		Co-58	* 7.35 E-01	1.95 E+00
		Fe-59	* 1.87 E+00	4.36 E+00
		Co-60	* 1.23 E+00	2.24 E+00
		Zn-65	* 2.52 E+00	4.04 E+00
		Zr-95	* 1.36 E+00	4.14 E+00
		Nb-95	* 1.17 E+00	2.06 E+00
		Cs-134	*-7.95 E-02	1.89 E+00
		Cs-137	* 1.03 E+00	1.97 E+00
		Ba-140	* 3.11 E+00	1.02 E+01
		La-140	*-1.20 E+00	4.67 E+00
		Ra-226	*-6.07 E+00	4.13 E+01
		Th-228	*-4.64 E+00	3.50 E+00
	900912 TO 901010	Be-7	* 2.21 E+01	2.88 E+01
		K-40	*-1.39 E-02	6.54 E+01
		Mn-54	* 1.73 E+00	2.88 E+00
		Co-58	*-2.04 E+00	2.93 E+00
		Fe-59	* 1.05 E+00	6.80 E+00
		Co-60	*-1.11 E+00	2.76 E+00
		Zn-65	*-1.31 E+00	6.55 E+00
		Zr-95	*-2.62 E-01	6.18 E+00
		Nb-95	* 2.02 E+00	3.08 E+00
		Cs-134	*-2.74 E-01	3.01 E+00
		Cs-137	* 3.78 E+00	3.08 E+00
		Ba-140	* 1.08 E+01	1.53 E+01
		La-140	*-4.70 E+00	6.59 E+00
		Ra-226	* 1.20 E+01	5.49 E+01
		Th-228	*-9.12 E+00	4.67 E+00

(a) Sampler not operational during part of this period.
* Denotes a result less than the detection limit.

TABLE A-7.1 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
		Discharge		
27	901010 TO 901107	Be-7	* 5.99 E+00	2.29 E+01
		K-40	*-8.31 E+01	5.55 E+01
		Mn-54	*-5.36 E-01	2.28 E+00
		Co-58	* 6.15 E-01	2.43 E+00
		Fe-59	* 1.15 E+00	5.26 E+00
		Co-60	*-9.15 E-01	2.35 E+00
		Zn-65	*-7.50 E+00	5.51 E+00
		Zr-95	* 5.00 E+00	5.09 E+00
		Nb-95	* 2.88 E+00	2.54 E+00
		Cs-134	*-6.74 E-01	2.56 E+00
		Cs-137	* 2.45 E+00	2.49 E+00
		Ba-140	* 3.29 E+00	9.97 E+00
		La-140	*-3.61 E+00	4.44 E+00
		Ra-226	*-3.49 E+01	4.70 E+01
		Th-228	*-2.49 E+00	4.02 E+00
	901107 to 901205 (a)	Be-7	* 4.08 E+00	1.80 E+01
		K-40	* 2.60 E+01	2.56 E+01
		Mn-54	* 9.35 E-01	1.88 E+00
		Co-58	*-1.95 E-01	2.00 E+00
		Fe-59	* 2.02 E+00	4.40 E+00
		Co-60	*-4.58 E-01	2.32 E+00
		Zn-65	*-2.85 E+00	4.48 E+00
		Zr-95	*-9.60 E-01	3.77 E+00
		Nb-95	* 6.17 E-01	1.97 E+00
		Cs-134	*-6.06 E-01	2.21 E+00
		Cs-137	* 1.78 E+00	2.12 E+00
		Ba-140	*-2.80 E+00	7.16 E+00
		La-140	* 2.17 E+00	3.45 E+00
		Ra-226	*-1.49 E+01	3.78 E+01
		Th-228	* 1.86 E+00	3.35 E+00

(a) Sampler not operational during part of this period.
* Denotes a result less than the detection limit.

TABLE A-7.1 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
		River/Drinking		
28	891213 to 900110	Be-7	* 3.31 E+00	2.57 E+01
		K-40	* 2.82 E+02	3.65 E+01
		Mn-54	* 6.97 E-01	2.48 E+00
		Co-58	* 0.00 E+00	2.59 E+00
		Fe-59	* 9.13 E-01	5.39 E+00
		Co-60	* 4.50 E+00	2.58 E+00
		Zn-65	*-1.02 E+00	5.36 E+00
		Zr-95	* 2.55 E+00	5.74 E+00
		Nb-95	* 7.57 E-01	2.72 E+00
		Cs-134	* 2.62 E+00	2.81 E+00
		Cs-137	* 7.46 E-01	2.78 E+00
		Ba-140	*-1.14 E+01	1.20 E+01
		La-140	*-1.12 E+00	4.84 E+00
		Ra-226	* 1.81 E+02	5.58 E+01
		Th-228	* 6.28 E+01	5.33 E+00
	900110 to 900213	Be-7	* 1.65 E+01	2.63 E+01
		K-40	*-9.71 E+01	3.70 E+01
		Mn-54	*-5.29 E-02	2.45 E+00
		Co-58	* 1.30 E+00	2.56 E+00
		Fe-59	* 3.32 E+00	5.66 E+00
		Co-60	* 5.41 E+00	2.84 E+00
		Zn-65	*-1.22 E+00	5.35 E+00
		Zr-95	* 6.87 E+00	5.81 E+00
		Nb-95	* 6.43 E-01	2.77 E+00
		Cs-134	* 1.42 E+00	2.78 E+00
		Cs-137	* 2.38 E+00	2.88 E+00
		Ba-140	* 6.03 E+00	1.22 E+01
		La-140	*-3.39 E+00	4.92 E+00
		Ra-226	*-4.44 E+01	5.66 E+01
		Th-228	*-1.79 E+01	5.40 E+00

* Denotes a result less than the detection limit.

TABLE A-7.1 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
		River/Drinking		
28	900213 to 900313	Be-7	*-9.94 E+00	1.65 E+01
		K-40	*-2.67 E+01	2.43 E+01
		Mn-54	* 2.21 E-01	1.60 E+00
		Co-58	* 1.23 E+00	1.75 E+00
		Fe-59	* 4.32 E-01	3.69 E+00
		Co-60	* 1.14 E+00	1.79 E+00
		Zn-65	*-3.53 E+00	3.61 E+00
		Zr-95	* 1.85 E+00	3.66 E+00
		Nb-95	* 2.57 E+00	1.81 E+00
		Cs-134	*-5.33 E-01	1.71 E+00
		Cs-137	* 7.77 E-01	1.74 E+00
		Ba-140	*-2.87 E+00	7.80 E+00
		La-140	* 7.04 E-01	3.22 E+00
		Ra-226	*-4.11 E+00	4.26 E+01
		Th-228	* 2.90 E+00	3.42 E+00
	900313 to 900418	Be-7	*-1.10 E+00	1.91 E+01
		K-40	*-2.50 E+01	3.10 E+01
		Mn-54	*-2.49 E-01	1.96 E+00
		Co-58	*-1.74 E-01	2.11 E+00
		Fe-59	* 2.10 E-01	4.30 E+00
		Co-60	* 1.83 E+00	2.18 E+00
		Zn-65	*-4.01 E+00	4.61 E+00
		Zr-95	*-2.74 E+00	4.25 E+00
		Nb-95	* 1.08 E+00	2.10 E+00
		Cs-134	* 0.00 E+00	2.23 E+00
		Cs-137	* 2.36 E-01	2.21 E+00
		Ba-140	*-2.61 E-01	8.67 E+00
		La-140	*-2.59 E+00	3.43 E+00
		Ra-226	*-4.73 E+00	5.35 E+01
		Th-228	* 3.85 E+00	4.36 E+00

* Denotes a result less than the detection limit.

TABLE A-7.1 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
		River/Drinking		
28	900418 to 900516	Be-7	*-1.92 E+01	1.63 E+01
		K-40	*-1.96 E+01	2.61 E+01
		Mn-54	* 1.32 E+00	1.66 E+00
		Co-58	*-1.65 E+00	1.71 E+00
		Fe-59	* 2.21 E+00	3.62 E+00
		Co-60	* 2.53 E+00	1.92 E+00
		Zn-65	*-2.05 E+00	4.09 E+00
		Zr-95	* 1.01 E+00	3.48 E+00
		Nb-95	* 1.45 E+00	1.83 E+00
		Cs-134	*-1.24 E+00	1.83 E+00
		Cs-137	* 3.81 E-01	1.77 E+00
		Ba-140	*-4.20 E+00	7.41 E+00
		La-140	* 3.44 E-01	3.49 E+00
		Ra-226	* 3.95 E+01	4.52 E+01
		Th-228	*-8.89 E+00	3.64 E+00
	900516 to 900613	Be-7	* 6.78 E+00	2.18 E+01
		K-40	* 1.10 E+01	5.47 E+01
		Mn-54	* 5.44 E-01	2.32 E+00
		Co-58	*-6.24 E-01	2.30 E+00
		Fe-59	* 5.42 E-01	5.23 E+00
		Co-60	*-6.11 E-01	2.32 E+00
		Zn-65	*-4.05 E+00	5.30 E+00
		Zr-95	*-6.61 E-01	4.82 E+00
		Nb-95	* 1.78 E+00	2.43 E+00
		Cs-134	* 1.31 E+00	2.47 E+00
		Cs-137	* 5.66 E+00	2.57 E+00
		Ba-140	* 4.51 E+00	1.05 E+01
		La-140	* 1.30 E-01	4.21 E+00
		Ra-226	* 5.94 E+00	4.50 E+01
		Th-228	* 4.43 E-01	3.85 E+00

* Denotes a result less than the detection limit.

TABLE A-7.1 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
		River/Drinking		
28	900613 to 900710	Be-7	* 9.24 E+00	1.71 E+01
		K-40	*-3.96 E+01	2.45 E+01
		Mn-54	* 0.00 E+00	1.78 E+00
		Co-58	*-9.93 E-01	1.78 E+00
		Fe-59	* 1.49 E+00	3.61 E+00
		Co-60	* 1.11 E+00	1.72 E+00
		Zn-65	* 0.00 E+00	3.58 E+00
		Zr-95	* 5.60 E-01	3.45 E+00
		Nb-95	* 9.39 E-01	1.86 E+00
		Cs-134	* 7.90 E-01	1.77 E+00
		Cs-137	* 8.24 E-01	1.92 E+00
		Ba-140	* 1.07 E+00	6.79 E+00
		La-140	*-2.89 E+00	3.00 E+00
		Ra-226	* 1.56 E+00	3.96 E+01
		Th-228	* 4.17 E+00	3.44 E+00
	900710 to 900815	Be-7	* 5.86 E+00	2.13 E+01
		K-40	*-1.61 E+01	2.61 E+01
		Mn-54	*-2.85 E-01	1.92 E+00
		Co-58	*-3.85 E-01	2.01 E+00
		Fe-59	* 2.47 E+00	4.29 E+00
		Co-60	* 1.88 E+00	2.16 E+00
		Zn-65	*-5.47 E+00	4.32 E+00
		Zr-95	*-1.00 E+00	4.33 E+00
		Nb-95	* 8.82 E-01	2.15 E+00
		Cs-134	* 3.82 E-01	2.19 E+00
		Cs-137	* 6.69 E-01	2.22 E+00
		Ba-140	* 1.65 E+00	9.96 E+00
		La-140	* 1.25 E+00	4.37 E+00
		Ra-226	* 2.30 E+01	4.84 E+01
		Th-228	* 4.75 E+00	4.00 E+00

* Denotes a result less than the detection limit.

TABLE A-7.1 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
		River/Drinking		
28	900815 to 900912	Be-7	*-6.99 E-01	2.54 E+01
		K-40	*-1.58 E+02	6.63 E+01
		Mn-54	*-3.00 E-01	2.40 E+00
		Co-58	* 1.10 E-01	2.61 E+00
		Fe-59	*-5.47 E+00	5.71 E+00
		Co-60	* 2.62 E+00	2.42 E+00
		Zn-65	* 8.18 E+00	5.99 E+00
		Zr-95	*-5.10 E+00	5.69 E+00
		Nb-95	* 2.79 E-01	2.84 E+00
		Cs-134	* 3.79 E+00	2.65 E+00
		Cs-137	* 3.54 E+00	2.79 E+00
		Ba-140	*-7.68 E+00	1.40 E+01
		La-140	*-5.43 E+00	5.18 E+00
		Ra-226	*-7.50 E+01	5.94 E+01
		Th-228	*-2.45 E+01	4.79 E+00
	900912 TO 901010	Be-7	* 1.51 E+01	2.07 E+01
		K-40	* 2.43 E+00	2.64 E+01
		Mn-54	*-2.66 E-01	1.98 E+00
		Co-58	*-9.54 E-01	2.12 E+00
		Fe-59	* 2.44 E+00	4.73 E+00
		Co-60	*-1.19 E+00	2.34 E+00
		Zn-65	*-1.21 E+00	4.53 E+00
		Zr-95	* 5.97 E+00	4.47 E+00
		Nb-95	*-1.40 E+00	2.23 E+00
		Cs-134	* 1.70 E+00	2.27 E+00
		Cs-137	* 4.10 E-01	2.19 E+00
		Ba-140	*-1.17 E+00	1.19 E+01
		La-140	*-5.37 E+00	5.28 E+00
		Ra-226	*-4.56 E+01	4.17 E+01
		Th-228	*-7.97 E+00	3.56 E+00

* Denotes a result less than the detection limit.

TABLE A-7.1 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
		River/Drinking		
28	901010 TO 901107	Be-7	*-1.19 E+00	1.58 E+01
		K-40	* 9.62 E-01	2.12 E+01
		Mn-54	* 7.14 E-01	1.68 E+00
		Co-58	* 0.00 E+00	1.72 E+00
		Fe-59	* 2.97 E+00	3.82 E+00
		Co-60	* 2.28 E+00	1.94 E+00
		Zn-65	*-3.52 E+00	4.12 E+00
		Zr-95	*-2.62 E-01	3.47 E+00
		Nb-95	* 9.44 E-01	1.73 E+00
		Cs-134	*-1.10 E+00	1.86 E+00
		Cs-137	* 2.74 E+00	1.89 E+00
		Ba-140	* 8.49 E+00	6.99 E+00
		La-140	* 0.00 E+00	3.35 E+00
		Ra-226	* 3.22 E+01	3.27 E+01
		Th-228	* 3.69 E+00	2.87 E+00
	901107 to 901205	Be-7	*-5.72 E+00	2.60 E+01
		K-40	*-8.13 E+01	6.36 E+01
		Mn-54	*-1.42 E+00	2.57 E+00
		Co-58	*-2.40 E+00	2.77 E+00
		Fe-59	* 1.09 E+00	6.10 E+00
		Co-60	*-4.52 E-01	2.80 E+00
		Zn-65	*-3.61 E+00	6.44 E+00
		Zr-95	*-1.08 E+00	5.72 E+00
		Nb-95	* 3.08 E-01	2.84 E+00
		Cs-134	*-1.13 E+00	2.90 E+00
		Cs-137	* 1.76 E+00	2.93 E+00
		Ba-140	* 3.90 E+00	1.13 E+01
		La-140	*-4.19 E+00	4.69 E+00
		Ra-226	*-7.12 E+00	5.50 E+01
		Th-228	*-2.87 E+00	4.70 E+00

* Denotes a result less than the detection limit.

TABLE A-7.1 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
		River/Drinking		
29	891213 to 900110	Be-7	* 7.84 E+00	2.18 E+01
		K-40	* 4.14 E+02	3.54 E+01
		Mn-54	* 2.45 E+00	2.10 E+00
		Co-58	*-1.29 E-01	2.20 E+00
		Fe-59	* 3.88 E+00	4.43 E+00
		Co-60	* 5.32 E-01	2.08 E+00
		Zn-65	*-1.05 E+01	4.79 E+00
		Zr-95	*-1.75 E+00	4.45 E+00
		Nb-95	* 8.98 E-01	2.21 E+00
		Cs-134	* 2.59 E-01	2.36 E+00
		Cs-137	* 1.93 E+00	2.28 E+00
		Ba-140	* 0.00 E+00	9.85 E+00
		La-140	* 2.56 E-01	3.96 E+00
		Ra-226	* 1.81 E+02	4.97 E+01
		Th-228	* 1.52 E+01	4.05 E+00
	900110 to 900213	Be-7	*-1.87 E+01	2.26 E+01
		K-40	*-1.52 E+02	3.46 E+01
		Mn-54	* 1.16 E+00	2.10 E+00
		Co-58	*-1.73 E+00	2.21 E+00
		Fe-59	*-1.45 E+00	4.81 E+00
		Co-60	*-9.00 E-01	2.18 E+00
		Zn-65	*-6.34 E+00	4.82 E+00
		Zr-95	*-6.75 E-01	4.76 E+00
		Nb-95	* 1.52 E+00	2.32 E+00
		Cs-134	*-4.60 E-02	2.37 E+00
		Cs-137	* 1.65 E+00	2.48 E+00
		Ba-140	* 4.17 E+00	1.03 E+01
		La-140	*-6.77 E-01	4.10 E+00
		Ra-226	*-1.70 E+01	5.20 E+01
		Th-228	*-3.46 E+00	4.21 E+00

* Denotes a result less than the detection limit.

