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Supply System Technical
Specification 6.9.1.10

April 29, 1988
G02-88-106

Docket No. 50-397

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Washington, DC 20555

Dear Sir:

SUBJECT: 1987 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL REPORT

Enclosed is a copy of the 1987 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

GCS/CJC/vlc

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Radiological Environmental Monitoring Program 1987 Annual Report for Nuclear Plant 2

WASHINGTON PUBLIC POWER SUPPLY SYSTEM

WASHINGTON PUBLIC POWER SUPPLY SYSTEM

NUCLEAR PLANT NUMBER 2

RADIOLOGICAL ENVIRONMENTAL

MONITORING PROGRAM

1987 ANNUAL REPORT

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1987 Radiological Environmental Monitoring Program

Annual Report - Plant 2

April 1988

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1.0 EXECUTIVE SUMMARY

The Washington Public Power Supply system Radiological Environmental Monitoring Program (REMP) activities during 1987 are discussed in this report. The REMP is designed to provide an assessment of the levels of radioactivity in the environment around Plant 2 in order to detect any radiological effect of plant operations over time. To accomplish this objective, the REMP provides for the collection of air, water, milk, soil, sediment and garden produce on a regular basis from the region surrounding the plant. In addition, direct radiation from the plant and plant effluents is measured using thermoluminescent dosimeters (TLDs).

Environmental samples collected in the Grandview/Sunnyside area are considered control samples; i.e., samples that provide an indication of the natural radioactivity background inherent in the region and that are unlikely to be affected by Plant 2 operations. Samples taken from locations near the plant and in directions likely to be affected by plant effluents are regarded as indicator samples. Determining whether Plant 2 operations have had a radiological impact on the environment involves comparing the indicator sample results to the control sample results, the results of samples taken prior to plant operation, the calculated lower limits of detection (LLDs) and the regulatory guidance and limits.

REMP monitoring results for 1987 were within the ranges previously observed for samples collected during the preoperational period and most of the results were less than the respective LLDs. Some residual radioactivity (mostly cesium-137) from the Chernobyl nuclear accident fallout was evident in milk samples taken in early 1987. Changes in the ambient environmental radioactivity levels were also evident in the gross beta in air samples taken during fall and winter inversion periods and in the TLD results.

None of the changes were related to Plant 2 operations. No radiological impact of plant operations on the environment around Plant 2 was detected during 1987.

2.0 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 for assessment of 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.

The results of environmental measurments made during CY 1987 are presented in this 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.

2.1 Site Description

The Washington Public Power Supply System Plant 2 is located in a sparsely populated shrub-steppe region within the Department of Energy-operated Hanford Reservation in southeastern Washington. The plant is approximately three miles west of the Columbia River and is surrounded on all sides by unoccupied desert land. The nearest population centers are Richland, Kennewick and Pasco, which are 8 miles south, 21 miles southeast, and 18 miles southeast, respectively. The nearest privately owned lands are located east of the plant, across the Columbia River. The prevailing wind directions from the south, southwest and west make this farming region an ideal area for REMP sample locations.

2.2 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 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 of the background levels of radioactivity due to differences in geologic composition, weapons test fallout, meteorological conditions and seasonal changes is reflected in that preoperational data.

Analysis of REMP environmental samples has always been performed by an analytical laboratory contractor. 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 determine the direct radiation are processed by the Supply System External Dosimetry Laboratory under the Radiological Programs and Instrument Calibration Department.

2.3 Program Objectives

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[6] and 10CFR50[7] 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 the plant on the environment must be distinguished from the normal variation in background radiation levels. 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 prevent further releases.

3.0 PROGRAM DESCRIPTION

The REMP plan for Plant 2, presented in Table 3-1, 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.

3.1 Sample Locations

Seventy-six locations were included in the 1987 monitoring program. Sixty-nine indicator and two control, i.e. background, locations were within 10 miles (16 kilometers) of 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 3-2 by meteorological sector, sample media and approximate distance from the plant. The number and locations of sample stations is based not only on factors such as population distribution and meteorological conditions, but also on station accessibility and security throughout the year and the requirements of applicable regulations.

Maps of the REMP sampling locations described in Tables 3-1 and 3-2 are presented in Figures 3-1 through 3-10 for sampling locations within the 10-mile radius and Figure 3-11 for sampling locations outside the 10-mile radius. A more detailed presentation of sampling locations in the Sunnyside/Grandview area is given in Figure 3-12.

3.2 Land Use Census

In August the annual land use census was performed, as required by Plant Technical Specificatons.[8] One purpose of the land use census is to identify, within a distance of 5 miles, the locations of the nearest milk animal, residence and garden greater than 50 m^2 in each of the 16 meteorological sectors. Another objective of the census is to determine whether any site located during the census has a calcu-

TABLE 3-1

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, 4-9, 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)	9, 1, 7, 21 and 23	Annually	Gamma isotopic[e]
2.	DIRECT RADIATION			
	TLD[g] (34/56)	1-9, 10-25, 40-47, 49-51, 53-56, 71-86 (S1-S16)[h]	Quarterly, annually	Thermoluminescent output; quarterly and annual processing.
	PIC[i] (0/3)	1, 21, and 23	Continuous recording, monthly tape exchange	Monthly data tape analysis, when used
3.	WATERBORNE			
	Surface/ Drinking Water[k] (3/4)	26, 27, 28 and 29	Composite aliquots[j] monthly	Gamma isotopic[e], gross beta; tritium quarterly composite
	Ground Water (2/3)	31, 32, and 52	Quarterly	Gamma isotopic[e]; tritium quarterly grab sample
	Sediment from shoreline (1/2)	33 and 34	Semiannually	Gamma isotopic[e]

TABLE 3-1 (Cont.)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM PLAN

SAMPLE TYPE[a]	SAMPLE STATION NO.[b]	SAMPLING AND COLLECTION FREQUENCY[c]	TYPE AND FREQUENCY OF ANALYSIS
4. INGESTION			
Milk[l] (5/4)	9, 36, 40, 59[m], and 96	Semimonthly during grazing season, monthly at other times	Gamma isotopic[e] Iodine-131
Fish[n] (2/2)	30 and 38, or 39	Seasonal or Semiannually	Gamma isotopic[e]
Garden Produce[o] (1/2)	9, 91[p] 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 sample locations to total number of sample locations currently being monitored in the surveillance program.

[b]The underlined sample location designates a control station.

[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 C.

[d]Particulate sample filters will be analyzed for gross beta after at least 24-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 should 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 the facility.

TABLE (Cont.)

(f)Soil samples are collected to satisfy the requirements of the Site Certification Agreement (SCA)[9] for Plant 2.

(g)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 (ANSI N545-1975), except for specified energy-dependence response. Correction factors are available for energy ranges with response outside of the specified tolerances.

(h)TLD stations 71-86 are special interest stations and are not included among the 34 routine TLD stations required by Plant Technical Specifications, Table 3.12-1. Their alternate designations are S1-S16.

(i)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.

(j)Composite (integrated grab) samples are collected with equipment which is capable of collecting an aliquot at time intervals which are short relative to the compositing period.

(k)Station 26, Plant 2 makeup water intake from the Columbia River is both an upstream surface water sample and drinking water control sample location. Station 28, 300 Area sample is both a downstream surface water sample and drinking water sample. Two week composite sample analysis for iodine-131 is initiated when the dose calculated for the consumption of water is greater than 1 mrem per year maximum organ dose using ODCM methodology and parameters.

(l)Milk samples will be obtained from farms or individual milk animals which are located in sectors with high calculated annual average ground-level D/Qs and high dose potential. Routine milk samples are collected in areas of high dose potential instead of within 5 kilometers, due to location of milk animals. 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.

(m)Station 58 discontinued milk production in June 1987. It was replaced by Station 59.

(n)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. Four fish specimen will normally be collected by electroshock technique in the vicinity of the plant discharge (Station 30). If electroshocking produces insufficient fish samples, anadromous species may be obtained from a catch pond at Ringold Fish Hatchery (Station 39).

TABLE 3-1 (Cont.)

(o)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 sample will be dependent on seasonal availability.

(p)Station 91, which was added in September 1987, is an apple orchard irrigated by the Columbia River. The apple crop from Station 91 is sampled annually.

TABLE 3-2

REMP SAMPLE LOCATIONS BY SECTOR

SECTOR[a]		STATION[b] NUMBER	DISTANCE[c] MILES	METERS	SAMPLE TYPE
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)	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	4.3	6919	AP/AI
		39	4.4	7084	FI
		46	4.7	7562	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	4.2	6758	TLD
		44	5.7	9171	TLD

TABLE 3-2 (Cont.)

REMP SAMPLE LOCATIONS BY SECTOR

SECTOR[a]	STATION[b] NUMBER	DISTANCE[c] MILES	METERS	SAMPLE TYPE
E (5)	75(5S)	0.4	644	TLD
	22	2.1	3379	TLD
	10	3.1	4988	TLD
	26	3.2	5149	PW
	27	3.2	5149	DW
	30	3.3	5311	FI
	43	5.7	9171	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	4.7	7562	AP/AI/TLD
	42	5.6	9010	TLD
	36	7.2	11585	MI
	5	7.7	12389	AP/AI/TLD
	38	26.5	42639	FI
	91	4.8	7723	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
	58	8.6	13838	MI
	59	9.6	15443	MI

TABLE 3-2 (Cont.)

REMP SAMPLE LOCATIONS BY SECTOR

SECTOR[a]	STATION[b] NUMBER	DISTANCE[c] MILES	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	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
	9[e]	30.0	48270	AP/AI/MI/GP/TLD/SO
W (13)	83(13S)	0.5	805	TLD
	15	1.4	2253	TLD

TABLE 3-2 (Cont.)

REMP SAMPLE LOCATIONS BY SECTOR

SECTOR[a]	STATION[b] NUMBER	DISTANCE[c] MILES	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	Drinking/ Surface Water
AI	Air Iodine	GW	Ground Water
SE	Sediment	DW	Discharge Water
FI	Fish	GP	Garden Produce
		FR	Fruit

(d) Station 9 designates the Sunnyside-Grandview control area for TLD, AI/AP, SO, and GP and is actually three separate stations within a few miles of each other and all within 30-35 miles of Plant 2. Station 96, which is the new control station for milk, is also located within the control area. It is 36 miles from Plant 2.

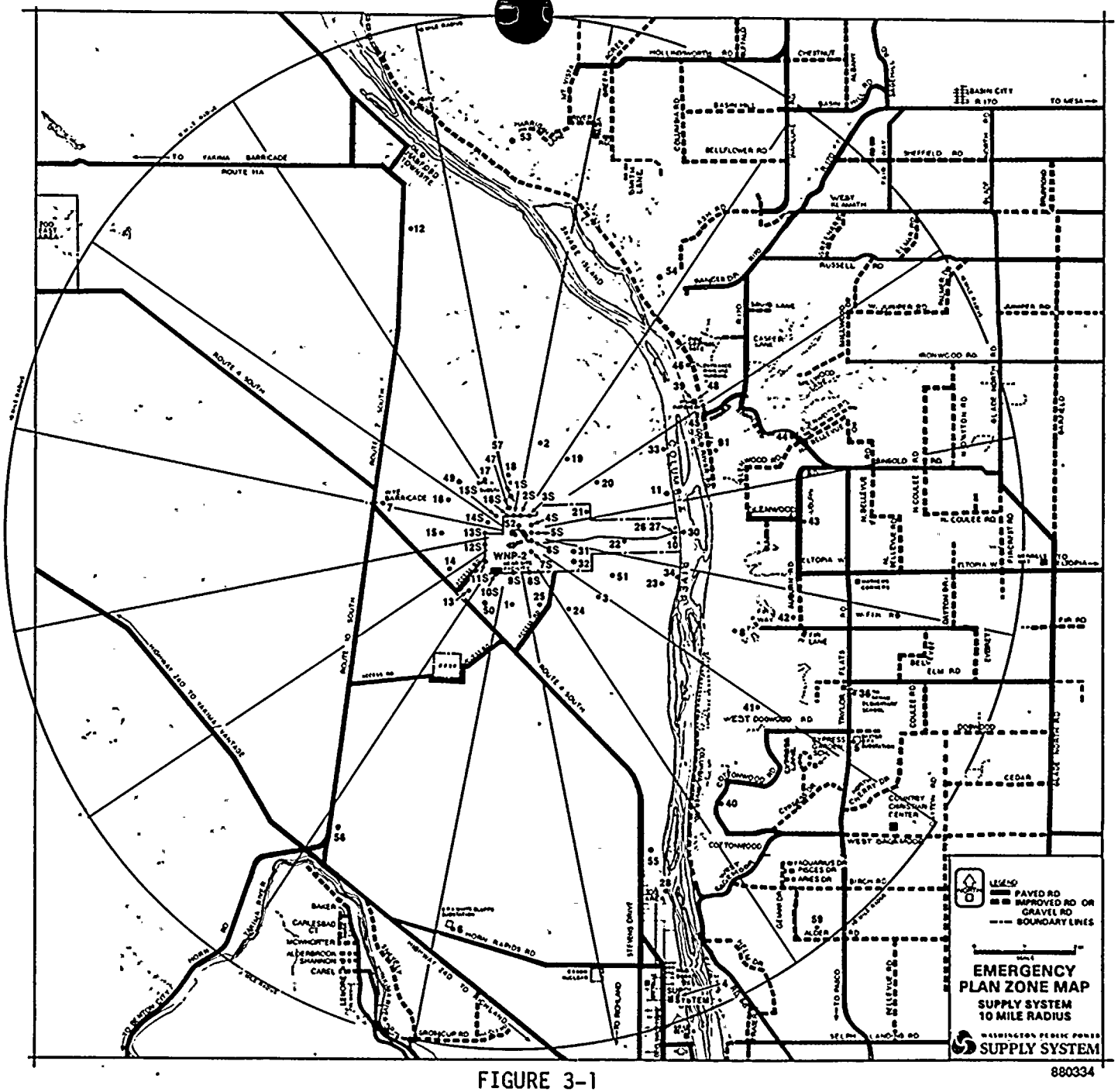


FIGURE 3-1
REMP SAMPLING LOCATIONS WITHIN THE 10-MILE RADIUS

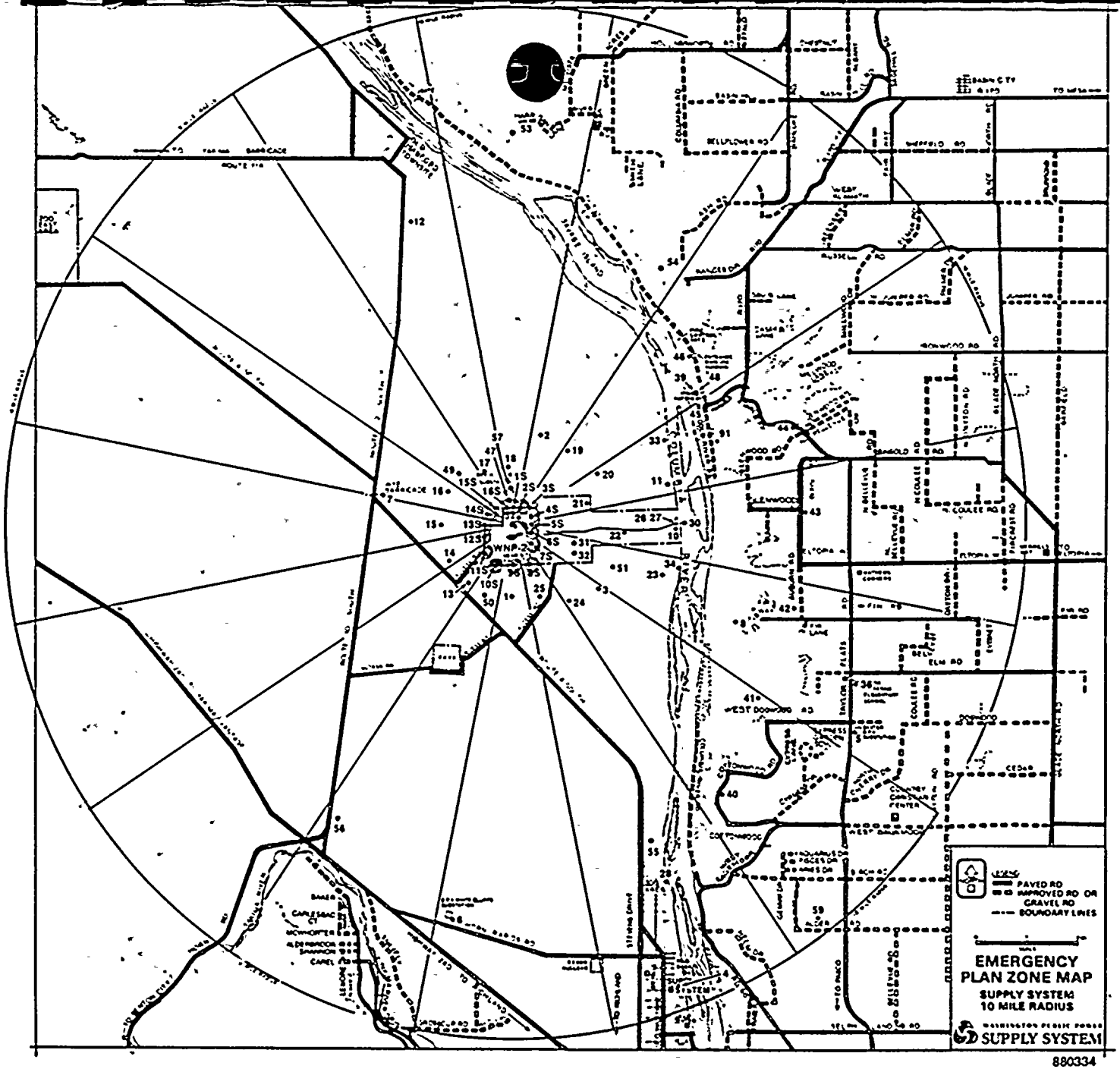


FIGURE 3-2
INNER CIRCLE TLD LOCATIONS

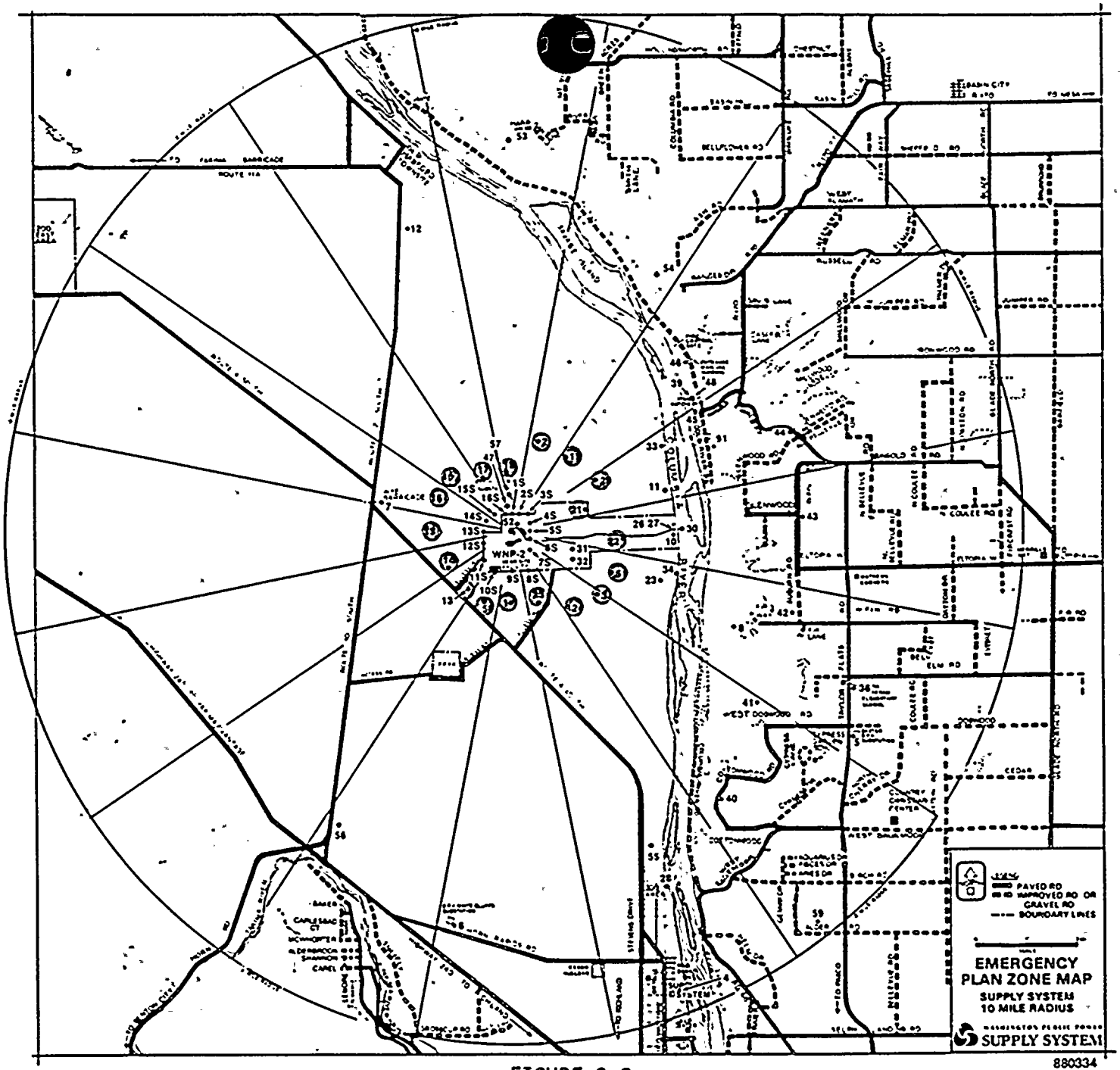


FIGURE 3-3
NEAR-PLANT TLD LOCATIONS

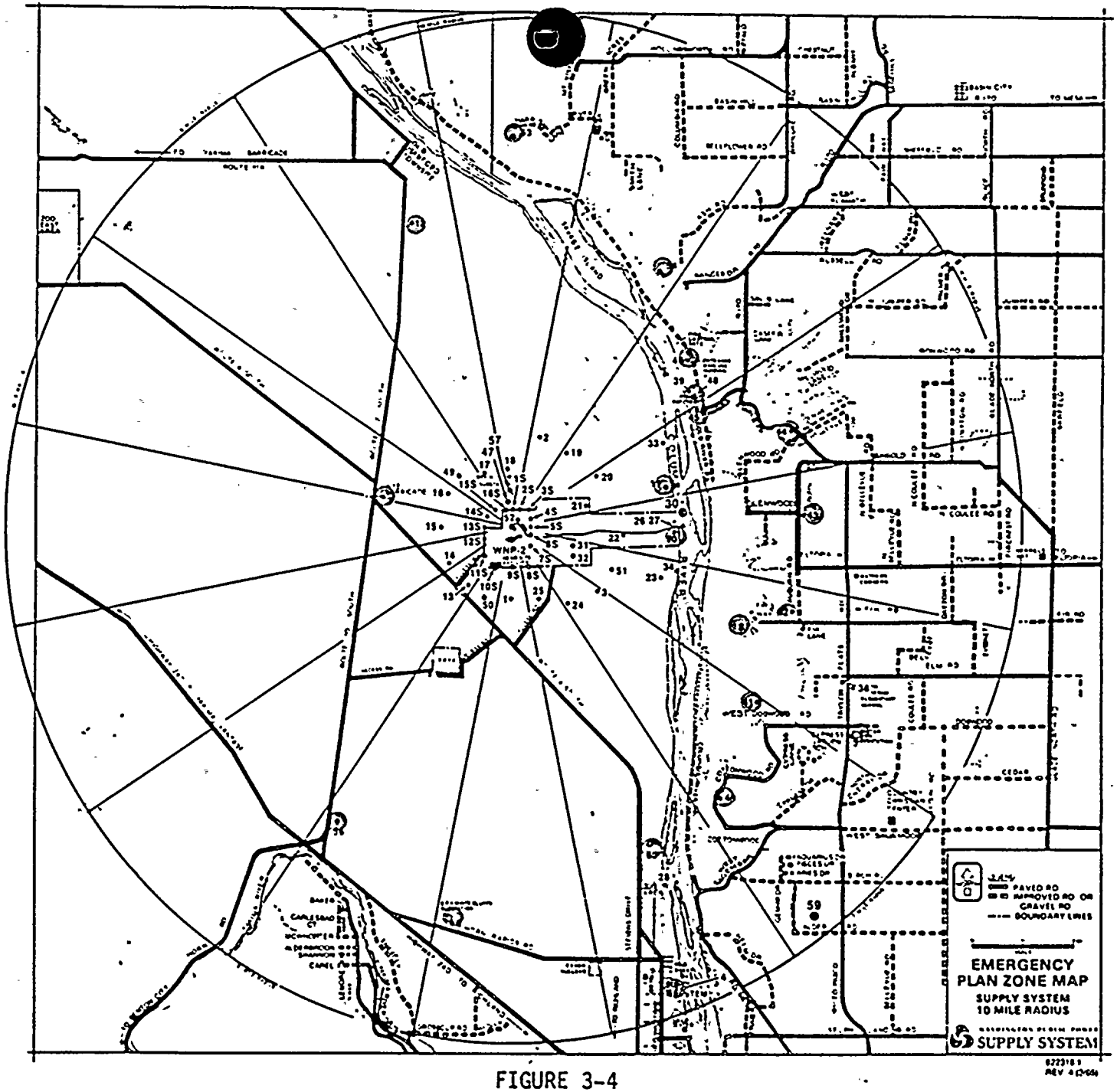


FIGURE 3-4
OUTLYING TLD LOCATIONS WITHIN THE 10-MILE RADIUS

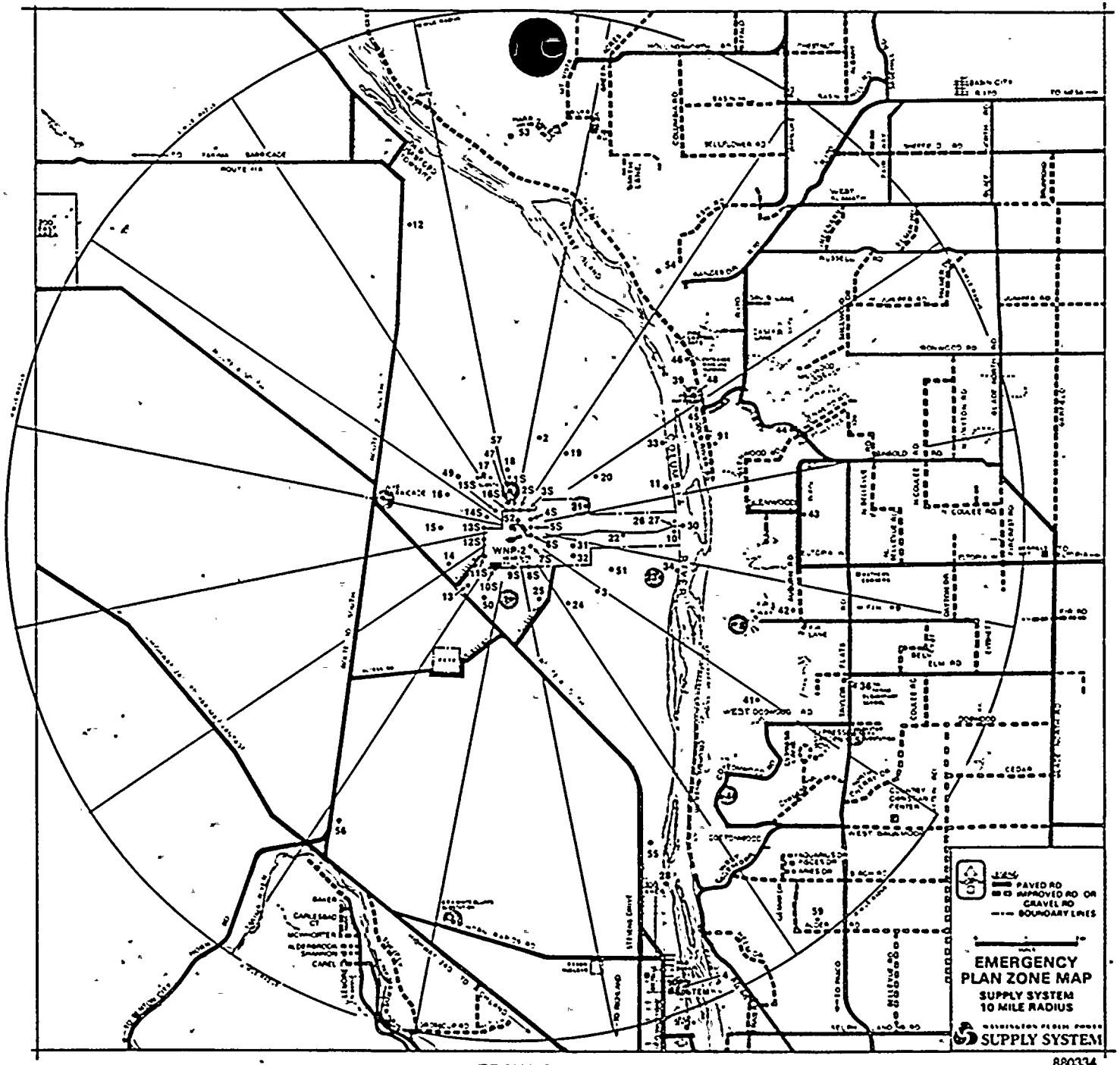


FIGURE 3-5
AIR SAMPLING LOCATIONS WITHIN THE 10-MILE RADIUS

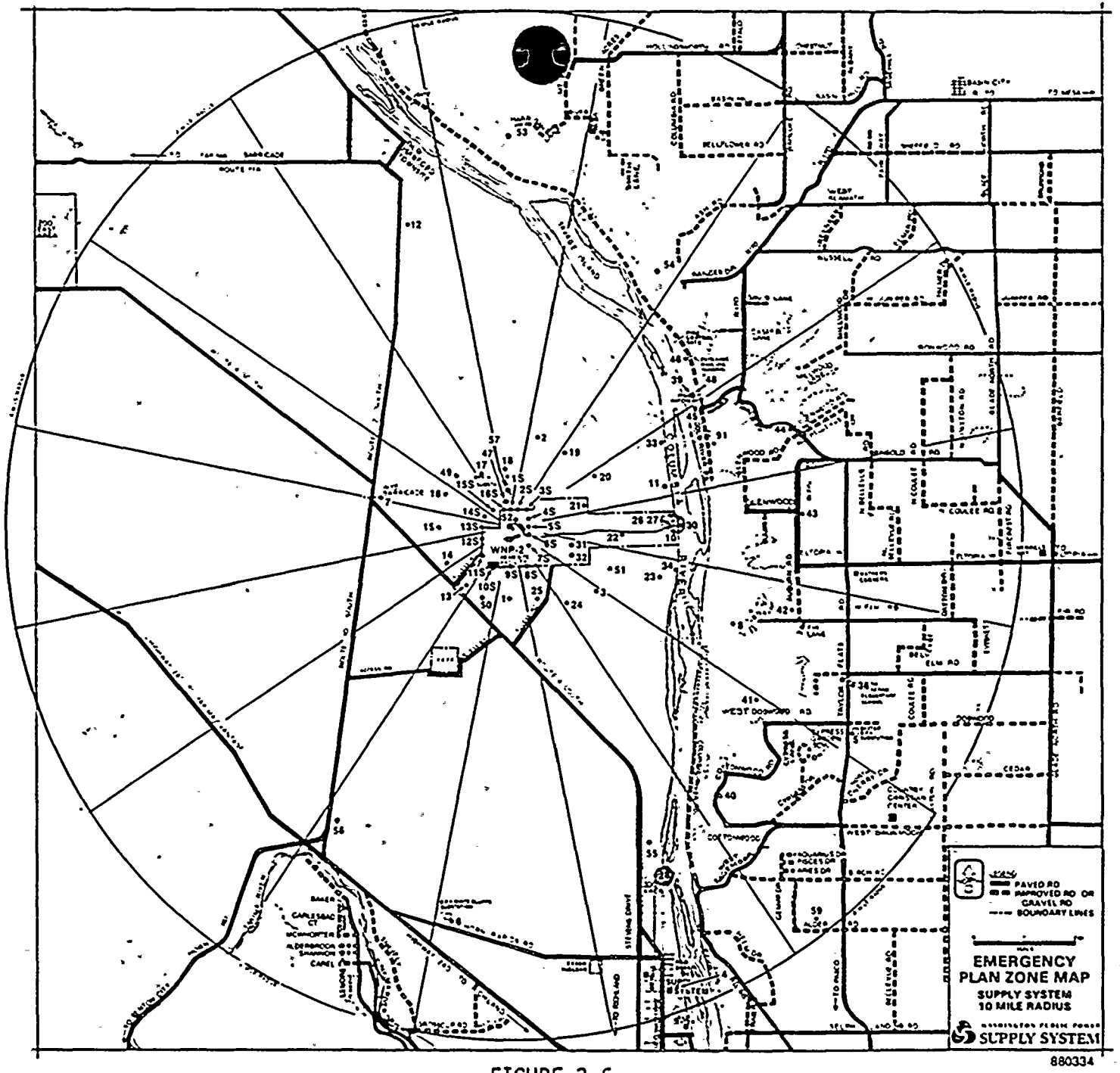


FIGURE 3-6
RIVER/DRINKING AND DISCHARGE WATER SAMPLING LOCATIONS WITHIN THE 10-MILE RADIUS

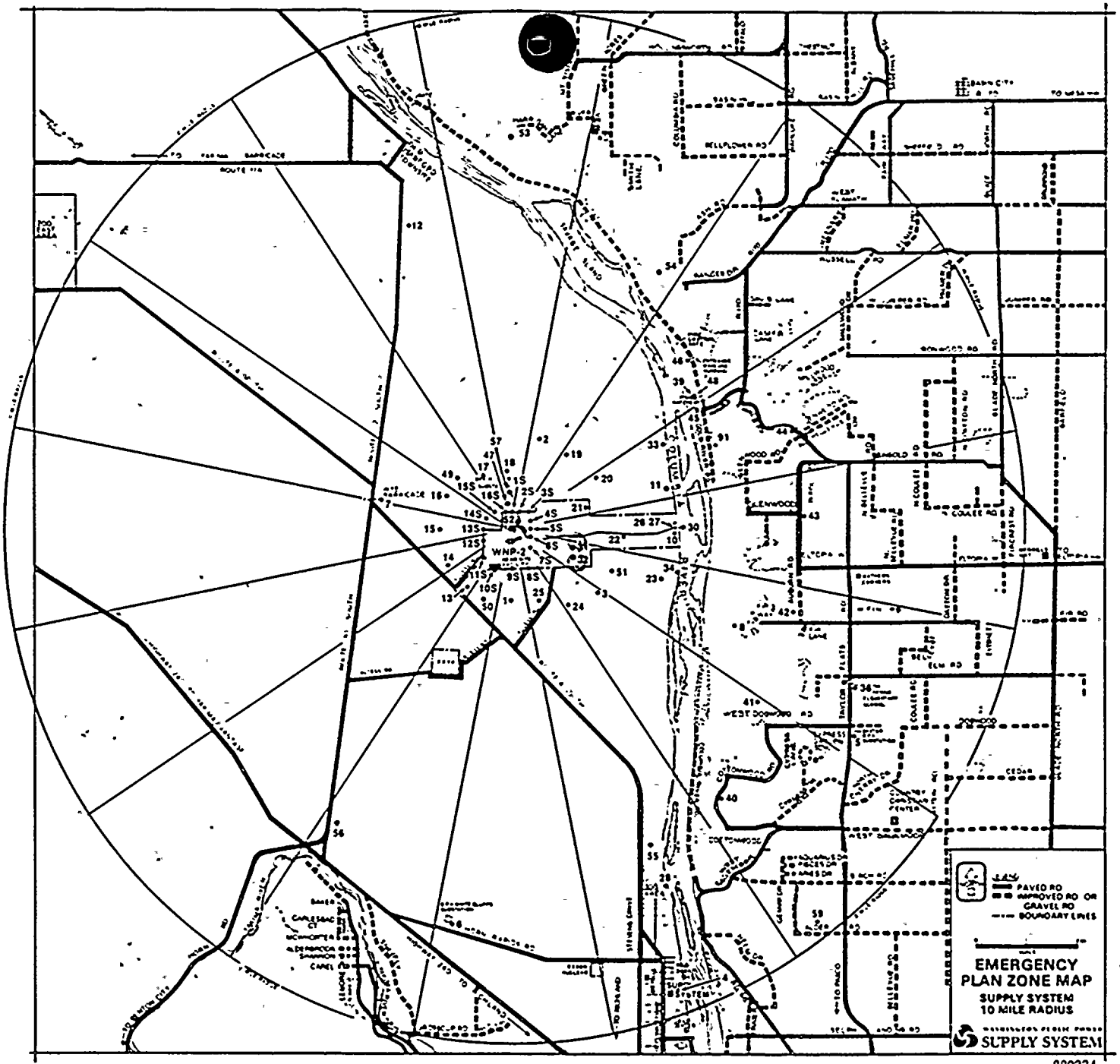


FIGURE 3-7
GROUNDWATER SAMPLING LOCATIONS

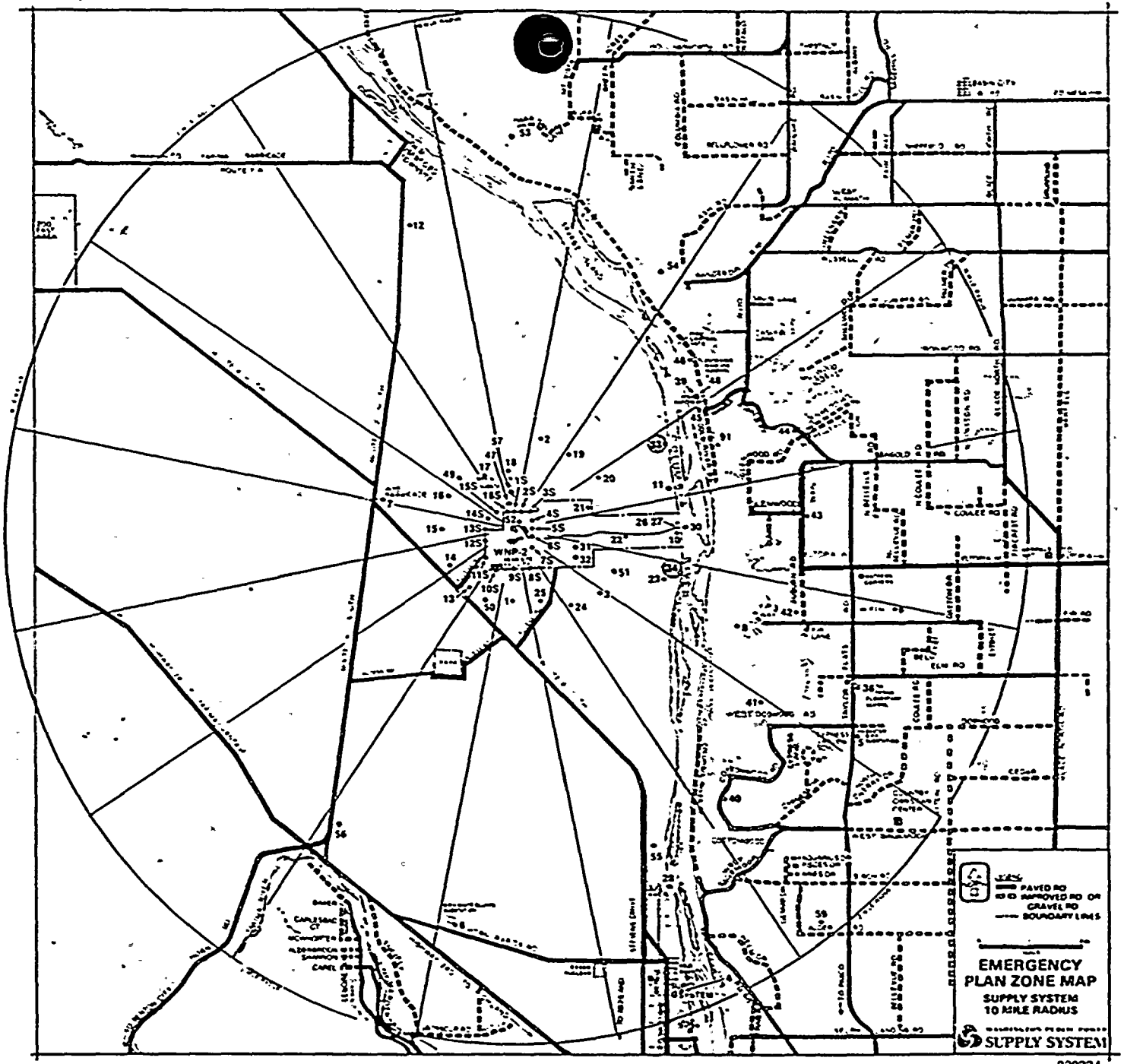


FIGURE 3-8
SEDIMENT SAMPLING LOCATIONS

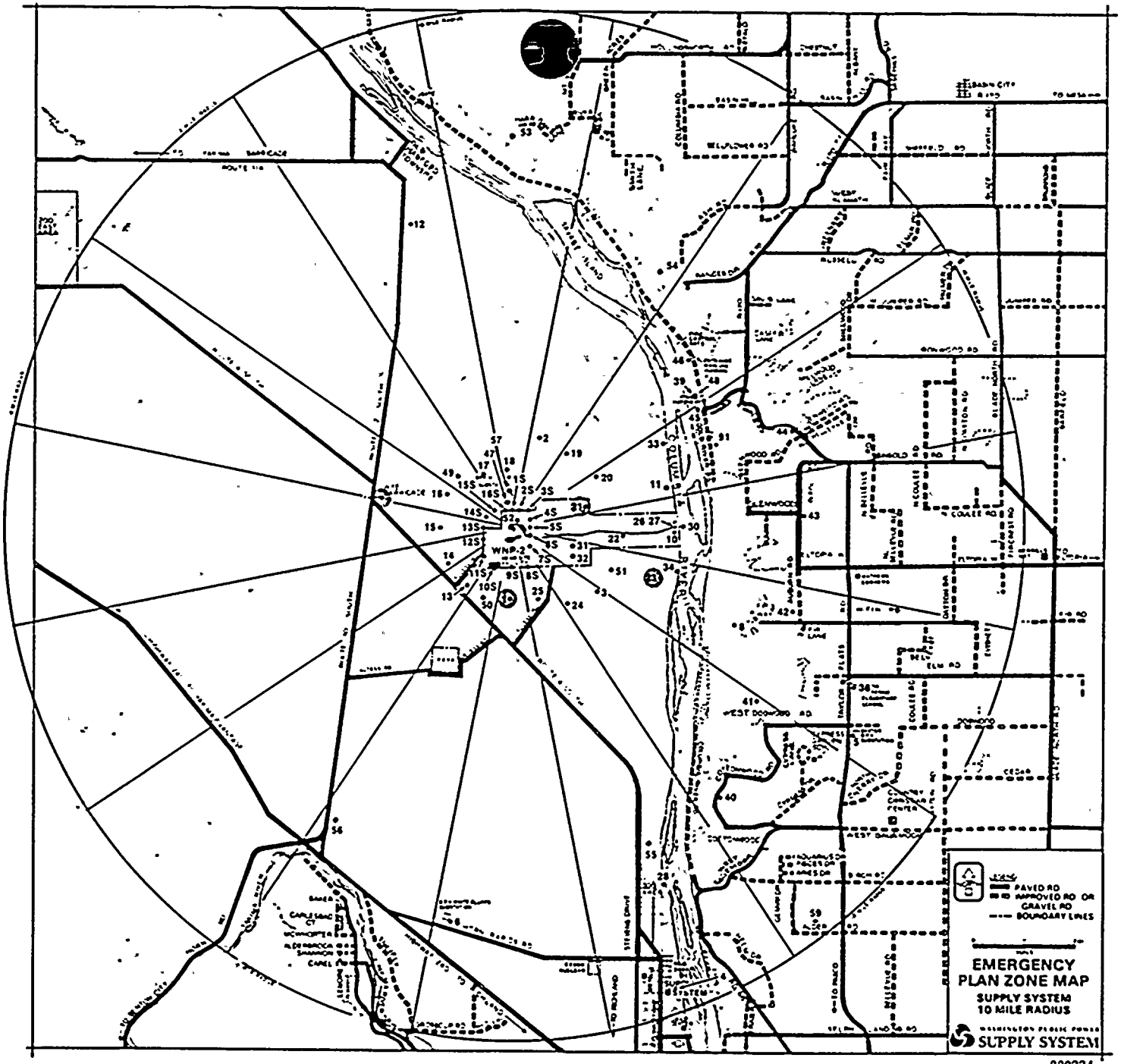


FIGURE 3-9
SOIL SAMPLING LOCATIONS WITHIN THE 10-MILE RADIUS

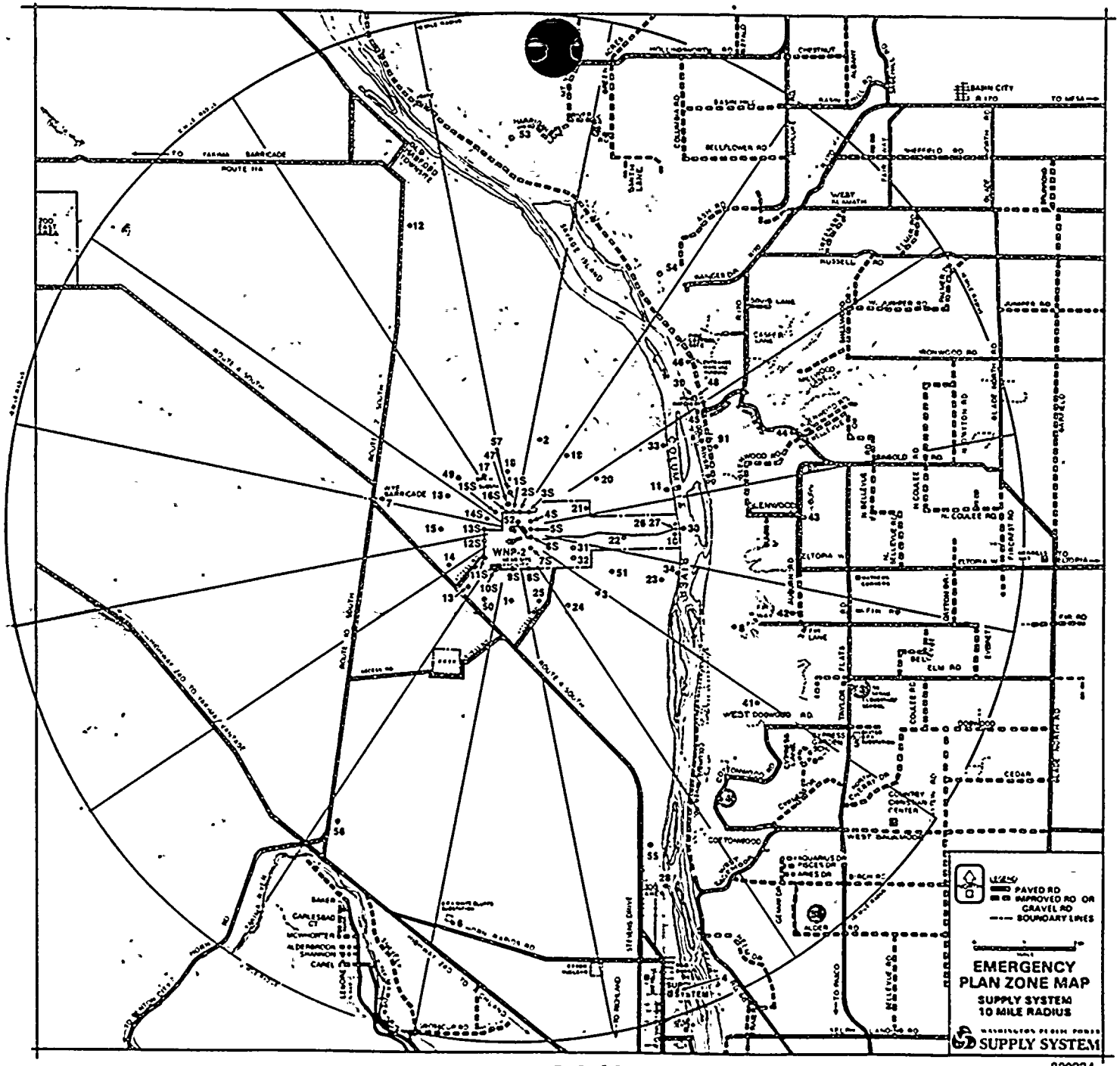


FIGURE 3-10
MILK SAMPLING LOCATIONS WITHIN THE 10-MILE RADIUS

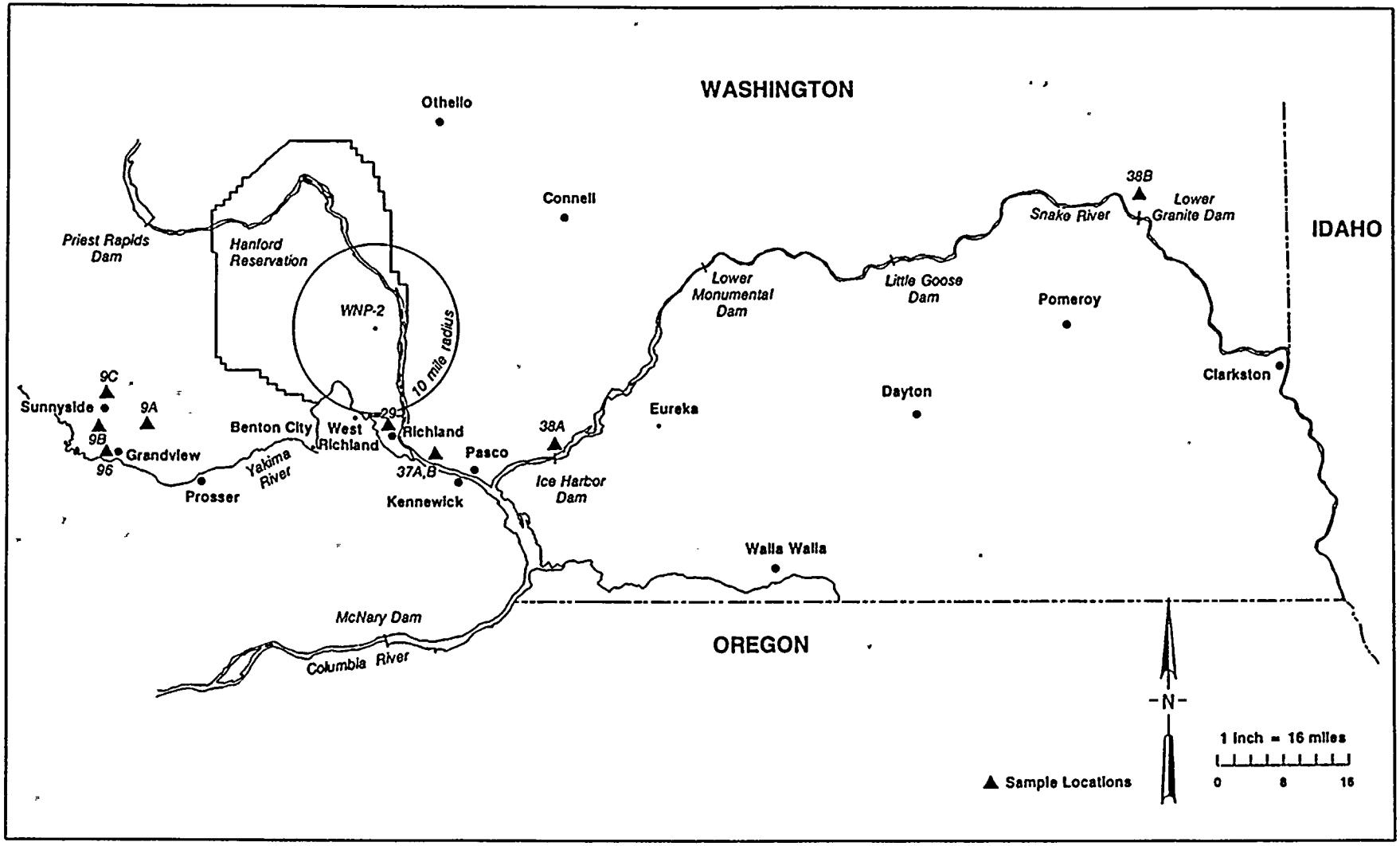


FIGURE 3-11
REMP SAMPLING LOCATIONS OUTSIDE THE 10-MILE RADIUS

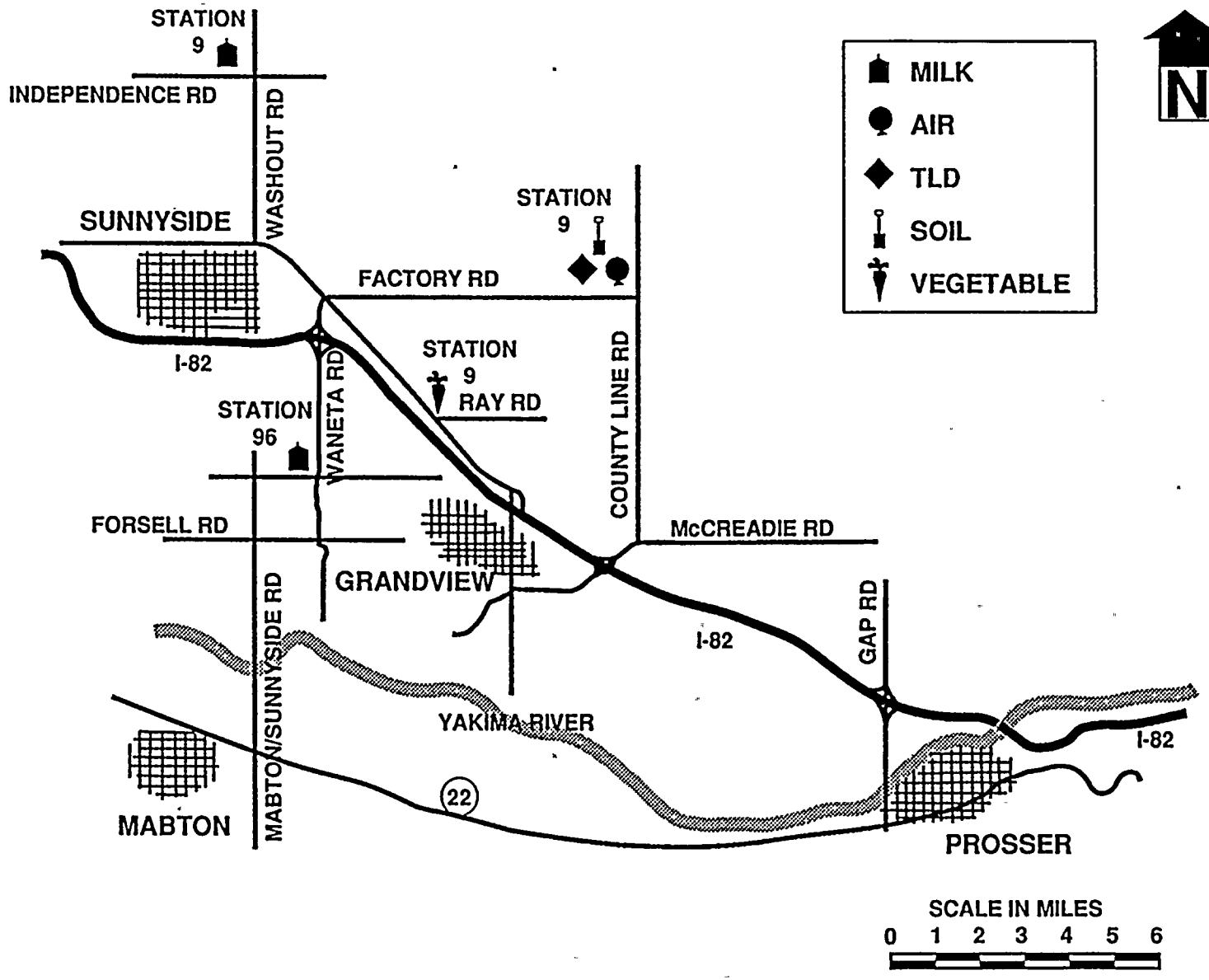


FIGURE 3-12
REMP SAMPLING LOCATIONS IN THE SUNNYSIDE/GRANDVIEW AREA

lated dose or dose commitment greater than the sites currently monitored for the same exposure pathway. If so, routine sampling of that exposure pathway would be initiated at that new site.

The results of the 1987 land use census within 5 miles are given in Table 3-3. 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. Milk sampling is currently performed at these sites, in addition to sites at 9.6 miles SE and two sites in the Sunnyside/Grandview area. Goats located at 5.6 miles ENE are not used as milk animals. Therefore, no changes were made in milk sampling locations as a result of the land use census. The gardens located by the land use census were either not irrigated by Columbia River water or located upstream from Plant 2, so no vegetation sampling will be conducted at these locations.

3.3 Sampling Methods

The collection of environmental samples for the REMP was performed according to the schedule in Table 3-1. All samples were collected by Supply System personnel. The 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.

3.3.1 Direct Radiation

Thermoluminescent dosimeters (TLDs) were used to determine the direct radiation levels at fifty-six (56) monitoring locations. 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 overresponse to low energy photons[10]. 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.

TABLE 3-3

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

SECTOR[a] PARAMETER	RESIDENT	GARDEN ($>50M^2$)	DAIRY[b] ANIMALS	LIVESTOCK
NE	4.3	4.3	0	0
ENE	3.9	3.9	0	3.9
E	4.4	4.4	0	4.4
ESE	4.2	4.4	0	0
SE	4.8	0	0	0

(a) 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.

(b) The closest dairy animal locations are at 6.4 miles, 9.6 miles and 8.3 miles SE and 7.2 miles ESE. The location at 8.3 miles SE is not used for milk sample collection due to the owner's reluctance to participate.

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 control dosimeters that accompanied the field dosimeters to and from the field locations.

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 to approximately 100 mR of Cs-137 gamma, in order to determine dose response (i.e, calibration) factors for each dosimeter. The calibration factors were then used to determine the total exposure received by each TLD.

Until late 1985, the Site Certification Agreement for Plant 2 required the use of pressurized ion chambers (PICs) to measure direct radiation at three locations on the site boundary. Because of lightning damage to these units and frequent malfunctioning, the requirement for the routine use of the PICs was waived. The units are currently maintained for use in special monitoring situations or as back-up monitoring systems. Solar panels have been constructed for the units to eliminate the occurrence of power surges and lightning damage.

3.3.2 Airborne Particulate/Air 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 9 are considered control, or background, samples; the ones drawn at the other locations are indicator samples. Air particulates were collected by drawing air through a 47 mm diameter glass fiber filter. Air iodine was collected by drawing air through a 57 mm 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 weather 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.

3.3.3 Water

The water sampling network consists of seven sampling locations: three for evaluation of river/drinking water, one for evaluation of discharge water and three for the evaluation of groundwater. The river/drinking water stations are located at the plant intake (Station 26) , the DOE 300 Area river intake (Station 28) and the Richland Water Treatment Plant (Station 29). The discharge water sample is drawn from the plant discharge line (Station 27) to the Columbia River. The sample drawn from the plant intake line is considered the control sample, while the samples drawn from the other locations are indicator samples. A Collins Model 42 composite sampler is installed at each of these locations to periodically collect 25-ml aliquots of water, which 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.

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 tritium water samples. One gallon 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 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.

The 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). Water from the Plant 2 well is used as a backup source for drinking and fire protection. Water from the WNP-1 wells supplies some of the drinking and fire protection water for the WNP-1 site and, until November, 1987, supplied drinking water to the Plant Support Facility at Plant 2. 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 samples were not acidified.

3.3.4 Soil

Soil samples were collected once during 1987, as required by the Site Certification Agreement. Samples were taken from five locations. The sample taken at Station 9 is the control sample, while the other four samples are indicator samples. 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.

Each sample was submitted for gamma isotopic analysis. No soil samples were submitted for strontium analysis because the cesium results for the indicator stations did not exceed ten (10) times the results for the control station.

3.3.5 Shoreline Sediment

Two shoreline sediment samples were collected twice during 1987 in accordance with the routine sampling schedule. The upstream sediment sampling location (Station 33) is approximately two miles up the

Columbia River from the plant discharge point and the other location (Station 34) is approximately one mile downstream of the discharge point. Samples were scooped from underwater 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.

3.3.6 Fish

Fish sampling was performed during two weeks in April and September, when the likelihood of obtaining anadromous* species was high. Fish samples collected from the Columbia River (Station 30) were indicator samples, while the fish collected on the Snake River (Station 38) were control samples.

Four separate fish samples, 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 electroshock, but samples of the anadromous species were also collected from the Ringold Fish Hatchery on the Columbia River and the fish trap at Ice Harbor Dam 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 overnight, and shipped to the analytical contractor.

3.3.7 Milk

Milk samples were collected monthly during January, February, March, October, November and December and semi-monthly 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 frozen overnight and shipped to the analytical contractor.

*Fish species, such as salmonids, known to ascend rivers from the sea for breeding.

Routine samples were collected from three indicator locations (Stations 36, 40, and 58) across the Columbia River in Franklin County and one indicator station (Station 9) and one control location (Station 96) near Sunnyside. Milk production at Station 58 was discontinued in June, so a replacement sampling site, Station 59, was located in Franklin County and sampling began there immediately. Station 9 in Grandview continued to serve as an indicator station in 1987. A portion of the feed for the cows at that location is hay from the north Pasco area of Franklin County, making this location unsuitable for use as a control location.

3.3.8 Garden Produce

Samples of local garden produce were collected monthly during the four months from June 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 the predominant downwind direction from the plant (Station 37) where crops are irrigated with Columbia River water. The control samples were obtained from produce stands in the Sunnyside area (Station 9), the direction least likely to be affected by plant effluents. During 1987, a new fruit sampling station (Station 91), where Columbia River water is used for orchard irrigation, was identified within five miles of Plant 2. Samples are collected there annually during harvest.

3.4 Analytical Procedures

The analytical procedures used for the 1987 REMP samples are described below. Teledyne Isotopes performed all analyses of REMP samples during 1987.

3.4.1 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, supplied by the Supply System, was counted as the blank.

3.4.2 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 with a shielded Ge(Li) detector.

Foodstuff

As much of the edible portion of the sample as possible was loaded into a tared Marinelli and weighed. The sample was then counted for at least 1000 minutes 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 and weighed. The sample was then counted for at least six 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 I-131 of each charcoal cartridge was determined (assuming no positive I-131) uniquely from the volume of air which passed through it. In the event that I-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

Three air particulate filters for a quarterly composite for each field station were aligned one in front of another and then counted for at least six 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.

3.4.3 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.

3.4.4 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.

3.4.5 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, anticoincidence system provided additional shielding from cosmic rays.

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

Water

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.

Milk

Stable strontium carrier was added to one liter of sample and trichloroacetic acid (TCA) was added to produce a curd. The curd was separated by filtration and discarded. An oxalate precipitation was performed on the filtrate and the precipitate was ashed in a muffle furnace. The ash was dissolved 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 nitric acid. The mixture was filtered and the liquid portion was reduced in volume by evaporation. 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 7 to 10 days for yttrium ingrowth. Yttrium was then precipitated as hydroxide, dissolved and re-precipitated as oxalate. The yttrium oxalate was mounted on a nylon planchet and counted in a low level beta counter to infer Sr-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.

3.4.7 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.

3.5 Data Analysis Methods

Since 1985 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" 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 lower limit of detection. A listing of the current lower limits of detection determined for each analysis is also provided 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, 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 (TLD) output minus the TLD background, minus any transit 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.

4.0 RESULTS AND DISCUSSION

During 1987 the analyses of REMP samples was performed by Teledyne Isotopes in Westwood, New Jersey. The thermoluminescent dosimeters were processed by the Supply System External Dosimetry Laboratory. Table 4-1 presents the means and ranges of the 1987 results for each type of sample collected. The means and ranges of the preoperational and the previous operational data from 1985 and 1986 are also included in the table for comparison. The results from 1984 are not included in this table but have been included in previous reports.

The data for the preoperational period included "less than" (<) designations for results below the lower limits of detection (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 1985. Since then, REMP data has been reported as net results, i.e. total (gross) results minus the detector counting background. Comparison of the mean results for 1987 to the mean preoperational results is difficult due to the high bias stemming from the "less than" data. However, comparison of the range of results observed for each period, in order to determine whether the 1987 results are significantly greater than during preoperational and previous operational periods, is a viable approach.

The 1987 REMP data compares well to the ranges of data from previous periods. Only in the results of the gross beta and tritium analyses of the discharge water is there a noticable increase over previous years. This increase, resulting from the 1986 change in the way plant effluents are discharged, is discussed in Subsection 4.3 below.

The LLDs generally determined by Teledyne Isotopes for each analysis performed and each radionuclide of interest are listed in Table 4-2. Presented alongside the Teledyne LLDs are the LLDs required by the NRC Branch Technical Position (BTP).

A summary of the REMP results above detection limits is presented in Table 4-3. If a particular radionuclide of interest was not detected in the 1987 samples, the term "LLD" is noted in the data mean and range columns. In this table the discharge water, river/drinking water, and groundwater results are listed separately to clarify the increases observed in the gross beta and tritium levels reported for the discharge water samples.

In general, the positive, or detected, 1987 results compare well with the results from previous years. Any significant differences or increases evident in the 1987 results are discussed in Subsections 4.1 - 4.8.

4.1 Direct Radiation

Summaries of the environmental radiation exposure rates, deter- mined by thermoluminescent dosimeters (TLDs) are presented in Tables 4-4 and 4-5. The individual quarterly and annual results for each TLD station are given in Tables A-1.1 and A-1.2 of Appendix A. The annual and quarterly results for all TLD locations, including the control location near Grandview, were generally 10-20% higher than those observed during previous operational periods and during the preoperational period. The increase was observed at all locations regardless of distance from the plant or location relative to the plant. A similar increase was observed in the 1986 Third and Fourth Quarter TLD results due to fall-out from the Chernobyl nuclear accident. NRC data for TLD stations in the vicinity of Plant 2, including some stations where Supply System TLDs are also located, indicated a similar but smaller increase. Figures 4-1 and 4-2 show the mean quarterly and annual results of near-plant and remote TLD locations from the preoperational period to 1987. Figure 4-3 presents the mean 1987 results for each of the

sixteen meteorological sectors. The increase in results in 1987 is shown in these figures to be generally consistent for all meteorological sectors and TLD locations.

Station 46 in the Wahluke Reserve remained the location with the highest exposure rate, 0.33 mR/day. 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 4-4 illustrates the Station 46 results relative to the results of Station 9, the control location. 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 1987 annual and mean quarterly TLD results is presented in Table 4-6. The 1987 annual TLD results are slightly lower but generally within 5% of the mean quarterly results. Steps taken during 1987 to improve the consistency of TLD calibration exposures and TLD processing likely contributed to the close agreement between the annual and the quarterly TLD results.

Because thermoluminescent signal fading has in the past been suspected as contributing to the differences between the annual and mean quarterly results, a study was conducted in 1987 to determine the extent of signal fading. The results of the study indicated that signal fading over time was not significant. It also demonstrated the need for tight controls on the accumulation of background on the TLDs while they are stored in the lead cave before distribution to the field and after retrieval from the field. Additional work will be performed in 1988 to further improve the consistency of the TLD results.

The log probability plots of the 1987 quarterly and annual TLD results are presented in Figures 4-5 and 4-6. The geometric standard deviations (slopes) of the lines ranged from 1.04 to 1.08, a range which is consistent with that observed during previous years and which is typical for ambient radiation measurements (11, 12).

TABLE 4-1

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM COMPARATIVE SUMMARY

MEDIA/ANALYSIS	PREOPERATIONAL[a]		OPERATIONAL[b]					
			1985		1986[f, g]		1987[g]	
	MEAN	RANGE	MEAN	RANGE	MEAN	RANGE	MEAN	RANGE
Air: pCi/m^3								
Gross Beta	<0.02 (≤0.003 - 0.130)		0.028 (0.007 - 0.140)		0.050 (0.003 - 0.741)		0.019 (0.004 - 0.074)	
I-131[c]	<0.05 (≤0.01 - 0.11)		0.00002 (-0.022 - 0.045)		0.031 (-0.024 - 0.818)		-0.0001 (-0.033) - 0.018)	
Gamma								
Cs-134	<0.01 (≤0.001 - 0.04)		0.0001 (-0.0021 - 0.0008)		0.002 (-0.001 - 0.015)		0.0001 (-0.0004 - 0.0003)	
Cs-137	<0.01 (≤0.001 - 0.04)		0.0001 (-0.0011 - 0.0014)		0.009 (-0.0008 - 0.036)		0.0001 (-0.0001 - 0.0005)	
Ru-103	Not Reported		Not Reported		0.005 (-0.0002 - 0.019)		0.000 (-0.0003 - 0.0007)	
Ru-106	Not Reported		Not Reported		0.003 (-0.002 - 0.013)		0.0004 (-0.017 - 0.020)	
Water: pCi/l								
Gross Beta[d]	<4.4 (≤1.0 -< 22.0)		2.7 (0.4 - 8.1)		5.8 (0.6 - 28.0)		10.5 (0.8 - 36.0)	
Gamma[e]								
Ba-140	<50.5 (≤4.0 -< 300.0)		2.5 (-22.9 - 24.3)		0.8 (-6.8 - 14.8)		-0.1 (-5.7 - 10.0)	
Cs-134	<3.8 (≤1.0 -< 12.0)		0.2 (-3.4 - 2.2)		0.1 (-4.1 - 2.8)		0.7 (-3.6 - 5.0)	
Cs-137	<3.8 (≤0.8 -< 16.0)		0.1 (-3.1 - 2.7)		1.0 (-4.0 - 3.9)		1.6 (-1.7 - 5.6)	

[a] All stations, all years.
[b] Indicator stations only.
[c] Charcoal cartridge results.
[d] Includes river/drinking water and discharge water results only.
[e] Includes ground water, river/drinking water and discharge water results.
[f] The effect of the fallout from the Chernobyl accident is evident in the 1986 results, such as iodine and cesium in milk and iodine, cesium and ruthenium in air.
[g] The effects of the change in plant discharge methods, which occurred in mid-1986, is evident in the gross beta and tritium in water results.

TABLE 4-1 (Cont.)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM COMPARATIVE SUMMARY

MEDIA/ANALYSIS	PREOPERATIONAL[a]		OPERATIONAL[b]					
			1985		1986[f, g]		1987[g]	
	MEAN	RANGE	MEAN	RANGE	MEAN	RANGE	MEAN	RANGE
Water: pCi/l (Cont.)								
Gamma[c]								
Co-58	<4.6 (≤1.0 -< 25.0)		0.2 (-3.3 - 1.9)		-0.2 (-2.7 - 2.7)		0.0 (-2.2 - 4.6)	
Co-60	<4.6 (≤0.1 -< 13.0)		-0.0 (-2.4 - 1.8)		0.9 (-4.9 - 8.4)		2.1 (-1.6 - 10.5)	
Fe-59	<12.1 (≤2.0 -< 93.0)		0.6 (-6.4 - 6.6)		0.2 (-3.8 - 4.9)		0.8 (-4.3 - 4.6)	
La-140	<25.5 (≤3.0 -< 160.0)		-1.8 (-48.1 - 13.5)		-0.1 (-6.8 - 6.1)		-0.4 (-5.5 - 5.8)	
Mn-54	<4.2 (≤1.0 -<16.0)		0.1 (-3.2 - 2.6)		0.6 (-1.8 - 4.2)		0.8 (-1.2 - 4.0)	
Nb-95	<5.1 (≤1.0 -<29.0)		0.1 (-3.3 - 3.8)		0.7 (-3.7 - 3.1)		1.5 (-1.6 - 6.0)	
Zn-65	<8.0 (≤1.4 - 27.0)		-0.0 (-4.6 - 3.9)		-2.2 (-12.6 - 3.1)		1.4 (-10.4 - 86.7)	
Zr-95	<10.6 (≤2.0 - 63.0)		0.2 (-7.0 - 4.3)		1.3 (-4.8 - 6.9)		1.5 (-5.5 - 8.9)	
H-3[c]	<463.1 (≤10.0 - 2600)		97.2 (-165.0 - 289.0)		164.0 (-24.7 - 620)		381.9 (-120 - 2300)	
Sr-90[d]	Not Reported		Not Reported		0.6 (0.1 - 1.0)		0.6 (0.3 - 1.1)	

[a] All stations, all years.
[b] Indicator stations only.
[c] Includes ground water, river/drinking water and discharge water results.
[d] Performed on drinking water samples having gross beta levels greater than 8.0 pCi/liter.
[f] The effect of the fallout from the Chernobyl accident is evident in the 1986 results, such as iodine and cesium in milk and iodine, cesium and ruthenium in air.
[g] The effects of the change in plant discharge methods, which occurred in mid-1986, is evident in the gross beta and tritium in water results.

TABLE 4-1 (Cont.)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM COMPARATIVE SUMMARY

MEDIA/ANALYSIS	PREOPERATIONAL[a]		OPERATIONAL[b]					
			1985		1986[c]		1987	
	MEAN	RANGE	MEAN	RANGE	MEAN	RANGE	MEAN	RANGE
Sediment: pCi/kg								
Gamma								
Co-60	<254.6 (≤ 130.00 - 610.00)		83.6 (73.6 - 93.6)		45.6 (34.4 - 56.6)		41.6 (28.5 - 54.6)	
Cs-134	<112.5 (≤ 50 -<150.00)		41.8 (36.0 - 47.6)		90.3 (7.0 - 172.0)		23.1 (14.4 - 31.8)	
Cs-137	<287.0 (≤ 50 -<560.00)		1090 (296 - 1890)		251.0 (215 - 306)		281.0 (222.0 - 339.0)	
Co-57	Not Reported		Not Reported		46.0 (34.0 - 54.0)		Not Reported	
Eu-152	Not Reported		Not Reported		Not Reported		143.0 (140.0 - 146.0)	
Soil: pCi/kg								
Gamma								
Cs-134	<65.3 (≤ 20.0 -<150.00)		34.2 (19.2 - 43.5)		38.0 (7.1 - 53.2)		35.4 (21.5 - 44.8)	
Cs-137	<364.3 (≤ 20.00 - 1880.0)		320.0 (9.4 - 586.0)		311.6 (36.6 - 735)		257.0 (115 - 470.0)	
Sr-90	Not reported		Not Reported		357.5 (260 - 455)		Not Reported	
Milk: pCi/l								
Gamma								
Cs-134	<3.7 (≤ 0.9 -<14.0)		-0.1 (-7.43 - 8.12)		3.4 (-3.1 - 20.2)		1.7 (-3.5 - 7.6)	
Cs-137	<3.8 (≤ 1.0 -<12.0)		1.0 (-6.1 - 7.7)		8.9 (-3.2 - 47.3)		4.4 (-2.2 - 27.0)	

(a) All stations, all years.
(b) Indicator stations only.
(c) The effect of the fallout from the Chernobyl accident is evident in the 1986 results, such as iodine and cesium in milk and iodine, cesium and ruthenium in air.

TABLE 4-1 (Cont.)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM COMPARATIVE SUMMARY

MEDIA/ANALYSIS	PREOPERATIONAL[a]		OPERATIONAL[b]					
			1985		1986[c]		1987	
	MEAN	RANGE	MEAN	RANGE	MEAN	RANGE	MEAN	RANGE
Milk: pCi/l								
Gamma								
Ba-140	< 72.1	(<6.0 -<2000.0)	3.6	(-44.3 - 42.7)	1.2	(-22.9 - 55.0)	0.1	(-8.7 - 9.7)
La-140	< 33.3	(<5.0 -<1000.0)	-1.9	(-24.2 - 9.0)	-0.5	(-13.3 - 7.5)	-0.1	(-6.4 - 4.2)
I-131[d]	<0.5	(<0.1 -<1.0)	0.0	(-0.4 - 0.6)	5.8	(-0.3 - 99.0)	0.0	(-0.7 - 0.3)
Sr-90	Not Reported		Not Reported		2.2	(-1.3 - 3.9)	Not Reported	
Fish: pCi/kg								
Gamma								
Cs-134	< 61.2	(<6.0 -<130.0)	4.6	(-4.3 - 13.3)	1.0	(-17.3 - 10.2)	4.0	(1.1 - 7.4)
Cs-137	< 88.8	(<10.0 -<130.0)	11.4	(-3.0 - 30.7)	22.6	(2.7 - 54.9)	21.7	(8.6 - 34.2)
Co-58	< 87.7	(<9.0 -<130.0)	-3.1	(-16.8 - 11.5)	3.7	(-4.0 - 17.3)	0.1	(-3.8 - 2.8)
Co-60	< 80.6	(<9.0 -<130.0)	-0.9	(-16.5 - 19.1)	3.1	(-5.7 - 9.6)	0.8	(-4.3 - 3.9)
Fe-59	<130.0	(<30.0 -<260.0)	-7.9	(-34.2 - 11.5)	-3.5	(-32.8 - 21.1)	-1.2	(-21.5 - 9.7)
Mn-54	< 88.3	(<8.0 -<130.0)	1.1	(-5.5 - 6.4)	-0.8	(-5.5 - 2.2)	0.2	(-1.8 - 2.4)

[a] All stations, all years.
[b] Indicator stations only.
[c] The effect of the fallout from the Chernobyl accident is evident in the 1986 results, such as iodine and cesium in milk and iodine, cesium and ruthenium in air.
[d] Resin method for I-131 determination.

TABLE 4-1 (Cont.)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM COMPARATIVE SUMMARY

MEDIA/ANALYSIS	PREOPERATIONAL[a]		OPERATIONAL[b]					
			1985		1986		1987	
	MEAN	RANGE	MEAN	RANGE	MEAN	RANGE	MEAN	RANGE
Produce: pCi/kg								
Gamma								
Cs-134	< 49.1	(<10.0 - <140.0)	1.9	(-9.3 - 13.1)	3.7	(-3.5 - 16.2)	1.0	(-7.2 - 5.3)
Cs-137	< 69.8	(<10.0 - <140.0)	0.6	(-9.8 - 9.9)	6.7	(-5.5 - 15.6)	5.7	(2.0 - 20.9)
I-131	<105.6	(<10.0 - <1000.0)	1.5	(-19.7 - 14.2)	2.3	(-21.3 - 33.5)	2.7	(-2.3 - 11.8)
TLD: mR/day								
Quarterly	0.24	(0.11 - 0.32)	0.23	(0.16 - 0.29)	0.24	(0.19 - 0.31)	0.27	(0.21 - 0.33)
Annual	0.24	(0.20 - 0.31)	0.22	(0.19 - .27)	0.21	(0.18 - 0.26)	0.26	(0.22 - 0.32)

[a]All stations, all years.
[b]Indicator stations only.

TABLE 4-2

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

MEDIA (UNITS)	ANALYSIS	TELEDYNE LLDs	BTP REQUIRED LLDs
Air	Gross Beta	0.003	0.01
Particulates:	Gamma Spectrometry	--	--
(pCi/m^3)	Cs-134	0.002	0.05
	Cs-137	0.002	0.06
Air Iodine: (pCi/m^3)	I-131	0.02	0.07
Water:	Gross Beta	1-2	4
(pCi/l)	Tritium	100-200	2000
	I-131	0.5	1
	Sr-90	1	--
	Gamma Spectrometry		
	Mn-54	5	15
	Fe-59	15	30
	Co-58	5	15
	Co-60	5	15
	Zn-65	10	30
	Zr-95	20	30
	Nb-95	10	15
	Cs-134	6	15
	Cs-137	6	18
	Ba-140	10-20	60
	La-140	5-10	15

TABLE 4-2 (Cont.)

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

MEDIA (UNITS)	ANALYSIS	TELEDYNE LLDs	BTP REQUIRED LLDs
Soil/	Gamma Spectrometry		
Sediment:	Co-60	20-30	--
(pCi/kg)	Cs-134	30-40	150
	Cs-137	30-40	180
	Sr-90	10	--
Fish:	Gamma Spectrometry		
(pCi/kg)	Mn-54	7-10	130
	Fe-59	20-30	260
	Co-58	8-10	130
	Co-60	8-10	130
	Zn-65	20-30	260
	Cs-134	7-10	130
	Cs-137	7-10	150
Milk:	I-131	0.5	1
(pCi/l)	Gamma Spectrometry		
	Cs-134	7-10	15
	Cs-137	7-10	18
	Ba-140	20	60
	La-140	10	15
	Sr-90	1	--
Garden	Gamma Spectrometry		
Produce:	Cs-134	6-10	60
(pCi/kg)	Cs-137	7-10	80
	I-131	20-30	60

TABLE 4-3

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

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

HANFORD, WASHINGTON JANUARY 1 to DECEMBER 31, 1987

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) RANGE	CONTROL LOCATION MEAN RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
AIR PARTICULATES (pCi/m^3)	Gross Beta 621	0.003	0.018(568/569) (0.004-0.074)	57 0.8 mi N	0.020(52/52) (0.005-0.069)	0.017(52/52) (0.005-0.051)	0
	Gamma (Quarterly) 48						
	Be-7	-	0.076(44/44) (0.032-0.133)	8 4.7 mi ESE	0.082(4/4) (0.045-0.122)	0.076(4/4) (0.049-0.106)	0
	K-40	-	0.006(9/48) (0.004-0.0101)	48 4.3 mi NE	0.008(2/4) (0.006-0.010)	0.012(1/4)	0
AIR IODINE (pCi/m^3)	I-131 621	0.04	LLD	LLD	LLD	-(0/52)	0

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

TABLE 4-3 (Cont.)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

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

HANFORD, WASHINGTON JANUARY 1 to DECEMBER 31, 1987

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) RANGE	CONTROL LOCATION MEAN RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
WATER (River/Drinking) (pCi/liter)	Gross Beta	36	4	2.51(23/24) (1.10-9.10)	29 11.0 mi SSE	3.15(11/12) (1.40-9.10)	1.90(11/12) (1.00-3.00)	0
	Tritium	12	300	193.3(6/8) (160-290)	28 7.4 mi SSE	210.0(4/4) (120-190)	186.7(3/4) (160-230)	0
	Sr-89	2		LLD		LLD	LLD	0
	Sr-90	2		LLD		LLD	LLD	0
	Gamma	36						
	Mn-54		10	LLD		LLD	LLD	0
	Fe-59		20	LLD		LLD	LLD	0
	Co-58		20	LLD		LLD	LLD	0
	Co-60		20	LLD		LLD	LLD	0
	Zn-65		20	LLD		LLD	LLD	0
	Zr-95		20	LLD		LLD	LLD	0
	Cs-134		20	LLD		LLD	LLD	0
	Cs-137		20	LLD		LLD	LLD	0
	Ba-140		20	LLD		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 4-3 (Cont.)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

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

HANFORD, WASHINGTON JANUARY 1 to DECEMBER 31, 1987

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) RANGE	CONTROL LOCATION MEAN RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
WATER (Discharge) (pCi/liter)	Gross Beta 11	4	28.0(11/11) (20-36)	27 3.2 mi E	28.0(11/11) (20-36)	None	0
	Tritium 4	300	1700(4/4) (1300-2300)	27 3.2 mi E	1700(4/4) (1300-2300)	None	0
	Sr-89 2		LLD		LLD		0
	Sr-90 2		LLD		LLD		0
	Gamma 12						
	Mn-54	10	LLD		LLD		0
	Fe-59	20	LLD		LLD		0
	Co-58	20	LLD		LLD		0
	Co-60	20	10.5(1/12)	27 3.2 mi E	10.5(1/12)		0
	Zn-65	20	51.0(2/12) (15.3-86.7)	27 3.2 mi E	51.0(2/12) (15.3-86.7)		0
	Zr-95	20	LLD		LLD		0
	Cs-134	20	LLD		LLD		0
	Cs-137	20	LLD		LLD		0
	Ba-140	20	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 4-3 (Cont.)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

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

HANFORD, WASHINGTON JANUARY 1 to DECEMBER 31, 1987

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) RANGE	CONTROL LOCATION MEAN RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
WATER (Ground) (pCi/liter)	Tritium	4	300	213.3(3/12) (160-250)	52 0.1 mi N	240(2/4) (230-250)	None	0
	Gamma	12						
	Mn-54		10	LLD		LLD		0
	Fe-59		20	LLD		LLD		0
	Co-58		20	LLD		LLD		0
	Co-60		20	LLD		LLD		0
	Zn-65		20	LLD		LLD		0
	Zr-95		20	LLD		LLD		0
	Cs-134		20	LLD		LLD		0
	Cs-137		20	LLD		LLD		0
	Ba-140		20	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 4-3 (Cont.)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

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

HANFORD, WASHINGTON JANUARY 1 to DECEMBER 31, 1987

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] RANGE	CONTROL LOCATION MEAN RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
SOIL (pCi/kg dry)	Gamma 5						
	Cs-134	100	-(0/4)			-(0/1)	0
	Cs-137	100	257(4/4) (115-470)	07 2.7 mi WNW	470(1/1)	-(0/1)	0
	Ra-226	400	784(4/4) (710-843)	09 30 mi WSW	901(1/1)	901(1/1)	0
SEDIMENT (pCi/kg dry)	Gamma 4						
	K-40	700	13800(2/2) (13000-14600)	34 3.5 mi ESE	13800(2/2) (13000-14600)	13500(2/2) (13400-13600)	0
	Co-60	100	41.6(2/2) (28.5-54.6)	34 3.5 mi ESE	41.6(2/2) (28.5-54.6)	31.2(2/2) (26.1-36.2)	0
	Cs-137	100	281(2/2) (222-339)	34 3.5 mi ESE	281(2/2) (222-339)	133(2/2) (128-137)	0
	Ra-226	400	1500(2/2) (1100-1900)	34 3.5 mi SE	1500(2/2) (1100-1900)	1625(2/2) (1520-1730)	0
	Eu-152	100	146(1/2) -	34 3.5 mi ESE	146(1/2) -	-(0/2) -	0
	Th-228	50	1486(2/2) (772-2200)	34 3.5 mi ESE	1486(2/2) (772-2200)	1235(2/2) (1060-1410)	0

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

TABLE 4-3 (Cont.)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

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

HANFORD, WASHINGTON JANUARY 1 to DECEMBER 31, 1987

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) RANGE	CONTROL LOCATION MEAN RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
MILK (pCi/liter)	I-131	104	1.0	LLD			LLD	0
	Cs-134	104	10	7.05(5/86) (6.50-7.63)	36 16.0 mi SSE	7.31(1/18) -	-(0/18) -	0
	Cs-137	104	10	13.6(13/86) (5.67-26.9)	58 8.6 mi SE	17.55(6/6) (14.6-26.9)	19.2(2/18) (16.1-22.3)	0

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

TABLE 4-3 (Cont.)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

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

HANFORD, WASHINGTON JANUARY 1 to DECEMBER 31, 1987

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) RANGE	CONTROL LOCATION MEAN RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
FISH (pCi/kg-wet)	Gamma 16						
	K-40		3334(8/8) (2870-3740)	30 3.3 mi E	3334(8/8) (2870-3740)	3354(8/8) (2860-3630)	0
	Mn-54	90	LLD			LLD	0
	Fe-59	170	LLD			LLD	0
	Co-58	90	LLD			LLD	0
	Co-60	90	LLD			LLD	0
	Zn-65	170	LLD			LLD	0
	Cs-134	90	LLD			LLD	0
	Cs-137	100	23.0(7/8) (8.55-34.2)	30 3.3 mi E	23.0(7/8) (8.55-34.2)	18.1(6/8) (9.56-27.4)	0

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

TABLE 4-3 (Cont.)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

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

HANFORD, WASHINGTON JANUARY 1 to DECEMBER 31, 1987

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) RANGE	CONTROL LOCATION MEAN RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
ROOTS (pCi/kg wet)	Gamma 10						
	I-131	50	LLD			LLD	0
	Cs-134	50	LLD			LLD	0
	Cs-137	50	18.7(1/6)	37 16 mi SSE	18.7(1/6)	(0/4)	0
FRUITS (pCi/kg wet)	Gamma 8						
	I-131	50	LLD			LLD	0
	Cs-134	50	LLD			LLD	0
	Cs-137	50	LLD			LLD	0
VEGETABLES (pCi/kg wet)	Gamma 9						
	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 4-3 (Cont.)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

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

HANFORD, WASHINGTON JANUARY 1 to DECEMBER 31, 1987

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) RANGE	CONTROL LOCATION MEAN RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
DIRECT RADIATION Quarterly TLD's (mR/day)	TLD 220	-	0.27(220/220) (0.21-0.33)	46 4.7 mi NE	0.33(4/4) (0.32-0.33)	0.24(4/4) (0.24-0.25)	0
DIRECT RADIATION Annual TLD's (mR/day)	TLD 56	-	0.26(55/55) (0.22-0.32)	46 4.7 mi NE	0.32(1/1) -	0.23(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 4-4

MEAN QUARTERLY TLD DATA SUMMARY FOR THE PREOPERATIONAL AND OPERATIONAL PERIODS

Results in mR/day

STATION	PREOPERATIONAL		1984 - 1986 OPERATIONAL		1987 OPERATIONAL	
	MEAN	STANDARD ERROR	MEAN	STANDARD ERROR	MEAN	STANDARD ERROR
1	0.24	0.02	0.23	0.02	0.27	0.01
2	0.23	0.02	0.22	0.01	0.26	0.00
3	0.22	0.01	0.22	0.01	0.26	0.00
4	0.22	0.02	0.20	0.01	0.23	0.01
5	0.23	0.01	0.21	0.01	0.25	0.01
6	0.22	0.01	0.21	0.01	0.25	0.00
7	0.23	0.01	0.22	0.01	0.27	0.01
8	0.26	0.01	0.24	0.02	0.29	0.01
9	0.22	0.01	0.21	0.01	0.24	0.01
10	0.23	0.01	0.22	0.01	0.26	0.01
11	0.24	0.01	0.22	0.01	0.26	0.00
12	0.25	0.01	0.24	0.01	0.28	0.00
13	0.24	0.01	0.23	0.02	0.26	0.01
14	0.24	0.02	0.23	0.01	0.26	0.00
15	0.25	0.01	0.24	0.02	0.28	0.00
16	0.24	0.01	0.24	0.02	0.26	0.01
17	0.25	0.01	0.23	0.01	0.27	0.01
18	0.24	0.01	0.23	0.02	0.27	0.00
19	0.24	0.01	0.23	0.02	0.27	0.00
20	0.24	0.01	0.23	0.01	0.26	0.01
21	0.23	0.01	0.21	0.01	0.24	0.01
22	0.24	0.01	0.23	0.01	0.26	0.01
23	0.24	0.01	0.22	0.01	0.26	0.00
24	0.24	0.01	0.23	0.01	0.26	0.01
25	0.25	0.01	0.24	0.02	0.28	0.01
40	0.22	0.01	0.22	0.02	0.26	0.01
41	0.26	0.02	0.24	0.01	0.29	0.01
42	0.25	0.01	0.23	0.01	0.27	0.01

TABLE 4-4 (Cont.)

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

STATION	PREOPERATIONAL		1984 - 1986 OPERATIONAL		1987 OPERATIONAL	
	MEAN	STANDARD ERROR	MEAN	STANDARD ERROR	MEAN	STANDARD ERROR
43	0.25	0.01	0.23	0.02	0.29	0.01
44	0.23	0.01	0.22	0.01	0.26	0.01
45	0.23	0.01	0.22	0.01	0.26	0.01
46	0.28	0.02	0.26	0.02	0.33	0.01
47	0.22	0.02	0.21	0.01	0.24	0.02
49	0.24	0.00	0.23	0.01	0.26	0.00
50	0.22	0.00	0.23	0.02	0.27	0.01
51	0.23	0.01	0.22	0.01	0.26	0.00
53	0.27	0.00	0.25	0.01	0.30	0.01
54	0.26	0.00	0.23	0.01	0.28	0.01
55	0.23	0.00	0.22	0.01	0.26	0.01
56	0.24	0.00	0.23	0.01	0.27	0.01
71(S1)	0.24	0.02	0.25	0.02	0.29	0.02
72(S2)	0.25	0.01	0.24	0.02	0.29	0.02
73(S3)	0.23	0.01	0.22	0.01	0.26	0.01
74(S4)	0.26	0.01	0.24	0.01	0.29	0.01
75(S5)	0.22	0.02	0.22	0.02	0.27	0.01
76(S6)	0.24	0.01	0.22	0.01	0.27	0.01
77(S7)	0.25	0.01	0.23	0.01	0.27	0.01
78(S8)	0.25	0.01	0.23	0.01	0.26	0.01
79(S9)	0.25	0.01	0.23	0.02	0.27	0.00
80(S10)	0.24	0.01	0.22	0.01	0.26	0.00
81(S11)	0.24	0.02	0.23	0.01	0.26	0.00
82(S12)	0.25	0.02	0.23	0.01	0.27	0.00
83(S13)	0.25	0.01	0.24	0.01	0.28	0.01
84(S14)	0.24	0.01	0.22	0.01	0.27	0.00
85(S15)	0.26	0.01	0.25	0.02	0.28	0.02
86(S16)	0.25	0.01	0.25	0.02	0.29	0.02
All	0.24	0.00	0.23	0.01	0.27	0.00

TABLE 4-5

ANNUAL TLD DATA SUMMARY FOR THE PREOPERATIONAL AND OPERATIONAL PERIODS

Results in mR/day

STATION	PREOPERATIONAL		1984 - 1986 OPERATIONAL		1987 OPERATIONAL	
	MEAN[a]	STANDARD ERROR	MEAN	STANDARD ERROR	MEAN	STANDARD DEVIATION(2σ)
1	0.23	0.04	0.22	0.02	0.26	0.01
2	0.22	0.04	0.21	0.01	0.25	0.01
3	0.21	0.04	0.20	0.01	0.24	0.00
4	0.22	0.06	0.19	0.01	0.22	0.01
5	0.22	0.04	0.20	0.00	0.24	0.00
6	0.21	0.04	0.20	0.01	0.24	0.01
7	0.22	0.02	0.22[b]	0.02	0.24	0.01
8	0.25	0.04	0.23[b]	0.00	0.28	0.02
9	0.20	0.02	0.19	0.01	0.23	0.01
10	0.22	0.04	0.21	0.02	0.24	0.01
11	0.22	0.04	0.21	0.01	0.25	0.02
12	0.24	0.04	0.23	0.01	0.27	0.00
13	0.22	0.04	0.22	0.01	0.25	0.01
14	0.22	0.04	0.21	0.02	0.25	0.01
15	0.23	0.06	0.22	0.02	0.27	0.02
16	0.23	0.04	0.22	0.01	0.26	0.01
17	0.23	0.02	0.22[b]	0.01	0.26	0.01
18	0.25	0.02	0.22	0.01	0.26	0.01
19	0.22	0.04	0.22	0.01	0.25	0.01
20	0.23	0.04	0.22	0.01	0.26	0.01
21	0.23	0.02	0.20	0.01	0.23	0.01
22	0.22	0.02	0.21	0.01	0.25	0.01
23	0.24	0.02	0.21	0.01	0.25	0.01
24	0.22	0.02	0.21	0.01	0.26	0.01
25	0.24	0.02	0.22	0.02	0.28	0.01
40	0.21[c]	0.02	0.21	0.02	0.25	0.01
41	0.26[c]	0.04	0.22	0.01	0.28	0.01

TABLE 4-5 (Cont.)

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

STATION	PREOPERATIONAL		1984 - 1986 OPERATIONAL		1987 OPERATIONAL	
	MEAN[a]	STANDARD ERROR	MEAN	STANDARD ERROR	MEAN	STANDARD DEVIATION(2σ)
42	0.24(c)	0.02	0.22	0.01	0.26	0.00
43	0.24(c)	0.02	0.22	0.00	0.28	0.01
44	0.24	0.02	0.21	0.00	0.25	0.01
45	0.24	0.01	0.21	0.00	0.25	0.01
46	0.29	0.01	0.27	0.01	0.32	0.02
47	0.22(c)	0.03	0.20	0.01	0.24	0.01
49	(d)		0.22	0.01	0.24(e)	0.01
50	(d)		0.21	0.02	0.26	0.00
51	(d)		0.20	0.01	0.25	0.01
53	(d)		0.24	0.01	0.28	0.01
54	(d)		0.23	0.00	0.27	0.01
55	(d)		0.21	0.01	0.25	0.01
56	(d)		0.22	0.01	0.25	0.01
71	0.24(c)	0.02	0.24	0.02	0.28	0.00
72	0.25(c)	0.02	0.23	0.01	0.28	0.00
73	0.23(c)	0.01	0.21	0.01	0.24	0.01
74	0.24(c)	0.01	0.23	0.01	0.27	0.02
75	0.24(c)	0.01	0.21	0.01	0.26	0.01
76	0.24(c)	0.02	0.22	0.01	0.25	0.01
77	0.25(c)	0.02	0.21	0.01	0.25	0.01
78	0.25(c)	0.04	0.23	0.04	0.25	0.01
79	0.25(c)	0.02	0.22	0.02	0.25	0.01
80	0.23(c)	0.05	0.20	0.02	0.25	0.01
81	0.23(c)	0.02	0.21	0.01	0.25	0.01
82	0.25(c)	0.03	0.22	0.01	0.27	0.01

TABLE 4-5 (Cont.)

ANNUAL TLD DATA SUMMARY FOR THE PREOPERATIONAL AND OPERATIONAL PERIODS

Results in mR/day

STATION	PREOPERATIONAL		1984 - 1986 OPERATIONAL		1987 OPERATIONAL	
	MEAN[a]	STANDARD ERROR	MEAN	STANDARD ERROR	MEAN	STANDARD DEVIATION(2σ)
83	0.25(c)	0.02	0.22	0.02	0.26	0.02
84	0.23(c)	0.02	0.21	0.01	0.27	0.01
85	0.26(c)	0.02	0.23	0.01	0.29	0.01
86	0.24	0.02	0.24	0.01	0.28	0.01
All	0.23	0.02	0.22	0.00	0.26	0.03

(a) This preoperational mean is for 1982 - 1983 data only.

(b) 1985 TLD missing

(c) These stations had only one annual exchange during the preoperational period

(d) Stations 49-56 were first monitored during Fourth Quarter 1983.

(e) This result is for a replacement TLD since the original TLD was lost.

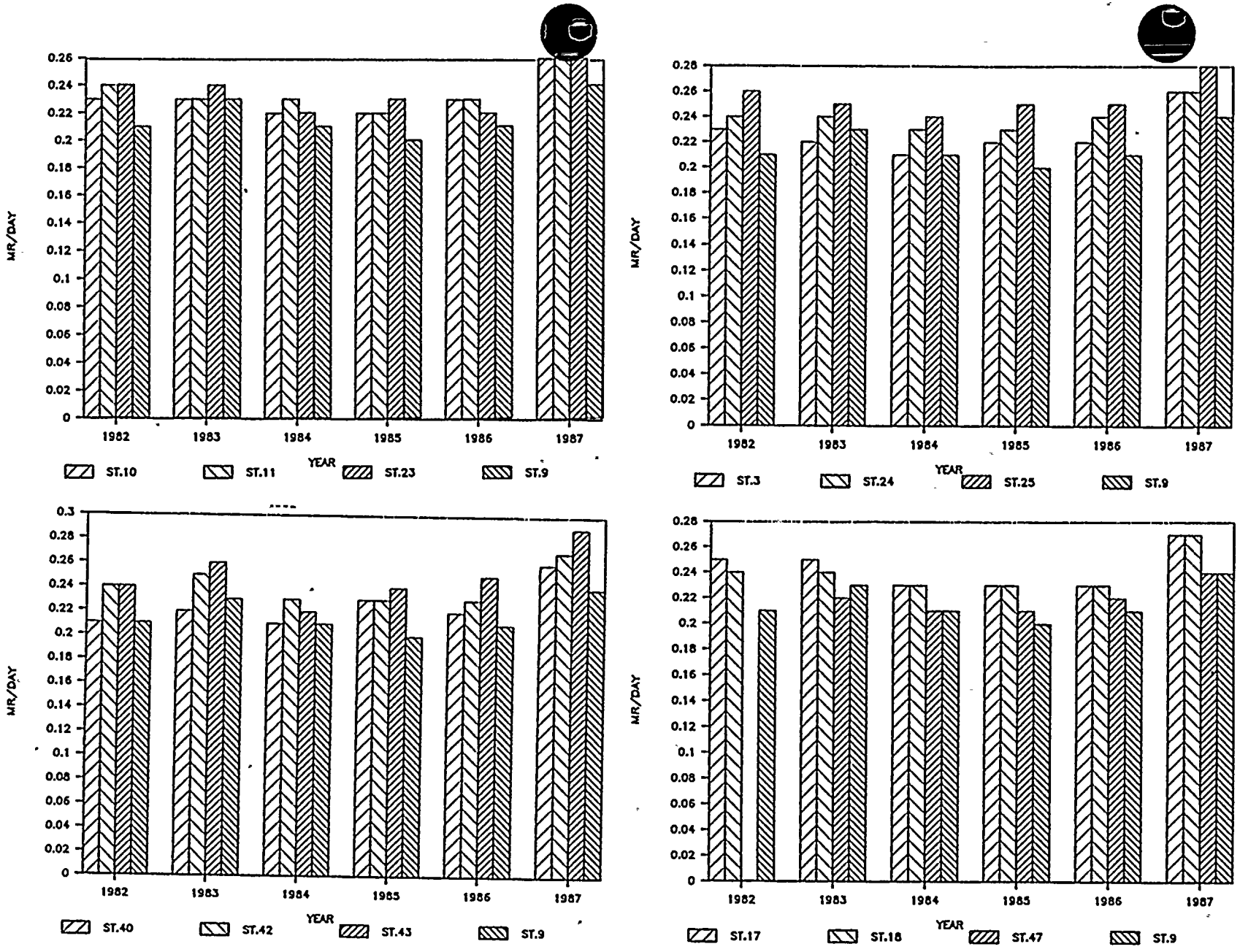


FIGURE 4-1

AVERAGE QUARTERLY TLD RESULTS FOR NEAR-PLANT LOCATIONS, PASCO LOCATIONS AND THE CONTROL LOCATION (STATION 9) FOR THE PERIOD 1982-1987

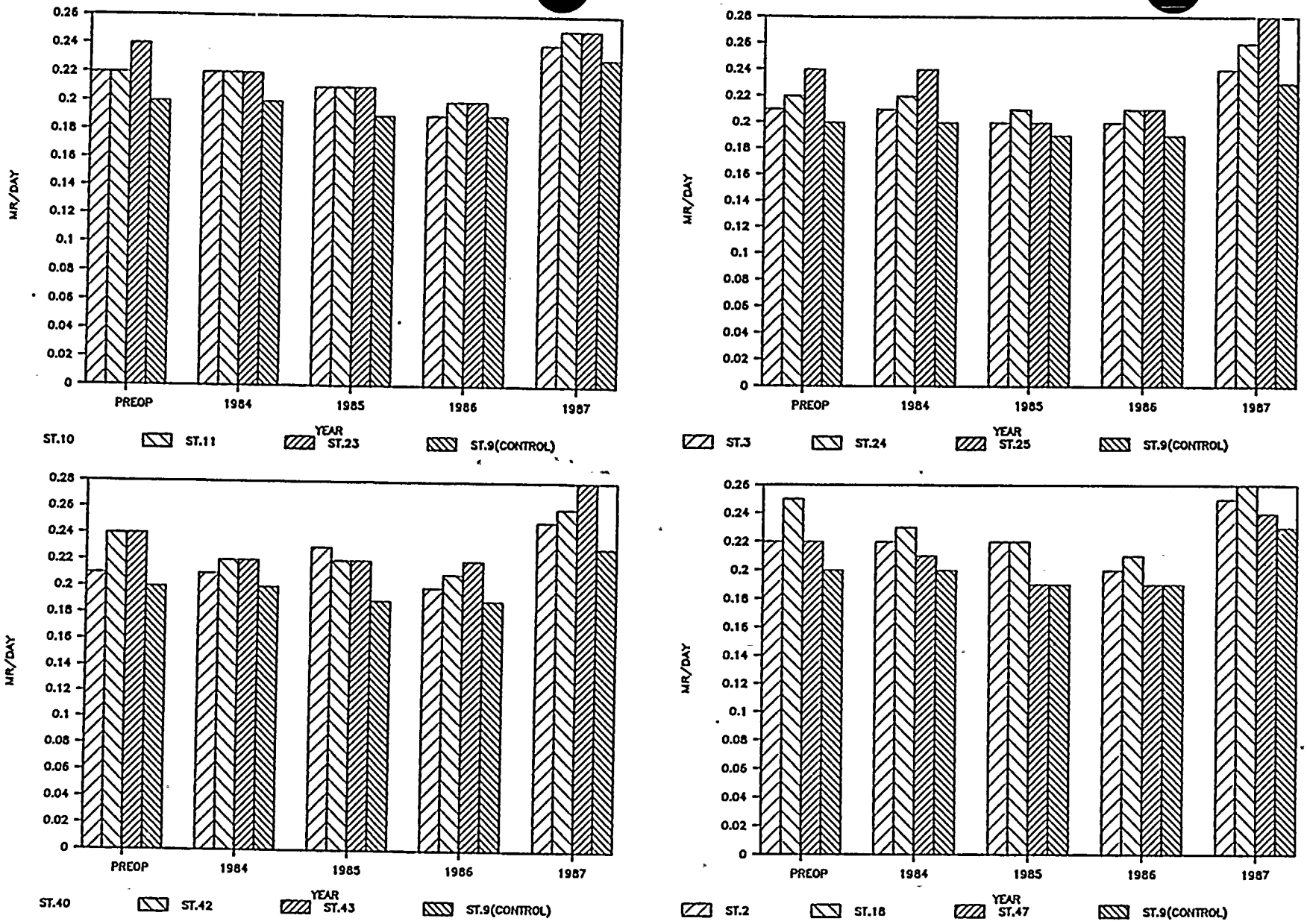


FIGURE 4-2

ANNUAL TLD RESULTS FOR NEAR-PLANT LOCATIONS, PASCO LOCATIONS AND THE CONTROL LOCATION (STATION 9) FOR THE PERIOD 1982-1987

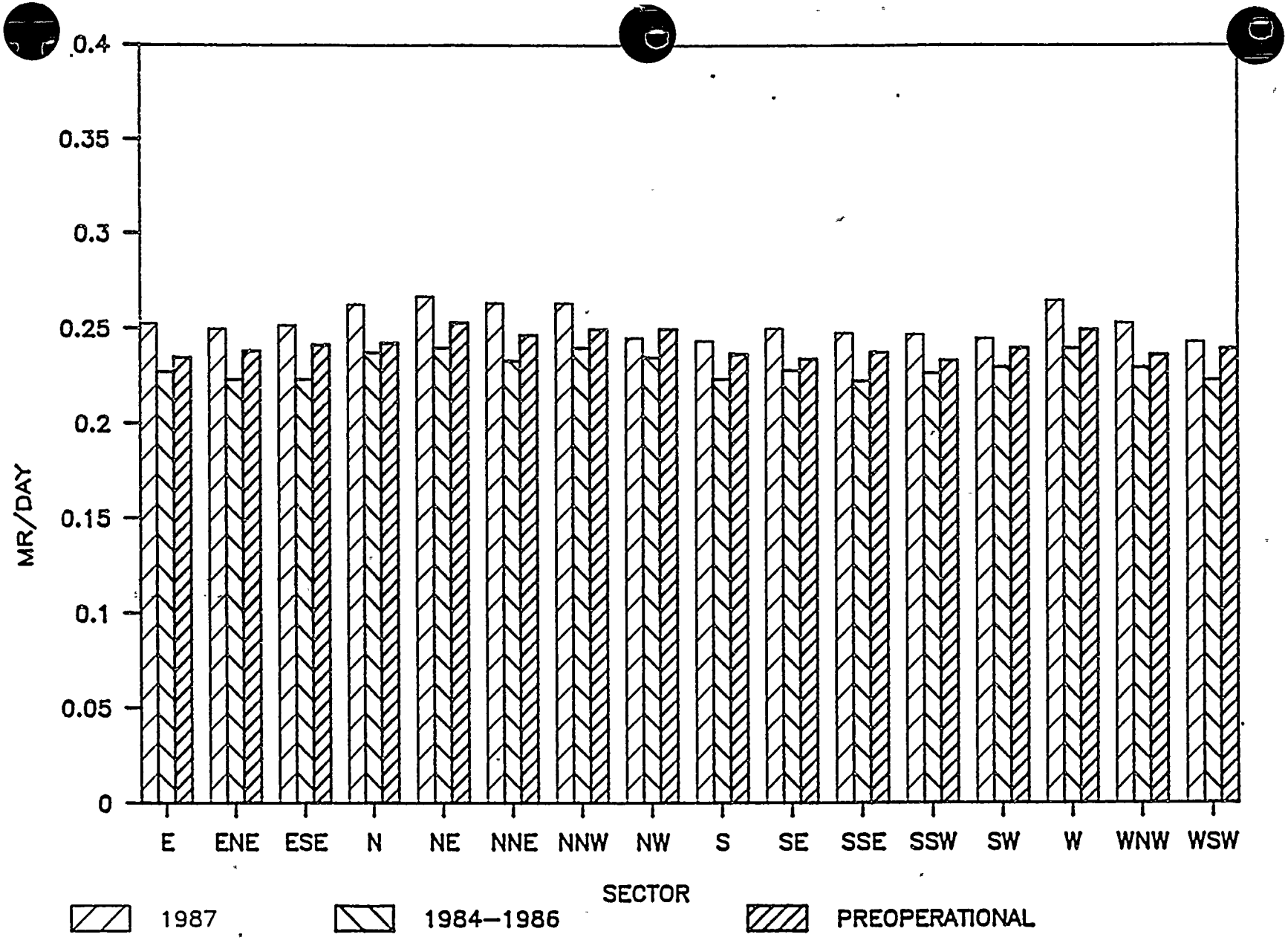


FIGURE 4-3

MEAN 1987 QUARTERLY TLD RESULTS FOR LOCATIONS IN EACH METEOROLOGICAL SECTOR COMPARED TO PREOPERATOIONAL AND PREVIOUS OPERATIONAL RESULTS

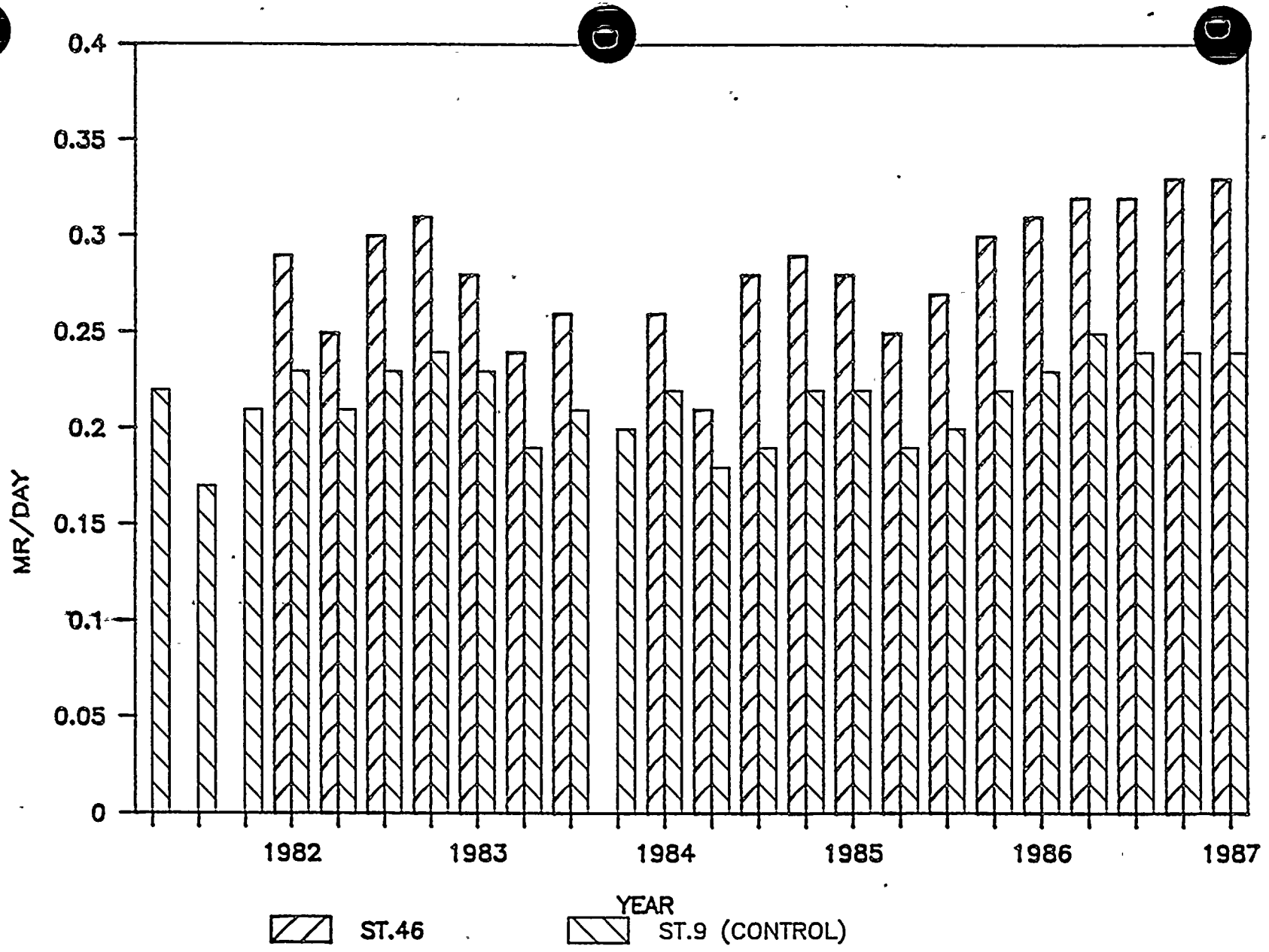


FIGURE 4-4

QUARTERLY TLD RESULTS FOR STATION 46 AND THE CONTROL LOCATION (STATION 9) FOR THE PERIOD 1982-1987

TABLE 4-6

1987 MEAN QUARTERLY VERSUS ANNUAL TLD DATA

Results in mR/day

STATION	QUARTERLY TLDS MEAN*	QUARTERLY TLDS STANDARD ERROR	ANNUAL TLDS MEAN**	ANNUAL TLDS STANDARD DEVIATION(2σ)
1	0.27	0.01	0.26	0.01
2	0.26	0.00	0.25	0.01
3	0.26	0.00	0.24	0.00
4	0.23	0.01	0.22	0.01
5	0.25	0.01	0.24	0.00
6	0.25	0.02	0.24	0.01
7	0.27	0.01	0.24	0.01
8	0.29	0.01	0.28	0.02
9	0.24	0.01	0.23	0.01
10	0.26	0.01	0.24	0.01
11	0.26	0.00	0.25	0.02
12	0.28	0.00	0.27	0.00
13	0.26	0.01	0.25	0.01
14	0.26	0.00	0.25	0.01
15	0.28	0.00	0.27	0.02
16	0.26	0.01	0.26	0.01
17	0.27	0.01	0.26	0.01
18	0.27	0.00	0.26	0.01
19	0.27	0.00	0.25	0.01
20	0.26	0.01	0.26	0.01
21	0.24	0.01	0.23	0.01
22	0.26	0.01	0.25	0.01
23	0.26	0.00	0.25	0.01
24	0.26	0.01	0.26	0.01
25	0.28	0.01	0.28	0.01
40	0.26	0.01	0.25	0.01
41	0.29	0.01	0.28	0.01
42	0.27	0.01	0.26	0.00

*Mean of the four quarterly results.

**Mean of four readout areas on each TLD.

TABLE 4-6 (Cont.)

1987 MEAN QUARTERLY VERSUS ANNUAL TLD DATA

Results in mR/day

STATION	QUARTERLY TLDS MEAN*	QUARTERLY TLDS STANDARD ERROR	ANNUAL TLDS MEAN**	ANNUAL TLDS STANDARD DEVIATION (2σ)
43	0.29	± 0.01	0.28	± 0.00
44	0.26	± 0.01	0.25	± 0.01
45	0.26	± 0.01	0.25	± 0.01
46	0.33	± 0.01	0.32	± 0.02
47	0.24	± 0.02	0.24	± 0.01
49	0.26	± 0.00	0.24	± 0.01
50	0.27	± 0.01	0.26	± 0.00
51	0.26	± 0.00	0.25	± 0.01
53	0.30	± 0.01	0.28	± 0.01
54	0.28	± 0.01	0.27	± 0.01
55	0.26	± 0.01	0.25	± 0.01
56	0.27	± 0.01	0.25	± 0.01
71 (S1)	0.29	± 0.02	0.28	± 0.00
72 (S2)	0.29	± 0.02	0.28	± 0.00
73 (S3)	0.26	± 0.01	0.24	± 0.01
74 (S4)	0.29	± 0.01	0.27	± 0.02
75 (S5)	0.27	± 0.01	0.26	± 0.01
76 (S6)	0.27	± 0.01	0.25	± 0.01
77 (S7)	0.27	± 0.01	0.25	± 0.01
78 (S8)	0.26	± 0.01	0.25	± 0.01
79 (S9)	0.27	± 0.00	0.25	± 0.01
80 (S10)	0.26	± 0.00	0.25	± 0.01
81 (S11)	0.26	± 0.00	0.25	± 0.01
82 (S12)	0.27	± 0.00	0.27	± 0.01
83 (S13)	0.28	± 0.01	0.27	± 0.02
84 (S14)	0.27	± 0.00	0.26	± 0.01
85 (S15)	0.28	± 0.02	0.27	± 0.01
86 (S16)	0.29	± 0.02	0.29	± 0.01

*Mean of the four quarterly mean results.

**Mean of four readout areas on each TLD.

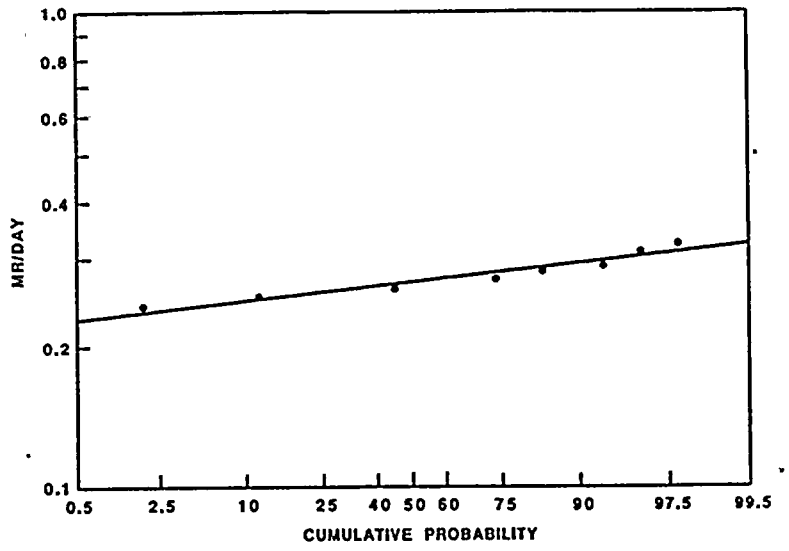
The log probability plots of the quarterly data for a near-plant location, Station 76, (S-6) and the control location, Station 9, from 1982 to 1987 are presented in Figure 4-7. The linearity of the plots indicates that the results, including the 1987 elevated levels, are all within the same log normal distribution.

The above comparisons of 1987 TLD results to preoperational and previous operational data and the analysis of results by meteorological sector and distance from the plant provide no indication that Plant 2 operations have impacted the direct radiation levels in the environment around the plant. Because the increase in results was observed at virtually all TLD locations, studies were performed into the potential sources of a high bias within the TLD preparation, storage, placement, exposure or processing. No sources of a significant bias were identified in the TLD processing and handling.

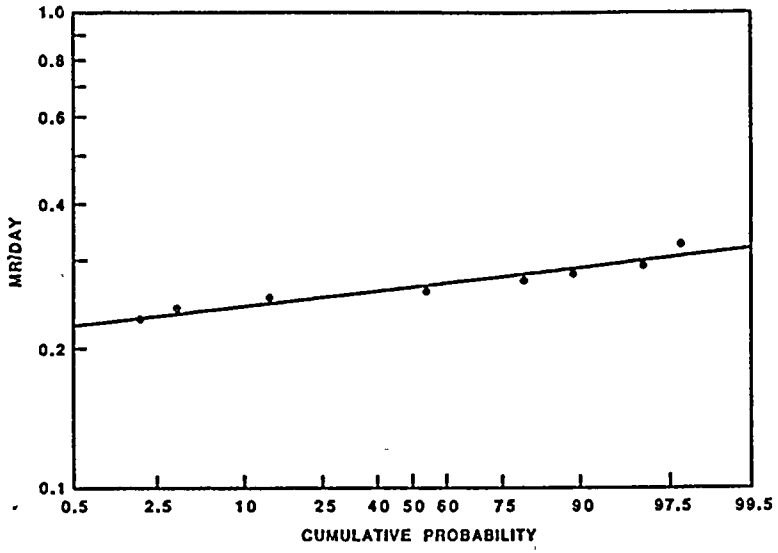
In addition, the NRC TLD results, along with the TLD data from other environmental monitoring programs in the region, e.g. the State of Oregon program, the Washington State DSHS program, the Pacific Northwest Lab (PNL) Hanford monitoring program and the Environmental Protection Agency (EPA) program, were gathered for comparison. Only the NRC data indicated a similar pattern of increase. Further inquiries into the source of the increase will continue during 1988.

4.2 Airborne Particulate/Iodine

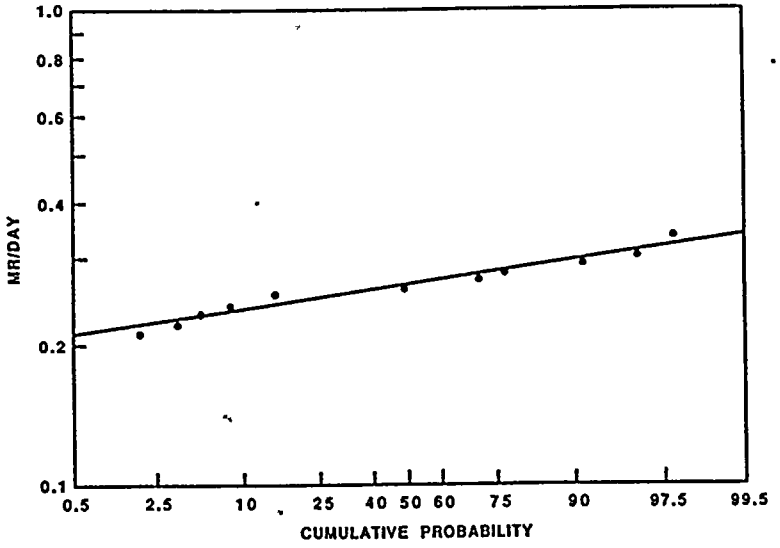
The results of the 1987 gross beta in air analyses are presented in Tables A-2.1 and A-2.2 of Appendix A. All gross beta in air results were within the ranges observed during the preoperational period and during previous operational periods. As observed previously, gross beta levels increased during periods of inversion occurring in the fall and winter months. The increase, which was evident in the results of all the air sampling locations, including the control location at Station 9, was likely due to an increase in radon and radon daughter concentrations during the inversions. This seasonal increase can be seen in the mean weekly results for all indicator locations plotted in



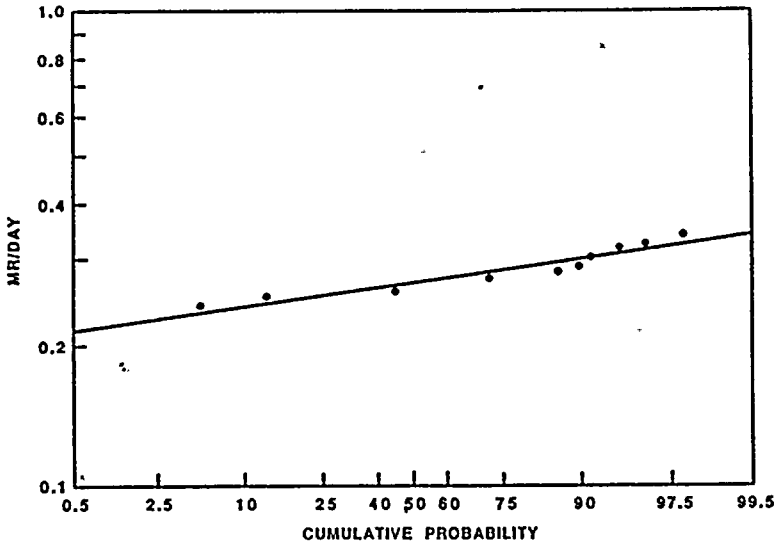
FIRST QUARTER



SECOND QUARTER



THIRD QUARTER



FOURTH QUARTER

FIGURE 4-5

LOG PROBABILITY PLOTS OF 1987 QUARTERLY TLD RESULTS

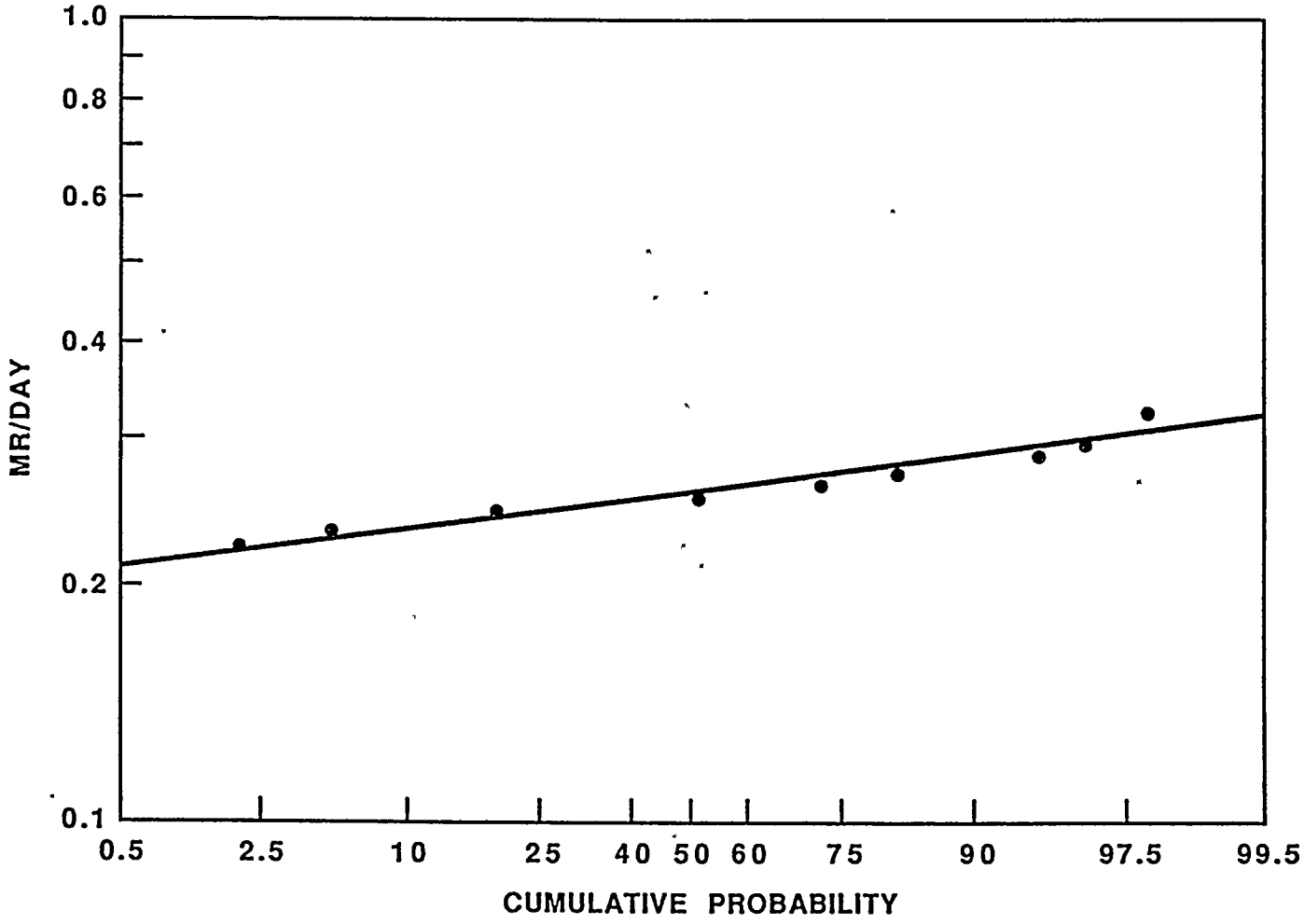
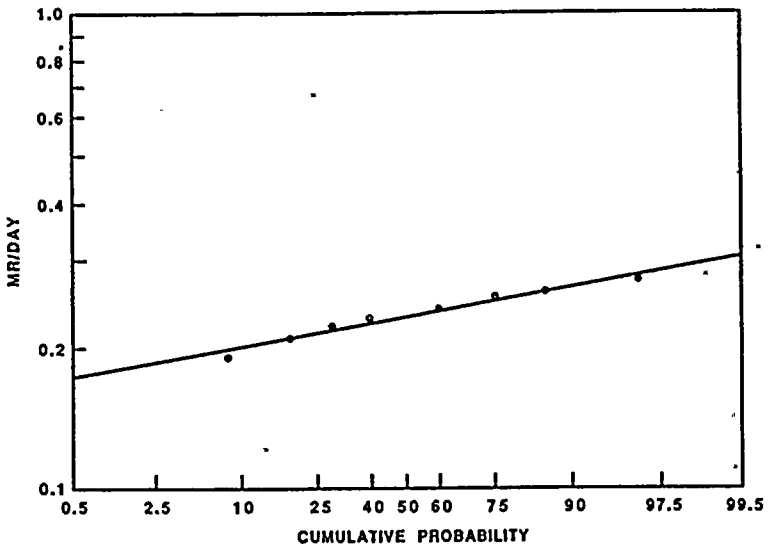
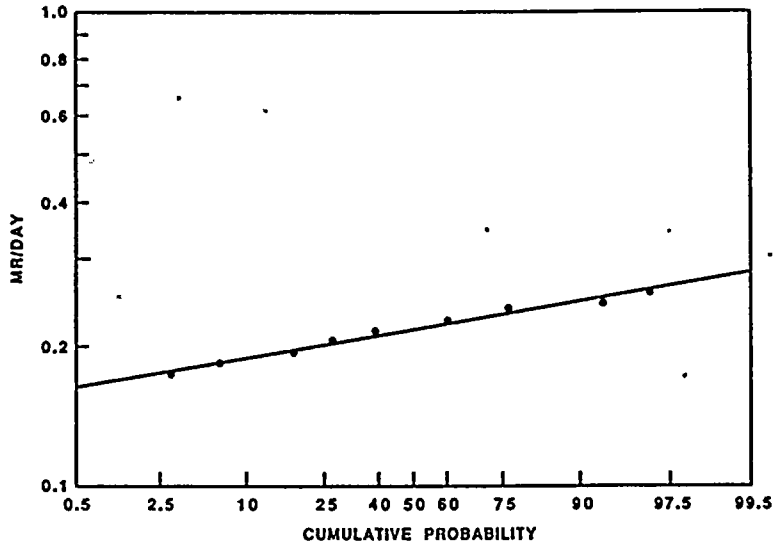


FIGURE 4-6

LOG PROBABILITY PLOT OF THE 1987 ANNUAL TLD RESULTS



STATION 76(S6)



STATION 9

FIGURE 4-7

LOG PROBABILITY PLOTS OF QUARTERLY TLD DATA FOR A NEAR-PLANT LOCATION (STATION 76) AND THE CONTROL LOCATION (STATION 9) FOR THE PERIOD 1982-1987

Figure 4-8. In Figure 4-9, plots of the weekly gross beta results for near-plant and remote locations and for the control location at Station 9 illustrate the similarity of the results from all locations.

In order to reduce the effect of the short-lived radon decay products on the air filter results, analysis of the filter is generally postponed for approximately eight days after collection. The effect of inversions on the gross beta results is evident despite this delay. A recount of a particulate filter collected in November 1987 when gross beta levels peaked was performed in January 1988 to determine whether there had been a significant reduction in beta activity on the filter. The gross beta result was the same as it had been two months earlier, indicating the presence of a radionuclide with a reasonably long half-life, such as K-40 or Pb-210, which are naturally-occurring.

The quarterly gamma analysis of the particulate filter composites indicated only the presence of Be-7 and K-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 1987 were less than the 0.04 pCi/cubic meter lower limit of detection.

No evidence of any impact of plant operations on the environment was apparent in the particulate filter and charcoal cartridge results for 1987.

4.3 Water

The gross beta in river/drinking and discharge water 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 compli-

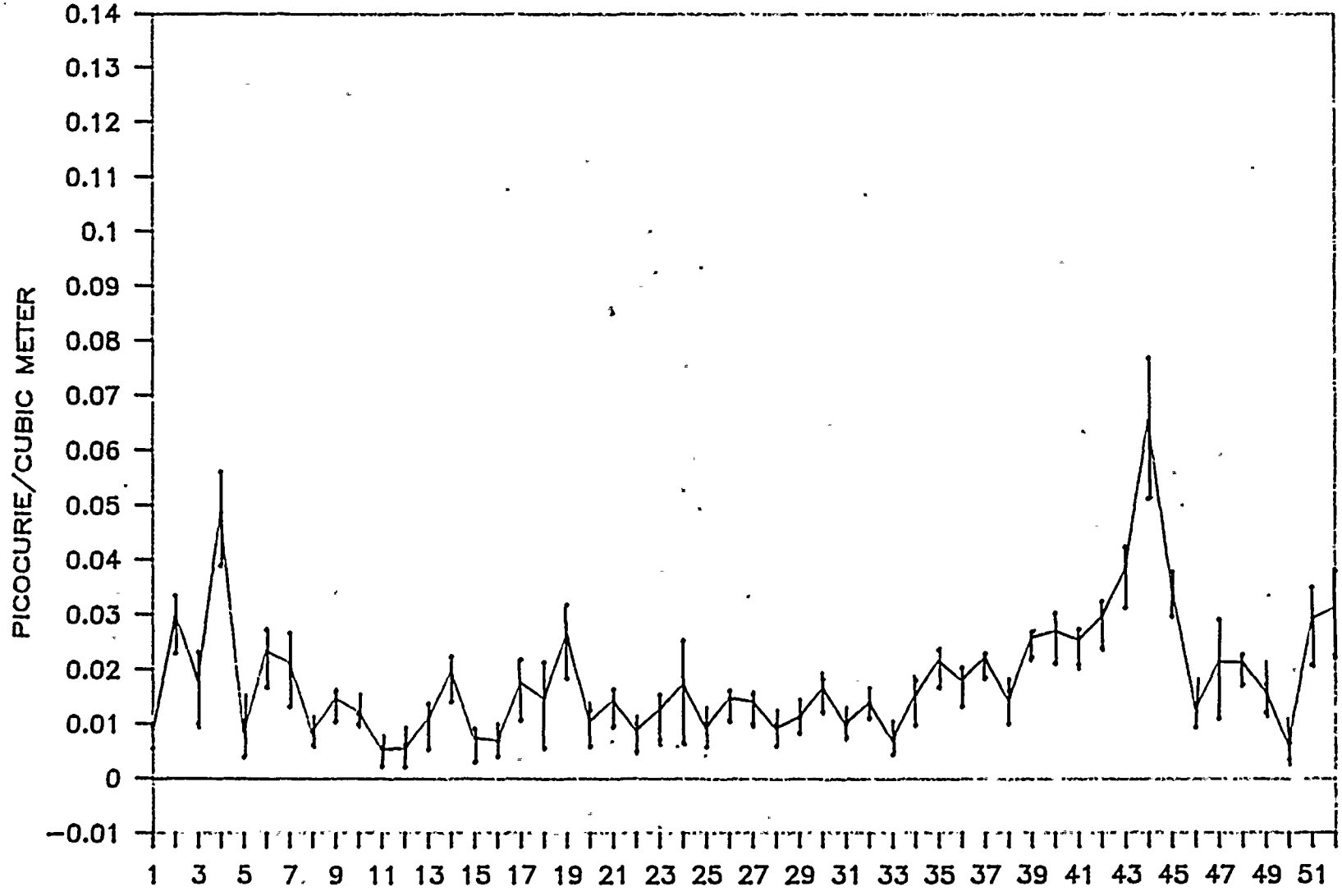
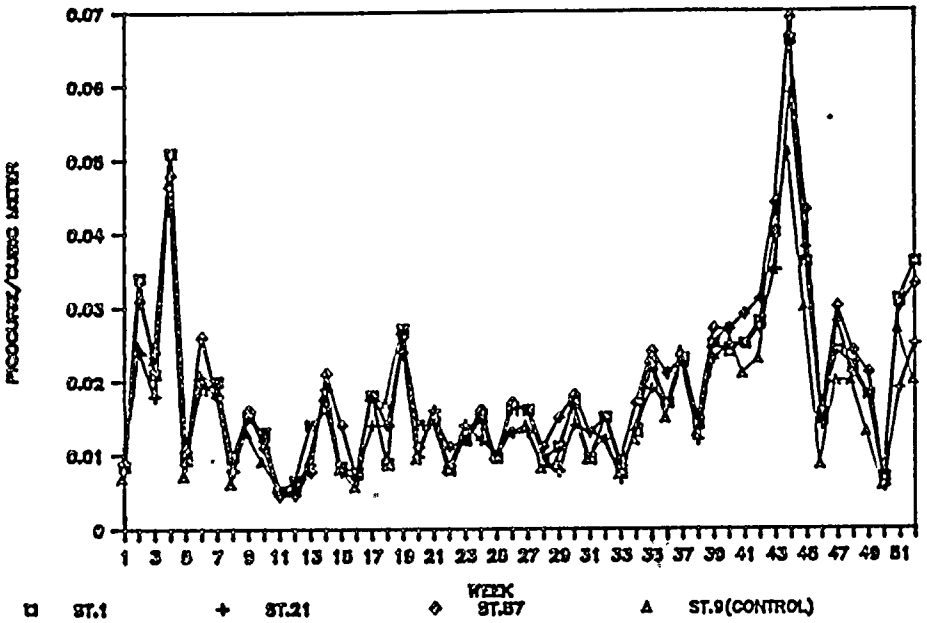
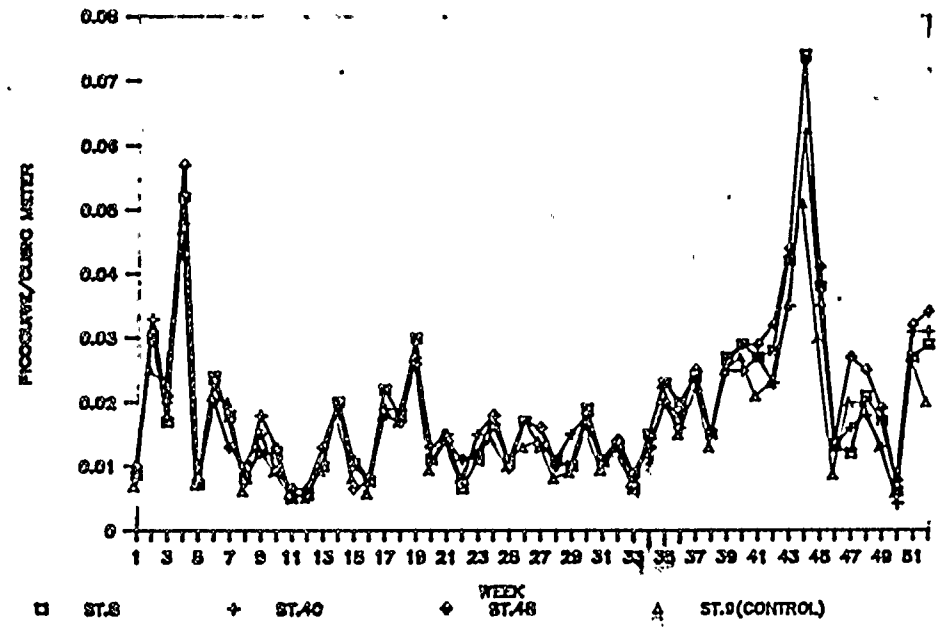


FIGURE 4-8

MEAN WEEKLY 1987 GROSS BETA IN AIR RESULTS



NEAR-PLANT



REMOTE

FIGURE 4-9
WEEKLY GROSS BETA IN AIR RESULTS FOR NEAR-PLANT AND REMOTE SAMPLING LOCATIONS VERSUS THE RESULTS FOR THE CONTROL LOCATION (STATION 9)

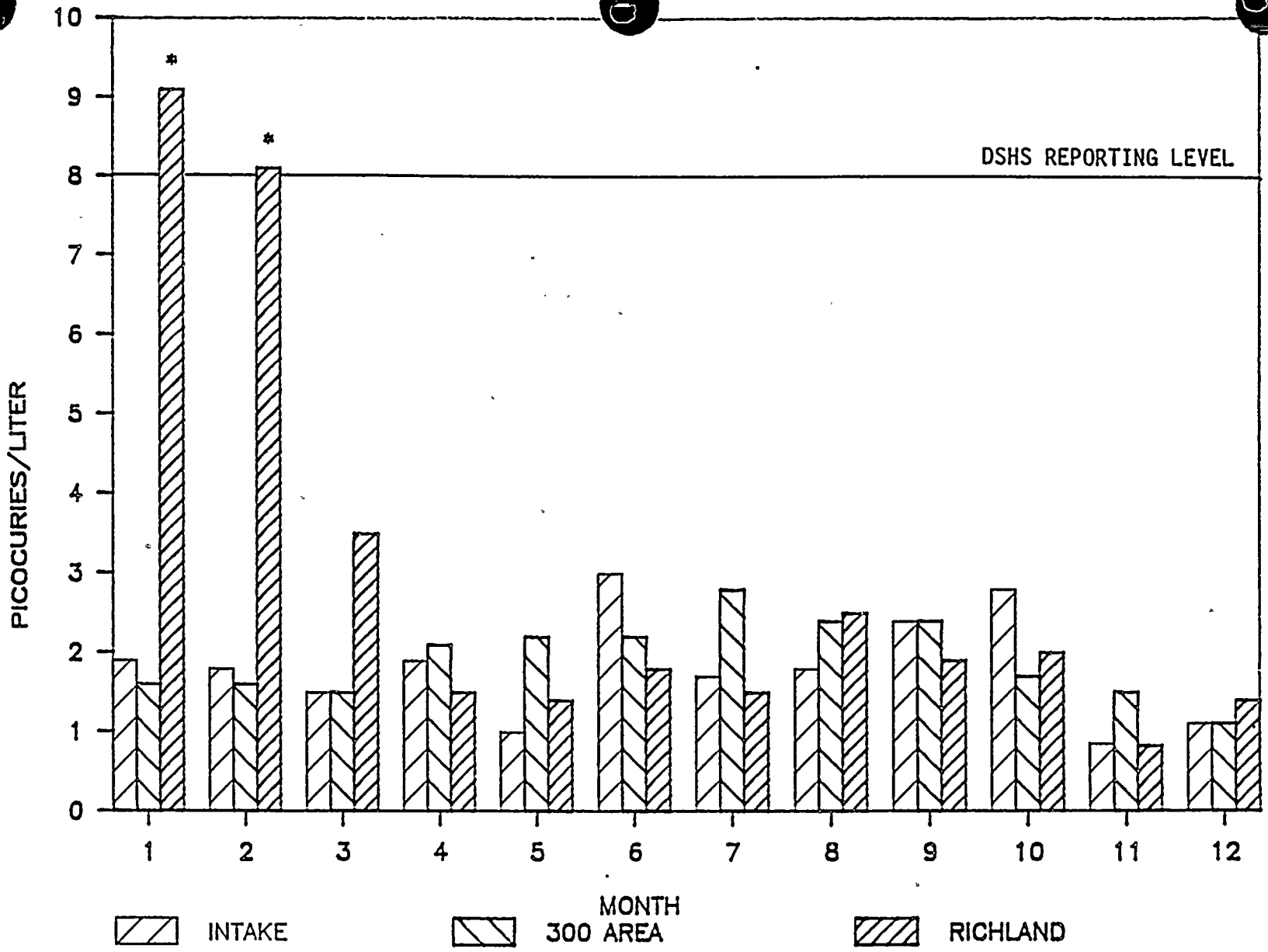
ance with the Washington State drinking water standard, except the January and February samples for the Richland drinking water, Station 29. Strontium analyses were performed on both samples and the results were less than the lower limit of detection, as indicated in Tables A-8.1 and A-8.2 of Appendix A.

This unusual increase in the gross beta levels for Station 29 stemmed from the use of groundwater from North Richland wells for Richland drinking water during the Richland Water Treatment Plant maintenance outage. Although higher than normally observed for water samples from this location, the gross beta levels were well within the range commonly observed in groundwater due to naturally occurring radionuclides from the surrounding rocks and soil. A graph of the gross beta in river/drinking water results during 1987 is presented in Figure 4-10.

The 1987 gross beta levels in the discharge water remained at a slightly higher level (20-36 pCi/liter) than during the last half of 1986. These gross beta levels resulted from the current mode of plant operations using higher cycles of circulating water concentration. Under these conditions, the gross beta levels in the discharge sample would reflect the concentration of naturally-occurring radionuclides, principally K-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 1987 gross beta results for the discharge sample are presented in Figure 4-11. The temporary, or interim level for reporting to DSHS (75 pCi/liter) is also given for comparison. The establishment of a final reporting level for gross beta in the discharge sample is pending the determination of the current river dilution factors for liquid effluents released down the discharge line.

In order to determine whether the increased gross beta results for the discharge sample could be attributed to low concentrations of a beta/gamma emitter(s), samples of the intake water and the discharge water



*Samples taken during period when Richland water was supplied by groundwater wells.

FIGURE 4-10

1987 GROSS BETA IN RIVER/DRINKING WATER RESULTS

were slowly evaporated to approximately one-ninth the volume of the original sample. Gamma isotopic analyses were above then performed on the concentrated samples. The only radionuclide detected in the discharge sample was K-40 (230 pCi/liter for a sample concentrated by a factor of 9) and no radionuclides were above detection limits in the intake sample. This study indicated that K-40 was at least a contributor to the gross beta levels observed for the discharge samples.

The tritium results for river/drinking water, discharge water and groundwater are presented in Tables A-6 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. All the results were within the range normally observed in such water and within the range of the preoperational and previous operational results for the same stations. A graph of the tritium results for Station 26, 28 and 29 is presented in Figure 4-12.

The tritium results for the quarterly groundwater samples were also low and within the range previously observed. A graph of the groundwater results is presented in Figure 4-13.

The tritium levels in the discharge water were higher than levels previously observed for that sample because of the higher levels of circulating water concentration prior to blowdown. Despite the increase, the levels observed are reasonable for samples taken directly from the discharge line without any river dilution and reasonable when considering that the circulating water is concentrated by a factor of 10 to 12. In addition, compared to the maximum allowable level for tritium in drinking water, 20,000 pCi/liter, the results were very low[13]. A graph of the discharge water tritium levels for 1987 is presented in Figure 4-14.

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. All results for the river/drinking water and ground water samples were less than detection limits. All results for dis-

charge water samples were also below the detection levels, except for two samples, one containing Zn-65 (15.3 pCi/liter) and another containing both Zn-65 and Co-60 (86.7 and 10.5 pCi/liter, respectively). None of the results exceeded DSHS or Nuclear Regulatory Commission (NRC) reporting levels.

4.4 Soil

Gamma spectrometry was performed on five soil samples collected in May. The cesium-137 levels in the samples ranged from 55.5 pCi/Kg at the control location, Station 9, to 470 pCi/Kg at Station 7 near the Wye Barricade. 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.

The cesium-137 levels in the soil samples were well within the range observed during preoperational and previous operational sampling. No strontium analyses were required for any of the indicator samples because none contained cesium concentrations ten times the levels determined for the control. The gamma spectrometry results for the soil samples are given in Table A-9.1 and A-9.2 in Appendix A.