TABLE A-7.1 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
		River/Drinking		
29	900213 to 900313	Be-7	* 6.57 E+00	1.65 E+01
		K-40	*-3.77 E+00	2.31 E+01
		Mn-54	*-3.12 E-01	1.57 E+00
		Co-58	*-3.98 E-01	1.71 E+00
		Fe-59	*-1.64 E-01	3.72 E+00
		Co-60	* 6.49 E-01	1.62 E+00
		Zn-65	* 4.82 E-01	3.70 E+00
		Zr-95	* 0.00 E+00	3.41 E+00
		Nb-95	* 2.14 E+00	1.68 E+00
		Cs-134	* 6.69 E-01	1.71 E+00
		Cs-137	* 1.11 E+00	1.71 E+00
		Ba-140	* 5.37 E+00	7.45 E+00
		La-140	* 0.00 E+00	3.16 E+00
		Ra-226	*-2.05 E-01	3.96 E+01
		Th-228	*-9.95 E+00	3.18 E+00
	900313 to 900418	Be-7	* 1.02 E+01	2.64 E+01
		K-40	*-2.20 E+02	6.25 E+01
		Mn-54	* 2.46 E+00	2.66 E+00
		Co-58	* 1.81 E+00	2.77 E+00
		Fe-59	*-4.66 E-01	5.84 E+00
		Co-60	* 2.25 E+00	2.79 E+00
		Zn-65	* 7.97 E+00	6.18 E+00
		Zr-95	* 5.73 E+00	5.97 E+00
		Nb-95	* 2.88 E+00	2.84 E+00
		Cs-134	*-3.32 E-01	2.91 E+00
		Cs-137	* 3.09 E+00	3.01 E+00
		Ba-140	* 1.94 E-01	1.10 E+01
		La-140	*-4.51 E+00	4.31 E+00
		Ra-226	* 6.19 E+01	5.36 E+01
		Th-228	*-1.38 E+01	4.48 E+00

* Denotes a result less than the detection limit.

TABLE A-7.1 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
		River/Drinking		
29	900418 to 900516	Be-7	* 1.26 E+01	2.19 E+01
		K-40	*-1.80 E+02	5.22 E+01
		Mn-54	* 9.60 E-01	2.16 E+00
		Co-58	* 2.03 E+00	2.35 E+00
		Fe-59	* 3.21 E+00	5.04 E+00
		Co-60	* 2.20 E+00	2.34 E+00
		Zn-65	* 4.14 E+00	5.47 E+00
		Zr-95	* 6.87 E+00	4.83 E+00
		Nb-95	* 6.73 E-01	2.37 E+00
		Cs-134	*-3.60 E-01	2.41 E+00
		Cs-137	* 2.29 E+00	2.43 E+00
		Ba-140	*-1.80 E+00	9.39 E+00
		La-140	*-3.23 E+00	4.07 E+00
		Ra-226	*-6.31 E+01	4.40 E+01
		Th-228	*-9.31 E+00	3.70 E+00
	900516 to 900613	Be-7	*-1.98 E+00	1.44 E+01
		K-40	* 2.97 E+00	1.94 E+01
		Mn-54	*-5.03 E-01	1.54 E+00
		Co-58	*-7.58 E-01	1.59 E+00
		Fe-59	* 1.08 E+00	3.63 E+00
		Co-60	* 4.89 E-01	1.78 E+00
		Zn-65	* 2.13 E-01	3.53 E+00
		Zr-95	*-2.48 E-01	3.22 E+00
		Nb-95	* 3.82 E-01	1.70 E+00
		Cs-134	*-5.86 E-01	1.70 E+00
		Cs-137	* 1.03 E+00	1.64 E+00
		Ba-140	* 1.89 E+00	6.85 E+00
		La-140	*-2.48 E+00	3.21 E+00
		Ra-226	*-2.31 E+01	2.97 E+01
		Th-228	* 9.02 E-01	2.55 E+00

* Denotes a result less than the detection limit.

TABLE A-7.1 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
		River/Drinking		
29	900613 to 900710	Be-7	* 4.42 E+00	2.32 E+01
		K-40	*-2.03 E+02	6.59 E+01
		Mn-54	* 1.47 E-01	2.39 E+00
		Co-58	*-1.37 E+00	2.43 E+00
		Fe-59	*-7.27 E-01	5.17 E+00
		Co-60	*-4.68 E+00	2.42 E+00
		Zn-65	*-4.50 E+00	5.75 E+00
		Zr-95	*-2.04 E+00	5.14 E+00
		Nb-95	* 1.20 E+00	2.48 E+00
		Cs-134	*-5.30 E-02	2.67 E+00
		Cs-137	*-5.74 E+00	2.69 E+00
		Ba-140	* 1.39 E+00	9.20 E+00
		La-140	* 0.00 E+00	3.36 E+00
		Ra-226	*-6.40 E+01	5.91 E+01
		Th-228	*-1.11 E+01	4.73 E+00
	900710 to 900815	Be-7	* 8.84 E-01	1.85 E+01
		K-40	*-7.62 E+00	2.43 E+01
		Mn-54	* 5.13 E-01	1.92 E+00
		Co-58	*-7.62 E-01	2.13 E+00
		Fe-59	* 1.53 E+00	4.63 E+00
		Co-60	* 7.45 E-01	2.09 E+00
		Zn-65	* 0.00 E+00	4.27 E+00
		Zr-95	*-3.86 E+00	4.02 E+00
		Nb-95	* 1.45 E+00	2.15 E+00
		Cs-134	*-4.12 E-01	2.15 E+00
		Cs-137	* 0.00 E+00	2.05 E+00
		Ba-140	*-3.47 E+00	9.50 E+00
		La-140	* 1.55 E+00	4.76 E+00
		Ra-226	*-3.28 E+01	3.67 E+01
		Th-228	*-1.71 E-01	3.25 E+00

* Denotes a result less than the detection limit.

TABLE A-7.1 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
		River/Drinking		
29	900815 to 900912	Be-7	* 5.92 E+00	2.26 E+01
		K-40	* 1.28 E+01	3.20 E+01
		Mn-54	* 1.22 E-01	1.96 E+00
		Co-58	* 1.11 E+00	2.18 E+00
		Fe-59	* 1.15 E+00	4.57 E+00
		Co-60	* 9.77 E-01	2.21 E+00
		Zn-65	*-4.73 E+00	4.71 E+00
		Zr-95	*-1.37 E+00	4.54 E+00
		Nb-95	*-2.65 E-01	2.39 E+00
		Cs-134	* 8.10 E-01	2.23 E+00
		Cs-137	* 2.60 E+00	2.35 E+00
		Ba-140	*-3.61 E-01	1.23 E+01
		La-140	*-1.95 E+00	5.21 E+00
		Ra-226	*-4.13 E+01	5.41 E+01
		Th-228	* 3.14 E-01	4.51 E+00
	900912 TO 901010	Be-7	*-5.19 E+00	2.15 E+01
		K-40	*-2.69 E+01	2.87 E+01
		Mn-54	*-7.38 E-02	1.89 E+00
		Co-58	* 8.16 E-02	2.13 E+00
		Fe-59	* 4.12 E-01	4.80 E+00
		Co-60	*-2.16 E-01	2.09 E+00
		Zn-65	* 4.93 E+00	4.48 E+00
		Zr-95	* 1.97 E+00	4.58 E+00
		Nb-95	* 3.12 E-01	2.19 E+00
		Cs-134	*-7.88 E-01	2.13 E+00
		Cs-137	* 1.51 E+00	2.23 E+00
		Ba-140	*-8.95 E+00	1.19 E+01
		La-140	*-5.80 E+00	5.59 E+00
		Ra-226	*-1.41 E+01	4.79 E+01
		Th-228	*-2.81 E+00	3.86 E+00

* Denotes a result less than the detection limit.

TABLE A-7.1 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
		River/Drinking		
29	901010 TO 901107	Be-7	* 8.14 E+00	1.64 E+01
		K-40	*-3.65 E+01	2.17 E+01
		Mn-54	*-1.40 E-01	1.61 E+00
		Co-58	*-5.96 E-01	1.61 E+00
		Fe-59	* 1.82 E+00	3.56 E+00
		Co-60	* 8.22 E-01	1.78 E+00
		Zn-65	* 0.00 E+00	3.62 E+00
		Zr-95	* 7.36 E-01	3.43 E+00
		Nb-95	* 4.73 E-01	1.65 E+00
		Cs-134	* 2.51 E-01	1.72 E+00
		Cs-137	* 4.39 E-02	1.66 E+00
		Ba-140	*-1.62 E+00	7.26 E+00
		La-140	* 1.18 E+00	3.25 E+00
		Ra-226	*-5.07 E+01	3.95 E+01
		Th-228	* 2.76 E+00	3.23 E+00
	901107 to 901205	Be-7	* 6.09 E+00	2.11 E+01
		K-40	*-2.15 E+02	4.88 E+01
		Mn-54	*-6.01 E-01	2.16 E+00
		Co-58	*-4.77 E-01	2.14 E+00
		Fe-59	* 1.91 E-01	4.95 E+00
		Co-60	* 9.26 E-01	2.23 E+00
		Zn-65	*-5.13 E+00	5.03 E+00
		Zr-95	* 9.18 E-01	4.74 E+00
		Nb-95	* 3.86 E+00	2.30 E+00
		Cs-134	*-3.06 E+00	2.31 E+00
		Cs-137	* 1.57 E+00	2.39 E+00
		Ba-140	* 3.91 E+00	9.68 E+00
		La-140	* 8.87 E-01	3.75 E+00
		Ra-226	*-1.46 E+02	4.66 E+01
		Th-228	*-3.27 E+01	3.85 E+00

* Denotes a result less than the detection limit.

TABLE A-7.1 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
		Ground		
31	900313	Be-7	* 1.36 E+01	1.64 E+01
		K-40	* 1.75 E+01	2.28 E+01
		Mn-54	* 1.46 E+00	1.55 E+00
		Co-58	* 1.05 E+00	1.66 E+00
		Fe-59	*-5.37 E-01	3.38 E+00
		Co-60	* 1.86 E+00	1.69 E+00
		Zn-65	*-1.99 E+00	3.52 E+00
		Zr-95	* 2.13 E+00	3.47 E+00
		Nb-95	* 1.69 E+00	1.73 E+00
		Cs-134	*-5.23 E-02	1.75 E+00
		Cs-137	* 3.21 E-01	1.74 E+00
		Ba-140	*-7.13 E-01	7.61 E+00
		La-140	*-4.86 E-01	3.32 E+00
		Ra-226	*-3.53 E+01	4.01 E+01
		Th-228	* 8.82 E+00	3.36 E+00
31	900614	Be-7	*-1.09 E+01	2.69 E+01
		K-40	*-1.31 E+02	4.02 E+01
		Mn-54	* 5.04 E-01	2.43 E+00
		Co-58	*-2.81 E+00	2.62 E+00
		Fe-59	*-1.06 E+00	5.42 E+00
		Co-60	*-2.40 E+00	2.48 E+00
		Zn-65	*-7.31 E+00	5.51 E+00
		Zr-95	* 3.40 E-01	5.45 E+00
		Nb-95	* 7.57 E-01	2.60 E+00
		Cs-134	* 3.00 E-01	2.61 E+00
		Cs-137	* 4.72 E-01	2.68 E+00
		Ba-140	*-4.32 E+00	1.33 E+01
		La-140	* 2.90 E+00	5.00 E+00
		Ra-226	*-4.71 E+01	5.84 E+01
		Th-228	*-1.02 E-02	4.73 E+00

* Denotes a result less than the detection limit.

TABLE A-7.1 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
		Ground		
31	900912	Be-7	* 1.37 E+01	2.12 E+01
		K-40	* 1.14 E+00	2.68 E+01
		Mn-54	*-6.45 E-01	1.96 E+00
		Co-58	* 7.93 E-02	2.15 E+00
		Fe-59	* 2.59 E+00	4.37 E+00
		Co-60	* 9.38 E-01	2.05 E+00
		Zn-65	*-7.16 E+00	4.37 E+00
		Zr-95	* 1.47 E-01	4.20 E+00
		Nb-95	* 1.97 E+00	2.27 E+00
		Cs-134	*-9.95 E-01	1.98 E+00
		Cs-137	* 1.47 E+00	2.29 E+00
		Ba-140	*-3.25 E-01	1.14 E+01
		La-140	*-1.77 E+00	5.15 E+00
		Ra-226	* 8.80 E+00	4.68 E+01
		Th-228	* 1.18 E+00	4.01 E+00
	901205	Be-7	*-6.18 E+00	2.11 E+01
		K-40	*-1.38 E+02	3.44 E+01
		Mn-54	* 6.13 E-01	2.02 E+00
		Co-58	*-1.06 E+00	2.12 E+00
		Fe-59	*-1.30 E+00	4.53 E+00
		Co-60	* 5.07 E-01	2.09 E+00
		Zn-65	*-6.76 E+00	4.63 E+00
		Zr-95	* 7.56 E-01	4.46 E+00
		Nb-95	* 1.67 E+00	2.16 E+00
		Cs-134	*-4.12 E-01	2.18 E+00
		Cs-137	* 1.48 E+00	2.21 E+00
		Ba-140	*-1.20 E+00	9.70 E+00
		La-140	* 2.31 E+00	3.85 E+00
		Ra-226	*-7.70 E+01	4.81 E+01
		Th-228	* 1.61 E+00	3.94 E+00

* Denotes a result less than the detection limit.

TABLE A-7.1 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
		Ground		
32	900313	Be-7	* 3.22 E+00	1.75 E+01
		K-40	*-2.34 E+01	2.57 E+01
		Mn-54	* 7.09 E-01	1.55 E+00
		Co-58	* 4.44 E-01	1.78 E+00
		Fe-59	*-1.86 E+00	3.81 E+00
		Co-60	* 3.45 E-01	1.87 E+00
		Zn-65	*-4.52 E+00	4.09 E+00
		Zr-95	*-4.70 E-01	3.47 E+00
		Nb-95	* 4.23 E-01	1.83 E+00
		Cs-134	* 6.34 E-01	1.89 E+00
		Cs-137	* 6.12 E-01	1.79 E+00
		Ba-140	* 7.37 E+00	8.27 E+00
		La-140	*-1.17 E+00	3.72 E+00
		Ra-226	* 3.55 E+00	4.52 E+01
		Th-228	*-5.18 E-01	3.79 E+00
32	900614	Be-7	*-1.50 E+01	1.73 E+01
		K-40	*-2.64 E+00	2.64 E+01
		Mn-54	*-7.44 E-01	1.80 E+00
		Co-58	* 8.09 E-01	1.94 E+00
		Fe-59	* 1.02 E+00	4.26 E+00
		Co-60	* 0.00 E+00	1.93 E+00
		Zn-65	* 5.80 E-01	4.22 E+00
		Zr-95	*-2.09 E+00	3.69 E+00
		Nb-95	* 7.70 E-02	1.89 E+00
		Cs-134	* 2.86 E+00	2.00 E+00
		Cs-137	* 0.00 E+00	1.99 E+00
		Ba-140	* 0.00 E+00	9.43 E+00
		La-140	*-2.85 E-01	4.38 E+00
		Ra-226	* 4.96 E+00	4.02 E+01
		Th-228	*-2.45 E+00	3.36 E+00

* Denotes a result less than the detection limit.

TABLE A-7.1 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
		Ground		
32	900912	Be-7	* 1.11 E+01	1.77 E+01
		K-40	* 1.35 E+01	2.29 E+01
		Mn-54	* 1.02 E+00	1.51 E+00
		Co-58	*-2.42 E-01	1.66 E+00
		Fe-59	*-1.55 E-01	3.87 E+00
		Co-60	* 2.36 E+00	1.89 E+00
		Zn-65	*-4.03 E+00	3.48 E+00
		Zr-95	*-1.91 E+00	3.40 E+00
		Nb-95	* 9.24 E-01	1.77 E+00
		Cs-134	*-1.14 E+00	1.70 E+00
		Cs-137	* 5.44 E-01	1.69 E+00
		Ba-140	* 8.91 E+00	1.07 E+01
		La-140	* 1.01 E+00	4.79 E+00
		Ra-226	* 9.54 E+00	3.78 E+01
		Th-228	*-1.69 E+00	3.13 E+00
	901205	Be-7	*-3.31 E-01	1.51 E+01
		K-40	*-4.76 E-01	2.06 E+01
		Mn-54	* 3.06 E-01	1.51 E+00
		Co-58	* 1.08 E-01	1.54 E+00
		Fe-59	* 2.69 E+00	3.61 E+00
		Co-60	* 0.00 E+00	1.59 E+00
		Zn-65	* 2.51 E+00	3.69 E+00
		Zr-95	* 3.09 E+00	3.37 E+00
		Nb-95	* 1.54 E+00	1.64 E+00
		Cs-134	* 6.00 E-01	1.59 E+00
		Cs-137	* 8.52 E-01	1.64 E+00
		Ba-140	*-2.77 E+00	7.02 E+00
		La-140	* 1.68 E+00	3.07 E+00
		Ra-226	* 1.31 E+01	3.41 E+01
		Th-228	*-1.38 E+00	2.89 E+00

* Denotes a result less than the detection limit.

TABLE A-7.1 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
		Ground		
52	900313	Be-7	* 1.20 E+01	2.27 E+01
		K-40	*-2.13 E+02	5.33 E+01
		Mn-54	*-8.75 E-02	2.23 E+00
		Co-58	* 3.76 E-01	2.38 E+00
		Fe-59	* 2.42 E+00	5.33 E+00
		Co-60	* 1.08 E+00	2.39 E+00
		Zn-65	*-4.46 E-01	5.44 E+00
		Zr-95	*-3.09 E+00	4.93 E+00
		Nb-95	* 1.61 E+00	2.40 E+00
		Cs-134	*-5.17 E-01	2.44 E+00
		Cs-137	* 2.02 E+00	2.57 E+00
		Ba-140	*-1.25 E+01	1.09 E+01
		La-140	*-2.47 E+00	4.22 E+00
		Ra-226	*-1.01 E+02	4.53 E+01
		Th-228	*-2.48 E+00	3.87 E+00
	900613	Be-7	* 1.40 E+00	2.58 E+01
		K-40	*-7.86 E+01	6.54 E+01
		Mn-54	* 6.49 E-01	2.41 E+00
		Co-58	*-1.26 E+00	2.67 E+00
		Fe-59	*-4.11 E+00	5.94 E+00
		Co-60	* 2.26 E+00	2.65 E+00
		Zn-65	*-3.07 E+00	5.77 E+00
		Zr-95	*-3.32 E+00	5.60 E+00
		Nb-95	* 4.98 E+00	2.80 E+00
		Cs-134	*-2.20 E+00	2.60 E+00
		Cs-137	* 4.36 E-01	2.76 E+00
		Ba-140	* 1.72 E+00	1.44 E+01
		La-140	*-5.86 E+00	5.50 E+00
		Ra-226	*-1.86 E+01	5.96 E+01
		Th-228	*-1.40 E+01	4.83 E+00

* Denotes a result less than the detection limit.

TABLE A-7.1 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
		Ground		
52	900912	Be-7	* 2.09 E+01	2.19 E+01
		K-40	* 2.71 E+01	2.80 E+01
		Mn-54	* 1.62 E+00	2.18 E+00
		Co-58	*-5.12 E-01	2.31 E+00
		Fe-59	* 2.14 E+00	5.26 E+00
		Co-60	*-3.35 E-01	2.23 E+00
		Zn-65	*-5.51 E+00	4.76 E+00
		Zr-95	*-3.18 E+00	4.43 E+00
		Nb-95	* 9.80 E-01	2.50 E+00
		Cs-134	*-1.73 E+00	2.36 E+00
		Cs-137	* 1.73 E+00	2.33 E+00
		Ba-140	* 2.45 E+00	1.15 E+01
		La-140	*-6.28 E-01	5.69 E+00
		Ra-226	* 7.09 E+00	4.12 E+01
		Th-228	*-2.78 E+00	3.56 E+00
	901205	Be-7	* 7.33 E+00	2.11 E+01
		K-40	*-1.59 E+02	5.42 E+01
		Mn-54	* 1.36 E+00	2.04 E+00
		Co-58	*-2.66 E+00	2.11 E+00
		Fe-59	*-1.07 E+00	4.89 E+00
		Co-60	* 1.40 E+00	2.19 E+00
		Zn-65	* 1.47 E+01	5.11 E+00
		Zr-95	*-1.13 E+00	4.63 E+00
		Nb-95	* 5.02 E+00	2.31 E+00
		Cs-134	* 1.32 E+00	2.24 E+00
		Cs-137	* 1.96 E+00	2.29 E+00
		Ba-140	*-5.97 E-01	9.81 E+00
		La-140	* 2.39 E+00	3.62 E+00
		Ra-226	*-4.44 E+01	5.04 E+01
		Th-228	*-3.19 E+01	4.00 E+00

* Denotes a result less than the detection limit.

TABLE A-7.2

GAMMA SPECTROMETRY OF WATER - SUMMARY

Results in pCi/liter

NUCLIDE	AVERAGE	LOW	HIGH	NUMBER SAMPLES	NUMBER POSITIVE
		River/Drinking			
Co-60 (I)	1.04E+00	-4.68E+00	5.41E+00	24	0
Co-60 (C)	5.00E-01	-1.10E+00	2.21E+00	12	0
Co-58 (I)	-2.39E-01	-2.40E+00	2.03E+00	24	0
Co-58 (C)	-1.91E-01	-1.95E+00	1.32E+00	12	0
Cs-134 (I)	1.82E-01	-3.06E+00	3.79E+00	24	0
Cs-134 (C)	-1.07E-01	-1.48E+00	1.32E+00	12	0
Cs-137 (I)	1.30E+00	-5.74E+00	5.66E+00	24	0
Cs-137 (C)	1.29E+00	-2.17E-01	4.38E+00	12	0
Nb-95 (I)	1.07E+00	-1.40E+00	3.86E+00	24	0
Nb-95 (C)	1.18E+00	0.00E+00	4.37E+00	12	0
Zr-95 (I)	5.94E-01	-5.10E+00	6.87E+00	24	0
Zr-95 (C)	9.46E-01	-3.20E+00	5.68E+00	12	0
Zn-65 (I)	-1.46E+00	-1.05E+01	8.18E+00	24	0
Zn-65 (C)	-1.66E+00	-4.78E+00	1.70E+00	12	0

(I) Indicator Stations
(C) Control Station

TABLE A-7.2 (Cont.)

GAMMA SPECTROMETRY OF WATER - SUMMARY

Results in pCi/liter

NUCLIDE	AVERAGE	LOW	HIGH	NUMBER SAMPLES	NUMBER POSITIVE
		River/Drinking			
Fe-59 (I)	9.62E-01	-5.47E+00	3.88E+00	24	0
Fe-59 (C)	1.02E+00	-3.58E+00	4.03E+00	12	0
Ba-140 (I)	-5.03E-02	-1.14E+01	8.49E+00	24	0
Ba-140 (C)	-1.94E+00	-1.90E+01	1.04E+01	12	0
La-140 (I)	-1.56E+00	-5.80E+00	1.55E+00	24	0
La-140 (C)	-1.13E+00	-3.27E+00	1.81E+00	12	0

(I) Indicator Stations
(C) Control Station

TABLE A-7.2 (Cont.)

GAMMA SPECTROMETRY OF WATER - SUMMARY

Results in pCi/liter

NUCLIDE	AVERAGE	LOW	HIGH	NUMBER SAMPLES	NUMBER POSITIVE
		Discharge (a)			
Co-60 (I)	1.34E+00	-1.11E+00	8.60E+00	12	1
Co-58 (I)	-2.30E-01	-2.28E+00	1.26E+00	12	0
Cs-134 (I)	7.81E-01	-8.60E-01	4.38E+00	12	0
Cs-137 (I)	2.17E+00	-1.56E-01	5.55E+00	12	0
Nb-95 (I)	1.43E+00	6.17E-01	2.88E+00	12	0
Zr-95 (I)	3.31E-01	-5.84E+00	5.00E+00	12	0
Zn-65 (I)	-5.85E-01	-7.50E+00	7.89E+00	12	0
Fe-59 (I)	1.28E+00	-3.59E-01	2.72E+00	12	0
Ba-140 (I)	-7.50E-03	-1.04E+01	1.08E+01	12	0
La-140 (I)	-7.90E-01	-4.70E+00	2.34E+00	12	0

(a) Duplicate station 72 not included in averages.
(I) Indicator Stations
(C) Control Station

TABLE A-7.2 (Cont.)

GAMMA SPECTROMETRY OF WATER - SUMMARY

Results in pCi/liter

NUCLIDE	AVERAGE	LOW	HIGH	NUMBER SAMPLES	NUMBER POSITIVE
		Ground			
Co-60 (I)	6.68E-01	-2.40E+00	2.36E+00	12	0
Co-58 (I)	-4.73E-01	-2.81E+00	1.05E+00	12	0
Cs-134 (I)	-1.11E-01	-2.20E+00	2.86E+00	12	0
Cs-137 (I)	9.91E-01	0.00E+00	2.02E+00	12	0
Nb-95 (I)	1.80E+00	7.70E-02	5.02E+00	12	0
Zr-95 (I)	-7.27E-01	-3.32E+00	3.09E+00	12	0
Zn-65 (I)	-1.92E+00	-7.31E+00	1.47E+01	12	0
Fe-59 (I)	6.40E-02	-4.11E+00	2.69E+00	12	0
Ba-140 (I)	-1.65E-01	-1.25E+01	8.91E+00	12	0
La-140 (I)	-1.98E-01	-5.86E+00	2.90E+00	12	0

(I) Indicator Stations
(C) Control Station

TABLE A-8.1

GAMMA SPECTROMETRY OF SOIL

Results in pCi/kilogram

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
1	900508	K-40	2.00 E+04	6.93 E+02
		Cs-134	* 1.46 E+01	1.65 E+01
		Cs-137	2.99 E+02	3.17 E+01
		Ra-226	*-1.66 E+02	2.67 E+02
		Th-228	7.23 E+02	4.39 E+01
7	900508	K-40	1.78 E+04	5.44 E+02
		Cs-134	* 2.33 E+01	1.60 E+01
		Cs-137	4.93 E+02	3.25 E+01
		Ra-226	8.86 E+02	3.46 E+02
		Th-228	8.37 E+02	4.56 E+01
9A	900508	K-40	1.21 E+04	4.03 E+02
		Cs-134	* 2.75 E+01	1.39 E+01
		Cs-137	1.21 E+02	2.18 E+01
		Ra-226	1.32 E+03	3.19 E+02
		Th-228	6.39 E+02	2.62 E+01
21	900508	K-40	1.21 E+04	3.44 E+02
		Cs-134	* 1.82 E+01	1.09 E+01
		Cs-137	3.29 E+01	1.79 E+01
		Ra-226	6.15 E+02	2.37 E+02
		Th-228	5.53 E+02	2.81 E+01
23	900508	K-40	2.14 E+04	7.44 E+02
		Cs-134	* 1.39 E+01	1.77 E+01
		Cs-137	3.23 E+02	3.67 E+01
		Ra-226	* 1.41 E+02	2.92 E+02
		Th-228	7.85 E+02	4.75 E+01

* Denotes a result less than the detection limit.

TABLE A-8.2

GAMMA SPECTROMETRY OF SOIL - SUMMARY

Results in pCi/kilogram

NUCLIDE	AVERAGE	LOW	HIGH	NUMBER SAMPLES	NUMBER POSITIVE
K-40 (I)	1.78E+04	1.21E+04	2.14E+04	4	4
K-40 (C)	1.21E+04	1.21E+04	1.21E+04	1	1
Cs-134 (I)	1.75E+01	1.39E+01	2.33E+01	4	0
Cs-134 (C)	2.75E+01	2.75E+01	2.75E+01	1	0
Cs-137 (I)	2.87E+02	3.29E+01	4.93E+02	4	4
Cs-137 (C)	1.21E+02	1.21E+02	1.21E+02	1	1
Ra-226 (I)	3.69E+02	-1.66E+02	8.86E+02	4	2
Ra-226 (C)	1.32E+03	1.32E+03	1.32E+03	1	1
Th-228 (I)	7.25E+02	5.53E+02	8.37E+02	4	4
Th-228 (C)	6.39E+02	6.39E+02	6.39E+02	1	1

(I) Indicator Station
(C) Control Station

TABLE A-9.1

GAMMA SPECTROMETRY OF SEDIMENT

Results in pCi/kilogram

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
33 (Upstream)	900419	K-40	1.61 E+04	4.46 E+02
		Co-57	* 5.63 E+00	9.25 E+00
		Co-60	* 3.68 E+00	1.17 E+01
		Cs-134	* 3.26 E+01	1.20 E+01
		Cs-137	1.15 E+02	1.91 E+01
		Ra-226	1.05 E+03	2.76 E+02
		Eu-152	7.91 E+01	1.16 E+02
		Th-228	7.89 E+02	2.50 E+01
34 (Downstream)	900419	K-40	1.40 E+04	3.37 E+02
		Co-57	* 1.25 E+01	8.79 E+00
		Co-60	* 1.52 E+01	9.53 E+00
		Cs-134	* 6.79 E+01	1.05 E+01
		Cs-137	1.82 E+02	1.70 E+01
		Ra-226	1.38 E+03	2.48 E+02
		Eu-152	* 5.60 E+00	2.78 E+01
		Th-228	1.29 E+03	2.47 E+01
33 (Upstream)	901016	K-40	1.46 E+04	7.00 E+02
		Co-57	*-1.47 E+00	1.74 E+01
		Co-60	* 2.09 E+00	2.05 E+01
		Cs-134	* 8.59 E+01	2.31 E+01
		Cs-137	* 9.08 E+01	3.65 E+01
		Ra-226	1.75 E+03	5.61 E+02
		Eu-152	* 1.55 E+02	1.04 E+02
		Th-228	1.92 E+03	7.37 E+01
34 (Downstream)	901016	K-40	1.38 E+04	7.40 E+02
		Co-57	*-1.16 E+01	3.29 E+01
		Co-60	* 1.48 E+01	2.26 E+01
		Cs-134	* 8.08 E+01	2.84 E+01
		Cs-137	1.97 E+02	5.01 E+01
		Ra-226	1.95 E+03	7.90 E+02
		Eu-152	* 1.66 E+02	1.25 E+02
		Th-228	2.46 E+03	1.03 E+02

* Denotes a result less than the detection limit.

TABLE A-9.2

GAMMA SPECTROMETRY OF SEDIMENT - SUMMARY

Results in pCi/kilogram

NUCLIDE		AVERAGE	LOW	HIGH	NUMBER SAMPLES	NUMBER POSITIVE
K-40	(I)	1.39E+04	1.38E+04	1.40E+04	2	2
K-40	(C)	1.54E+04	1.46E+04	1.61E+04	2	2
Co-57	(I)	4.50E-01	-1.16E+01	1.25E+01	2	0
Co-57	(C)	2.08E+00	-1.47E+00	5.63E+00	2	0
Co-60	(I)	1.50E+01	1.48E+01	1.52E+01	2	0
Co-60	(C)	2.89E+00	2.09E+00	3.68E+00	2	0
Cs-134	(I)	7.44E+01	6.79E+01	8.08E+01	2	0
Cs-134	(C)	5.93E+01	3.26E+01	8.59E+01	2	0
Cs-137	(I)	1.90E+02	1.82E+02	1.97E+02	2	2
Cs-137	(C)	1.03E+02	9.08E+01	1.15E+02	2	2
Ra-226	(I)	1.67E+03	1.38E+03	1.95E+03	2	2
Ra-226	(C)	1.40E+03	1.05E+03	1.75E+03	2	2
Eu-152	(I)	8.58E+01	5.60E+00	1.66E+02	2	0
Eu-152	(C)	1.17E+02	7.91E+01	1.55E+02	2	1
Th-228	(I)	1.88E+03	1.29E+03	2.46E+03	2	2
Th-228	(C)	1.35E+03	7.89E+02	1.92E+03	2	2

(I) Indicator Station
(C) Control Station

TABLE A-10.1 (Cont.)

GAMMA SPECTROMETRY OF FISH

Results in pCi/kilogram

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
30 Sucker	900924	K-40	3.54 E+03	3.42 E+02
		Mn-54	*-7.35 E+00	1.15 E+01
		Co-58	* 4.54 E-01	1.37 E+01
		Fe-59	* 8.78 E+00	3.67 E+01
		Co-60	*-2.64 E+00	1.20 E+01
		Zn-65	*-3.83 E+00	2.83 E+01
		Cs-134	* 4.61 E+00	1.24 E+01
		Cs-137	3.04 E+01	1.72 E+01
		Ra-226	*-9.32 E+01	2.24 E+02
		Th-228	*-2.48 E+01	2.01 E+01
Carp	900924	K-40	2.55 E+03	2.58 E+02
		Mn-54	* 1.86 E+00	8.84 E+00
		Co-58	*-3.83 E-01	1.07 E+01
		Fe-59	*-2.11 E+00	2.81 E+01
		Co-60	* 0.00 E+00	8.35 E+00
		Zn-65	*-8.05 E-01	2.26 E+01
		Cs-134	* 0.00 E+00	9.43 E+00
		Cs-137	* 2.51 E+00	9.36 E+00
		Ra-226	*-5.35 E+01	1.87 E+02
		Th-228	*-1.85 E+01	1.60 E+01
Steelhead	901002	K-40	3.80 E+03	2.90 E+02
		Mn-54	* 7.87 E+00	1.16 E+01
		Co-58	* 2.75 E+00	1.30 E+01
		Fe-59	* 1.86 E+01	3.23 E+01
		Co-60	*-4.08 E+00	1.27 E+01
		Zn-65	*-2.81 E+01	2.74 E+01
		Cs-134	* 5.56 E+00	1.28 E+01
		Cs-137	* 1.12 E+01	1.28 E+01
		Ra-226	*-1.83 E+02	2.22 E+02
		Th-228	*-8.49 E+01	2.22 E+01
Whitefish	900924	K-40	3.82 E+03	3.26 E+02
		Mn-54	* 3.76 E+00	1.10 E+01
		Co-58	* 4.68 E+00	1.28 E+01
		Fe-59	* 6.49 E+00	3.39 E+01
		Co-60	* 6.99 E+00	1.21 E+01
		Zn-65	* 1.37 E+01	2.75 E+01
		Cs-134	* 7.06 E+00	1.10 E+01
		Cs-137	* 6.37 E+00	1.20 E+01
		Ra-226	* 1.92 E+02	2.42 E+02
		Th-228	* 2.61 E+01	2.01 E+01

* Denotes a result less than the detection limit.