4.5 Shoreline Sediment

The results of gamma spectrometry of shoreline sediment are presented in Tables A-10.1 and A-10.2 in Appendix A. Aside from the naturally occurring radionuclides (potassium-40, radium-226 and thorium-228), cobalt-60 and cesium-137 were detected in both the control location, upstream from the plant discharge point, and the indicator location downstream from the plant discharge point. Both of these radionuclides have been detected in preoperational samples and in samples taken since plant operation began. They have also been previously identified as components of the Columbia River sediment originating from the operation of the old Hanford Reservation reactors[14]. Europium-152, which originates from past Hanford Reservation operations, was also detected

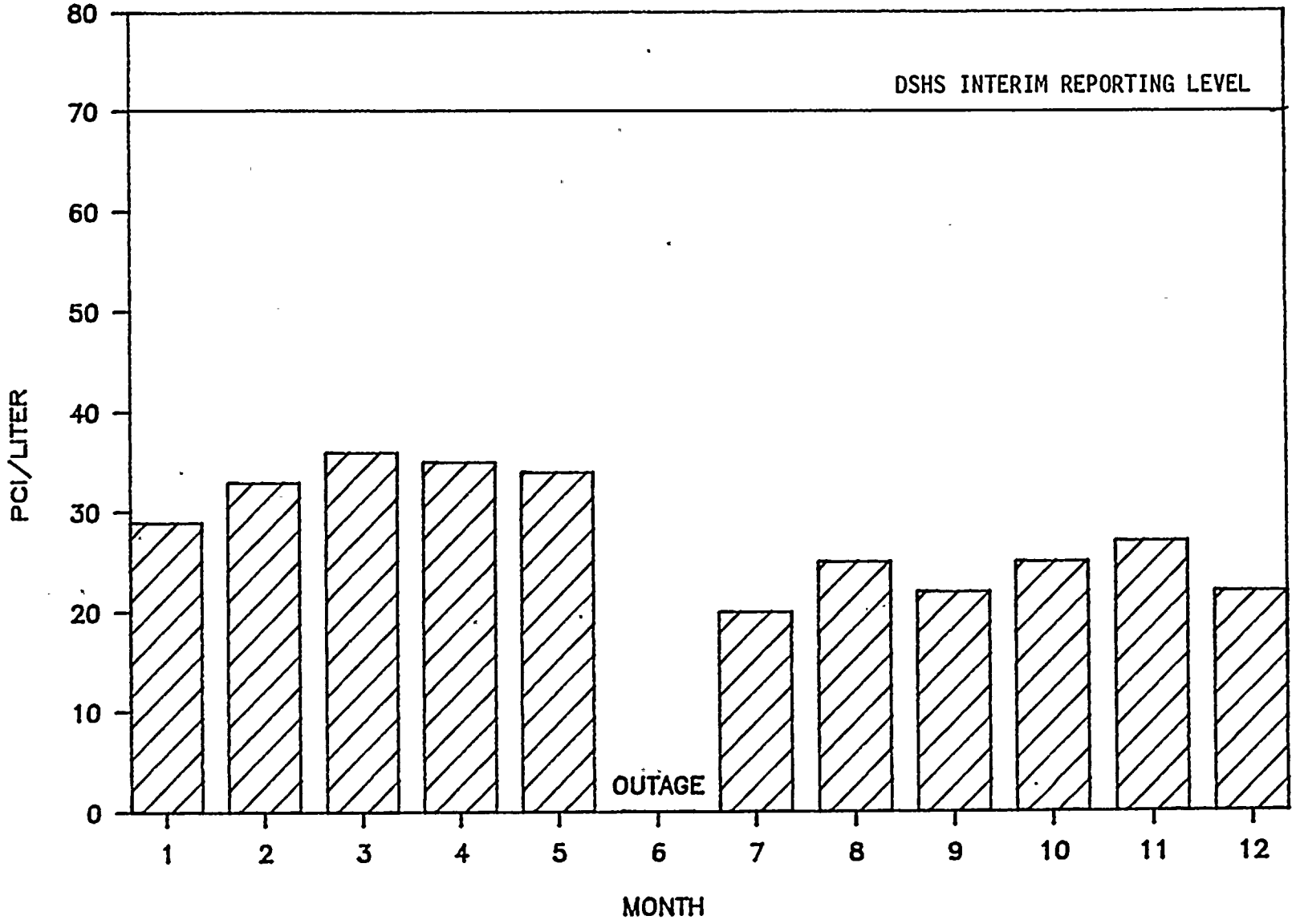


FIGURE 4-11

1987 GROSS BETA IN DISCHARGE WATER RESULTS

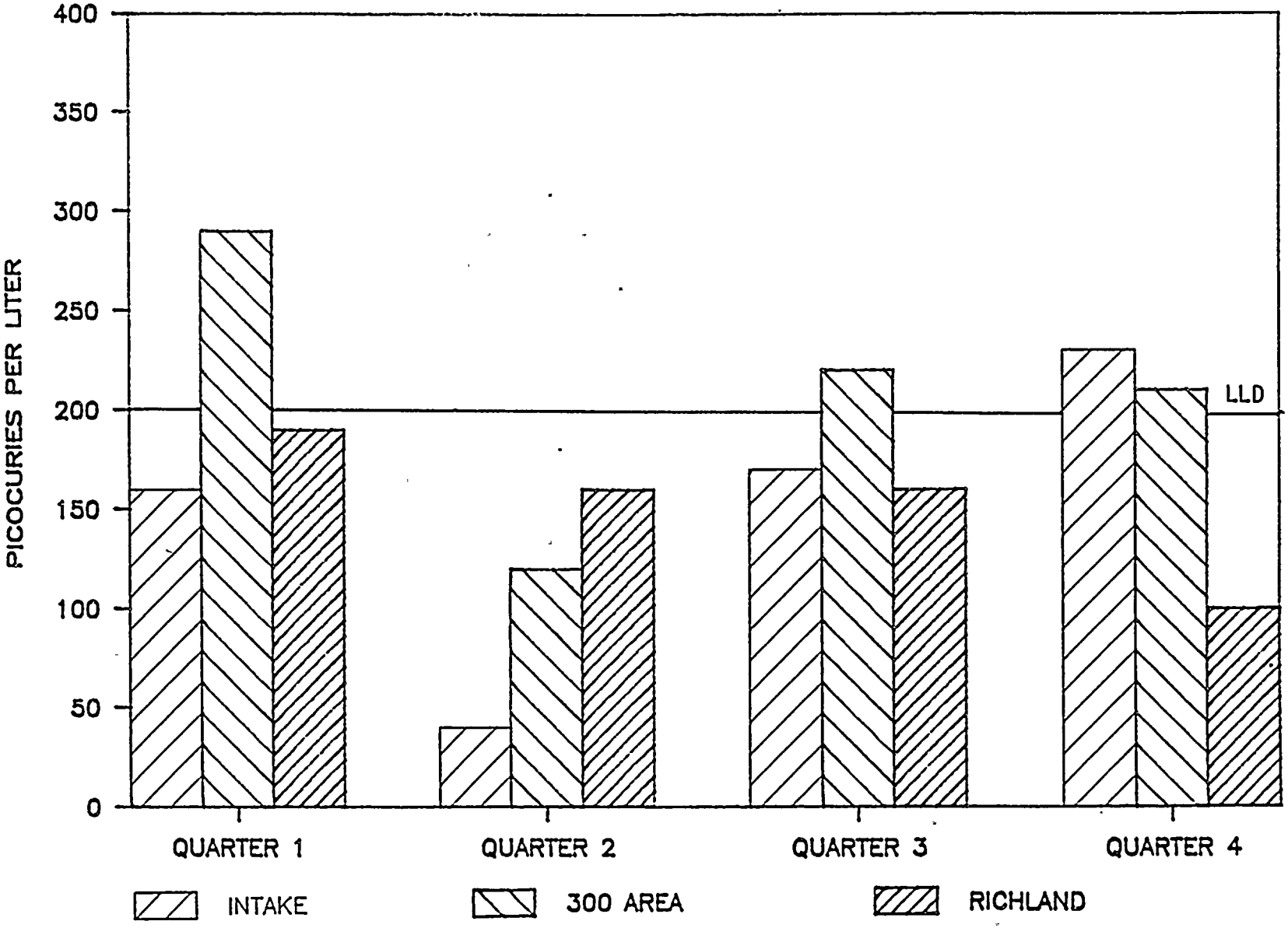


FIGURE 4-12

1987 TRITIUM IN RIVER/DRINKING WATER RESULTS

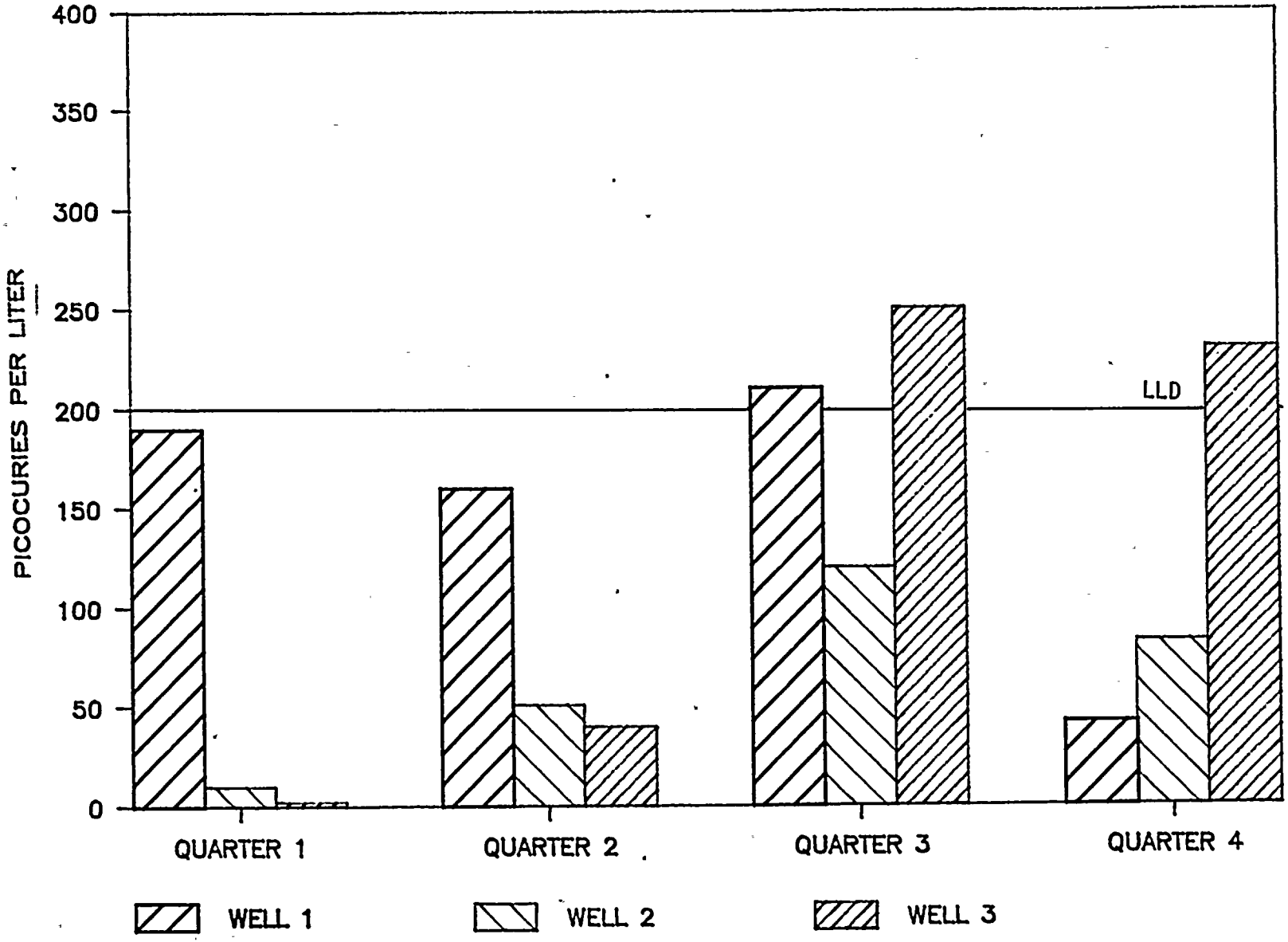


FIGURE 4-13

1987 TRITIUM IN GROUNDWATER RESULTS

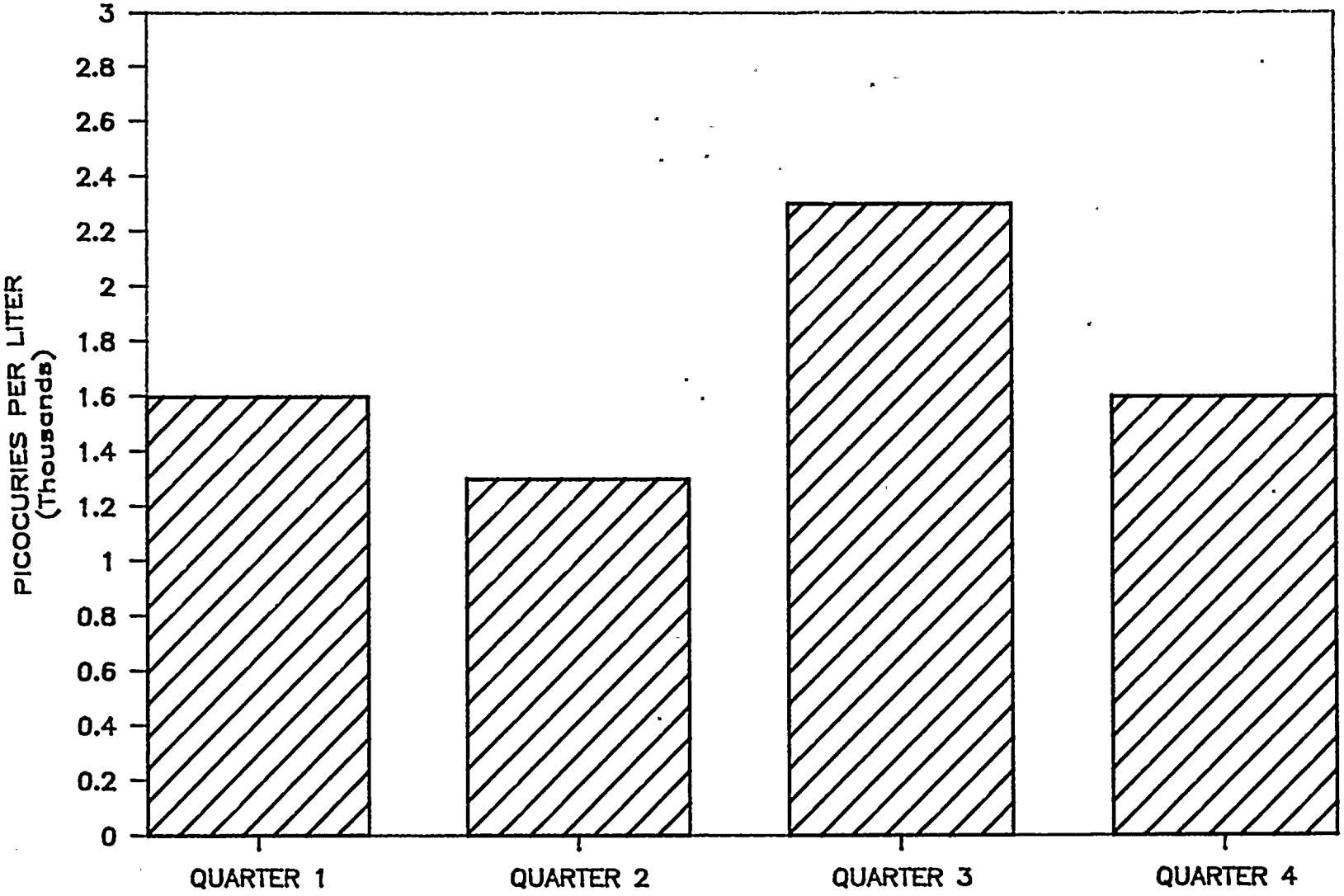


FIGURE 4-14
1987 TRITIUM IN DISCHARGE WATER RESULTS

in one of the downstream sediment samples during 1987. There was no evidence in these results of any detectable accumulation of radionuclides from Plant 2 operations in the river sediment downstream.

4.6 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-11.1 and A-11.2 of Appendix A. All results, except for potassium-40, a naturally-occurring radionuclide, were below detection limits.

4.7 Milk

The results of iodine-131 analyses of milk samples collected during 1987 were all less than detection limits. These results are listed in Tables A-13.1 and A-13.2 of Appendix A.

The gamma spectrometry results for the same milk samples are listed in Tables A-13.1 and A-13.2. Cesium-137 was detected in five indicator samples and two control samples collected during the first three months of 1987. Although above detection limits, the concentrations of cesium-137 in these samples were low, ranging from 5.7 to 26.9 pCi/liter.

These results are attributed to the use of hay and other feed grown during the period of fallout from the Chernobyl nuclear accident in 1986. After March 1987, all cesium-137 levels in the milk samples were below detection limits except for Station 58 samples, which continued to show low but detectable levels of cesium-137 and, occasionally, cesium-134 until June when milk production there was discontinued. None of the cesium concentrations exceeded 30 pCi/liter, the level at which a strontium analysis would be performed.

In June 1987, Station 58 was replaced by Station 59, the Johnson dairy. All gamma spectrometry results for samples collected at Station 59 were below detection limits.

4.8 Garden Produce

The gamma isotopic analysis results for all root, fruit and leafy vegetables were below detection limits, except for a Swiss chard sample collected in August from the Riverview area of Pasco. The cesium-137 result for this sample was low (18.7 pCi/Kg), but just above detection limits. No other radionuclides were detected. The results of all garden produce samples are listed in Tables A-14.1 through A-16.2 of Appendix A.

5.0 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. In addition, during 1987, the Washington State Department of Social and Health Services - sponsored Quality Assurance Task Force of the Pacific Northwest hired a panel of three experts in the environmental radiation monitoring field to evaluate the REMP, along with other radiological environmental monitoring programs in Washington and Oregon. The final report from this evaluation is available from the Washington State Department of Social and Health Services.

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.

The following sections summarize the quality assurance and quality control aspects of the TLD and analytical components of the REMP..

5.1 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 5-1 and 5-2. 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. If the QA dosimeter results are greater than ± 5% (or 5 mR) of the given exposure, an investigation into the source of the discrepancy is initiated. The number of QA dosimeters used during each processing is generally 10% of the number of field dosimeters. During 1987 the same QA dosimeters

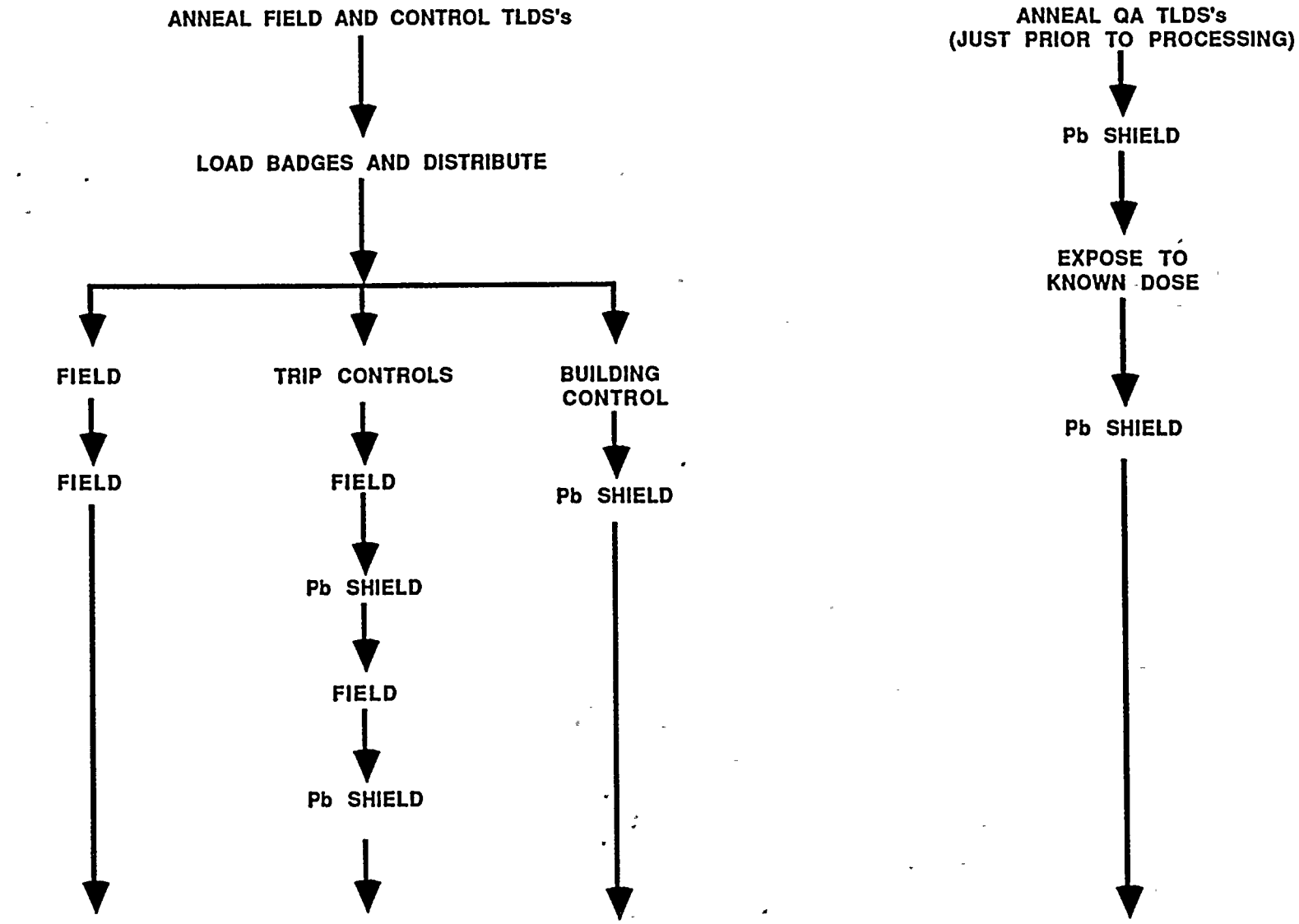


FIGURE 5-1
SUPPLY SYSTEM ENVIRONMENTAL TLD PREPARATION - USE CYCLE

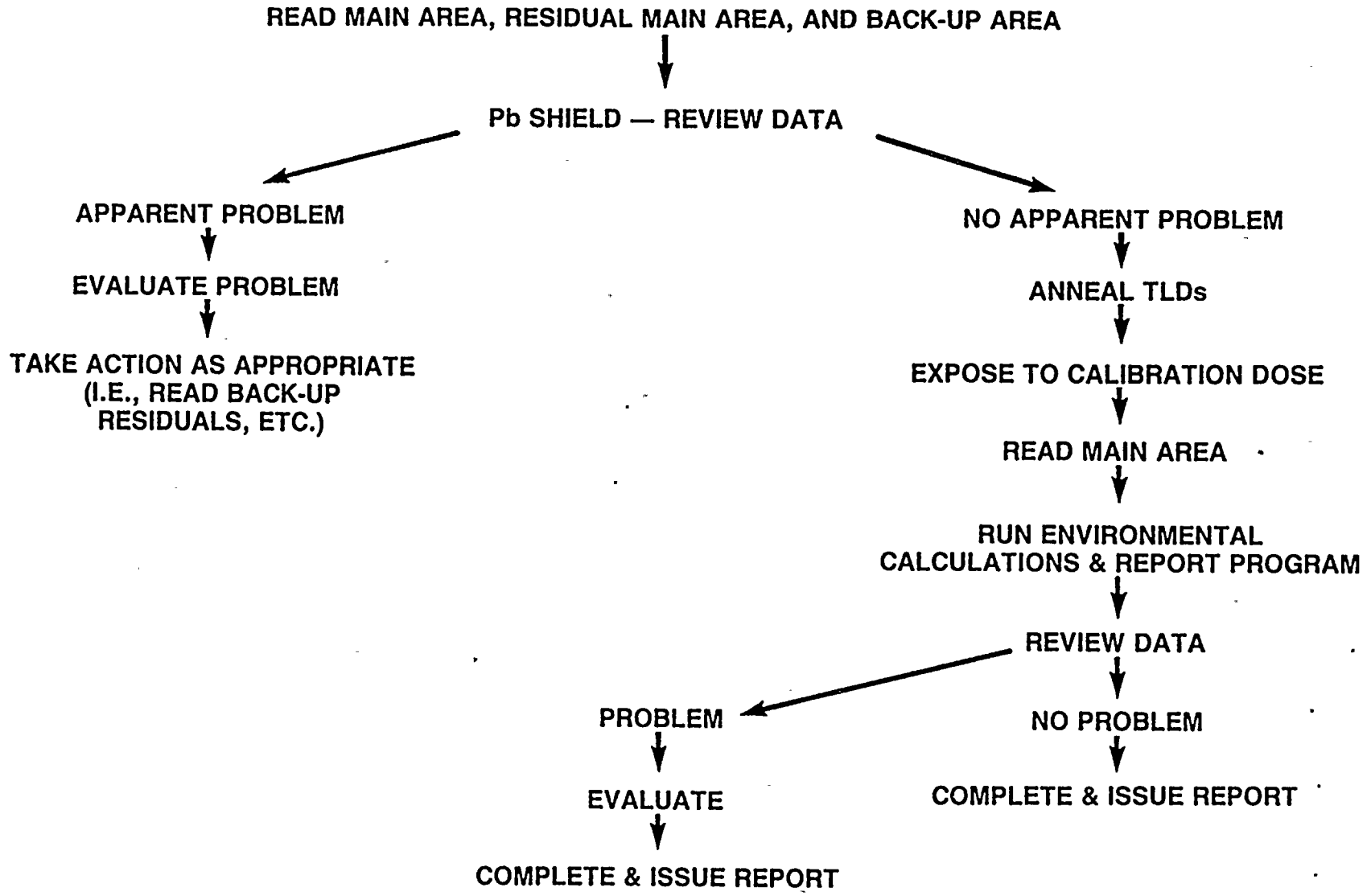


FIGURE 5-2
SUPPLY SYSTEM TLD EVALUATION

were used repeatedly throughout the year in order to track their sensitivity from run to run. Evaluation of the QA dosimeter results indicated only small biases of 3-5% 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 to their field locations. 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.

An additional step taken in 1987 to improve the quality of each run was to set aside two groups of environmental dosimeters which were alternately used throughout the year so that the thermoluminescent response of each dosimeter could be tracked over several exposures. In this way, any unusual dosimeter response or trend in the data could be more easily investigated and resolved.

Audit dosimeters, which are exposed to known levels of radiation below the 100 mR given to the QA dosimeters, were processed each quarter with the field dosimeters to verify the accuracy of the environmental TLD evaluations. The results of these audit dosimeters processed during 1987 are presented in Table 5-1. The close agreement between the given audit exposures and the reported results provided another indication that the dosimeter evaluations were performed without significant problems.

An additional aspect of the Quality Control program for the TLDs is participation in intercomparison studies. The results of participation in the Eighth International Intercomparison of Environmental Dosimeters were reported in the 1986 Annual Report. The Ninth International Intercomparison is expected to take place in 1988.

TABLE 5-1

ENVIRONMENTAL AUDIT DOSIMETER RESULTS

DISTRIBUTION	GIVEN EXPOSURE (mR)	REPORTED EXPOSURE (mR)	BIAS (%)
First Quarter	52	51.1	-1.0
	52	50.7	-2.5
	52	50.6	-2.7
Second Quarter	51	51.6	1.2
	51	51.8	1.6
	51	51.7	1.4
Third Quarter	39	39.4	1.0
	39	39.8	2.1
	39	39.8	2.1
Fourth Quarter	60	61.3	2.2
	60	61.9	3.2
	60	61.6	2.7

5.2 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.

5.2.1 Supply System Quality Control Activities

During 1987, several environmental samples were submitted to Teledyne Isotopes for intercomparison with other analytical laboratories. The first set of intercomparison samples consisted of well water collected on the Department of Energy Hanford Reservation near the N Reactor and split with the States of Washington and Oregon, the Hanford Environmental Program and the environmental group, SEARCH Technical Services. The results of this intercomparison are presented in Table 5-2.

Participation in the U.S. Department of Energy Environmental Measurements Laboratory (EML) Quality Assessment Program was begun in 1987. In September, soil, vegetation, water and air samples were submitted to Teledyne Isotopes for analysis as a part of this intercomparison program. The reported results along with the EML expected results are presented in Table 5-3.

In addition to the submittal of intercomparison samples to Teledyne Isotopes, duplicate milk and water samples were submitted 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 Tables 5-4 and 5-5. Most of the gamma isotopic results and all of the iodine-131 results for duplicate milk samples were below detection levels, making the value of the comparison somewhat limited. However, considering the uncertainty associated with numbers below detection levels, the duplicate results agreed well.

TABLE 5-2

INTERCOMPARISON RESULTS FROM HANFORD SEEP SAMPLING

NUCLIDE	REPORTED RESULTS[1] (pCi/liter) SUPPLY SYSTEM	WASHINGTON STATE	OREGON STATE	HANFORD ENVIRONMENTAL
		N-Spring Seep Well #4		
Co-60	1.2 ± 0.1 E+02	1.1 ± 0.05 E+02	1.0 ± 0.2 E+02	6.6 ± 2.5 E+01
Sb-125	6.6 ± 1.2 E+01	5.9 ± 0.8 E+01	6.3 ± 3.0 E+01	<19.0
Sr-90	4.5 ± 0.1 E+03	4.2 ± 0.1 E+03	3.8 ± 0.1 E+03	3.7 ± 0.3 E+03
Gr-Beta	9.7 ± 0.2 E+03(2)	8.5 ± 0.1 E+03	7.9 ± 0.2 E+03	6.1 ± 0.3 E+03
Tritium	9.9 ± 0.1 E+04	1.0 ± 0.02 E+05	1.0 ± 0.01 E+05	1.0 ± 0.01 E+05
		N-Spring Monitoring Well N8T		
Co-60	1.1 ± 0.1 E+02	1.1 ± 0.1 E+02	1.2 ± 0.2 E+02	9.8 ± 3.0 E+01
Sb-125	5.6 ± 1.1 E+01	5.5 ± 1.0 E+01	5.0 ± 3.0 E+01	<19.0
Sr-90	6.7 ± 0.1 E+03	6.9 ± 0.3 E+03	6.0 ± 0.2 E+03	5.8 ± 0.4 E+03
Gr-Beta	1.7 ± 0.1 E+04(2)	1.4 ± 0.02 E+04	1.3 ± 0.03 E+04	1.1 ± 0.04 E+04
Tritium	8.9 ± 0.1 E+04	9.1 ± 0.2 E+04	9.0 ± 0.1 E+04	8.4 ± 0.1 E+04

(1) SEARCH Technical Services had not reported their results by the time this report was published.

(2) Supply System samples were filtered differently than the others.

TABLE 5-3

RESULTS OF ENVIRONMENTAL MEASUREMENT LAB (EML) INTERCOMPARISON SAMPLES

MEDIA	UNITS	NUCLIDE	REPORTED RESULTS ± 2σ UNCERTAINTY	EML EXPECTED RESULTS	TELEDYNE/ EML VALUE
Air	pCi/l	Zr-95	0.168 ± 0.007 E+03	0.188 E+03	0.89
		Ru-106	0.163 ± 0.026 E+03	0.251 E+03	0.65
	(a)	Sb-125	0.863 ± 0.086 E+03	0.963 E+03	0.90
		Cs-137	0.308 ± 0.031 E+03	0.290 E+03	1.06
		Ce-144	0.402 ± 0.040 E+03	0.406 E+03	0.99
Soil	pCi/gm	K-40	0.224 ± 0.022 E+02	0.200 E+02	1.12
		Cs-137	0.230 ± 0.055 E+00	0.211 E+00	1.09
	(b)	Ra-226	0.210 ± 0.077 E+01	0.636 E+00	3.30
Vegetation	pCi/gm(c)	K-40	0.192 ± 0.019 E+01	0.163 E+03	0.01
	(d)	Cs-137	0.246 ± 0.025 E+01	0.182 E+01	1.35
Water	pCi/gm	Tritium	0.190 ± 0.010 E+02	0.191 E+02	0.99
		Mn-54	0.247 ± 0.025 E+01	0.228 E+01	1.08
		Co-57	0.160 ± 0.016 E+00	0.142 E+00	1.13
		Co-60	0.230 ± 0.023 E+01	0.227 E+01	1.01
		Sr-90	0.240 ± 0.010 E+00	0.252 E+00	0.95
		Cs-137	0.232 ± 0.023 E+01	0.228 E+01	1.02

(a) Based on sample reanalysis and the results of the other participants, EML expected value is believed to be high.

(b) Ra-226 is naturally-occurring, so Teledyne uses the 186 keV peak to determine its activity; this technique can overestimate the amount of Ra-226 because of interference by other radionuclides.

(c) Teledyne transcription error; actual result determined was 1.92E+03.

(d) Detector calibration discrepancy; the results were improved after the sample was recounted on same detector after recalibration and on another detector.

TABLE 5-4

COMPARISON OF IODINE-131 AND GAMMA ISOTOPIC RESULTS FOR DUPLICATE MILK SAMPLES

SAMPLE LOCATION	COLLECTION DATE	RESULTS (pCi/liter) I-131[(a)]	Cs-134	Cs-137
Station 36	870113	-1.5 ± 1.6 E-01	7.3 ± 3.8 E+00	19.2 ± 4.4 E+00
Station 37		-8.0 ± 2.0 E-01	9.0 ± 4.1 E+00	17.8 ± 4.8 E+00
Station 36	870210	14.0 ± 31.4 E-02	6.8 ± 3.1 E+00	8.2 ± 4.2 E+00
Station 37		3.0 ± 30.3 E-02	7.8 ± 2.9 E+00	7.3 ± 3.8 E+00
Station 36	870310	-0.4 ± 20.7 E-02	2.4 ± 2.8 E+00	2.3 ± 2.7 E+00
Station 37		5.5 ± 20.7 E-02	1.5 ± 2.7 E+00	2.1 ± 2.5 E+00
Station 36	870407	-16.0 ± 16.0 E-02	0.5 ± 2.6 E+00	2.7 ± 2.7 E+00
Station 37		5.9 ± 27.8 E-02	0.4 ± 2.8 E+00	3.3 ± 2.6 E+00
Station 36	870421	9.5 ± 10.8 E-02	0.5 ± 2.8 E+00	3.2 ± 2.6 E+00
Station 37		-8.1 ± 25.9 E-02	0.2 ± 2.6 E+00	2.3 ± 2.5 E+00
Station 36	870505	9.7 ± 24.3 E-02	0.3 ± 2.5 E+00	1.8 ± 2.7 E+00
Station 37		8.5 ± 12.8 E-02	-0.1 ± 3.4 E+00	3.0 ± 2.2 E+00
Station 36	870519	7.0 ± 24.9 E-02	0.2 ± 2.6 E+00	1.9 ± 2.8 E+00
Station 37		11.0 ± 22.0 E-02	2.9 ± 3.6 E+00	3.1 ± 3.4 E+00
Station 36	870602	-0.9 ± 21.9 E-02	-0.8 ± 2.0 E+00	2.5 ± 1.9 E+00
Station 37		-1.2 ± 16.3 E-02	-0.2 ± 2.9 E+00	1.7 ± 2.7 E+00
Station 36	870616	-26.0 ± 16.0 E-02	-3.5 ± 2.7 E+00	3.6 ± 2.4 E+00
Station 37		9.1 ± 20.7 E-02	3.1 ± 4.5 E+00	1.9 ± 3.9 E+00

(a) Resin Method

TABLE 5-4 (Cont.)

COMPARISON OF IODINE-131 AND GAMMA ISOTOPIC RESULTS FOR DUPLICATE MILK SAMPLES

SAMPLE LOCATION	COLLECTION DATE	I-131[(a)]	RESULTS (pCi/liter) Cs-134	Cs-137
Station 36	870804	5.1 ± 24.5 E-02	0.3 ± 2.1 E+00	0.9 ± 2.2 E+00
Station 37		12.0 ± 17.0 E-02	-1.1 ± 2.3 E+00	3.3 ± 2.2 E+00
Station 36	870909	4.0 ± 22.9 E-02	2.8 ± 3.6 E+00	2.9 ± 3.3 E+00
Station 37		9.6 ± 19.4 E-02	-0.1 ± 2.4 E+00	1.5 ± 2.4 E+00
Station 36	871013	-18.0 ± 15.9 E-02	-0.3 ± 2.7 E+00	0.0 ± 2.8 E+00
Station 37		-1.2 ± 13.6 E-02	1.4 ± 2.8 E+00	1.6 ± 2.6 E+00
Station 36	871117	-24.0 ± 16.2 E-02	1.1 ± 2.5 E+00	3.3 ± 2.7 E+00
Station 37		-2.5 ± 12.3 E-02	1.4 ± 2.7 E+00	0.8 ± 2.4 E+00
Station 36	871215	-1.2 ± 16.2 E-02	0.0 ± 2.5 E+00	2.2 ± 2.5 E+00
Station 37		-2.6 ± 13.6 E-02	0.3 ± 2.2 E+00	2.5 ± 2.3 E+00

(a) Resin Method

TABLE 5-5

COMPARISON OF GROSS BETA AND TRITIUM RESULTS FOR DUPLICATE WATER SAMPLES

NUCLIDE	COLLECTION PERIOD	RESULTS (pCi/liter) STATION 27	STATION 72
Gr-Beta	861217 to 870121	2.9 ± 0.3 E+01	3.2 ± 0.3 E+01
	870121 to 870218	3.3 ± 0.3 E+01	3.4 ± 0.3 E+01
	870218 to 870318	3.6 ± 0.3 E+01	3.3 ± 0.3 E+01
	870318 to 870415	3.5 ± 0.3 E+01	3.2 ± 0.3 E+01
Tritium	861217 to 870318	1.6 ± 0.1 E+03	1.4 ± 0.1 E+03

5.2.2 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, Nuclear Regulatory Guide 4.15 and the program as described in Quality Assurance Manual IWL-0032-395 and the Quality Control Manual IWL-0032-365.

All measuring equipment is calibrated for efficiency yearly using standard reference material traceable to NBS. For alpha and beta counting, check sources are prepared and counted every week day except holidays. Control charts are maintained with three sigma limits specified. Control of the alpha beta counting equipment is described in procedure PRO-032-27, "Utilization of Standards for Alpha and Beta Counters and Evaluation of Control Chart Data". Backgrounds are usually measured at least once per week.

The efficiency of the gamma spectrometers is calibrated yearly with an NBS 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. This procedure is described in PRO-042-44, "Calibration of Ge(Li) Gamma Ray Spectrometers".

The efficiency of the liquid scintillation counters is determined every six months by counting an NBS traceable standard on three consecutive days and arriving at an average efficiency. A sealed source is counted every other day and plotted on a control chart with three sigma limits. A background is counted every other day. This control system is described in PRO-052-35 "Determination of Tritium in Water by Liquid Scintillation".

The flow chart of how samples are controlled from time of receipt to reporting of results is presented in Figure 5-3. 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 work sheets 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. The control of sample receipt, log-in number assignment, designation of analysis, assignment of blank samples to a group, etc., is described in procedure PRO-032-48, "Procedure for Receipt of Samples". Also included in this procedure are instructions for storage and prevention of contamination of samples.

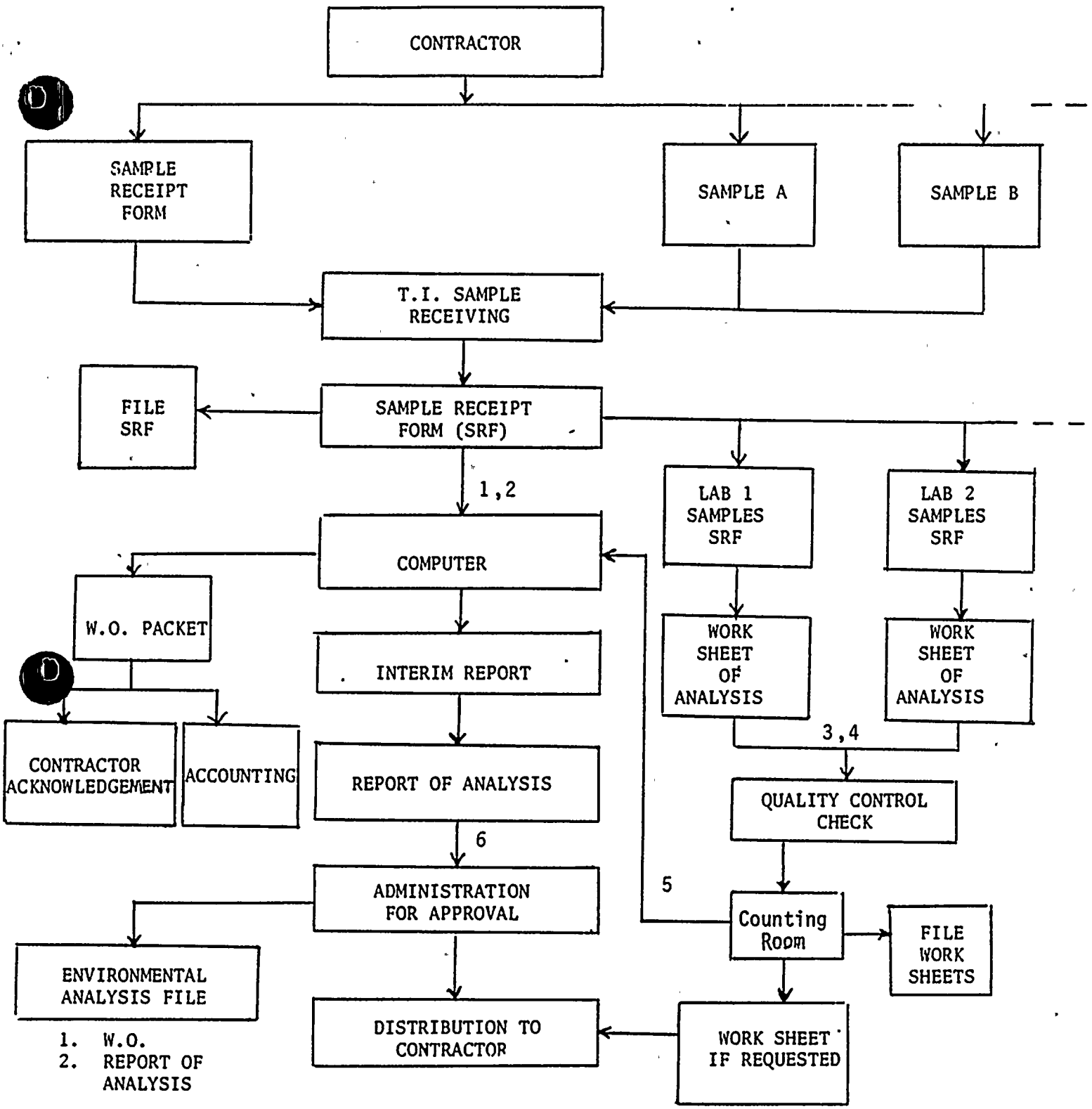


FIGURE 5-3
FLOW CHART FOR TELEDYNE ISOTOPES SAMPLES

Preparation of carrier solutions and acceptability criteria are contained in procedure PRO-032-49, "Standardization of Radiochemical Carrier Solutions". Preparation of efficiency calibration standard and check sources is described in procedure PRO-032-27, "Utilization of Standards for Alpha and Beta Counters and Evaluation of Control Chart Data".

Results are reviewed before being entered into the data system by the quality control manager and/or the technical vice president for reasonableness of the parameters (background, efficiency, decay, etc.). Any results which are suspect, being 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 work sheet(s).

No deviations from written procedures occurred during 1987. A summary of the quality control blank and spiked sample results of analyses follows.

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 indicated that there was no bias on the low background counters, which are isotope specific. The average activity for eighteen samples was -0.033 ± 0.17 pCi/l which shows a variation over a small range. This was calculated from quality control samples without considering detection limits.

Gross Beta - Filters

One blank filter was measured with each set of filters assayed. Fifty-two blanks were counted. The resultant average activity in total pCi was 1.02 ± 0.30, which indicated a relatively stable background for the filter including the background of the gross beta proportional counters.

Gross Beta - Water

Fifty-two blanks were prepared from distilled water. The resultant average based on the highest detection level measured was less than 2.0 pCi/l. No contamination was indicated and the background level was low and stable. During 1987 fifty gross beta spike samples were analyzed. The average result was 19.22 ± 2.27 pCi/l with a spike level of 21.0 ± 5.0 pCi/l. This was well within the guidelines outlined in Table 2 of the EPA-600/4-81-004, "Environmental Radioactivity Laboratory Intercomparison Studies Program".

Tritium in Water

Fifty-two blank samples were analyzed by gas counting. The average result was less than 300 pCi/l. The resultant average based on the highest detection level measured. A total of 47 spike tritium samples were analyzed. The average result was 2.6 ± 0.2 E+03 pCi/l, as compared with a spike level of 2.6 ± 0.3 E+03 pCi/l.

Sr-90 - Milk and Water

Weekly blank water samples were analyzed between January 1-September 31, 1987. From October 1987 to present blank water samples were analyzed on a bi-monthly basis as a means of reducing the QA strontium load from 13%. The average activity based on the highest detection level was less than 2 pCi/l. A total of 45 spiked milk samples were spiked to a level of 47 ± 7 pCi/l. The average activity determined was 46 ± 2 pCi/l, which was within the limits as specified by the EPA Intercomparison Studies Program. A total of 45 blank milk samples were analyzed with an average activity of 1.9 ± 0.6 pCi/l of strontium-90.

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 1.39 ± 0.14 E+05 pCi/l, as compared with a spike level of 1.40 ± 0.10 E+05 pCi/l.

There were no deviations from written procedures in 1987. Adherence to written procedures, control of measuring equipment and review of results by supervisory personnel continue to assure accurate repeatable results. The final revisions of the environmental strontium procedures reflecting the additional step of calcium precipitation was implemented in the beginning of 1988. All supporting data is favorable.

Tables summarizing the results of internal blanks and spike samples are presented in Tables 5-6 and 5-7. A summary of the EPA cross-check results is presented in Appendix B. Any result above the ± two sigma normalized deviation from the known is explained, giving the reason for the deviation and the corrective action to be taken.

TABLE 5-6

SUMMARY OF 1987 QUALITY CONTROL DATA: BLANKS

NUCLIDE	MEDIUM	BLANKS NUMBER	AVERAGE BLANK	UNITS
I-131	Milk	18	(a) -0.033 ± 0.17	pCi/l
		52	(d) L.T. 6.0 E+00	pCi/l
Gr-Beta	AP Filter	52	(c)(b) 1.02 ± 0.30 E+00	Total pCi
H-3	Water	52	(d) L.T. 3.0 E+02	pCi/l
(Gas Counting)				
I-131	Charcoal	50	(a) -3.9 ± 2.1 E-01	Total pCi
Sr-90	Water	44	(d) L.T. 4.0 E+00	pCi/l
Gamma	Water	52	*	pCi/l
Gr-Beta	Water	52	(d) L.T. 2.0 E+00	pCi/l

* 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 5-7

SUMMARY OF 1987 QUALITY CONTROL DATA: SPIKES

NUCLIDE	MEDIUM	SPIKED SAMPLES NUMBER	AVERAGE RESULT (pCi/liter)	SPIKE LEVEL (pCi/liter)
Gr-Beta	Water	50	19.0 ± 2.2	21.0 ± 5.0
H-3 (Gas Counting)	Water	47	2.6 ± 0.2 E+03	2.6 ± 0.4 E+03
Sr-90	Water	45	47.0 ± 2.0	47.0 ± 7.0
Sr-90	Milk	45	46.0 ± 2.0	47.0 ± 7.0
Eu-154 (Gamma Spectroscopy)	Water	52	1.4 ± 0.1 E+05	1.4 ± 0.1 E+05

6.0 PLANT EFFLUENTS AND DOSE ASSESSMENT

The Supply System Offsite Dose Calculation Manual (ODCM) provides the site specific information and methodologies used to ensure compliance with dose requirements stated in the Technical Specifications for Plant 2. The following is a summary of the assessed doses for 1987.

6.1 Liquid Effluents

6.1.1 Liquid Source Terms

Liquid radwaste effluents released from Plant 2 are required to meet the 10CFR20 Appendix B limits at the point of discharge into the Columbia River and the 10CFR50 Appendix I limits for unrestricted areas.[6,7] To ensure that these requirements are met, limits are set for the concentration of radioactivity in each liquid radwaste release.

The radwaste liquid effluents from Plant 2 were released in a batch mode only. All liquid effluents from the radwaste building are recirculated in a vented hold-up tank at atmospheric pressure prior to sampling and discharge analysis. The radioactivity of each batch of liquid radwaste is determined by batch sampling. The Radwaste Liquid Effluent Radiation Monitoring System measures the liquid effluents for radioactivity prior to the effluents entering the cooling tower blowdown line.

Doses from liquid effluents are calculated using the LADTAP II computer codes. Table 6-1 lists the source terms used for the LADTAP II calculations of the doses due to Plant 2 1987 liquid effluents.

6.1.2 Doses to Man: Liquid Pathways

Dose estimates for the Maximum Individual and the Average Individual are listed in Table 6-2. Technical Specification limits and the dose balance at year end are also listed in Table 6-2, verifying compliance with Technical Specifications. The maximally exposed individual is

assumed to be an adult whose exposure pathways include potable water and fish consumption. The choice of the maximally exposed individual is based on the highest fish and water consumption rates shown by that age group and the fact that most of the dose obtained from the Plant 2 liquid effluent comes from these two pathways. The doses to the 50-mile population are presented in Table 6-3, along with the design base doses calculated from the design base source terms obtained from the GALE liquid computer code.

6.2 Gaseous Effluents

6.2.1 Gaseous Source Terms

The gaseous effluents from Plant 2 were released in a continuous mode from three release points:

a. Main Plant Vent - ground and elevated release characteristics, dependent upon meteorological conditions
b. Turbine Building - ground level release
c. Radwaste Building - ground level release

Each gaseous release point is equipped with radiation monitoring systems and particulate and iodine filters for determining the radioactivity of the releases and verifying that the releases are well within limits.

The total gaseous, particulate and tritium releases during 1987 are listed in Table 6-4. These are the source terms used for determining the doses from Plant 2 gaseous effluents.

6.2.2 Dose to Man: Airborne Pathway

Gaseous releases from Plant 2 are required to meet the dose rate limits in 10CFR20, 10CFR50 Appendix I and 40CFR190 for locations at and beyond the Site Boundary.[6,7,15] To verify compliance with these limits, doses at the 1.2 mile Site Boundary, doses to the nearest resident,

i.e. maximum individual, the average individual and the population dose within a 50-mile radius were calculated using the GASPAR computer code. The annual average atmospheric dispersion factors (X/Q) and deposition rates (D/Q) were determined from the XOQDOQ computer code and used in the calculations.

Compliance with the air dose limits at the 1.2 mile Site Boundary and the dose limits to a member of the public is demonstrated in Table 6-5. The calculated maximum organ dose for a member of the public is presented for a person located in the Taylor Flats area (4.2 miles ESE) of North Pasco and compared to the Technical Specification limit. The doses calculated for the average individual are also presented. Doses calculated for the population within a 50-mile radius of the plant are presented in Table 6-6, along with the preoperational population dose projection, referred to as design base data.

The Plant 2 Visitor Center was evaluated for assessment of radiation doses to "Members of the Public", due to their activities within the site boundary. The ODCM assumes an eight hour per year occupancy by a member of the public at the Visitor Center. The dose assessment resulted in an annual calculated whole body dose of 6.1 E-03 mrem. The maximum annual organ dose (other than the thyroid) was 1.1 E-02 mrem and the annual thyroid dose was 6.5 E-03 mrem.

To show conformance with 40CFR190, radiation doses to the most likely exposed member of the public, were assessed. The individual for whom the doses were calculated was located in the Taylor Flats area of Franklin County. The GASPAR computer code, with annual source terms and meteorological data, was used to obtain the dose assessment from gaseous effluents only, since it is assumed that there is no dose contribution from liquid effluents at Taylor Flats. The assessment resulted in an annual whole body dose of 3.1 E-02 mrem. The maximum annual organ dose (other than the thyroid) was 5.0 E-02 mrem and the annual thyroid dose was 9.5 E-02 mrem. The direct radiation contribution was not significantly above normal background for that area, which is approximately 90 mrem per year.

TABLE 6-1

PLANT 2 1987 LIQUID EFFLUENTS - SOURCE TERMS

NUCLIDES RELEASED	ACTIVITY (CURIES)
Strontium-89	2.6 E-04
Strontium-90	1.5 E-05
Cesium-134	1.2 E-05
Cesium-137	<1.8 E-04
Iodine-131	<1.5 E-04
Sodium-24	1.0 E-04
Cobalt-58	5.2 E-04
Cobalt-60	1.1 E-03
Iron-59	<2.4 E-04
Zinc-65	8.0 E-03
Manganese-54	1.9 E-04
Chromium-51	1.8 E-03
Zirconium-Niobium-95	<2.4 E-04
Molybdenum-99	<1.4 E-03
Technetium-99m	<1.0 E-04
Barium-Lanthanum-140	<5.5 E-04
Cerium-141	<1.9 E-04
Cerium-144	<7.8 E-04
Tritium	1.2 E+00
Iron-55	9.4 E-05
Total for Period	1.2 E+00

TABLE 6-2

MAXIMUM AND AVERAGE INDIVIDUAL DOSES FROM 1987 LIQUID EFFLUENTS

	MAXIMUM INDIVIDUAL[a]		AVERAGE INDIVIDUAL	
PATHWAY	WHOLE BODY (mrem/year)	MAXIMUM ORGAN (mrem/yr)	WHOLE BODY (mrem/year)	MAXIMUM ORGAN (mrem/year)
Drinking	2.2E-06	3.9E-06	1.3E-06(d)	2.4E-06(d)
Shoreline	2.5E-06	2.9E-06	8.4E-08(d)	8.6E-08(d)
Fishing	1.7E-02	3.1E-02	4.2E-05(d)	7.5E-05(d)
Boating	1.2E-07	1.2E-07	6.1E-10(d)	6.1E-10(d)
Swimming	1.0E-08	1.0E-08	1.0E-09(d)	1.0E-09(d)
Leafy Vegetables	9.5E-07	2.1E-06	1.4E-05(e)	3.8E-05(e)
Vegetables	5.2E-06	1.1E-05	1.6E-05(e)	3.2E-05(e)
Milk	3.3E-06	6.0E-06	2.1E-06(e)	4.3E-06(e)
Meat	9.5E-07	2.1E-06	5.5E-07(e)	1.1E-06(e)
Total[b]	1.7E-02	3.1E-02	7.6E-05	1.5E-04
Technical Spec. Limits	3.0E+00	1.0E+01	--	--
Balance at Year End (mrem)[c]	2.98E+00	9.96E+00	--	--

(a) The Maximum Individual is an adult assumed to reside in Richland, consume food grown in the Riverview area of Pasco and fish at the Plant 2 slough area.

(b) Data obtained from WNP-2 Semi-Annual Effluent Report, July to December 1987.

(c) Technical Specification Limit minus Total.

(d) The adult dose for the "As Low As Reasonably Achievable" category in the LADTAP calculations.

(e) Population doses divided by the 50-mile radius production population served.

TABLE 6-3

50-MILE POPULATION DOSES FROM 1987 LIQUID EFFLUENTS[a]

	ANNUAL 1987		DESIGN BASE[b]	
	WHOLE BODY (man-Rem)	MAX. ORGAN (man-Rem)	WHOLE BODY (man-Rem)	MAX. ORGAN (man-Rem)
Fish	2.5 E-05	8.5 E-05	5.4 E-04	1.0 E-03
Drinking Water	7.7 E-05	1.6 E-04	8.3 E-04	3.4 E-03
Shoreline	2.7 E-05	3.2 E-05	1.9 E-04	2.2 E-04
Swimming	3.3 E-07	3.3 E-07	3.1 E-06	3.1 E-06
Boating	8.4 E-08	8.4 E-08	7.7 E-07	7.7 E-07
Vegetables	1.8 E-04	3.5 E-04	4.3 E-04	6.2 E-04
Leafy Vegetables	1.5 E-04	4.0 E-04	2.7 E-05	4.0 E-05
Milk	2.9 E-05	5.7 E-05	2.7 E-04	4.7 E-04
Meat	5.6 E-06	1.1 E-05	5.7 E-05	9.6 E-05
Total	4.9 E-04	1.1 E-03	2.4 E-03	5.9 E-03

(a) All age groups combined.

(b) Based on design base source terms (i.e., GALE Liquid Computer Code).

TABLE 6-4

PLANT 2 1987 GASEOUS EFFLUENTS-SOURCE TERMS

NUCLIDES RELEASED	ACTIVITY RELEASED (CURIES) REACTOR BUILDING	TURBINE BUILDING	RADWASTE BUILDING
1. Fission Gases			
Krypton-85	<6.6 E+01	<5.7 E+02	<7.5 E+01
Krypton-85m	1.3 E+01	1.9 E-02	2.7 E-01
Krypton-87	3.0 E+00	4.6 E+00	2.2 E+00
Krypton-88	1.4 E+01	6.7 E+00	3.0 E+00
Xenon-131m	1.8 E-01	N.D.	N.D.
Xenon-133	3.0 E+02	9.8 E+00	3.3 E+00
Xenon-135	5.9 E+01	3.6 E+00	3.4 E+00
Xenon-135m	4.7 E-01	4.3 E+00	3.0 E+00
Xenon-138	2.4 E+01	3.1 E+01	7.7 E+00
Xenon-133m	1.1 E+01	1.5 E+01	6.8 E+00
Argon-41	3.3 E-02	N.D.	N.D.
Total for period	4.2 E+02	7.5 E+01	3.0 E+01
2. Iodines			
Iodine-131	5.6 E-03	3.9 E-04	6.8 E-04
Iodine-133	6.8 E-03	1.1 E-03	1.0 E-03
Total for period	1.2 E-02	1.5 E-03	1.7 E-03

TABLE 6-4 (Cont.)

PLANT 2 1987 GASEOUS EFFLUENTS-SOURCE TERMS

NUCLIDES RELEASED	ACTIVITY RELEASED (CURIES) REACTOR BUILDING	TURBINE BUILDING	RADWASTE BUILDING
3. Particulates			
Strontium-89	8.0 E-06	1.1 E-04	6.8 E-07
Strontium-90	2.7 E-07	<2.1 E-05	<1.1 E-06
Cesium-134	<6.1 E-04	<5.8 E-04	<1.3 E-04
Cesium-137	2.7 E-05	<5.1 E-04	1.4 E-05
Barium-Lanthanum-140	<1.6 E-03	<2.0 E-03	<4.1 E-04
Molybdenum-99	2.9 E-04	<5.7 E-03	<1.4 E-03
Cerium-141	<5.0 E-04	<6.6 E-04	<1.5 E-04
Cerium-144	<2.0 E-03	<2.6 E-03	<5.7 E-04
Cobalt-58	1.8 E-03	<5.3 E-04	<1.1 E-04
Cobalt-60	3.6 E-03	1.3 E-04	<1.7 E-04
Chromium-51	4.3 E-03	3.1 E-04	<9.0 E-04
Zinc-65	8.8 E-03	<7.3 E-04	4.8 E-05
Zirconium-95	9.2 E-04	<8.6 E-04	<1.8 E-04
Iron-59	<1.0 E-03	<1.2 E-03	<2.7 E-04
Manganese-54	6.3 E-04	3.2 E-05	<1.2 E-04
Cesium-138	2.4 E-02	2.4 E-01	N.D.
Technetium-99m	8.1 E-03	2.1 E-04	N.D.
Sodium-24	1.5 E-03	N.D.	N.D.
Bromine-82	1.7 E-05	N.D.	N.D.

TABLE 6-4 (Cont.)

PLANT 2 1987 GASEOUS EFFLUENTS-SOURCE TERMS

NUCLIDES RELEASED	ACTIVITY RELEASED (CURIES) REACTOR BUILDING	TURBINE BUILDING	RADWASTE BUILDING
3. Particulates			
Zinc-69m	4.8 E-06	N.D.	N.D.
Copper-64	2.0 E-03	N.D.	N.D.
Arsenic-76	1.0 E-05	2.3 E-05	N.D.
Iodine-132	2.0 E-04	N.D.	N.D.
Total for Period	5.6 E-02	2.4 E-01	<6.3 E-05
4. Tritium	6.6 E-01	2.0 E+01	1.2 E+00
Total Building release*	4.2 E+02	9.5 E+01	3.1 E+01

*Less than (<) values are not included in the Total Building Release Values.

TABLE 6-5

MAXIMUM AND AVERAGE INDIVIDUAL DOSES FROM 1987 GASEOUS EFFLUENTS

SOURCE/ PATHWAY	MAXIMUM INDIVIDUAL AIR DOSE[a] (mrad/year)	MAXIMUM INDIVIDUAL MAXIMUM ORGAN[b] (mrem/year)	AVERAGE INDIVIDUAL[d] WHOLE BODY (mrem/year)	AVERAGE INDIVIDUAL[d] MAXIMUM ORGAN mrem/year
Beta	2.3 E-01			
Gamma	3.8 E-01			
Plume		1.4 E-02	3.9 E-04	1.4 E-03
Ground		2.0 E-03	5.2 E-05	6.0 E-05
Inhalation		7.8 E-03	1.9 E-04	6.4 E-04
Vegetables			8.7 E-05	1.6 E-04
Milk		7.2 E-02[c]	2.5 E-05	6.0 E-05
Meat			9.1 E-06	9.5 E-06
Total		9.5 E-02	7.5 E-04	2.3 E-03
Tech. Spec. Limits (mrem/year)	20 (Beta) 10 (Gamma)	1.5 E+01		
Balance at Year End (mrem)	19.7 (Beta) 9.6 (Gamma)			

(a)For the Site Boundary, 1.2 miles ESE.
(b)For infant residing at 4.2 miles ESE in the Taylor Flats area.
(c)Goat milk
(d)The projected population doses divided by the population for the 50-mile radius in the year 1980.

TABLE 6-6

50-MILE POPULATION DOSES FROM 1987 GASEOUS EFFLUENTS[a]

EXPOSURE PATHWAY	1987 DATA		DESIGN BASE DATA[b]	
	WHOLE BODY (man-Rem)	MAX. ORGAN (man-Rem)	WHOLE BODY (man-Rem)	MAX. ORGAN (man-Rem)
Plume	9.7 E-02	3.5 E-01	2.4 E-01	6.9 E-01
Ground	1.3 E-02	1.5 E-02	4.3 E-02	5.1 E-02
Inhalation	4.8 E-02	1.6 E-01	1.1 E-02	1.3 E+0
Vegetables	2.2 E-02	4.0 E-02	1.9 E-02	2.7 E+0
Cow Milk	6.2 E-03	1.5 E-02	9.2 E-03	1.8 E+0
Meat	2.3 E-03	2.4 E-03	1.9 E-03	6.8 E-02
Total:	1.9 E-01	5.8 E-01	3.2 E-01	6.6 E+00

[a] All age groups combined.

[b] Based on design base source terms.

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APPENDIX A: SAMPLE RESULTS

TABLE A-1.1

1987 QUARTERLY TLD RESULTS

Results in mR/day

LOCATION	COLLECTION PERIOD	RESULT	UNCERTAINTY 2σ
1	861230 to 870326	0.27	0.01
1	870326 to 870625	0.26	0.01
1	870625 to 870924	0.27	0.00
1	870924 to 871230	0.27	0.01
2	861230 to 870326	0.26	0.00
2	870326 to 870625	0.26	0.01
2	870625 to 870924	0.26	0.01
2	870924 to 871230	0.26	0.02
3	861230 to 870326	0.26	0.01
3	870326 to 870625	0.26	0.00
3	870625 to 870924	0.26	0.01
3	870924 to 871230	0.26	0.01
4	861230 to 870326	0.24	0.02
4	870326 to 870625	0.23	0.02
4	870625 to 870924	0.21	0.01
4	870924 to 871230	0.24	0.01
5	861230 to 870326	0.26	0.02
5	870326 to 870625	0.25	0.01
5	870625 to 870924	0.25	0.02
5	870924 to 871230	0.25	0.01
6	861230 to 870326	0.25	0.01
6	870326 to 870625	0.25	0.01
6	870625 to 870924	0.25	0.01
6	870924 to 871230	0.25	0.01
7	861230 to 870326	0.27	0.02
7	870326 to 870625	0.26	0.01
7	870625 to 870924	0.27	0.02
7	870924 to 871230	0.26	0.01
8	861230 to 870326	0.30	0.03
8	870326 to 870625	0.29	0.02
8	870625 to 870924	0.29	0.01
8	870924 to 871230	0.29	0.01

TABLE A-1.1 (Cont.)

1987 QUARTERLY TLD RESULTS

Results in mR/day

LOCATION	COLLECTION PERIOD	RESULT	UNCERTAINTY 2σ
9	861230 to 870326	0.25	0.02
9	870326 to 870625	0.24	0.01
9	870625 to 870924	0.24	0.01
9	870924 to 871230	0.24	0.01
10	861230 to 870326	0.25	0.02
10	870326 to 870625	0.26	0.01
10	870625 to 870924	0.26	0.01
10	870924 to 871230	0.25	0.01
11	861230 to 870326	0.26	0.01
11	870326 to 870625	0.26	0.01
11	870625 to 870924	0.26	0.01
11	870924 to 871230	0.26	0.01
12	861230 to 870326	0.28	0.01
12	870326 to 870625	0.28	0.02
12	870625 to 870924	0.28	0.01
12	870924 to 871230	0.28	0.01
13	861230 to 870326	0.26	0.01
13	870326 to 870625	0.27	0.01
13	870625 to 870924	0.26	0.01
13	870924 to 871230	0.26	0.01
14	861230 to 870326	0.26	0.01
14	870326 to 870625	0.26	0.01
14	870625 to 870924	0.26	0.01
14	870924 to 871230	0.26	0.00
15	861230 to 870326	0.29	0.01
15	870326 to 870625	0.28	0.02
15	870625 to 870924	0.28	0.01
15	870924 to 871230	0.28	0.00
16	861230 to 870326	0.27	0.02
16	870326 to 870625	0.26	0.02
16	870625 to 870924	0.25	0.00
16	870924 to 871230	0.27	0.01

TABLE A-1.1 (Cont.)

1987 QUARTERLY TLD RESULTS

Results in mR/day

LOCATION	COLLECTION PERIOD	RESULT	UNCERTAINTY 2σ
17	861230 to 870326	0.27	0.00
17	870326 to 870625	0.27	0.01
17	870624 to 870924	0.28	0.01
17	870924 to 871230	0.27	0.00
18	861230 to 870326	0.27	0.01
18	870326 to 870625	0.27	0.01
18	870625 to 870924	0.27	0.01
18	870924 to 871230	0.27	0.01
19	861230 to 870326	0.27	0.02
19	870326 to 870625	0.27	0.01
19	870625 to 870924	0.27	0.01
19	870924 to 871230	0.27	0.01
20	861230 to 870326	0.27	0.01
20	870326 to 870625	0.26	0.02
20	870625 to 870924	0.26	0.01
20	870924 to 871230	0.26	0.01
21	861230 to 870326	0.25	0.01
21	870326 to 870625	0.25	0.01
21	870625 to 870924	0.23	0.02
21	870924 to 871230	0.24	0.01
22	861230 to 870326	0.26	0.00
22	870326 to 870625	0.26	0.01
22	870625 to 870924	0.24	0.01
22	870924 to 871230	0.26	0.00
23	861230 to 870326	0.26	0.02
23	870326 to 870625	0.26	0.01
23	870625 to 870924	0.26	0.01
23	870924 to 871230	0.26	0.01
24	861230 to 870326	0.26	0.01
24	870326 to 870625	0.27	0.01
24	870625 to 870924	0.26	0.01
24	870924 to 871230	0.26	0.01
25	861230 to 870326	0.27	0.01
25	870326 to 870625	0.28	0.01
25	870625 to 870924	0.29	0.02
25	870924 to 871230	0.28	0.01

TABLE A-1.1 (Cont.)

1987 QUARTERLY TLD RESULTS

Results in mR/day

LOCATION	COLLECTION PERIOD	RESULT	UNCERTAINTY 2σ
40	861230 to 870326	0.25	0.02
40	870326 to 870625	0.25	0.02
40	870625 to 870924	0.26	0.02
40	870924 to 871230	0.26	0.00
41	861230 to 870326	0.29	0.02
41	870326 to 870625	0.29	0.01
41	870625 to 870924	0.29	0.01
41	870924 to 871230	0.28	0.01
42	861230 to 870326	0.27	0.00
42	870326 to 870625	0.27	0.01
42	870625 to 870924	0.26	0.00
42	870924 to 871230	0.27	0.00
43	861230 to 870326	0.28	0.01
43	870326 to 870625	0.29	0.01
43	870625 to 870924	0.29	0.01
43	870924 to 871230	0.28	0.00
44	861230 to 870326	0.26	0.01
44	870326 to 870625	0.26	0.01
44	870625 to 870924	0.26	0.01
44	870924 to 871230	0.25	0.01
45	861230 to 870326	0.26	0.01
45	870326 to 870625	0.26	0.02
45	870625 to 870924	0.27	0.01
45	870924 to 871230	0.26	0.01
46	861230 to 870326	0.32	0.02
46	870326 to 870625	0.32	0.01
46	870625 to 870924	0.33	0.02
46	870924 to 871230	0.33	0.01
47	861230 to 870326	0.25	0.03
47	870326 to 870625	0.25	0.02
47	870625 to 870924	0.22	0.02
47	870924 to 871230	0.25	0.02
49	861230 to 870326	0.26	0.01
49	870326 to 870625	0.26	0.01
49	870625 to 870924	0.26	0.02
49	870924 to 871230	0.26	0.01

TABLE A-1.1 (Cont.)

1987 QUARTERLY TLD RESULTS

.Results in mR/day

LOCATION	COLLECTION PERIOD	RESULT	UNCERTAINTY 2σ
50	861230 to 870326	0.26	0.03
50	870326 to 870625	0.27	0.00
50	870625 to 870924	0.27	0.01
50	870924 to 871230	0.27	0.02
51	861230 to 870326	0.26	0.02
51	870326 to 870625	0.26	0.02
51	870625 to 870924	0.26	0.01
51	870924 to 871230	0.26	0.01
53	861230 to 870326	0.30	0.03
53	870326 to 870625	0.29	0.02
53	870625 to 870924	0.30	0.01
53	870924 to 871230	0.30	0.01
54	861230 to 870326	0.28	0.01
54	870326 to 870625	0.27	0.01
54	870625 to 870924	0.29	0.02
54	870924 to 871230	0.28	0.04
55	861230 to 870326	0.26	0.01
55	870326 to 870625	0.26	0.01
55	870625 to 870924	0.26	0.01
55	870924 to 871230	0.27	0.00
56	861230 to 870326	0.28	0.01
56	870326 to 870625	0.26	0.01
56	870625 to 870924	0.27	0.00
56	870924 to 871230	0.27	0.01
71 (1S)	861230 to 870326	0.29	0.02
71	870326 to 870625	0.26	0.01
71	870625 to 870924	0.30	0.01
71	870924 to 871230	0.31	0.01
72 (2S)	861230 to 870326	0.28	0.01
72	870326 to 870625	0.27	0.01
72	870625 to 870924	0.29	0.02
72	870924 to 871230	0.31	0.01
73 (3S)	861230 to 870326	0.26	0.02
73	870326 to 870625	0.25	0.00
73	870625 to 870924	0.25	0.01
73	870924 to 871230	0.26	0.01

TABLE A-1.1 (Cont.)

1987 QUARTERLY TLD RESULTS

Results in mR/day

LOCATION	COLLECTION PERIOD	RESULT	UNCERTAINTY 2 σ
74 (4S)	861230 to 870326	0.29	0.02
74	870326 to 870625	0.28	0.01
74	870625 to 870924	0.29	0.01
74	870924 to 871230	0.29	0.01
75 (5S)	861230 to 870326	0.27	0.02
75	870326 to 870625	0.26	0.01
75	870625 to 870924	0.27	0.01
75	870924 to 871230	0.27	0.00
76 (6S)	861230 to 870326	0.26	0.01
76	870326 to 870625	0.26	0.01
76	870625 to 870924	0.27	0.02
76	870924 to 871230	0.27	0.01
77 (7S)	861230 to 870326	0.27	0.03
77	870326 to 870625	0.27	0.01
77	870625 to 870924	0.26	0.00
77	870924 to 871230	0.27	0.00
78 (8S)	861230 to 870326	0.27	0.03
78	870326 to 870625	0.26	0.01
78	870625 to 870924	0.26	0.01
78	870924 to 871230	0.26	0.01
79 (9S)	861230 to 870326	0.27	0.02
79	870326 to 870625	0.27	0.01
79	870625 to 870924	0.27	0.02
79	870924 to 871230	0.27	0.01
80 (10S)	861230 to 870326	0.26	0.01
80	870326 to 870625	0.26	0.01
80	870625 to 870924	0.26	0.01
80	870924 to 871230	0.26	0.00
81 (11S)	861230 to 870326	0.26	0.01
81	870326 to 870625	0.26	0.01
81	870625 to 870924	0.26	0.00
81	870924 to 871230	0.26	0.00
82 (12S)	861230 to 870326	0.27	0.01
82	870326 to 870625	0.27	0.01
82	870625 to 870924	0.27	0.01
82	870924 to 871230	0.27	0.01

TABLE A-1.1 (Cont.)

1987 QUARTERLY TLD RESULTS

Results in mR/day

LOCATION	COLLECTION PERIOD	RESULT	UNCERTAINTY 2 σ
83 (13S)	861230 to 870326	0.28	0.02
83	870326 to 870625	0.27	0.02
83	870625 to 870924	0.27	0.01
83	870924 to 871230	0.28	0.01
84 (14S)	861230 to 870326	0.27	0.01
84	870326 to 870625	0.27	0.01
84	870625 to 870924	0.27	0.01
84	870924 to 871230	0.27	0.00
85 (15S)	861230 to 870326	0.27	0.01
85	870326 to 870625	0.28	0.02
85	870625 to 870924	0.29	0.01
85	870924 to 871230	0.28	0.01
86 (16S)	861230 to 870326	0.29	0.01
86	870326 to 870625	0.27	0.01
86	870625 to 870924	0.30	0.02
86	870924 to 871230	0.32	0.01
	Average ± 2 s.d.	0.27	0.05

TABLE A-1.2

1987 ANNUAL TLD RESULTS

Results in mR/day

LOCATION	COLLECTION PERIOD	RESULT	UNCERTAINTY 2σ
1	861231 to 871231	0.26	0.01
2	861231 to 871231	0.25	0.01
3	861231 to 871231	0.24	0.00
4	861231 to 871231	0.22	0.01
5	861231 to 871231	0.24	0.00
6	861231 to 871231	0.24	0.01
7	861231 to 871231	0.24	0.01
8	861231 to 871231	0.28	0.02
9	861231 to 871231	0.23	0.01
10	861231 to 871231	0.24	0.01
11	861231 to 871231	0.25	0.02
12	861231 to 871231	0.27	0.00
13	861231 to 871231	0.25	0.01
14	861231 to 871231	0.25	0.01
15	861231 to 871231	0.27	0.02
16	861231 to 871231	0.26	0.01
17	861231 to 871231	0.26	0.01
18	861231 to 871231	0.26	0.01
19	861231 to 871231	0.25	0.01
20	861231 to 871231	0.26	0.01
21	861231 to 871231	0.23	0.01

TABLE A-1.2 (Cont.)

1987 ANNUAL TLD RESULTS

Results in mR/day

LOCATION	COLLECTION PERIOD	RESULT	UNCERTAINTY 2 σ
22	861231 to 871231	0.25	0.01
23	861231 to 871231	0.25	0.01
24	861231 to 871231	0.26	0.01
25	861231 to 871231	0.28	0.01
40	861231 to 871231	0.25	0.01
41	861231 to 871231	0.28	0.01
42	861231 to 871231	0.26	0.00
43	861231 to 871231	0.28	0.01
44	861231 to 871231	0.25	0.01
45	861231 to 871231	0.25	0.01
46	861231 to 871231	0.32	0.02
47	861231 to 871231	0.24	0.01
49	861231 to 871231	0.24 (a)	0.01
50	861231 to 871231	0.26	0.00
51	861231 to 871231	0.25	0.01
53	861231 to 871231	0.28	0.01
54	861231 to 871231	0.27	0.01
55	861231 to 871231	0.25	0.01
56	861231 to 871231	0.25	0.01
71	861231 to 871231	0.28	0.00

(a) Original dosimeter lost; replaced on September 29, 1987.

TABLE A-1.2 (Cont.)

1987 ANNUAL TLD RESULTS

Results in mR/day

LOCATION	COLLECTION PERIOD	RESULT	UNCERTAINTY 2σ
72	861231 to 871231	0.28	0.00
73	861231 to 871231	0.24	0.01
74	861231 to 871231	0.27	0.02
75	861231 to 871231	0.26	0.01
76	861231 to 871231	0.25	0.01
77	861231 to 871231	0.25	0.01
78	861231 to 871231	0.25	0.01
79	861231 to 871231	0.25	0.01
80	861231 to 871231	0.25	0.01
81	861231 to 871231	0.25	0.01
82	861231 to 871231	0.26	0.01
83	861231 to 871231	0.27	0.02
84	861231 to 871231	0.26	0.01
85	861231 to 871231	0.27	0.01
86	861231 to 871231	0.29	0.01
	Average ± 2 s.d.	0.26	0.03

TABLE A-1.3

1987 TLD RESULTS - SUMMARY

Results in mR/day

LOCATION	AVERAGE	LOW	HIGH	NUMBER SAMPLES	NUMBER POSITIVE
QUARTERLY TLD RESULTS					
TLD (I)	0.27	0.21	0.33	220	220
TLD (C) (a)	0.24	0.24	0.25	4	4
ANNUAL TLD RESULTS					
TLD (I)	0.26	0.22	0.32	55	55
TLD (C) (a)	0.22	0.22	0.22	1	1

(a) Control Station - 9

TABLE A-2.1

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
1	861229 to 870105	8.5 E-03	1.9 E-03
	870105 to 870112	3.4 E-02	0.3 E-02
	870112 to 870119	2.1 E-02	0.3 E-02
	870119 to 870126	5.1 E-02	0.4 E-02
	870126 to 870202	1.0 E-02	0.2 E-02
	870202 to 870209	1.9 E-02	0.3 E-02
	870209 to 870217	2.0 E-02	0.3 E-02
	870217 to 870223	1.0 E-02	0.2 E-02
	870223 to 870302	1.5 E-02	0.2 E-02
	870302 to 870309	1.3 E-02	0.2 E-02
	870309 to 870316	5.2 E-03	1.7 E-03
	870316 to 870323	6.5 E-03	1.8 E-03
	870323 to 870330	1.4 E-02	0.2 E-02
	870330 to 870406	1.6 E-02	2.0 E-03
	870406 to 870413	8.4 E-03	2.2 E-03
	870413 to 870420	7.7 E-03	1.9 E-03
	870420 to 870427	1.8 E-02	3.0 E-03
	870427 to 870504	8.8 E-03	2.5 E-03
	870504 to 870511	2.7 E-02	4.0 E-03
	870511 to 870518 (a)	1.4 E-02	7.0 E-03
	870518 to 870526	1.4 E-02	2.0 E-03
	870526 to 870601	8.0 E-03	2.5 E-03
	870601 to 870608	1.2 E-02	3.0 E-03
	870608 to 870615	1.5 E-02	3.0 E-03
	870615 to 870622	9.6 E-03	2.2 E-03
	870622 to 870629	1.6 E-02	3.0 E-03
	870629 to 870706	1.6 E-02	2.0 E-03
	870706 to 870713	9.4 E-03	2.2 E-03
	870713 to 870720	1.1 E-02	2.0 E-03
	870720 to 870727	1.7 E-02	3.0 E-03
	870727 to 870803	9.4 E-03	2.0 E-03
	870803 to 870810	1.5 E-02	2.0 E-03
	870810 to 870817	7.9 E-03	2.0 E-03
	870817 to 870824	1.3 E-02	3.0 E-03
	870824 to 870831	2.2 E-02	3.0 E-03
	870831 to 870908	1.7 E-02	2.0 E-03
	870908 to 870914	2.3 E-02	3.0 E-03
	870914 to 870921	1.4 E-02	2.0 E-03
	870921 to 870928	2.5 E-02	3.0 E-03

(a) Low time: power outage.

TABLE A-2.1 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
1	870928 to 871005	2.4 E-02	3.0 E-03
	871005 to 871012	2.5 E-02	3.0 E-03
	871012 to 871019	2.8 E-02	3.0 E-03
	871019 to 871026	4.0 E-02	3.0 E-03
	871026 to 871102	6.6 E-02	4.0 E-03
	871102 to 871109	3.6 E-02	3.0 E-03
	871109 to 871116	1.5 E-02	2.0 E-03
	871116 to 871123	2.4 E-02	3.0 E-03
	871123 to 871130	2.2 E-02	3.0 E-03
	871130 to 871207	1.8 E-02	2.0 E-03
	871207 to 871214	6.9 E-03	2.0 E-03
	871214 to 871221	3.1 E-02	3.0 E-03
	871221 to 871228	3.6 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
4	861229 to 870105	8.4 E-03	1.9 E-03
	870105 to 870112	2.7 E-02	0.3 E-02
	870112 to 870119	2.3 E-02	0.3 E-02
	870119 to 870126	4.9 E-02	0.4 E-02
	870126 to 870202	9.4 E-03	2.1 E-03
	870202 to 870209	2.1 E-02	0.3 E-02
	870209 to 870217	2.2 E-02	0.3 E-02
	870217 to 870223	8.4 E-03	2.2 E-03
	870223 to 870302	1.4 E-02	0.2 E-02
	870302 to 870309	1.2 E-02	0.2 E-02
	870309 to 870316	7.3 E-03	1.8 E-03
	870316 to 870323	5.4 E-03	1.8 E-03
	870323 to 870330	1.3 E-02	0.2 E-02
	870330 to 870406	2.2 E-02	3.0 E-03
	870406 to 870413	6.5 E-03	2.1 E-03
	870413 to 870420	6.8 E-03	1.8 E-03
	870420 to 870427	1.3 E-02	2.0 E-03
	870427 to 870504	1.2 E-02	2.0 E-03
	870504 to 870511	2.1 E-02	3.0 E-03
	870511 to 870518	9.4 E-03	2.0 E-03
	870518 to 870526	1.4 E-02	2.0 E-03
	870526 to 870601	1.0 E-02	3.0 E-03
	870601 to 870608	1.2 E-02	2.0 E-03
	870608 to 870615	1.2 E-02	2.0 E-03
	870615 to 870622	9.6 E-03	2.3 E-03
	870622 to 870629	1.4 E-02	3.0 E-03
	870629 to 870706	1.3 E-02	3.0 E-03
	870706 to 870713	8.4 E-03	2.1 E-03
	870713 to 870720	1.2 E-02	2.0 E-03
	870720 to 870727	1.5 E-02	2.0 E-03
	870727 to 870803	1.0 E-02	2.0 E-03
	870803 to 870810	1.4 E-02	2.0 E-03
	870810 to 870817	8.3 E-03	2.0 E-03
	870817 to 870824	1.7 E-02	3.0 E-03
	870824 to 870831	2.3 E-02	3.0 E-03
	870831 to 870908	1.6 E-02	2.0 E-03
	870908 to 870914	2.2 E-02	3.0 E-03
	870914 to 870921	1.7 E-02	3.0 E-03
	870921 to 870928	2.6 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
4	870928 to 871005	2.9 E-02	3.0 E-03
	871005 to 871012	2.8 E-02	3.0 E-03
	871012 to 871019	3.1 E-02	3.0 E-03
	871019 to 871026	3.6 E-02	3.0 E-03
	871026 to 871102	6.3 E-02	4.0 E-03
	871102 to 871109	3.4 E-02	3.0 E-03
	871109 to 871116	1.3 E-02	2.0 E-03
	871116 to 871123	2.4 E-02	3.0 E-03
	871123 to 871130	2.4 E-02	3.0 E-03
	871130 to 871207	1.6 E-02	2.0 E-03
	871207 to 871214	7.2 E-03	2.0 E-03
	871214 to 871221	3.0 E-02	3.0 E-03
	871221 to 871228	3.2 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	861229 to 870105	7.7 E-03	1.9 E-03
	870105 to 870112	3.0 E-02	0.3 E-02
	870112 to 870119	1.8 E-02	0.2 E-02
	870119 to 870126	4.3 E-02	0.3 E-02
	870126 to 870202	7.0 E-03	2.0 E-03
	870202 to 870209	2.5 E-02	0.3 E-02
	870209 to 870217	1.7 E-02	0.2 E-02
	870217 to 870223	8.5 E-03	2.3 E-03
	870223 to 870302	1.6 E-02	0.2 E-02
	870302 to 870309	1.2 E-02	0.2 E-02
	870309 to 870316	5.0 E-03	1.7 E-03
	870316 to 870323	7.0 E-03	1.9 E-03
	870323 to 870330	7.7 E-03	1.9 E-03
	870330 to 870406	1.8 E-02	3.0 E-03
	870406 to 870413	5.7 E-03	2.1 E-03
	870413 to 870420	6.9 E-03	1.8 E-03
	870420 to 870427	1.6 E-02	2.0 E-03
	870427 to 870504	1.5 E-02	2.0 E-03
	870504 to 870511	2.3 E-02	3.0 E-03
	870511 to 870518	9.2 E-03	2.0 E-03
	870518 to 870526	1.3 E-02	2.0 E-03
	870526 to 870601	1.0 E-02	3.0 E-03
	870601 to 870608	1.1 E-02	3.0 E-03
	870608 to 870615	1.8 E-02	3.0 E-03
	870615 to 870622	7.9 E-03	2.2 E-03
	870622 to 870629	1.3 E-02	2.0 E-03
	870629 to 870706	1.3 E-02	2.0 E-03
	870706 to 870713	8.1 E-03	2.1 E-03
	870713 to 870720	1.2 E-02	2.0 E-03
	870720 to 870727	1.8 E-02	3.0 E-03
	870727 to 870803	9.4 E-03	2.0 E-03
	870803 to 870810	1.4 E-02	2.0 E-03
	870810 to 870817	6.3 E-03	1.9 E-03
	870817 to 870824	1.9 E-03	3.0 E-03
	870824 to 870831	1.8 E-02	3.0 E-03
	870831 to 870908	1.7 E-02	2.0 E-03
	870908 to 870914	2.1 E-02	3.0 E-03
	870914 to 870921	1.4 E-02	2.0 E-03
	870921 to 870928	2.4 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	870928 to 871005	2.9 E-02	3.0 E-03
	871005 to 871012	2.5 E-02	3.0 E-03
	871012 to 871019	2.7 E-02	3.0 E-03
	871019 to 871026	3.5 E-02	3.0 E-03
	871026 to 871102	5.6 E-02	4.0 E-03
	871102 to 871109	3.2 E-02	3.0 E-03
	871109 to 871116	1.2 E-02	2.0 E-03
	871116 to 871123	2.0 E-02	3.0 E-03
	871123 to 871130	2.0 E-02	2.0 E-03
	871130 to 871207	1.4 E-02	2.0 E-03
	871207 to 871214	6.3 E-03	1.9 E-03
	871214 to 871221	2.6 E-02	3.0 E-03
	871221 to 871228	2.6 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
6	861229 to 870105	9.1 E-03	2.0 E-03
	870105 to 870112	3.1 E-02	0.3 E-02
	870112 to 870119	1.6 E-02	0.2 E-02
	870119 to 870126	5.5 E-02	0.4 E-02
	870126 to 870202	6.6 E-03	2.0 E-03
	870202 to 870209	2.6 E-02	0.3 E-02
	870209 to 870217	2.5 E-02	0.3 E-02
	870217 to 870223	8.8 E-03	2.3 E-03
	870223 to 870302	1.6 E-02	0.2 E-02
	870302 to 870309	1.2 E-02	0.2 E-02
	870309 to 870316	4.9 E-03	1.7 E-03
	870316 to 870323	4.0 E-03	1.7 E-03
	870323 to 870330	1.0 E-02	0.2 E-02
	870330 to 870406	2.1 E-02	3.0 E-03
	870406 to 870413	5.9 E-03	2.1 E-03
	870413 to 870420	6.8 E-03	1.8 E-03
	870420 to 870427	1.9 E-02	2.0 E-03
	870427 to 870504	2.1 E-02	3.0 E-03
	870504 to 870511	2.9 E-02	3.0 E-03
	870511 to 870518	1.0 E-02	2.0 E-03
	870518 to 870526	1.8 E-02	2.0 E-03
	870526 to 870601	8.6 E-03	2.5 E-03
	870601 to 870608	1.3 E-02	3.0 E-03
	870608 to 870615	1.6 E-02	3.0 E-03
	870615 to 870622	8.1 E-03	2.2 E-03
	870622 to 870629	1.4 E-02	3.0 E-03
	870629 to 870706	1.4 E-02	2.0 E-03
	870706 to 870713	1.0 E-02	2.0 E-03
	870713 to 870720	1.1 E-02	2.0 E-03
	870720 to 870727	1.5 E-02	2.0 E-03
	870727 to 870803	1.1 E-02	2.0 E-03
	870803 to 870810	1.4 E-02	2.0 E-03
	870810 to 870817	6.8 E-03	2.0 E-03
	870817 to 870824	1.4 E-02	3.0 E-03
	870824 to 870831	2.2 E-02	3.0 E-03
	870831 to 870908	1.8 E-02	2.0 E-03
	870908 to 870914	2.2 E-02	3.0 E-03
	870914 to 870921	1.5 E-02	2.0 E-03
	870921 to 870928	2.7 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
6	870928 to 871005	2.8 E-02	3.0 E-03
	871005 to 871012	2.5 E-02	3.0 E-03
	871012 to 871019	3.1 E-02	3.0 E-03
	871019 to 871026	4.1 E-02	3.0 E-03
	871026 to 871102	7.3 E-02	4.0 E-03
	871102 to 871109	3.7 E-02	3.0 E-03
	871109 to 871116	1.2 E-02	2.0 E-03
	871116 to 871123	2.5 E-02	3.0 E-03
	871123 to 871130	2.1 E-02	3.0 E-03
	871130 to 871207	1.6 E-02	2.0 E-03
	871207 to 871214	6.6 E-03	1.9 E-03
	871214 to 871221	2.6 E-02	3.0 E-03
	871221 to 871228	3.7 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
7	861229 to 870105	1.1 E-02	0.2 E-02
	870105 to 870112	2.6 E-02	0.3 E-02
	870112 to 870119	1.3 E-02	0.2 E-02
	870119 to 870126	4.4 E-02	0.3 E-02
	870126 to 870202	1.1 E-02	0.2 E-02
	870202 to 870209	2.6 E-02	0.3 E-02
	870209 to 870217	2.6 E-02	0.3 E-02
	870217 to 870223	8.6 E-03	2.3 E-03
	870223 to 870302	1.5 E-02	0.2 E-02
	870302 to 870309	1.3 E-02	0.2 E-02
	870309 to 870316	4.8 E-03	1.7 E-03
	870316 to 870323	4.7 E-03	1.7 E-03
	870323 to 870330	1.1 E-02	0.2 E-02
	870330 to 870406	2.1 E-02	3.0 E-03
	870406 to 870413	8.1 E-03	2.2 E-03
	870413 to 870420	5.6 E-03	1.7 E-03
	870420 to 870427	1.8 E-02	2.0 E-03
	870428 to 870504	1.4 E-02	2.0 E-03
	870504 to 870511	2.9 E-02	3.0 E-03
	870511 to 870518	9.8 E-03	2.1 E-03
	870518 to 870526	1.4 E-02	2.0 E-03
	870526 to 870601	9.9 E-03	2.6 E-03
	870601 to 870608	1.7 E-02	3.0 E-03
	870608 to 870615	2.7 E-02	3.0 E-03
	870615 to 870622	1.0 E-02	2.0 E-03
	870622 to 870629	1.5 E-02	3.0 E-03
	870629 to 870706	1.6 E-02	2.0 E-03
	870706 to 870713	9.0 E-03	2.2 E-03
	870713 to 870720	2.1 E+00 (a)	8.0 E-01
	870720 to 870727	1.6 E-02	3.0 E-03
	870727 to 870803	9.8 E-03	2.0 E-03
	870803 to 870810	1.3 E-02	2.0 E-03
	870810 to 870817	7.3 E-03	2.0 E-03
	870817 to 870824	1.4 E-02	3.0 E-03
	870824 to 870831	2.2 E-02	3.0 E-03
	870831 to 870908	2.1 E-02	2.0 E-03
	870908 to 870914	2.1 E-02	3.0 E-03
	870914 to 870921	1.2 E-02	2.0 E-03
	870921 to 870928	2.7 E-02	3.0 E-03

(a) Results in total pCi; 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
7	870928 to 871005	2.4 E-02	3.0 E-03
	871005 to 871012	2.3 E-02	3.0 E-03
	871012 to 871019	3.3 E-02	5.0 E-03
	871019 to 871026	3.6 E-02	3.0 E-03
	871026 to 871102	6.1 E-02	4.0 E-03
	871102 to 871109	3.4 E-02	3.0 E-03
	871109 to 871116	1.2 E-02	2.0 E-03
	871116 to 871123	2.4 E-02	3.0 E-03
	871123 to 871130	2.0 E-02	3.0 E-03
	871130 to 871207	1.5 E-02	2.0 E-03
	871207 to 871214	4.9 E-03	1.8 E-03
	871214 to 871221	3.6 E-03	3.0 E-03
	871221 to 871228	2.9 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
8	861229 to 870105	8.7 E-03	1.9 E-03
	870105 to 870112	3.0 E-02	0.3 E-02
	870112 to 870119	1.7 E-02	0.2 E-02
	870119 to 870126	5.2 E-02	0.4 E-02
	870126 to 870202	7.3 E-03	2.0 E-03
	870202 to 870209	2.4 E-02	0.3 E-02
	870209 to 870217	1.8 E-02	0.3 E-02
	870217 to 870223	8.1 E-03	2.2 E-03
	870223 to 870302	1.2 E-02	0.2 E-02
	870302 to 870309	1.2 E-02	0.2 E-02
	870309 to 870316	5.1 E-03	1.7 E-03
	870316 to 870323	5.6 E-03	1.8 E-03
	870323 to 870330	1.0 E-02	0.2 E-02
	870330 to 870406	2.0 E-02	3.0 E-03
	870406 to 870413	9.9 E-03	2.3 E-03
	870413 to 870420	7.7 E-03	1.9 E-03
	870420 to 870427	2.2 E-02	3.0 E-03
	870427 to 870504	1.8 E-02	3.0 E-03
	870504 to 870511	3.0 E-02	3.0 E-03
	870511 to 870518	1.1 E-02	2.0 E-03
	870518 to 870526	1.3 E-02	2.0 E-03
	870526 to 870601	6.6 E-03	2.4 E-03
	870601 to 870608	1.1 E-02	2.0 E-03
	870608 to 870615	1.6 E-02	3.0 E-03
	870615 to 870622	1.1 E-02	2.0 E-03
	870622 to 870629	1.7 E-02	3.0 E-03
	870629 to 870706	1.3 E-02	2.0 E-03
	870706 to 870713	1.1 E-02	2.0 E-03
	870713 to 870720	1.0 E-02	2.0 E-03
	870720 to 870727	1.9 E-02	3.0 E-03
	870727 to 870803	1.1 E-02	2.0 E-03
	870803 to 870810	1.3 E-02	2.0 E-03
	870810 to 870817	6.5 E-03	1.9 E-03
	870817 to 870824	1.5 E-02	3.0 E-03
	870824 to 870831	2.3 E-02	3.0 E-03
	870831 to 870908	2.0 E-02	2.0 E-03
	870908 to 870914	2.4 E-02	3.0 E-03
	870914 to 870921	1.5 E-02	2.0 E-03
	870921 to 870928	2.7 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
8	870928 to 871005	2.9 E-02	3.0 E-03
	871005 to 871012	2.7 E-02	3.0 E-03
	871012 to 871019	2.8 E-02	3.0 E-03
	871019 to 871026	4.2 E-02	3.0 E-03
	871026 to 871102	7.4 E-02 (a)	4.0 E-03
	871102 to 871109	3.8 E-02	3.0 E-03
	871109 to 871116	1.3 E-02	2.0 E-03
	871116 to 871123	1.2 E-02	7.0 E-03
	871123 to 871130	2.1 E-02	3.0 E-03
	871130 to 871207	1.7 E-02	2.0 E-03
	871207 to 871214	6.0 E-03	1.9 E-03
	871214 to 871221	2.7 E-02	3.0 E-03
	871221 to 871228	2.9 E-02	3.0 E-03

(a) Confirmed by a recount.

TABLE A-2.1 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
9	861229 to 870105	7.0 E-03	1.8 E-03
	870105 to 870112	2.5 E-02	0.3 E-02
	870112 to 870119	2.3 E-02	0.3 E-02
	870119 to 870126	4.7 E-02	0.4 E-02
	870126 to 870202	7.2 E-03	2.0 E-03
	870202 to 870209	2.1 E-02	0.3 E-02
	870209 to 870217	2.0 E-02	0.3 E-02
	870217 to 870223	6.2 E-03	2.1 E-03
	870223 to 870302	1.3 E-02	0.2 E-02
	870302 to 870309	9.2 E-03	2.2 E-03
	870309 to 870316	5.7 E-03	1.8 E-03
	870316 to 870323	5.1 E-03	1.8 E-03
	870323 to 870330	9.3 E-03	2.0 E-03
	870330 to 870406	1.8 E-02	3.0 E-03
	870406 to 870413	8.1 E-03	2.2 E-03
	870413 to 870420	5.8 E-03	1.7 E-03
	870420 to 870427	1.8 E-02	2.0 E-03
	870427 to 870504	1.7 E-02	3.0 E-03
	870504 to 870511	2.7 E-02	3.0 E-03
	870511 to 870518	9.5 E-03	2.0 E-03
	870518 to 870526	1.5 E-02	2.0 E-03
	870526 to 870601	8.2 E-03	2.5 E-03
	870601 to 870608	1.2 E-02	3.0 E-03
	870608 to 870615	1.4 E-02	3.0 E-03
	870615 to 870622	1.0 E-02	2.0 E-03
	870622 to 870629	1.3 E-02	2.0 E-03
	870629 to 870706	1.4 E-02	2.0 E-03
	870706 to 870713	8.2 E-03	2.1 E-03
	870713 to 870720	9.1 E-03	2.0 E-03
	870720 to 870727	1.6 E-02	3.0 E-03
	870727 to 870803	9.4 E-03	2.0 E-03
	870803 to 870810	1.2 E-02	2.0 E-03
	870810 to 870817	7.4 E-03	2.0 E-03
	870817 to 870824	1.2 E-02	2.0 E-03
	870824 to 870831	2.3 E-02	3.0 E-03
	870831 to 870908	1.5 E-02	2.0 E-03
	870908 to 870914	2.4 E-02	3.0 E-03
	870914 to 870921	1.3 E-02	2.0 E-03
	870921 to 870928	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
9	870928 to 871005	2.7 E-02	3.0 E-03
	871005 to 871012	2.1 E-02	3.0 E-03
	871012 to 871019	2.3 E-02	3.0 E-03
	871019 to 871026	3.5 E-02	3.0 E-03
	871026 to 871102	5.1 E-02 (a)	4.0 E-03
	871102 to 871109	3.0 E-02	3.0 E-03
	871109 to 871116	8.7 E-03	2.1 E-03
	871116 to 871123	2.0 E-02	2.0 E-03
	871123 to 871130	2.0 E-02	2.0 E-03
	871130 to 871207	1.3 E-02	2.0 E-03
	871207 to 871214	5.8 E-03	1.9 E-03
	871214 to 871221	2.7 E-02	3.0 E-03
	871221 to 871228	2.0 E-02	2.0 E-03

(a) Confirmed by a recount.

TABLE A-2.1 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
21	861229 to 870105	8.0 E-03	1.9 E-03
	870105 to 870112	2.4 E-02	0.3 E-02
	870112 to 870119	1.8 E-02	0.2 E-02
	870119 to 870126	5.1 E-02	0.4 E-02
	870126 to 870202	8.8 E-03	2.4 E-03
	870202 to 870209	2.0 E-02	0.3 E-02
	870209 to 870217	1.8 E-02	0.2 E-02
	870217 to 870223	7.9 E-03	2.2 E-03
	870223 to 870302	1.6 E-02	0.2 E-02
	870302 to 870309	1.2 E-02	0.2 E-02
	870309 to 870316	4.8 E-03	1.7 E-03
	870316 to 870323	5.4 E-03	1.8 E-03
	870323 to 870330	8.8 E-03	1.9 E-03
	870330 to 870406	1.9 E-02	3.0 E-03
	870406 to 870413	7.8 E-03	2.2 E-03
	870413 to 870420	6.8 E-03	1.8 E-03
	870420 to 870427	1.4 E-02	2.0 E-03
	870427 to 870504	1.4 E-02	2.0 E-03
	870504 to 870511	2.4 E-02	3.0 E-03
	870511 to 870518	9.7 E-03	2.0 E-03
	870518 to 870526	1.6 E-02	2.0 E-03
	870526 to 870601	8.3 E-03	2.6 E-03
	870601 to 870608	1.4 E-02	3.0 E-03
	870608 to 870615	1.2 E-02	2.0 E-03
	870615 to 870622	1.0 E-02	2.0 E-03
	870622 to 870629	1.3 E-02	2.0 E-03
	870629 to 870706	1.3 E-02	2.0 E-03
	870706 to 870713	8.5 E-03	2.1 E-03
	870713 to 870720	7.8 E-03	1.9 E-03
	870720 to 870727	1.4 E-02	2.0 E-03
	870727 to 870803	1.3 E-02	2.0 E-03
	870803 to 870810	1.2 E-02	2.0 E-03
	870810 to 870817	6.9 E-03	2.0 E-03
	870817 to 870824	1.4 E-02	3.0 E-03
	870824 to 870831	1.9 E-02	3.0 E-03
	870831 to 870908	1.7 E-02	2.0 E-03
	870908 to 870914	2.2 E-02	3.0 E-03
	870914 to 870921	1.2 E-02	2.0 E-03
	870921 to 870928	2.3 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
21	870928 to 871005	2.5 E-02	3.0 E-03
	871005 to 871012	2.5 E-02	3.0 E-03
	871012 to 871019	2.7 E-02	3.0 E-03
	871019 to 871026	3.5 E-02	3.0 E-03
	871026 to 871102	5.9 E-02	4.0 E-03
	871102 to 871109	3.8 E-02	3.0 E-03
	871109 to 871116	1.4 E-02	2.0 E-03
	871116 to 871123	2.8 E-02	3.0 E-03
	871123 to 871130	2.1 E-02	3.0 E-03
	871130 to 871207	1.8 E-02	2.0 E-03
	871207 to 871214	5.7 E-03	1.9 E-03
	871214 to 871221	1.9 E-02	3.0 E-03
	871221 to 871228	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
23	861229 to 870105	8.1 E-03	1.9 E-03
	870105 to 870112	3.1 E-02	0.3 E-02
	870112 to 870119	1.7 E-02	0.2 E-02
	870119 to 870126	4.6 E-02	0.4 E-02
	870126 to 870202	1.0 E-02	0.2 E-02
	870202 to 870209	2.2 E-02	0.3 E-02
	870209 to 870217	1.9 E-02	0.3 E-02
	870217 to 870223	7.0 E-03	2.2 E-03
	870223 to 870302	1.8 E-02	0.3 E-02
	870302 to 870309	1.4 E-02	0.2 E-02
	870309 to 870316	5.4 E-03	1.7 E-03
	870316 to 870323	4.4 E-03	1.7 E-03
	870323 to 870330	1.1 E-02	0.2 E-02
	870330 to 870406	2.1 E-02	3.0 E-03
	870406 to 870413	6.4 E-03	2.1 E-03
	870413 to 870420	6.2 E-03	1.8 E-03
	870420 to 870427	2.1 E-02	3.0 E-03
	870427 to 870504	1.7 E-02	3.0 E-03
	870504 to 870511	3.0 E-02	3.0 E-03
	870511 to 870518	1.3 E-02	2.0 E-03
	870518 to 870526	1.1 E-02	2.0 E-03
	870526 to 870601	9.1 E-03	2.5 E-03
	870601 to 870608	1.4 E-02	3.0 E-03
	870608 to 870615	1.7 E-02	3.0 E-03
	870615 to 870622	1.0 E-02	2.0 E-03
	870622 to 870629	1.7 E-02	3.0 E-03
	870629 to 870706	1.8 E-02	2.0 E-03
	870706 to 870713	1.0 E-02	2.0 E-03
	870713 to 870720	1.2 E-02	2.0 E-03
	870720 to 870727	1.8 E-02	3.0 E-03
	870727 to 870803	1.1 E-02	2.0 E-03
	870803 to 870810	1.5 E-02	3.0 E-03
	870810 to 870817	7.7 E-03	2.0 E-03
	870817 to 870824	1.6 E-02	3.0 E-03
	870824 to 870831	2.6 E-02	3.0 E-03
	870831 to 870908	6.4 E+00 (a)	1.0 E+00
	870908 to 870914	2.4 E-02	3.0 E-03
	870914 to 870921	1.5 E-02	2.0 E-03
	870921 to 870928 (b)		

(a) Result in total pCi; not included in averages.
(b) Power maintenance outage; no sample available.

TABLE A-2.1 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
23	870928 to 871005	2.6 E-02	5.0 E-03
	871005 to 871012	2.9 E-02	3.0 E-03
	871012 to 871019	3.1 E-02	3.0 E-03
	871019 to 871026	4.7 E-02	3.0 E-03
	871026 to 871102	7.3 E-02	4.0 E-03
	871102 to 871109	4.1 E-02	3.0 E-03
	871109 to 871116	1.4 E-02	2.0 E-03
	871116 to 871123	2.4 E-02	3.0 E-03
	871123 to 871130	2.5 E-02	3.0 E-03
	871130 to 871207	2.0 E-02	3.0 E-03
	871207 to 871214	6.8 E-03	1.9 E-03
	871214 to 871221	3.0 E-02	3.0 E-03
	871221 to 871228	3.2 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
40	861229 to 870105	8.2 E-03	1.9 E-03
	870105 to 870112	3.3 E-02	0.3 E-02
	870112 to 870119	2.0 E-02	0.3 E-02
	870119 to 870126	4.8 E-02	0.4 E-02
	870126 to 870202	7.3 E-03	2.0 E-03
	870202 to 870209	2.3 E-02	0.3 E-02
	870209 to 870217	1.7 E-02	0.2 E-02
	870217 to 870223	7.7 E-03	2.2 E-03
	870223 to 870302	1.8 E-02	0.3 E-02
	870302 to 870309	1.3 E-02	0.2 E-02
	870309 to 870316	5.4 E-03	1.7 E-03
	870316 to 870323	5.9 E-03	1.8 E-03
	870323 to 870330	1.3 E-02	0.2 E-02
	870330 to 870406	2.0 E-02	3.0 E-03
	870406 to 870413	1.1 E-02	2.0 E-03
	870413 to 870420	8.3 E-03	1.9 E-03
	870420 to 870427	1.9 E-02	2.0 E-03
	870427 to 870504	1.9 E-02	3.0 E-03
	870504 to 870511	2.7 E-02	3.0 E-03
	870511 to 870518	1.3 E-02	2.0 E-03
	870518 to 870526	1.5 E-02	2.0 E-03
	870526 to 870601	7.5 E-03	2.5 E-03
	870601 to 870608	1.5 E-02	3.0 E-03
	870608 to 870615	1.8 E-02	3.0 E-03
	870615 to 870622	1.1 E-02	2.0 E-03
	870622 to 870629	1.7 E-02	3.0 E-03
	870629 to 870706	1.6 E-02	2.0 E-03
	870706 to 870713	1.1 E-02	2.0 E-03
	870713 to 870720	1.5 E-02	2.0 E-03
	870720 to 870727	1.8 E-02	3.0 E-03
	870727 to 870803	1.0 E-02	2.0 E-03
	870803 to 870810	1.4 E-02	2.0 E-03
	870810 to 870817	9.0 E-03	2.1 E-03
	870817 to 870824	1.3 E-02	3.0 E-03
	870824 to 870831	2.0 E-02	3.0 E-03
	870831 to 870908	1.6 E-02	2.0 E-03
	870908 to 870914	2.2 E-02	3.0 E-03
	870914 to 870921	1.5 E-02	2.0 E-03
	870921 to 870928	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
40	870928 to 871005	2.5 E-02	3.0 E-03
	871005 to 871012	2.7 E-02	3.0 E-03
	871012 to 871019	2.3 E-02	3.0 E-03
	871019 to 871026	3.5 E-02	3.0 E-03
	871026 to 871102	6.2 E-02	4.0 E-03
	871102 to 871109	3.5 E-02	3.0 E-03
	871109 to 871116	1.3 E-02	2.0 E-03
	871116 to 871123	1.6 E-02	3.0 E-03
	871123 to 871130	1.8 E-02	2.0 E-03
	871130 to 871207	1.3 E-02	2.0 E-03
	871207 to 871214	* 4.2 E-03	4.8 E-03
	871214 to 871221	3.1 E-02	3.0 E-03
	871221 to 871228	3.1 E-02	3.0 E-03

* 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	861229 to 870105	9.9 E-03	2.0 E-03
	870105 to 870112	3.1 E-02	0.3 E-02
	870112 to 870119	2.1 E-02	0.3 E-02
	870119 to 870126	5.7 E-02	0.4 E-02
	870126 to 870202	7.3 E-03	2.0 E-03
	870202 to 870209	2.0 E-02	0.3 E-02
	870209 to 870217	1.3 E-02	0.2 E-02
	870217 to 870223	1.0 E-02	0.2 E-02
	870223 to 870302	1.5 E-02	0.2 E-02
	870302 to 870309	9.3 E-03	2.0 E-03
	870309 to 870316	6.5 E-03	1.8 E-03
	870316 to 870323	6.6 E-03	1.8 E-03
	870323 to 870330	1.3 E-02	0.2 E-02
	870330 to 870406	2.0 E-02	3.0 E-03
	870406 to 870413	6.6 E-03	2.1 E-03
	870413 to 870420	7.7 E-03	1.9 E-03
	870420 to 870427	1.8 E-02	2.0 E-03
	870427 to 870504	1.7 E-02	3.0 E-03
	870504 to 870511	2.6 E-02	3.0 E-03
	870511 to 870518	1.1 E-02	2.0 E-03
	870518 to 870526	1.4 E-02	2.0 E-03
	870526 to 870601	1.1 E-02	3.0 E-03
	870601 to 870608	1.2 E-02	3.0 E-03
	870608 to 870615	1.8 E-02	3.0 E-03
	870615 to 870622	9.8 E-03	2.3 E-03
	870622 to 870629	1.7 E-02	3.0 E-03
	870629 to 870706	1.6 E-02	2.0 E-03
	870706 to 870713	1.0 E-02	2.0 E-03
	870713 to 870720	1.0 E-02	2.0 E-03
	870720 to 870727	1.6 E-02	3.0 E-03
	870727 to 870803	1.1 E-02	2.0 E-03
	870803 to 870810	1.4 E-02	2.0 E-03
	870810 to 870817	8.4 E-03	2.1 E-03
	870817 to 870824	1.3 E-02	3.0 E-03
	870824 to 870831	2.0 E-02	3.0 E-03
	870831 to 870908	1.8 E-02	2.0 E-03
	870908 to 870914	2.5 E-02	3.0 E-03
	870914 to 870921	1.5 E-02	2.0 E-03
	870921 to 870928	2.6 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
48	870928 to 871005	2.9 E-02	3.0 E-03
	871005 to 871012	2.9 E-02	3.0 E-03
	871012 to 871019	3.2 E-02	3.0 E-03
	871019 to 871026	4.4 E-02	3.0 E-03
	871026 to 871102	7.3 E-02	4.0 E-03
	871102 to 871109	4.1 E-02	3.0 E-03
	871109 to 871116	1.4 E-02	2.0 E-03
	871116 to 871123	2.7 E-02	3.0 E-03
	871123 to 871130	2.5 E-02	3.0 E-03
	871130 to 871207	1.9 E-02	2.0 E-03
	871207 to 871214	7.7 E-03	2.0 E-03
	871214 to 871221	3.2 E-03	3.0 E-03
	871221 to 871228	3.4 E-03	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
57	861229 to 870105	8.9 E-03	1.9 E-03
	870105 to 870112	3.1 E-02	0.3 E-02
	870112 to 870119	2.4 E-02	0.3 E-02
	870119 to 870126	4.8 E-02	0.4 E-02
	870126 to 870202	9.4 E-03	2.1 E-03
	870202 to 870209	2.6 E-02	0.3 E-02
	870209 to 870217	1.8 E-02	0.2 E-02
	870217 to 870223	9.2 E-03	2.3 E-03
	870223 to 870302	1.6 E-02	0.2 E-02
	870302 to 870309	1.1 E-02	0.2 E-02
	870309 to 870316	4.6 E-03	1.7 E-03
	870316 to 870323	4.7 E-03	1.7 E-03
	870323 to 870330	7.8 E-03	1.9 E-03
	870330 to 870406	2.1 E-02	3.0 E-03
	870406 to 870413	1.4 E-02	2.0 E-03
	870413 to 870420	7.1 E-03	1.8 E-03
	870420 to 870427	1.8 E-02	2.0 E-03
	870427 to 870504	1.4 E-02	2.0 E-03
	870504 to 870511	2.6 E-02	3.0 E-03
	870511 to 870518	1.1 E-02	2.0 E-03
	870518 to 870526	1.5 E-02	2.0 E-03
	870526 to 870601	1.1 E-02	3.0 E-03
	870601 to 870608	1.2 E-02	3.0 E-03
	870608 to 870615	1.6 E-02	3.0 E-03
	870615 to 870622	9.6 E-03	2.2 E-03
	870622 to 870629	1.7 E-02	3.0 E-03
	870629 to 870706	1.6 E-02	2.0 E-03
	870706 to 870713	1.1 E-02	2.0 E-03
	870713 to 870720	1.5 E-02	2.0 E-03
	870720 to 870727	1.8 E-02	3.0 E-03
	870727 to 870803	1.3 E-02	2.0 E-03
	870803 to 870810	1.5 E-02	2.0 E-03
	870810 to 870817	9.3 E-03	2.1 E-03
	870817 to 870824	1.7 E-02	3.0 E-03
	870824 to 870831	2.4 E-02	3.0 E-03
	870831 to 870908	2.1 E-02	2.0 E-03
	870908 to 870914	2.3 E-02	3.0 E-03
	870914 to 870921	1.5 E-02	2.0 E-03
	870921 to 870928	2.7 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
57	870928 to 871005	2.7 E-02	3.0 E-03
	871005 to 871012	2.9 E-02	3.0 E-03
	871012 to 871019	3.1 E-02	3.0 E-03
	871019 to 871026	4.4 E-02	3.0 E-03
	871026 to 871102	6.9 E-02	4.0 E-03
	871102 to 871109	4.3 E-02	3.0 E-03
	871109 to 871116	1.6 E-02	2.0 E-03
	871116 to 871123	3.0 E-02	3.0 E-03
	871123 to 871130	2.4 E-02	3.0 E-03
	871130 to 871207	2.1 E-02	3.0 E-03
	871207 to 871214	7.0 E-03	2.0 E-03
	871214 to 871221	3.0 E-02	3.0 E-03
	871221 to 871228	3.3 E-02	3.0 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)	1.85 E-02	4.00 E-03	7.40 E-02	571	570
Gr-Beta (C)	1.70 E-02	5.00 E-02	5.10 E-02	52	52

(I) Indicator Station
(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	861229 to 870330	Be-7	4.46 E-02	5.34 E-03
		K-40	* 6.97 E-03	2.66 E-03
		Ru-103	*-1.65 E-04	3.13 E-04
		Ru-106	*-9.64 E-04	1.74 E-03
		Cs-134	* 0.00 E-01	1.97 E-04
		Cs-137	* 1.98 E-04	1.98 E-04
		Ra-226	* 7.66 E-03	3.55 E-03
		Th-228	* 9.19 E-04	3.14 E-04
	870330 to 870629	Be-7	1.04 E-01	6.17 E-03
		K-40	* 7.47 E-03	3.08 E-03
		Ru-103	*-1.32 E-04	2.05 E-04
		Ru-106	* 5.55 E-04	1.59 E-03
		Cs-134	* 2.04 E-04	2.15 E-04
		Cs-137	* 1.14 E-04	2.05 E-04
		Ra-226	* 7.28 E-04	3.94 E-03
		Th-228	* 8.94 E-04	3.95 E-04
	870629 to 870928	Be-7	9.43 E-02	6.05 E-03
		K-40	* 6.36 E-03	2.91 E-03
		Ru-103	* 1.81 E-05	2.37 E-04
		Ru-106	*-9.70 E-04	1.85 E-03
		Cs-134	* 0.00 E-01	2.04 E-04
		Cs-137	* 1.55 E-04	2.25 E-04
		Ra-226	* 6.19 E-03	3.78 E-03
		Th-228	* 9.56 E-04	3.43 E-04
	870928 to 871228	Be-7	4.66 E-02	3.70 E-03
		K-40	* 7.61 E-03	2.40 E-03
		Ru-103	* 3.46 E-05	1.76 E-04
		Ru-106	* 9.62 E-04	1.19 E-03
		Cs-134	* 8.65 E-06	1.39 E-04
		Cs-137	* 8.65 E-05	1.46 E-04
		Ra-226	* 2.83 E-03	2.65 E-03
		Th-228	* 4.26 E-04	2.17 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
4	861229 to 870330	Be-7	5.43 E-02	5.60 E-03
		K-40	* 1.07 E-02	3.18 E-03
		Ru-103	*-2.16 E-05	3.16 E-04
		Ru-106	* 4.34 E-04	1.69 E-03
		Cs-134	*-1.00 E-05	1.74 E-04
		Cs-137	* 5.03 E-05	1.82 E-04
		Ra-226	* 4.92 E-04	3.42 E-03
		Th-228	* 5.69 E-04	3.03 E-04
	870330 to 870629	Be-7	1.01 E-01	5.44 E-03
		K-40	* 7.05 E-03	2.53 E-03
		Ru-103	* 3.89 E-05	1.92 E-04
		Ru-106	*-4.18 E-04	1.43 E-03
		Cs-134	* 2.34 E-04	1.85 E-04
		Cs-137	* 1.43 E-04	1.71 E-04
		Ra-226	* 4.99 E-03	3.29 E-03
		Th-228	* 8.36 E-04	3.01 E-04
	870629 to 870928	Be-7	1.08 E-01	6.27 E-03
		K-40	4.85 E-03	2.48 E-03
		Ru-103	*-1.16 E-04	2.49 E-04
		Ru-106	*-1.35 E-03	1.75 E-03
		Cs-134	*-1.12 E-05	1.92 E-04
		Cs-137	* 3.81 E-05	1.96 E-04
		Ra-226	*-4.97 E-04	3.75 E-03
		Th-228	* 4.92 E-04	3.32 E-04
	870928 to 871228	Be-7	4.46 E-02	3.79 E-03
		K-40	3.32 E-03	1.85 E-03
		Ru-103	* 1.12 E-04	1.72 E-04
		Ru-106	* 0.00 E-01	1.12 E-03
		Cs-134	* 5.53 E-05	1.35 E-04
		Cs-137	* 2.62 E-04	1.52 E-04
		Ra-226	* 8.60 E-03	2.67 E-03
		Th-228	* 7.22 E-04	2.30 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
5	861229 to 870330	Be-7	4.65 E-02	5.30 E-03
		K-40	* 1.99 E-02	3.69 E-03
		Ru-103	*-1.60 E-04	4.16 E-04
		Ru-106	*-1.00 E-03	2.29 E-03
		Cs-134	* 3.43 E-04	2.56 E-04
		Cs-137	* 1.88 E-04	2.48 E-04
		Ra-226	* 5.97 E-03	3.93 E-03
		Th-228	* 3.09 E-03	4.19 E-04
	870330 to 870629	Be-7	9.63 E-02	4.97 E-03
		K-40	* 5.36 E-03	2.22 E-03
		Ru-103	* 9.31 E-05	1.66 E-04
		Ru-106	* 5.96 E-05	1.30 E-03
		Cs-134	* 1.31 E-04	1.63 E-04
		Cs-137	* 4.30 E-05	1.49 E-04
		Ra-226	* 4.03 E-03	2.33 E-03
		Th-228	* 6.04 E-04	2.31 E-04
	870629 to 870928	Be-7	1.01 E-01	6.13 E-03
		K-40	* 1.94 E-02	3.83 E-03
		Ru-103	* 5.41 E-05	3.16 E-04
		Ru-106	*-6.82 E-05	2.18 E-03
		Cs-134	* 1.71 E-04	2.58 E-04
		Cs-137	* 8.15 E-05	2.69 E-04
		Ra-226	* 2.97 E-03	4.12 E-03
		Th-228	* 3.04 E-03	4.34 E-04
	870928 to 871228	Be-7	3.98 E-02	4.88 E-03
		K-40	* 5.40 E-02	6.74 E-03
		Ru-103	* 0.00 E-01	3.03 E-04
		Ru-106	*-6.97 E-04	2.29 E-03
		Cs-134	* 2.25 E-05	2.79 E-04
		Cs-137	* 1.40 E-04	2.62 E-04
		Ra-226	* 4.72 E-03	4.83 E-03
		Th-228	* 7.48 E-04	3.76 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	861229 to 870330	Be-7	3.21 E-02	4.67 E-03
		K-40	* 3.21 E-02	6.26 E-03
		Ru-103	*-1.48 E-04	4.61 E-04
		Ru-106	*-1.69 E-03	2.62 E-03
		Cs-134	* 1.64 E-04	3.33 E-04
		Cs-137	* 3.30 E-04	3.11 E-04
		Ra-226	* 3.85 E-03	4.33 E-03
		Th-228	* 4.87 E-04	4.67 E-04
	870330 to 870629	Be-7	1.09 E-01	7.14 E-03
		K-40	* 8.53 E-03	3.19 E-03
		Ru-103	* 1.17 E-04	2.69 E-04
		Ru-106	*-2.80 E-04	1.82 E-03
		Cs-134	*-3.93 E-05	2.14 E-04
		Cs-137	* 0.00 E-01	1.97 E-04
		Ra-226	*-1.60 E-03	3.90 E-03
		Th-228	* 1.27 E-04	3.49 E-0
	870629 to 870928	Be-7	9.05 E-02	5.45 E-03
		K-40	* 5.98 E-02	5.96 E-03
		Ru-103	* 1.28 E-05	3.10 E-04
		Ru-106	*-4.03 E-04	2.36 E-03
		Cs-134	* 2.47 E-04	2.76 E-04
		Cs-137	* 8.99 E-05	2.71 E-04
		Ra-226	* 2.61 E-03	5.12 E-03
		Th-228	* 5.17 E-04	4.28 E-04
	870928 to 871228	Be-7	4.87 E-02	4.28 E-03
		K-40	* 7.51 E-03	2.78 E-03
		Ru-103	*-1.54 E-04	1.82 E-04
		Ru-106	* 1.35 E-04	1.27 E-03
		Cs-134	* 1.27 E-04	1.64 E-04
		Cs-137	* 1.53 E-04	1.85 E-04
		Ra-226	*-1.41 E-03	2.45 E-03
		Th-228	* 4.64 E-04	2.30 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
7	861229 to 870330	Be-7	4.84 E-02	4.80 E-03
		K-40	4.47 E-03	2.21 E-03
		Ru-103	*-6.13 E-05	2.49 E-04
		Ru-106	* 0.00 E-01	1.45 E-03
		Cs-134	* 0.00 E-01	1.64 E-04
		Cs-137	* 1.50 E-04	1.64 E-04
		Ra-226	* 4.00 E-03	2.88 E-03
		Th-228	* 6.66 E-04	2.95 E-04
	870330 to 870629	Be-7	9.92 E-02	7.14 E-03
		K-40	* 1.11 E-01	8.98 E-03
		Ru-103	*-2.16 E-04	4.24 E-04
		Ru-106	*-1.22 E-03	3.14 E-03
		Cs-134	* 2.66 E-04	3.78 E-04
		Cs-137	* 1.38 E-04	3.61 E-04
		Ra-226	* 4.74 E-03	5.55 E-03
		Th-228	* 1.02 E-03	4.68 E-04
	870629 to 870928	Be-7	9.66 E-02	5.96 E-03
		K-40	* 6.97 E-03	2.61 E-03
		Ru-103	*-4.21 E-05	1.85 E-04
		Ru-106	* 5.44 E-04	1.27 E-03
		Cs-134	* 5.71 E-05	1.80 E-04
		Cs-137	* 1.88 E-04	1.80 E-04
		Ra-226	* 1.98 E-03	2.99 E-03
		Th-228	* 5.08 E-04	3.18 E-04
	870928 to 871228	Be-7	4.67 E-02	4.68 E-03
		K-40	* 6.62 E-02	6.79 E-03
		Ru-103	*-9.75 E-05	2.97 E-04
		Ru-106	*-3.28 E-04	2.11 E-03
		Cs-134	*-2.85 E-05	2.54 E-04
		Cs-137	* 5.50 E-05	2.64 E-04
		Ra-226	* 2.33 E-04	3.64 E-03
		Th-228	* 1.91 E-04	3.26 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
8	861229 to 870330	Be-7	5.45 E-02	6.85 E-03
		K-40	* 9.38 E-03	3.15 E-03
		Ru-103	* 3.86 E-05	3.50 E-04
		Ru-106	*-1.87 E-03	1.77 E-03
		Cs-134	* 1.44 E-04	2.03 E-04
		Cs-137	* 1.88 E-04	1.92 E-04
		Ra-226	* 3.57 E-03	3.53 E-03
		Th-228	* 1.34 E-03	3.35 E-04
	870330 to 870629	Be-7	1.22 E-01	6.14 E-03
		K-40	4.56 E-03	1.83 E-03
		Ru-103	* 2.37 E-05	2.10 E-04
		Ru-106	*-2.72 E-04	1.41 E-03
		Cs-134	* 4.71 E-05	1.79 E-04
		Cs-137	* 0.00 E-01	1.64 E-04
		Ra-226	* 1.87 E-03	3.49 E-03
		Th-228	* 4.80 E-04	3.07 E-0
	870629 to 870928	Be-7	1.07 E-01	8.87 E-03
		K-40	* 7.00 E-02	8.60 E-03
		Ru-103	* 1.49 E-04	4.37 E-04
		Ru-106	* 1.42 E-03	3.02 E-03
		Cs-134	* 1.86 E-04	3.93 E-04
		Cs-137	*-1.33 E-04	3.59 E-04
		Ra-226	* 8.09 E-03	5.31 E-03
		Th-228	* 1.12 E-03	5.01 E-04
	870928 to 871228	Be-7	4.51 E-02	4.52 E-03
		K-40	* 6.74 E-02	6.47 E-03
		Ru-103	* 7.58 E-06	2.87 E-04
		Ru-106	*-1.96 E-04	2.03 E-03
		Cs-134	*-3.72 E-05	2.47 E-04
		Cs-137	* 1.48 E-04	2.46 E-04
		Ra-226	* 2.74 E-03	3.61 E-03
		Th-228	* 9.03 E-04	3.21 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
9	861229 to 870330	Be-7	4.93 E-02	5.25 E-03
		K-40	* 1.00 E-02	3.13 E-03
		Ru-103	*-2.50 E-04	3.18 E-04
		Ru-106	* 0.00 E-01	1.76 E-03
		Cs-134	* 4.20 E-05	2.01 E-04
		Cs-137	* 1.56 E-04	1.93 E-04
		Ra-226	* 4.61 E-03	3.31 E-03
		Th-228	* 6.74 E-04	3.07 E-04
	870330 to 870629	Be-7	1.06 E-01	5.94 E-03
		K-40	* 4.15 E-03	2.37 E-03
		Ru-103	*-5.93 E-05	1.80 E-04
		Ru-106	* 2.13 E-04	1.32 E-03
		Cs-134	* 8.69 E-05	1.50 E-04
		Cs-137	*-2.52 E-05	1.50 E-04
		Ra-226	* 8.74 E-03	3.41 E-03
		Th-228	* 8.17 E-04	3.12 E-04
	870629 to 870928	Be-7	9.79 E-02	5.92 E-03
		K-40	1.16 E-02	4.83 E-03
		Ru-103	* 1.17 E-04	2.45 E-04
		Ru-106	* 6.56 E-04	1.76 E-03
		Cs-134	*-1.17 E-05	2.07 E-04
		Cs-137	* 9.87 E-06	2.09 E-04
		Ra-226	* 4.11 E-03	3.60 E-03
		Th-228	* 4.51 E-04	3.17 E-04
	870928 to 871228	Be-7	4.89 E-02	4.11 E-03
		K-40	* 1.04 E-02	2.80 E-03
		Ru-103	* 6.58 E-05	2.01 E-04
		Ru-106	* 4.95 E-04	1.48 E-03
		Cs-134	* 0.00 E-01	1.76 E-04
		Cs-137	* 2.28 E-04	1.74 E-04
		Ra-226	* 7.99 E-03	3.07 E-03
		Th-228	* 9.20 E-04	2.72 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
21	861229 to 870330	Be-7	4.47 E-02	4.72 E-03
		K-40	5.24 E-03	2.78 E-03
		Ru-103	*-1.11 E-05	2.63 E-04
		Ru-106	* 0.00 E-01	1.36 E-03
		Cs-134	* 0.00 E-01	1.55 E-04
		Cs-137	* 5.02 E-05	1.58 E-04
		Ra-226	* 6.63 E-03	3.25 E-03
		Th-228	* 1.28 E-03	3.15 E-04
	870330 to 870629	Be-7	1.33 E-01	9.19 E-03
		K-40	* 4.80 E-02	6.01 E-03
		Ru-103	*-1.11 E-05	2.63 E-04
		Ru-106	* 0.00 E-01	1.36 E-03
		Cs-134	* 0.00 E-01	1.55 E-04
		Cs-137	* 5.02 E-05	1.58 E-04
		Ra-226	* 2.99 E-03	7.33 E-03
		Th-228	* 1.83 E-03	7.33 E-04
	870629 to 870928	Be-7	9.23 E-02	5.33 E-03
		K-40	6.63 E-03	2.51 E-03
		Ru-103	*-4.58 E-05	1.85 E-04
		Ru-106	* 1.08 E-03	1.39 E-03
		Cs-134	* 3.76 E-05	1.72 E-04
		Cs-137	* 1.86 E-04	1.67 E-04
		Ra-226	* 6.20 E-03	3.49 E-03
		Th-228	* 6.38 E-04	3.04 E-04
	870928 to 871228	Be-7	4.38 E-02	4.08 E-03
		K-40	* 6.28 E-03	2.42 E-03
		Ru-103	* 4.85 E-05	1.84 E-04
		Ru-106	*-2.80 E-04	1.23 E-03
		Cs-134	* 2.01 E-05	1.41 E-04
		Cs-137	* 4.19 E-05	1.44 E-04
		Ra-226	* 3.26 E-03	2.86 E-03
		Th-228	* 5.36 E-04	2.39 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
23	861229 to 870330	Be-7	4.68 E-02	8.22 E-03
		K-40	* 3.80 E-02	5.46 E-03
		Ru-103	* 6.55 E-04	5.78 E-04
		Ru-106	* 9.21 E-04	3.13 E-03
		Cs-134	*-1.17 E-04	3.15 E-04
		Cs-137	* 9.29 E-05	3.50 E-04
		Ra-226	* 2.98 E-03	6.77 E-03
		Th-228	* 1.01 E-03	6.80 E-04
	870330 to 870629	Be-7	1.31 E-01	8.77 E-03
		K-40	* 5.38 E-03	3.66 E-03
		Ru-103	*-1.58 E-04	3.45 E-04
		Ru-106	*-1.45 E-03	2.23 E-03
		Cs-134	* 1.54 E-04	2.71 E-04
		Cs-137	* 2.52 E-04	3.13 E-04
		Ra-226	* 7.55 E-03	5.17 E-03
		Th-228	* 1.10 E-03	4.53 E-04
	870629 to 870928	Be-7	9.32 E-02	5.51 E-03
		K-40	* 6.75 E-03	2.72 E-03
		Ru-103	* 7.95 E-05	2.01 E-04
		Ru-106	* 0.00 E-01	1.47 E-03
		Cs-134	*-4.63 E-05	1.86 E-04
		Cs-137	* 0.00 E-01	1.41 E-04
		Ra-226	* 3.59 E-03	2.47 E-03
		Th-228	* 5.09 E-04	2.35 E-04
	870928 to 871228	Be-7	5.28 E-02	4.19 E-03
		K-40	4.36 E-03	2.43 E-03
		Ru-103	* 5.98 E-05	1.96 E-04
		Ru-106	*-2.59 E-04	1.27 E-03
		Cs-134	* 6.51 E-05	1.57 E-04
		Cs-137	* 3.88 E-05	1.54 E-04
		Ra-226	* 2.46 E-03	2.83 E-03
		Th-228	* 7.50 E-04	2.45 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
40	861229 to 870330	Be-7	4.98 E-02	7.57 E-03
		K-40	* 1.12 E-02	4.04 E-03
		Ru-103	* 1.74 E-05	4.64 E-04
		Ru-106	* 1.38 E-03	2.64 E-03
		Cs-134	*-1.57 E-05	2.78 E-04
		Cs-137	* 4.78 E-04	3.23 E-04
		Ra-226	* 4.27 E-03	4.93 E-03
		Th-228	* 1.00 E-03	4.58 E-04
	870330 to 870629	Be-7	1.23 E-01	6.74 E-03
		K-40	* 7.78 E-03	2.95 E-03
		Ru-103	*-7.10 E-05	2.39 E-04
		Ru-106	* 8.96 E-04	1.67 E-03
		Cs-134	*-9.18 E-05	1.75 E-04
		Cs-137	* 5.31 E-04	2.22 E-04
		Ra-226	* 3.66 E-03	3.71 E-03
		Th-228	* 4.37 E-04	3.24 E-04
	870629 to 870928	Be-7	1.06 E-01	8.09 E-03
		K-40	* 4.65 E-02	5.87 E-03
		Ru-103	* 1.08 E-04	4.29 E-04
		Ru-106	*-3.96 E-04	3.02 E-03
		Cs-134	* 1.67 E-04	3.11 E-04
		Cs-137	* 1.28 E-04	3.40 E-04
		Ra-226	* 4.56 E-03	7.05 E-03
		Th-228	* 9.52 E-04	7.09 E-04
	870928 to 871228	Be-7	3.94 E-02	3.71 E-03
		K-40	* 6.76 E-03	2.32 E-03
		Ru-103	* 7.01 E-05	1.53 E-04
		Ru-106	* 0.00 E-01	1.20 E-03
		Cs-134	*-8.03 E-06	1.60 E-04
		Cs-137	* 3.33 E-05	1.38 E-04
		Ra-226	* 4.16 E-03	2.00 E-03
		Th-228	* 4.11 E-04	1.72 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
48	861229 to 870330	Be-7	4.49 E-02	5.54 E-03
		K-40	* 5.87 E-03	2.48 E-03
		Ru-103	*-3.52 E-05	3.28 E-04
		Ru-106	* 1.15 E-03	1.72 E-03
		Cs-134	* 6.21 E-05	1.80 E-04
		Cs-137	* 3.36 E-04	2.03 E-04
		Ra-226	* 4.24 E-03	3.67 E-03
		Th-228	* 5.44 E-04	3.26 E-04
	870330 to 870629	Be-7	1.28 E-01	7.30 E-03
		K-40	1.01 E-02	4.33 E-03
		Ru-103	*-5.46 E-05	3.97 E-04
		Ru-106	*-8.50 E-04	2.69 E-03
		Cs-134	* 2.09 E-04	3.10 E-04
		Cs-137	* 1.10 E-04	2.95 E-04
		Ra-226	* 1.87 E-03	3.35 E-03
		Th-228	* 1.77 E-03	3.83 E-04
	870629 to 870928	Be-7	1.03 E-01	7.86 E-03
		K-40	* 4.09 E-03	3.80 E-03
		Ru-103	* 3.81 E-05	3.35 E-04
		Ru-106	*-6.68 E-04	2.30 E-03
		Cs-134	* 1.39 E-04	2.77 E-04
		Cs-137	* 3.85 E-04	3.34 E-04
		Ra-226	* 3.82 E-03	5.04 E-03
		Th-228	* 8.04 E-04	4.56 E-04
	870928 to 871228	Be-7	4.60 E-02	4.12 E-03
		K-40	6.41 E-03	2.49 E-03
		Ru-103	* 0.00 E-01	1.72 E-04
		Ru-106	* 3.87 E-04	1.32 E-03
		Cs-134	*-2.79 E-05	1.43 E-04
		Cs-137	*-6.19 E-05	1.44 E-04
		Ra-226	* 2.28 E-03	2.47 E-03
		Th-228	* 1.38 E-04	2.12 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
57	861229 to 870330	Be-7	4.53 E-02	8.10 E-03
		K-40	* 5.50 E-02	6.12 E-03
		Ru-103	* 8.43 E-05	4.46 E-04
		Ru-106	*-1.27 E-03	2.65 E-03
		Cs-134	* 0.00 E-01	2.86 E-04
		Cs-137	* 9.13 E-06	3.00 E-04
		Ra-226	* 6.01 E-03	2.99 E-03
		Th-228	* 1.76 E-03	3.55 E-04
	870330 to 870629	Be-7	8.36 E-02	4.79 E-03
		K-40	* 6.59 E-02	6.43 E-03
		Ru-103	* 3.14 E-05	2.33 E-04
		Ru-106	* 6.72 E-05	2.17 E-03
		Cs-134	* 2.48 E-04	2.41 E-04
		Cs-137	* 9.23 E-05	2.67 E-04
		Ra-226	* 4.35 E-03	3.33 E-03
		Th-228	* 5.21 E-04	2.68 E-04
	870629 to 870928	Be-7	1.08 E-01	6.47 E-03
		K-40	* 1.08 E-02	2.85 E-03
		Ru-103	* 1.11 E-04	2.21 E-04
		Ru-106	* 1.19 E-03	1.68 E-03
		Cs-134	*-1.32 E-04	1.75 E-04
		Cs-137	* 1.95 E-04	2.06 E-04
		Ra-226	* 4.17 E-03	3.65 E-03
		Th-228	* 2.28 E-04	3.25 E-04
	870928 to 871228	Be-7	4.62 E-02	5.43 E-03
		K-40	* 1.16 E-01	8.96 E-03
		Ru-103	* 8.00 E-06	3.78 E-04
		Ru-106	* 1.95 E-03	2.87 E-03
		Cs-134	* 1.00 E-04	3.32 E-04
		Cs-137	* 2.92 E-04	3.11 E-04
		Ra-226	* 2.53 E-03	4.77 E-03
		Th-228	* 9.68 E-04	4.10 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)	0.0 E+00	-2.5 E-04	6.6 E-04	44	0
Ru-103	(C)	-3.0 E-05	-2.5 E-04	1.2 E-04	4	0
Ru-106	(I)	4.0 E-06	-1.7 E-02	2.0 E-02	44	0
Ru-106	(C)	3.4 E-04	0.0 E+00	6.6 E-04	4	0
Cs-134	(I)	6.4 E-05	-3.7 E-04	3.4 E-04	44	0
Cs-134	(C)	1.8 E-05	-1.0 E-05	8.7 E-05	4	0
Cs-137	(I)	1.4 E-04	-1.3 E-04	5.3 E-04	44	0
Cs-137	(C)	6.6 E-05	-2.0 E-05	2.3 E-04	4	0

(I) Indicator Station
(C) Control Station

TABLE A-4.1

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
1	861229 to 870105	* 3.40 E-03	1.40 E-02
	870105 to 870112	* 1.20 E-02	1.50 E-02
	870112 to 870119	*-1.20 E-03	1.03 E-02
	870119 to 870126	* 6.40 E-03	1.49 E-02
	870126 to 870202	*-2.90 E-03	1.06 E-02
	870202 to 870209	*-3.10 E-03	1.29 E-02
	870209 to 870217	* 2.80 E-03	1.20 E-02
	870217 to 870223	* 1.10 E-02	1.60 E-02
	870223 to 870302	* 5.90 E-04	1.45 E-02
	870302 to 870309	*-3.20 E-03	1.07 E-02
	870309 to 870316	*-1.30 E-02	1.50 E-02
	870316 to 870323	* 2.90 E-03	9.40 E-03
	870323 to 870330	*-9.60 E-03	9.10 E-03
	870330 to 870406	*-3.55 E-03	1.48 E-02
	870406 to 870413	*-1.37 E-02	9.58 E-03
	870413 to 870420	* 0.00 E-01	1.43 E-02
	870420 to 870427	* 7.74 E-03	1.34 E-02
	870427 to 870504	* 7.84 E-03	1.09 E-02
	870504 to 870511	* 1.31 E-02	1.59 E-02
	870511 to 870518	*-3.33 E-02	4.33 E-02
	870518 to 870526	* 6.37 E-04	8.85 E-03
	870526 to 870601	*-7.28 E-03	1.13 E-02
	870601 to 870608	* 5.35 E-04	7.99 E-03
	870608 to 870615	* 4.29 E-03	1.04 E-02
	870615 to 870622	* 4.34 E-03	9.67 E-03
	870622 to 870629	* 5.85 E-03	9.91 E-03
	870629 to 870706	*-7.89 E-04	9.80 E-03
	870706 to 870713	*-2.33 E-03	1.04 E-02
	870713 to 870720	* 3.36 E-03	9.76 E-03
	870720 to 870727	*-2.78 E-03	1.07 E-02
	870727 to 870803	* 3.05 E-03	9.16 E-03
	870803 to 870810	* 2.62 E-03	1.07 E-02
	870810 to 870817	*-2.00 E-03	9.44 E-03
	870817 to 870824	* 1.35 E-03	8.86 E-03
	870824 to 870831	* 3.63 E-03	9.28 E-03
	870831 to 870908	* 6.91 E-03	8.50 E-03
	870908 to 870914	*-5.70 E-03	1.23 E-02
	870914 to 870921	* 4.09 E-03	1.39 E-02
	870921 to 870928	*-1.28 E-04	1.05 E-02

* Denotes a result less than the detection limit.

TABLE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
1	870928 to 871005	* 5.31 E-04	1.05 E-02
	871005 to 871012	* 2.15 E-03	1.35 E-02
	871012 to 871019	*-1.49 E-03	6.91 E-03
	871019 to 871026	*-5.97 E-03	9.02 E-03
	871026 to 871102	* 6.51 E-03	9.30 E-03
	871102 to 871109	*-3.38 E-03	9.80 E-03
	871109 to 871116	* 5.85 E-03	1.06 E-02
	871116 to 871123	*-6.14 E-03	5.90 E-03
	871123 to 871130	* 9.01 E-03	1.10 E-02
	871130 to 871207	* 7.56 E-03	1.23 E-02
	871207 to 871214	* 2.44 E-04	7.86 E-03
	871214 to 871221	*-1.59 E-03	5.49 E-03
	871221 to 871228	*-3.04 E-03	9.14 E-03

* Denotes a result less than the detection limit.

TABLE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
4	861229 to 870105	* 3.40 E-03	1.38 E-02
	870105 to 870112	* 1.20 E-02	1.50 E-02
	870112 to 870119	*-6.50 E-04	5.80 E-03
	870119 to 870126	* 6.30 E-03	1.46 E-02
	870126 to 870202	*-2.90 E-03	1.04 E-02
	870202 to 870209	*-3.10 E-03	1.27 E-02
	870209 to 870217	* 2.80 E-03	1.17 E-02
	870217 to 870223	* 1.10 E-02	1.60 E-02
	870223 to 870302	* 5.80 E-04	1.42 E-02
	870302 to 870309	*-3.10 E-03	1.05 E-02
	870309 to 870316	*-1.20 E-02	1.50 E-02
	870316 to 870323	* 2.80 E-03	9.30 E-03
	870323 to 870330	*-9.40 E-03	8.90 E-03
	870330 to 870406	*-3.49 E-03	1.45 E-02
	870406 to 870413	*-1.34 E-02	9.40 E-03
	870413 to 870420	* 0.00 E-01	1.40 E-02
	870420 to 870427	* 5.29 E-03	9.15 E-03
	870427 to 870504	* 6.40 E-03	8.88 E-03
	870504 to 870511	* 9.12 E-03	1.11 E-02
	870511 to 870518	*-7.73 E-03	1.00 E-02
	870518 to 870526	* 6.29 E-04	8.73 E-03
	870526 to 870601	*-7.12 E-03	1.10 E-02
	870601 to 870608	* 5.25 E-04	7.83 E-03
	870608 to 870615	* 4.22 E-03	1.02 E-02
	870615 to 870622	* 4.30 E-03	9.58 E-03
	870622 to 870629	* 5.73 E-03	9.73 E-03
	870629 to 870706	*-8.90 E-04	1.11 E-02
	870706 to 870713	*-2.29 E-03	1.03 E-02
	870713 to 870720	* 3.29 E-03	9.56 E-03
	870720 to 870727	*-4.78 E-03	1.83 E-02
	870727 to 870803	* 2.94 E-03	8.94 E-03
	870803 to 870810	* 2.58 E-03	1.06 E-02
	870810 to 870817	*-1.95 E-03	9.22 E-03
	870817 to 870824	* 1.32 E-03	8.70 E-03
	870824 to 870831	* 3.58 E-03	9.15 E-03
	870831 to 870908	* 6.79 E-03	8.35 E-03
	870908 to 870914	*-5.58 E-03	1.20 E-02
	870914 to 870921	* 4.01 E-03	1.36 E-02
	870921 to 870928	*-1.26 E-04	1.03 E-02

* Denotes a result less than the detection limit.

TABLE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
4	870928 to 871005	* 5.15 E-04	1.02 E-02
	871005 to 871012	* 2.14 E-03	1.34 E-02
	871012 to 871019	*-1.46 E-03	6.79 E-03
	871019 to 871026	*-5.86 E-03	8.86 E-03
	871026 to 871102	* 6.37 E-03	9.10 E-03
	871102 to 871109	*-3.31 E-03	9.61 E-03
	871109 to 871116	* 5.74 E-03	1.04 E-02
	871116 to 871123	*-6.03 E-03	5.80 E-03
	871123 to 871130	* 8.81 E-03	1.08 E-02
	871130 to 871207	* 7.42 E-03	1.21 E-02
	871207 to 871214	* 2.41 E-04	7.75 E-03
	871214 to 871221	*-1.55 E-03	5.34 E-03
	871221 to 871228	*-2.99 E-03	8.98 E-03

* Denotes a result less than the detection limit.

TABLE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
5	861229 to 870105	* 3.40 E-03	1.38 E-02
	870105 to 870112	* 1.20 E-02	1.50 E-02
	870112 to 870119	* 5.70 E-03	1.11 E-02
	870119 to 870126	* 6.30 E-03	1.47 E-02
	870126 to 870202	*-2.90 E-03	1.05 E-02
	870202 to 870209	*-3.10 E-03	1.28 E-02
	870209 to 870217	* 2.80 E-03	1.18 E-02
	870217 to 870223	* 1.10 E-02	1.60 E-02
	870223 to 870302	* 5.80 E-04	1.43 E-02
	870302 to 870309	*-3.10 E-03	1.05 E-02
	870309 to 870316	*-1.30 E-02	1.50 E-02
	870316 to 870323	* 2.80 E-03	9.30 E-03
	870323 to 870330	*-9.40 E-03 (a)	8.90 E-03
	870330 to 870406	*-3.51 E-03	1.46 E-02
	870406 to 870413	*-1.35 E-02	9.45 E-03
	870413 to 870420	* 0.00 E-01	1.42 E-02
	870420 to 870427	* 5.32 E-03	9.20 E-03
	870427 to 870504	* 6.43 E-03	8.92 E-03
	870504 to 870511	* 9.20 E-03	1.12 E-02
	870511 to 870518	*-7.78 E-03	1.01 E-02
	870518 to 870526	* 6.31 E-04	8.76 E-03
	870526 to 870601	*-7.16 E-03	1.11 E-02
	870601 to 870608	* 5.28 E-04	7.88 E-03
	870608 to 870615	* 4.24 E-03	1.03 E-02
	870615 to 870622	* 4.29 E-03	9.56 E-03
	870622 to 870629	* 5.75 E-03	9.76 E-03
	870629 to 870706	*-7.78 E-04	9.67 E-03
	870706 to 870713	*-2.30 E-03	1.03 E-02
	870713 to 870720	* 3.31 E-03	9.61 E-03
	870720 to 870727	*-2.75 E-03	1.06 E-02
	870727 to 870803	* 2.94 E-03	8.94 E-03
	870803 to 870810	* 2.60 E-03	1.07 E-02
	870810 to 870817	*-1.96 E-03	9.25 E-03
	870817 to 870824	* 1.33 E-03	8.75 E-03
	870824 to 870831	* 3.59 E-03	9.18 E-03
	870831 to 870908	* 6.82 E-03	8.39 E-03
	870908 to 870914	*-5.61 E-03	1.21 E-02
	870914 to 870921	* 4.03 E-03	1.37 E-02
	870921 to 870928	*-1.27 E-04	1.04 E-02

* Denotes a result less than the detection limit.
(a) Results in total pCi; not included in averages.