TABLE A-10.1

GAMMA SPECTROMETRY OF FISH

Results in pCi/kilogram

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
30 Steelhead	900430	K-40	4.96 E+03	3.59 E+02
		Mn-54	*-1.50 E+00	1.15 E+01
		Co-58	*-8.22 E+00	1.19 E+01
		Fe-59	*-1.02 E+01	2.64 E+01
		Co-60	*-7.07 E+00	1.14 E+01
		Zn-65	* 3.83 E+00	2.62 E+01
		Cs-134	* 2.40 E+01	1.30 E+01
		Cs-137	* 3.85 E+00	1.22 E+01
		Ra-226	* 9.16 E+01	2.35 E+02
		Th-228	*-2.17 E+01	2.21 E+01
Whitefish	900430	K-40	4.44 E+03	2.82 E+02
		Mn-54	* 5.32 E+00	9.06 E+00
		Co-58	* 6.72 E+00	1.00 E+01
		Fe-59	* 4.35 E+00	2.43 E+01
		Co-60	* 1.92 E+00	1.01 E+01
		Zn-65	*-9.47 E+00	2.09 E+01
		Cs-134	* 1.31 E+01	1.02 E+01
		Cs-137	* 2.35 E+01	1.03 E+01
		Ra-226	*-3.32 E+01	2.10 E+02
		Th-228	* 1.99 E+01	1.78 E+01
Carp	900430	K-40	3.00 E+03	2.66 E+02
		Mn-54	*-5.39 E+00	9.09 E+00
		Co-58	* 7.01 E-01	1.02 E+01
		Fe-59	* 1.76 E+00	2.43 E+01
		Co-60	* 3.68 E+00	1.01 E+01
		Zn-65	*-4.05 E+00	2.13 E+01
		Cs-134	* 4.74 E+00	1.04 E+01
		Cs-137	* 1.89 E+01	1.12 E+01
		Ra-226	* 3.64 E+01	2.05 E+02
		Th-228	*-1.52 E+01	1.88 E+01
Sucker	900430	K-40	4.11 E+03	2.37 E+02
		Mn-54	* 3.18 E+00	1.05 E+01
		Co-58	*-5.61 E+00	1.14 E+01
		Fe-59	* 3.00 E+01	2.55 E+01
		Co-60	*-5.06 E+00	1.10 E+01
		Zn-65	*-3.00 E+01	2.60 E+01
		Cs-134	* 9.93 E-01	1.13 E+01
		Cs-137	* 2.47 E+01	1.19 E+01
		Ra-226	* 1.20 E+01	2.21 E+02
		Th-228	*-2.94 E+01	1.96 E+01

* Denotes a result less than the detection limit.

TABLE A-10.1 (Cont.)

GAMMA SPECTROMETRY OF FISH

Results in pCi/kilogram

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
38 Sucker	900504	K-40	4.80 E+03	2.67 E+02
		Mn-54	*-5.19 E+00	1.18 E+01
		Co-58	* 1.52 E+00	1.28 E+01
		Fe-59	* 1.46 E+01	2.87 E+01
		Co-60	*-1.24 E+01	1.24 E+01
		Zn-65	*-4.18 E+01	2.77 E+01
		Cs-134	* 6.39 E-01	1.28 E+01
		Cs-137	* 2.34 E+01	1.34 E+01
		Ra-226	* 1.09 E+01	2.52 E+02
		Th-228	*-7.42 E+00	2.25 E+01
Carp	900504	K-40	3.67 E+03	2.81 E+02
		Mn-54	* 3.12 E+00	9.21 E+00
		Co-58	* 2.04 E+00	1.05 E+01
		Fe-59	* 5.89 E+00	2.34 E+01
		Co-60	* 5.00 E+00	1.05 E+01
		Zn-65	*-1.35 E+01	2.20 E+01
		Cs-134	* 2.34 E+00	1.02 E+01
		Cs-137	* 1.17 E+01	1.12 E+01
		Ra-226	*-1.57 E+02	2.06 E+02
		Th-228	*-7.77 E+00	1.96 E+01
Salmon	900504	K-40	3.95 E+03	2.64 E+02
		Mn-54	* 2.12 E+00	8.53 E+00
		Co-58	*-3.34 E+00	8.45 E+00
		Fe-59	* 5.07 E+00	2.11 E+01
		Co-60	* 0.00 E+00	8.74 E+00
		Zn-65	*-4.20 E+00	1.98 E+01
		Cs-134	* 2.02 E+00	9.08 E+00
		Cs-137	* 1.89 E+01	9.10 E+00
		Ra-226	*-5.87 E+01	1.94 E+02
		Th-228	* 2.20 E+01	1.59 E+01
Bass	900504	K-40	7.71 E+03	4.72 E+02
		Mn-54	*-8.04 E-01	1.26 E+01
		Co-58	*-1.22 E+01	1.42 E+01
		Fe-59	* 1.85 E+01	3.37 E+01
		Co-60	* 1.48 E+01	1.53 E+01
		Zn-65	*-1.14 E+01	3.57 E+01
		Cs-134	* 3.01 E+00	1.33 E+01
		Cs-137	* 2.32 E+01	1.41 E+01
		Ra-226	*-1.80 E+02	2.81 E+02
		Th-228	* 1.87 E+01	2.38 E+01

* Denotes a result less than the detection limit.

TABLE A-10.1 (Cont.)

GAMMA SPECTROMETRY OF FISH

Results in pCi/kilogram

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
38 Bass	900925	K-40	3.65 E+03	2.93 E+02
		Mn-54	* 1.06 E+01	9.50 E+00
		Co-58	* 3.47 E+00	1.11 E+01
		Fe-59	*-8.48 E+00	2.94 E+01
		Co-60	* 8.00 E+00	1.03 E+01
		Zn-65	*-1.30 E+01	2.33 E+01
		Cs-134	* 7.51 E+00	9.73 E+00
		Cs-137	* 7.01 E+00	1.01 E+01
		Ra-226	*-4.41 E+01	2.05 E+02
		Th-228	* 1.91 E+01	1.73 E+01
Squawfish	900926	K-40	2.85 E+03	3.24 E+02
		Mn-54	* 1.04 E+01	1.35 E+01
		Co-58	* 1.91 E+00	1.56 E+01
		Fe-59	* 1.72 E+00	3.92 E+01
		Co-60	* 5.07 E+00	1.25 E+01
		Zn-65	*-2.79 E+01	3.29 E+01
		Cs-134	* 8.72 E+00	1.39 E+01
		Cs-137	* 2.41 E+01	1.47 E+01
		Ra-226	* 2.53 E+02	3.37 E+02
		Th-228	* 1.00 E+01	2.84 E+01
Steelhead	901003	K-40	3.19 E+03	2.93 E+02
		Mn-54	* 1.71 E+01	1.48 E+01
		Co-58	*-1.50 E+01	1.60 E+01
		Fe-59	*-9.81 E-01	4.13 E+01
		Co-60	* 1.20 E+01	1.50 E+01
		Zn-65	*-8.28 E+00	3.59 E+01
		Cs-134	* 9.90 E+00	1.55 E+01
		Cs-137	* 6.22 E+00	1.55 E+01
		Ra-226	*-3.61 E+01	2.58 E+02
		Th-228	*-2.04 E+01	2.27 E+01
Carp	900925	K-40	3.50 E+03	2.10 E+02
		Mn-54	* 1.86 E+00	6.84 E+00
		Co-58	*-6.52 E+00	8.62 E+00
		Fe-59	* 8.04 E+00	2.17 E+01
		Co-60	* 9.36 E-01	7.28 E+00
		Zn-65	*-2.42 E+01	1.62 E+01
		Cs-134	* 7.76 E+00	7.28 E+00
		Cs-137	* 5.95 E+00	7.30 E+00
		Ra-226	*-1.70 E+02	1.52 E+02
		Th-228	* 1.10 E+01	1.32 E+01

* Denotes a result less than the detection limit.

TABLE A-10.1 (Cont.)

GAMMA SPECTROMETRY OF FISH

Results in pCi/kilogram

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
38 Sucker	900925	K-40	3.88 E+03	2.41 E+02
		Mn-54	* 7.35 E+00	6.81 E+00
		Co-58	* 4.08 E+00	8.80 E+00
		Fe-59	*-5.90 E-01	2.27 E+01
		Co-60	*-2.24 E+00	6.92 E+00
		Zn-65	*-1.45 E+01	1.71 E+01
		Cs-134	* 3.39 E+00	7.25 E+00
		Cs-137	* 8.94 E+00	7.59 E+00
		Ra-226	*-6.69 E+01	1.52 E+02
		Th-228	* 2.14 E+01	1.32 E+01

* Denotes a result less than the detection limit.

TABLE A-10.2

GAMMA SPECTROMETRY OF FISH- SUMMARY

Results in pCi/kilogram

NUCLIDE		AVERAGE	LOW	HIGH	NUMBER SAMPLES	NUMBER POSITIVE
K-40	(I)	3.78E+03	2.55E+03	4.96E+03	8	8
K-40	(C)	4.13E+03	2.85E+03	7.71E+03	9	9
Co-60	(I)	-7.83E-01	-7.07E+00	6.99E+00	8	0
Co-60	(C)	3.46E+00	-1.24E+01	1.48E+01	9	0
Fe-59	(I)	7.21E+00	-1.02E+01	3.00E+01	8	0
Fe-59	(C)	4.86E+00	-8.48E+00	1.85E+01	9	0
Zn-65	(I)	-7.34E+00	-3.00E+01	1.37E+01	8	0
Zn-65	(C)	-1.76E+01	-4.18E+01	-4.20E+00	9	0
Co-58	(I)	1.37E-01	-8.22E+00	6.72E+00	8	0
Co-58	(C)	-2.67E+00	-1.50E+01	4.08E+00	9	0
Cs-134	(I)	7.51E+00	0.00E+00	2.40E+01	8	0
Cs-134	(C)	5.03E+00	6.39E-01	9.90E+00	9	0
Cs-137	(I)	1.53E+01	2.51E+00	3.14E+01	8	1
Cs-137	(C)	1.44E+01	5.95E+00	2.41E+01	9	0
Mn-54	(I)	9.69E-01	-7.35E+00	7.87E+00	8	0
Mn-54	(C)	5.17E+00	-5.19E+00	1.71E+01	9	0

(I) Indicator Stations
(C) Control Station

TABLE A-11.1

I-131 IN MILK

Results in pCi/liter

LOCATION	COLLECTION DATE	RESULT	OVERALL UNCERTAINTY
9B	900109	* 7.7 E-02	1.26 E-01
	900206	* 7.4 E-02	2.04 E-01
	900306	*-3.2 E-01	1.96 E-01
	900403	* 7.3 E-02	1.78 E-01
	900417	*-1.8 E-02	2.22 E-01
	900501	* 2.1 E-01	1.60 E-01
	900515	*-5.1 E-02	9.78 E-02
	900612	*-9.5 E-03	1.38 E-01
	900626	* 7.9 E-02	1.02 E-01
	900717	*-2.1 E-01	2.93 E-01
	900731	*-1.6 E-02	2.18 E-01
	900814	* 3.0 E-02	9.83 E-02
	900828	* 1.0 E-01	1.42 E-01
	900910	* 1.4 E-01	1.38 E-01
	900925	*-1.5 E-01	1.20 E-01
	901009	* 7.8 E-02	2.81 E-01
	901106	* 3.4 E-02	1.67 E-01
	901204	*-1.8 E-01	3.00 E-01
36	900109	* 1.8 E-02	1.27 E-01
	900206	*-2.5 E-01	2.19 E-01
	900306	* 6.9 E-03	9.49 E-02
	900403	*-4.2 E-02	8.96 E-02
	900417	*-7.0 E-02	1.36 E-01
	900501	* 1.1 E-01	1.00 E-01
	900515	* 1.1 E-01	1.18 E-01
	900612	*-4.7 E-02	1.13 E-01
	900626	*-9.7 E-02	3.30 E-01
	900717	*-1.8 E-01	2.42 E-01
	900731	*-2.3 E-01	3.10 E-01
	900814	*-6.2 E-02	1.09 E-01
	900828	* 3.2 E-01	2.19 E-01
	900910	* 9.5 E-02	1.28 E-01
	900925	*-1.9 E-01	1.06 E-01
	901009	*-3.0 E-02	1.86 E-01
	901106	* 3.9 E-01	2.70 E-01
	901204	* 2.0 E-01	2.74 E-01

* Denotes a result less than the detection limit.

TABLE A-11.1 (Cont.)

I-131 IN MILK

Results in pCi/liter

LOCATION	COLLECTION DATE	RESULT	OVERALL UNCERTAINTY
40	900109	* 1.0 E-02	1.13 E-01
	900206	* 3.5 E-02	1.59 E-01
	900306	* 1.2 E-01	1.70 E-01
	900403	* 1.4 E-01	1.43 E-01
	900417	*-5.8 E-02	1.68 E-01
	(a)		
59	900109	*-2.4 E-02	1.06 E-01
	900206	* 1.3 E-01	1.38 E-01
	900306	* 9.6 E-02	1.82 E-01
	900403	*-2.3 E-01	1.47 E-01
	900417	* 0.0 E+00	3.32 E-01
	900501	* 7.5 E-02	1.73 E-01
	900515	* 7.4 E-02	1.19 E-01
	900612	* 2.0 E-01	1.75 E-01
	900626	* 1.5 E-02	1.03 E-01
	900717	*-5.4 E-02	2.91 E-01
	900731	*-1.7 E-01	2.30 E-01
	900814	* 6.1 E-02	1.07 E-01
	900828	* 1.2 E-01	1.75 E-01
	900910	*-1.1 E-01	8.41 E-02
	900925	*-2.9 E-02	9.21 E-02
	901009	*-2.0 E-02	2.78 E-01
	901106	*-3.3 E-02	1.22 E-01
	901204	* 2.2 E-01	3.27 E-01

(a) Supplier suspended milk sampling; replaced by location 62.
* Denotes a result less than the detection limit.

TABLE A-11.1 (Cont.)

I-131 IN MILK

Results in pCi/liter

LOCATION	COLLECTION DATE	RESULT	OVERALL UNCERTAINTY
62 (a)	900515	*-6.8 E-02	1.33 E-01
	900612	* 7.3 E-03	1.40 E-01
	900626	* 1.2 E-01	2.34 E-01
	900717	*-1.8 E-01	3.13 E-01
	900731	*-1.8 E-01	1.60 E-01
	900814	*-1.8 E-01	1.72 E-01
	900828	*-5.2 E-02	2.54 E-01
	900910	*-2.0 E-01	9.32 E-02
	900925	*-4.5 E-02	1.07 E-01
	901009	*-9.0 E-02	3.22 E-01
	901106	* 8.3 E-02	1.57 E-01
	901204	*-7.4 E-02	2.22 E-01
63	900717	*-1.6 E-01	2.11 E-01
	900731	* 1.0 E-02	1.16 E-01
	900814	* 6.7 E-02	9.38 E-02
	900828	*-1.8 E-02	1.25 E-01
	900925	*-2.0 E-03	7.84 E-02
	901009	*-1.8 E-01	2.55 E-01
	901106	* 9.2 E-02	1.23 E-01
	901204	*-1.7 E-01	2.71 E-01
96	900109	*-1.3 E-02	1.81 E-01
	900206	*-7.2 E-02	1.46 E-01
	900306	* 1.0 E-01	1.80 E-01
	900403	* 9.1 E-02	1.52 E-01
	900417	*-6.2 E-02	1.90 E-01
	900501	* 8.9 E-02	1.32 E-01
	900515	* 9.1 E-02	9.90 E-02
	900612	* 5.9 E-02	9.15 E-02
	900626	* 1.5 E-01	1.35 E-01
	900717	* 4.8 E-02	2.13 E-01
	900731	*-9.0 E-03	1.61 E-01
	900814	* 6.1 E-03	1.32 E-01
	900828	*-1.3 E-01	1.59 E-01
	900910	*-9.3 E-02	1.12 E-01
	900925	* 1.4 E-01	1.00 E-01
	901009	* 4.9 E-01	3.60 E-01
	901106	* 2.4 E-02	1.97 E-01
	901204	*-7.2 E-02	2.22 E-01

(a) Station 62 replaces station 40; supplier suspended milk sampling.
* Denotes a result less than the detection limit.