TABLE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
5	870928 to 871005	* 5.18 E-04	1.02 E-02
	871005 to 871012	* 2.14 E-03	1.34 E-02
	871012 to 871019	*-1.47 E-03	6.82 E-03
	871019 to 871026	*-5.91 E-03	8.93 E-03
	871026 to 871102	* 6.41 E-03	9.15 E-03
	871102 to 871109	*-3.33 E-03	9.67 E-03
	871109 to 871116	* 5.77 E-03	1.04 E-02
	871116 to 871123	*-6.07 E-03	5.84 E-03
	871123 to 871130	* 8.86 E-03	1.08 E-02
	871130 to 871207	* 7.48 E-03	1.22 E-02
	871207 to 871214	* 2.42 E-04	7.77 E-03
	871214 to 871221	*-1.56 E-03	5.38 E-03
	871221 to 871228	*-3.01 E-03	9.04 E-03

* Denotes a result less than the detection limit.

TABLE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
6	861229 to 870105	* 3.40 E-03	1.39 E-02
	870105 to 870112	* 1.20 E-02	1.50 E-02
	870112 to 870119	* 5.70 E-03	1.12 E-02
	870119 to 870126	* 6.40 E-03	1.49 E-02
	870126 to 870202	*-2.90 E-03	1.06 E-02
	870202 to 870209	*-3.10 E-03	1.29 E-02
	870209 to 870217	* 2.80 E-03	1.19 E-02
	870217 to 870223	* 1.10 E-02	1.60 E-02
	870223 to 870302	* 5.90 E-04	1.45 E-02
	870302 to 870309	*-3.20 E-03	1.07 E-02
	870309 to 870316	*-1.30 E-02	1.50 E-02
	870316 to 870323	* 2.90 E-03	9.40 E-03
	870323 to 870330	*-9.50 E-03	9.00 E-03
	870330 to 870406	*-3.54 E-03	1.48 E-02
	870406 to 870413	*-1.36 E-02	9.55 E-03
	870413 to 870420	* 0.00 E-01	1.43 E-02
	870420 to 870427	* 5.36 E-03	9.27 E-03
	870427 to 870504	* 6.50 E-03	9.01 E-03
	870504 to 870511	* 9.29 E-03	1.13 E-02
	870511 to 870518	*-7.86 E-03	1.02 E-02
	870518 to 870526	* 6.36 E-04	8.82 E-03
	870526 to 870601	*-7.25 E-03	1.12 E-02
	870601 to 870608	* 5.32 E-04	7.93 E-03
	870608 to 870615	* 4.29 E-03	1.04 E-02
	870615 to 870622	* 4.35 E-03	9.68 E-03
	870622 to 870629	* 5.81 E-03	9.85 E-03
	870629 to 870706	*-7.86 E-04	9.78 E-03
	870706 to 870713	*-2.32 E-03	1.04 E-02
	870713 to 870720	* 3.34 E-03	9.70 E-03
	870720 to 870727	*-2.78 E-03	1.07 E-02
	870727 to 870803	* 3.05 E-03	9.16 E-03
	870803 to 870810	* 2.61 E-03	1.07 E-02
	870810 to 870817	*-1.99 E-03	9.38 E-03
	870817 to 870824	* 1.35 E-03	8.85 E-03
	870824 to 870831	* 3.62 E-03	9.25 E-03
	870831 to 870908	* 6.89 E-03	8.47 E-03
	870908 to 870914	*-5.68 E-03	1.23 E-02
	870914 to 870921	* 4.08 E-04	1.05 E-02
	870921 to 870928	*-1.28 E-04	1.05 E-02

* Denotes a result less than the detection limit.

TABLE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
6	870928 to 871005	* 5.30 E-04	1.05 E-02
	871005 to 871012	* 2.15 E-03	1.35 E-02
	871012 to 871019	*-1.47 E-03	6.85 E-03
	871019 to 871026	*-5.97 E-03	9.01 E-03
	871026 to 871102	* 6.47 E-03	9.24 E-03
	871102 to 871109	*-3.36 E-03	9.76 E-03
	871109 to 871116	* 5.83 E-03	1.05 E-02
	871116 to 871123	*-6.12 E-03	5.89 E-03
	871123 to 871130	* 8.97 E-03	1.10 E-02
	871130 to 871207	* 7.53 E-03	1.22 E-02
	871207 to 871214	* 2.44 E-04	7.84 E-03
	871214 to 871221	*-1.58 E-03	5.43 E-03
	871221 to 871228	*-3.04 E-03	9.12 E-03

* Denotes a result less than the detection limit.

TABLE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
7	861229 to 870105	* 1.80 E-03	7.40 E-03
	870105 to 870112	* 6.40 E-03	8.10 E-03
	870112 to 870119	* 5.70 E-03	1.12 E-02
	870119 to 870126	* 3.40 E-03	7.90 E-03
	870126 to 870202	*-1.70 E-03	6.10 E-03
	870202 to 870209	*-1.70 E-03	6.90 E-03
	870209 to 870217	* 1.50 E-03	6.30 E-03
	870217 to 870223	* 5.70 E-03	8.40 E-03
	870223 to 870302	* 3.10 E-04	7.69 E-03
	870302 to 870309	*-1.80 E-03	6.20 E-03
	870309 to 870316	*-6.70 E-03	7.90 E-03
	870316 to 870323	* 1.90 E-03	6.30 E-03
	870323 to 870330	*-6.40 E-03	6.00 E-03
	870330 to 870406	*-1.88 E-03	7.84 E-02
	870406 to 870413	*-7.83 E-03	5.49 E-03
	870413 to 870420	* 0.00 E-01	7.59 E-03
	870420 to 870427	*-3.59 E-03	6.20 E-03
	870427 to 870504	* 4.34 E-03	6.03 E-03
	870504 to 870511	* 5.34 E-03	6.48 E-03
	870511 to 870518	*-4.52 E-03	5.87 E-03
	870518 to 870526	* 3.65 E-04	5.07 E-03
	870526 to 870601	*-4.21 E-03	6.50 E-03
	870601 to 870608	* 3.55 E-04	5.31 E-03
	870608 to 870615	* 2.46 E-03	5.97 E-03
	870615 to 870622	* 2.49 E-03	5.55 E-03
	870622 to 870629	* 3.34 E-03	5.67 E-03
	870629 to 870706	*-5.26 E-04	6.54 E-03
	870706 to 870713	*-1.34 E-03	5.99 E-03
	870713 to 870720	* 9.47 E-01 (a)	2.75 E+00
	870720 to 870727	*-1.60 E-03	6.13 E-03
	870727 to 870803	* 2.07 E-03	6.10 E-03
	870803 to 870810	* 1.54 E-03	6.31 E-03
	870810 to 870817	*-1.33 E-03	6.27 E-03
	870817 to 870824	* 9.00 E-04	5.92 E-03
	870824 to 870831	* 2.42 E-03	6.18 E-03
	870831 to 870908	* 3.96 E-03	4.87 E-03
	870908 to 870914	*-3.27 E-03	7.06 E-03
	870914 to 870921	* 2.17 E-03	7.38 E-03
	870921 to 870928	*-7.35 E-05	6.02 E-03

* Denotes a result less than the detection limit.
(a) Results in total pCi; not used in averages.

TABLE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
7	870928 to 871005	* 3.04 E-04	6.02 E-03
	871005 to 871012	* 1.14 E-03	7.16 E-03
	871012 to 871019	*-2.29 E-03	1.07 E-02
	871019 to 871026	*-3.45 E-03	5.22 E-03
	871026 to 871102	* 4.33 E-03	6.18 E-03
	871102 to 871109	*-1.93 E-03	5.61 E-03
	871109 to 871116	* 3.35 E-03	6.05 E-03
	871116 to 871123	*-4.42 E-03	4.25 E-03
	871123 to 871130	* 5.82 E-03	7.11 E-03
	871130 to 871207	* 4.88 E-03	7.93 E-03
	871207 to 871214	* 1.35 E-04	4.33 E-03
	871214 to 871221	*-1.14 E-03	3.92 E-03
	871221 to 871228	*-2.40 E-03	7.22 E-03

* Denotes a result less than the detection limit.

TABLE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
8	861229 to 870105	* 9.50 E-03	1.03 E-02
	870105 to 870112	* 3.80 E-03	1.12 E-02
	870112 to 870119	* 5.70 E-03	1.12 E-02
	870119 to 870126	* 3.30 E-03	1.03 E-02
	870126 to 870202	* 2.10 E-03	1.05 E-02
	870202 to 870209	*-5.70 E-03	1.03 E-02
	870209 to 870217	*-7.10 E-03	8.40 E-03
	870217 to 870223	* 1.80 E-02	1.70 E-02
	870223 to 870302	* 1.20 E-03	1.03 E-02
	870302 to 870309	*-4.20 E-03	9.20 E-03
	870309 to 870316	*-3.20 E-03	1.05 E-02
	870316 to 870323	*-5.70 E-03	1.02 E-02
	870323 to 870330	* 5.00 E-03	1.03 E-02
	870330 to 870406	* 2.94 E-03	1.06 E-02
	870406 to 870413	* 1.76 E-04	1.30 E-02
	870413 to 870420	* 6.03 E-03	1.09 E-02
	870420 to 870427	* 5.54 E-03	9.98 E-03
	870427 to 870504	* 1.70 E-04	9.78 E-03
	870504 to 870511	* 2.41 E-03	9.55 E-03
	870511 to 870518	*-2.94 E-04	8.51 E-03
	870518 to 870526	*-3.26 E-03	7.41 E-03
	870526 to 870601	* 3.61 E-03	1.01 E-02
	870601 to 870608	*-2.28 E-03	1.04 E-02
	870608 to 870615	* 1.21 E-03	9.31 E-03
	870615 to 870622	*-6.43 E-03	1.11 E-02
	870622 to 870629	*-6.97 E-03	7.99 E-03
	870629 to 870706	*-4.07 E-03	1.03 E-02
	870706 to 870713	* 9.91 E-04	1.00 E-02
	870713 to 870720	* 2.69 E-03	1.03 E-02
	870720 to 870727	* 3.03 E-03	9.98 E-03
	870727 to 870803	*-3.49 E-03	9.81 E-03
	870803 to 870810	* 3.43 E-03	8.73 E-03
	870810 to 870817	*-7.71 E-03	9.92 E-03
	870817 to 870824	* 1.18 E-03	1.01 E-02
	870824 to 870831	*-4.60 E-03	9.99 E-03
	870831 to 870908	*-3.65 E-03	7.54 E-03
	870908 to 870914	*-1.06 E-03	1.08 E-02
	870914 to 870921	*-9.16 E-03	1.04 E-02
	870921 to 870928	* 1.04 E-03	9.09 E-03

* Denotes a result less than the detection limit.

TABLE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
8	870928 to 871005	*-5.22 E-03	9.15 E-03
	871005 to 871012	* 4.28 E-03	1.03 E-02
	871012 to 871019	*-6.28 E-03	1.05 E-02
	871019 to 871026	* 1.12 E-03	8.14 E-03
	871026 to 871102	*-5.37 E-03	8.40 E-03
	871102 to 871109	*-7.65 E-03	8.59 E-03
	871109 to 871116	*-3.22 E-03	9.36 E-03
	871116 to 871123	*-2.47 E-02	3.49 E-02
	871123 to 871130	* 1.62 E-04	1.00 E-02
	871130 to 871207	*-8.43 E-03	9.78 E-03
	871207 to 871214	*-2.39 E-03	6.45 E-03
	871214 to 871221	*-1.09 E-04	8.02 E-03
	871221 to 871228	*-3.44 E-03	1.09 E-02

* Denotes a result less than the detection limit.

TABLE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
9	861229 to 870105	* 9.50 E-03	1.03 E-02
	870105 to 870112	* 3.80 E-03	1.13 E-02
	870112 to 870119	* 3.30 E-03	6.40 E-03
	870119 to 870126	* 3.30 E-03	1.04 E-02
	870126 to 870202	* 2.10 E-03	1.06 E-02
	870202 to 870209	*-5.80 E-03	1.04 E-02
	870209 to 870217	*-7.10 E-03	8.40 E-03
	870217 to 870223	* 1.80 E-02	1.80 E-02
	870223 to 870302	* 1.20 E-03	1.04 E-02
	870302 to 870309	*-4.80 E-03	1.06 E-02
	870309 to 870316	*-3.30 E-03	1.07 E-02
	870316 to 870323	*-5.80 E-03	1.03 E-02
	870323 to 870330	* 5.00 E-03	1.04 E-02
	870330 to 870406	* 2.95 E-03	1.07 E-02
	870406 to 870413	* 1.81 E-04	1.34 E-02
	870413 to 870420	* 6.07 E-03	1.09 E-02
	870420 to 870427	* 5.56 E-03	1.00 E-02
	870427 to 870504	* 1.72 E-04	9.88 E-03
	870504 to 870511	* 2.43 E-03	9.61 E-03
	870511 to 870518	*-2.96 E-04	8.57 E-03
	870518 to 870526	*-3.28 E-03	7.44 E-03
	870526 to 870601	* 3.65 E-03	1.02 E-02
	870601 to 870608	*-2.29 E-03	1.04 E-02
	870608 to 870615	* 1.22 E-03	9.37 E-03
	870615 to 870622	*-6.47 E-03	1.12 E-02
	870622 to 870629	*-7.01 E-03	8.04 E-03
	870629 to 870706	*-4.10 E-03	1.04 E-02
	870706 to 870713	* 9.97 E-04	1.01 E-02
	870713 to 870720	* 2.70 E-03	1.04 E-02
	870720 to 870727	* 3.05 E-03	1.00 E-02
	870727 to 870803	*-3.60 E-03	9.92 E-03
	870803 to 870810	* 3.46 E-03	8.81 E-03
	870810 to 870817	*-7.76 E-03	9.99 E-03
	870817 to 870824	* 1.19 E-03	1.02 E-02
	870824 to 870831	*-4.62 E-03	1.00 E-02
	870831 to 870908	*-3.68 E-03	7.59 E-03
	870908 to 870914	*-1.07 E-03	1.09 E-02
	870914 to 870921	*-9.28 E-03	1.06 E-02
	870921 to 870928	* 1.04 E-03	9.14 E-03

* Denotes a result less than the detection limit.

TABLE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter.

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
9	870928 to 871005	*-5.24 E-03	9.18 E-03
	871005 to 871012	* 4.31 E-03	1.04 E-02
	871012 to 871019	*-6.31 E-03	1.05 E-02
	871019 to 871026	* 1.12 E-03	8.19 E-03
	871026 to 871102	*-5.41 E-03	8.45 E-03
	871102 to 871109	*-7.70 E-03	8.65 E-03
	871109 to 871116	*-3.25 E-03	9.42 E-03
	871116 to 871123	*-6.34 E-03	8.95 E-03
	871123 to 871130	* 1.63 E-04	1.01 E-02
	871130 to 871207	*-8.48 E-03	9.84 E-03
	871207 to 871214	*-2.37 E-03	6.42 E-03
	871214 to 871221	*-1.10 E-04	8.07 E-03
	871221 to 871228	*-3.46 E-03	1.09 E-02

* Denotes a result less than the detection limit.

LE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
21	861229 to 870105	* 9.60 E-03	1.04 E-02
	870105 to 870112	* 3.90 E-03	1.14 E-02
	870112 to 870119	* 1.00 E-03	1.02 E-02
	870119 to 870126	* 3.30 E-03	1.05 E-02
	870126 to 870202	* 2.50 E-03	1.25 E-02
	870202 to 870209	*-5.80 E-03	1.05 E-02
	870209 to 870217	*-7.20 E-03	8.50 E-03
	870217 to 870223	* 1.80 E-02	1.70 E-02
	870223 to 870302	* 1.20 E-03	1.05 E-02
	870302 to 870309	*-4.20 E-03	9.40 E-03
	870309 to 870316	*-3.30 E-03	1.07 E-02
	870316 to 870323	*-5.80 E-03	1.03 E-02
	870323 to 870330	* 5.10 E-03	1.05 E-03
	870330 to 870406	* 2.98 E-03	1.08 E-02
	870406 to 870413	* 1.83 E-04	1.35 E-02
	870413 to 870420	* 6.11 E-03	1.10 E-02
	870420 to 870427	* 5.64 E-03	1.02 E-02
	870427 to 870504	* 1.72 E-04	9.91 E-03
	870504 to 870511	* 2.45 E-03	9.70 E-03
	870511 to 870518	*-2.99 E-04	8.65 E-03
	870518 to 870526	*-3.31 E-03	7.51 E-03
	870526 to 870601	* 3.83 E-03	1.07 E-02
	870601 to 870608	*-2.32 E-03	1.06 E-02
	870608 to 870615	* 1.23 E-03	9.43 E-03
	870615 to 870622	*-6.53 E-03	1.13 E-02
	870622 to 870629	*-7.10 E-03	8.14 E-03
	870629 to 870706	*-4.14 E-03	1.05 E-02
	870706 to 870713	* 1.00 E-03	1.02 E-02
	870713 to 870720	* 2.74 E-03	1.05 E-02
	870720 to 870727	* 3.08 E-03	1.01 E-02
	870727 to 870803	*-3.60 E-03	1.01 E-02
	870803 to 870810	* 3.46 E-03	8.82 E-03
	870810 to 870817	*-7.89 E-03	1.02 E-02
	870817 to 870824	* 1.19 E-03	1.02 E-02
	870824 to 870831	*-4.66 E-03	1.01 E-02
	870831 to 870908	*-3.71 E-03	7.66 E-03
	870908 to 870914	*-1.08 E-03	1.10 E-02
	870914 to 870921	*-9.34 E-03	1.06 E-02
	870921 to 870928	* 1.06 E-03	9.24 E-03

* Denotes a result less than the detection limit.

TABLE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
21	870928 to 871005	*-5.30 E-03	9.29 E-03
	871005 to 871012	* 4.34 E-03	1.04 E-02
	871012 to 871019	*-6.38 E-03	1.07 E-02
	871019 to 871026	* 1.13 E-03	8.25 E-03
	871026 to 871102	*-5.47 E-03	8.56 E-03
	871102 to 871109	*-7.78 E-03	8.74 E-03
	871109 to 871116	*-3.31 E-03	9.61 E-03
	871116 to 871123	*-6.39 E-03	9.02 E-03
	871123 to 871130	* 1.66 E-04	1.02 E-02
	871130 to 871207	*-8.54 E-03	9.91 E-03
	871207 to 871214	*-2.39 E-03	6.47 E-03
	871214 to 871221	*-1.12 E-04	8.20 E-03
	871221 to 871228	*-3.49 E-03	1.10 E-02

* Denotes a result less than the detection limit.

TABLE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
23	861229 to 870105	* 9.60 E-03	1.04 E-02
	870105 to 870112	* 3.90 E-03	1.14 E-02
	870112 to 870119	* 1.00 E-03	1.02 E-02
	870119 to 870126	* 3.30 E-03	1.05 E-02
	870126 to 870202	* 2.10 E-03	1.07 E-02
	870202 to 870209	*-5.80 E-03	1.05 E-02
	870209 to 870217	*-7.20 E-03	8.50 E-03
	870217 to 870223	* 1.80 E-02	1.70 E-02
	870223 to 870302	* 1.20 E-03	1.05 E-02
	870302 to 870309	*-4.30 E-03	9.40 E-03
	870309 to 870316	*-3.30 E-03	1.07 E-02
	870316 to 870323	*-5.80 E-03	1.03 E-02
	870323 to 870330	* 5.10 E-03	1.05 E-02
	870330 to 870406	* 2.98 E-03	1.08 E-02
	870406 to 870413	* 1.83 E-04	1.35 E-02
	870413 to 870420	* 6.10 E-03	1.10 E-02
	870420 to 870427	* 5.62 E-03	1.01 E-02
	870427 to 870504	* 1.72 E-04	9.90 E-03
	870504 to 870511	* 2.45 E-03	9.72 E-03
	870511 to 870518	*-2.98 E-04	8.64 E-03
	870518 to 870526	*-3.30 E-03	7.50 E-03
	870526 to 870601	* 3.68 E-03	1.03 E-02
	870601 to 870608	*-2.32 E-03	1.06 E-02
	870608 to 870615	* 1.23 E-03	9.42 E-03
	870615 to 870622	*-6.52 E-03	1.13 E-02
	870622 to 870629	*-7.09 E-03	8.14 E-03
	870629 to 870706	*-4.14 E-03	1.05 E-02
	870706 to 870713	* 1.00 E-03	1.01 E-02
	870713 to 870720	* 2.73 E-03	1.05 E-02
	870720 to 870727	* 3.08 E-03	1.01 E-02
	870727 to 870803	*-3.60 E-03	1.01 E-02
	870803 to 870810	* 3.78 E-03	9.63 E-03
	870810 to 870817	*-7.87 E-03	1.01 E-02
	870817 to 870824	* 1.19 E-03	1.02 E-02
	870824 to 870831	*-4.66 E-03	1.01 E-02
	870831 to 870908	*-1.79 E+00 (a)	3.70 E+00
	870908 to 870914	*-1.08 E-03	1.10 E-02
	870914 to 870921	*-9.33 E-03	1.06 E-02
	870921 to 870928 (b)		

* Denotes a result less than the detection limit.
(a) Result in total pCi; not included in averages.
(b) Power outage; sample not collected.

TABLE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
23	870928 to 871005	*-1.27 E-02	2.22 E-02
	871005 to 871012	* 4.34 E-03	1.04 E-02
	871012 to 871019	*-6.38 E-03	1.07 E-02
	871019 to 871026	* 1.13 E-03	8.24 E-03
	871026 to 871102	*-5.47 E-03	8.55 E-03
	871102 to 871109	*-7.77 E-03	8.73 E-03
	871109 to 871116	*-3.28 E-03	9.52 E-03
	871116 to 871123	*-6.38 E-03	9.01 E-03
	871123 to 871130	* 1.65 E-04	1.02 E-02
	871130 to 871207	*-8.51 E-03	9.88 E-03
	871207 to 871214	*-2.39 E-03	6.46 E-03
	871214 to 871221	*-1.12 E-04	8.19 E-03
	871221 to 871228	*-3.49 E-03	1.10 E-02

* Denotes a result less than the detection limit.

TABLE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
40	861229 to 870105	* 5.50 E-03	5.90 E-03
	870105 to 870112	* 2.20 E-03	6.40 E-03
	870112 to 870119	* 1.00 E-03	1.01 E-02
	870119 to 870126	* 1.90 E-03	5.90 E-03
	870126 to 870202	* 1.20 E-03	6.10 E-03
	870202 to 870209	*-3.30 E-03	6.00 E-03
	870209 to 870217	*-4.10 E-03	4.80 E-03
	870217 to 870223	* 9.50 E-03	9.20 E-03
	870223 to 870302	* 6.80 E-04	5.96 E-03
	870302 to 870309	*-2.80 E-03	6.20 E-03
	870309 to 870316	*-1.90 E-03	6.10 E-03
	870316 to 870323	*-3.60 E-03	1.04 E-02
	870323 to 870330	* 3.20 E-03	6.50 E-03
	870330 to 870406	* 1.69 E-03	6.12 E-03
	870406 to 870413	* 9.55 E-05	7.07 E-03
	870413 to 870420	* 3.47 E-03	6.25 E-03
	870420 to 870427	* 3.49 E-03	6.29 E-03
	870427 to 870504	* 1.08 E-04	6.22 E-03
	870504 to 870511	* 1.61 E-03	6.39 E-03
	870511 to 870518	*-1.97 E-04	5.69 E-03
	870518 to 870526	*-2.18 E-03	4.96 E-03
	870526 to 870601	* 2.42 E-03	6.77 E-03
	870601 to 870608	*-1.31 E-03	5.98 E-03
	870608 to 870615	* 8.16 E-04	6.26 E-03
	870615 to 870622	*-5.52 E-03	9.56 E-03
	870622 to 870629	*-4.66 E-03	5.35 E-03
	870629 to 870706	*-2.58 E-03	6.56 E-03
	870706 to 870713	* 6.54 E-04	6.61 E-03
	870713 to 870720	* 2.98 E-03	1.15 E-02
	870720 to 870727	* 2.03 E-03	6.68 E-03
	870727 to 870803	*-2.18 E-03	6.21 E-03
	870803 to 870810	* 2.29 E-03	5.84 E-03
	870810 to 870817	*-4.88 E-03	6.28 E-03
	870817 to 870824	* 7.44 E-04	6.38 E-03
	870824 to 870831	*-2.92 E-03	6.34 E-03
	870831 to 870908	*-2.44 E-03	5.05 E-03
	870908 to 870914	*-7.10 E-04	7.23 E-03
	870914 to 870921	*-5.27 E-03	6.01 E-03
	870921 to 870928	* 1.04 E-03	9.09 E-03

* Denotes a result less than the detection limit.

TABLE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
40	870928 to 871005	*-3.43 E-03	6.01 E-03
	871005 to 871012	* 2.49 E-03	5.98 E-03
	871012 to 871019	*-3.62 E-03	6.05 E-03
	871019 to 871026	* 7.45 E-04	5.43 E-03
	871026 to 871102	*-3.21 E-03	5.01 E-03
	871102 to 871109	*-5.12 E-03	5.75 E-03
	871109 to 871116	*-2.16 E-03	6.27 E-03
	871116 to 871123	*-4.99 E-03	7.05 E-03
	871123 to 871130	* 8.53 E-05	5.27 E-03
	871130 to 871207	*-4.43 E-03	5.14 E-03
	871207 to 871214 (a)	*-5.15 E-03	1.39 E-02
	871214 to 871221	*-5.74 E-05	4.21 E-03
	871221 to 871228	*-2.23 E-03	7.05 E-03

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

TABLE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
48	861229 to 870105	*-5.30 E-03	1.42 E-02
	870105 to 870112	* 4.20 E-03	1.37 E-02
	870112 to 870119	* 9.90 E-04	1.00 E-02
	870119 to 870126	* 8.40 E-03	1.47 E-02
	870126 to 870202	* 1.10 E-03	1.41 E-02
	870202 to 870209	* 3.60 E-03	1.47 E-02
	870209 to 870217	* 2.80 E-03	1.13 E-02
	870217 to 870223	* 2.30 E-03	1.21 E-02
	870223 to 870302	*-6.90 E-03	1.32 E-02
	870302 to 870309	*-4.20 E-03	9.70 E-03
	870309 to 870316	* 9.50 E-04	8.97 E-03
	870316 to 870323	*-3.40 E-03	1.04 E-02
	870323 to 870330	*-4.80 E-03	1.05 E-02
	870330 to 870406	*-8.49 E-04	1.18 E-02
	870406 to 870413	* 0.00 E-01	9.50 E-03
	870413 to 870420	*-5.84 E-03	1.31 E-02
	870420 to 870427	* 4.11 E-03	9.29 E-03
	870427 to 870504	*-5.47 E-03	1.01 E-02
	870504 to 870511	*-2.01 E-03	1.07 E-02
	870511 to 870518	*-4.17 E-03	9.01 E-03
	870518 to 870526	*-6.11 E-03	8.38 E-03
	870526 to 870601	*-5.09 E-03	1.11 E-02
	870601 to 870608	* 1.24 E-03	9.51 E-03
	870608 to 870615	*-3.29 E-03	1.02 E-02
	870615 to 870622	*-1.26 E-03	1.01 E-02
	870622 to 870629	*-8.17 E-03	8.63 E-03
	870629 to 870706	* 5.65 E-03	8.56 E-03
	870706 to 870713	* 5.24 E-03	1.08 E-02
	870713 to 870720	*-2.86 E-03	1.01 E-02
	870720 to 870727	*-2.00 E-03	1.03 E-02
	870727 to 870803	* 1.85 E-03	9.48 E-03
	870803 to 870810	* 3.09 E-03	8.89 E-03
	870810 to 870817	*-1.18 E-03	9.67 E-03
	870817 to 870824	* 2.31 E-03	9.79 E-03
	870824 to 870831	* 1.15 E-03	9.08 E-03
	870831 to 870908	* 0.00 E-01	8.09 E-03
	870908 to 870914	*-3.22 E-03	1.11 E-02
	870914 to 870921	* 1.08 E-03	8.99 E-03
	870921 to 870928	* 6.93 E-04	6.06 E-03

* Denotes a result less than the detection limit.

TABLE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
48	870928 to 871005	*-2.30 E-03	9.92 E-03
	871005 to 871012	*-2.38 E-03	8.66 E-03
	871012 to 871019	* 2.76 E-03	9.32 E-03
	871019 to 871026	*-5.89 E-03	7.77 E-03
	871026 to 871102	*-1.92 E-03	8.01 E-03
	871102 to 871109	* 2.14 E-03	7.79 E-03
	871109 to 871116	* 2.84 E-04	8.11 E-03
	871116 to 871123	*-9.91 E-04	7.76 E-03
	871123 to 871130	* 1.72 E-03	8.67 E-03
	871130 to 871207	* 2.63 E-03	8.39 E-03
	871207 to 871214	*-1.98 E-03	9.27 E-03
	871214 to 871221	*-4.82 E-03	6.98 E-03
	871221 to 871228	* 3.54 E-03	8.09 E-03

* Denotes a result less than the detection limit.

TABLE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
57	861229 to 870105	*-5.40 E-03	1.44 E-02
	870105 to 870112	* 4.30 E-03	1.40 E-02
	870112 to 870119	* 6.80 E-04	6.83 E-03
	870119 to 870126	* 8.60 E-03	1.50 E-02
	870126 to 870202	* 1.20 E-03	1.44 E-02
	870202 to 870209	* 3.60 E-03	1.49 E-02
	870209 to 870217	* 2.80 E-03	1.15 E-02
	870217 to 870223	* 2.30 E-03	1.23 E-02
	870223 to 870302	*-7.00 E-03	1.35 E-02
	870302 to 870309	*-4.30 E-03	9.90 E-03
	870309 to 870316	* 9.60 E-04	9.10 E-03
	870316 to 870323	*-3.40 E-03	1.06 E-02
	870323 to 870330	*-4.90 E-03	1.08 E-02
	870330 to 870406	*-8.64 E-04	1.20 E-02
	870406 to 870413	* 0.00 E-01	9.67 E-03
	870413 to 870420	*-5.95 E-03	1.34 E-02
	870420 to 870427	* 4.19 E-03	9.46 E-03
	870427 to 870504	*-5.55 E-03	1.02 E-02
	870504 to 870511	*-2.05 E-03	1.09 E-02
	870511 to 870518	*-4.25 E-03	9.18 E-03
	870518 to 870526	*-6.19 E-03	8.48 E-03
	870526 to 870601	*-5.20 E-03	1.13 E-02
	870601 to 870608	* 1.27 E-03	9.69 E-03
	870608 to 870615	*-4.51 E-03	1.39 E-02
	870615 to 870622	*-1.28 E-03	1.02 E-02
	870622 to 870629	*-8.34 E-03	8.81 E-03
	870629 to 870706	* 5.75 E-03	8.72 E-03
	870706 to 870713	* 5.33 E-03	1.10 E-02
	870713 to 870720	*-2.91 E-03	1.03 E-02
	870720 to 870727	*-2.03 E-03	1.04 E-02
	870727 to 870803	* 1.96 E-03	1.07 E-02
	870803 to 870810	* 3.12 E-03	9.00 E-03
	870810 to 870817	*-1.20 E-03	9.83 E-03
	870817 to 870824	* 2.35 E-03	9.95 E-03
	870824 to 870831	* 1.17 E-03	9.22 E-03
	870831 to 870908	* 0.00 E-01	8.23 E-03
	870908 to 870914	*-3.28 E-03	1.13 E-02
	870914 to 870921	* 1.10 E-03	9.16 E-03
	870921 to 870928	*-1.95 E-03	8.87 E-03

* Denotes a result less than the detection limit.

TABLE A-4.1 (Cont.)

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
57	870928 to 871005	*-2.37 E-03	1.02 E-02
	871005 to 871012	*-2.40 E-03	8.75 E-03
	871012 to 871019	* 2.81 E-03	9.49 E-03
	871019 to 871026	*-5.98 E-03	7.88 E-03
	871026 to 871102	*-1.96 E-03	8.18 E-03
	871102 to 871109	* 2.18 E-03	7.93 E-03
	871109 to 871116	* 2.90 E-04	8.27 E-03
	871116 to 871123	*-1.01 E-03	7.89 E-03
	871123 to 871130	* 1.76 E-03	8.86 E-03
	871130 to 871207	* 2.67 E-03	8.52 E-03
	871207 to 871214	*-2.01 E-03	9.42 E-03
	871214 to 871221	*-4.95 E-03	7.17 E-03
	871221 to 871228	* 3.60 E-03	8.23 E-03

* 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)	-1.40 E-04	-3.33 E-02	1.80 E-02	573	0
I-131	(C)	-8.17 E-04	-9.28 E-04	1.80 E-02	52	0

(I) Indicator Station
(C) Control Station

TABLE A-5.1

GROSS BETA IN WATER

. Results in pCi/liter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
	River/Drinking		
26	861217 to 870121	1.9 E+00	8.0 E-01
	870121 to 870218	1.8 E+00	8.0 E-01
	870218 to 870318	1.5 E+00	7.0 E-01
	870318 to 870415	1.9 E+00	8.0 E-01
	870415 to 870513	1.0 E+00	6.0 E-01
	870513 to 870610	3.0 E+00	9.0 E-01
	870610 to 870715	1.7 E+00	8.0 E-01
	870715 to 870811	1.8 E+00	7.0 E-01
	870812 to 870916	2.4 E+00	8.0 E-01
	870916 to 871021	2.8 E+00	9.0 E-01
	871021 to 871119	* 8.5 E-01	7.4 E-01
	871119 to 871216	1.1 E+00	7.0 E-01
28	861217 to 870121	1.6 E+00	8.0 E-01
	870121 to 870218	1.6 E+00	8.0 E-01
	870218 to 870318	1.5 E+00	7.0 E-01
	870318 to 870415	2.1 E+00	8.0 E-01
	870415 to 870513	2.2 E+00	7.0 E-01
	870513 to 870610	2.2 E+00	8.0 E-01
	870610 to 870715	2.8 E+00	9.0 E-01
	870715 to 870811	2.4 E+00	7.0 E-01
	870812 to 870916	2.4 E+00	8.0 E-01
	870916 to 871021	1.7 E+00	8.0 E-01
	871021 to 871119	1.5 E+00	8.0 E-01
	871119 to 871216	1.1 E+00	7.0 E-01
29	861217 to 870121	9.1 E+00	1.6 E+00
	870121 to 870218	8.1 E+00	1.5 E+00
	870218 to 870318	3.5 E+00	9.0 E-01
	870318 to 870415	1.5 E+00	8.0 E-01
	870415 to 870513	1.4 E+00	7.0 E-01
	870513 to 870610	1.8 E+00	7.0 E-01
	870610 to 870715	1.5 E+00	7.0 E-01
	870715 to 870811	2.5 E+00	7.0 E-01
	870812 to 870916	1.9 E+00	8.0 E-01
	870916 to 871021	2.0 E+00	8.0 E-01
	871021 to 871119	* 8.2 E-01	7.6 E-01
	871119 to 871216	1.4 E+00	7.0 E-01

* 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	861217 to 870121	2.9 E+01	3.0 E+00
	870121 to 870218	3.3 E+01	3.0 E+00
	870218 to 870318	3.6 E+01	3.0 E+00
	870318 to 870415	3.5 E+01	3.0 E+00
	870415 to 870513	3.4 E+01	3.0 E+00
	870513 to 870610	(a)	
	870610 to 870715	2.0 E+01	2.0 E+00
	870715 to 870811	2.5 E+01	3.0 E+00
	870812 to 870916	2.2 E+01	3.0 E+00
	870916 to 871021	2.5 E+01	3.0 E+00
	871021 to 871119	2.7 E+01	3.0 E+00
	871119 to 871216	2.2 E+01	3.0 E+00
72	861217 to 870121	3.2 E+01	3.0 E+00
	870121 to 870218	3.4 E+01	3.0 E+00
	870218 to 870318	3.3 E+01	3.0 E+00
	870318 to 870415	3.2 E+01	3.0 E+00
	870415 to 870513	(b)	

(a) Plant maintenance outage; no sample available.
(b) The collection of this duplicate sample on a regular basis was discontinued.

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)	2.44 E+00	8.20 E-01	9.10 E+00	24	23
Gr-Beta (C)	1.81 E+00	8.50 E-01	3.00 E+00	12	11
		Discharge (a)			
Gr-Beta (I)	2.57 E+01	2.00 E+01	3.60 E+01	11	11

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

TABLE A-6.1

TRITIUM IN WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD		RESULT	OVERALL UNCERTAINTY
		River/Drinking		
26	861217 to 870318		1.6 E+02	1.00 E+02
	870318 to 870610	*	4.0 E+01	8.57 E+01
	870610 to 870916		1.7 E+02	6.00 E+01
	870916 to 871216		2.3 E+02	8.00 E+01
28	861217 to 870318		2.9 E+02	9.00 E+01
	870318 to 870610		1.2 E+02	7.00 E+01
	870610 to 870916		2.2 E+02	6.00 E+01
	870916 to 871216		2.1 E+02	8.00 E+01
29	861217 to 870318	*	1.9 E+02	1.33 E+02
	870318 to 870610		1.6 E+02	7.00 E+01
	870610 to 870916		1.6 E+02	8.00 E+01
	870916 to 871216	*	1.0 E+02	9.54 E+01

* 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
	Discharge		
27	861217 to 870318	1.6 E+03	1.00 E+02
	870318 to 870513	1.3 E+03	1.00 E+02
	870610 to 870916	2.3 E+03	1.00 E+02
	870916 to 871216	1.6 E+03	1.00 E+02
72	861217 to 870318	1.4 E+03	1.00 E+02
	870318 to 870513 (b) (a)	* 9.3 E+01	7.57 E+01
	Ground		
31	870318 (Well-1)	* 1.9 E+02	1.25 E+02
	870609	1.6 E+02	9.00 E+01
	870916	*-2.1 E+01	1.13 E+00
	871216	* 4.2 E+01	9.21 E+01
32	870318 (Well-2)	* 1.0 E+01	1.17 E+02
	870609	* 5.1 E+01	1.01 E+02
	870916	*-1.2 E+02	8.00 E+01
	871216	* 8.3 E+01	8.11 E+01
52	870318 (Well-3)	* 2.3 E+00	1.06 E+02
	870609	* 4.0 E+01	1.04 E+02
	870916	2.5 E+02	8.00 E+01
	871216	2.3 E+02	1.00 E+02

* Denotes a result less than the detection limit.
(a) The collection of this sample on a regular basis was discontinued.
(b) One month sample only.

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)	1.81 E+02	1.00 E+02	2.90 E+02	8	8
H-3	(C)	1.50 E+02	4.00 E+01	2.30 E+02	4	3
			Discharge (a)(b)			
H-3	(I)	1.70 E+03	1.30 E+03	2.30 E+03	4	4
			Ground (b)			
H-3	(I)	7.64 E+01	-1.20 E+02	2.50 E+02	12	3

(I) Indicator Station
(C) Control Station
(a) Duplicate sample (Station 72) not included.
(b) Indicator Stations only.

TABLE A-7.1

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
		River/Drinking		
26	861217 to 870121	Be-7	*-7.70 E+00	2.13 E+01
		K-40	* 4.70 E+01	2.40 E+01
		Mn-54	*-1.10 E+00	2.00 E+00
		Co-58	*-5.90 E-01	2.11 E+00
		Fe-59	* 1.90 E-01	4.41 E+00
		Co-60	* 1.80 E+00	2.40 E+00
		Zn-65	* 1.70 E+00	4.80 E+00
		Zr-95	* 1.30 E+00	4.60 E+00
		Nb-95	* 8.20 E-01	2.19 E+00
		Cs-134	*-2.60 E-01	2.16 E+00
		Cs-137	*-9.00 E-01	2.04 E+00
		Ba-140	*-3.90 E+00	9.40 E+00
		La-140	* 2.90 E+00	3.80 E+00
		Ra-226	* 6.73 E+01	5.29 E+01
		Th-228	* 9.67 E+00	4.07 E+00
	870121 to 870218	Be-7	*-1.00 E+00	2.30 E+01
		K-40	* 7.30 E+01	2.80 E+01
		Mn-54	* 2.20 E+00	2.10 E+00
		Co-58	*-2.40 E-01	2.30 E+00
		Fe-59	* 1.60 E+00	5.00 E+00
		Co-60	* 4.20 E-01	2.50 E+00
		Zn-65	* 2.80 E+00	4.80 E+00
		Zr-95	*-1.50 E+00	4.70 E+00
		Nb-95	*-3.10 E-01	2.30 E+00
		Cs-134	* 1.30 E+00	2.30 E+00
		Cs-137	* 1.90 E+00	2.40 E+00
		Ba-140	*-5.70 E-01	1.20 E+00
		La-140	*-4.00 E+00	4.80 E+00
		Ra-226	* 1.84 E+01	5.94 E+01
		Th-228	* 1.12 E+01	4.96 E+00
	870218 to 870318	Be-7	* 0.00 E+01	2.10 E+01
		K-40	* 1.10 E+02	2.90 E+01
		Mn-54	* 2.10 E+00	2.00 E+00
		Co-58	*-1.50 E-01	2.10 E+00
		Fe-59	* 3.40 E-01	4.20 E+00
		Co-60	* 7.10 E-01	2.40 E+00
		Zn-65	*-3.40 E+00	4.60 E+00
		Zr-95	* 8.30 E-01	4.30 E+00
		Nb-95	* 2.10 E+00	2.20 E+00
		Cs-134	*-3.90 E-01	2.20 E+00
		Cs-137	* 1.40 E+00	2.20 E+00
		Ba-140	*-5.70 E+00	8.10 E+00
		La-140	*-1.40 E+00	3.30 E+00
		Ra-226	* 1.68 E+02	5.38 E+01
		Th-228	* 1.37 E+01	4.47 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	870318 to 870415	Be-7	* 1.35 E+01	2.93 E+01
		K-40	* 4.33 E+01	2.26 E+01
		Mn-54	* 4.99 E-01	2.21 E+00
		Co-58	*-8.18 E-01	2.06 E+00
		Fe-59	*-1.50 E+00	4.30 E+00
		Co-60	* 1.14 E+00	2.16 E+00
		Zn-65	*-2.86 E+00	4.82 E+00
		Zr-95	* 0.00 E-01	5.83 E+00
		Nb-95	* 1.40 E+00	2.20 E+00
		Cs-134	*-2.69 E+00	2.45 E+00
		Cs-137	* 5.30 E-01	2.05 E+00
		Ba-140	*-1.09 E+01	3.59 E+01
		La-140	* 6.11 E+00	1.58 E+01
		Ra-226	* 8.94 E+01	4.59 E+01
		Th-228	* 1.16 E+01	3.93 E+00
	870415 to 870513	Be-7	* 6.60 E+00	2.03 E+01
		K-40	* 9.79 E+01	2.70 E+01
		Mn-54	* 4.69 E-01	2.07 E+00
		Co-58	*-2.78 E-01	2.14 E+00
		Fe-59	* 1.32 E+00	4.54 E+00
		Co-60	*-8.82 E-01	2.28 E+00
		Zn-65	*-6.62 E+00	4.55 E+00
		Zr-95	* 1.55 E+00	4.21 E+00
		Nb-95	* 1.54 E+00	2.26 E+00
		Cs-134	*-9.46 E-01	2.33 E+00
		Cs-137	* 3.03 E+00	2.27 E+00
		Ba-140	*-6.57 E+00	7.79 E+00
		La-140	* 3.91 E+00	3.30 E+00
		Ra-226	* 1.12 E+02	4.57 E+01
		Th-228	* 1.52 E+01	4.06 E+00
	870513 to 870610	Be-7	*-1.80 E+01	3.01 E+01
		K-40	* 1.01 E+03	6.50 E+01
		Mn-54	*-9.13 E-01	2.79 E+00
		Co-58	* 8.95 E-01	2.91 E+00
		Fe-59	* 3.37 E+00	6.34 E+00
		Co-60	* 1.18 E+00	2.98 E+00
		Zn-65	*-9.19 E+00	6.94 E+00
		Zr-95	* 4.02 E+00	6.09 E+00
		Nb-95	* 2.70 E-01	3.27 E+00
		Cs-134	*-2.28 E+00	3.19 E+00
		Cs-137	* 2.54 E+00	3.03 E+00
		Ba-140	* 2.18 E+00	1.28 E+01
		La-140	* 8.58 E-01	4.98 E+00
		Ra-226	* 8.41 E+01	6.70 E+01
		Th-228	* 2.03 E+01	5.53 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	870610 to 870715	Be-7	*-2.34 E+00	2.00 E+01
		K-40	* 8.09 E+01	2.57 E+01
		Mn-54	* 7.41 E-01	1.81 E+00
		Co-58	*-5.47 E-01	1.98 E+00
		Fe-59	*-8.85 E-01	4.27 E+00
		Co-60	* 5.79 E-01	2.12 E+00
		Zn-65	*-3.47 E+00	4.30 E+00
		Zr-95	*-2.27 E-01	4.12 E+00
		Nb-95	*-2.94 E-01	2.02 E+00
		Cs-134	* 3.08 E-01	2.11 E+00
		Cs-137	* 1.18 E+00	2.05 E+00
		Ba-140	* 7.24 E+00	9.08 E+00
		La-140	*-1.77 E-01	3.80 E+00
		Ra-226	* 1.54 E+02	4.31 E+01
		Th-228	* 1.32 E+01	3.75 E+00
	870715 to 870811	Be-7	* 1.19 E+01	2.32 E+01
		K-40	* 8.30 E+01	2.49 E+01
		Mn-54	* 1.83 E+00	2.12 E+00
		Co-58	* 0.00 E-01	2.06 E+00
		Fe-59	*-3.65 E+00	4.16 E+00
		Co-60	*-7.07 E-01	2.15 E+00
		Zn-65	*-1.79 E-01	4.63 E+00
		Zr-95	* 1.58 E+00	4.24 E+00
		Nb-95	* 9.62 E-01	2.18 E+00
		Cs-134	* 0.00 E-01	2.41 E+00
		Cs-137	* 1.43 E+00	2.25 E+00
		Ba-140	* 3.60 E+00	8.45 E+00
		La-140	* 8.52 E-01	2.82 E+00
		Ra-226	* 1.23 E+02	5.63 E+01
		Th-228	* 1.42 E+01	4.69 E+00
	870812 to 870916	Be-7	* 4.85 E-01	2.04 E+01
		K-40	* 1.05 E+02	2.92 E+01
		Mn-54	* 1.22 E+00	2.08 E+00
		Co-58	*-7.46 E-02	2.05 E+00
		Fe-59	* 0.00 E-01	4.35 E+00
		Co-60	* 1.54 E+00	2.12 E+00
		Zn-65	* 3.59 E-01	4.33 E+00
		Zr-95	*-1.39 E-01	4.29 E+00
		Nb-95	* 1.30 E+00	2.27 E+00
		Cs-134	* 5.48 E-01	2.19 E+00
		Cs-137	* 2.57 E+00	2.27 E+00
		Ba-140	*-1.27 E+00	7.86 E+00
		La-140	*-5.27 E-01	3.18 E+00
		Ra-226	* 1.62 E+02	5.29 E+01
		Th-228	* 1.29 E+01	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		
26	870916 to 871021	Be-7	*-1.14 E+01	2.11 E+01
		K-40	* 6.09 E+01	2.60 E+01
		Mn-54	* 2.92 E+00	2.10 E+00
		Co-58	*-8.56 E-01	2.09 E+00
		Fe-59	*-1.03 E+00	4.22 E+00
		Co-60	* 1.98 E-01	2.20 E+00
		Zn-65	*-1.55 E+00	4.53 E+00
		Zr-95	* 5.57 E+00	4.51 E+00
		Nb-95	* 6.88 E-02	2.21 E+00
		Cs-134	* 1.10 E+00	2.32 E+00
		Cs-137	* 2.20 E+00	2.32 E+00
		Ba-140	* 3.03 E+00	8.74 E+00
		La-140	* 0.00 E-01	3.61 E+00
		Ra-226	* 1.26 E+02	4.67 E+01
		Th-228	* 1.81 E+01	4.11 E+00
	871021 to 871119	Be-7	* 7.45 E+00	1.64 E+01
		K-40	* 8.44 E+01	2.13 E+01
		Mn-54	* 4.08 E-01	1.63 E+00
		Co-58	*-3.76 E-01	1.75 E+00
		Fe-59	* 1.45 E+00	3.59 E+00
		Co-60	* 2.79 E+00	1.96 E+00
		Zn-65	*-1.15 E-01	3.60 E+00
		Zr-95	* 1.92 E+00	3.53 E+00
		Nb-95	* 2.94 E+00	1.77 E+00
		Cs-134	* 5.42 E-01	1.82 E+00
		Cs-137	* 3.74 E+00	1.88 E+00
		Ba-140	*-3.15 E+00	6.55 E+00
		La-140	*-1.27 E+00	2.57 E+00
		Ra-226	* 1.00 E+02	3.75 E+01
		Th-228	* 1.53 E+01	3.37 E+00
	871118 to 871216	Be-7	*-6.19 E+00	1.79 E+01
		K-40	* 1.27 E+02	2.84 E+01
		Mn-54	*-2.61 E-01	1.90 E+00
		Co-58	*-4.04 E-01	1.86 E+00
		Fe-59	* 2.43 E+00	4.01 E+00
		Co-60	* 8.80 E-01	2.34 E+00
		Zn-65	* 0.00 E-01	4.15 E+00
		Zr-95	* 2.48 E-01	3.70 E+00
		Nb-95	* 1.15 E+00	1.96 E+00
		Cs-134	* 2.82 E-01	2.03 E+00
		Cs-137	*-4.93 E-01	2.06 E+00
		Ba-140	*-3.81 E+00	7.14 E+00
		La-140	*-1.02 E+00	3.16 E+00
		Ra-226	* 1.35 E+02	4.57 E+01
		Th-228	* 1.13 E+01	3.69 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 UNCERTAINITY
		River/Drinking		
28	861217 to 870121	Be-7	* 1.10 E+01	2.20 E+01
		K-40	* 7.40 E+01	2.60 E+01
		Mn-54	* 1.40 E+00	2.00 E+00
		Co-58	*-6.20 E-01	2.19 E+00
		Fe-59	* 2.00 E+00	4.40 E+00
		Co-60	*-1.10 E+00	2.10 E+00
		Zn-65	* 3.30 E-01	4.69 E+00
		Zr-95	* 4.10 E+00	4.40 E+00
		Nb-95	* 6.70 E-02	2.22 E+00
		Cs-134	*-3.50 E-01	2.35 E+00
		Cs-137	* 2.00 E+00	2.20 E+00
		Ba-140	* 5.00 E+00	9.50 E+00
		La-140	* 7.70 E-01	3.72 E+00
		Ra-226	* 1.07 E+02	4.73 E+01
		Th-228	* 1.73 E+01	4.17 E+00
	870121 to 870218	Be-7	*-1.20 E+01	2.40 E+01
		K-40	* 8.00 E+01	2.60 E+01
		Mn-54	* 1.70 E+00	2.10 E+00
		Co-58	* 7.50 E-01	2.20 E+00
		Fe-59	* 3.00 E+00	4.60 E+00
		Co-60	* 3.20 E-01	2.10 E+00
		Zn-65	*-9.40 E-01	4.80 E+00
		Zr-95	*-3.00 E+00	4.70 E+00
		Nb-95	* 1.60 E+00	2.40 E+00
		Cs-134	* 6.70 E-01	2.30 E+00
		Cs-137	* 2.80 E-01	2.30 E+00
		Ba-140	* 1.00 E+01	1.20 E+01
		La-140	*-7.30 E-01	4.40 E+00
		Ra-226	* 1.67 E+02	5.89 E+01
		Th-228	* 1.29 E+01	4.90 E+00
	870218 to 870318	Be-7	* 1.50 E+01	2.20 E+01
		K-40	* 1.20 E+02	3.00 E+01
		Mn-54	* 1.60 E+00	2.20 E+00
		Co-58	*-7.40 E-02	2.20 E+00
		Fe-59	* 4.60 E+00	4.70 E+00
		Co-60	* 1.30 E+00	2.40 E+00
		Zn-65	* 1.30 E+00	5.10 E+00
		Zr-95	* 1.90 E+00	4.60 E+00
		Nb-95	* 1.40 E-01	2.20 E+00
		Cs-134	* 1.80 E+00	2.40 E+00
		Cs-137	* 1.70 E+00	2.20 E+00
		Ba-140	* 4.90 E+00	9.30 E+00
		La-140	* 1.40 E+00	3.80 E+00
		Ra-226	* 7.13 E+01	4.74 E+01
		Th-228	* 1.67 E+01	4.24 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	870318 to 870415	Be-7	*-5.20 E+00	3.18 E+01
		K-40	* 3.05 E+02	3.90 E+01
		Mn-54	* 2.37 E+00	2.79 E+00
		Co-58	*-2.02 E+00	2.92 E+00
		Fe-59	* 1.80 E+00	5.99 E+00
		Co-60	* 5.66 E+00	2.77 E+00
		Zn-65	*-1.79 E+00	6.00 E+00
		Zr-95	* 5.80 E+00	6.66 E+00
		Nb-95	*-7.52 E-01	3.11 E+00
		Cs-134	* 5.02 E-01	3.18 E+00
		Cs-137	* 8.87 E-01	3.06 E+00
		Ba-140	* 0.00 E-01	1.37 E+01
		La-140	*-3.28 E+00	4.44 E+00
		Ra-226	* 2.05 E+02	7.32 E+01
		Th-228	* 8.16 E+01	6.78 E+00
	870415 to 870513	Be-7	* 6.61 E+00	1.95 E+01
		K-40	* 8.38 E+01	2.51 E+01
		Mn-54	* 4.09 E-01	1.81 E+00
		Co-58	* 0.00 E-01	1.95 E+00
		Fe-59	* 2.47 E+00	4.11 E+00
		Co-60	* 1.34 E+00	2.16 E+00
		Zn-65	*-1.96 E+00	4.11 E+00
		Zr-95	* 6.24 E-01	4.25 E+00
		Nb-95	* 4.07 E-01	2.20 E+00
		Cs-134	* 2.66 E-01	2.23 E+00
		Cs-137	* 1.86 E+00	2.04 E+00
		Ba-140	* 4.60 E-01	7.53 E+00
		La-140	* 1.17 E+00	3.18 E+00
		Ra-226	* 1.06 E+02	5.19 E+01
		Th-228	* 1.11 E+01	4.19 E+00
	870513 to 870610	Be-7	* 1.83 E+01	2.19 E+01
		K-40	* 1.37 E+02	3.04 E+01
		Mn-54	* 9.32 E-01	2.03 E+00
		Co-58	*-5.29 E-01	2.03 E+00
		Fe-59	*-3.57 E-01	4.13 E+00
		Co-60	* 3.78 E+00	2.24 E+00
		Zn-65	*-2.51 E+00	4.28 E+00
		Zr-95	* 1.27 E+00	4.61 E+00
		Nb-95	* 2.56 E+00	2.21 E+00
		Cs-134	*-5.45 E-01	2.31 E+00
		Cs-137	* 2.03 E+00	2.23 E+00
		Ba-140	*-5.39 E+00	8.88 E+00
		La-140	* 1.55 E+00	3.60 E+00
		Ra-226	* 1.66 E+02	5.35 E+01
		Th-228	* 1.34 E+01	4.30 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	870610 to 870715	Be-7	*-1.70 E+00	3.03 E+01
		K-40	* 2.86 E+02	3.65 E+01
		Mn-54	* 1.82 E+00	2.70 E+00
		Co-58	*-9.41 E-01	2.89 E+00
		Fe-59	* 1.18 E+00	5.86 E+00
		Co-60	* 6.66 E+00	2.76 E+00
		Zn-65	*-5.50 E+00	5.66 E+00
		Zr-95	*-5.45 E+00	6.22 E+00
		Nb-95	* 1.53 E+00	3.03 E+00
		Cs-134	* 4.97 E+00	3.22 E+00
		Cs-137	* 2.94 E+00	2.89 E+00
		Ba-140	*-1.30 E+00	1.42 E+01
		La-140	*-6.81 E-01	4.81 E+00
		Ra-226	* 1.81 E+02	7.01 E+01
		Th-228	* 8.36 E+01	6.52 E+00
	870715 to 870811	Be-7	*-4.26 E+00	2.05 E+01
		K-40	* 6.31 E+01	2.54 E+01
		Mn-54	*-8.31 E-02	1.98 E+00
		Co-58	* 4.28 E-01	2.03 E+00
		Fe-59	* 1.18 E+00	4.59 E+00
		Co-60	* 4.56 E-01	2.37 E+00
		Zn-65	*-1.61 E+00	4.24 E+00
		Zr-95	* 9.38 E-01	4.05 E+00
		Nb-95	*-1.62 E-01	2.15 E+00
		Cs-134	* 0.00 E-01	2.52 E+00
		Cs-137	* 6.88 E-01	2.17 E+00
		Ba-140	*-7.12 E-01	7.90 E+00
		La-140	* 2.60 E+00	3.46 E+00
		Ra-226	* 9.05 E+01	5.61 E+01
		Th-228	* 1.42 E+01	4.48 E+00
	870812 to 870916	Be-7	* 1.47 E+01	2.05 E+01
		K-40	* 1.34 E+02	2.93 E+01
		Mn-54	*-1.39 E-01	1.86 E+00
		Co-58	*-1.02 E+00	2.02 E+00
		Fe-59	*-1.03 E+00	4.22 E+00
		Co-60	* 2.58 E+00	2.30 E+00
		Zn-65	* 1.22 E+00	4.57 E+00
		Zr-95	* 3.27 E+00	4.23 E+00
		Nb-95	* 9.85 E-01	2.14 E+00
		Cs-134	* 2.20 E+00	2.26 E+00
		Cs-137	*-6.38 E-02	2.19 E+00
		Ba-140	*-2.38 E+00	8.54 E+00
		La-140	*-1.43 E+00	3.33 E+00
		Ra-226	* 1.59 E+02	5.21 E+01
		Th-228	* 1.83 E+01	4.45 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	870916 to 871021	Be-7	* 1.21 E+01	3.68 E+01
		K-40	* 7.45 E+02	5.28 E+01
		Mn-54	* 1.83 E+00	3.00 E+00
		Co-58	*-7.74 E-01	3.21 E+00
		Fe-59	* 3.44 E+00	6.28 E+00
		Co-60	* 3.95 E+00	2.82 E+00
		Zn-65	*-6.32 E+00	6.40 E+00
		Zr-95	* 2.09 E+00	6.75 E+00
		Nb-95	* 2.86 E+00	3.32 E+00
		Cs-134	* 2.99 E+00	3.43 E+00
		Cs-137	* 1.29 E+00	3.70 E+00
		Ba-140	*-5.39 E+00	1.48 E+01
		La-140	*-2.33 E+00	4.14 E+00
		Ra-226	* 1.13 E+02	8.73 E+01
		Th-228	* 3.14 E+01	8.00 E+00
	871021 to 871118	Be-7	* 9.54 E+00	2.63 E+01
		K-40	* 2.72 E+02	3.21 E+01
		Mn-54	* 1.45 E+00	2.29 E+00
		Co-58	* 2.74 E+00	2.58 E+00
		Fe-59	* 2.83 E+00	4.69 E+00
		Co-60	* 4.04 E+00	2.48 E+00
		Zn-65	*-3.46 E-01	5.07 E+00
		Zr-95	* 5.16 E+00	5.31 E+00
		Nb-95	* 4.78 E-02	2.72 E+00
		Cs-134	* 2.55 E+00	2.75 E+00
		Cs-137	* 5.90 E-01	2.57 E+00
		Ba-140	* 2.98 E-01	1.07 E+01
		La-140	*-2.69 E+00	3.56 E+00
		Ra-226	* 2.47 E+02	6.25 E+01
		Th-228	* 8.28 E+01	5.28 E+00
	871118 to 871216	Be-7	* 1.31 E+01	1.71 E+01
		K-40	* 4.72 E+01	2.36 E+01
		Mn-54	* 4.77 E-01	1.90 E+00
		Co-58	* 4.31 E-01	1.89 E+00
		Fe-59	* 2.34 E+00	4.07 E+00
		Co-60	*-4.38 E-01	2.19 E+00
		Zn-65	*-2.87 E+00	4.50 E+00
		Zr-95	*-2.28 E+00	3.78 E+00
		Nb-95	* 3.33 E+00	1.98 E+00
		Cs-134	*-2.64 E+00	2.08 E+00
		Cs-137	* 1.59 E+00	2.18 E+00
		Ba-140	* 8.45 E-01	6.93 E+00
		La-140	*-2.56 E+00	3.33 E+00
		Ra-226	* 1.00 E+02	3.73 E+01
		Th-228	* 8.03 E+00	3.15 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	861217 to 870121	Be-7	* 1.40 E+01	2.10 E+01
		K-40	* 1.10 E+02	3.00 E+01
		Mn-54	* 1.10 E+00	2.10 E+00
		Co-58	*-7.80 E-01	2.26 E+00
		Fe-59	*-1.44 E+00	4.10 E+00
		Co-60	* 6.30 E-01	2.11 E+00
		Zn-65	*-2.40 E+00	4.30 E+00
		Zr-95	* 5.30 E-01	4.53 E+00
		Nb-95	* 2.10 E+00	2.40 E+00
		Cs-134	* 1.10 E+00	2.30 E+00
		Cs-137	* 2.90 E-01	2.14 E+00
		Ba-140	* 1.10 E+00	9.10 E+00
		La-140	* 1.20 E+00	4.00 E+00
		Ra-226	* 7.61 E+01	4.68 E+01
		Th-228	* 1.30 E+01	4.16 E+00
	870121 to 870218	Be-7	*-1.10 E+00	2.30 E+01
		K-40	* 1.30 E+02	3.00 E+01
		Mn-54	*-1.10 E+00	2.00 E+00
		Co-58	*-4.10 E-01	2.30 E+00
		Fe-59	* 4.00 E-01	4.70 E+00
		Co-60	* 0.00 E+00	2.30 E+00
		Zn-65	* 3.80 E-01	4.80 E+00
		Zr-95	* 7.20 E+00	5.00 E+00
		Nb-95	* 3.50 E+00	2.40 E+00
		Cs-134	*-7.40 E-01	2.40 E+00
		Cs-137	* 2.80 E-01	2.20 E+00
		Ba-140	*-2.80 E+00	1.10 E+00
		La-140	*-3.80 E+00	4.60 E+00
		Ra-226	* 1.81 E+02	5.56 E+01
		Th-228	* 1.95 E+01	4.70 E+00
	870218 to 870318	Be-7	*-2.90 E+00	2.10 E+01
		K-40	* 1.30 E+02	2.95 E+01
		Mn-54	* 8.50 E-01	2.00 E+00
		Co-58	*-2.20 E-01	2.00 E+00
		Fe-59	* 4.00 E+00	4.10 E+00
		Co-60	* 3.00 E-01	2.20 E+00
		Zn-65	*-3.10 E+00	4.50 E+00
		Zr-95	*-1.20 E+00	4.20 E+00
		Nb-95	* 5.00 E-01	2.10 E+00
		Cs-134	*-4.60 E-01	2.30 E+00
		Cs-137	* 8.40 E-01	2.10 E+00
		Ba-140	*-3.50 E+00	8.30 E+00
		La-140	*-1.80 E+00	3.50 E+00
		Ra-226	* 1.85 E+02	5.40 E+01
		Th-228	* 1.85 E+02	5.40 E+01

* 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	870318 to 870415	Be-7	* 6.01 E+00	1.88 E+01
		K-40	* 8.68 E+01	2.55 E+01
		Mn-54	* 9.36 E-01	2.02 E+00
		Co-58	*-3.30 E-01	1.97 E+00
		Fe-59	* 3.78 E+00	4.18 E+00
		Co-60	* 1.06 E+00	1.99 E+00
		Zn-65	*-2.06 E+00	3.69 E+00
		Zr-95	* 1.68 E+00	4.20 E+00
		Nb-95	* 4.79 E-01	2.10 E+00
		Cs-134	*-9.26 E-01	2.14 E+00
		Cs-137	* 2.64 E+00	1.99 E+00
		Ba-140	*-5.65 E+00	8.36 E+00
		La-140	*-4.37 E-01	3.72 E+00
		Ra-226	* 8.39 E+01	5.03 E+01
		Th-228	* 1.20 E+01	4.01 E+00
	870415 to 870513	Be-7	*-5.80 E+00	2.04 E+01
		K-40	* 1.14 E+02	2.83 E+01
		Mn-54	*-3.07 E-01	2.15 E+00
		Co-58	*-1.11 E+00	2.10 E+00
		Fe-59	* 1.06 E+00	3.89 E+00
		Co-60	*-3.16 E-01	2.10 E+00
		Zn-65	*-1.64 E+00	4.44 E+00
		Zr-95	*-3.26 E+00	4.50 E+00
		Nb-95	* 0.00 E-01	2.31 E+00
		Cs-134	* 1.34 E+00	2.57 E+00
		Cs-137	* 1.38 E+00	2.32 E+00
		Ba-140	* 8.56 E-01	8.21 E+00
		La-140	* 1.52 E+00	3.54 E+00
		Ra-226	* 9.76 E+01	4.94 E+01
		Th-228	* 1.46 E+01	4.41 E+00
	870513 to 870610	Be-7	* 5.54 E+00	2.07 E+01
		K-40	* 8.12 E+01	2.62 E+01
		Mn-54	*-5.93 E-01	1.94 E+00
		Co-58	*-1.59 E+00	2.14 E+00
		Fe-59	*-2.05 E-01	4.52 E+00
		Co-60	* 1.39 E+00	2.14 E+00
		Zn-65	*-2.47 E+00	4.52 E+00
		Zr-95	* 2.11 E+00	4.23 E+00
		Nb-95	* 6.72 E-01	2.17 E+00
		Cs-134	* 1.18 E+00	2.29 E+00
		Cs-137	* 7.75 E-01	2.29 E+00
		Ba-140	* 2.42 E+00	9.28 E+00
		La-140	* 0.00 E-01	3.61 E+00
		Ra-226	* 1.30 E+02	5.58 E+01
		Th-228	* 1.54 E+01	4.46 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	870610 to 870715	Be-7	*-8.00 E+00	3.54 E+01
		K-40	* 7.54 E+02	4.78 E+01
		Mn-54	* 1.74 E+00	2.86 E+00
		Co-58	* 0.00 E-01	3.10 E+00
		Fe-59	*-4.32 E+00	6.07 E+00
		Co-60	* 7.08 E+00	2.73 E+00
		Zn-65	*-1.04 E+01	6.23 E+00
		Zr-95	*-5.46 E+00	6.46 E+00
		Nb-95	* 3.14 E+00	3.24 E+00
		Cs-134	* 1.45 E+00	3.19 E+00
		Cs-137	* 1.80 E+00	3.46 E+00
		Ba-140	* 6.01 E-01	1.56 E+01
		La-140	*-2.43 E+00	4.14 E+00
		Ra-226	* 2.15 E+02	8.26 E+01
		Th-228	* 2.87 E+01	7.52 E+00
	870715 to 870811	Be-7	*-2.75 E+00	1.98 E+01
		K-40	* 4.09 E+01	2.31 E+01
		Mn-54	*-1.17 E+00	1.99 E+00
		Co-58	*-1.57 E+00	2.19 E+00
		Fe-59	*-1.86 E+00	4.11 E+00
		Co-60	* 6.25 E-01	2.15 E+00
		Zn-65	*-7.34 E+00	4.52 E+00
		Zr-95	*-2.79 E+00	4.52 E+00
		Nb-95	*-2.08 E-01	2.27 E+00
		Cs-134	*-3.59 E+00	2.44 E+00
		Cs-137	*-1.69 E+00	2.02 E+00
		Ba-140	*-2.25 E+00	8.31 E+00
		La-140	* 7.63 E-01	3.33 E+00
		Ra-226	* 8.65 E+01	4.26 E+01
		Th-228	* 1.16 E+01	3.74 E+00
	870812 to 870916	Be-7	* 3.19 E+00	2.02 E+01
		K-40	* 7.35 E+01	2.41 E+01
		Mn-54	* 7.40 E-01	2.10 E+00
		Co-58	* 0.00 E-01	2.15 E+00
		Fe-59	* 3.93 E+00	4.43 E+00
		Co-60	* 1.69 E+00	2.10 E+00
		Zn-65	* 2.20 E+00	4.66 E+00
		Zr-95	* 1.25 E+00	4.29 E+00
		Nb-95	* 1.21 E+00	2.24 E+00
		Cs-134	*-8.83 E-02	2.25 E+00
		Cs-137	* 9.06 E-01	2.31 E+00
		Ba-140	* 6.92 E+00	8.50 E+00
		La-140	* 1.88 E+00	3.61 E+00
		Ra-226	* 8.48 E+01	5.68 E+01
		Th-228	* 1.25 E+01	4.40 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		
29	870916 to 871021	Be-7	* 4.49 E+00	2.23 E+01
		K-40	* 1.03 E+02	2.87 E+01
		Mn-54	* 2.02 E+00	2.14 E+00
		Co-58	* 1.06 E+00	2.30 E+00
		Fe-59	*-1.83 E+00	4.44 E+00
		Co-60	* 6.38 E-01	2.15 E+00
		Zn-65	* 3.68 E-01	4.68 E+00
		Zr-95	* 3.05 E-01	4.80 E+00
		Nb-95	* 2.39 E+00	2.39 E+00
		Cs-134	* 1.52 E+00	2.42 E+00
		Cs-137	* 8.32 E-01	2.41 E+00
		Ba-140	*-1.68 E+00	9.07 E+00
		La-140	*-2.56 E+00	4.06 E+00
		Ra-226	* 4.26 E+01	5.00 E+01
		Th-228	* 1.13 E+01	4.48 E+00
	871021 to 871118	Be-7	*-1.33 E+01	2.96 E+01
		K-40	* 6.98 E+02	4.17 E+01
		Mn-54	* 1.63 E+00	2.46 E+00
		Co-58	* 1.55 E+00	2.64 E+00
		Fe-59	*-3.79 E-01	4.93 E+00
		Co-60	* 7.11 E+00	2.38 E+00
		Zn-65	*-5.96 E+00	5.45 E+00
		Zr-95	* 3.92 E+00	5.58 E+00
		Nb-95	* 1.08 E+00	2.65 E+00
		Cs-134	* 2.37 E+00	2.86 E+00
		Cs-137	* 2.23 E+00	3.07 E+00
		Ba-140	*-2.21 E+00	1.17 E+01
		La-140	*-8.37 E-01	3.33 E+00
		Ra-226	* 1.36 E+02	7.25 E+01
		Th-228	* 2.37 E+01	6.58 E+00
	871118 to 871216	Be-7	*-2.12 E+01	3.24 E+01
		K-40	* 1.58 E+03	8.43 E+01
		Mn-54	* 1.69 E+00	3.45 E+00
		Co-58	*-2.08 E+00	3.50 E+00
		Fe-59	* 4.87 E-01	7.81 E+00
		Co-60	* 1.87 E+00	3.68 E+00
		Zn-65	*-4.87 E+00	8.21 E+00
		Zr-95	*-4.80 E+00	7.06 E+00
		Nb-95	* 5.97 E+00	3.58 E+00
		Cs-134	* 7.01 E-01	3.71 E+00
		Cs-137	* 4.83 E+00	3.82 E+00
		Ba-140	* 4.31 E+00	1.28 E+01
		La-140	* 2.74 E+00	4.85 E+00
		Ra-226	* 9.86 E+01	6.83 E+01
		Th-228	* 1.79 E+01	5.82 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	861217 to 870121	Be-7	* 1.20 E+01	2.00 E+01
		K-40	* 5.20 E+01	2.20 E+01
		Mn-54	* 2.10 E-01	1.86 E+00
		Co-58	*-2.30 E-01	1.94 E+00
		Fe-59	*-3.60 E+00	4.00 E+00
		Co-60	* 1.20 E+00	2.10 E+00
		Zn-65	* 3.00 E+00	4.00 E+00
		Zr-95	* 2.40 E+00	4.40 E+00
		Nb-95	* 1.20 E+00	2.10 E+00
		Cs-134	* 9.90 E-01	1.96 E+00
		Cs-137	* 9.10 E-01	1.94 E+00
		Ba-140	*-2.40 E+00	8.50 E+00
		La-140	* 1.90 E+00	3.90 E+00
		Ra-226	* 7.13 E+01	4.80 E+01
		Th-228	* 1.10 E+01	3.91 E+00
	870121 to 870218	Be-7	* 1.50 E+01	2.70 E+01
		K-40	* 1.20 E+02	3.00 E+01
		Mn-54	* 1.80 E+00	2.40 E+00
		Co-58	* 1.70 E-01	2.40 E-02
		Fe-59	*-1.00 E+00	5.10 E+00
		Co-60	* 3.30 E-01	2.40 E+00
		Zn-65	* 9.90 E-01	4.60 E+00
		Zr-95	* 2.30 E+00	5.20 E+00
		Nb-95	* 7.50 E-01	2.50 E+00
		Cs-134	* 8.60 E-01	2.50 E+00
		Cs-137	* 2.90 E+00	2.50 E+00
		Ba-140	*-2.30 E+00	1.30 E+01
		La-140	* 1.00 E+00	4.90 E+00
		Ra-226	* 1.84 E+01	5.94 E+01
		Th-228	* 1.12 E+01	4.96 E+00
	870218 to 870318	Be-7	* 1.30 E+01	3.80 E+01
		K-40	* 1.70 E+03	9.00 E+00
		Mn-54	* 1.40 E+00	4.00 E+00
		Co-58	* 0.00 E+00	4.10 E+00
		Fe-59	* 5.30 E-01	8.60 E+00
		Co-60	* 5.70 E+00	4.10 E+00
		Zn-65	* 1.30 E+01	9.50 E+00
		Zr-95	* 3.20 E+00	8.30 E+00
		Nb-95	* 6.80 E-01	4.30 E+00
		Cs-134	*-3.00 E+00	4.40 E+00
		Cs-137	* 5.60 E+00	4.00 E+00
		Ba-140	* 1.00 E+01	1.60 E+01
		La-140	* 2.20 E+00	5.50 E+00
		Ra-226	* 8.74 E+01	8.89 E+01
		Th-228	* 2.12 E+01	7.31 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	870318 to 870415	Be-7	*-5.49 E+00	2.24 E+01
		K-40	* 1.14 E+02	2.82 E+01
		Mn-54	* 5.62 E-01	2.12 E+00
		Co-58	*-1.64 E+00	2.08 E+00
		Fe-59	* 1.92 E+00	4.51 E+00
		Co-60	* 1.47 E+00	2.11 E+00
		Zn-65	*-6.93 E-01	4.61 E+00
		Zr-95	* 2.66 E+00	4.68 E+00
		Nb-95	* 1.64 E+00	2.15 E+00
		Cs-134	* 5.32 E-01	2.22 E+00
		Cs-137	* 1.97 E+00	2.46 E+00
		Ba-140	*-2.69 E+00	9.57 E+00
		La-140	*-1.76 E+00	3.65 E+00
		Ra-226	* 7.60 E+01	5.61 E+01
		Th-228	* 1.05 E+01	4.58 E+00
	870415 to 870513	Be-7	* 5.06 E+00	2.25 E+01
		K-40	* 1.14 E+02	2.97 E+01
		Mn-54	* 3.97 E+00	2.28 E+00
		Co-58	* 4.58 E+00	2.53 E+00
		Fe-59	* 1.06 E+00	4.61 E+00
		Co-60	* 6.59 E+00	2.71 E+00
		Zn-65	1.53 E+01	4.81 E+00
		Zr-95	* 1.86 E+00	4.29 E+00
		Nb-95	* 2.55 E+00	2.27 E+00
		Cs-134	* 2.56 E+00	2.49 E+00
		Cs-137	* 3.00 E+00	2.48 E+00
		Ba-140	*-4.61 E+00	8.57 E+00
		La-140	*-5.26 E-01	3.43 E+00
		Ra-226	* 8.19 E+01	4.20 E+01
		Th-228	* 1.51 E+01	3.76 E+00
	870513 to 870610	(a)		

* Denotes a result less than the detection limit.
(a) Plant maintenance outage; sample not available.

TABLE A-7.1 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
		Discharge		
27	870610 to 870715	Be-7	* 0.00 E-01	2.29 E+01
		K-40	* 1.09 E+02	2.60 E+01
		Mn-54	* 2.50 E+00	2.25 E+00
		Co-58	* 3.48 E+00	2.43 E+00
		Fe-59	* 9.45 E-01	4.36 E+00
		Co-60	1.05 E+01	3.10 E+00
		Zn-65	8.67 E+01	1.31 E+01
		Zr-95	* 2.89 E+00	4.72 E+00
		Nb-95	*-7.06 E-01	2.31 E+00
		Cs-134	* 6.09 E-01	2.41 E+00
		Cs-137	* 1.20 E+00	2.37 E+00
		Ba-140	* 5.02 E+00	1.05 E+01
		La-140	*-2.01 E+00	3.85 E+00
		Ra-226	* 8.93 E+01	5.44 E+01
		Th-228	* 1.07 E+01	4.53 E+00
	870715 to 870811	Be-7	*-2.38 E+00	2.00 E+01
		K-40	* 1.33 E+02	2.96 E+01
		Mn-54	* 5.63 E-01	2.07 E+00
		Co-58	* 4.38 E-01	2.09 E+00
		Fe-59	* 3.24 E+00	4.30 E+00
		Co-60	* 1.21 E+00	2.14 E+00
		Zn-65	* 4.04 E+00	4.77 E+00
		Zr-95	* 2.73 E-01	4.18 E+00
		Nb-95	*-2.82 E-01	2.07 E+00
		Cs-134	*-1.30 E+00	2.19 E+00
		Cs-137	* 6.46 E-01	2.09 E+00
		Ba-140	*-4.15 E-01	7.76 E+00
		La-140	*-1.89 E+00	3.25 E+00
		Ra-226	* 2.05 E+02	5.39 E+01
		Th-228	* 1.59 E+01	4.38 E+00
	870812 to 870916	Be-7	*-1.09 E+00	2.06 E+01
		K-40	* 6.79 E+01	2.65 E+01
		Mn-54	*-2.04 E+00	2.07 E+00
		Co-58	* 1.22 E+00	2.11 E+00
		Fe-59	*-1.20 E+00	4.49 E+00
		Co-60	* 9.31 E-01	2.15 E+00
		Zn-65	* 2.06 E+00	4.59 E+00
		Zr-95	*-6.38 E-01	4.14 E+00
		Nb-95	* 1.32 E+00	2.09 E+00
		Cs-134	* 1.00 E+00	2.31 E+00
		Cs-137	*-1.56 E-01	2.50 E+00
		Ba-140	*-7.28 E-01	8.14 E+00
		La-140	* 0.00 E-01	3.67 E+00
		Ra-226	* 1.16 E+02	5.61 E+01
		Th-228	* 1.31 E+01	4.45 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	870916 to 871021	Be-7	*-1.62 E+01	2.38 E+01
		K-40	* 9.87 E+01	2.93 E+01
		Mn-54	*-7.44 E-02	2.18 E+00
		Co-58	* 7.84 E-01	2.28 E+00
		Fe-59	*-1.83 E+00	4.41 E+00
		Co-60	*-1.04 E+01	2.21 E+00
		Zn-65	* 5.87 E+00	4.97 E+00
		Zr-95	*-1.47 E-01	4.75 E+00
		Nb-95	* 2.78 E+00	2.32 E+00
		Cs-134	*-8.07 E-02	2.29 E+00
		Cs-137	* 1.80 E+00	2.39 E+00
		Ba-140	* 0.00 E-01	9.28 E+00
		La-140	* 0.00 E-01	3.27 E+00
		Ra-226	* 8.39 E+01	5.75 E+01
		Th-228	* 1.47 E+01	4.71 E+00
	871021 to 871119	Be-7	*-6.85 E+00	1.81 E+01
		K-40	* 1.18 E+02	2.41 E+01
		Mn-54	*-2.99 E-01	1.67 E+00
		Co-58	* 5.17 E-01	1.72 E+00
		Fe-59	*-4.77 E-01	3.61 E+00
		Co-60	* 0.00 E-01	1.89 E+00
		Zn-65	* 7.35 E-01	3.55 E+00
		Zr-95	* 1.35 E+00	3.71 E+00
		Nb-95	* 1.93 E+00	1.89 E+00
		Cs-134	*-1.62 E-01	1.85 E+00
		Cs-137	* 9.66 E-02	1.88 E+00
		Ba-140	* 1.49 E-01	7.06 E+00
		La-140	* 5.96 E-01	2.64 E+00
		Ra-226	* 1.03 E+02	4.77 E+01
		Th-228	* 1.40 E+01	3.89 E+00
	871119 to 871216	Be-7	* 5.91 E+00	1.78 E+01
		K-40	* 7.82 E+01	2.68 E+01
		Mn-54	*-7.22 E-02	1.72 E+00
		Co-58	*-1.42 E+00	1.74 E+00
		Fe-59	* 0.00 E-01	3.62 E+00
		Co-60	* 1.52 E+00	1.91 E+00
		Zn-65	* 4.46 E+00	4.20 E+00
		Zr-95	* 3.01 E+00	3.92 E+00
		Nb-95	* 1.98 E+00	1.81 E+00
		Cs-134	* 1.17 E+00	2.02 E+00
		Cs-137	* 3.41 E+00	2.06 E+00
		Ba-140	*-3.00 E+00	6.48 E+00
		La-140	* 1.70 E+00	3.04 E+00
		Ra-226	* 9.02 E+01	4.77 E+01
		Th-228	* 1.22 E+01	3.75 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		
72	861217 to 870121	Be-7	* 1.10 E+01	2.30 E+01
		K-40	* 1.00 E+02	3.00 E+01
		Mn-54	* 1.50 E-01	2.23 E+00
		Co-58	* 1.60 E-01	2.26 E+00
		Fe-59	* 0.00 E+00	4.70 E+00
		Co-60	* 2.10 E+00	2.10 E+00
		Zn-65	*-2.10 E+00	4.70 E+00
		Zr-95	* 2.10 E+00	4.80 E+00
		Nb-95	* 7.80 E-02	2.51 E+00
		Cs-134	*-7.30 E-01	2.47 E+00
		Cs-137	* 4.00 E-01	2.27 E+00
		Ba-140	*-2.90 E+00	9.50 E+00
		La-140	* 1.50 E+00	4.40 E+00
		Ra-226	* 9.26 E+01	5.14 E+01
		Th-228	* 1.04 E+01	4.46 E+00
	870121 to 870218	Be-7	*-1.60 E+00	2.40 E+01
		K-40	* 5.40 E+01	2.40 E+01
		Mn-54	* 1.50 E-01	2.30 E+00
		Co-58	*-5.70 E-01	2.40 E+00
		Fe-59	* 2.70 E+00	4.80 E+00
		Co-60	* 8.60 E-01	2.40 E+00
		Zn-65	*-1.40 E+00	5.00 E+00
		Zr-95	*-1.70 E+00	5.00 E+00
		Nb-95	*-1.70 E+00	2.60 E+00
		Cs-134	*-3.10 E+00	2.70 E+00
		Cs-137	* 3.10 E+00	2.40 E+00
		Ba-140	* 4.90 E+00	1.20 E+01
		La-140	*-3.80 E+00	5.00 E+00
		Ra-226	* 9.74 E+01	4.49 E+01
		Th-228	* 1.55 E+01	4.11 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		
72	870218 to 870318	Be-7	* 8.20 E+00	2.40 E+01
		K-40	* 9.10 E+01	2.60 E+01
		Mn-54	* 1.90 E+00	2.10 E+00
		Co-58	* 3.30 E+00	2.30 E+00
		Fe-59	* 4.50 E+00	4.50 E+00
		Co-60	* 8.80 E-01	2.10 E+00
		Zn-65	* 1.10 E+01	5.50 E+00
		Zr-95	* 1.30 E+00	4.50 E+00
		Nb-95	* 0.00 E+00	2.30 E+00
		Cs-134	* 2.80 E+00	2.30 E+00
		Cs-137	* 1.50 E+00	2.30 E+00
		Ba-140	* 1.20 E+01	9.60 E+00
		La-140	* 0.00 E+00	3.20 E+00
		Ra-226	* 1.27 E+02	5.61 E+01
		Th-228	* 1.15 E+01	4.79 E+00
	870318 to 870415	Be-7	* 1.72 E+01	2.17 E+01
		K-40	* 1.22 E+02	2.85 E+01
		Mn-54	* 1.61 E+00	2.15 E+00
		Co-58	* 9.32 E-01	2.25 E+00
		Fe-59	* 4.91 E+00	4.56 E+00
		Co-60	* 9.01 E-01	2.25 E+00
		Zn-65	*-4.87 E+00	4.72 E+00
		Zr-95	* 4.64 E+00	4.67 E+00
		Nb-95	* 1.52 E-01	2.39 E+00
		Cs-134	*-7.15 E-01	2.29 E+00
		Cs-137	* 1.11 E+00	2.18 E+00
		Ba-140	* 2.87 E+00	9.73 E+00
		La-140	* 4.26 E-01	3.75 E+00
		Ra-226	* 9.11 E+01	4.83 E+01
		Th-228	* 1.60 E+01	4.45 E+00
	870415 to 870513	(a)		
	870513 to 870610	(b)		

* Denotes a result less than the detection limit.
(a) Sample not collected.
(b) Plant maintenance outage; sample not available.

TABLE A-7.1 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
		Ground		
31 (Well 1)	870318	Be-7	* 5.70 E+00	2.10 E+01
		K-40	* 9.70 E+01	2.80 E+01
		Mn-54	* 1.70 E-01	2.00 E+00
		Co-58	* 4.30 E-01	2.20 E+00
		Fe-59	* 2.50 E+00	4.40 E+01
		Co-60	* 1.80 E+00	2.30 E+00
		Zn-65	*-3.40 E+00	4.70 E+00
		Zr-95	* 9.60 E-01	4.40 E+00
		Nb-95	* 3.10 E+00	2.40 E+00
		Cs-134	* 9.90 E-01	2.30 E+00
		Cs-137	* 2.30 E+00	2.30 E+00
		Ba-140	*-5.20 E+00	7.80 E+00
		La-140	*-1.40 E+00	3.10 E+00
		Ra-226	* 9.08 E+01	5.42 E+01
		Th-228	* 1.77 E+01	4.44 E+00
	870609	Be-7	*-1.45 E+00	2.17 E+01
		K-40	* 5.83 E+01	2.48 E+01
		Mn-54	* 1.26 E+00	2.14 E+00
		Co-58	*-1.93 E+00	2.17 E+00
		Fe-59	* 2.64 E+00	4.48 E+00
		Co-60	* 2.27 E+00	2.27 E+00
		Zn-65	*-2.12 E+00	4.47 E+00
		Zr-95	* 4.18 E-01	4.68 E+00
		Nb-95	* 7.25 E-01	2.38 E+00
		Cs-134	*-2.43 E+00	2.56 E+00
		Cs-137	* 1.22 E+00	2.27 E+00
		Ba-140	* 1.03 E+01	9.97 E+00
		La-140	* 1.46 E+00	4.07 E+00
		Ra-226	* 1.14 E+02	4.37 E+01
		Th-228	* 1.20 E+01	3.79 E+00

* Denotes a result less than the detection limits.

TABLE A-7.1 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
		Ground		
31 (Well 1)	870916	Be-7	* 1.52 E+01	1.92 E+01
		K-40	* 9.03 E+01	2.46 E+01
		Mn-54	*-6.93 E-01	1.89 E+00
		Co-58	*-2.26 E-01	1.85 E+00
		Fe-59	* 2.05 E+00	3.94 E+00
		Co-60	*-1.55 E-01	1.89 E+00
		Zn-65	* 0.00 E-01	4.17 E+00
		Zr-95	* 2.74 E+00	3.92 E+00
		Nb-95	* 1.69 E+00	2.07 E+00
		Cs-134	*-2.88 E-01	2.02 E+00
		Cs-137	* 3.17 E+00	2.01 E+00
		Ba-140	*-1.62 E+00	8.36 E+00
		La-140	*-3.16 E-01	3.41 E+00
		Ra-226	* 1.17 E+02	4.12 E+01
		Th-228	* 1.52 E+01	3.66 E+00
	871216	Be-7	* 3.84 E+00	1.78 E+00
		K-40	* 9.46 E+01	2.51 E+01
		Mn-54	*-2.44 E-01	1.85 E+00
		Co-58	*-1.20 E+00	1.91 E+00
		Fe-59	* 1.85 E+00	3.93 E+00
		Co-60	* 2.03 E+00	2.10 E+00
		Zn-65	* 1.26 E+00	4.25 E+00
		Zr-95	* 4.07 E+00	4.11 E+00
		Nb-95	* 1.20 E+00	2.00 E+00
		Cs-134	* 5.90 E-01	2.02 E+00
		Cs-137	* 3.43 E+00	2.21 E+00
		Ba-140	* 5.12 E+00	7.55 E+00
		La-140	* 1.70 E-01	3.02 E+00
		Ra-226	* 1.01 E+02	4.06 E+01
		Th-228	* 1.36 E+01	3.44 E+00

* Denotes a result less than the detection limits.

TABLE A-7.1 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
		Ground		
32 (Well 2)	870318	Be-7	*-3.90 E+00	2.30 E+01
		K-40	* 1.20 E+02	3.00 E+01
		Mn-54	* 3.10 E-01	2.40 E+00
		Co-58	* 1.10 E+00	2.40 E+00
		Fe-59	*-1.80 E-01	4.90 E+00
		Co-60	*-3.20 E-01	2.50 E+00
		Zn-65	*-5.40 E+00	5.40 E+00
		Zr-95	* 5.30 E+00	5.20 E+00
		Nb-95	* 3.60 E+00	2.70 E+00
		Cs-134	* 2.10 E+00	2.60 E+00
		Cs-137	* 2.40 E+00	2.40 E+00
		Ba-140	*-3.70 E+00	8.70 E+00
		La-140	* 3.90 E-01	3.80 E+00
		Ra-226	* 6.60 E+01	5.32 E+01
		Th-228	* 2.05 E+01	4.99 E+00
	870609	Be-7	* 6.87 E+00	2.36 E+01
		K-40	* 1.39 E+02	2.95 E+01
		Mn-54	* 2.23 E-01	2.03 E+00
		Co-58	* 1.19 E+00	2.13 E+00
		Fe-59	*-1.11 E+00	4.42 E+00
		Co-60	* 3.31 E+00	2.15 E+00
		Zn-65	*-7.34 E-01	4.59 E+00
		Zr-95	* 2.67 E+00	4.74 E+00
		Nb-95	* 3.26 E+00	2.32 E+00
		Cs-134	*-2.42 E-01	2.43 E+00
		Cs-137	* 4.88 E+00	2.54 E+00
		Ba-140	*-5.45 E+00	9.87 E+00
		La-140	*-1.66 E+00	3.85 E+00
		Ra-226	* 7.32 E+01	5.77 E+01
		Th-228	* 1.24 E+01	4.85 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 DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
32 (Well 2)	870916	Ground		
		Be-7	*-7.07 E+00	2.06 E+01
		K-40	* 1.29 E+02	2.60 E+01
		Mn-54	* 4.68 E-01	1.88 E+00
		Co-58	*-1.93 E+00	1.96 E+00
		Fe-59	* 3.20 E+00	3.92 E+00
		Co-60	* 2.52 E+00	1.77 E+00
		Zn-65	* 2.02 E+00	4.06 E+00
		Zr-95	* 2.68 E+00	4.21 E+00
		Nb-95	* 6.55 E-01	2.12 E+00
		Cs-134	* 1.08 E+00	2.10 E+00
		Cs-137	*-1.13 E-01	2.14 E+00
		Ba-140	* 0.00 E-01	8.71 E+00
		La-140	* 0.00 E-01	3.23 E+00
		Ra-226	* 1.22 E+02	5.22 E+01
		Th-228	* 1.39 E+01	4.31 E+00
	871216	Be-7	* 0.00 E-01	1.91 E+0[illegible]
		K-40	* 1.22 E+02	2.91 E+[illegible]
		Mn-54	* 4.69 E-01	1.91 E+00
		Co-58	*-1.39 E-01	2.00 E+00
		Fe-59	* 8.41 E-01	4.19 E+00
		Co-60	* 0.00 E-01	2.24 E+00
		Zn-65	* 3.77 E+00	4.73 E+00
		Zr-95	* 0.00 E-01	3.95 E+00
		Nb-95	* 1.19 E+00	2.06 E+00
		Cs-134	*-1.44 E-01	2.09 E+00
		Cs-137	*-1.39 E+00	2.00 E+00
		Ba-140	*-9.86 E-01	7.60 E+00
		La-140	*-1.09 E+00	3.34 E+00
		Ra-226	* 7.07 E+01	4.68 E+01
		Th-228	* 1.52 E+01	3.97 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 DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
		Ground		
52 (Well 3)	870318	Be-7	* 1.80 E+00	3.00 E+01
		K-40	* 9.90 E+02	6.50 E+01
		Mn-54	* 9.90 E-01	2.90 E+00
		Co-58	*-2.20 E+00	2.90 E+00
		Fe-59	*-1.40 E+00	6.30 E+00
		Co-60	*-4.60 E-01	2.90 E+00
		Zn-65	* 8.10 E-01	6.70 E+00
		Zr-95	* 8.90 E+00	6.70 E+00
		Nb-95	* 2.70 E+00	3.00 E+00
		Cs-134	* 0.00 E+00	3.20 E+00
		Cs-137	* 2.20 E+00	3.10 E+00
		Ba-140	*-1.20 E+00	1.20 E+01
		La-140	*-2.80 E+00	4.30 E+00
		Ra-226	* 8.34 E+01	6.66 E+01
		Th-228	* 1.88 E+01	5.60 E+00
	870609	Be-7	* 9.94 E+00	2.08 E+01
		K-40	* 8.67 E+01	2.32 E+01
		Mn-54	*-6.45 E-01	1.81 E+00
		Co-58	*-6.29 E-01	1.92 E+00
		Fe-59	* 1.17 E+00	3.78 E+00
		Co-60	*-1.60 E+00	1.81 E+00
		Zn-65	*-3.87 E+00	3.84 E+00
		Zr-95	*-2.02 E+00	4.05 E+00
		Nb-95	* 1.16 E+00	1.98 E+00
		Cs-134	* 7.01 E-01	2.02 E+00
		Cs-137	* 1.13 E+00	1.97 E+00
		Ba-140	*-2.01 E+00	9.18 E+00
		La-140	*-8.45 E-01	3.43 E+00
		Ra-226	* 1.31 E+02	5.01 E+01
		Th-228	* 6.67 E+00	4.19 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 DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
		Ground		
52 (Well 3)	870916	Be-7	*-1.50 E+01	2.86 E+01
		K-40	* 2.97 E+02	3.59 E+01
		Mn-54	* 1.48 E+00	2.56 E+00
		Co-58	*-1.90 E+00	2.00 E+00
		Fe-59	* 1.91 E+00	5.47 E+00
		Co-60	* 4.64 E+00	2.59 E+00
		Zn-65	*-1.35 E+00	5.59 E+00
		Zr-95	* 5.72 E+00	5.66 E+00
		Nb-95	* 3.02 E+00	2.89 E+00
		Cs-134	* 4.30 E+00	3.07 E+00
		Cs-137	* 4.93 E-02	2.87 E+00
		Ba-140	*-2.92 E+00	1.25 E+01
		La-140	* 5.81 E+00	4.43 E+00
		Ra-226	* 1.78 E+02	6.63 E+01
		Th-228	* 8.18 E+01	6.16 E+0[illegible]
	871216	Be-7	* 2.88 E+00	2.73 E+01
		K-40	* 2.82 E+02	3.85 E+01
		Mn-54	* 3.80 E-01	2.55 E+00
		Co-58	* 1.39 E+00	2.92 E+00
		Fe-59	*-2.22 E+00	5.53 E+00
		Co-60	* 6.64 E+00	2.93 E+00
		Zn-65	*-2.74 E+00	5.88 E+00
		Zr-95	* 5.24 E+00	5.95 E+00
		Nb-95	* 2.95 E+00	3.00 E+00
		Cs-134	* 3.76 E+00	2.95 E+00
		Cs-137	* 1.26 E+00	3.04 E+00
		Ba-140	* 2.27 E+00	1.12 E+01
		La-140	*-5.50 E+00	4.02 E+00
		Ra-226	* 1.28 E+02	6.08 E+01
		Th-228	* 7.11 E+01	6.04 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)	2.11 E+00	-1.10 E+00	7.11 E+00	24	0
Co-60 (C)	9.60 E-01	-8.82 E-01	3.00 E+00	12	0
Co-58 (I)	-2.40 E-01	-2.08 E+00	2.74 E+00	24	0
Co-58 (C)	-2.96 E-01	-8.56 E-01	9.00 E-01	12	0
Cs-134 (I)	6.90 E-01	-3.60 E+00	5.00 E+00	24	0
Cs-134 (C)	2.00 E-02	-2.30 E+00	1.30 E+00	12	0
Cs-137 (I)	1.29 E+00	-1.69 E+00	4.83 E+00	24	0
Cs-137 (C)	1.59 E+00	-9.00 E-01	3.74 E+00	12	0
Nb-95 (I)	1.39 E+00	-1.60 E+00	5.97 E+00	24	0
Nb-95 (C)	9.30 E-01	-3.10 E-01	2.94 E+00	12	0
Zr-95 (I)	5.80 E-01	-5.46 E+00	7.20 E+00	24	0
Zr-95 (C)	1.09 E+00	-1.60 E+00	5.60 E+00	12	0
Zn-65 (I)	-2.43 E+00	-1.04 E+01	2.20 E+00	24	0
Zn-65 (C)	-1.88 E+00	-9.19 E+00	2.80 E+00	12	0
Fe-59 (I)	1.15 E+00	-4.32 E+00	4.60 E+00	24	0
Fe-59 (C)	3.10 E-01	-3.65 E+00	3.40 E+00	12	0
Ba-140 (I)	1.80 E-01	-5.70 E+00	1.00 E+01	24	0
Ba-140 (C)	-3.80 E-01	-6.60 E+00	7.20 E+01	12	0
La-140 (I)	-5.20 E-01	-3.80 E+00	2.70 E+00	24	0
La-140 (C)	-3.40 E-01	-4.20 E+00	3.90 E+00	12	0

(I) Indicator
(C) Control

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)	2.67 E+00	-1.00 E-01	1.05 E+01	11	1
Co-58 (I)	7.18 E-01	-1.64 E+00	4.58 E+00	11	0
Cs-134 (I)	3.00 E-01	-3.00 E+00	2.60 E+00	11	0
Cs-137 (I)	1.94 E+00	-1.56 E-01	5.60 E+00	11	0
Nb-95 (I)	1.26 E+00	-7.06 E-01	2.78 E+00	11	0
Zr-95 (I)	1.74 E+00	-6.38 E-01	3.20 E+00	11	0
Zn-65 (I)	1.23 E+01	-6.93 E-01	8.67 E+01	11	2
Fe-59 (I)	-3.75 E-02	-3.60 E+00	3.24 E+00	11	0
Ba-140 (I)	-9.00 E-02	-4.60 E+00	1.00 E+01	11	0
La-140 (I)	1.10 E-01	-2.00 E+00	2.20 E+00	11	0

(I) Indicator Station
(a) Indicator Stations only

TABLE A-7.2 (Cont.)

GAMMA SPECTROMETRY OF WATER - SUMMARY

Results in pCi/liter

NUCLIDE	AVERAGE	LOW	HIGH	NUMBER SAMPLES	NUMBER POSITIVE
		Ground[a]			
Co-60 (I)	1.72 E+00	-1.60 E+00	6.64 E+00	12	0
Co-58 (I)	-2.60 E-01	-2.20 E+00	1.39 E+00	12	0
Cs-134 (I)	8.80 E-01	-2.40 E+00	4.30 E+00	12	0
Cs-137 (I)	1.71 E+00	-1.39 E+00	4.88 E+00	12	0
Nb-95 (I)	2.10 E+00	6.55 E-01	3.60 E+00	12	0
Zr-95 (I)	3.06 E+00	-2.02 E+00	8.90 E+00	12	0
Zn-65 (I)	-9.80 E-01	-5.40 E+00	3.77 E+00	12	0
Fe-59 (I)	9.38 E-01	-2.22 E+00	3.20 E+00	12	0
Ba-140 (I)	-4.70 E-01	-5.50 E+00	1.00 E+01	12	0
La-140 (I)	-4.80 E-01	-5.50 E+00	5.80 E+00	12	0

(I) Indicator Station
(a) Indicator Stations only

TABLE A-8.1

STRONTIUM IN WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
		River/Drinking (a)		
29	861217 to 870121	Sr-89	*-1.40 E-01	1.77 E+00
		Sr-90	* 6.50 E-01	6.05 E-01
	870121 to 870218	Sr-89	* 1.10 E+00	2.09 E+00
		Sr-90	* 2.50 E-01	4.43 E-01
		Discharge (a)		
27	861217 to 870121	Sr-89	*-6.60 E-01	.2.72 E+00
		Sr-90	* 1.10 E+00	7.50 E-01
	870121 to 870218	Sr-89	*-2.70 E-01	2.48 E+00
		Sr-90	* 4.70 E-01	5.68 E-01

* Denotes a result less than the detection limit.
(a) Indicator Station only.

TABLE A-8.2

STRONTIUM IN WATER - SUMMARY

Results in pCi/liter

NUCLIDE		AVERAGE	LOW	HIGH	NUMBER SAMPLES	NUMBER POSITIVE
			River/Drinking			
Sr-89	(I)	4.80 E-01	-1.40 E-01	1.10 E+00	2	0
Sr-90	(I)	4.50 E-01	2.50 E-01	6.50 E-01	2	0
			Discharge			
Sr-89	(I)	-4.65 E-01	-6.60 E-01	-2.70 E-01	2	0
Sr-90	(I)	7.85 E-01	4.70 E-01	1.10 E+00	2	0

(I) Indicator Station

TABLE A-9.1

GAMMA SPECTROMETRY OF SOIL

Results in pCi/kilogram

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
1	870520	K-40	1.35 E+04	3.06 E+02
		Cs-134	* 3.62 E+01	8.64 E+00
		Cs-137	1.15 E+02	1.38 E+01
		Ra-226	8.18 E+02	2.00 E+02
		Th-228	5.90 E+02	1.74 E+01
7	870520	K-40	1.38 E+04	3.87 E+02
		Cs-134	* 3.53 E+01	1.39 E+01
		Cs-137	4.70 E+02	2.44 E+02
		Ra-226	8.43 E+02	2.89 E+02
		Th-228	7.12 E+02	2.55 E+01
9	870520	K-40	1.70 E+04	4.36 E+02
		Cs-134	* 3.91 E+01	1.22 E+01
		Cs-137	* 5.55 E+01	1.27 E+01
		Ra-226	9.01 E+02	2.68 E+02
		Th-228	5.70 E+02	2.20 E+01
21	870520	K-40	1.01 E+04	2.81 E+02
		Cs-134	* 2.15 E+01	8.14 E+00
		Cs-137	1.21 E+02	1.42 E+01
		Ra-226	7.10 E+02	2.29 E+02
		Th-228	5.54 E+02	1.90 E+01
23	870520	K-40	1.53 E+04	3.75 E+02
		Cs-134	* 4.48 E+01	1.22 E+01
		Cs-137	3.23 E+02	2.18 E+01
		Ra-226	7.64 E+02	2.04 E+02
		Th-228	7.86 E+02	3.76 E+01

* Denotes a result less than the detection limit.

TABLE A-9.2

GAMMA SPECTROMETRY OF SOIL - SUMMARY

Results in pCi/kilogram

NUCLIDE		AVERAGE	LOW	HIGH	NUMBER SAMPLES	NUMBER POSITIVE
K-40	(I)	1.32 E+04	1.01 E+04	1.53 E+04	4	4
K-40	(C)	1.70 E+04	1.70 E+04	1.70 E+04	1	1
Cs-134	(I)	3.54 E+01	2.15 E+01	4.48 E+01	4	0
Cs-134	(C)	3.91 E+01	3.91 E+01	3.91 E+01	1	0
Cs-137	(I)	2.57 E+02	1.15 E+02	4.70 E+01	4	0
Cs-137	(C)	5.55 E+01	5.55 E+01	5.55 E+01	1	0
Ra-226	(I)	7.84 E+02	7.10 E+02	8.43 E+02	4	4
Ra-226	(C)	9.01 E+02	9.01 E+02	9.01 E+02	1	1
Th-228	(I)	4.59 E+02	5.54 E+02	7.86 E+02	4	4
Th-228	(C)	5.70 E+02	5.70 E+02	5.70 E+02	1	1

(I) Indicator Station
(C) Control Station

TABLE A-10.1

GAMMA SPECTROMETRY OF SEDIMENT

Results in pCi/kilogram

LOCATION	COLLECTION DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
33 (Upstream)	870409	K-40	1.36 E+04	3.73 E+02
		Co-60	2.61 E+01	1.36 E+01
		Cs-134	* 8.75 E+01	1.31 E+01
		Cs-137	1.28 E+02	2.01 E+01
		Ra-226	1.73 E+03	3.24 E+02
		Eu-152	* 1.40 E+02	3.04 E+01
		Th-228	1.41 E+03	2.73 E+01
33	871014	K-40	1.34 E+04	3.53 E+02
		Co-60	3.62 E+01	1.70 E+01
		Cs-134	* 5.84 E+01	1.37 E+01
		Cs-137	1.37 E+02	1.27 E+01
		Ra-226	1.52 E+03	3.01 E+02
		Eu-152	* 9.15 E+01	5.68 E+01
		Th-228	1.06 E+03	2.70 E+01
34 (Downstream)	870409	K-40	1.46 E+04	3.44 E+02
		Co-60	5.46 E+01	1.78 E+01
		Cs-134	* 3.18 E+01	9.96 E+00
		Cs-137	3.39 E+02	1.95 E+01
		Ra-226	1.10 E+03	2.71 E+02
		Eu-152	1.40 E+02	3.04 E+01
		Th-228	7.72 E+02	2.24 E+01
34	871014	K-40	1.30 E+04	3.37 E+02
		Co-60	2.85 E+01	1.15 E+01
		Cs-134	* 1.44 E+01	1.16 E+01
		Cs-137	2.22 E+02	2.11 E+01
		Ra-226	1.90 E+03	3.39 E+02
		Eu-152	* 1.46 E+02	5.71 E+01
		Th-228	2.20 E+03	4.60 E+01

* Denotes a result less than the detection limit.

TABLE 10.2

GAMMA SPECTROMETRY OF SEDIMENT - SUMMARY

Results in pCi/kilogram

NUCLIDE		AVERAGE	LOW	HIGH	NUMBER SAMPLES	NUMBER POSITIVE
K-40	(I)	1.38 E+04	1.30 E+04	1.46 E+04	2	2
K-40	(C)	1.35 E+04	1.34 E+04	1.36 E+04	2	2
Co-60	(I)	4.16 E+01	2.85 E+01	5.46 E+01	2	2
Co-60	(C)	3.12 E+01	2.61 E+01	3.62 E+01	2	2
Cs-134	(I)	2.31 E+01	1.44 E+01	3.18 E+01	2	0
Cs-134	(C)	7.30 E+01	5.84 E+01	8.75 E+01	2	0
Cs-137	(I)	2.81 E+02	2.22 E+02	3.39 E+02	2	2
Cs-137	(C)	1.33 E+02	1.28 E+02	1.37 E+02	2	2
Ra-226	(I)	1.50 E+03	1.10 E+03	1.90 E+03	2	2
Ra-226	(C)	1.63 E+03	1.52 E+03	1.73 E+03	2	2
Eu-152	(I)	1.43 E+02	1.40 E+02	1.46 E+02	2	1
Eu-152	(C)	1.16 E+02	9.15 E+01	1.40 E+02	2	0
Th-228	(I)	1.49 E+03	7.72 E+02	2.20 E+03	2	2
Th-228	(C)	1.24 E+03	1.06 E+03	1.41 E+03	2	2

(I) Indicator Station
(C) Control Station

TABLE A-11.1

GAMMA SPECTROMETRY OF FISH

Results in pCi/kilogram (wet)

LOCATION	COLLECTION DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
30 Carp	870511	K-40	3.01 E+03	1.28 E+02
		Mn-54	* 0.00 E-01	3.13 E+00
		Co-58	* 3.42 E-01	3.88 E+00
		Fe-59	* 2.06 E+00	1.06 E+01
		Co-60	* 1.60 E+00	3.62 E+00
		Zn-65	*-5.97 E+00	8.83 E+00
		Cs-134	* 5.03 E+00	3.50 E+00
		Cs-137	* 1.28 E+01	3.85 E+00
		Ra-226	* 1.67 E+02	7.44 E+01
		Th-228	* 1.81 E+01	6.52 E+00
Sucker	870511	K-40	3.46 E+03	1.23 E+02
		Mn-54	* 0.00 E-01	2.73 E+00
		Co-58	* 1.13 E+00	3.32 E+00
		Fe-59	* 6.95 E+00	9.78 E+00
		Co-60	* 2.63 E+00	3.21 E+00
		Zn-65	*-3.49 E+00	7.96 E+00
		Cs-134	* 1.14 E+00	3.16 E+00
		Cs-137	2.98 E+01	4.87 E+00
		Ra-226	* 2.14 E+02	6.00 E+01
		Th-228	* 2.14 E+01	5.22 E+00
White Fish	870511	K-40	3.45 E+03	1.51 E+02
		Mn-54	* 0.00 E-01	5.56 E+00
		Co-58	* 5.40 E-01	6.83 E+00
		Fe-59	* 9.70 E+00	1.66 E+01
		Co-60	*-4.32 E+00	5.51 E+00
		Zn-65	*-1.76 E+01	1.44 E+01
		Cs-134	* 6.68 E+00	6.53 E+00
		Cs-137	1.59 E+01	8.55 E+00
		Ra-226	* 3.55 E+02	1.34 E+02
		Th-228	* 8.10 E+01	1.14 E+01
Chinook	870511	K-40	3.41 E+03	1.23 E+02
		Mn-54	* 2.19 E-01	3.72 E+00
		Co-58	* 5.36 E-01	4.41 E+00
		Fe-59	*-2.33 E-01	1.24 E+01
		Co-60	*-1.37 E+00	3.65 E+00
		Zn-65	*-9.66 E+00	9.37 E+00
		Cs-134	* 1.40 E+00	4.04 E+00
		Cs-137	1.28 E+01	5.03 E+00
		Ra-226	* 2.46 E+02	7.67 E+01
		Th-228	* 2.36 E+01	6.32 E+00

* Denotes a result less than the detection limit.

TABLE A-11.1 (Cont.)

GAMMA SPECTROMETRY OF FISH

Results in pCi/kilogram (wet)

LOCATION	COLLECTION DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
30 White Fish	870915	K-40	3.74 E+03	1.58 E+02
		Mn-54	* 2.39 E+00	3.97 E+00
		Co-58	*-3.75 E+00	4.56 E+00
		Fe-59	*-2.19 E+00	1.24 E+01
		Co-60	* 2.98 E+00	4.56 E+00
		Zn-65	* 7.58 E+00	1.08 E+01
		Cs-134	* 4.18 E+00	4.76 E+00
		Cs-137	2.77 E+01	7.42 E+00
		Ra-226	* 1.07 E+02	7.85 E+01
		Th-228	* 1.90 E+01	6.97 E+00
Carp	870915	K-40	2.87 E+03	1.32 E+02
		Mn-54	*-1.75 E+00	3.54 E+00
		Co-58	*-8.97 E-01	4.06 E+00
		Fe-59	*-3.89 E+00	1.08 E+01
		Co-60	* 3.93 E+00	3.85 E+00
		Zn-65	*-4.08 E+00	9.57 E+00
		Cs-134	* 1.78 E+00	3.87 E+00
		Cs-137	8.55 E+00	4.87 E+00
		Ra-226	* 7.69 E+01	6.87 E+01
		Th-228	* 9.75 E+00	5.99 E+00
Sucker	870914	K-40	3.44 E+03	1.46 E+02
		Mn-54	* 2.30 E+00	5.32 E+00
		Co-58	* 1.22 E-01	6.03 E+00
		Fe-59	*-6.01 E-01	1.46 E+01
		Co-60	* 5.54 E-01	5.11 E+00
		Zn-65	*-7.17 E+00	1.31 E+01
		Cs-134	* 7.42 E+00	6.06 E+00
		Cs-137	3.18 E+01	8.43 E+00
		Ra-226	* 1.39 E+02	1.26 E+02
		Th-228	* 3.82 E+01	1.04 E+01
Sturgeon	870912	K-40	3.29 E+03	1.80 E+02
		Mn-54	*-1.52 E+00	6.36 E+00
		Co-58	* 2.79 E+00	7.52 E+00
		Fe-59	*-2.15 E+01	1.85 E+01
		Co-60	* 0.00 E-01	6.46 E+00
		Zn-65	*-4.94 E+00	1.64 E+01
		Cs-134	* 4.56 E+00	6.90 E+00
		Cs-137	3.42 E+01	9.81 E+00
		Ra-226	* 1.23 E+02	1.33 E+02
		Th-228	* 3.80 E+01	1.14 E+01

* Denotes a result less than the detection limit.

TABLE A-11.1 (Cont.)

GAMMA SPECTROMETRY OF FISH

Results in pCi/kilogram (wet)

LOCATION	COLLECTION DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
38 Chinook	870518	K-40	3.36 E+03	1.28 E+02
		Mn-54	*-1.08 E+00	3.14 E+00
		Co-58	* 2.08 E-01	3.40 E+00
		Fe-59	* 1.29 E+00	9.03 E+00
		Co-60	* 5.89 E+00	3.44 E+00
		Zn-65	*-1.26 E+01	8.27 E+00
		Cs-134	*-5.70 E-01	3.19 E+00
		Cs-137	1.57 E+01	4.95 E+00
		Ra-226	* 1.10 E+02	6.45 E+01
		Th-228	* 1.96 E+01	5.44 E+00
Carp	870518	K-40	2.86 E+03	1.31 E+02
		Mn-54	*-7.76 E-01	3.39 E+00
		Co-58	* 0.00 E-01	3.81 E+00
		Fe-59	* 3.40 E+00	1.02 E+01
		Co-60	*-1.30 E-01	3.49 E+00
		Zn-65	*-1.91 E+00	8.96 E+00
		Cs-134	*-1.04 E+00	3.64 E+00
		Cs-137	9.56 E+00	4.86 E+00
		Ra-226	* 1.23 E+02	7.66 E+01
		Th-228	* 1.02 E+01	6.47 E+00
Sucker	870518	K-40	3.62 E+03	1.31 E+02
		Mn-54	* 2.51 E+00	2.87 E+00
		Co-58	*-1.89 E-01	3.22 E+00
		Fe-59	* 2.42 E+00	9.14 E+00
		Co-60	* 1.24 E+00	3.15 E+00
		Zn-65	*-5.11 E+00	7.87 E+00
		Cs-134	* 3.37 E+00	3.17 E+00
		Cs-137	1.94 E+01	5.37 E+00
		Ra-226	* 2.84 E+02	6.45 E+01
		Th-228	* 1.73 E+01	5.29 E+00
Squaw	870528	K-40	3.63 E+03	1.56 E+02
		Mn-54	*-4.50 E-01	5.16 E+00
		Co-58	* 3.27 E+00	6.22 E+00
		Fe-59	*-8.50 E+00	1.46 E+01
		Co-60	* 1.05 E+01	5.85 E+00
		Zn-65	*-1.68 E+00	1.27 E+01
		Cs-134	* 6.64 E+00	6.10 E+00
		Cs-137	2.74 E+01	7.53 E+00
		Ra-226	* 3.09 E+02	1.25 E+02
		Th-228	* 1.34 E+02	1.16 E+01

* Denotes a result less than the detection limit.

TABLE A-11.1 (Cont.)

GAMMA SPECTROMETRY OF FISH

Results in pCi/kilogram (wet)

LOCATION	COLLECTION DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
38 Chinook	870930	K-40	3.62 E+03	1.60 E+02
		Mn-54	*-1.32 E+00	4.09 E+00
		Co-58	* 5.73 E-01	4.21 E+00
		Fe-59	*-5.77 E+00	1.04 E+01
		Co-60	*-7.63 E-01	4.72 E+00
		Zn-65	* 3.78 E+00	1.12 E+01
		Cs-134	* 5.07 E+00	4.59 E+00
		Cs-137	2.21 E+01	6.26 E+00
		Ra-226	* 3.09 E+02	1.25 E+02
		Th-228	* 1.34 E+02	1.16 E+01
Steelhead	870930	K-40	3.30 E+03	1.46 E+02
		Mn-54	* 2.13 E+00	5.16 E+00
		Co-58	* 8.45 E-01	5.24 E+00
		Fe-59	* 7.18 E-01	1.19 E+01
		Co-60	* 2.77 E+00	5.15 E+00
		Zn-65	*-9.36 E+00	1.30 E+01
		Cs-134	* 3.34 E+00	5.97 E+00
		Cs-137	* 6.45 E+00	5.77 E+00
		Ra-226	* 1.43 E+02	1.26 E+02
		Th-228	* 5.21 E+01	1.01 E+01
Sucker	870924	K-40	3.36 E+03	1.33 E+02
		Mn-54	* 1.70 E+00	3.97 E+00
		Co-58	* 7.06 E-01	4.05 E+00
		Fe-59	* 0.00 E-01	1.08 E+01
		Co-60	*-4.64 E-01	4.11 E+00
		Zn-65	*-4.51 E+00	1.00 E+01
		Cs-134	* 0.00 E-01	4.16 E+00
		Cs-137	1.45 E+01	5.59 E+00
		Ra-226	* 8.02 E+01	8.01 E+01
		Th-228	* 2.28 E+01	6.98 E+00
Carp	870924	K-40	3.08 E+03	1.48 E+02
		Mn-54	* 2.30 E+00	3.69 E+00
		Co-58	* 1.14 E-01	4.27 E+00
		Fe-59	*-8.27 E-01	1.02 E+01
		Co-60	* 2.33 E+00	3.97 E+00
		Zn-65	* 2.60 E-01	9.97 E+00
		Cs-134	*-1.24 E+00	4.11 E+00
		Cs-137	* 1.31 E+01	4.49 E+00
		Ra-226	* 8.44 E+01	7.52 E+01
		Th-228	* 1.68 E+01	6.74 E+00

* Denotes a result less than the detection limit.

TABLE A-11.2

GAMMA SPECTROMETRY OF FISH - SUMMARY

Results in pCi/kilogram (wet)

NUCLIDE		AVERAGE	LOW	HIGH	NUMBER SAMPLES	NUMBER POSITIVE
K-40	(I)	3.33 E+03	2.87 E+03	3.74 E+03	8	8
K-40	(C)	3.35 E+03	2.86 E+03	3.63 E+03	8	8
Co-60	(I)	7.51 E-01	-4.32 E+00	3.93 E+00	8	0
Co-60	(C)	2.67 E+00	-7.63 E-01	1.05 E+01	8	0
Fe-59	(I)	-1.21 E+00	-2.15 E+01	9.70 E+00	8	0
Fe-59	(C)	-9.09 E-01	-8.50 E+00	3.40 E+00	8	0
Zn-65	(I)	-5.67 E+00	-1.76 E+01	7.58 E+00	8	0
Zn-65	(C)	-3.89 E+00	-1.26 E+01	3.78 E+00	8	0
Co-58	(I)	1.02 E-01	-3.75 E+00	2.79 E+00	8	0
Co-58	(C)	6.91 E-01	-1.89 E-01	3.27 E+00	8	0
Cs-134	(I)	4.02 E+00	1.14 E+00	7.42 E+00	8	0
Cs-134	(C)	1.95 E+00	-1.24 E+00	6.64 E+00	8	0
Cs-137	(I)	2.17 E+01	8.55 E+00	3.42 E+01	8	7
Cs-137	(C)	1.60 E+01	6.45 E+00	2.74 E+01	8	6

(I) Indicator Station
(C) Control Station

TABLE A-12.1

I-131 IN RAW MILK

Results in pCi/liter

LOCATION	COLLECTION DATE	RESULT	OVERALL UNCERTAINTY
9	870113	*-2.4 E-01	2.00 E-01
	870210	* 6.4 E-03	3.18 E-01
	870310	* 1.3 E-01	2.73 E-01
	870407	*-4.2 E-02	1.46 E-01
	870421	* 2.0 E-01	2.99 E-01
	870505	*-9.2 E-02	1.34 E-01
	870519	* 7.9 E-02	1.89 E-01
	870602	* 2.3 E-01	1.99 E-01
	870616	*-1.1 E-02	2.01 E-01
	870707	* 1.6 E-03	2.43 E-01
	870721	*-2.1 E-02	1.99 E-01
	870804	*-7.6 E-02	1.54 E-01
	870818	* 6.8 E-02	2.17 E-01
	870909	* 1.6 E-01	2.80 E-01
	870922	* 1.2 E-01	2.20 E-01
	871013	* 1.0 E-01	1.70 E-01
	871117	*-4.5 E-02	2.24 E-01
	871215	*-4.7 E-02	1.72 E-01
36	870113	*-1.5 E-01	1.60 E-01
	870210	* 1.4 E-01	3.14 E-01
	870310	*-3.9 E-03	2.07 E-01
	870407	*-1.6 E-01	1.59 E-01
	870421	* 9.5 E-02	1.08 E-01
	870505	* 9.7 E-02	2.43 E-01
	870519	* 7.0 E-02	2.49 E-01
	870602	*-8.5 E-03	2.19 E-01
	870616	*-2.6 E-01	1.60 E-01
	870707	*-3.3 E-01	2.39 E-01
	870721	*-1.3 E-01	1.75 E-01
	870804	* 5.1 E-02	2.45 E-01
	870818	* 2.7 E-03	2.30 E-02
	870909	* 4.0 E-02	2.29 E-01
	870922	* 1.4 E-01	1.84 E-01
	871013	*-1.8 E-01	1.59 E-01
	871117	*-2.4 E-01	1.62 E-01
	871215	*-1.2 E-02	1.62 E-01

* Denotes a result less than the detection limit.

TABLE A-12.1 (Cont.)

I-131 IN RAW MILK

Results in pCi/liter

LOCATION	COLLECTION DATE	RESULT	OVERALL UNCERTAINTY
37	870113	*-8.0 E-01	2.00 E-01
	870210	* 3.0 E-02	3.03 E-01
	870310	* 5.5 E-02	2.07 E-01
	870407	* 5.9 E-02	2.78 E-01
	870421	*-8.1 E-02	2.59 E-01
	870505	* 8.5 E-02	1.28 E-01
	870519	* 1.1 E-01	2.20 E-01
	870602	*-1.2 E-02	1.63 E-01
	870616	*-9.1 E-02	2.07 E-01
	870707 (a)		
	870804	* 1.2 E-01	1.70 E-01
	870909	* 9.6 E-02	1.94 E-01
	871013	*-1.2 E-02	1.36 E-01
	871117	*-2.5 E-02	1.23 E-01
	871215	*-2.6 E-02	1.36 E-01
40	870113	*-7.5 E-02	2.19 E-01
	870210	* 3.3 E-01	3.11 E-01
	870310	*-1.4 E-01	1.21 E-01
	870407	*-1.4 E-01	1.31 E-01
	870421	*-4.0 E-03	1.50 E-01
	870505	* 6.5 E-03	1.64 E-01
	870519	* 1.1 E-01	1.50 E-01
	870602	*-1.0 E-01	1.79 E-01
	870616	*-2.3 E-01	1.60 E-01
	870707	*-3.0 E-02	1.81 E-01
	870721	*-1.6 E-01	1.77 E-01
	870804	*-2.5 E-02	1.45 E-01
	870818	* 2.3 E-02	2.36 E-01
	870909	* 1.1 E-01	1.90 E-01
	870922	*-8.2 E-02	1.42 E-01
	871013	*-1.0 E-01	1.31 E-01
	871117	* 2.9 E-02	1.85 E-01
	871215	* 1.3 E-02	1.52 E-01

* Denotes a result less than the detection limit.
(a) Sample not collected.

TABLE A-12.1 (Cont.)

I-131 IN RAW MILK

Results in pCi/liter

LOCATION	COLLECTION DATE	RESULT	OVERALL UNCERTAINTY
58	870113	*-1.9 E-04	3.16 E-01
	870210	*-6.6 E-01	2.99 E-01
	870310	* 1.6 E-01	3.03 E-01
	870407	* 2.0 E-01	1.52 E-01
	870421	*-8.2 E-02	1.75 E-01
	870505	*-1.6 E-01	1.32 E-01
	870519	* 1.6 E-01	1.90 E-01
	870602	*-8.7 E-02	1.69 E-01
	870616 (a)		
59	870617	*-5.9 E-02	1.24 E-01
	870707	* 2.8 E-01	2.74 E-01
	870721	* 1.8 E-01	3.25 E-01
	870804	*-1.5 E-01	1.80 E-01
	870818	*-2.2 E-01	1.60 E-01
	870909	* 2.8 E-01	2.30 E-01
	870922	*-6.5 E-02	2.89 E-01
	871013	*-1.5 E-01	1.90 E-01
	871117	*-1.2 E-01	1.98 E-01
	871215	* 7.4 E-02	2.31 E-01
96	870113	*-2.8 E-02	2.05 E-01
	870210	*-1.8 E-01	2.86 E-01
	870310	* 3.3 E-01	2.99 E-01
	870407	* 8.2 E-02	1.49 E-01
	870421	* 2.9 E-02	1.53 E-01
	870505	* 2.0 E-01	2.09 E-01
	870519	* 4.3 E-02	1.77 E-01
	870602	*-1.4 E-01	1.80 E-01
	870616	*-1.0 E-01	2.50 E-01
	870707	* 1.5 E-02	2.48 E-01
	870721	*-1.8 E-01	1.99 E-01
	870804	*-2.8 E-01	1.90 E-01
	870818	*-3.5 E-02	1.94 E-01
	870909	* 2.9 E-01	1.60 E-01
	870922	*-3.2 E-01	3.15 E-01
	871013	*-1.0 E-01	2.22 E-01
	871117	* 1.5 E-02	1.65 E-01
	871215	*-8.1 E-02	1.19 E-01

* Denotes a result less than the detection limit.
(a) Discontinued Operation

TABLE A-12.2

I-131 IN RAW MILK - SUMMARY

Results in pCi/liter

NUCLIDE		AVERAGE	LOW	HIGH	NUMBER SAMPLES	NUMBER POSITIVE
I-131	(I)	-1.70 E-02	-6.60 E-01	3.30 E-01	86	0
I-131	(C)	-2.44 E-02	-3.20 E-01	3.30 E-01	18	0

(I) Indicator Station
(C) Control Station

TABLE A-13.1

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
9	870113	Cs-134	* 4.10 E+00	2.80 E+00
		Cs-137	7.58 E+00	4.18 E+00
		Ba-140	*-7.00 E+00	9.00 E+00
		La-140	*-3.40 E-01	3.40 E+00
	870210	Cs-134	* 3.70 E+00	2.80 E+00
		Cs-137	1.22 E+01	3.80 E+00
		Ba-140	* 7.10 E-01	1.00 E+01
		La-140	*-1.50 E+00	4.00 E+00
	870310	Cs-134	* 2.40 E+00	2.70 E+00
		Cs-137	8.02 E+00	4.11 E+00
		Ba-140	*-3.10 E+00	9.10 E+00
		La-140	*-7.20 E-01	3.50 E+00
	870407	Cs-134	* 3.20 E+00	2.88 E+00
		Cs-137	* 8.51 E+00	2.82 E+00
		Ba-140	*-2.74 E+00	8.66 E+00
		La-140	*-3.45 E-01	3.34 E+00
	870421	Cs-134	* 2.08 E+00	2.76 E+00
		Cs-137	* 5.92 E+00	2.71 E+00
		Ba-140	* 0.00 E-01	8.72 E+00
		La-140	* 2.39 E+00	3.07 E+00
	870505	Cs-134	* 3.64 E+00	2.74 E+00
		Cs-137	* 4.71 E+00	2.53 E+00
		Ba-140	*-2.93 E+00	7.17 E+00
		La-140	* 1.36 E-01	2.88 E+00
	870519	Cs-134	* 1.31 E+00	2.70 E+00
		Cs-137	6.79 E+00	3.53 E+00
		Ba-140	*-2.83 E+00	8.65 E+00
		La-140	* 1.78 E-01	3.77 E+00
	870602	Cs-134	* 1.95 E+00	2.33 E+00
		Cs-137	5.67 E+00	2.81 E+00
		Ba-140	* 0.00 E-01	6.69 E+00
		La-140	*-1.61 E+00	2.00 E+00
	870616	Cs-134	* 8.66 E-02	2.50 E+00
		Cs-137	* 4.81 E+00	2.58 E+00
		Ba-140	* 5.07 E+00	9.01 E+00
		La-140	* 1.02 E+00	3.33 E+00

* Denotes a result less than the detection limit.

TABLE A-13.1 (Cont.)

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
9	870707	Cs-134	* 1.41 E+00	2.59 E+00
		Cs-137	* 3.91 E+00	2.60 E+00
		Ba-140	*-6.67 E+00	9.35 E+00
		La-140	*-1.74 E-01	3.36 E+00
	870721	Cs-134	* 3.65 E+00	3.58 E+00
		Cs-137	* 4.55 E+00	3.96 E+00
		Ba-140	*-7.36 E+00	1.63 E+01
		La-140	* 2.17 E+00	4.18 E+00
	870804	Cs-134	* 2.95 E-01	2.09 E+00
		Cs-137	* 2.42 E+00	2.01 E+00
		Ba-140	*-1.88 E+00	6.39 E+00
		La-140	*-1.96 E+00	2.35 E+00
	870818	Cs-134	* 6.75 E-01	2.58 E+00
		Cs-137	* 9.37 E-01	2.35 E+00
		Ba-140	*-1.46 E+00	9.04 E+00
		La-140	*-1.47 E+00	3.45 E+00
	870909	Cs-134	* 0.00 E-01	2.50 E+00
		Cs-137	* 1.29 E+00	2.48 E+00
		Ba-140	* 2.30 E+00	9.53 E+00
		La-140	* 0.00 E-01	3.23 E+00
	870922	Cs-134	* 9.80 E-01	2.52 E+00
		Cs-137	* 9.42 E-01	2.49 E+00
		Ba-140	*-9.93 E-01	8.57 E+00
		La-140	*-3.49 E-01	3.21 E+00
	871013	Cs-134	* 9.61 E-01	2.49 E+00
		Cs-137	* 3.02 E+00	2.53 E+00
		Ba-140	*-1.64 E+00	8.76 E+00
		La-140	*-3.61 E-01	3.69 E+00
	871117	Cs-134	* 8.86 E-01	2.52 E+00
		Cs-137	* 3.02 E+00	2.35 E+00
		Ba-140	*-1.36 E+00	8.62 E+00
		La-140	*-1.37 E+00	3.39 E+00
	871215	Cs-134	* 2.66 E-01	2.34 E+00
		Cs-137	* 2.44 E+00	2.21 E+00
		Ba-140	* 0.00 E-01	7.56 E+00
		La-140	* 9.81 E-01	3.13 E+00

* Denotes a result less than the detection limit.

TABLE A-13.1 (Cont.)

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
36	870113	Cs-134	7.31 E+00	3.82 E+00
		Cs-137	1.92 E+01	4.40 E+00
		Ba-140	*-8.70 E+00	1.00 E+01
		La-140	* 0.00 E+00	3.10 E+00
	870210	Cs-134	* 6.80 E+00	3.10 E+00
		Cs-137	8.23 E+00	4.18 E+00
		Ba-140	* 5.10 E+00	1.10 E+01
		La-140	* 6.40 E-01	3.80 E+00
	870310	Cs-134	* 2.40 E+00	2.80 E+00
		Cs-137	* 2.30 E+00	2.70 E+00
		Ba-140	* 0.00 E+00	9.60 E+00
		La-140	*-2.10 E+00	3.30 E+00
	870407	Cs-134	* 4.91 E-01	2.59 E+00
		Cs-137	* 2.71 E+00	2.68 E+00
		Ba-140	* 3.56 E+00	9.13 E+00
		La-140	*-3.56 E-01	3.22 E+00
	870421	Cs-134	* 5.13 E-01	2.78 E+00
		Cs-137	* 3.17 E+00	2.59 E+00
		Ba-140	*-3.92 E+00	8.84 E+00
		La-140	*-5.82 E-01	3.49 E+00
	870505	Cs-134	* 3.02 E-01	2.47 E+00
		Cs-137	* 1.82 E+00	2.70 E+00
		Ba-140	*-2.10 E+00	7.41 E+00
		La-140	*-2.10 E+00	2.87 E+00
	870519	Cs-134	* 2.40 E-01	2.64 E+00
		Cs-137	* 1.85 E+00	2.80 E+00
		Ba-140	* 6.42 E+00	1.00 E+01
		La-140	* 9.17 E-01	3.22 E+00
	870602	Cs-134	*-7.88 E-01	2.04 E+00
		Cs-137	* 2.54 E+00	1.94 E+00
		Ba-140	* 2.80 E-01	5.93 E+00
		La-140	* 2.32 E-01	2.41 E+00
	870616	Cs-134	*-3.48 E+00	2.69 E+00
		Cs-137	* 3.56 E+00	2.40 E+00
		Ba-140	* 4.16 E-01	9.10 E+00
		La-140	* 0.00 E-01	3.44 E+00

* Denotes a result less than the detection limit.

TABLE A-13.1 (Cont.)

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
36	870707	Cs-134	*-8.49 E-01	3.44 E+00
		Cs-137	* 2.82 E+00	3.14 E+00
		Ba-140	*-3.27 E+00	1.27 E+01
		La-140	*-6.44 E+00	4.16 E+00
	870721	Cs-134	*-1.18 E+00	2.64 E+00
		Cs-137	* 1.46 E+00	2.44 E+00
		Ba-140	* 2.75 E-01	9.68 E+00
		La-140	*-9.37 E-01	4.03 E+00
	870804	Cs-134	* 2.70 E-01	2.14 E+00
		Cs-137	* 9.18 E-01	2.15 E+00
		Ba-140	*-2.94 E+00	6.72 E+00
		La-140	*-2.14 E+00	2.50 E+00
	870818	Cs-134	*-8.24 E-02	2.75 E+00
		Cs-137	* 5.59 E+00	2.90 E+00
		Ba-140	* 9.47 E-01	9.59 E+00
		La-140	* 5.68 E-01	3.60 E+00
	870909	Cs-134	* 2.79 E+00	3.56 E+00
		Cs-137	* 2.87 E+00	3.33 E+00
		Ba-140	*-5.88 E+00	1.28 E+01
		La-140	* 2.74 E+00	4.40 E+00
	870922	Cs-134	*-3.31 E-01	2.55 E+00
		Cs-137	* 5.92 E-01	2.54 E+00
		Ba-140	* 2.93 E+00	9.10 E+00
		La-140	*-1.26 E+00	3.05 E+00
	871013	Cs-134	*-3.25 E-01	2.73 E+00
		Cs-137	* 0.00 E-01	2.78 E+00
		Ba-140	* 1.17 E+00	9.60 E+00
		La-140	* 7.46 E-01	3.60 E+00
	871117	Cs-134	* 1.14 E+00	2.53 E+00
		Cs-137	* 3.26 E+00	2.71 E+00
		Ba-140	*-3.09 E+00	8.76 E+00
		La-140	* 2.65 E+00	3.28 E+00
	871215	Cs-134	* 0.00 E-01	2.46 E+00
		Cs-137	* 2.17 E+00	2.45 E+00
		Ba-140	* 4.36 E+00	7.84 E+00
		La-140	*-3.51 E-01	3.29 E+00

* Denotes a result less than the detection limit.

TABLE A-13.1 (Cont.)

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
37	870113	Cs-134	* 9.00 E+00	4.10 E+00
		Cs-137	1.78 E+01	4.80 E+00
		Ba-140	* 4.20 E+00	1.40 E+01
		La-140	* 1.20 E+00	4.20 E+00
	870210	Cs-134	* 1.80 E+00	2.90 E+00
		Cs-137	7.34 E+00	3.83 E+00
		Ba-140	* 0.00 E+01	1.10 E+01
		La-140	* 1.60 E+00	3.60 E+00
	870310	Cs-134	* 1.50 E+00	2.70 E+00
		Cs-137	* 2.10 E+00	2.50 E+00
		Ba-140	*-1.50 E+00	9.30 E+00
		La-140	*-1.70 E+00	3.40 E+00
	870407	Cs-134	* 4.32 E-01	2.78 E+00
		Cs-137	* 3.33 E+00	2.57 E+00
		Ba-140	* 4.53 E+00	8.08 E+00
		La-140	*-1.60 E+00	2.93 E+00
	870421	Cs-134	* 1.59 E-01	2.64 E+00
		Cs-137	* 2.30 E+00	2.54 E+00
		Ba-140	*-2.89 E+00	8.89 E+00
		La-140	*-1.52 E+00	2.97 E+00
	870505	Cs-134	*-8.35 E-02	2.36 E+00
		Cs-137	* 3.04 E+00	2.24 E+00
		Ba-140	*-4.79 E+00	6.51 E+00
		La-140	*-2.19 E+00	2.52 E+00
	870519	Cs-134	* 2.94 E+00	3.62 E+00
		Cs-137	* 3.05 E+00	3.37 E+00
		Ba-140	* 3.48 E+00	1.34 E+01
		La-140	* 2.91 E+00	4.47 E+00
	870602	Cs-134	*-2.14 E-01	2.86 E+00
		Cs-137	* 1.74 E+00	2.65 E+00
		Ba-140	*-6.04 E+00	8.63 E+00
		La-140	*-1.09 E+00	3.04 E+00
	870616	Cs-134	* 3.10 E+00	4.46 E+00
		Cs-137	* 1.91 E+00	3.92 E+00
		Ba-140	*-1.16 E+01	1.60 E+01
		La-140	*-1.84 E+00	5.63 E+00

* Denotes a result less than the detection limit.

TABLE A-13.1 (Cont.)

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
37	870707	(a)		
	870804	Cs-134	*-1.07 E+00	2.32 E+00
		Cs-137	* 3.26 E+00	2.17 E+00
		Ba-140	*-3.00 E+00	6.49 E+00
		La-140	* 6.98 E-01	2.61 E+00
	870909	Cs-134	*-7.59 E-02	2.43 E+00
		Cs-137	* 1.47 E+00	2.38 E+00
		Ba-140	*-5.39 E+00	8.61 E+00
		La-140	* 1.07 E+00	3.39 E+00
	871013	Cs-134	* 1.36 E+00	2.78 E+00
		Cs-137	* 1.61 E+00	2.59 E+00
		Ba-140	* 3.42 E+00	9.52 E+00
		La-140	*-2.03 E-01	3.85 E+00
	871117	Cs-134	* 1.44 E+00	2.70 E+00
		Cs-137	* 7.67 E-01	2.42 E+00
		Ba-140	*-2.16 E-01	8.87 E+00
		La-140	* 2.31 E+00	3.40 E+00
	871215	Cs-134	* 3.13 E-01	2.15 E+00
		Cs-137	* 2.46 E+00	2.25 E+00
		Ba-140	*-7.05 E+00	7.37 E+00
		La-140	* 3.04 E+00	3.26 E+00

* Denotes a result less than the detection limit.
(a) Sample not collected.

TABLE A-13.1 (Cont.)

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
40	870113	Cs-134	* 1.30 E+00	3.00 E+00
		Cs-137	* 1.90 E+00	2.70 E+00
		Ba-140	*-9.40 E-01	8.50 E+00
		La-140	*-3.80 E+00	3.20 E+00
	870210	Cs-134	*-3.30 E-01	2.60 E+00
		Cs-137	*-1.40 E-01	2.50 E+00
		Ba-140	* 2.00 E+00	9.60 E+00
		La-140	*-1.20 E+00	3.30 E+00
	870310	Cs-134	*-1.20 E+00	2.50 E+00
		Cs-137	* 3.40 E+00	2.60 E+00
		Ba-140	*-1.10 E+00	9.20 E+00
		La-140	* 1.40 E+00	4.10 E+00
	870407	Cs-134	* 1.24 E+00	2.76 E+00
		Cs-137	* 2.33 E+00	2.57 E+00
		Ba-140	*-1.86 E+00	9.21 E+00
		La-140	* 1.36 E+00	4.04 E+00
	870421	Cs-134	*-2.89 E-01	3.48 E+00
		Cs-137	* 1.29 E+00	3.11 E+00
		Ba-140	* 9.70 E+00	1.16 E+01
		La-140	*-2.65 E+00	3.99 E+00
	870505	Cs-134	* 1.50 E+00	2.63 E+00
		Cs-137	* 3.25 E+00	2.44 E+00
		Ba-140	*-6.85 E+00	7.48 E+00
		La-140	*-9.16 E-01	2.96 E+00
	870519	Cs-134	* 1.24 E+00	2.74 E+00
		Cs-137	* 9.27 E-01	2.40 E+00
		Ba-140	* 1.93 E+00	8.71 E+00
		La-140	*-3.08 E+00	3.51 E+00
	870602	Cs-134	*-2.23 E-01	2.08 E+00
		Cs-137	* 1.70 E+00	2.03 E+00
		Ba-140	* 6.45 E-01	6.05 E+00
		La-140	*-1.07 E+00	2.43 E+00
	870616	Cs-134	* 1.25 E+00	2.53 E+00
		Cs-137	* 2.99 E+00	2.48 E+00
		Ba-140	* 8.58 E-01	9.24 E+00
		La-140	*-1.51 E+00	3.88 E+00

* Denotes a result less than the detection limit.

TABLE A-13.1 (Cont.)

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
40	870707	Cs-134	* 1.20 E+00	2.40 E+00
		Cs-137	*-1.21 E+00	2.33 E+00
		Ba-140	*-1.37 E+00	8.56 E+00
		La-140	* 2.27 E+00	3.45 E+00
	870721	Cs-134	*-8.56 E-01	2.71 E+00
		Cs-137	* 2.67 E+00	2.59 E+00
		Ba-140	*-6.15 E+00	1.02 E+01
		La-140	* 2.05 E+00	4.11 E+00
	870804	Cs-134	* 4.17 E+00	2.99 E+00
		Cs-137	* 8.01 E-01	2.75 E+00
		Ba-140	* 4.06 E+00	9.54 E+00
		La-140	*-1.99 E-01	3.26 E+00
	870818	Cs-134	* 3.18 E+00	3.65 E+00
		Cs-137	* 4.04 E+00	3.48 E+00
		Ba-140	*-1.55 E+01	1.37 E+01
		La-140	* 4.24 E+00	4.31 E+00
	870909	Cs-134	* 2.11 E+00	3.54 E+00
		Cs-137	* 1.34 E+00	3.73 E+00
		Ba-140	* 1.61 E+00	1.46 E+01
		La-140	*-3.13 E+00	3.78 E+00
	870922	Cs-134	* 6.40 E+00	3.58 E+00
		Cs-137	* 3.23 E+00	3.39 E+00
		Ba-140	* 6.84 E+00	1.28 E+01
		La-140	*-2.52 E+00	4.09 E+00
	871013	Cs-134	* 4.21 E+00	3.70 E+00
		Cs-137	* 3.54 E+00	3.43 E+00
		Ba-140	* 6.20 E+00	1.33 E+01
		La-140	*-4.00 E+00	4.36 E+00
	871117	Cs-134	*-1.53 E-01	3.45 E+00
		Cs-137	* 8.22 E-01	3.28 E+00
		Ba-140	* 8.38 E+00	1.27 E+01
		La-140	*-9.88 E-01	4.07 E+00
	871215	Cs-134	* 1.94 E+00	3.26 E+00
		Cs-137	* 2.32 E+00	3.27 E+00
		Ba-140	*-5.42 E-01	1.10 E+01
		La-140	*-3.61 E+00	3.89 E+00

* Denotes a result less than the detection limit.

TABLE A-13.1 (Cont.)

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
58	870113	Cs-134	* 6.00 E+00	3.30 E+00
		Cs-137	2.69 E+01	4.50 E+00
		Ba-140	*-3.00 E+00	9.30 E+00
		La-140	* 0.00 E+00	3.70 E+00
	870210	Cs-134	7.63 E+00	4.05 E+00
		Cs-137	2.14 E+01	4.60 E+00
		Ba-140	* 1.40 E+00	1.10 E+01
		La-140	*-1.20 E+00	3.60 E+00
	870310	Cs-134	* 3.70 E+00	3.00 E+00
		Cs-137	1.50 E+01	4.60 E+00
		Ba-140	* 7.70 E+00	1.00 E+01
		La-140	* 3.40 E+00	3.20 E+00
	870407	Cs-134	* 3.42 E-01	3.02 E+00
		Cs-137	* 4.29 E+00	2.94 E+00
		Ba-140	* 2.48 E+00	8.56 E+00
		La-140	* 1.71 E-01	3.26 E+00
	870421	Cs-134	*-2.89 E-01	3.48 E+00
		Cs-137	* 1.29 E+00	3.11 E+00
		Ba-140	* 9.70 E+00	1.16 E+01
		La-140	*-2.65 E+00	3.99 E+00
	870505	Cs-134	7.14 E+00	3.64 E+00
		Cs-137	1.46 E+01	4.21 E+00
		Ba-140	* 8.11 E-01	7.10 E+00
		La-140	*-4.04 E-01	2.69 E+00
	870519	Cs-134	6.50 E+00	3.43 E+00
		Cs-137	1.59 E+01	3.89 E+00
		Ba-140	* 6.28 E+00	9.76 E+00
		La-140	*-9.99 E-01	3.47 E+00
	870602	Cs-134	6.66 E+00	2.29 E+00
		Cs-137	1.59 E+01	3.39 E+00
		Ba-140	*-6.50 E+00	6.38 E+00
		La-140	*-1.25 E-01	2.33 E+00
	870616 (a)			

* Denotes a result less than the detection limit.
(a) Discontinued operation.

TABLE A-13.1 (Cont.)

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
59 (a)	870617	Cs-134	* 5.31 E+00	3.57 E+00
		Cs-137	* 2.69 E+00	3.37 E+00
		Ba-140	*-4.16 E+00	1.38 E+01
		La-140	* 3.09 E+00	4.51 E+00
	870707	Cs-134	*-2.55 E+00	2.38 E+00
		Cs-137	* 3.16 E-01	2.29 E+00
		Ba-140	* 1.92 E+00	8.71 E+00
		La-140	*-1.59 E+00	3.18 E+00
	870721	Cs-134	* 4.78 E-01	2.58 E+00
		Cs-137	*-1.69 E+00	2.45 E+00
		Ba-140	* 6.52 E+00	1.06 E+01
		La-140	*-1.98 E+00	3.75 E+00
	870804	Cs-134	* 2.00 E+00	2.98 E+00
		Cs-137	* 3.22 E+00	3.15 E+00
		Ba-140	*-8.09 E+00	1.05 E+01
		La-140	* 1.03 E+00	2.76 E+00
	870818	Cs-134	*-9.51 E-02	3.65 E-01
		Cs-137	* 4.90 E-01	3.98 E-01
		Ba-140	*-5.41 E-01	1.47 E+00
		La-140	*-4.35 E-01	3.75 E-01
	870909	Cs-134	*-2.39 E+00	2.55 E+00
		Cs-137	*-2.21 E+00	2.55 E+00
		Ba-140	* 7.49 E+00	8.92 E+00
		La-140	* 6.17 E-01	3.26 E+00
	870922	Cs-134	* 1.02 E+00	3.57 E+00
		Cs-137	* 3.03 E+00	3.92 E+00
		Ba-140	* 5.35 E+00	1.40 E+01
		La-140	*-2.27 E+00	3.66 E+00

* Denotes a result less than the detection limit.
(a) Station added to program 06/17/87.