TABLE A-11.2

IODINE IN MILK- SUMMARY

Results in pCi/liter

NUCLIDE		AVERAGE	LOW	HIGH	NUMBER SAMPLES	NUMBER POSITIVE
I-131	(I)	-8.2E-03	-3.2E-01	3.9E-01	79	0
I-131	(C)	4.7E-02	-1.3E-01	3.9E-01	18	0

(I) Indicator Stations
(C) Control Station

TABLE A-12.1

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
9B	900109	K-40	1.13 E+03	7.21 E+01
		Cs-134	*-5.51 E-01	2.25 E+00
		Cs-137	* 3.84 E+00	2.35 E+00
		Ba-140	*-3.51 E+00	7.40 E+00
		La-140	* 0.00 E+00	2.99 E+00
	900206	K-40	1.33 E+03	7.57 E+01
		Cs-134	*-3.52 E-01	2.21 E+00
		Cs-137	* 2.60 E+00	2.34 E+00
		Ba-140	*-1.63 E+00	8.20 E+00
		La-140	*-2.22 E+00	3.36 E+00
	900306	K-40	1.29 E+03	7.71 E+01
		Cs-134	*-8.95 E-01	2.31 E+00
		Cs-137	* 5.91 E-01	2.31 E+00
		Ba-140	*-1.55 E+00	7.79 E+00
		La-140	*-1.41 E+00	3.13 E+00
	900403	K-40	1.22 E+03	7.38 E+01
		Cs-134	* 3.03 E+00	2.36 E+00
		Cs-137	* 3.92 E+00	2.44 E+00
		Ba-140	*-2.23 E+00	7.19 E+00
		La-140	*-1.82 E+00	2.71 E+00
	900417	K-40	1.31 E+03	7.99 E+01
		Cs-134	* 1.54 E+00	2.33 E+00
		Cs-137	* 2.69 E-01	2.38 E+00
		Ba-140	*-3.76 E+00	8.64 E+00
		La-140	*-3.55 E+00	3.50 E+00
	900501	K-40	9.97 E+02	6.95 E+01
		Cs-134	*-1.19 E+00	2.95 E+00
		Cs-137	* 2.90 E+00	3.07 E+00
		Ba-140	*-7.09 E+00	1.02 E+01
		La-140	*-1.46 E+00	4.19 E+00
	900515	K-40	1.20 E+03	7.56 E+01
		Cs-134	*-9.67 E-01	2.27 E+00
		Cs-137	* 6.61 E-01	2.28 E+00
		Ba-140	* 7.39 E+00	7.23 E+00
		La-140	*-1.36 E+00	3.31 E+00

* Denotes a result less than the detection limit.

TABLE A-12.1 (Cont.)

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
9B	900612	K-40	1.06 E+03	7.25 E+01
		Cs-134	* 1.48 E+00	2.36 E+00
		Cs-137	* 3.13 E+00	2.36 E+00
		Ba-140	* 6.45 E+00	8.41 E+00
		La-140	* 5.84 E-01	3.54 E+00
	900626	K-40	1.25 E+03	7.71 E+01
		Cs-134	* 4.22 E-01	2.39 E+00
		Cs-137	* 1.66 E+00	2.31 E+00
		Ba-140	*-2.87 E+00	7.94 E+00
		La-140	*-1.45 E+00	3.44 E+00
	900717	K-40	1.21 E+03	7.90 E+01
		Cs-134	* 3.09 E-01	2.41 E+00
		Cs-137	* 3.03 E+00	2.56 E+00
		Ba-140	* 0.00 E+00	9.09 E+00
		La-140	*-6.60 E-01	3.65 E+00
	900731	K-40	1.22 E+03	7.92 E+01
		Cs-134	* 1.16 E+00	2.35 E+00
		Cs-137	* 5.40 E-01	2.39 E+00
		Ba-140	* 4.63 E+00	8.57 E+00
		La-140	* 2.91 E+00	3.65 E+00
	900814	K-40	1.30 E+03	8.54 E+01
		Cs-134	*-1.68 E+00	2.39 E+00
		Cs-137	* 5.14 E-01	2.34 E+00
		Ba-140	* 3.68 E+00	7.56 E+00
		La-140	* 4.06 E-01	3.13 E+00
	900828	K-40	1.29 E+03	9.22 E+01
		Cs-134	*-4.13 E-01	2.51 E+00
		Cs-137	* 1.58 E+00	2.48 E+00
		Ba-140	* 6.76 E+00	9.29 E+00
		La-140	* 2.60 E+00	4.25 E+00
	900910	K-40	1.19 E+03	8.31 E+01
		Cs-134	*-7.65 E-01	2.33 E+00
		Cs-137	* 1.47 E+00	2.40 E+00
		Ba-140	*-4.42 E+00	1.02 E+01
		La-140	* 1.58 E+00	3.95 E+00

* Denotes a result less than the detection limit.

TABLE A-12.1 (Cont.)

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
9B	900925	K-40	1.06 E+03	7.91 E+01
		Cs-134	*-1.80 E+00	2.35 E+00
		Cs-137	* 0.00 E+00	2.36 E+00
		Ba-140	*-2.03 E+00	8.68 E+00
		La-140	*-1.87 E+00	3.66 E+00
	901009	K-40	1.19 E+03	7.34 E+01
		Cs-134	*-6.34 E-01	2.08 E+00
		Cs-137	* 1.22 E-01	1.99 E+00
		Ba-140	*-5.33 E+00	8.43 E+00
		La-140	*-1.72 E+00	3.66 E+00
	901106	K-40	1.26 E+03	6.90 E+01
		Cs-134	* 1.84 E+00	2,21 E+00
		Cs-137	*-1.38 E+00	2.45 E+00
		Ba-140	*-1.69 E+00	1.07 E+01
		La-140	*-1.14 E+00	4.46 E+00
	901204	K-40	1.30 E+03	7.67 E+01
		Cs-134	* 1.29 E+00	2.30 E+00
		Cs-137	* 2.13 E+00	2.25 E+00
		Ba-140	*-1.65 E+00	8.44 E+00
		La-140	*-1.52 E+00	3.55 E+00

* Denotes a result less than the detection limit.

TABLE A-12.1 (Cont.)

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
36	900109	K-40	1.19 E+03	7.72 E+01
		Cs-134	* 6.90 E-01	2.37 E+00
		Cs-137	* 1.21 E+00	2.43 E+00
		Ba-140	* 1.19 E+00	7.78 E+00
		La-140	* 2.01 E+00	2.99 E+00
	900206	K-40	1.41 E+03	8.62 E+01
		Cs-134	* 1.96 E+00	2.53 E+00
		Cs-137	* 6.01 E-01	2.47 E+00
		Ba-140	* 3.72 E+00	8.93 E+00
		La-140	* 2.46 E+00	3.74 E+00
	900306	K-40	1.26 E+03	6.95 E+01
		Cs-134	* 1.23 E+00	2.04 E+00
		Cs-137	* 7.73 E-01	2.09 E+00
		Ba-140	* 1.69 E+00	6.13 E+00
		La-140	*-7.18 E-01	2.54 E+00
	900403	K-40	1.25 E+03	8.01 E+01
		Cs-134	* 1.08 E+00	2.21 E+00
		Cs-137	*-3.34 E-01	2.19 E+00
		Ba-140	* 4.50 E+00	6.94 E+00
		La-140	*-4.16 E+00	3.00 E+00
	900417	K-40	1.30 E+03	7.83 E+01
		Cs-134	* 7.32 E-02	2.16 E+00
		Cs-137	* 7.71 E-01	2.33 E+00
		Ba-140	*-1.21 E+00	7.84 E+00
		La-140	* 3.65 E-01	3.50 E+00
	900501	K-40	1.37 E+03	7.90 E+01
		Cs-134	* 2.66 E+00	2.23 E+00
		Cs-137	* 2.76 E+00	2.30 E+00
		Ba-140	*-1.91 E+00	7.50 E+00
		La-140	* 1.23 E+00	3.23 E+00
	900515	K-40	1.27 E+03	8.00 E+01
		Cs-134	* 2.37 E-01	2.16 E+00
		Cs-137	* 2.54 E+00	2.19 E+00
		Ba-140	* 1.61 E+00	7.05 E+00
		La-140	*-9.71 E-01	2.95 E+00

* Denotes a result less than the detection limit.

TABLE A-12.1 (Cont.)

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
36	900612	K-40	1.19 E+03	8.18 E+01
		Cs-134	* 1.62 E+00	2.25 E+00
		Cs-137	*-2.81 E-01	2.27 E+00
		Ba-140	* 4.16 E+00	7.80 E+00
		La-140	*-4.47 E-01	3.35 E+00
	900626	K-40	1.35 E+03	8.48 E+01
		Cs-134	* 1.42 E+00	2.28 E+00
		Cs-137	* 3.54 E+00	2.29 E+00
		Ba-140	* 2.65 E+00	7.61 E+00
		La-140	*-1.60 E+00	3.33 E+00
	900717	K-40	1.39 E+03	7.77 E+01
		Cs-134	* 8.11 E-01	2.31 E+00
		Cs-137	*-7.46 E-01	2.30 E+00
		Ba-140	*-5.65 E+00	8.89 E+00
		La-140	*-1.17 E+00	3.72 E+00
	900731	K-40	1.38 E+03	7.91 E+01
		Cs-134	* 1.43 E+00	2.43 E+00
		Cs-137	* 7.95 E-01	2.35 E+00
		Ba-140	*-4.51 E+00	7.94 E+00
		La-140	*-1.07 E+00	3.11 E+00
	900814	K-40	1.30 E+03	8.62 E+01
		Cs-134	* 7.61 E-02	2.39 E+00
		Cs-137	* 1.61 E+00	2.47 E+00
		Ba-140	*-3.37 E+00	7.83 E+00
		La-140	*-1.26 E+00	3.09 E+00
	900828	K-40	1.35 E+03	7.99 E+01
		Cs-134	*-5.07 E-01	2.37 E+00
		Cs-137	* 1.88 E+00	2.41 E+00
		Ba-140	* 4.80 E+00	9.21 E+00
		La-140	*-2.11 E+00	4.00 E+00
	900910	K-40	1.12 E+03	7.21 E+01
		Cs-134	*-3.97 E-01	2.19 E+00
		Cs-137	* 2.24 E+00	2.29 E+00
		Ba-140	* 9.89 E+00	8.52 E+00
		La-140	* 0.00 E+00	3.47 E+00

* Denotes a result less than the detection limit.

TABLE A-12.1 (Cont.)

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
36	900925	K-40	1.22 E+03	8.02 E+01
		Cs-134	* 8.64 E-01	2.47 E+00
		Cs-137	* 6.78 E+00	2.82 E+00
		Ba-140	*-7.87 E+00	8.39 E+00
		La-140	* 1.21 E+00	3.63 E+00
	901009	K-40	1.23 E+03	7.82 E+01
		Cs-134	* 1.34 E+00	2.29 E+00
		Cs-137	* 1.58 E+00	2.22 E+00
		Ba-140	*-4.06 E+00	8.29 E+00
		La-140	*-2.24 E-01	3.33 E+00
	901106	K-40	1.33 E+03	7.92 E+01
		Cs-134	* 2.11 E+00	2.25 E+00
		Cs-137	*-8.68 E-01	2.33 E+00
		Ba-140	*-7.06 E+00	1.08 E+01
		La-140	*-1.46 E+00	4.20 E+00
	901204	K-40	1.30 E+03	7.57 E+01
		Cs-134	* 7.07 E-01	2.24 E+00
		Cs-137	* 2.91 E+00	2.29 E+00
		Ba-140	*-1.29 E+00	8.97 E+00
		La-140	* 1.78 E+00	4.04 E+00

* Denotes a result less than the detection limit.

TABLE A-12.1 (Cont.)

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
40	900109	K-40	1.17 E+03	7.93 E+01
		Cs-134	* 3.67 E-01	3.30 E+00
		Cs-137	* 0.00 E+00	3.38 E+00
		Ba-140	* 3.04 E+00	1.15 E+01
		La-140	*-1.76 E-01	4.07 E+00
	900206	K-40	1.16 E+03	6.97 E+01
		Cs-134	* 1.90 E+00	2.92 E+00
		Cs-137	* 2.90 E+00	3.04 E+00
		Ba-140	* 6.44 E+00	1.09 E+01
		La-140	*-4.45 E+00	4.31 E+00
	900306	K-40	1.20 E+03	6.66 E+01
		Cs-134	*-1.20 E-01	1.85 E+00
		Cs-137	* 2.15 E+00	1.84 E+00
		Ba-140	* 3.54 E+00	5.30 E+00
		La-140	* 3.80 E-01	2.39 E+00
	900403	K-40	1.14 E+03	7.68 E+01
		Cs-134	* 0.00 E+00	2.35 E+00
		Cs-137	* 2.01 E+00	2.47 E+00
		Ba-140	*-3.16 E+00	7.76 E+00
		La-140	* 1.87 E-01	3.35 E+00
	900417	K-40	1.01 E+03	8.15 E+01
		Cs-134	*-1.33 E+00	2.50 E+00
		Cs-137	* 7.81 E-01	2.39 E+00
		Ba-140	* 9.77 E-01	8.60 E+00
		La-140	* 1.32 E+00	3.71 E+00
	900501 (a)			

(a) Supplier suspended milk program.
* Denotes a result less than the detection limit.

TABLE A-12.1 (Cont.)

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
59	900109	K-40	1.31 E+03	7.25 E+01
		Cs-134	* 1.43 E+00	2.78 E+00
		Cs-137	* 4.13 E+00	2.86 E+00
		Ba-140	*-2.78 E+00	9.28 E+00
		La-140	*-1.41 E-01	3.50 E+00
	900206	K-40	1.23 E+03	7.31 E+01
		Cs-134	*-1.36 E-01	2.16 E+00
		Cs-137	* 2.69 E+00	2.20 E+00
		Ba-140	*-3.93 E+00	7.83 E+00
		La-140	* 3.61 E-01	3.23 E+00
	900306	K-40	1.41 E+03	7.44 E+01
		Cs-134	* 2.34 E+00	2.29 E+00
		Cs-137	* 7.90 E-01	2.19 E+00
		Ba-140	*-5.29 E-01	6.10 E+00
		La-140	* 1.37 E+00	2.43 E+00
	900403	K-40	1.37 E+03	7.88 E+01
		Cs-134	*-7.29 E-02	2.47 E+00
		Cs-137	* 2.95 E+00	2.36 E+00
		Ba-140	*-2.28 E+00	7.60 E+00
		La-140	*-1.21 E+00	2.96 E+00
	900417	K-40	1.40 E+03	7.63 E+01
		Cs-134	* 4.17 E-01	2.15 E+00
		Cs-137	* 1.16 E+00	2.18 E+00
		Ba-140	* 3.61 E+00	7.65 E+00
		La-140	*-5.24 E-01	3.34 E+00
	900501	K-40	1.20 E+03	7.79 E+01
		Cs-134	* 7.90 E-01	2.25 E+00
		Cs-137	* 9.67 E-01	2.28 E+00
		Ba-140	*-1.93 E+00	7.52 E+00
		La-140	* 1.41 E+00	3.03 E+00
	900515	K-40	1.33 E+03	7.98 E+01
		Cs-134	* 2.24 E-01	2.39 E+00
		Cs-137	* 1.84 E+00	2.44 E+00
		Ba-140	*-9.72 E-01	7.98 E+00
		La-140	*-1.59 E+00	3.14 E+00

* Denotes a result less than the detection limit.

TABLE A-12.1 (Cont.)

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
59	900612	K-40	1.32 E+03	8.06 E+01
		Cs-134	* 6.12 E-01	2.35 E+00
		Cs-137	* 1.95 E+00	2.33 E+00
		Ba-140	*-2.91 E+00	8.62 E+00
		La-140	*-4.07 E-01	3.78 E+00
	900626	K-40	1.35 E+03	7.77 E+01
		Cs-134	* 1.37 E-01	2.25 E+00
		Cs-137	* 1.26 E+00	2.34 E+00
		Ba-140	* 7.51 E-01	8.21 E+00
		La-140	* 1.38 E+00	3.38 E+00
	900717	K-40	1.64 E+03	8.44 E+01
		Cs-134	* 1.05 E+00	2.49 E+00
		Cs-137	* 8.56 E-01	2.49 E+00
		Ba-140	*-1.12 E+01	9.38 E+00
		La-140	* 3.79 E+00	3.90 E+00
	900731	K-40	1.43 E+03	8.95 E+01
		Cs-134	* 2.74 E+00	2.65 E+00
		Cs-137	* 1.61 E-01	2.49 E+00
		Ba-140	* 9.55 E-01	8.45 E+00
		La-140	* 0.00 E+00	3.40 E+00
	900814	K-40	1.42 E+03	9.29 E+01
		Cs-134	*-3.28 E+00	2.57 E+00
		Cs-137	* 3.01 E+00	2.52 E+00
		Ba-140	*-5.55 E+00	8.36 E+00
		La-140	*-2.17 E-01	3.50 E+00
	900828	K-40	1.38 E+03	8.71 E+01
		Cs-134	* 1.61 E+00	2.60 E+00
		Cs-137	* 3.38 E+00	2.80 E+00
		Ba-140	* 4.45 E+00	9.99 E+00
		La-140	*-2.96 E+00	3.69 E+00
	900910	K-40	1.42 E+03	8.13 E+01
		Cs-134	* 5.90 E-01	2.47 E+00
		Cs-137	* 2.00 E+00	2.36 E+00
		Ba-140	*-4.48 E-01	9.57 E+00
		La-140	* 2.47 E+00	3.82 E+00

* Denotes a result less than the detection limit.

TABLE A-12.1 (Cont.)

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
59	900925	K-40	1.33 E+03	9.08 E+01
		Cs-134	*-2.18 E+00	3.20 E+00
		Cs-137	*-2.50 E+00	3.33 E+00
		Ba-140	* 4.51 E+00	1.10 E+01
		La-140	* 1.23 E+00	4.82 E+00
	901009	K-40	1.31 E+03	7.40 E+01
		Cs-134	* 7.40 E-01	2.25 E+00
		Cs-137	* 8.56 E-01	2.21 E+00
		Ba-140	*-8.17 E+00	8.92 E+00
		La-140	*-1.31 E+00	3.96 E+00
	901106	K-40	1.42 E+03	8.41 E+01
		Cs-134	*-4.67 E-01	2.36 E+00
		Cs-137	* 2.36 E+00	2.33 E+00
		Ba-140	*-7.49 E+00	1.07 E+01
		La-140	*-4.17 E+00	4.56 E+00
	901204	K-40	1.32 E+03	8.50 E+01
		Cs-134	*-7.26 E-01	2.36 E+00
		Cs-137	*-5.64 E-01	2.22 E+00
		Ba-140	* 2.55 E+00	8.76 E+00
		La-140	* 4.12 E+00	3.98 E+00

* Denotes a result less than the detection limit.

TABLE A-12.1 (Cont.)

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
62 (a)	900515	K-40	1.28 E+03	8.07 E+01
		Cs-134	* 2.05 E+00	2.49 E+00
		Cs-137	*-4.82 E-01	2.42 E+00
		Ba-140	*-4.05 E-01	8.19 E+00
		La-140	* 5.75 E-01	3.52 E+00
	900612	K-40	1.23 E+03	8.05 E+01
		Cs-134	* 9.69 E-01	2.44 E+00
		Cs-137	*-7.04 E-02	2.45 E+00
		Ba-140	* 5.54 E+00	9.37 E+00
		La-140	* 2.18 E-01	3.88 E+00
	900626	K-40	1.20 E+03	7.89 E+01
		Cs-134	* 2.81 E-01	1.96 E+00
		Cs-137	* 5.51 E-01	2.16 E+00
		Ba-140	* 2.27 E+00	6.98 E+00
		La-140	*-9.16 E-01	3.38 E+00
	900717	K-40	1.32 E+03	8.34 E+01
		Cs-134	* 1.70 E+00	2.18 E+00
		Cs-137	* 3.02 E+00	2.16 E+00
		Ba-140	* 1.38 E+00	7.74 E+00
		La-140	* 0.00 E+00	3.38 E+00
	900731	K-40	1.29 E+03	7.80 E+01
		Cs-134	*-3.21 E+00	2.29 E+00
		Cs-137	* 1.69 E+00	2.35 E+00
		Ba-140	* 3.53 E+00	7.71 E+00
		La-140	*-2.34 E+00	3.50 E+00
	900814	K-40	1.42 E+03	8.00 E+01
		Cs-134	* 2.23 E-01	2.16 E+00
		Cs-137	* 4.70 E+00	2.37 E+00
		Ba-140	*-3.86 E-01	7.72 E+00
		La-140	*-2.84 E+00	3.22 E+00

(a) New station added to replace discontinued station 40.
* Denotes a result less than the detection limit.

TABLE A-12.1 (Cont.)

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
62	900828	K-40	1.28 E+03	8.42 E+01
		Cs-134	* 0.00 E+00	2.37 E+00
		Cs-137	* 3.44 E+00	2.38 E+00
		Ba-140	*-1.50 E+00	8.93 E+00
		La-140	* 2.41 E+00	3.91 E+00
	900910	K-40	1.24 E+03	7.74 E+01
		Cs-134	* 9.63 E-01	2.18 E+00
		Cs-137	* 1.25 E+00	2.31 E+00
		Ba-140	* 4.34 E-01	9.03 E+00
		La-140	* 6.28 E-01	4.28 E+00
	900925	K-40	1.29 E+03	7.91 E+01
		Cs-134	*-1.55 E+00	2.33 E+00
		Cs-137	* 2.02 E+00	2.36 E+00
		Ba-140	*-3.99 E+00	8.21 E+00
		La-140	*-2.70 E+00	3.74 E+00
	901009	K-40	1.44 E+03	8.42 E+01
		Cs-134	* 6.89 E-01	2.19 E+00
		Cs-137	* 4.17 E+00	2.37 E+00
		Ba-140	*-2.99 E-01	1.09 E+01
		La-140	*-2.89 E+00	5.05 E+00
	901106	K-40	1.23 E+03	8.63 E+01
		Cs-134	* 2.34 E-01	2.43 E+00
		Cs-137	* 1.49 E+00	2.50 E+00
		Ba-140	*-5.52 E+00	1.17 E+01
		La-140	*-2.74 E+00	4.75 E+00
	901204	K-40	1.24 E+03	8.06 E+01
		Cs-134	* 0.00 E+00	2.31 E+00
		Cs-137	* 2.37 E+00	2.38 E+00
		Ba-140	*-1.19 E+01	1.35 E+01
		La-140	* 2.44 E+00	5.68 E+00

* Denotes a result less than the detection limit.

TABLE A-12.1 (Cont.)

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
63	900717	K-40	1.24 E+03	8.26 E+01
		Cs-134	*-3.01 E+00	2.42 E+00
		Cs-137	* 2.34 E+00	2.51 E+00
		Ba-140	*-1.63 E+00	9.87 E+00
		La-140	* 0.00 E+00	3.97 E+00
	900731	K-40	1.32 E+03	8.17 E+01
		Cs-134	*-1.49 E-01	2.38 E+00
		Cs-137	* 1.70 E+00	2.24 E+00
		Ba-140	*-3.25 E+00	8.34 E+00
		La-140	* 1.18 E+00	3.59 E+00
	900814	K-40	1.09 E+03	7.73 E+01
		Cs-134	*-3.83 E-01	2.31 E+00
		Cs-137	* 2.08 E+00	2.29 E+00
		Ba-140	* 2.57 E+00	8.98 E+00
		La-140	* 2.13 E-01	3.46 E+00
	900828	K-40	1.31 E+03	8.53 E+01
		Cs-134	* 5.70 E-01	2.65 E+00
		Cs-137	* 3.25 E-01	2.51 E+00
		Ba-140	*-2.06 E+00	1.03 E+01
		La-140	* 5.29 E-01	4.52 E+00
	900910 (a)			
	900925	K-40	1.29 E+03	9.10 E+01
		Cs-134	* 3.20 E-01	2.60 E+00
		Cs-137	* 2.30 E+00	2.51 E+00
		Ba-140	* 1.45 E+00	9.44 E+00
		La-140	*-1.14 E+00	4.05 E+00
	901009	K-40	1.18 E+03	7.80 E+01
		Cs-134	* 1.68 E+00	2.31 E+00
		Cs-137	* 5.29 E-01	2.22 E+00
		Ba-140	*-5.41 E+00	8.91 E+00
		La-140	* 2.75 E+00	3.63 E+00

(a) Milk sample not available.
* Denotes a result less than the detection limit.

TABLE A-12.1 (Cont.)

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
63	901106	K-40	1.07 E+03	6.84 E+01
		Cs-134	* 9.84 E-01	2.31 E+00
		Cs-137	* 1.90 E+00	2.27 E+00
		Ba-140	* 3.18 E+00	1.10 E+01
		La-140	*-3.16 E+00	4.29 E+00
	901204	K-40	9.34 E+02	7.36 E+01
		Cs-134	* 2.25 E+00	2.64 E+00
		Cs-137	* 7.90 E-01	2.56 E+00
		Ba-140	* 1.65 E+00	9.25 E+00
		La-140	*-9.93 E-01	3.80 E+00

* Denotes a result less than the detection limit.

TABLE A-12.1 (Cont.)

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
96	900109	K-40	1.44 E+03	9.17 E+01
		Cs-134	* 3.15 E-01	2.37 E+00
		Cs-137	* 2.67 E+00	2.28 E+00
		Ba-140	* 2.00 E+00	7.15 E+00
		La-140	* 2.52 E+00	3.07 E+00
	900206	K-40	1.35 E+03	7.65 E+01
		Cs-134	*-7.44 E-01	2.23 E+00
		Cs-137	* 2.41 E+00	2.25 E+00
		Ba-140	*-2.02 E-01	8.65 E+00
		La-140	* 9.76 E-01	3.88 E+00
	900306	K-40	1.44 E+03	7.37 E+01
		Cs-134	* 6.92 E-01	2.09 E+00
		Cs-137	*-1.52 E-01	2.03 E+00
		Ba-140	*-1.54 E+00	5.82 E+00
		La-140	* 1.17 E-01	2.15 E+00
	900403	K-40	1.27 E+03	8.29 E+01
		Cs-134	* 3.54 E-01	2.57 E+00
		Cs-137	* 7.01 E-01	2.54 E+00
		Ba-140	*-6.93 E+00	8.17 E+00
		La-140	* 2.08 E+00	3.57 E+00
	900417	K-40	1.30 E+03	8.00 E+01
		Cs-134	*-4.71 E-01	2.22 E+00
		Cs-137	* 1.72 E+00	2.17 E+00
		Ba-140	* 1.49 E+00	7.86 E+00
		La-140	*-1.20 E+00	3.25 E+00
	900501	K-40	1.22 E+03	7.41 E+01
		Cs-134	*-2.97 E+00	2.18 E+00
		Cs-137	* 2.90 E-01	2.28 E+00
		Ba-140	*-1.09 E+00	7.27 E+00
		La-140	*-3.92 E+00	3.55 E+00
	900515	K-40	1.26 E+03	8.61 E+01
		Cs-134	* 9.95 E-01	2.54 E+00
		Cs-137	*-1.12 E+00	2.50 E+00
		Ba-140	* 2.36 E-01	8.14 E+00
		La-140	*-8.51 E-01	3.53 E+00

* Denotes a result less than the detection limit.

TABLE A-12.1 (Cont.)

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
96	900612	K-40	1.32 E+03	8.48 E+01
		Cs-134	*-1.85 E-01	2.80 E+00
		Cs-137	* 1.30 E+00	2.51 E+00
		Ba-140	*-1.63 E+00	9.31 E+00
		La-140	* 2.44 E-01	3.68 E+00
	900626	K-40	1.17 E+03	8.13 E+01
		Cs-134	* 7.28 E-01	2.44 E+00
		Cs-137	* 1.42 E-01	2.42 E+00
		Ba-140	*-2.24 E+00	8.16 E+00
		La-140	*-4.02 E-01	3.66 E+00
	900717	K-40	1.42 E+03	8.20 E+01
		Cs-134	* 7.31 E-02	2.32 E+00
		Cs-137	* 2.37 E+00	2.51 E+00
		Ba-140	*-4.69 E+00	8.86 E+00
		La-140	*-1.22 E+00	3.77 E+00
	900731	K-40	1.36 E+03	8.52 E+01
		Cs-134	* 2.37 E+00	2.31 E+00
		Cs-137	* 1.31 E+00	2.08 E+00
		Ba-140	*-2.55 E+00	7.82 E+00
		La-140	*-4.11 E-01	3.35 E+00
	900814	K-40	1.38 E+03	9.45 E+01
		Cs-134	*-2.54 E+00	2.70 E+00
		Cs-137	* 1.74 E+00	2.58 E+00
		Ba-140	* 4.12 E+00	9.60 E+00
		La-140	* 1.73 E+00	3.73 E+00
	900828	K-40	1.30 E+03	8.26 E+01
		Cs-134	* 1.49 E+00	2.45 E+00
		Cs-137	*-2.06 E-01	2.43 E+00
		Ba-140	*-2.89 E+00	9.84 E+00
		La-140	*-1.97 E+00	3.89 E+00
	900910	K-40	1.34 E+03	8.15 E+01
		Cs-134	* 9.43 E-01	2.34 E+00
		Cs-137	* 3.95 E+00	2.31 E+00
		Ba-140	*-1.98 E+00	9.02 E+00
		La-140	* 1.68 E+00	4.09 E+00

* Denotes a result less than the detection limit.

TABLE A-12.1 (Cont.)

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
96	900925	K-40	1.33 E+03	8.65 E+01
		Cs-134	* 8.00 E-02	2.21 E+00
		Cs-137	* 5.56 E-01	2.38 E+00
		Ba-140	*-3.11 E+00	8.65 E+00
		La-140	* 4.62 E-01	3.64 E+00
	901009	K-40	1.31 E+03	7.86 E+01
		Cs-134	* 5.64 E-01	2.21 E+00
		Cs-137	* 6.75 E-01	2.38 E+00
		Ba-140	*-6.05 E+00	9.75 E+00
		La-140	*-8.47 E-01	4.37 E+00
	901106	K-40	1.43 E+03	7.13 E+01
		Cs-134	*-3.33 E+00	2.96 E+00
		Cs-137	* 7.05 E-01	3.04 E+00
		Ba-140	* 4.26 E-01	1.47 E+01
		La-140	*-6.19 E+00	5.27 E+00
	901204	K-40	1.47 E+03	8.27 E+01
		Cs-134	* 8.28 E-01	2.33 E+00
		Cs-137	*-1.32 E+00	2.37 E+00
		Ba-140	*-1.53 E+00	1.13 E+01
		La-140	* 7.39 E-01	4.90 E+00

* Denotes a result less than the detection limit.

TABLE A-12.2

GAMMA SPECTROMETRY OF MILK - SUMMARY

Results in pCi/liter

NUCLIDE		AVERAGE	LOW	HIGH	NUMBER SAMPLES	NUMBER POSITIVE
K-40	(I)	1.27E+03	9.34E+02	1.64E+03	79	79
K-40	(C)	1.34E+03	1.17E+03	1.47E+03	18	18
Cs-134	(I)	3.86E-01	-3.28E+00	3.03E+00	79	0
Cs-134	(C)	-4.49E-02	-3.33E+00	2.37E+00	18	0
Cs-137	(I)	1.60E+00	-2.50E+00	6.78E+00	79	0
Cs-137	(C)	9.86E-01	-1.32E+00	3.95E+00	18	0
Ba-140	(I)	-5.88E-01	-1.19E+01	9.89E+00	79	0
Ba-140	(C)	-1.56E+00	-6.93E+00	4.12E+00	18	0
La-140	(I)	-3.31E-01	-4.45E+00	4.12E+00	79	0
La-140	(C)	-3.59E-01	-6.19E+00	2.52E+00	18	0

(I) Indicator Stations
(C) Control Station

TABLE A-13.1

GAMMA SPECTROMETRY OF ROOT

Results in pCi/kilogram (wet)

LOCATION	COLLECTION DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
9B Onion	900626	Cs-134	*-1.96 E+00	7.48 E+00
		Cs-137	* 2.55 E+00	7.54 E+00
		I-131	*-5.94 E+00	1.29 E+01
9B Potatoes	900718	Cs-134	*-9.10 E-01	4.20 E+00
		Cs-137	* 3.10 E+00	4.10 E+00
		I-131	*-3.01 E+00	8.68 E+00
9B Potatoes	900814	Cs-134	*-2.52 E-01	6.15 E+00
		Cs-137	* 2.64 E+00	6.06 E+00
		I-131	*-1.29 E+01	1.95 E+01
9B Onion	900910	Cs-134	* 8.73 E+00	7.56 E+00
		Cs-137	* 8.69 E+00	7.87 E+00
		I-131	* 1.39 E+01	1.45 E+01
37 Onion	900626	Cs-134	*-1.20 E+01	6.42 E+00
		Cs-137	* 7.13 E+00	6.61 E+00
		I-131	*-4.19 E+00	1.11 E+01
37 Potatoes	900718	Cs-134	*-9.88 E+00	7.19 E+00
		Cs-137	* 2.91 E+00	7.13 E+00
		I-131	*-3.37 E+00	1.40 E+01
37 Carrots	900814	Cs-134	* 5.47 E+00	5.43 E+00
		Cs-137	* 3.16 E+00	5.55 E+00
		I-131	*-9.35 E+00	1.53 E+01
37 Onion	900910	Cs-134	* 4.45 E+00	6.01 E+00
		Cs-137	* 3.33 E+00	5.89 E+00
		I-131	*-9.15 E+00	1.19 E+01

* Denotes a result less than the detection limit.