TABLE A-13.1 (Cont.)

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
59	871013	Cs-134	*-8.70 E-01	3.53 E+00
		Cs-137	* 8.05 E-01	3.87 E+00
		Ba-140	* 3.69 E+00	1.45 E+01
		La-140	*-2.76 E+00	3.98 E+00
	871117	Cs-134	* 2.67 E+00	3.70 E+00
		Cs-137	* 3.77 E+00	3.96 E+00
		Ba-140	*-1.09 E+01	1.34 E+01
		La-140	* 2.22 E+00	3.53 E+00
	871215	Cs-134	* 3.28 E+00	3.12 E+00
		Cs-137	* 2.68 E+00	3.15 E+00
		Ba-140	*-6.90 E+00	1.09 E+01
		La-140	*-2.86 E+00	3.72 E+00

* Denotes a result less than the detection limit.

TABLE A-13.1 (Cont.)

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
96	870113	Cs-134	* 2.40 E+00	3.30 E+00
		Cs-137	1.61 E+01	4.10 E+00
		Ba-140	* 3.00 E+00	9.30 E+00
		La-140	*-2.40 E+00	3.40 E+00
	870210	Cs-134	* 4.50 E+00	3.50 E+00
		Cs-137	2.23 E+01	4.70 E+00
		Ba-140	* 5.40 E+00	1.10 E+01
		La-140	*-3.10 E+00	3.60 E+00
	870310	Cs-134	*-5.70 E-01	2.50 E+00
		Cs-137	* 2.30 E+00	2.40 E+00
		Ba-140	*-5.30 E+00	8.80 E+00
		La-140	* 3.60 E+00	3.60 E+00
	870407	Cs-134	* 3.99 E-01	2.94 E+00
		Cs-137	* 7.45 E-01	2.48 E+00
		Ba-140	* 2.67 E+00	9.74 E+00
		La-140	* 1.18 E+00	3.21 E+00
	870421	Cs-134	* 2.15 E+00	2.83 E+00
		Cs-137	* 3.06 E+00	2.68 E+00
		Ba-140	* 4.26 E+00	8.80 E+00
		La-140	*-4.79 E+00	3.66 E+00
	870505	Cs-134	* 0.00 E-01	2.47 E+00
		Cs-137	* 4.94 E-01	2.50 E+00
		Ba-140	* 0.00 E-01	7.47 E+00
		La-140	*-1.57 E-01	2.64 E+00
	870519	Cs-134	*-2.59 E-01	2.57 E+00
		Cs-137	* 1.70 E+00	2.68 E+00
		Ba-140	*-9.64 E-01	9.11 E+00
		La-140	* 2.04 E-01	3.66 E+00
	870602	Cs-134	*-2.45 E+00	2.32 E+00
		Cs-137	* 1.05 E+00	2.01 E+00
		Ba-140	* 4.07 E+00	6.10 E+00
		La-140	* 9.50 E-01	2.60 E+00
	870616	Cs-134	* 5.63 E-01	2.71 E+00
		Cs-137	* 2.08 E+00	2.79 E+00
		Ba-140	*-1.71 E+00	9.98 E+00
		La-140	*-2.14 E+00	3.80 E+00

* Denotes a result less than the detection limit.

TABLE A-13.1 (Cont.)

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
96	870707	Cs-134	* 2.62 E+00	2.76 E+00
		Cs-137	* 6.12 E+00	2.69 E+00
		Ba-140	* 2.44 E-01	9.07 E+00
		La-140	*-4.11 E-01	3.64 E+00
	870721	Cs-134	* 4.09 E-01	2.43 E+00
		Cs-137	* 3.41 E-01	2.25 E+00
		Ba-140	* 2.59 E+00	9.48 E+00
		La-140	* 6.43 E-01	3.80 E+00
	870804	Cs-134	*-4.78 E-01	2.05 E+00
		Cs-137	* 3.77 E+00	1.92 E+00
		Ba-140	* 8.01 E+00	6.36 E+00
		La-140	*-3.58 E-01	2.21 E+00
	870818	Cs-134	* 9.17 E-02	2.69 E+00
		Cs-137	* 2.37 E+00	2.46 E+00
		Ba-140	* 4.00 E+00	8.80 E+00
		La-140	*-4.26 E-01	3.26 E+00
	870909	Cs-134	* 3.26 E+00	2.73 E+00
		Cs-137	* 3.44 E+00	2.64 E+00
		Ba-140	*-2.25 E-01	9.44 E+00
		La-140	*-1.40 E+00	3.61 E+00
	870922	Cs-134	* 8.25 E-01	2.60 E+00
		Cs-137	* 6.66 E-01	2.40 E+00
		Ba-140	*-5.22 E+00	8.28 E+00
		La-140	*-6.05 E-01	3.51 E+00
	871013	Cs-134	* 8.09 E-01	2.61 E+00
		Cs-137	* 2.68 E+00	2.39 E+00
		Ba-140	*-6.62 E+00	8.64 E+00
		La-140	*-2.30 E+00	3.33 E+00
	871117	Cs-134	* 8.10 E-01	2.63 E+00
		Cs-137	* 6.10 E+00	2.50 E+00
		Ba-140	*-4.95 E+00	8.50 E+00
		La-140	*-3.00 E+00	3.30 E+00
	871215	Cs-134	*-5.37 E-01	2.11 E+00
		Cs-137	* 3.81 E+00	2.26 E+00
		Ba-140	* 1.17 E+00	6.88 E+00
		La-140	* 1.13 E+00	3.41 E+00

* Denotes a result less than the detection limit.

TABLE A-13.2

GAMMA SPECTROMETRY OF MILK - SUMMARY

Results in pCi/liter

NUCLIDE		AVERAGE	LOW	HIGH	NUMBER SAMPLES	NUMBER POSITIVE
Cs-134	(I)	1.7 E+00	-3.5 E+00	7.6 E+00	72	5
Cs-134	(C)	8.1 E-01	-2.5 E+00	4.5 E+00	18	0
Cs-137	(I)	4.4 E+00	-2.2 E+00	2.7 E+01	72	13
Cs-137	(C)	4.4 E+00	3.4 E-01	2.2 E+01	18	2
Ba-140	(I)	5.1 E-02	-8.7 E+00	9.7 E+00	72	0
Ba-140	(C)	1.1 E+00	-6.6 E+00	8.0 E+00	18	0
La-140	(I)	-4.7 E-01	-6.4 E+00	4.2 E+00	72	0
La-140	(C)	-7.4 E-01	-4.8 E+00	3.6 E+00	18	0

(I) Indicator Station
(C) Control Station

TABLE A-14.1

GAMMA SPECTROMETRY OF ROOT

Results in pCi/kilogram (wet)

LOCATION	COLLECTION DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
9 Carrot	870616	Cs-134	* 0.00 E-01	3.65 E+00
		Cs-137	* 3.41 E+00	3.44 E+00
		I-131	*-4.32 E+00	6.27 E+00
9 Onion	870721	Cs-134	* 3.18 E+00	6.28 E+00
		Cs-137	* 7.64 E+00	6.82 E+00
		I-131	*-1.88 E+00	1.99 E+01
9 Onion	870818	Cs-134	* 2.65 E+00	5.21 E+00
		Cs-137	* 1.68 E+00	4.72 E+00
		I-131	* 2.86 E+00	9.00 E+00
9 Potatoes	870922	Cs-134	* 6.07 E+00	8.00 E+00
		Cs-137	* 2.06 E+00	7.19 E+00
		I-131	*-1.56 E+01	1.51 E+01

* Denotes a result less than the detection limit.

TABLE A-14.1 (Cont.)

GAMMA SPECTROMETRY OF ROOT

Results in pCi/kilogram (wet)

LOCATION	COLLECTION DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
37 Horseradish	870519	Cs-134	* 2.96 E+00	4.71 E+00
		Cs-137	* 4.40 E+00	3.99 E+00
		I-131	* 7.66 E+00	1.46 E+01
37 Onion	870616	Cs-134	*-2.84 E+00	6.34 E+00
		Cs-137	* 2.09 E+01	7.10 E+00
		I-131	* 8.36 E+00	1.17 E+01
37 Carrots	870721	Cs-134	* 8.60 E-01	4.96 E+00
		Cs-137	* 4.17 E+00	4.81 E+00
		I-131	*-3.96 E-01	1.19 E+01
37 Potatoes	870818	Cs-134	*-3.20 E+00	4.94 E+00
		Cs-137	* 5.96 E+00	5.13 E+00
		I-131	*-2.93 E-01	9.22 E+00
37 Swiss Chard	870818	Cs-134	* 4.67 E+00	8.65 E+00
		Cs-137	1.87 E+01	9.91 E+00
		I-131	* 1.79 E+00	1.51 E+01
37 Carrots	870922	Cs-134	* 1.99 E+00	4.79 E+00
		Cs-137	*-1.42 E+00	4.44 E+00
		I-131	*-1.46 E+00	8.58 E+00

* Denotes a result less than the detection limit.

TABLE A-14.2

GAMMA SPECTROMETRY OF ROOT - SUMMARY

Results in pCi/kilogram (wet)

NUCLIDE		AVERAGE	LOW	HIGH	NUMBER SAMPLES	NUMBER POSITIVE
I-131	(I)	2.61 E+00	-3.96 E-01	8.36 E+00	6	0
I-131	(C)	-4.74 E+00	-1.56 E+01	2.86 E+00	4	0
Cs-134	(I)	7.45 E-01	-3.20 E+00	4.67 E+00	6	0
Cs-134	(C)	2.98 E+00	0.00 E-01	6.07 E+00	4	0
Cs-137	(I)	8.79 E+00	-1.42 E+00	2.09 E+01	6	1
Cs-137	(C)	3.70 E+00	1.68 E+00	7.64 E+00	4	0

(I) Indicator Station
(C) Control Station

TABLE A-15.1

GAMMA SPECTROMETRY OF FRUIT

Results in pCi/kilogram (wet)

LOCATION	COLLECTION DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
9 Strawberry	870616	Cs-134	* 3.86 E+00	5.25 E+00
		Cs-137	* 3.19 E+00	4.84 E+00
		I-131	*-1.14 E+00	1.00 E+01
9 Peaches	870721	Cs-134	* 3.31 E+00	3.31 E+00
		Cs-137	* 9.05 E-01	3.16 E+00
		I-131	*-3.87 E+00	8.05 E+00
9 Pears	870818	Cs-134	*-1.48 E-01	4.56 E+00
		Cs-137	* 4.25 E+00	4.24 E+00
		I-131	* 3.35 E+00	7.93 E+00
9 Plums	870922	Cs-134	* 8.09 E-01	3.10 E+00
		Cs-137	* 2.52 E+00	2.92 E+00
		I-131	*-2.19 E+00	4.34 E+00

* Denotes a result less than the detection limit.

TABLE A-15.1 (Cont.)

GAMMA SPECTROMETRY OF FRUIT

Results in pCi/kilogram (wet)

LOCATION	COLLECTION DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
37 Raspberry	870616	Cs-134	*-1.89 E-01	4.40 E+00
		Cs-137	* 1.94 E+00	3.88 E+00
		I-131	* 3.17 E+00	7.59 E+00
37 Peaches	870721	Cs-134	* 4.34 E+00	4.71 E+00
		Cs-137	*-1.98 E+00	4.38 E+00
		I-131	* 9.91 E+00	1.19 E+01
37 Cantalope	870818	Cs-134	* 5.25 E+00	5.58 E+00
		Cs-137	* 1.79 E+00	5.22 E+00
		I-131	*-2.31 E+00	1.01 E+01
37 Peaches	870922	Cs-134	* 3.37 E+00	4.48 E+00
		Cs-137	* 2.19 E+00	4.32 E+00
		I-131	* 7.19 E-02	7.34 E+00

* Denotes a result less than the detection limit.

TABLE A-15.2

GAMMA SPECTROMETRY OF FRUIT - SUMMARY

Results in pCi/kilogram (wet)

NUCLIDE		AVERAGE	LOW	HIGH	NUMBER SAMPLES	NUMBER POSITIVE
I-131	(I)	2.71 E+00	-2.31 E+00	9.91 E+00	4	0
I-131	(C)	-9.63 E-01	-3.87 E+00	3.35 E+00	4	0
Cs-134	(I)	3.19 E+00	-1.89 E-01	5.25 E+00	4	0
Cs-134	(C)	1.96 E+00	-1.48 E-01	3.86 E+00	4	0
Cs-137	(I)	9.85 E-01	-1.98 E+00	2.19 E+00	4	0
Cs-137	(C)	2.72 E+00	9.05 E-01	4.25 E+00	4	0

(I) Indicator Station
(C) Control Station

TABLE A-16.1

GAMMA SPECTROMETRY OF VEGETABLES

Results in pCi/kilogram (wet)

LOCATION	COLLECTION DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
9 Asparagus	870421	Cs-134	* 7.28 E-01	5.84 E+00
		Cs-137	* 7.48 E+00	6.17 E+00
		I-131	*-3.34 E+00	1.22 E+01
9 Asparagus	870519	Cs-134	*-2.69 E+00	3.52 E+00
		Cs-137	* 2.64 E+00	3.37 E+00
		I-131	* 8.06 E+00	1.14 E+01
9 Lettuce	870616	Cs-134	* 2.79 E+00	9.17 E+00
		Cs-137	* 7.73 E+00	8.22 E+00
		I-131	*-1.25 E+01	1.32 E+01
9 Lettuce	870721	Cs-134	*-3.00 E+00	6.10 E+00
		Cs-137	* 6.03 E+00	5.43 E+00
		I-131	* 1.98 E+00	1.40 E+01
9 Cabbage	870818	Cs-134	* 9.13 E+00	8.99 E+00
		Cs-137	* 1.95 E+01	9.52 E+00
		I-131	*-9.64 E+00	1.98 E+01
9 Cabbage	870922	Cs-134	*-5.71 E-01	5.93 E+00
		Cs-137	*-4.81 E+00	5.95 E+00
		I-131	*-5.81 E+00	1.08 E+01

*. Denotes a result less than the detection limit.

TABLE A-16.1 (Cont.)

GAMMA SPECTROMETRY OF VEGETABLES

Results in pCi/kilogram (wet)

LOCATION	COLLECTION DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
	(a)			
37 Lettuce	870616	Cs-134	*-7.24 E+00	8.05 E+00
		Cs-137	* 1.41 E+01	7.75 E+00
		I-131	* 9.46 E+00	1.53 E+01
37 Lettuce	870721	Cs-134	* 2.65 E+00	7.55 E+00
		Cs-137	* 1.34 E+01	7.81 E+00
		I-131	* 1.18 E+01	2.40 E+01
37 Lettuce	870922	Cs-134	* 7.71 E-01	6.37 E+00
		Cs-137	*-1.66 E+00	6.82 E+00
		I-131	* 4.81 E+00	9.89 E+00

* Denotes a result less than the detection limit.
(a) Vegetable samples were not available at Station 37, the Riverview area of Pasco, until June.

TABLE A-16.2

GAMMA SPECTROMETRY OF VEGETABLES - SUMMARY

Results in pCi/kilogram (wet)

NUCLIDE		AVERAGE	LOW	HIGH	NUMBER SAMPLES	NUMBER POSITIVE
I-131	(I)	8.69 E+00	4.81 E+00	1.18 E+01	3	0
I-131	(C)	-3.54 E+00	-1.25 E+01	8.06 E+00	6	0
Cs-134	(I)	-1.27 E+00	-7.24 E+00	2.65 E+00	3	0
Cs-134	(C)	1.06 E+00	-3.00 E+00	9.13 E+00	6	0
Cs-137	(I)	8.61 E+00	-1.66 E+00	1.41 E+00	3	0
Cs-137	(C)	6.43 E+00	-4.81 E+00	1.95 E+01	6	0

(I) Indicator Station
(C) Control Station

APPENDIX B: TELEDYNE ISOTOPES RESULTS FOR 1987 EPA INTERCOMPARISON SAMPLES

TABLE B-1

1987 EPA INTERCOMPARISON PROGRAM RESULTS

ISOTOPE	COLLECTION DATE	TI RESULTS (a)	EPA RESULTS (b)	OTHER LABS (c)
		MEDIUM - AIR FILTERS (pCi/cubic meter)		
Gr-Alpha	870410	18.33 ± 1.15	14.00 ± 5.00	15.49 ± 3.04
Gr-Beta	"	42.00 ± 2.64	43.00 ± 5.00	45.31 ± 5.02
Sr-90	"	15.66 ± 0.58	17.00 ± 1.50	17.52 ± 1.83
Cs-137	"	8.00 ± 1.00	8.00 ± 5.00	9.27 ± 2.10
Gr-Alpha	870828	11.00 ± 1.00	10.00 ± 5.00	10.47 ± 2.18
Gr-Beta	"	26.33 ± 2.89	30.00 ± 5.00	30.31 ± 4.32
Sr-90	"	9.33 ± 0.58	10.00 ± 1.50	9.55 ± 1.95
Cs-137	"	9.00 ± 1.00	10.00 ± 5.00	10.66 ± 1.87
		MEDIUM - FOOD (pCi/kilogram)		
Sr-90	870130	50.00 ± 2.83	49.00 ± 10.00	43.06 ± 10.17
I-131	"	74.00 ± 1.41	78.00 ± 8.00	80.90 ± 6.23
Cs-137	"	91.00 ± 5.66	84.00 ± 5.00	87.76 ± 5.04
K-40	"	984.00 ± 67.10	980.00 ± 49.00	984.23 ± 70.75
Sr-89	870731	18.67 ± 1.15	20.00 ± 5.00	20.36 ± 6.97
Sr-90	"	31.00 ± 1.00	30.00 ± 1.50	27.58 ± 3.92
I-131	"	88.00 ± 10.58	80.00 ± 8.00	81.11 ± 7.29
Cs-137	"	57.33 ± 5.51	50.00 ± 5.00	52.07 ± 4.65 (d)
K-40	"	1603.33 ± 201.08	1680.00 ± 84.00	1730.28 ± 146.68

* Footnotes are located at end of table.

TABLE B-1 (Cont.)

1987 EPA INTERCOMPARISON PROGRAM RESULTS

ISOTOPE	COLLECTION DATE	TI RESULTS (a)	EPA RESULTS (b)	OTHER LABS (c)
		MEDIUM - MILK (pCi/liter)		
I-131	870227	8.67 ± 0.58	9.00 ± 0.90	8.58 ± 1.50
Sr-89	870626	63.67 ± 2.51	69.00 ± 5.00	63.67 ± 14.21
Sr-90	"	39.66 ± 1.15	35.00 ± 1.50	34.29 ± 5.09 (e)
I-131	"	49.33 ± 3.21	59.00 ± 6.00	61.98 ± 5.91 (f)
Cs-137	"	77.00 ± 5.20	74.00 ± 5.00	75.22 ± 5.71
K-40	"	1533.33 ± 98.15	1525.00 ± 76.00	1576.61 ± 112.59

* Footnotes are located at end of table

TABLE B-1 (Cont.)

1987 EPA INTERCOMPARISON PROGRAM RESULTS

ISOTOPE	COLLECTION DATE	TI RESULTS (a)	EPA RESULTS (b)	OTHER LABS (c)
		MEDIUM - WATER (pCi/liter)		
Gr-Alpha	870123	18.33 ± 1.15	11.00 ± 5.00	10.15 ± 2.63 (g)
Gr-Alpha	870320	3.33 ± 0.58	3.00 ± 5.00	3.91 ± 1.35
Gr-Alpha	870417 (h)	36.33 ± 1.52	30.00 ± 8.00	28.38 ± 8.26
Gr-Alpha	870522	9.67 ± 0.58	11.00 ± 5.00	9.70 ± 3.06
Gr-Alpha	870724	6.33 ± 0.58	5.00 ± 5.00	4.71 ± 1.45
Gr-Alpha	870918	2.67 ± 0.58	4.00 ± 5.00	3.85 ± 1.45
Gr-Alpha	871021	40.67 ± 2.08	28.00 ± 7.00	27.96 ± 7.52 (i)
Gr-Alpha	871120	<1.0	7.00 ± 5.00	6.34 ± 2.11 (j)
Gr-Beta	870123	11.66 ± 0.58	10.00 ± 5.00	11.19 ± 2.30
Gr-Beta	870320	14.33 ± 0.58	13.00 ± 5.00	12.83 ± 2.36
Gr-Beta	870417	56.00 ± 1.73	66.00 ± 5.00	64.51 ± 7.31 (k)
Gr-Beta	870522	8.33 ± 0.58	7.00 ± 5.00	7.89 ± 2.17
Gr-Beta	870724	6.33 ± 0.58	5.00 ± 5.00	6.05 ± 1.79
Gr-Beta	870918	13.00 ± 1.00	12.00 ± 5.00	12.00 ± 2.23
Gr-Beta	871021	72.67 ± 1.53	72.00 ± 5.00	75.22 ± 9.28
Gr-Beta	871120	<1.0	19.00 ± 5.00	18.55 ± 3.67 (j)

* Footnotes are located at end of table

TABLE B-1 (Cont.)

1987 EPA INTERCOMPARISON PROGRAM RESULTS

ISOTOPE	COLLECTION DATE	TI RESULTS (a)	EPA RESULTS (b)	OTHER LABS (c)
		MEDIUM - WATER (pCi/liter) (Cont.)		
Sr-89	870109	22.66 ± 0.58	25.00 ± 5.00	23.28 ± 6.34
Sr-90	"	26.00 ± 0.00	25.00 ± 1.50	23.33 ± 2.83
Co-60	870206	50.33 ± 1.52	50.00 ± 5.00	50.40 ± 4.02
Zn-65	"	108.33 ± 2.51	91.00 ± 5.00	93.88 ± 8.14 (l)
Ru-106	"	100.33 ± 11.15	100.00 ± 5.00	95.01 ± 15.51
Cs-134	"	62.00 ± 5.57	59.00 ± 5.00	54.77 ± 3.45
Cs-137	"	92.00 ± 3.60	87.00 ± 5.00	87.31 ± 5.42
H-3	870213	4100.00 ± 200.00	4209.00 ± 421.00	4155.66 ± 417.
Ra-226	870313	7.50 ± 0.10	7.30 ± 1.10	6.96 ± 0.92
Ra-228	"	5.87 ± 0.60	7.50 ± 1.13	7.72 ± 1.96 (m)
I-131	870413	6.67 ± 0.58	7.00 ± 0.70	7.26 ± 1.08
Ra-226	870417 (h)	3.80 ± 0.10	3.90 ± 0.60	3.75 ± 0.42
Ra-228	"	3.86 ± 0.25	4.00 ± 0.60	4.20 ± 0.96
Sr-89	"	16.33 ± 0.58	19.00 ± 5.00	17.38 ± 4.35
Sr-90	"	9.33 ± 0.58	10.00 ± 1.50	9.98 ± 1.56
Co-60	"	8.00 ± 1.00	8.00 ± 5.00	9.04 ± 1.95
Cs-134	"	15.33 ± 1.52	20.00 ± 5.00	18.19 ± 2.57
Cs-137	"	12.33 ± 1.15	15.00 ± 5.00	15.68 ± 2.17
Sr-89	870508	40.33 ± 2.31	41.00 ± 5.00	38.96 ± 7.10
Sr-90	"	21.33 ± 0.58	20.00 ± 1.50	19.57 ± 2.86

* Footnotes are located at end of table

TABLE B-1 (Cont.)

1987 EPA INTERCOMPARISON PROGRAM RESULTS

ISOTOPE	COLLECTION DATE	TI RESULTS (a)	EPA RESULTS (b)	OTHER LABS (c)
		MEDIUM - WATER (pCi/liter) (Cont.)		
Cr-51	870605	<53.33	41.00 ± 5.00	39.25 ± 13.80
Co-60	"	63.00 ± 4.36	64.00 ± 5.00	64.80 ± 4.25
Zn-65	"	<9.67	10.00 ± 5.00	10.93 ± 2.32
Ru-106	"	72.00 ± 11.79	75.00 ± 5.00	72.58 ± 10.71
Cs-134	"	34.66 ± 1.52	40.00 ± 5.00	36.71 ± 3.36
Cs-137	"	79.00 ± 4.36	80.00 ± 5.00	79.59 ± 5.19
H-3	870612	2800.00 ± 100.00	2895.00 ± 357.00	2784.83 ± 292.83
Ra-226	870619	7.30 ± 0.17	7.30 ± 1.10	6.98 ± 1.23
Ra-228	"	17.23 ± 0.70	15.20 ± 2.28	13.52 ± 3.64
I-131	870807	58.67 ± 0.58	48.00 ± 6.00	47.19 ± 4.87 (n)
Ra-226	870911	9.70 ± 0.17	9.70 ± 1.46	9.03 ± 1.34
Ra-228	"	7.97 ± 0.29	6.30 ± 0.95	6.63 ± 1.69
Cr-51	871009	90.67 ± 11.59	70.00 ± 5.00	68.82 ± 8.87 (o)
Co-60	"	16.33 ± 0.58	15.00 ± 5.00	16.39 ± 2.00
Zn-65	"	50.67 ± 0.58	46.00 ± 5.00	47.24 ± 4.66
Ru-106	"	55.67 ± 4.04	61.00 ± 5.00	60.21 ± 9.68
Cs-134	"	25.67 ± 0.58	25.00 ± 5.00	24.44 ± 2.45
Cs-137	"	54.67 ± 2.08	51.00 ± 5.00	51.78 ± 2.99
H-3	871016	4300.00 ± 100.00	4492.00 ± 449.20	4386.34 ± 299.16

* Footnotes are located at end of table

TABLE B-1 (Cont.)

1987 EPA INTERCOMPARISON PROGRAM RESULTS

ISOTOPE	COLLECTION DATE	TI RESULTS (a)	EPA RESULTS (b)	OTHER LABS (c)
		MEDIUM - WATER (pCi/liter) (Cont.)		
Ra-226	871021	4.77 ± 0.15	4.80 ± 0.72	4.72 ± 0.72
Ra-228	"	3.30 ± 0.30	3.60 ± 0.54	3.91 ± 0.74
Sr-89	"	14.67 ± 0.58	16.00 ± 5.00	15.21 ± 3.63
Sr-90		9.67 ± 0.58	10.00 ± 1.50	9.85 ± 1.29
Co-60		19.32 ± 2.52	16.00 ± 5.00	16.57 ± 2.23
Cs-134	"	14.33 ± 2.52	16.00 ± 5.00	15.67 ± 2.59
Cs-137	"	25.00 ± 3.61	24.00 ± 5.00	24.29 ± 2.20
I-131	871204	26.33 ± 1.53	26.00 ± 6.00	26.61 ± 3.14

* Footnotes are located at end of table.

TABLE B-1 (Cont.)

1987 EPA INTERCOMPARISON PROGRAM RESULTS

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

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) Units for food analysis are pCi/kilogram except K-40 which is mg/kilogram.

(d) The Cs-137 results in EPA Foods have typically been biased high. Teledyne is in the process of performing annual calibrations. A new Amersham mixed gamma standard is being used rather than the most recently prepared NBS standard which is now several years old. Based on preliminary results the three Cs-137 values would be 52.1, 50.3 and 50.9, pCi/kilogram which average 51.1 pCi/kilogram.

(e) The reported high result was due to small aliquot available for the Sr-90 analysis. Inadvertently a larger aliquot was used for another analysis leaving 40% of the normal volume for Sr-90. Additionally, the narrow acceptance limits defined by EPA are particularly difficult to meet. For this analysis 63% of the participants were beyond the ± 3 sigma limit.

(f) The low result is attributed to the application of the resin method rather than the hydroxide method to this analysis. The resin method is inefficient at absorbing protein-bound iodine thus leading to low results. The results obtained by GeLi were higher.

(g) No aerosol solution was added to the planchets in the final stages of preparation in order to create a more efficient counting geometry. The technicians in the alpha beta laboratory have been instructed to add the aerosol in accordance with procedures.

(h) Lab Performance Evaluation

(i) Uneven distribution of residue on planchet, probably because of aerosol omission. The residue from the original planchets was dissolved, evaporated and remounted using aerosol. The counting results then became accurate (29±3, 30±3, 26±3 pCi/liter). The analysts have been reminded to use aerosol when mounting evaporated liquids.

TABLE B-1 (Cont.)

1987 EPA INTERCOMPARISON PROGRAM RESULTS

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

Notes: (Cont.)

(j) The EPA sample was not analyzed. A newly trained technician misinterpreted the Sample Receipt Form and proceeded to dilute and analyze instead an in-house blank of deionized water. In the future, all dilutions will be performed by the laboratory supervisor or the laboratory manager to ensure accuracy.

(k) A correction factor was applied to the results to compensate for low energy beta emitters which did not adequately compensate for the low energy beta emitters present in the sample.

(l) No reason could be ascertained for the high result for Zn-65. Previous results had a normalized deviation from the known of -0.34 pCi/liter (10/10/86) and 0.58 pCi/liter (06/06/86). Therefore this does not appear to be a trend. Further cross-checks will be studied for any problems.

(m) A new radiochemical method is being developed for this analysis which should give more accurate results.

(n) Erroneously high electrode reading of stable iodide in sample (possibly because of interfering species such as S--) leading to erroneously low chemical yields. After repeating the electrode reading, the calculated average I-131 is 49.6 pCi/liter. Technicians have been made aware to be suspicious of high electrode readings. When unusually high readings occur samples will be diluted and/or oxidized, and remeasured.

(o) The data for the Cr-51 results were reviewed. The detector efficiencies appear to be correct. The other five isotopes measured in this sample were within two standard deviations indicating there is no systematic error. Chromium-51 is difficult to measure at this activity level because of the low branching intensity of the gamma ray and being in the high background region of the spectrum since Cr-51 has a low energy ray.

APPENDIX C: SAMPLE DEVIATIONS

Sample Deviations

Deviations from the 1987 sampling schedule or from analytical procedures are listed in Table C-1. In each case, the problems resulting in the deviations were resolved, so no long-term impact on the program resulted.

The majority of the sampling problems encountered during 1987 involved the malfunction of air samplers and the composite water sampler on the plant discharge line, Station 27. New timers were installed in all air samplers to ensure that when the sampler pump stops functioning, the timer also stops. This modification is expected to reduce the number of air filter sampler and charcoal cartridges that have to be processed for gross count, i.e., total activity, because the air volume sampled can not be determined. Steps taken to remedy the operational problems with the composite water sampler on the discharge line included installation of a new sampling line and sampling system, including a new sampler that can be operated in the flow proportional mode. Installation of the flow meter for that sampler plus the associated wiring changes that will permit flow proportional sampling will be completed in 1988. This change will ensure flow proportional sampling as required by the Technical Specifications, despite variable discharge flow rates.

TABLE C-1

1987 SAMPLE DEVIATIONS

SAMPLE MEDIA	COLLECTION PERIOD/DATE	SAMPLE LOCATION	PROBLEM
Air Particulate/ Air Iodine			
	870126 to 870202	21	Power to sampler shut off accidentally for one day.
	870209 to 870217	48	Low cfm; sampler repaired.
	870217 to 870223	9	Power outage due to work on line and shortened sampling time
	870323 to 870330	5	Pump and timer failure; sample submitted for gross count
	870420 to 870427	1	Power outage; breaker tripped; shortened sampling time
	870427 to 870429	1	Power outage; breaker tripped; shortened sampling time
	870504 to 870511	1	Power outage; breaker tripped; shortened sampling time
	870511 to 870518	1	Power off to repair line; shortened sampling time
	870526 to 870601	21	Power outage; shortened sampling time
	870608 to 870615	40	Small power outage; shortened sampling time
	870629 to 870706	4	Blown fuse; shortened sampling time
	870713 to 870720	7	Pump out and timer malfunction; sample submitted for gross count

TABLE C-1 (Cont.)

1987 SAMPLE DEVIATIONS

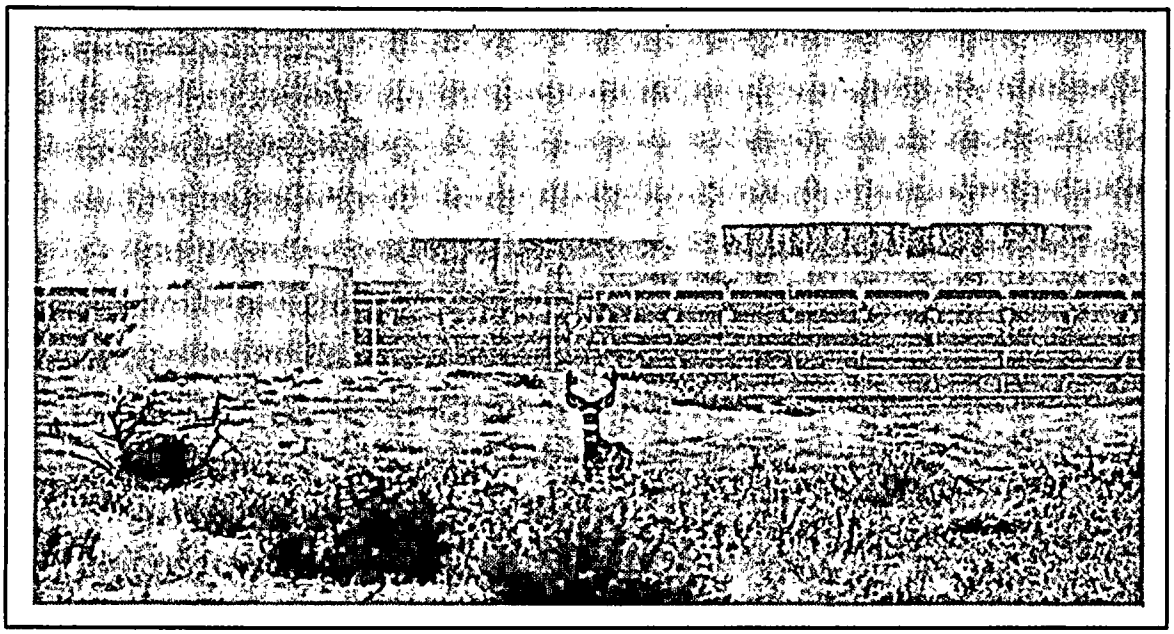
SAMPLE MEDIA	COLLECTION PERIOD/DATE	SAMPLE LOCATION	PROBLEM
Air Particulate/ Air Iodine (Cont.)	870831 to 870908	23	Pump out and timer malfunctioning; sample submitted for gross count
	870921 to 870928	23	Power outage at the Benton Switching Station; no sample collected
	870928 to 870930	23	Pump out; shortened sampling time
	871207 to 871214	40	Blown fuse; shortened sampling time
Water	861217 to 870121	28	Sampler leaked so collected a larger volume than usual
	870106	27	Sampler line plugged; line cleared and sampling resumed
	870121 to 870122	28	Sampler removed for repair; returned to service on January 22, 1987
	870513 to 870610	27	Plant Maintenance Outage; sample not available.
	870812 to 870825	27	Composite water dumped by workmen installing new sample line and sampler
	870812 to 870916	26, 27, 28, 29	These samples were inadvertantly not analyzed for gross beta activity until October 20, 1987. The LLD remained at 1.0 pCi/liter.
	870909 to 870914	27	Sampling pump lost prime, so sampler not operational.
	871020 to 871023	27	Sampler out of service for installation of flow switch

TABLE C-1 (Cont.)

1987 SAMPLE DEVIATIONS

SAMPLE MEDIA	COLLECTION PERIOD/DATE	SAMPLE LOCATION	PROBLEM
Vegetable/ Fruit/Root	870421		No vegetable samples available in Pasco (Station 37); asparagus collected in Grandview (Station 9) and at a special location in North Pasco (Station 99)
	870519		No vegetable samples available in Pasco (Station 37); asparagus collected in Grandview (Station 9)
Fish	870513		Fish sampling delayed one week due to lack of personnel for electrofishing
Direct Radiation (TLDs)	Annual Distribution		Station 49 dosimeter was lost; replaced on September 29, 1987

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM ANNUAL REPORT PLANT 2



1986

WASHINGTON PUBLIC POWER
SUPPLY SYSTEM

1986 Radiological Environmental Monitoring Program

Annual Report - Plant 2

April 1987

Approvals:

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WASHINGTON PUBLIC POWER SUPPLY SYSTEM

NUCLEAR PLANT NUMBER 2

RADIOLOGICAL ENVIRONMENTAL

MONITORING PROGRAM

1986 ANNUAL REPORT

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1.0 INTRODUCTION

The Radiological Environmental Monitoring Program (REMP) for Plant 2 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[1] and 10CFR50[2] criteria for releases of radioactive effluents are met, the REMP provides supplemental verification that the concentrations of radionuclides actually in the environment are not greater than anticipated.

The REMP is designed to conform to regulatory guidance provided by Regulatory Guides 4.1 and 4.8, including the Radiological Assessment Branch Technical Position (BTP)[3], taking into account site specific characteristics. 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 of the background levels of radioactivity, due to differences in geologic composition, weapons test fallout, meterological conditions and seasonal changes, is reflected in that preoperational data.

Any radiological effect of the plant on its environment must be distinguished from the normal variation in background radiation levels. 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 prevent further releases. The results of environmental measurements made during CY 1986 and the assessment and comparison of these results to the measurements made during the preoperational, 1984 and 1985 monitoring periods are presented in this report.

Analysis of the REMP environmental samples during the first five months of 1986 was performed by U.S. Testing Company, Richland, Washington. Beginning June 1, 1986, Teledyne Isotopes, Westwood, New Jersey, provided sample analysis for the REMP. Processing of the thermoluminescent dosimeters used in the REMP to determine direct radiation was performed by the Supply System External Dosimetry Laboratory under the Radiological Programs and Standards Department.

2.0 PROGRAM DESCRIPTION

The Radiological Environmental Monitoring Program for Plant 2 utilizes ten different types of sample media to evaluate the concentrations of radioactivity in the air, water, milk, fish and garden produces in the region immediately surrounding the plant. In addition, thermoluminescent dosimeters (TLDs) are used to measure the direct radiation resulting from plant operation.

The REMP plan, presented in Table 2-1, summarizes the sample locations, collection frequency and types of analyses 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 the major exposure pathways for the radionuclides potentially released from the plant to the surrounding environment.

2.1 Sample Locations

The plant site is located in a sparsely populated region on a shrub-steppe within the Hanford Reservation. It is surrounded on all sides by unoccupied desert land which is dedicated primarily to nuclear activities. The nearest privately owned lands are located east of the Columbia River and are spread over six compass sectors. The prevailing wind direction from the south, southwest, and west makes this farming region an ideal area for REMP sample locations.

The number and locations of monitoring stations is based not only on factors such as population distribution and meteorological conditions, but also on station accessibility and security throughout the year and applicable regulations.

Seventy-five locations were included in the 1986 monitoring program. Sixty-nine indicator and two control, i.e. background, locations were within 10 miles (16 kilometers) of Plant 2 containment. Three additional control stations were 26.5 miles ESE, 30 miles WSW, and 36 miles SW from the plant. Sample stations are listed by meteorological sector, sample media and approximate distance from plant in Table 2-2.

Maps of the REMP sampling locations described in Tables 2-1 and 2-2 are presented in Figures 2-1 and 2-2 for locations within and outside the 10 mile radius, respectively.

2.2 Land Use Census

In August the annual land use census was performed, as required by Plant Technical Specificatons.[4] One purpose of the land use census is to identify, within a distance of 5 miles, the locations of the nearest milk animal, residence and garden greater than.50 m^2 in each of the 16 meteorological sectors. Another objective of the census 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 exposure pathway would be initiated at that new site.

The results of the 1986 land use census within 5 miles are given in Table 2-3. No milk animals are located within the 5 mile radius. The closest milk locations are at 6.3 miles SE and 5.8 miles NE. Current milk sampling is performed at sites 6.4 miles SE, 7.2 miles ESE, 8.6 miles SE. Because the calculated dose estimates for the two new sites was not significantly greater than those for the existing sampling sites and milk cows are not consistently present at the location in the SE sector, no changes were made in milk sampling locations as a result of the land use census. The gardens located by the land use census were not irrigated by Columbia River water, so no vegetation sampling will be conducted at these locations.

Two new milk sampling sites were added to the 1986 monitoring program as a result of other circumstances. The Bumpaous farm on Taylor Flats Road (Station 58) was included because the Cook/Buckanan farm, (Station 35) ceased operation. The Ramerman farm near Grandview (Station 96) was added because it provided a more appropriate control milk sample. The feed used there is predominately homegrown.

Two new fruit and vegetable locations were identified in the Riverview area of Pasco: the Harris produce stand on Court Street and the Olsen's popcorn and produce stand on Road 100. A water pumping station located 15.8 river miles downstream from the discharge site supplies irrigation water to these two new sites.

TABLE 2-1

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, 4-9, 21, 23, 40, 48, and 57	Continuous sampling Weekly collection	Particulate: Gross beta[d], weekly; gamma isotopic[e] quarterly composite (by location)
Soil[f] (0/5)	9, 1, 7, 21 and 23	Annually	Gamma isotopic[e]
2. DIRECT RADIATION			
TLD[g] (34/56)	1-9, 10-25, 40-47, 49-51, 53-56, 71-86 (S1-S16)[h]	Quarterly, annually	Gamma, quarterly data review
PIC[i] (0/3)	1, 21, and 23	Continuous recording, monthly tape exchange	Gamma, monthly data review
3. WATERBORNE			
Surface/ Drinking Water[k] (3/4)	26, 27, 28 and 29	Composite aliquots[j] monthly	Gamma isotopic[e], Gross Beta; Tritium quarterly composite
Ground Water (2/3)	31, 32, and 52	Quarterly	Gamma isotopic[e] and tritium, quarterly
Sediment from shoreline (1/2)	33 and 34	Semiannually	Gamma isotopic[e]

TABLE 2-1 (Cont.)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM PLAN

Sample Type[a]	Sample Location Code[b]	Sampling and Collection Frequency[c]	Type and Frequency of Analysis
4. INGESTION			
Milk[l] (4/4)	9, 35[m], 36, 40, 58, 96[n]	Semimonthly during grazing season, monthly at other times	Gamma isotopic[e] Iodine-131
Fish[o] (2/2)	30 and 38, or 39	Seasonal or Semiannually	Gamma isotopic[e]
Garden Produce[f] (1/2)	37 and 9	Monthly during growing season in the Riverview area of Pasco and a control near Grandview	Gamma isotopic[e]

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

[b]The underlined sample location designates a control station.

[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 C.

[d]Particulate sample filters will be analyzed for gross beta after at least 24-hour decay. If gross beta activity is greater than 10 times the mean of the result for the control Station 9A, gamma isotopic analysis should 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 the facility.

[f]Soil samples are collected to satisfy the requirements of the WNP-2 Site Certification Agreement (SCA).[5]

TABLE 2-1 (Cont.)

(g)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 (ANSI N545-1975), except for specified energy-dependence response. Correction factors are available for energy ranges with response outside of the specified tolerances.

(h)TLD stations 71-86 are special interest stations and are not included among the 34 routine TLD stations required by Plant Technical Specifications, Table 3.12-1. Their alternate designations are S1-S16.

(i)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.

(j)Composite (integrated grab) samples are collected with equipment which is capable of collecting an aliquot at time intervals which are short relative to the compositing period.

(k)Station 26, Plant 2 makeup water intake from the Columbia River is both an upstream surface water sample and drinking water control sample location. Station 28, 300 Area sample is both a downstream surface water sample and drinking water sample. Two week composite sample analysis for Iodine-131 is initiated when the dose calculated for the consumption of water is greater than 1 mrem per year maximum organ dose using ODCM methodology and parameters.

(l)Milk samples will be obtained from farms or individual milk animals which are located in sectors with high calculated annual average ground-level D/Qs and high dose potential. Routine milk samples are collected in areas of high dose potential instead of within 5 kilometers, due to location of milk animals. If cesium-134 or cesium-137 is measured in an individual milk sample in excess of 30 pCi/l, then strontium-90 analysis will be performed.

(m)Station 35 discontinued milk production in May 1986. It was replaced in June by Station 58.

(n)Station 96 was added as the control station in April 1986. This dairy utilized home grown hay instead of buying hay from the North Pasco area.

(o)There are no commercially important species in the Hanford reach of the Columbia River. Most recreationally important species in the area are anadromous, primarily salminoids. Four fish specimen will normally be collected by electroshock technique in the vicinity of the plant discharge (Station 30). If electroshocking produces insufficient fish samples, anadromous species may be obtained from a catch pond at Ringold Fish Hatchery (Station 39).

TABLE 2-1 (Cont.)

(p) 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 sample will be dependent on seasonal availability.

TABLE 2-2

REMP SAMPLE LOCATIONS BY SECTOR

SECTOR[a]	STATION[b] NUMBER	DISTANCE[c] MILES	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)	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	4.3	6919	AP/AI
	39	4.4	7084	FI
	46	4.7	7562	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	4.2	6758	TLD
	44	5.7	9171	TLD
	35	10.5	16895	MI

TABLE 2-2 (Cont.)

REMP SAMPLE LOCATIONS BY SECTOR.

SECTOR[a]	STATION[b] NUMBER	DISTANCE[c] MILES	METERS	SAMPLE TYPE[d]
E (5)	75(5S)	0.4	644	TLD
	22	2.1	3379	TLD
	10	3.1	4988	TLD
	26	3.2	5149	PW
	27	3.2	5149	DW
	30	3.3	5311	FI
	43	5.7	9171	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	4.7	7562	AP/AI/TLD
	42	5.6	9010	TLD
	36	7.2	11585	MI
	5	7.7	12389	AP/AI/TLD
	38	26.5	42639	FI
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
	58	8.6	13838	MI

TABLE 2-2 (Cont.)

REMP SAMPLE LOCATIONS BY SECTOR

SECTOR[a]	STATION[b] NUMBER	DISTANCE[c] MILES	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	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)	0.74	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
	9[e]	30.0	48270.	AP/AI/MI/GP/ TLD/SO
W (13)	83(13S)	0.5	805	TLD
	15	1.4	2253	TLD

TABLE 2-2 (Cont.)

REMP SAMPLE LOCATIONS BY SECTOR

SECTOR[a]	STATION[b] NUMBER	DISTANCE[c] MILES	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 the Plant 2 plant 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 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
AP - Air Particulate
AI - Air Iodine
SE - Sediment
FI - Fish
MI - Milk
PW - Drinking/ Surface Water
GW - Ground Water
DW - Discharge Water
GP - Garden Produce

(d) Station 9 designates the Sunnyside-Grandview control area for TLD, AI/AP, SO, and GP and is actually 3 separate stations within a few miles of each other and all within 30-35 miles of Plant 2. Station 96, which is the new control station for milk, is also located within the control area. It is 36 miles from Plant 2.

TABLE 2-3

DISTANCES IN MILES TO NEAREST POINTS OF INTEREST

WITHIN THE FIVE MILE RADIUS FROM PLANT 2 CONTAINMENT

Sector[a] Parameter	Resident	Garden ($>50m^2$)	Dairy[b] Animals	Livestock
NE	4.2	4.2	0	0
ENE	3.8	3.8	0	0
E	4.4	4.5	0	4.5
ESE	4.1	4.3	0	4.8
SE	4.8	4.8	0	0

[a] Eleven of the sixteen compass 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.

[b] The closest dairy animal locations are at 6.3 miles SE, 6.4 miles ESE and 7.2 miles ESE.

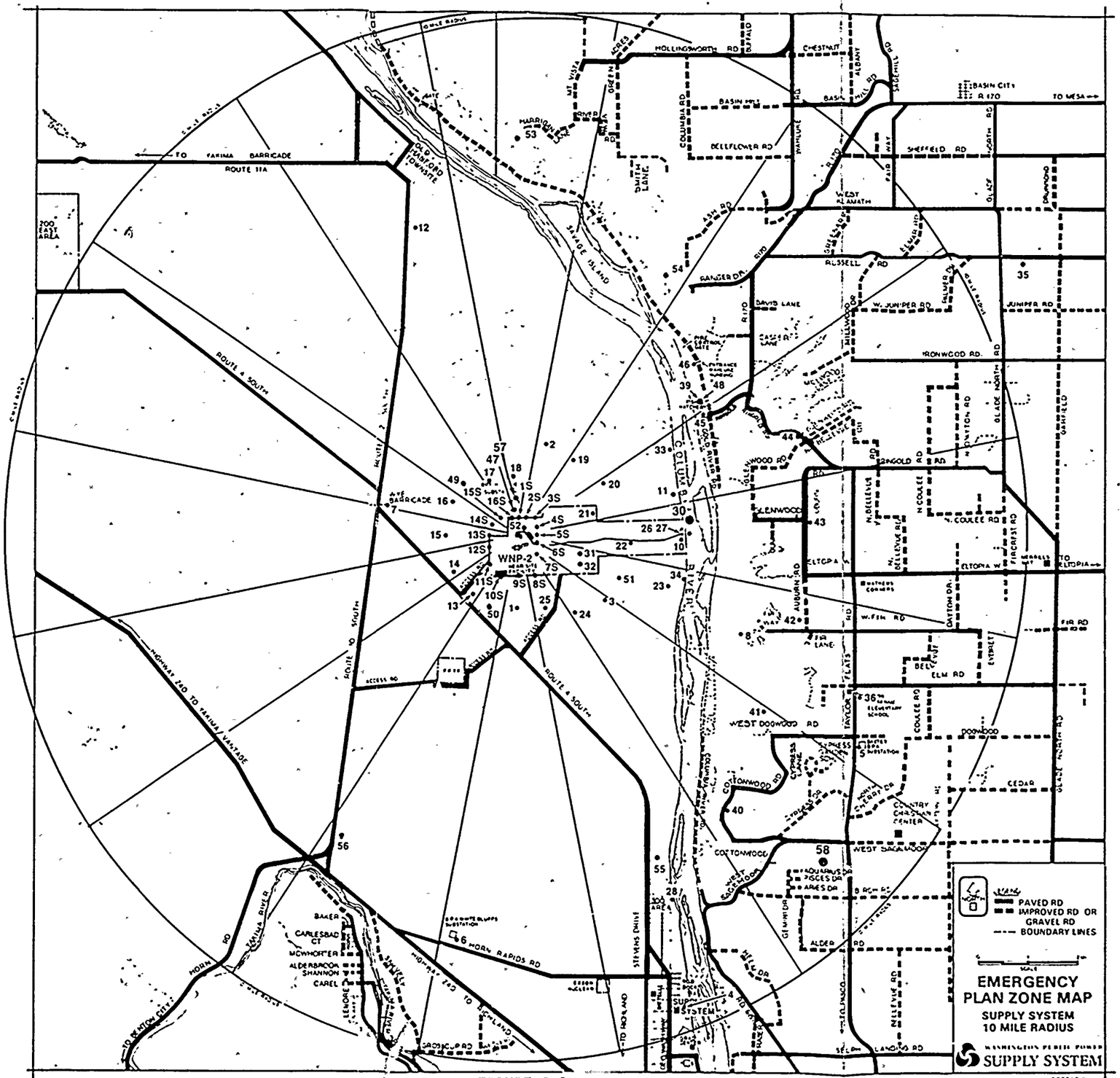


FIGURE 2-1
REMP SAMPLING LOCATIONS WITHIN 10 MILE RADIUS

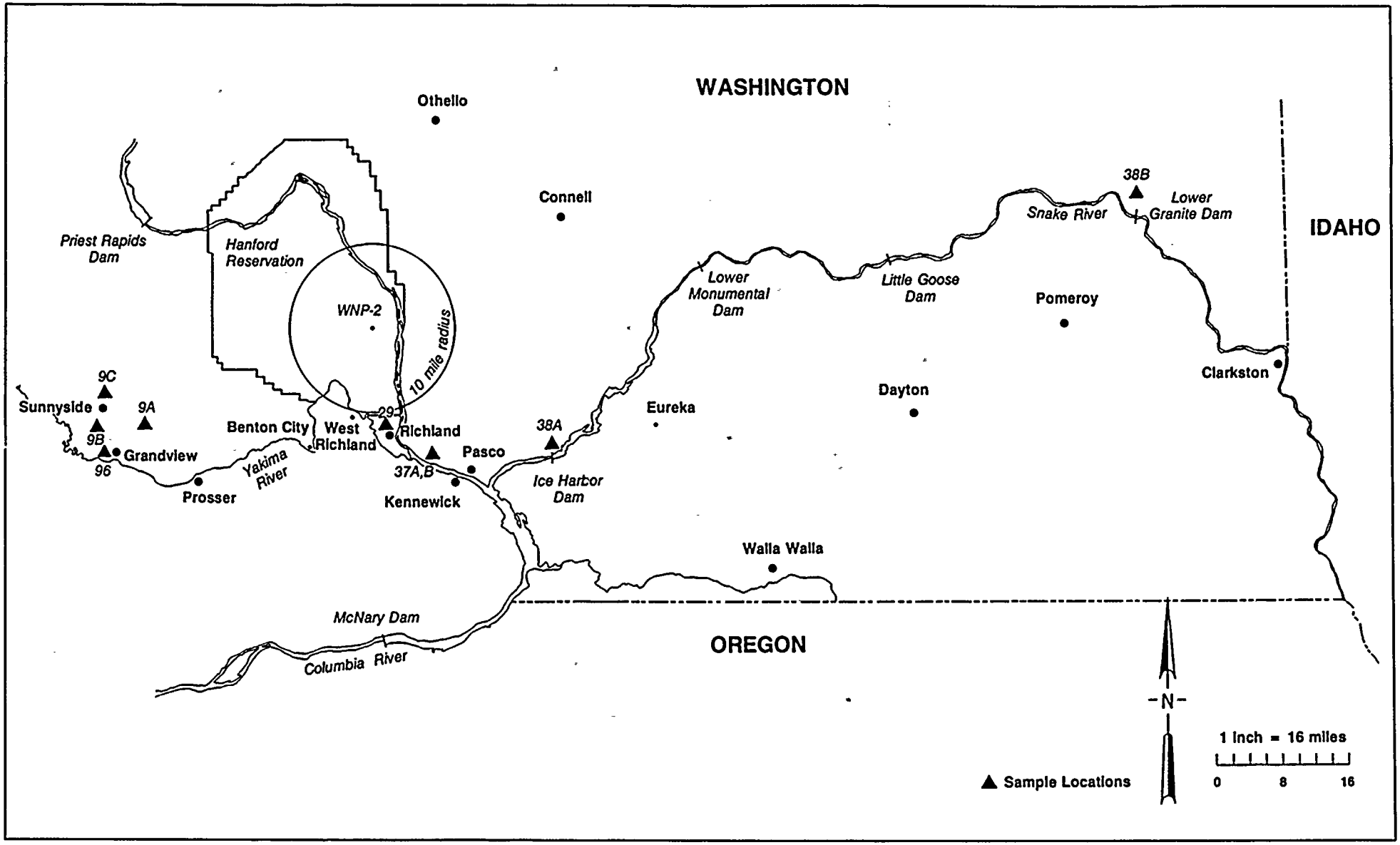


FIGURE 2-2
REMP SAMPLING LOCATIONS OUTSIDE THE 10 MILE RADIUS

2.3 Sampling in Response to the Chernobyl Accident

Following the Chernobyl nuclear accident in late April 1986, the Supply System REMP began an augmented sampling program in order to document the effect of the resulting fallout on local environmental radiation levels. In addition to the routine sample collection, the following special samples were collected during the months following the accident:

Sample Media	Number of Stations	Collection Frequency
TLD	16	Weekly (from 5/01 to 7/03)
Air particulate/ iodine	2	Every 3-4 days (from 5/02 to 6/20)
Milk	2	Weekly to biweekly (from 5/06 to 6/11)
	1	Daily (DSHS) (from 5/08 to 5/30), then weekly (from 6/02 to 6/30)
Vegetation	1	3 times (from 5/14 to 5/28)
Poultry/eggs	1	Twice (6/04 and 8/25)

All samples, except the daily and weekly milk samples collected for the Washington State Department of Social and Health Services (DSHS), were processed in the same manner as routine samples. The results of these special samples collected after the Chernobyl accident are presented in Appendix B, Tables B-1 through B-9.

3.0 SAMPLING METHODS

The collection of environmental samples for the REMP was performed according to the schedule in Table 2-1. All samples were collected by Supply System personnel. The 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.

3.1 Direct Radiation

Thermoluminescent dosimeters (TLDs) were used to determine the direct radiation levels at fifty-six (56) monitoring locations. The environmental dosimeter consists of a card containing $CaSO_4$:Dy phosphor (25%) 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 overresponse to low energy photons[6]. 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.

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 control dosimeters that accompanied the field dosimeters to and from the field locations.

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 to 100 mR of Cs-137 gamma, in order to determine dose response (i.e, calibration) factors for each dosimeter. The calibration factors were used to determine the total exposure received by each TLD.

Until late 1985, the Site Certification Agreement for Plant 2 required the use of pressurized ion chambers (PICs) to measure direct radiation at three locations on the site boundary. Because of lightning damage to these units and frequent malfunctioning, the requirement for the routine use of the PICs was waived. The units are currently maintained for use in special monitoring situations or as back-up monitoring systems. Solar panels have been constructed for the units to eliminate the occurrence of power surges and lightning damage.

3.2 Airborne Particulate/Air 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 9 are considered control, or background, samples; the ones drawn at the other locations are indicator samples. Air particulates were collected by drawing air through a 47 mm diameter glass fiber filter. Air iodine was collected by drawing air through a 57 mm 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 weather 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.

3.3 Water

The water sampling network consists of seven sampling locations: four for evaluation of surface/drinking water and three for the evaluation of groundwater. The surface/drinking water stations are located at

the plant intake and discharge lines, the DOE 300 Area river intake and the Richland Water Treatment Plant. The sample drawn from the plant intake line is considered the control sample, while the samples drawn from the other locations are indicator samples. A Collins Model 42 composite sampler is installed at each of these locations to periodically collect 25-ml aliquots of water, which 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.

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, in order to inhibit biological growth and plateout of dissolved ions on the bottle wall. One gallon 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 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. No strontium or iodine-131 analyses were performed on drinking water during 1986. The strontium-90 analysis was performed on several water samples taken from the plant discharge line.

The 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 on the WNP-1 site (1.2 miles downgradient from Plant 2). Water from the Plant 2 well is used as a back up source for drinking and fire protection. Water from the WNP-1 wells supplies some of the drinking and fire protection water for WNP-1 site and supplies drinking

water to the Plant Support Facility at Plant 2. 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 samples were not acidified.

3.4 Soil

Soil samples were collected once during 1986, as required by the Site Certification Agreement. Samples were taken from five locations. The sample taken at Station 9 is the control sample, while the other four samples are indicator samples. Each sample was taken from an area of approximately one square foot to a depth of approximately one inch. Approximately two kilograms of soil were used in each sample.

Each sample was submitted for gamma isotopic analyses. Two of the samples were submitted for strontium analysis because their results were greater than ten times the control location result.

3.5 Shoreline Sediment

Two shoreline sediment samples were collected twice during 1986 in accordance with the routine sampling schedule. Nonroutine sediment sampling was also performed during the year in order to obtain additional data.

One sediment sampling location (Station 33) is approximately two miles upstream and the other location (Station 34) is approximately one mile downstream of the liquid effluent discharge point. Samples were scooped from underwater 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 delivered or shipped to the analytical contractor within a day or two of collection.

3.6 Fish

Fish sampling was performed during two weeks in April and September, when the likelihood of obtaining anadromous* species was high. Fish samples collected from the Columbia River (Station 30) were indicator samples, while the fish collected on the Snake River (Station 38) were control samples.

Four separate fish samples, an anadromous species and three other species generally considered edible, or potentially edible, types, such as carp, catfish and whitefish, were collected at each location. Most of the fish were collected through the use of electroshock, but samples of the anadromous species were also collected from the Ringold Fish Hatchery on the Columbia River and the fish trap at Ice Harbor Dam 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 over night, and delivered or shipped to the analytical contractor.

3.7 Milk

Milk samples were collected monthly during January, February, March, October, November and December and semi-monthly 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 frozen overnight and delivered or shipped to the analytical contractor.

Routine samples were collected from three indicator locations (Stations 35, 36 and 40) across the Columbia River in Franklin County and from the control location (Station 9) near Sunnyside during the first four months of 1986. Milk production at Station 35 was discontinued, however, in May so a replacement sampling site was located in Franklin

*Fish species known to ascend rivers from the sea for breeding.

County and sampling began there in June. A new control location was established in April near Sunnyside when it was learned that the existing control station, Station 9, was feeding hay from farms in the region northeast of the plant instead of hay grown in the Grandview/ Sunnyside area. Station 9 is now considered an indicator station. The new control location, Station 96, is located in the southwest sector, approximately 36 miles from the plant.

3.8 Garden Produce

Samples of local garden produce were collected monthly during the four months from June 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 the predominant downwind direction from the plant (Station 37), where crops are irrigated with Columbia River water. The control samples were obtained from produce stands in the Sunnyside area (Station 9), the direction least likely to be affected by plant effluents.

4.0 ANALYTICAL PROCEDURES

The analytical procedures used for the 1986 REMP samples are described below. Since Teledyne Isotopes took over the analytical contract from U.S. Testing on June 1, 1986, the analytical procedures used by both contractors are included in the following sections. Except for the determination of tritium in water and iodine-131 on charcoal cartridges, there are few significant differences between the procedures used by the two contractors.

4.1 Gross Beta Activity on Particulate Filters

4.1.1 U.S. Testing Procedure:

The particulate filters were stored under cover for about one week before they were counted, in order to allow for the decay of natural radioactivity collected on the filters. The filters were counted directly with beta counters for at least 50 minutes.

4.1.2 Teledyne Procedure:

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, supplied by the Supply System, was counted as the blank.

4.2 Measurement of Gamma Emitters

4.2.1 U.S. Testing Procedures:

Water

Water samples were well mixed, acidified and evaporated down to a volume of approximately 50 ml. The samples were then adjusted to 50,100 or 200 ml with deionized water and counted for at least 50 minutes.

Milk

The milk samples were transferred to a 500 ml Marinelli beaker and counted on a germanium detector for at least 500 minutes.

Foodstuff

The edible portion of foodstuff was transferred to a tared Marinelli beaker or other container, weighed and counted with a germanium detector.

Soils and Sediments

Soil/sediment samples were dried in an oven at 105°C for 24 hours. The samples were then weighed and passed through a 2 mm stainless steel sieve to remove extraneous material. The dried, sieved samples were then transferred to a tared Marinelli beaker, weighed and submitted for counting with a germanium detector.

Charcoal Cartridges (Air Iodine)

Charcoal filters were placed into a plastic bottle, making sure that the flow arrow was facing upward. The filters were then counted for at least 50 minutes on a germanium detector.

Air Particulate Filters

The filters collected throughout the quarter for each station were placed in a plastic bottle and counted on a germanium detector.

Samples were prepared for direct counting in one of several standard counting geometries. The samples were then counted on a germanium detector for a period that would ensure meeting the specified detection limit. Reduction of a gamma ray pulse height spectrum was accomplished using a Nuclear Data Systems ND6700 (ND) computer and ND software.

The pulse height analysis program for spectra obtained using germanium detection, analyzed the spectra by locating the peaks, determining the centroid values for the peaks, calculating their corresponding energies in KeV, the area for each peak, and the associated standard deviation. The areas of the peaks were calculated by summation of the number of counts in each channel of the peak, without assuming a gaussian peak shape. The peak areas were converted to activity units per sample units by applying efficiency factors determined by using NBS traceable standards, corrected for the counting geometry and sample aliquot factor, when needed.

4.2.2 Teledyne Procedures:

Milk and Water

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

Food Stuff

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

Soils and Sediments

A large quantity of the sample was dried at a low temperature, less than 100°C. As much sample as possible was loaded into a tared 1-liter Marinelli and weighed. The sample was then counted for at least six hours with a shielded Ge(Li) detector.

Charcoal Cartridges (Air Iodine)

Charcoal cartridges 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 I-131 of each charcoal cartridge was determined (assuming no positive I-131) uniquely from the volume

of air which passed through it. In the event I-131 was observed in the initial counting of a set, each charcoal cartridge was then positioned separately on the face of the detector and counted.

Air Particulate Filters

Three air particulate filters for a quarterly composite for each field station were aligned one in front of another and then counted for at least six 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.

4.3 Gross Beta Activity in Water

4.3.1 U.S. Testing Procedure:

A 500 ml aliquot of the sample was acidified, using concentrated nitric acid, and evaporated to dryness. After transfer to a planchet using 2 M HNO_3, the sample was again evaporated to dryness, cooled and then counted on a beta counter. The beta counting efficiency was based on a Cs-137 standard, corrected for self absorption. The activity determined for the sample was not indicative of any specific radionuclide. It served as a general indicator of the radioactive contamination of the sample.

4.3.2 Teledyne Procedure:

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 Iodine-131 in Water

4.4.1 U.S. Testing Procedure:

Iodide ion was separated from interferences by oxidation to I_2 with $NaNO_2$ and extraction into CCl_4 from dilute acid media. The iodine was then reduced to iodide with $NaHSO_3$, extracted into water, precipitated with $AgNO_3$ and slurried onto a 1-in. planchet for counting. Chemical yields are normally about 89%. Iodine-131 was determined with low background gas flow beta proportional counters having background counts of about 1.5 cpm. Isotopic purity can be determined by recounting the sample and checking for the proper decay of the iodine-131.

4.4.2 Teledyne Procedure:

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.

4.5 Tritium in Water

4.5.1 U.S. Testing Procedure:

Tritium in water was measured by a direct count of the distilled sample using a liquid scintillation spectrometer. After distillation, a 5-ml sample was pipetted into 15 ml of scintillator solution. The mixture was transferred to the refrigerated sample changer of the liquid scintillation counter and allowed to remain there for 24 hours before counting. This waiting period allowed for temperature equilibrium to be reached and for the decay of light excitation within the plastic vials. The counting efficiency of each sample (including corrections for quenching) was determined by using the external standard technique. A quench curve was obtained by counting samples with known amounts of tritium and varying amounts of quenching material. The degree of quenching was determined using an external radioactive source and correlated with the counting efficiency of the appropriate standard. When a sample was counted, its quench parameter was determined and compared to the quench curve to obtain the counting efficiency.

4.5.2 Teledyne Procedure:

Approximately 2 ml 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, anticoincidence system provided additional shielding from cosmic rays.

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

4.6.1 U. S. Testing Procedures

Water

The water samples larger than one liter were acidified, concentrated by evaporation and neutralized with ammonium hydroxide. Saturated sodium carbonate was added to the sample and the precipitate was allowed to settle overnight. The sample was centrifuged to collect the precipitate. The precipitate was then dissolved using nitric acid.

Milk

Strontium was separated from milk and concentrated using DOWEX 50W-X8 cation resin. The resin was rinsed with deionized water and the strontium was desorbed from the resin using sodium chloride. Ammonium hydroxide was added to neutralize the sample. Sodium carbonate was added and the sample was heated, cooled, and centrifuged to collect the precipitate. Nitric acid was then used to dissolve the precipitate.

Soil

Following leaching, the sample was dissolved in 9M hydrochloric acid and the majority of iron was removed using an isopropyl ether extraction. The hydrochloric acid solution was converted back to the nitric form and a fuming nitric acid precipitation was performed.

Strontium was precipitated sequentially, first as the nitrate and then as the carbonate. The fuming nitric acid separation removed most of the other interferring ions and concentrated nitric acid precipitations removed calcium. Radioisotopes of barium, radium, and lead were co-precipitated with barium chromate. Iron and final traces of other fission products were separated by a hydroxide scavenge. Following a final carbonate precipitation, the gravimetric yield and the strontium-89/90 activity were determined. Yttrium-90 was permitted to grow into equilibrium with the strontium-90, then separated from the

strontium by successive hydroxide and oxalate precipitations. The oxalate was transferred to a counting dish, dried under a heat lamp, ignited to yttrium oxide, weighed for chemical recovery, and counted on a low background beta proportional counter. Decay counts were made to check the purity of the yttrium-90.

4.6.2 Teledyne Procedures:

Water

Stable stronium carrier was added to 1 liter of sample and the volume was reduced by evaporation. Strontium was precipitated as $Sr(NO_3)_2$ using nitric acid.

Milk

Stable strontium carrier was added to 1 liter of sample and trichloracetic acid (TCA) was added to produce a curd. The curd was separated by filtration and discarded. An oxalate precipitation was performed on the filtrate and the precipitate was ashed in a muffle furnace. The ash was dissolved 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 nitric acid. The mixture was filtered and the liquid portion was reduced in volume by evaporation. 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 7 to 10 days for yttrium ingrowth. Yttrium was then precipitated as hydroxide, dissolved and re-precipitated as oxalate. The yttrium oxalate was mounted on a nylon planchet and counted in a low level beta counter to infer Sr-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.

4.7 Iodine-131 in Milk

4.7.1 U.S. Testing Procedures

Dowex 1 x 8 anion exchange resin was added to approximately four liters of milk sample. The iodine-131 present in the milk was adsorbed onto the resin, then removed from the resin using NaOCl. After reduction to I_2 by hydroxylamine hydrochloride, the iodine was extracted into carbon tetrachloride. The I_2 was reduced to I_2, extracted into water and precipitated as palladous iodide. Chemical yield was determined gravimetrically, based upon the amount of iodine carrier added. The iodine-131 concentration was determined by counting the palladous iodide precipitate in a low background beta counter. The isotopic purity was determined by performing a decay count on the sample and checking the radioactive decay of iodine-131.

4.7.2 Teledyne Procedure:

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.

5.0 DISCUSSION OF ANALYTICAL RESULTS

During 1986 the analyses of REMP samples were performed by U.S. Testing and Teledyne Isotopes. Both contractors reported results as net results after analytical background subtraction. Analytical results determined during the preoperational period and the 1984 operational period were reported by the analytical contractors at the time as "less than" (<) values, i.e., less than the contractual or BTP lower limits of detection.

The data summaries presented in Table 5-1 give the means and ranges of the preoperational and 1985 and 1986 operational results. The preoperational data given contain the "less than" designations and are, therefore, biased averages. For this reason, comparison of the mean results for 1986 to the mean preoperational results is difficult. Comparison of the range of results observed for each period, in order to determine whether current results are significantly greater than those during the preoperational and previous operational periods, is a viable approach. 1986 mean results and data ranges can be compared directly to the 1985 results since no "less than" values are involved. The 1984 results were not included in Table 5-1, since that data has been presented and compared to preoperational data in previous annual reports.[8,9]

The Cs-137, Cs-134 and I-131 levels in the Chernobyl accident fallout so dominated the 1986 results for air, milk and vegetables that determining any low level environmental effect of 1986 operations from the information in Table 5-1 is not possible for these media. The continued elevation of Cs-137 levels in some samples gives evidence of the long term effect of the accident on environmental results. Summaries of results for each sample media type are presented in Subsections 5.1 through 5.8. Where possible, results prior to the Chernobyl accident and following the period of highest fallout levels are examined to determine the effect of Plant 2 operations.

The results reported for individual samples are given in Appendix A. The tables designated as A-3.1, A-4.1, etc. are the results reported by U.S. Testing for a particular sample medium. The corresponding Tables A-3.2, A-4.2, etc. are the results reported by Teledyne Isotopes. The asterisk appearing to the left of most of the results indicates that the result is either below the contractual lower limits of detection (CLLD), as in the case of U.S. Testing results, or below the calculated lower limits of detection, as in the case of Teledyne Isotopes results. The CLLDs, calculated LLDs and Branch Technical Position LLDs are presented in Table 5-2 for comparison.

A summary of the REMP results and a comparison of the results to the CLLD, is presented in Table 5-3. For continuity, the term CLLD is used for all REMP results whether processed by U.S. Testing or Teledyne Isotopes. Both contractors were required to attain lower limits of detection equal to or less than the same CLLDs. It should be noted that Teledyne's calculated LLD's, in many cases, were lower than the CLLD.