TABLE A-13.2

GAMMA SPECTROMETRY OF ROOT - SUMMARY

Results in pCi/kilogram (wet)

NUCLIDE	AVERAGE	LOW	HIGH	NUMBER SAMPLES	NUMBER POSITIVE
Cs-134 (I)	-2.99E+00	-1.20E+01	5.47E+00	4	0
Cs-134 (C)	1.40E+00	-1.96E+00	8.73E+00	4	0
Cs-137 (I)	4.13E+00	2.91E+00	7.13E+00	4	0
Cs-137 (C)	4.25E+00	2.55E+00	8.69E+00	4	0
I-131 (I)	-6.52E+00	-9.35E+00	-3.37E+00	4	0
I-131 (C)	-1.99E+00	-1.29E+01	1.39E+01	4	0

(I) Indicator Stations
(C) Control Station

TABLE A-14.1

GAMMA SPECTROMETRY OF FRUIT

Results in pCi/kilogram (wet)

LOCATION	COLLECTION DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
9B Raspberries	900626	Cs-134	* 1.58 E+00	3.13 E+00
		Cs-137	*-4.78 E-01	3.01 E+00
		I-131	* 1.24 E+00	4.94 E+00
9B Apricot	900718	Cs-134	* 3.43 E-01	2.87 E+00
		Cs-137	* 3.32 E+00	2.85 E+00
		I-131	*-1.84 E+00	5.86 E+00
9B Nectarine	900814	Cs-134	* 0.00 E+00	3.53 E+00
		Cs-137	* 3.95 E+00	3.49 E+00
		I-131	* 4.22 E-01	1.02 E+01
9B Plum	900910	Cs-134	*-1.67 E+00	4.06 E+00
		Cs-137	* 4.05 E+00	4.15 E+00
		I-131	* 1.12 E+00	7.82 E+00
37 Raspberries	900626	Cs-134	* 1.51 E+00	3.67 E+00
		Cs-137	*-4.44 E-02	3.61 E+00
		I-131	* 8.40 E+00	6.01 E+00
37 Apricot	900718	Cs-134	* 1.41 E+00	4.20 E+00
		Cs-137	*-3.55 E+00	4.26 E+00
		I-131	*-1.42 E+00	8.38 E+00
37 Peaches	900814	Cs-134	*-6.32 E-01	3.14 E+00
		Cs-137	* 1.39 E+00	2.89 E+00
		I-131	*-2.01 E+00	7.10 E+00
37 Plums	900910	Cs-134	*-2.48 E+00	6.95 E+00
		Cs-137	* 6.40 E+00	7.29 E+00
		I-131	*-7.79 E+00	1.54 E+01
61 Cherries	900612	Cs-134	* 3.97 E-01	6.02 E+00
		Cs-137	* 1.13 E+01	6.07 E+00
		I-131	* 1.56 E+00	2.19 E+01
91 Apples	900918	Cs-134	* 7.86 E-01	5.24 E+00
		Cs-137	* 4.46 E+00	5.55 E+00
		I-131	*-6.63 E+00	1.05 E+01

* Denotes a result less than the detection limit.

TABLE A-14.2

GAMMA SPECTROMETRY OF FRUIT - SUMMARY

Results in pCi/kilogram (wet)

NUCLIDE	AVERAGE	LOW	HIGH	NUMBER SAMPLES	NUMBER POSITIVE
Cs-134 (I)	1.65E-01	-2.48E+00	1.51E+00	6	0
Cs-134 (C)	6.33E-02	-1.67E+00	1.58E+00	4	0
Cs-137 (I)	3.33E+00	-3.55E+00	1.13E+01	6	0
Cs-137 (C)	2.71E+00	-4.78E-01	4.05E+00	4	0
I-131 (I)	-1.32E+00	-7.79E+00	8.40E+00	6	0
I-131 (C)	2.36E-01	-1.84E+00	1.24E+00	4	0

(I) Indicator Stations
(C) Control Station

TABLE A-15.1

GAMMA SPECTROMETRY OF VEGETABLES

Results in pCi/kilogram (wet)

LOCATION	COLLECTION DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
9B Asparagus	900417	Cs-134	* 1.18 E+00	4.78 E+00
		Cs-137	* 5.45 E+00	4.57 E+00
		I-131	*-1.47 E+00	9.16 E+00
9B Beet Top	900626	Cs-134	* 2.92 E+00	4.05 E+00
		Cs-137	* 7.14 E-01	4.14 E+00
		I-131	* 1.87 E+00	7.49 E+00
9B Asparagus	900515	Cs-134	*-2.13 E+00	8.37 E+00
		Cs-137	*-1.09 E+00	8.54 E+00
		I-131	*-6.14 E+00	1.51 E+01
9B Cabbage	900718	Cs-134	* 1.40 E+00	7.39 E+00
		Cs-137	* 1.28 E+01	7.43 E+00
		I-131	*-1.14 E+01	1.66 E+01
9B Cabbage	900814	Cs-134	* 3.33 E+00	9.84 E+00
		Cs-137	*-2.55 E-01	1.02 E+01
		I-131	*-3.82 E+01	2.97 E+01
9B Green Beans	900910 (a)	Cs-134	* 1.53 E+00	5.57 E+00
		Cs-137	* 8.36 E-01	5.64 E+00
		I-131	* 9.12 E+00	1.08 E+01
37 Asparagus	900417	Cs-134	* 3.74 E+00	3.67 E+00
		Cs-137	* 2.75 E+00	3.62 E+00
		I-131	*-1.10 E+00	7.68 E+00
37 Beet Top	900626	Cs-134	* 8.69 E+00	7.89 E+00
		Cs-137	* 1.01 E+01	7.89 E+00
		I-131	*-9.52 E+00	1.30 E+01
37 Asparagus	900515	Cs-134	* 1.65 E+01	1.06 E+01
		Cs-137	* 1.51 E+01	1.11 E+01
		I-131	*-4.04 E+00	1.89 E+01
37 Cabbage	900718	Cs-134	*-6.91 E-01	1.07 E+01
		Cs-137	* 1.03 E+01	1.08 E+01
		I-131	*-1.19 E+01	2.22 E+01

(a) Substitute for leafy vegetables which are unavailable.
* Denotes a result less than the detection limit.

TABLE A-15.1 (Cont.)

GAMMA SPECTROMETRY OF VEGETABLES

Results in pCi/kilogram (wet)

LOCATION	COLLECTION DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
37 Cabbage	900814	Cs-134	* 7.28 E+00	8.99 E+00
		Cs-137	* 8.46 E+00	8.84 E+00
		I-131	* 3.49 E+00	3.06 E+01
37 Tomatoes	900910 (a)	Cs-134	*-4.49 E+00	5.05 E+00
		Cs-137	* 7.24 E+00	5.01 E+00
		I-131	*-2.77 E+00	1.02 E+01

(a) Substitute for leafy vegetables which are unavailable.
* Denotes a result less than the detection limit.

TABLE A-15.2

GAMMA SPECTROMETRY OF VEGETATION - SUMMARY

Results in pCi/kilogram (wet)

NUCLIDE	AVERAGE	LOW	HIG H	NUMBER SAMPLES	NUMBER POSITIVE
Cs-134 (I)	5.17E+00	-4.49E+00	1.65E+01	6	0
Cs-134 (C)	1.37E+00	-2.13E+00	3.33E+00	6	0
Cs-137 (I)	8.99E+00	2.75E+00	1.51E+01	6	0
Cs-137 (C)	3.08E+00	-1.09E+00	1.28E+01	6	0
I-131 (I)	-4.31E+00	-1.19E+01	3.49E+00	6	0
I-131 (C)	-7.70E+00	-3.82E+01	9.12E+00	6	0

(I) Indicator Stations
(C) Control Station

APPENDIX B: TELEDYNE ISOTOPES 1990 EPA INTERCOMPARISON RESULTS

TABLE B-1

1990 EPA INTERCOMPARISON PROGRAM RESULTS

ISOTOPE	COLLECTION DATE	TI RESULTS (a)	EPA RESULTS (b)	OTHER LABS (c)
		MEDIUM - WATER (pCi/liter)		
Gr-Beta	900126	12.33 ± 1.53	12.0 ± 5.00	14.96 ± 11.6
Gr-Beta	900417	53.33 ± 1.53	52.0 ± 5.0	49.06 ± 6.39
Gr-Beta	900511	17.00 ± 1.00	15.0 ± 5.0	16.16 ± 3.85
Gr-Beta	900921	11.00 ± 1.00	10.0 ± 5.0	10.91 ± 2.25
GR-Beta	901030	51.00 ± 2.31	53.0 ± 5.0	50.78 ± 6.32
Sr-89	900112	24.00 ± 1.73	25.00 ± 5.00	25.14 ± 7.22
Sr-90	"	19.67 ± 2.52	20.00 ± 1.50	19.66 ± 3.69
Sr-89	900417	10.67 ± 1.15	10.0 ± 5.0	12.71 ± 25.09
Sr-90	"	9.67 ± 0.58	10.0 ± 1.5	9.50 ± 0.99
Sr-89	900504	6.67 ± 0.58	7.0 ± 5.0	7.64 ± 2.26
Sr-90	"	6.67 ± 0.58	7.0 ± 5.0	7.02 ± 1.71
Sr-89	900914	8.67 ± 0.58	10.0 ± 5.0	9.89 ± 2.72
Sr-90	"	9.0 ± 1.00	9.0 ± 5.0	9.30 ± 1.98
Co-60	900209	15.00 ± 3.46	15.00 ± 5.00	15.31 ± 2.28
Zn-65	"	131.33 ± 9.07	139.00 ± 14.00	138.93 ± 9.60
Ru-106	"	113.67 ± 4.04	139.00 ± 14.00	133.60 ± 14.22 (d
Cs-134	"	15.33 ± 2.31	18.00 ± 5.00	17.00 ± 2.14
Cs-137	"	19.33 ± 3.21	18.00 ± 5.00	18.76 ± 2.40
Ba-133	"	66.00 ± 3.46	74.00 ± 7.00	72.49 ± 6.21
H-3	900223	4900.00 ± 100.00	4976.00 ± 498.00	4839.04 ± 929.23
Ra-226	900309	4.73 ± 0.47	4.9 ± 0.7	5.20 ± 0.88
Ra-228	"	13.00 ± 1.00	12.7 ± 1.9	12.25 ± 2.66
Ra-226	900417	5.67 ± 0.15	5.0 ± 0.8	4.96 ± 0.83
Ra-228	"	9.37 ± 1.44	10.2 ± 1.5	10.43 ± 2.39
Ra-226	901109	7.27 ± 0.38	7.4 ± 1.1	7.11 ± 1.10
Ra-228	"	7.57 ± 0.32	7.7 ± 1.9	8.10 ± 1.99
Cs-134	900417	12.67 ± 1.53	15.0 ± 5.0	14.44 ± 1.77
Cs-137	"	16.33 ± 1.15	15.0 ± 5.0	15.80 ± 1.88
Co-60	900608	25.33 ± 2.52	24.0 ± 5.0	25.12 ± 2.69
Zn-65	"	148.67 ± 3.06	148.0 ± 15.0	149.18 ± 12.30
Ru-106	"	196.00 ± 20.66	210.0 ± 21.0	201.0 ± 17.01
Cs-134	"	23.67 ± 2.89	24.0 ± 5.0	23.26 ± 2.10
Cs-137	"	24.67 ± 2.08	25.0 ± 5.0	26.21 ± 2.61
Ba-133	"	93.00 ± 6.08	99.0 ± 10.0	96.37 ± 8.16
H-3	900622	2900. ± 100.00	2933.0 ± 358.0	2966.81 ± 285.64
Ra-226	900713	11.37 ± 0.60	12.1 ± 1.8	11.44 ± 1.85
Ra-228	"	4.20 ± 0.75	5.1 ± 1.3	5.50 ± 1.40
I-131	900810	36.00 ± 3.00	39.0 ± 6.0	40.26 ± 4.10
Co-60	901015	21.00 ± 1.00	20.0 ± 5.0	20.53 ± 2.53
Zn-65	"	115.00 ± 11.53	115.0 ± 12.0	116.25 ± 9.89
Ru-106	"	142.00 ± 8.66	151.0 ± 15.0	140.39 ± 15.33
Cs-134	"	11.00 ± 0.00	12.0 ± 5.0	11.89 ± 2.09

TABLE B-1 (Cont.)

1990 EPA INTERCOMPARISON PROGRAM RESULTS

ISOTOPE	COLLECTION DATE	TI RESULTS (a)	EPA RESULTS (b)	OTHER LABS (c)
		MEDIUM - WATER (pCi/liter) (Cont.)		
Cs-137	901015	16.33 ± 2.52	12.0 ± 5.0	13.11 ± 2.17
Ba-133	"	94.67 ± 5.13	110.0 ± 11.0	107.73 ± 9.22 (e)
H-3	901019	7133.33 ± 251.66	7203.0 ± 720.0	7125.08 ± 671.93
		MEDIUM - AIR FILTERS (pCi/cubic meter)		
Gr-Beta	900330	31.67 ± 0.58	31.0 ± 5.0	32.19 ± 3.68
Sr-90	"	9.33 ± 0.58	10.0 ± 1.5	9.69 ± 1.36
Cs-137	"	10.67 ± 1.15	10.0 ± 5.0	11.56 ± 2.05
Gr-Beta	900831	63.33 ± 1.53	62.0 ± 5.0	64.66 ± 6.77
Sr-90	"	18.00 ± 1.00	20.0 ± 5.0	19.45 ± 2.51
Cs-137	"	18.33 ± 3.21	20.0 ± 5.0	22.70 ± 3.91
		MEDIUM - MILK (pCi/liter)		
Sr-89	900427	24.67 ± 1.53	23.0 ± 5.0	23.14 ± 5.10
Sr-90	"	24.00 ± 0.00	23.0 ± 5.0	22.33 ± 3.38
I-131	"	89.67 ± 3.21	99.0 ± 10.0	98.49 ± 8.13
Cs-137	"	27.33 ± 2.52	24.0 ± 5.0	24.65 ± 3.03
K	"	1483.33 ± 75.06	1550.0 ± 78.0	1548.38 ± 117.33
Sr-89	900928	9.0 ± 2.65	16.0 ± 5.0	13.53 ± 4.28 (f)
Sr-90	"	15.33 ± 0.58	20.0 ± 5.0	17.57 ± 3.25
I-131	"	54.67 ± 1.53	58.0 ± 6.0	58.88 ± 4.67
Cs-137	"	23.00 ± 1.73	20.0 ± 5.0	21.47 ± 2.35
K	"	1710.00 ± 65.51	1700.0 ± 85.0	1713.52 ± 124.69

Footnotes:

(a) Teledyne Results - Average ± one sigma. Units are pCi/liter for water and milk except K is in mg/liter. Units are total pCi for air particulate filters

(b) EPA Results - Expected laboratory precision (1 sigma). Units are pCi/liter for water, and milk except K is in mg/liter. Units are total pCi for air particulate filters

(c) Average concentration plus or minus one sigma, based on range of values encountered.

TABLE B-1 (Cont.)

1990 EPA INTERCOMPARISON PROGRAM RESULTS

ISOTOPE	COLLECTION DATE	TI RESULTS (a)	EPA RESULTS (b)	OTHER LABS (c)

Footnotes: (Cont.)

(d) No apparent cause for the low results were found. Three aliquots of the sample were counted on three separate detectors. The results of all three were similar. The calibration curve fit is good (0.997). Ru-106 was obtained from the EPA. Results from the EPA did not exceed two normalized standard deviations. No additional follow-up is necessary, but we will continue to monitor the results. New calibrations were completed in March 1991.

(e) There is no apparent reason for the deviation between the EPA and Teledyne Isotopes values. Other isotopes in the sample were measured accurately. The calculations were reviewed and activities calculated from other Ba-133 gamma rays. Results were reproduced as reported.

(f) Incomplete removal of calcium, lead to erroneously high strontium yields. More care is being taken in the strontium nitrate and strontium sulfate precipitation steps to ensure a final volume of at least 20 ml in the strontium sulfate step. Reanalysis of internal QC samples produced good results after implementing the corrective action.

APPENDIX C: 1990 SPECIAL SAMPLE RESULTS

Special Samples

The analytical results presented in Appendix C are for samples collected outside the routine monitoring program. They include the results of grab samples taken from the plant intake and discharge lines, as well as the results of air samples taken at a nonroutine monitoring location near the plant.

During periods of composite water sampler inoperability, efforts are focused on correcting the problem(s) and fixing the sampler before the start of the next sampling period. In addition, if repair is not expected to be completed within a few days, grab samples are taken from the intake or discharge lines as a matter of "good practice." The results of these composites of the grab samples are presented in Table C-1. The special Station 27 sample for the period 5/10/90 to 5/11/90 included detectable levels of cobalt-60 and zinc-65 resulting from releases associated with plant outage activities.

During February, March and April 1990, special air samples were collected at the training facility near the turbine generator building, in order to determine whether there was a plant effect that was not apparent from the air sampling results for the routine monitoring stations. The gross beta and iodine-131 results for these samples are presented in Table C-2, along with the results for samples taken at the nearest routine air sampling station, Station 57, during the same periods. There were no significant differences between the results for the Station 57 and the results for the special station.

A test of the environmental TLD fade characteristics for the annual distribution was also conducted during 1990 (see Section 5.1). As described in Sections 4.0 and 5.0, none of the TLDs from a batch suspected to have a higher than usual signal fade rate were collected with nine TLDs from a batch having a normal fade rate. The two sets of TLDs remained at field locations for the year, then were retrieved and processed. The results of the two batches are presented in Table C-3. The results for the set with the suspected higher signal fade rate were approximately 12% lower than the results for the other TLD set. The set with the apparent higher fade rate i.e., the 600 series, will, therefore, no longer be used.

TABLE C-1

RESULTS OF WATER GRAB SAMPLE COMPOSITES

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE		RESULT	OVERALL UNCERTAINTY
26	900120 to 900125	Gr-B		1.3 E+00	7.0 E-01
		Be-7	*	-6.1 E+00	1.6 E+01
		K-40	*	1.2 E+02	2.0 E+01
		Mn-54	*	1.1 E+00	1.5 E+00
		Co-58	*	4.6 E-01	1.7 E+00
		Fe-59	*	1.5 E-01	3.9 E+00
		Co-60	*	8.9 E-01	1.7 E+00
		Zn-65	*	-3.1 E+00	3.6 E+00
		Zr-95	*	3.2 E+00	3.3 E+00
		Nb-95	*	1.8 E+00	1.7 E+00
		Cs-134	*	1.3 E+00	1.6 E+00
		Cs-137	*	1.4 E+00	1.7 E+00
		Ba-140	*	2.8 E+00	7.7 E+00
		La-140	*	9.8 E-01	4.0 E+00
		Ra-226	*	8.0 E+01	3.5 E+01
		Th-228	*	1.1 E+01	3.0 E+00
26	900703 to 900710	Gr-B		1.7 E+00	9.0 E-01
		Be-7	*	5.1 E+00	2.0 E+01
		K-40	*	-1.1 E+01	2.8 E+01
		Mn-54	*	-1.1 E+00	1.9 E+00
		Co-58	*	-3.1 E-01	2.0 E+00
		Fe-59	*	-5.6 E-01	4.4 E+00
		Co-60	*	-3.3 E-01	2.3 E+00
		Zn-65	*	3.8 E-01	4.7 E+00
		Zr-95	*	4.9 E+00	4.4 E+00
		Nb-95	*	1.5 E-01	2.0 E+00
		Cs-134	*	-8.7 E-01	2.1 E+00
		Cs-137	*	-3.7 E+00	2.3 E+00
		Ba-140	*	-6.5 E-01	7.9 E+00
		La-140	*	2.0 E-01	3.7 E+00
		Ra-226	*	-6.3 E+01	4.7 E+01
		Th-228	*	-2.1 E+00	3.9 E+00

*Denotes a result less than the detection limit.

TABLE C-1 (Cont.)

RESULTS OF WATER GRAB SAMPLE COMPOSITES

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE		RESULT	OVERALL UNCERTAINTY
27	900120 to 900125	Gr-B		1.6 E+01	2.0 E+00
		Be-7	*	-1.4 E+01	2.0 E+01
		K-40	*	-7.9 E+00	2.2 E+01
		Mn-54	*	1.8 E-01	1.6 E+00
		Co-58	*	-3.6 E-01	1.9 E+00
		Fe-59	*	4.6 E+00	5.2 E+00
		Co-60	*	-2.6 E-01	1.8 E+00
		Zn-65	*	1.3 E+00	3.8 E+00
		Zr-95	*	-3.9 E+00	4.1 E+00
		Nb-95	*	2.2 E+00	2.0 E+00
		Cs-134	*	8.1 E-01	1.8 E+00
		Cs-137	*	1.9 E+00	1.7 E+00
		Ba-140	*	-2.2 E+00	2.1 E+01
		La-140	*	-8.8 E+00	9.7 E+00
		Ra-226	*	2.3 E+00	3.5 E+01
		Th-228	*	-7.4 E+00	3.1 E+00
27	900510 to 900511	Gr-B		5.4 E+01	4.0 E+00
		Be-7	*	-4.7 E+00	1.8 E+01
		K-40	*	2.0 E+00	2.3 E+01
		Mn-54	*	2.9 E+00	1.8 E+00
		Co-58	*	-2.3 E-01	1.9 E+00
		Fe-59	*	-1.4 E+00	4.4 E+00
		Co-60		1.1 E+01	3.0 E+00
		Zn-65		2.1 E+01	7.0 E+00
		Zr-95	*	-2.5 E+00	3.9 E+00
		Nb-95	*	1.3 E+00	1.9 E+00
		Cs-134		7.6 E+00	3.0 E+00
		Cs-137		9.7 E+00	3.0 E+00
		Ba-140	*	5.1 E+00	1.0 E+01
		La-140	*	5.0 E+00	3.3 E+00
		Ra-226	*	-2.3 E+00	4.2 E+01
		Th-228	*	-6.1 E+00	3.5 E+00

*Denotes a result less than the detection limit.

TABLE C-1 (Cont.)

RESULTS OF WATER GRAB SAMPLE COMPOSITES

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE		RESULT	OVERALL UNCERTAINTY
27	900808 to 900815	Gr-B		5.6 E+00	1.2 E+00
		Be-7	*	-9.0 E+00	2.6 E+01
		K-40	*	-2.7 E+01	6.9 E+01
		Mn-54	*	2.9 E+00	2.5 E+00
		Co-58	*	1.2 E+00	2.7 E+00
		Fe-59	*	2.4 E+00	6.0 E+00
		Co-60	*	1.7 E+00	2.7 E+00
		Zn-65	*	-2.6 E-01	6.0 E+00
		Zr-95	*	2.6 E+00	6.0 E+00
		Nb-95	*	2.4 E+00	2.8 E+00
		Cs-134	*	-2.5 E+00	2.8 E+00
		Cs-137	*	8.5 E-01	2.9 E+00
		Ba-140	*	1.8 E+00	1.3 E+01
		La-140	*	-1.4 E+00	4.9 E+00
		Ra-226	*	-3.5 E+01	6.3 E+01
		Th-228	*	-1.3 E+01	5.0 E+00

*Denotes a result less than the detection limit.

TABLE C-2

COMPARISON OF THE AIR SAMPLING RESULTS
AT A NEAR-PLANT LOCATION AND AT STATION 57
Results in pCi/cubic meter

COLLECTION DATES		GROSS BETA	OVERALL UNCERTAINTY	IODINE-131	OVERALL UNCERTAINTY
900212 to 900220	Near-Plant Station	2.6 E-02	2.0 E-03	2.4 E-03	6.8 E-03
	Station 57	1.9 E-02	2.0 E-03	2.2 E-03	6.1 E-03
900220 to 900226	Near-Plant Station	2.2 E-02	3.0 E-03	5.3 E-04	2.3 E-02
	Station 57	1.8 E-02	3.0 E-03	5.3 E-04	2.3 E-02
900226 to 900305	Near-Plant Station	2.9 E-02	3.0 E-03	1.8 E-03	7.6 E-03
	Station 57	2.8 E-02	3.0 E-03	1.8 E-03	7.6 E-03
900305 to 900312	Near-Plant Station	1.1 E-02	2.0 E-03	7.5 E-03	9.9 E-03
	Station 57	6.2 E-03	1.7 E-03	7.5 E-03	9.9 E-03
900312 to 900319	Near-Plant Station	1.2 E-02	2.0 E-02	5.4 E-03	7.7 E-02
	Station 57	1.0 E-02	2.0 E-03	5.4 E-03	7.7 E-02
900416 to 90042	Near-Plant Station	8.3 E-03	1.9 E-03	1.3 E-02	1.4 E-02
	Station 57	8.2 E-03	1.9 E-03	1.3 E-02	1.4 E-02

TABLE C-3

ENVIRONMENTAL TLD FADE TEST RESULTS*

Results in mR/day

STATION #	TLD #	RESULT	TLD #	RESULT
1	0646	0.215	0200	0.236
8	0647	0.234	0207	0.256
2	0648	0.208	0201	0.232
40	0650	0.200	0226	0.225
9	0651	0.190	0208	0.216
10	0652	0.204	0209	0.232
47	0653	0.198	0235	0.224
46	0654	0.261	0234	0.290
53	0655	0.245	0240	0.264
	Mean	= 0.217	Mean	= 0.242
	Standard Deviation	= 0.024	Standard Deviation	= 0.024

*TLDs at one station were lost so only nine sets of results were evaluated.

APPENDIX D: 1990 SAMPLE DEVIATIONS

Sample Deviations

During 1990, the majority of deviations from the sampling requirements of Table 3.12-1 of the Technical Specifications and Table 1 of the Site Certification Agreement involved the frequent periods of inoperability of the flow-proportional composite water sampler at Station 27 (discharge line) during the first eight months of the year and occasional periods of inoperability of various air samplers. These deviations are listed in Table D-1.

The composite water sampler at Station 27 was frequently inoperable during part of 1990 because some components of this complex flow-proportional sampling system were prone to failure under the conditions of low flow and intermittent sampling. The sample line from the discharge line also became plugged with sediment, which then caused sampler operational problems. In accordance with Plant 2 Technical Specifications, the sampler was returned to service before an entire sampling period had elapsed. The corrective actions taken to resolve these sampler operability problems included purchasing two new composite samplers for installation on the discharge line during the 1991 outage and clearing the debris from the sampling line. Since the sampling line was cleared in August, the sampler has operated consistently. In conjunction with the installation of the new samplers, a schedule will be determined for periodically clearing out the sampling line.

The most frequent causes of air sampler failures were power outages and stalled pumps resulting from gummy lubicating oil or oil leaks. The frequency of air sampler failures observed during 1990 appears to be fairly typical, considering the continuous operation of the samplers. Measures taken to prevent air sampler outages due to pump failures include adding oil when needed during weekly filter exchanges and preventive maintenance every six months.

The problems encountered during fish sampling were, in general, related to the unavailability of fish, inclement weather and high river water level. These problems are mostly unpreventable.

TABLE D-1

1990 SAMPLE DEVIATIONS

SAMPLE MEDIA	DATE	LOCATION	PROBLEM
Air Particulate/ Iodine	900102 to 900108	Station 7	Power outage due to extremely high winds; shortened sampling time.
	900102 to 900108	All Stations	Air samples sent to wrong laboratory and not received at Teledyne until 1/18/90, 12 days after collection; LLDs ranged from 0.02 to 0.03 pCi/m^3 for iodine-131.
	900108 to 900115	Station 7	Power outage due to high winds; shortened sampling time.
	900122 to 900129	Station 6	Power outage due to repair work at White Bluffs substation.
	900205 to 900212	Station 21	Power outage; shortened sampling time.
	900226 to 900305	Station 48	Blown fuse; shortened sampling time.
	900305 to 900306	Station 48	Location without sampler due to unavailability of replacement unit. Brought out replacement unit March 6.
	900312 to 900319	Station 23	Sampler malfunction; shortened sampling time.
	900409 to 900416	Station 8	Relay fuse on power pole burned out; shortened sampling time.
	900416 to 900423	Station 8	Power outage; shortened sampling time.
	900416 to 900423	Station 48	Relay fuse not repaired until 4/19/90; shortened sampling time.

TABLE D-1 (Cont.)

1990 SAMPLE DEVIATIONS

SAMPLE MEDIA	DATE	LOCATION	PROBLEM
Air Particulate/ Iodine	900423 to 900430	Station 40	Brief power outage; slightly shortened sampling time.
	900430 to 900507	Station 1	Power outage due to plant outage work; shortened sampling time.
	900507 to 900514	Station 1	Power outage; shortened sampling time.
	900507 to 900514	Station 9	Power outage due to work by PP&L; slightly shortened sampling time.
	900514 to 900521	Station 1	Brief power outage; slightly shortened sampling time.
	900521 to 900529	Station 9	Sampler failure; shortened sampling time.
	900604 to 900611	Station 40	Sampler pump failure; shortened sampling time.
	900716 to 900723	Station 7	Power outage due to DOE relocation of meteorological tower; shortened sampling time.
	900716 to 900723	Station 9	Volume measurement indicator low; shortened sampling time since no replacement until 7/24/90.
	900723 to 900730	Station 9	Shortened sampling time since no replacement unit until 7/24/90.
	900723 to 900730	Station 4	Blown fuse; short sampling time.
	900813 to 900820	Station 8	Pump failure; short sampling time.

TABLE D-1 (Cont.)

1990 SAMPLE DEVIATIONS

SAMPLE MEDIA	DATE	LOCATION	PROBLEM
Air Particulate/ Iodine	900827 to 900904	Station 7	Power outage due to DOE equipment relocation activities; shortened sampling time.
	900910 to 900917	Station 7	Power outage due to DOE equipment relocation activities; shortened sampling time.
	901001 to 901008	Station 23	Blown fuse; short sampling time.
	901119 to 901126	Station 40	Blown fuse; shortened sampling time.
	901126 to 901203	Station 40	Blown fuse; short sampling time.
	901203 to 901210	Station 40	Pump failure; shortened sampling time.
	901210 to 901217	Station 7	Power outage due to DOE relocation activities; shortened sampling time.
Fish	900430 to 900508	Station 38	Bass sample from the Snake River was about one-half kilogram short due to lack of availability of the sample.
	900924 to 901004	Station 38	The required 1.0 kg. of flesh from a third resident species was not obtained due to lack of availability of fish. Two smaller samples, one of squaw fish weighing 0.5 kg and one of bass weighing 0.5 kg, were each submitted for analysis to cover this requirement.

TABLE D-1 (Cont.)

1990 SAMPLE DEVIATIONS

SAMPLE MEDIA	DATE	LOCATION	PROBLEM
Sediment	900410	Stations 33, 34	Sediment sampling delayed one week due to unavailability of staff.
Milk	900501 to 900717	Station 40	Milk production stopped at this station. Another source of milk was sought within 5 kilometers (9.9 miles). None became available until July when Station 63, the Herr farm (6.4 miles SE), was added. In the meantime, sampling at the other milk source available, the Howard farm, Station 62, began on 5/15.
TLD	900928 to 901228	Station 4	This TLD was found missing in the field during the fourth quarter collection.
Vegetation	900417	Stations 9, 37	No roots, fruits, or leafy vegetables available; collected asparagus only.
	900515	Stations 9, 37	No roots, fruits, or leafy vegetables available; collected asparagus only.
	900910	Stations 9, 37	Leafy vegetables not available.
Water	900102 to 900109	Station 26	Sampler inoperable due to a leak.
	900112 to 900115	Station 27	Sampler inoperable, but began operating again before I&C shop could repair it.
	900118 to 900128	Station 27	Sampler not operational due to failure of the positive displacement pump.

TABLE D-1 (Cont.)

1990 SAMPLE DEVIATIONS

SAMPLE MEDIA	DATE	LOCATION	PROBLEM
Water	902001 to 900204	Station 27	Electrical line grounded, causing sampling system outage.
	900215 to 900216	Station 27	Sampler not operational due to failure of the positive displacement pump.
	900401 to 900406	Station 27	Sampler not operational due to disconnection of the supervisory signal for the flow-proportional sampling mode.
	900409	Station 27	Sampler not operational due to flow testing to determine if there was a sampling line restriction.
	900415 to 900417	Station 27	Sampler not operational due to plugged sample line.
	900417 to 900515	Station 27	Sampler not operating due to loss of the supervisory signal and outage work.
	900602	Station 27	Sampler not operational due to a blown fuse.
	900629 to 900710	Station 26	Sampler not operational because the potable water pump was out.
	900714 to 900717	Station 27	Sampler not operational, but cause not determined.

TABLE D-1 (Cont.)

1990 SAMPLE DEVIATIONS

SAMPLE MEDIA	DATE	LOCATION	PROBLEM
Water	900731 to 900817	Station 27	Sampler not operational due to sampling line restriction. Problem Evaluation Request (PER) issued on 8/03/90 to document continued operational problems.
	901213 to 901226	Station 27	Sampler not operational due to line restriction and valve misalignment.

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