TABLE 5-1

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM COMPARATIVE SUMMARY

Media/Analysis	Preoperational[a] Mean	Preoperational[a] Range	1985 Operational[b] Mean	1985 Operational[b] Range	1986 Operational[b] Mean	1986 Operational[b] Range
Air: pCi/m^3						
Gross Beta	<0.02	(<0.003 - 0.130)	0.028	(0.007 - 0.140)	0.050	(0.003 - 0.741)
Cs-134	<0.01	(<0.001 - 0.04)	0.0001	(-0.0021 - 0.0008)	0.002	(-0.001 - 0.015)
Cs-137	<0.01	(<0.001 - 0.04)	0.0001	(-0.0011 - 0.0014)	0.009	(-0.0008 - 0.036)
I-131	<0.05	(<0.01 - 0.11)	0.00002	(-0.022 - 0.045)	0.031	(-0.024 - 0.818)
Ru-103	Not Reported		Not Reported		0.005	(-0.0002 - 0.019)
Ru-106	Not Reported		Not Reported		0.003	(-0.002 - 0.013)
Water: pCi/l[d]						
Gross Beta	<4.4	(<1.0 - <22.0)	2.65	(0.38 - 8.06)	5.75	(0.59 - 28.00)
Ba-140	<50.5	(<4.0 - <300.0)	2.54	(-22.9 - 24.30)	0.83	(-6.81 - 14.80)
Cs-134	<3.8	(<1.0 - <12.0)	0.17	(-3.35 - 2.21)	0.11	(-4.10 - 2.76)
Cs-137	<3.8	(0.8 - <16.0)	0.13	(-3.10 - 2.65)	0.96	(-4.00 - 3.94)
Co-58	<4.6	(<1.0 - <25.0)	0.17	(-3.25 - 1.92)	-0.20	(-2.73 - 2.68)
Co-60	<4.6	(<0.1 - <13.0)	-0.04	(-2.43 - 1.75)	0.92	(-4.94 - 8.40)
Fe-59	<12.1	(<2.0 - <93.0)	0.59	(-6.39 - 6.57)	0.16	(-3.81 - 4.86)
La-140	<25.5	(<3.0 - <160.0)	-1.79	(-48.1 - 13.5)	-0.12	(-6.82 - 6.10)
Mn-54	<4.2	(<1.0 - <16.0)	0.07	(-3.18 - 2.58)	0.57	(-1.77 - 4.23)
Nb-95	<5.1	(<1.0 - <29.0)	0.12	(-3.28 - 3.78)	0.74	(-3.74 - 3.06)

(a) All stations, all years
(b) Indicator stations only
(c) Charcoal cartridge results
(d) Includes ground and surface/drinking water

TABLE 5-1 (Cont.)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM COMPARATIVE SUMMARY

Media/Analysis	Preoperational[a] Mean	Preoperational[a] Range	1985 Operational[b] Mean	1985 Operational[b] Range	1986 Operational[c] Mean	1986 Operational[c] Range
Water: pCi/l (Cont.)						
Zn-65	<8.0	(<1.38 -<27.00)	-0.04	(-4.58 - 3.85)	-2.16	(-12.60 - 3.12)
Zr-95	<10.6	(<2.00 -<63.00)	0.18	(-6.98 - 4.31)	1.26	(-4.78 - 6.90)
H-3	<463.1	(<10.0 -<2600)	97.2	(-165.0 - 289.0)	164.0	(-24.7 - 620)
Sr-90	Not Reported		Not Reported		0.6	(0.1 - 1.0)
Sediment: pCi/kg						
Co-60	<254.6	(<130.00 - 610.00)	83.6	(73.6 - 93.6)	45.6	(34.4 - 56.6)
Cs-134	<112.5	(<50 -<150.00)	41.8	(36.0 - 47.6)	90.3	(7.0 - 172.0)
Cs-137	<287.0	(<50 - 560.00)	1090	(296 - 1890)	251.0	(215 - 306)
Co-57	Not Reported		Not Reported		46.0	(34.0 - 54.0)
Soil: pCi/kg						
Cs-137	<364.3	(<20.00 - 1880.0)	320.0	(9.4 - 586.0)	311.6	(36.6 - 735)
Cs-134	<65.3	(<20.0 -<150.00)	34.2	(19.2 - 43.5)	38.0	(7.1 - 53.2)
Sr-90	Not reported		Not Reported		357.5	(260 - 455)
Milk: pCi/l						
Ba-140	<72.1	(<6.00 -<2000.0)	3.6	(-44.3 - 42.7)	1.2	(-22.9 - 55.0)
Cs-134	<3.7	(<0.90 -<14.00)	-0.06	(-7.43 - 8.12)	3.4	(-3.1 - 20.2)
Cs-137	<3.8	(<1.00 -<12.00)	1.0	(-6.1 - 7.7)	8.9	(-3.2 - 47.3)
La-140	<33.3	(<5.00 -<1000.0)	-1.9	(-24.2 - 9.0)	-0.5	(-13.3 - 7.5)
I-131[c]	<0.5	(<0.09 -<1.00)	0.0336	(-0.392 - 0.598)	5.8	(-0.3 - 99.0)
Sr-90	Not Reported		Not Reported		2.17	(-1.3 - 3.9)

(a) All stations, all years
(b) Indicator stations only
(c) Resin method for I-131 determination

TABLE 5-1 (Cont.)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM COMPARATIVE SUMMARY

Media/Analysis	Preoperational[a] Mean	Preoperational[a] Range	1985 Operational[b] Mean	1985 Operational[b] Range	1986 Operational[b] Mean	1986 Operational[b] Range
Fish: pCi/kg						
Cs-134	<61.2	(<6.0 -<130.0)	4.6	(-4.3 - 13.3)	1.0	(-17.3 - 10.2)
Cs-137	<88.8	(<10.0 -<130.0)	11.4	(-3.0 - 30.7)	22.6	(2.7 - 54.9)
Co-58	<87.7	(<9.0 -<130.0)	-3.1	(-16.8 - 11.5)	3.7	(-4.0 - 17.3)
Co-60	<80.6	(<9.0 -<130.0)	-0.9	(-16.5 - 19.1)	3.1	(-5.7 - 9.6)
Fe-59	<130.0	(<30.0 -<260.0)	-7.9	(-34.2 - 11.5)	-3.5	(-32.8 - 21.1)
Mn-54	<88.3	(<8.0 -<130.0)	1.1	(-5.5 - 6.4)	-0.8	(-5.5 - 2.2)
Produce: pCi/kg						
Cs-134	<49.1	(<10.0 -<140.0)	1.9	(-9.3 - 13.1)	3.7	(-3.5 - 16.2)
Cs-137	<69.8	(<10.0 -<140.0)	0.6	(-9.8 - 9.9)	6.7	(-5.5 - 15.6)
I-131	<105.6	(<10.0 -<1000.0)	1.5	(-19.7 - 14.2)	2.3	(-21.3 - 33.5)
TLD: mR/day						
Quarterly	0.24	(0.11 - 0.32)	0.23	(0.16 - 0.29)	0.24	(0.19 - 0.31)
Annual	0.24	(0.20 - 0.31)	0.22	(0.19 - .27)	0.21	(0.18 - 0.26)

[a] All stations, all years
[b] Indicator stations only

TABLE 5-2

CONTRACTUAL, CALCULATED AND BRANCH TECHNICAL

POSITION LOWER LIMITS OF DETECTION (LLDS) FOR 1986

Media (Units)	Analysis	UST LLDs (Contractual)	Teledyne LLDs (Calculated)	BTP LLDs
Air	Gross Beta	0.003	0.003	0.01
Particulates:	Gamma Spectrometry	0.01	--	--
(pCi/m^3)	Cs-134	0.008	0.002	0.05
	Cs-137	0.01	0.002	0.06
Air Iodine: (pCi/m^3)	I-131	0.04	0.02	0.07
Water:	Gross Beta	4	1-2	4
(pCi/l)	Tritium	300	100-200	2000
	I-131	1	0.5	1
	Sr-90	1	1	--
	Gamma Spectrometry			
	Mn-54	10	5	15
	Fe-59	20	15	30
	Co-58	10	5	15
	Co-60	10	5	15
	Zn-65	20	10	30
	Zr-95	20	20	30
	Nb-95	10	10	15
	Cs-134	10	6	15
	Cs-137	10	6	18
	Ba-140	35	10-20	60
	La-140	10	5-10	15

TABLE 5-2 (Cont.)

CONTRACTUAL, CALCULATED AND BRANCH TECHNICAL

POSITION LOWER LIMITS OF DETECTION (LLDS) FOR 1986

Media (Units)	Analysis	UST LLDs (Contractual)	Teledyne LLDs (Calculated)	BTP LLDs
Soil/	Gamma Spectrometry			
Sediment:	Co-60	100	20-30	--
(pCi/kg)	Cs-134	100	30-40	150
	Cs-137	100	30-40	180
	Sr-90	10	10	--
Fish:	Gamma Spectrometry			
(pCi/kg)	Mn-54	90	7-10	130
	Fe-59	170	20-30	260
	Co-58	90	8-10	130
	Co-60	90	8-10	130
	Zn-65	170	20-30	260
	Cs-134	90	7-10	130
	Cs-137	100	7-10	150
Milk:	I-131	1	0.5	1
(pCi/l)	Gamma Spectrometry			
	Cs-134	10	7-10	15
	Cs-137	10	7-10	18
	Ba-140	35	20	60
	La-140	15	10	15
	Sr-90	10	1	--
Garden	Gamma Spectrometry			
Produce:	Cs-134	50	6-10	60
(pCi/kg)	Cs-137	50	7-10	80
	I-131	50	20-30	60

TABLE 5-3
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM 1986 ANNUAL SUMMARY

WASHINGTON PUBLIC POWER SUPPLY SYSTEM — DOCKET NO. 50-397

HANFORD, WASHINGTON — JANUARY 1 TO DECEMBER 31, 1986

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSIS PERFORMED	LOWER LIMIT OF DETECTION (CCLD) (a)	ALL INDICATOR LOCATIONS MEAN (f)(b) RANGE	LOCATION WITH HIGHEST MEAN NAME DISTANCE AND DIRECTION	MEAN(f)(b) RANGE	CONTROL LOCATION MEAN(f)(b) RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
Air Particulates (pCi/m^3)	Gross Beta 626	0.003	0.050 (573/574) (0.003-0.741)	1 1.30 mi S	0.056 (52/52) (0.006-0.741)	0.044 (52/52) (0.003-0.513)	0
	Gamma 48 (Quarterly)						
	Be-7		0.084 (44/44) (0.042-0.127)	48 4.3 mi NE	0.097 (4/4) (0.073-0.121)	0.082 (4/4) (0.048-0.102)	0
	Cs-134	0.008	0.013 (11/44) (0.011-0.015)	40 6.4 mi SE	0.015 (1/4)	0.009 (1/4)	0
	Cs-137	0.01	0.029 (11/44) (0.022-0.036)	40 6.4 mi SE	0.036 (1/4)	0.024 (1/4)	0
	Ru-103		0.016 (11/44) (0.012-0.019)	40 6.4 mi SE	0.019 (1/4)	0.016 (1/4)	0
	Ru-106		0.011 (1/44)	48 4.3 mi NE	0.011 (1/4)	(0/4)	0
Air Iodine (pCi/m^3)	I-131 626	0.04	0.0334 (52/574) (0.022-0.818)	1 1.30 mi S	0.425 (4/52) (0.044-0.801)	0.033 (4/52) (0.063-0.639)	0

(a) Contractual Lower Limit of Detection (CLLD) is defined in Nuclear Project No. 2, Contract C-20028.
(b) (f) is the ratio of positive results above the CLLD to the number of samples analyzed for the parameter of interest.

TABLE 5-3 (Cont.)
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM 1986 ANNUAL SUMMARY

WASHINGTON PUBLIC POWER SUPPLY SYSTEM — DOCKET NO. 50-397

HANFORD, WASHINGTON — JANUARY 1 TO DECEMBER 31, 1986

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSIS PERFORMED	LOWER LIMIT OF DETECTION (CCLD) (a)	ALL INDICATOR LOCATIONS MEAN (f)(b) RANGE	LOCATION WITH HIGHEST MEAN NAME DISTANCE AND DIRECTION	MEAN(f)(b) RANGE	CONTROL LOCATION MEAN(f)(b) RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
Air Particulates (PCi/m^3)(Cont.)	(Special weekly samples due to Chernobyl accident)						
	Gamma 36 (Weekly)						
	Be-7		0.14 (24/33) (0.073-0.23)	40	6.4 mi SE	0.188 (2/4) (0.15-0.23)	0.134 (2/3) (0.123-0.144)	0
	Cs-134	0.008	0.049 (33/33) (0.016-0.083)	40	6.4 mi SE	0.061 (3/3) (0.027-0.083)	0.040 (3/3) (0.018-0.059)	0
	Cs-137	0.01	0.091 (33/33) (0.029-0.14)	1	1.30 mi SE	0.104 (3/3) (0.044-0.14)	0.081 (3/3) (0.032-0.12)	0
	Ru-103		0.109 (33/33) (0.055-0.212)	4	9.3 mi SSE	0.12 (3/3) (0.066-0.21)	0.10 (3/3) (0.033-0.14)	0
	Ru-106		CLLD			CLLD	CLLD	
	I-131 626		0.19 (33/33) (0.034-0.39)	1	1.30 mi S	0.40 (3/3) (0.29-0.52)	0.17 (3/3) (0.03-0.26)	0

(a) Contractual Lower Limit of Detection (CLLD) is defined in Nuclear Project No. 2, Contract C-20028.
(b) (f) is the ratio of positive results above the CLLD to the number of samples analyzed for the parameter of interest.

TABLE 5-3 (Cont.)
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM 1986 ANNUAL SUMMARY

WASHINGTON PUBLIC POWER SUPPLY SYSTEM — DOCKET NO. 50-397

HANFORD, WASHINGTON — JANUARY 1 TO DECEMBER 31, 1986

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSIS PERFORMED	LOWER LIMIT OF DETECTION (CCLD) (a)	ALL INDICATOR LOCATIONS MEAN (f)(b) RANGE	LOCATION WITH HIGHEST MEAN NAME DISTANCE AND DIRECTION	MEAN(f)(b) RANGE	CONTROL LOCATION MEAN(f)(b) RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
Sediment (pCi/kg dry)	Gamma 8						
	Co-60	100	56.6 (1/4)	34 3.5 mi ESE	56.6 (1/4)	(0/4)	0
	Cs-134	100	172.0 (1/4)	34 3.5 mi ESE	172.0 (1/4)	(0/4)	0
	Cs-137	100	251.0 (4/4) (215-306)	34 3.5 mi ESE	251.0 (4/4) (215-306)	162.3 (4/4) (106-233)	0
	Ra-226	-	1833 (4/4) (1260-2820)	34 3.5 mi ESE	1833 (4/4) (1260-2820)	1657 (4/4) (738-2440)	0
Soil (pCi/kg dry)	Gamma 5						
	Cs-134	100	CLLD			CLLD	0
	Cs-137	100	713 (2/4) (691-735)	1 1.3 mi S	735 (1/4)	(0/1)	0
	Ra-226		598 (4/4) (498-764)	1 1.3 mi S	764 (1/1)	626 (1/1)	0
	Th-232		701 (4/4) (528-818)	9 30 mi WSW	862 (1/1)	862 (1/1)	0

(a) Contractual Lower Limit of Detection (CLLD) is defined in Nuclear Project No. 2, Contract C-20028.
(b) (f) is the ratio of positive results above the CLLD to the number of samples analyzed for the parameter of interest.

TABLE 5-3 (Cont.)
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM 1986 ANNUAL SUMMARY

WASHINGTON PUBLIC POWER SUPPLY SYSTEM — DOCKET NO. 50-397

HANFORD, WASHINGTON — JANUARY 1 TO DECEMBER 31, 1986

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSIS PERFORMED	LOWER LIMIT OF DETECTION (CCLD) (a)	ALL INDICATOR LOCATIONS MEAN (f)(b) RANGE	LOCATION WITH HIGHEST MEAN NAME DISTANCE AND DIRECTION	MEAN(f)(b) RANGE	CONTROL LOCATION MEAN(f)(b) RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
Water (pCi/l)	Gross Beta 49	4	7.74 (22/37) (1.6-28.0)	27 3.2 mi E	15.2 (9/11) (4.6-28.0)	2.13 (6/12) (1.40-3.10)	0
	Tritium 28	300	291.3 (10/24) (110-620)	27 3.2 mi E	390.0 (3/4) (130-620)	190.0 (1/4) (110-300)	0
	Gamma 64						
	Mn-54	10	CLLD		CLLD		0
	Fe-59	20	CLLD		CLLD		0
	Co-58	20	CLLD		CLLD		0
	Co-60	20	CLLD		CLLD		0
	Zn-65	20	CLLD		CLLD		0
	Zr-95	20	CLLD		CLLD		0
	Cs-134	20	CLLD		CLLD		0
	Cs-137	20	CLLD		CLLD		0
	Ba-140	20	CLLD		CLLD		0

(a) Contractual Lower Limit of Detection (CLLD) is defined in Nuclear Project No. 2, Contract C-20028.
(b) (f) is the ratio of positive results above the CLLD to the number of samples analyzed for the parameter of interest.

TABLE 5-3 (Cont.)
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM 1986 ANNUAL SUMMARY

WASHINGTON PUBLIC POWER SUPPLY SYSTEM — DOCKET NO. 50-397

HANFORD, WASHINGTON — JANUARY 1 TO DECEMBER 31, 1986

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSIS PERFORMED		LOWER LIMIT OF DETECTION (CCLD) (a)	ALL INDICATOR LOCATIONS MEAN (f)(b) RANGE	LOCATION WITH HIGHEST MEAN NAME DISTANCE AND DIRECTION		MEAN(f)(b) RANGE	CONTROL LOCATION MEAN(f)(b) RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
Milk (pCi/l)	I-131	85	1.0	25.1 (10/67) (0.7-99.1)	36	16.0 mi SSE	61.1 (2/18) (23.0-99.1)	0.895 (2/18) (0.69-1.10)	0
	Gamma	85							
	Cs-134		10	15.9 (6/67) (9.0-20.2)	40	6.4 mi SE	17.7 (3/18) (15.4-19.0)	(0/18)	0
	Cs-137		10	23.1 (17/67) (8.48-47.3)	40	6.4 mi SE	33.9 (4/18) (21.7-45.2)	(0/18)	0
	Ba-140		35	43.7 (1/67)	9	30 mi WSW	43.7 (1/18)	(0/18)	0
	I-131(c)			74.7 (5/67) (27.1-170.0)	36	7.2 mi ESE	98.6 (2/18) (27.1-170.0)	(0/18)	0

(a) Contractual Lower Limit of Detection (CLLD) is defined in Nuclear Project No. 2, Contract C-20028.
(b) (f) is the ratio of positive results above the CLLD to the number of samples analyzed for the parameter of interest.
(c) Analysis by gamma spectroscopy.

TABLE 5-3 (Cont.)
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM.1986 ANNUAL SUMMARY

WASHINGTON PUBLIC POWER SUPPLY SYSTEM DOCKET NO. 50-397

HANFORD, WASHINGTON JANUARY 1 TO DECEMBER 31, 1986

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSIS PERFORMED	LOWER LIMIT OF DETECTION (CCLD) (a)	ALL INDICATOR LOCATIONS MEAN (f)(b) RANGE	LOCATION WITH HIGHEST MEAN NAME DISTANCE AND DIRECTION	MEAN(f)(b) RANGE	CONTROL LOCATION MEAN(f)(b) RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
Fish	Gamma 16						
(pCi/kg-wet)	Mn-54	90	CLLD			CLLD	0
	Fe-59	170	CLLD			CLLD	0
	Co-58	90	CLLD			CLLD	0
	Co-60	90	CLLD			CLLD	0
	Zn-65	170	CLLD			CLLD	0
	Cs-134	90	CLLD			CLLD	0
	Cs-137	100	CLLD			CLLD	0

(a) Contractual Lower Limit of Detection (CLLD) is defined in Nuclear Project No. 2, Contract C-20028.
(b) (f) is the ratio of positive results above the CLLD to the number of samples analyzed for the parameter of interest.

TABLE 5-3 (Cont.)
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM 1986 ANNUAL SUMMARY

WASHINGTON PUBLIC POWER SUPPLY SYSTEM — DOCKET NO. 50-397

HANFORD, WASHINGTON — JANUARY 1 TO DECEMBER 31, 1986

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	ANALYSIS AND TOTAL NUMBER OF ANALYSIS PERFORMED	LOWER LIMIT OF DETECTION (CCLD) (a)	ALL INDICATOR LOCATIONS MEAN (f)(b) RANGE	LOCATION WITH HIGHEST MEAN NAME DISTANCE AND DIRECTION	MEAN(f)(b) RANGE	CONTROL LOCATION MEAN(f)(b) RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
Roots	Gamma 11						
(pCi/kg-wet)	I-131	50	CLLD			CLLD	0
	Cs-134	50	CLLD			CLLD	0
	Cs-137	50	CLLD			CLLD	0
Fruits	Gamma 9						
(pCi/kg-wet)	I-131	50	CLLD			CLLD	0
	Cs-134	50	CLLD			CLLD	0
	Cs-137	50	10.0(1/5)	37 16 mi SSE	10.0(1/5)	(0/4)	0
Veg Stock	Gamma 10						
(pCi/kg-wet)	I-131	50	(0/4)	9 30 mi WSW	287.5(2/6) (256-319)	287.5(2/6) (256-319)	0 0
	Cs-34	50	CLLD			CLLD	0
	Cs-137	50	CLLD			CLLD	0

(a) Contractual Lower Limit of Detection (CLLD) is defined in Nuclear Project No. 2, Contract C-20028.
(b) (f) is the ratio of positive results above the CLLD to the number of samples analyzed for the parameter of interest.

5.1 Direct Radiation

Summaries of the environmental radiation exposure rates due primarily to gamma radiation, as determined by thermoluminescent dosimeters (TLDs), are presented in Tables 5-4 through 5-6.

The 1986 Quarterly and Annual TLD results given in Tables 5-4 and 5-5 do not differ significantly from the mean quarterly and annual results obtained for previous operational periods and the preoperational period. However, the comparison of the quarterly results with the annual results for 1986 in Table 5-6 indicates that there is a significant difference between the two groups. This difference (10-20%) is slightly higher than that observed in 1985.[9] Some processing parameters may also have contributed to the difference between the quarterly and annual groups. Part of this difference can be attributed to the fading of the thermoluminescent signals on annual dosimeters, i.e. dosimeters placed in the field for the entire year versus that placed in the field for one quarter. The degree of signal fading of the $CaSO_4$:Dy phosphor is reported to be small.[10] The specific fading characteristics of the Supply System dosimeters, however, have not yet been determined.

A study of the effect of signal fading on the quarterly and annual TLD results will be started in 1987. The need to resolve the fading issue is supported also by a comparison of the special TLDs exchanged weekly following the Chernobyl accident (Appendix B, Table B-1) and the second quarter dosimeter results (Appendix A, Table A-11). During seven of the 13 weeks making up the second quarter, exposure rates were significantly elevated above normal levels. Yet the results of the second quarter dosimeters did not reflect any increase. From the results of quality control dosimeters processed with the second quarter field dosimeters, there was no indication of a low bias in the second quarter run.

An increase was observed in the results of most stations during the third and fourth quarters. As shown in Figure 5-1, this increase was evident in the results for both the near plant stations (Stations 71-76) and the remote stations (Stations 5, 8 and 9 (Control)). Log probability plots of the 1986 quarterly TLD results are presented in Figure 5-2. The linearity of the data indicates that the results fit a log normal distribution. The geometric standard deviations (slopes) determined for the plots of each quarter ranged from 1.05 to 1.08, indicating a consistent variability among the results for each period. The plots of the data from the third and fourth quarters illustrate the general increase in the results for all stations, due, most likely, to an increase in background radiation levels as a result of Chernobyl fallout.

Comparisons of the 1986 mean quarterly results for routine and special near plant stations plus the control station to the mean results for the preoperational and 1984 and 1985 operational periods are presented in Figures 5-3 and 5-4. In general, the 1986 results were higher than those for the same stations during previous operational periods but within the range observed during the preoperational period. The increase during 1986 was evident in the results of the control station, as well as near plant indicator stations, suggesting the effect of environmental factors, such as increased levels in the ground and atmosphere due to Chernobyl fallout, and/or TLD processing variability on the results. A similar increase was also observed in the results for Pasco TLD Stations, as shown in Figure 5-5.

The log probability plot for the 1986 annual TLD data is shown in Figure 5-6. The geometic standard deviation (slope) for this plot was 1.05. The line has approximately the same slope as that observed for the quarterly data, but it is oriented lower on the graph, reflecting the generally lower results.

TABLE 5-4

MEAN QUARTERLY TLD DATA SUMMARY FOR THE PREOPERATIONAL AND OPERATIONAL PERIODS

Results in mR/day

STATION	PREOPERATIONAL		1984 AND 1985 OPERATIONAL		1986 OPERATIONAL	
	Mean	Error (2σ)	Mean	Error (2σ)	Mean	Error (2σ)
1	0.24	0.05	0.24	0.07	0.23	0.02
2	0.23	0.04	0.23	0.06	0.23	0.02
3	0.23	0.05	0.22	0.07	0.22	0.04
4	0.22	0.08	0.20	0.05	0.21	0.02
5	0.23	0.04	0.21	0.03	0.22	0.03
6	0.23	0.04	0.22	0.05	0.21	0.04
7	0.24	0.04	0.22	0.05	0.23	0.04
8	0.26	0.04	0.24	0.06	0.25	0.04
9	0.22	0.05	0.20	0.03	0.21	0.04
10	0.23	0.04	0.22	0.06	0.23	0.02
11	0.24	0.04	0.23	0.08	0.23	0.04
12	0.25	0.04	0.24	0.05	0.24	0.04
13	0.24	0.04	0.23	0.06	0.23	0.04
14	0.24	0.06	0.23	0.05	0.23	0.04
15	0.25	0.05	0.24	0.06	0.24	0.02
16	0.24	0.04	0.24	0.06	0.24	0.04
17	0.25	0.05	0.23	0.06	0.23	0.04
18	0.24	0.03	0.23	0.06	0.23	0.02
19	0.24	0.04	0.24	0.06	0.23	0.03
20	0.24	0.04	0.23	0.06	0.23	0.02
21	0.23	0.04	0.21	0.04	0.22	0.02
22	0.24	0.04	0.23	0.06	0.23	0.03
23	0.24	0.03	0.23	0.05	0.22	0.03
24	0.24	0.04	0.23	0.05	0.24	0.03
25	0.25	0.04	0.25	0.07	0.25	0.05
40	0.22	0.03	0.22	0.06	0.22	0.04
41	0.26	0.04	0.24	0.04	0.25	0.04
42	0.25	0.04	0.23	0.04	0.23	0.04

TABLE 5-4 (Cont.)

MEAN QUARTERLY TLD DATA SUMMARY FOR THE PREOPERATIONAL AND OPERATIONAL PERIODS

Results in mR/day

STATION	PREOPERATIONAL		1984 AND 1985 OPERATIONAL		1986 OPERATIONAL	
	Mean	Error (2σ)	Mean	Error (2σ)	Mean	Error (2σ)
43	0.25	0.04	0.23	0.06	0.25	0.04
44	0.23	0.03	0.22	0.05	0.23	0.03
45	0.23	0.04	0.22	0.04	0.23	0.03
46	0.28	0.05	0.26	0.05	0.28	0.04
47	0.21	0.03	0.21	0.06	0.22	0.03
49	0.23	0.03	0.23	0.06	0.23	0.02
50	0.22	0.02	0.23	0.06	0.23	0.03
51	0.22	0.03	0.22	0.05	0.23	0.03
53	0.27	0.04	0.25	0.05	0.26	0.04
54	0.26	0.02	0.23	0.04	0.25	0.02
55	0.22	0.02	0.22	0.05	0.23	0.03
56	0.23	0.02	0.23	0.06	0.23	0.03
71(S1)	0.24	0.04	0.24	0.06	0.26	0.07
72(S2)	0.24	0.02	0.24	0.05	0.26	0.05
73(S3)	0.22	0.03	0.22	0.05	0.23	0.02
74(S4)	0.26	0.03	0.24	0.05	0.25	0.04
75(S5)	0.22	0.03	0.21	0.06	0.24	0.05
76(S6)	0.24	0.02	0.22	0.05	0.23	0.03
77(S7)	0.24	0.02	0.23	0.05	0.25	0.05
78(S8)	0.24	0.03	0.22	0.05	0.23	0.02
79(S9)	0.25	0.04	0.23	0.06	0.24	0.03
80(S10)	0.24	0.02	0.23	0.06	0.23	0.02
81(S11)	0.24	0.05	0.23	0.06	0.24	0.03
82(S12)	0.25	0.04	0.23	0.06	0.24	0.04
83(S13)	0.25	0.03	0.24	0.06	0.24	0.04
84(S14)	0.24	0.03	0.22	0.06	0.25	0.03
85(S15)	0.25	0.03	0.24	0.06	0.25	0.04
86(S16)	0.24	0.03	0.24	0.06	0.27	0.08
All	0.24	0.05	0.22	0.04	0.23	0.04

TABLE 5-5

ANNUAL TLD DATA SUMMARY FOR THE PREOPERATIONAL AND OPERATIONAL PERIODS

Results in mR/day

STATION	PREOPERATIONAL		1984 AND 1985 OPERATIONAL		1986 OPERATIONAL	
	Mean	Error (2σ)	Mean	Error (2σ)	Mean	Error (2σ)
1	0.25	0.04	0.23	0.02	0.20	0.02
2	0.23	0.01	0.22	0.01	0.20	0.02
3	0.23	0.02	0.20	0.01	0.20	0.04
4	0.24	0.08	0.20	0.00	0.18	0.02
5	0.24	0.04	0.20	0.00	0.20	0.02
6	0.22	0.02	0.21	0.01	0.19	0.00
7	0.23	0.02	0.23(a)	0.02	0.21	0.02
8	0.27	0.02	0.23(a)	0.01	0.23	0.04
9	0.22	0.02	0.19	0.01	0.19	0.02
10	0.23	0.02	0.21	0.01	0.19	0.02
11	0.24	0.02	0.21	0.01	0.20	0.02
12	0.25	0.01	0.23	0.01	0.22	0.02
13	0.24	0.01	0.22	0.01	0.21	0.01
14	0.23	0.02	0.21	0.01	0.19	0.02
15	0.26	0.01	0.23	0.02	0.21	0.02
16	0.25	0.02	0.22	0.01	0.21	0.02
17	0.24	0.02	0.23(a)	0.01	0.21	0.01
18	0.25	0.03	0.23	0.01	0.21	0.01
19	0.24	0.01	0.22	0.01	0.21	0.02
20	0.24	0.02	0.22	0.01	0.21	0.02
21	0.23	0.02	0.21	0.00	0.19	0.02
22	0.24	0.01	0.21	0.03	0.21	0.02
23	0.23	0.01	0.21	0.01	0.20	0.02
24	0.24	0.02	0.22	0.01	0.21	0.02
25	0.26	0.02	0.22	0.04	0.21	0.04
40	0.21	0.01	0.22	0.02	0.20	0.02
41	0.26	0.02	0.22	0.02	0.23	0.02

TABLE 5-5 (Cont.)

ANNUAL TLD DATA SUMMARY FOR THE PREOPERATIONAL AND OPERATIONAL PERIODS

Results in mR/day

STATION	PREOPERATIONAL		1984 AND 1985 OPERATIONAL		1986 OPERATIONAL	
	Mean	Error (2σ)	Mean	Error (2σ)	Mean	Error (2σ)
42	0.24	0.02	0.22	0.00	0.21	0.00
43	0.24	0.02	0.22	0.00	0.22	0.02
44	0.24	0.03	0.21	0.00	0.21	0.02
45	0.23	0.02	0.21	0.01	0.21	0.02
46	0.29	0.02	0.27	0.00	0.26	0.02
47	0.22	0.03	0.20	0.02	0.19	0.02
49	(b)		0.22	0.01	0.21	0.00
50	(b)		0.22	0.02	0.20	0.00
51	(b)		0.21	0.01	0.20	0.00
53	(b)		0.25	0.01	0.23	0.02
54	(b)		0.23	0.01	0.23	0.00
55	(b)		0.22	0.01	0.20	0.02
56	(b)		0.22	0.01	0.21	0.02
71	0.24	0.02	0.24	0.02	0.23	0.00
72	0.25	0.02	0.24	0.01	0.23	0.00
73	0.23	0.01	0.21	0.00	0.20	0.02
74	0.24	0.01	0.23	0.02	0.22	0.02
75	0.24	0.01	0.21	0.01	0.20	0.00
76	0.24	0.02	0.23	0.01	0.21	0.02
77	0.25	0.02	0.22	0.00	0.20	0.02
78	0.25	0.04	0.25	0.05	0.20	0.00
79	0.25	0.02	0.22	0.01	0.20	0.02
80	0.23	0.05	0.20	0.03	0.20	0.02
81	0.23	0.02	0.22	0.01	0.20	0.02
82	0.25	0.03	0.23	0.01	0.22	0.02
83	0.25	0.02	0.23	0.02	0.21	0.02
84	0.23	0.02	0.21	0.01	0.21	0.00

TABLE 5-5 (Cont.)

ANNUAL TLD DATA SUMMARY FOR THE PREOPERATIONAL AND OPERATIONAL PERIODS

Results in mR/day

STATION	PREOPERATIONAL		1984 AND 1985 OPERATIONAL		1986 OPERATIONAL	
	Mean	Error (2σ)	Mean	Error (2σ)	Mean	Error (2σ)
85	0.25	0.01	0.24	0.01	0.22	0.02
86	0.24	0.02	0.25	0.00	0.24	0.02
All	0.24	0.03	0.22	0.02	0.21	0.04

(a) 1985 TLD missing

(b) Stations 49-56 were first monitored during Fourth Quarter 1983.

TABLE 5-6

1986 MEAN QUARTERLY* VERSUS ANNUAL TLD DATA

Results in mR/day

STATION	QUARTERLY TLDS		ANNUAL TLDS	
	Mean	Error (2σ)	Mean	Error (2σ)
1	0.23	0.02	0.20	0.02
2	0.23	0.02	0.20	0.02
3	0.22	0.04	0.20	0.04
4	0.21	0.02	0.18	0.02
5	0.22	0.03	0.20	0.02
6	0.21	0.04	0.19	0.00
7	0.23	0.04	0.21	0.02
8	0.25	0.04	0.23	0.04
9	0.21	0.04	0.19	0.02
10	0.23	0.02	0.19	0.02
11	0.23	0.04	0.20	0.02
12	0.24	0.04	0.22	0.02
13	0.23	0.04	0.21	0.01
14	0.23	0.04	0.19	0.02
15	0.24	0.02	0.21	0.02
16	0.24	0.04	0.21	0.02
17	0.23	0.04	0.21	0.01
18	0.23	0.02	0.21	0.01
19	0.23	0.03	0.21	0.02
20	0.23	0.02	0.21	0.02
21	0.22	0.02	0.19	0.02
22	0.23	0.03	0.21	0.02
23	0.22	0.03	0.20	0.02
24	0.24	0.03	0.21	0.02
25	0.25	0.05	0.21	0.04
40	0.22	0.04	0.20	0.02
41	0.25	0.04	0.23	0.02
42	0.23	0.04	0.21	0.00

*Mean of the four quarterly results.

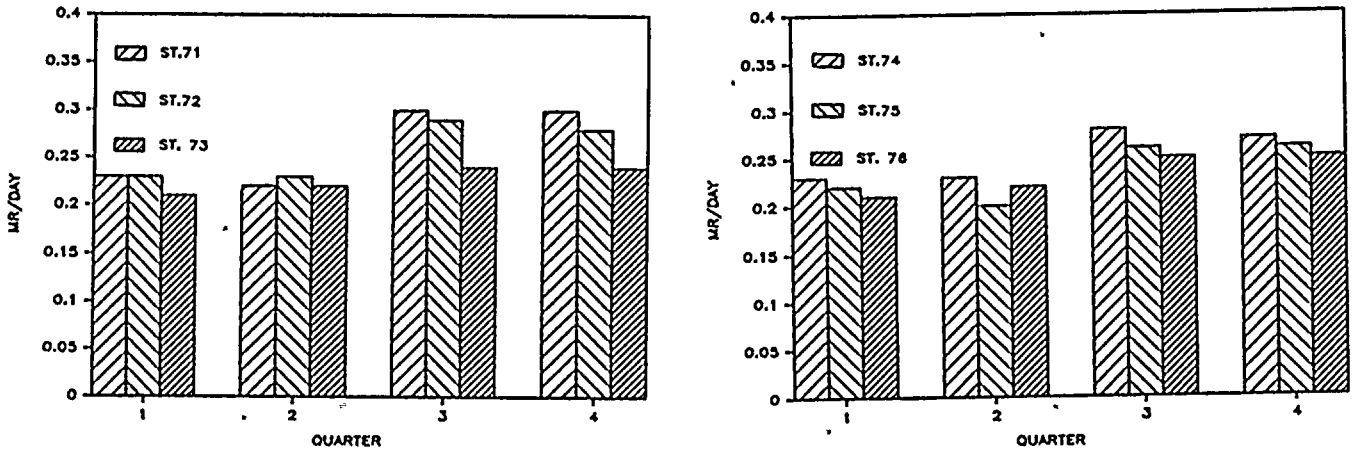
TABLE 5-6 (Cont.)

1986 MEAN QUARTERLY* VERSUS ANNUAL TLD DATA

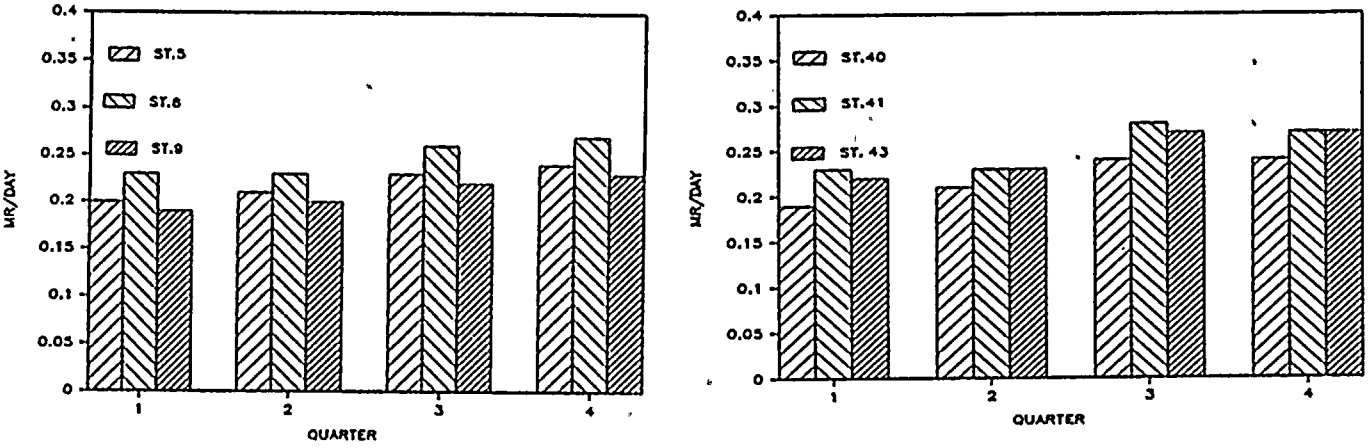
Results in mR/day

STATION	QUARTERLY TLDS		ANNUAL TLDS	
	Mean	Error (2σ)	Mean	Error (2σ)
43	0.25	± 0.02	0.22	± 0.02
44	0.23	± 0.02	0.21	± 0.02
45	0.23	± 0.02	0.21	± 0.02
46	0.28	± 0.02	0.26	± 0.02
47	0.22	± 0.02	0.19	± 0.02
49	0.23	± 0.01	0.21	± 0.00
50	0.23	± 0.02	0.20	± 0.00
51	0.23	± 0.02	0.20	± 0.00
53	0.26	± 0.02	0.23	± 0.02
54	0.25	± 0.01	0.23	± 0.00
55	0.23	± 0.02	0.20	± 0.02
56	0.23	± 0.02	0.21	± 0.02
71 (S1)	0.26	± 0.04	0.23	± 0.00
72 (S2)	0.26	± 0.03	0.23	± 0.00
73 (S3)	0.23	± 0.01	0.20	± 0.02
74 (S4)	0.25	± 0.02	0.22	± 0.02
75 (S5)	0.24	± 0.03	0.20	± 0.00
76 (S6)	0.23	± 0.02	0.21	± 0.02
77 (S7)	0.25	± 0.03	0.20	± 0.02
78 (S8)	0.23	± 0.01	0.20	± 0.00
79 (S9)	0.24	± 0.02	0.20	± 0.02
80 (S10)	0.23	± 0.01	0.20	± 0.02
81 (S11)	0.24	± 0.02	0.20	± 0.02
82 (S12)	0.24	± 0.02	0.22	± 0.02
83 (S13)	0.24	± 0.02	0.21	± 0.02
84 (S14)	0.25	± 0.02	0.21	± 0.00
85 (S15)	0.25	± 0.02	0.22	± 0.02
86 (S16)	0.27	± 0.04	0.24	± 0.02

*Mean of the four quarterly results.



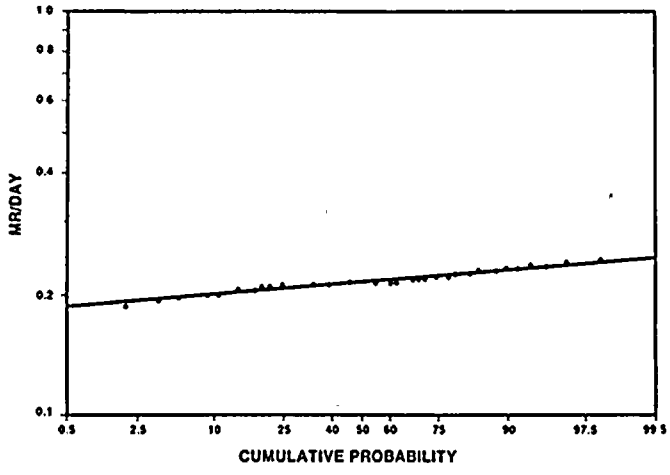
Near Plant Stations



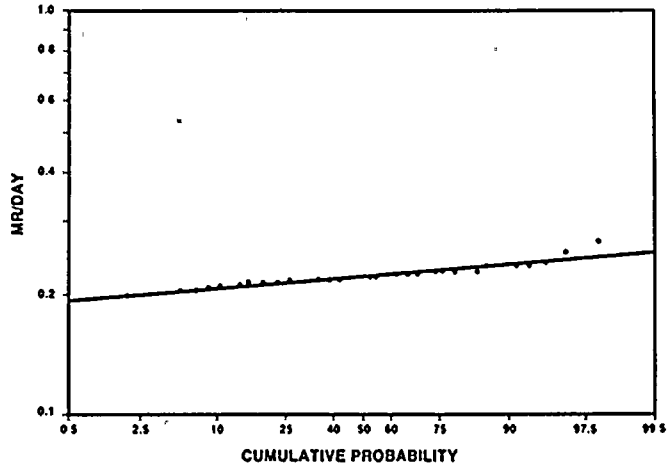
Pasco Stations

FIGURE 5-1

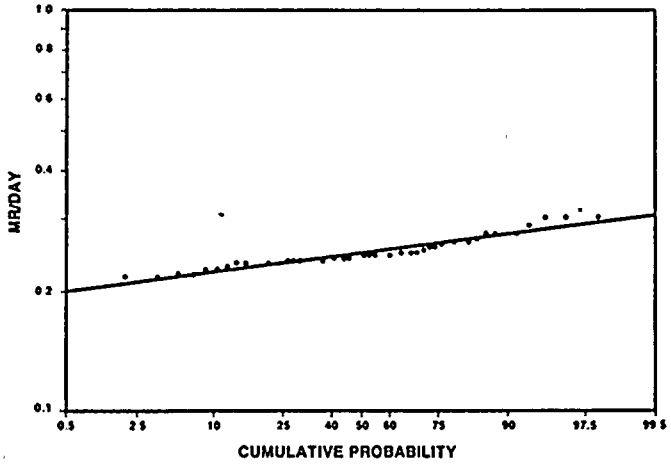
1986 QUARTERLY TLD RESULTS FOR NEAR PLANT AND PASCO STATIONS



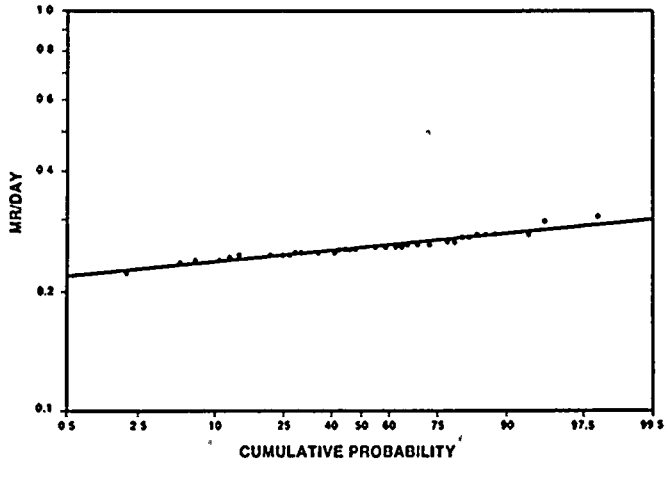
First Quarter



Second Quarter



Third Quarter



Fourth Quarter

FIGURE 5-2
LOG PROBABILITY PLOTS OF 1986 QUARTERLY TLD RESULTS

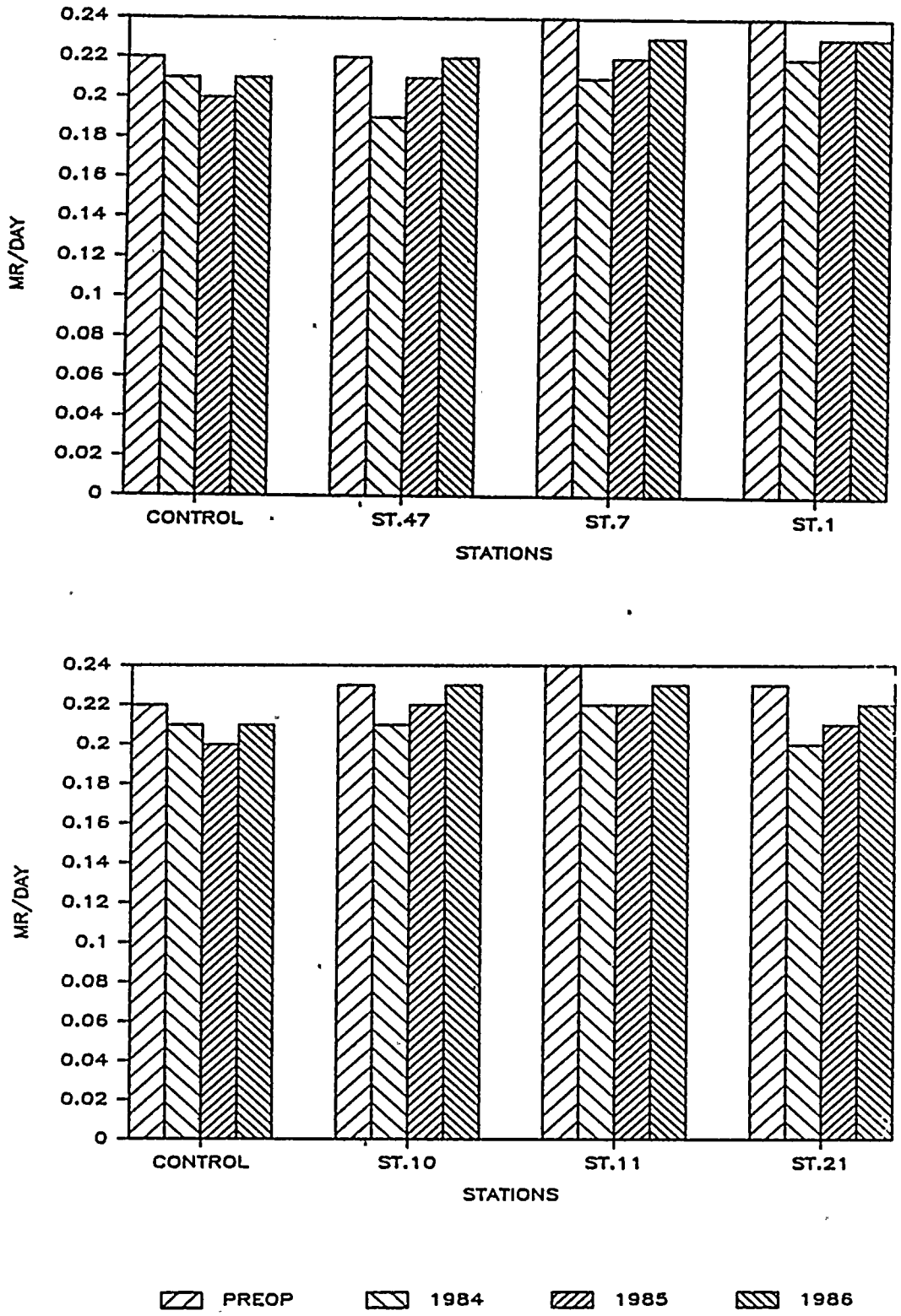


FIGURE 5-3

COMPARISON OF 1986 NEAR PLANT AND CONTROL TLD RESULTS TO PREOPERATIONAL AND PREVIOUS OPERATIONAL RESULTS

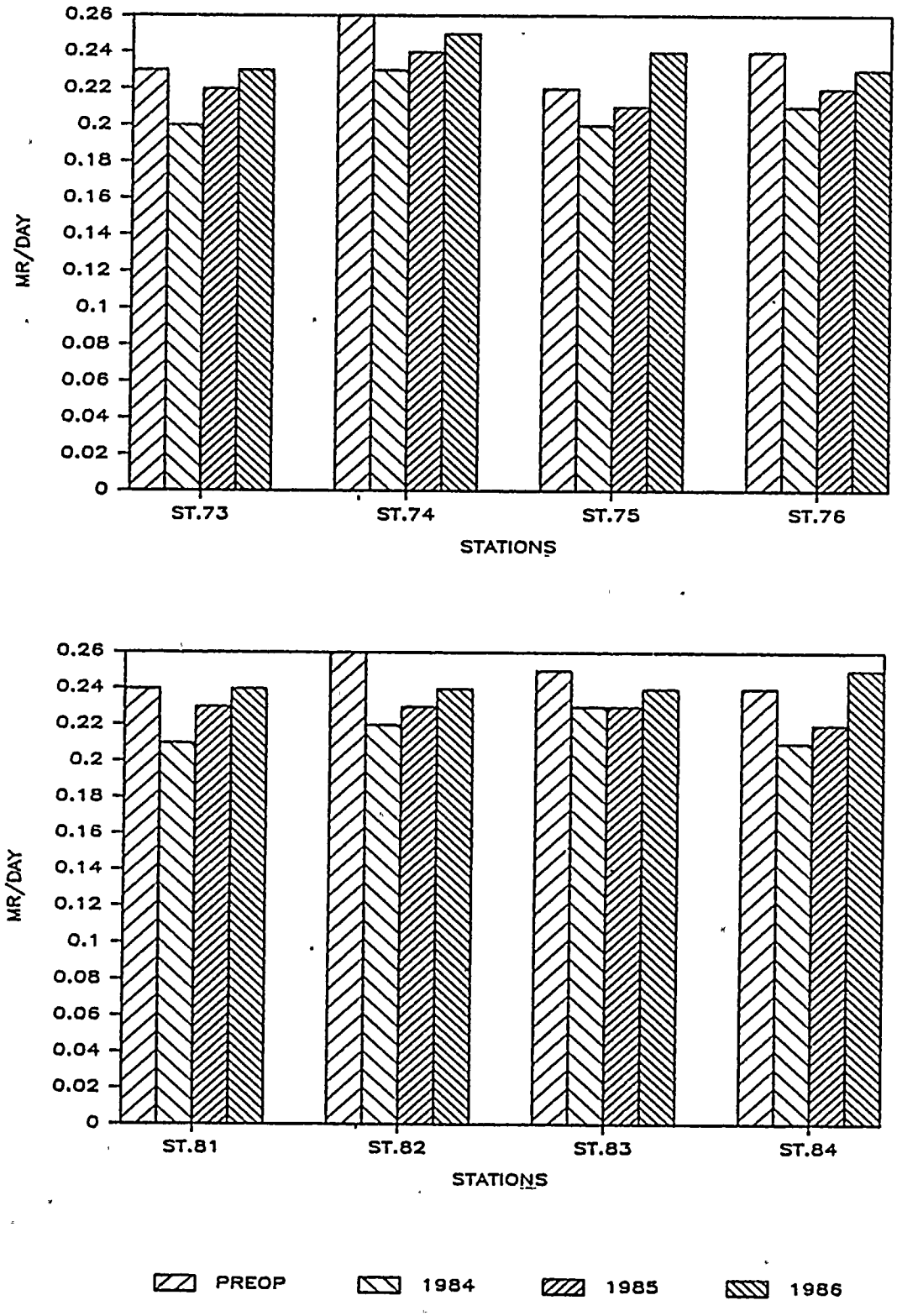
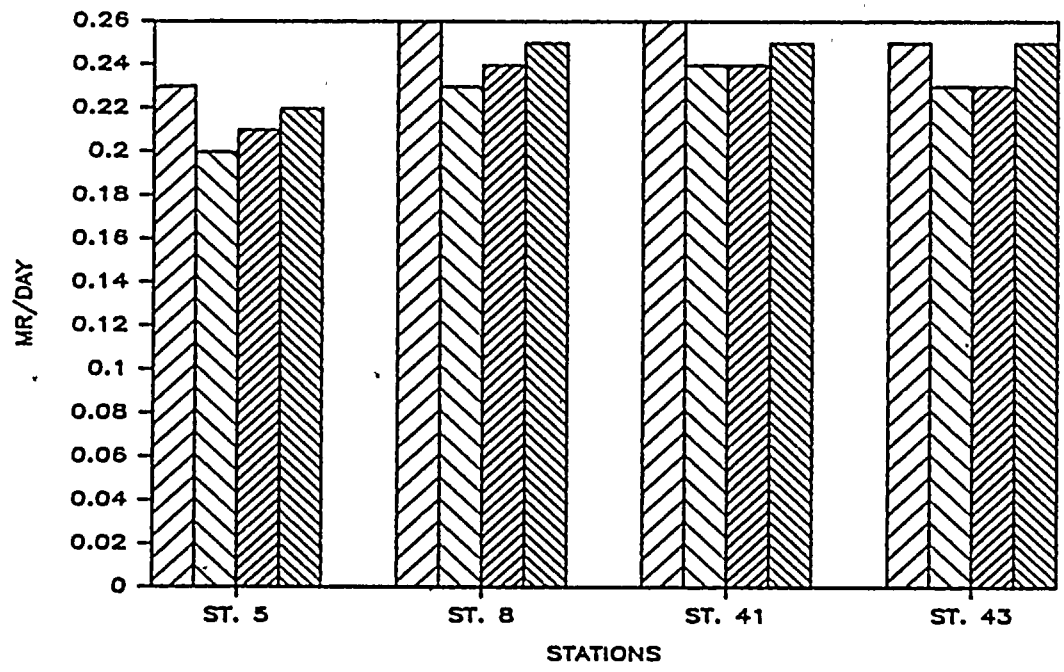


FIGURE 5-4

COMPARISON OF 1986 SPECIAL NEAR PLANT TLD RESULTS TO PREOPERATIONAL AND PREVIOUS OPERATIONAL RESULTS



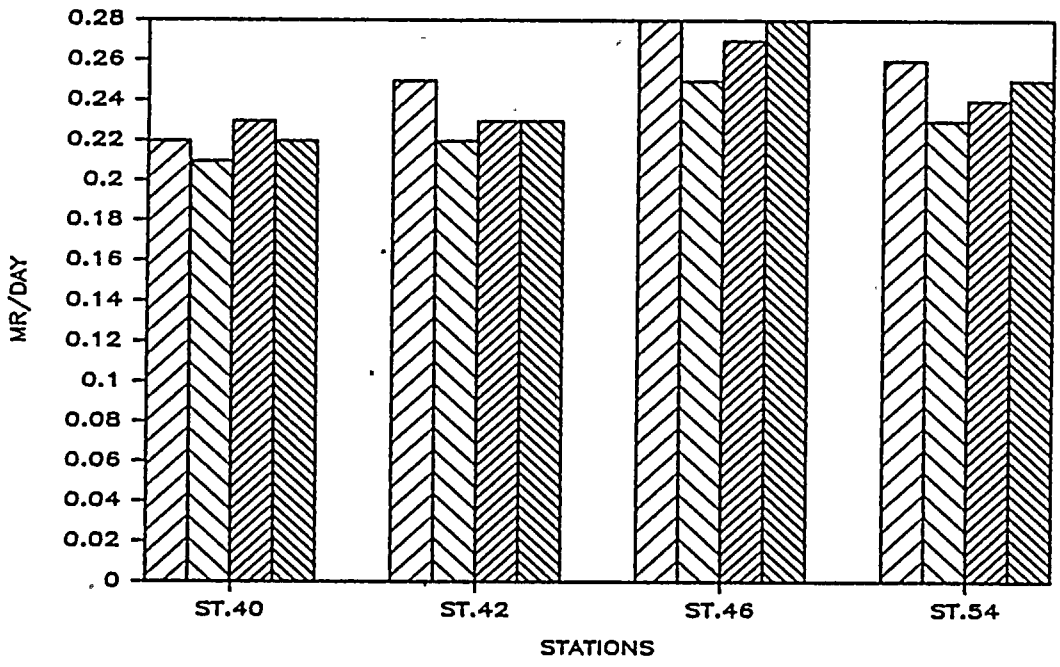


FIGURE 5-5

COMPARISON OF 1986 PASCO TLD RESULTS TO PREOPERATIONAL AND PREVIOUS OPERATIONAL RESULTS

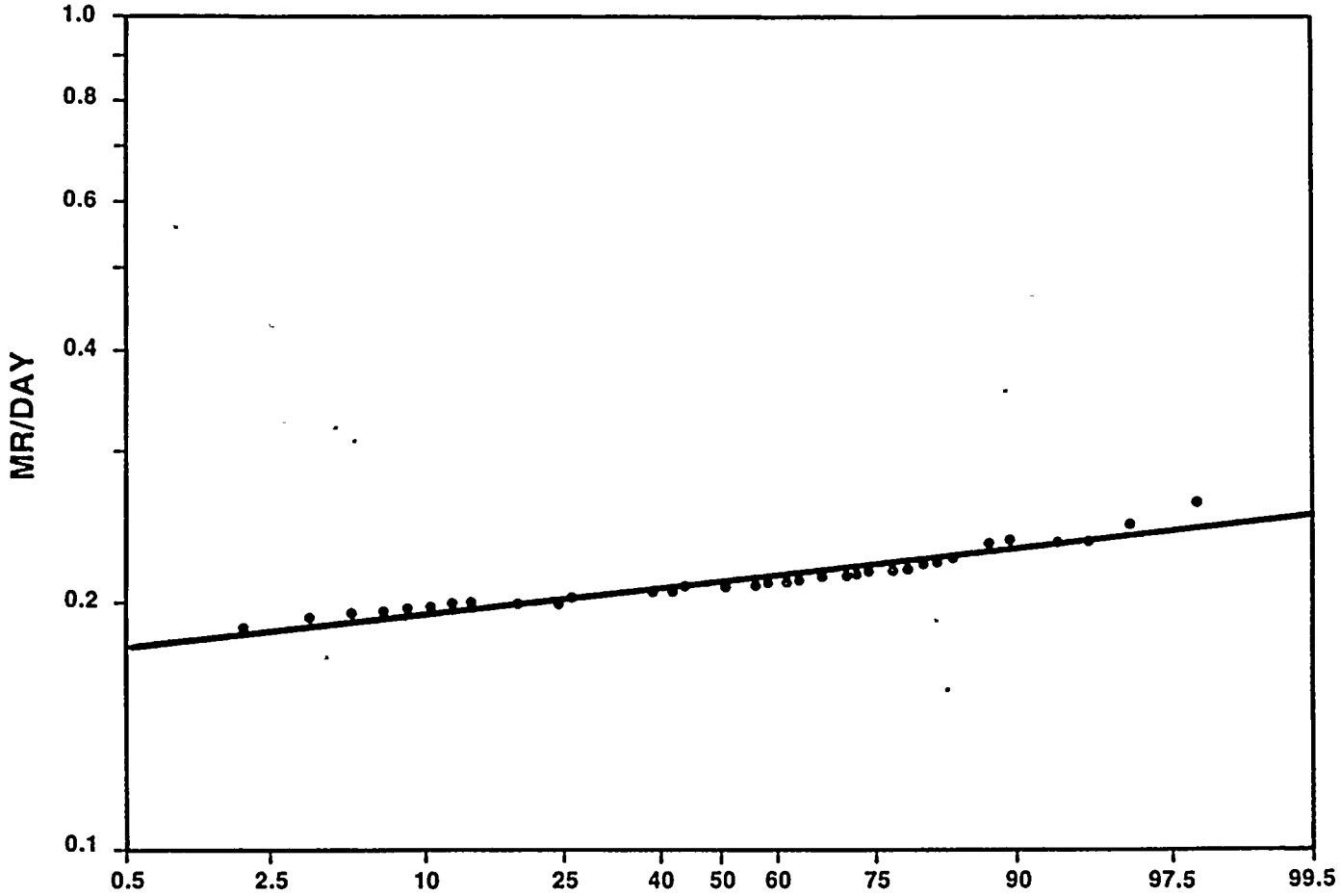


FIGURE 5-6

LOG PROBABILITY PLOT OF 1986 ANNUAL TLD RESULTS

5.2 Airborne Particulate/Air Iodine

The results of gross beta analyses on air particulate filters are presented in Tables A-3.1 through A-3.3 of Appendix A. The mean weekly results for all stations, as plotted in Figure 5-7, indicate the significant effect that the fallout from the Chernobyl accident had on the gross beta levels in the area. During May gross beta levels increased from 0.01-0.03 pCi/m^3 to 0.60 pCi/m^3. By mid June, gross beta levels had returned to normal levels. In mid October another increase occurred, apparently as a result of fallout washed from the atmosphere by the heavy rainfall at the time. Other smaller increases observed in November and December were a result of the inversion conditions which caused an increase in natural background radiation levels.

No effect of plant operations on the gross beta levels was apparent during 1986. Figures 5-8 and 5-9 show the gross beta results for two near-plant stations and the control station in Grandview during the periods prior to and after the Chernobyl accident. The control station results agree with the results of the near plant stations during both periods. This suggests that the increases observed were due to environmental factors rather than plant operation. The cycling of gross beta results during the first quarter of 1986, as seen in Figure 5-8, was investigated as a potential analytical problem. However, no problems were found in the analyses of these filters. Periods of inversion during the winter months, as observed in previous years, most likely accounted for this cycling.

The results of gamma spectrometry of particulate filters are presented in Tables A-4.1 through A-4.3 of Appendix A. Both the results of quarterly composited particulate filters and the individual particulate filters collected during May when Chernobyl fallout was the greatest are included in these tables.

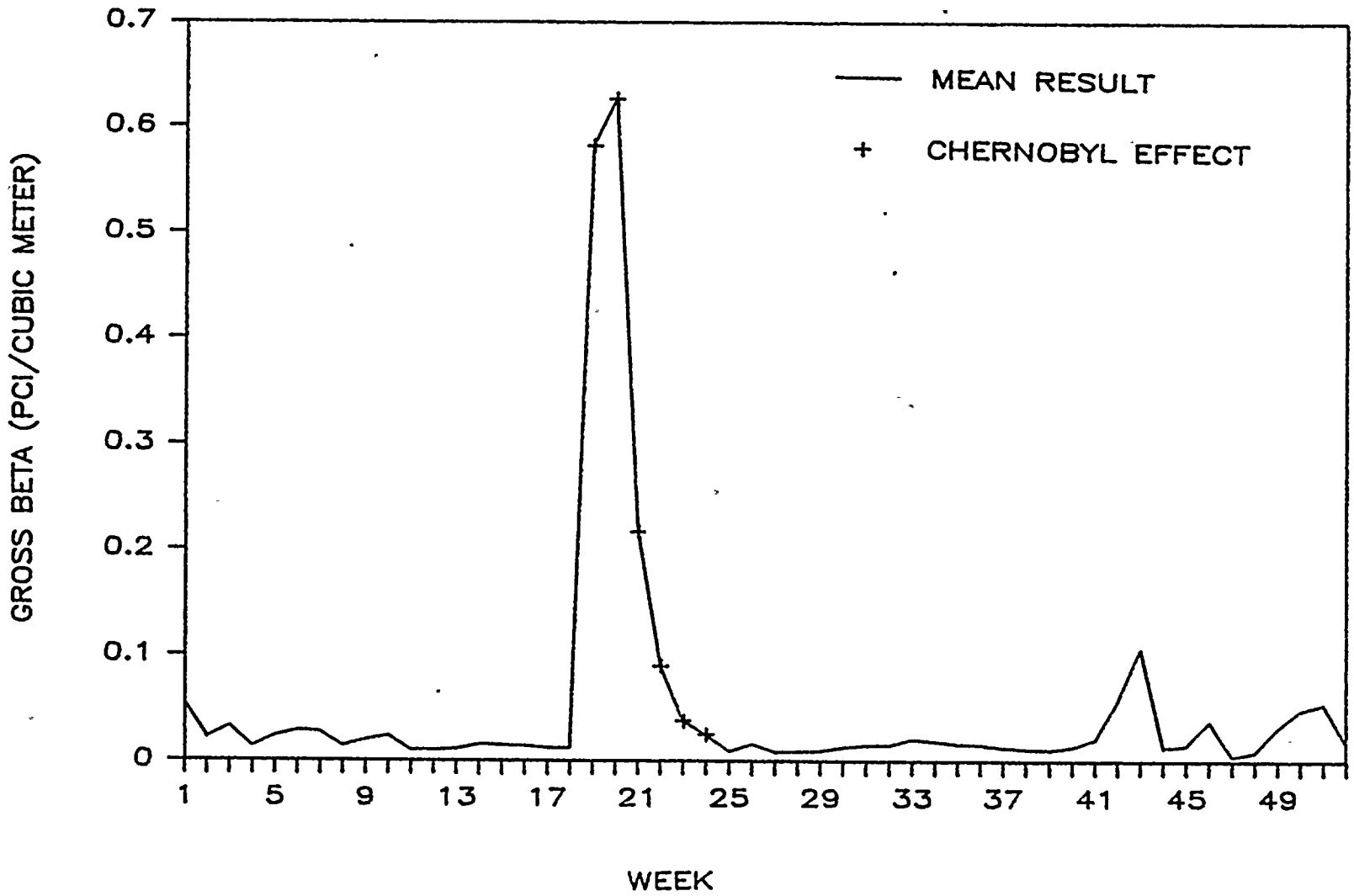


FIGURE 5-7

1986 GROSS BETA IN AIR AVERAGE WEEKLY RESULTS

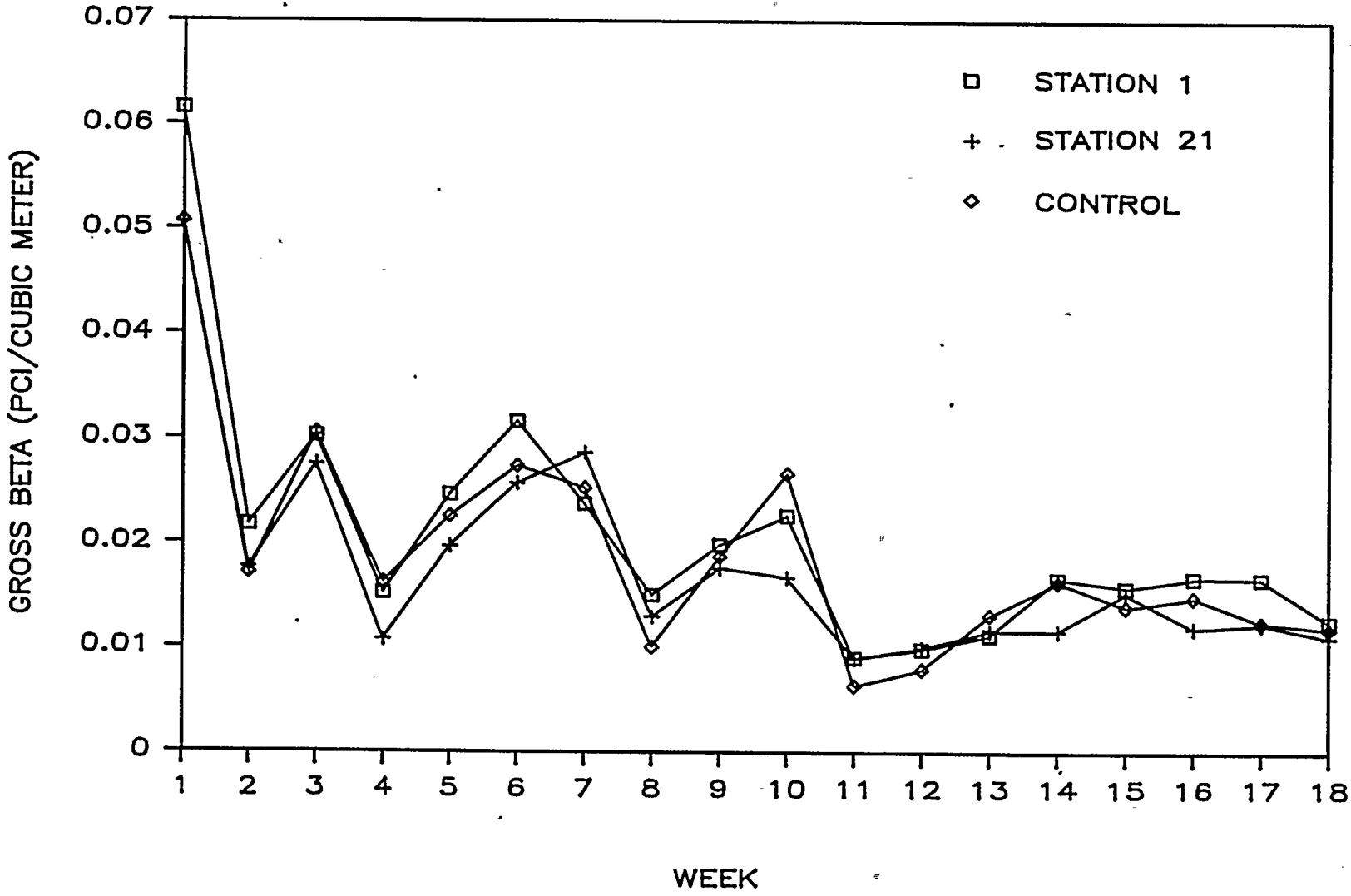


FIGURE 5-8

GROSS BETA IN AIR RESULTS FOR NEAR STATIONS AND CONTROL: PRE-CHERNOBYL ACCIDENT

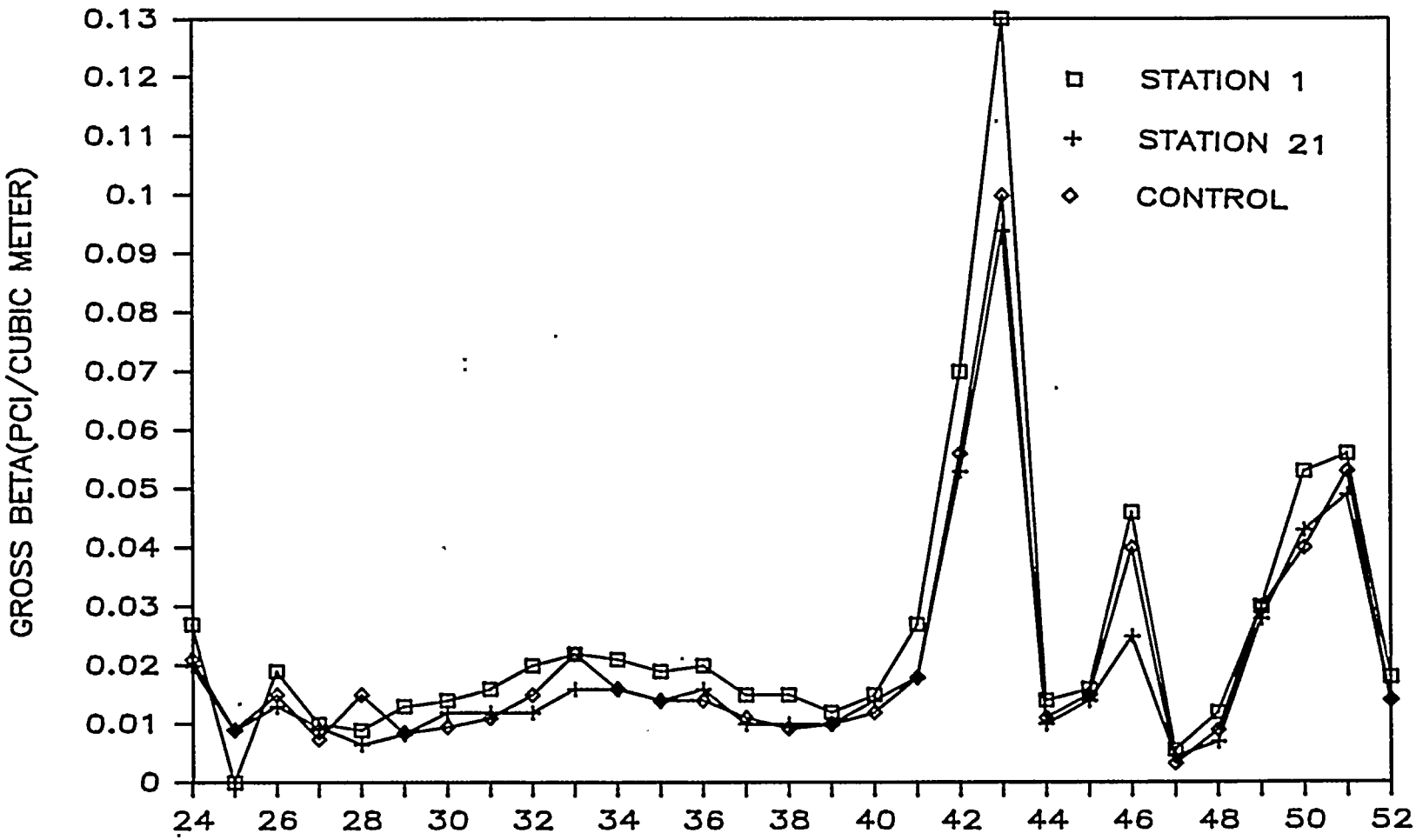


FIGURE 5-9

GROSS BETA IN AIR RESULTS FOR NEAR STATIONS AND CONTROL: POST CHERNOBYL ACCIDENT

Such radionuclides as I-131, Ru-103, and Ru-106 appeared as components of the Chernobyl fallout. The levels of Cs-137 and Cs-134 exceeded the detection limits for weekly and quarterly composite samples collected during periods of Chernobyl fallout. There was no evidence, however, of increases due to plant operations in the quarterly composite results.

The results of analyses of charcoal filters for I-131 are given in Tables A-5.1 through A-5.3 of Appendix A. All results, except those for samples collected during May and part of June, are below the detection limits. During that period I-131 levels in air from Chernobyl accident fallout reached 0.7-0.8 pCi/m^3. No significant effect of plant operations, in terms of the concentrations of I-131 in air, were observed during 1986.

5.3 Water

The results of gross beta analyses on river/drinking water are contained in Tables A-6.1 through A-6.3. These results are plotted in Figure 5-10. All gross beta results for plant intake (Station 26), 300 Area drinking water (Station 28) and Richland drinking water (Station 29) were within ranges observed during preoperational and previous operational periods and below the 8 pCi/liter reporting level for DSHS immediate notification. The gross beta results for the plant discharge water (Station 27) and its duplicate (Station 72) were also below the reporting level during the first seven months. However, with the discontinuance of the constant flow of river water through the discharge line regardless of whether there was discharge or not and the beginning of operating at high cycles of circulating water concentration, the gross beta results for the composite samples from the discharge line had increased to 20-30 pCi/liter by December 1986. Since this mode of discharging has become routine and since these are relatively undiluted samples of plant discharges, not drinking water samples or samples taken beyond the mixing zone in the river, a request has been submitted to DSHS to raise the reporting level for the discharge water only.

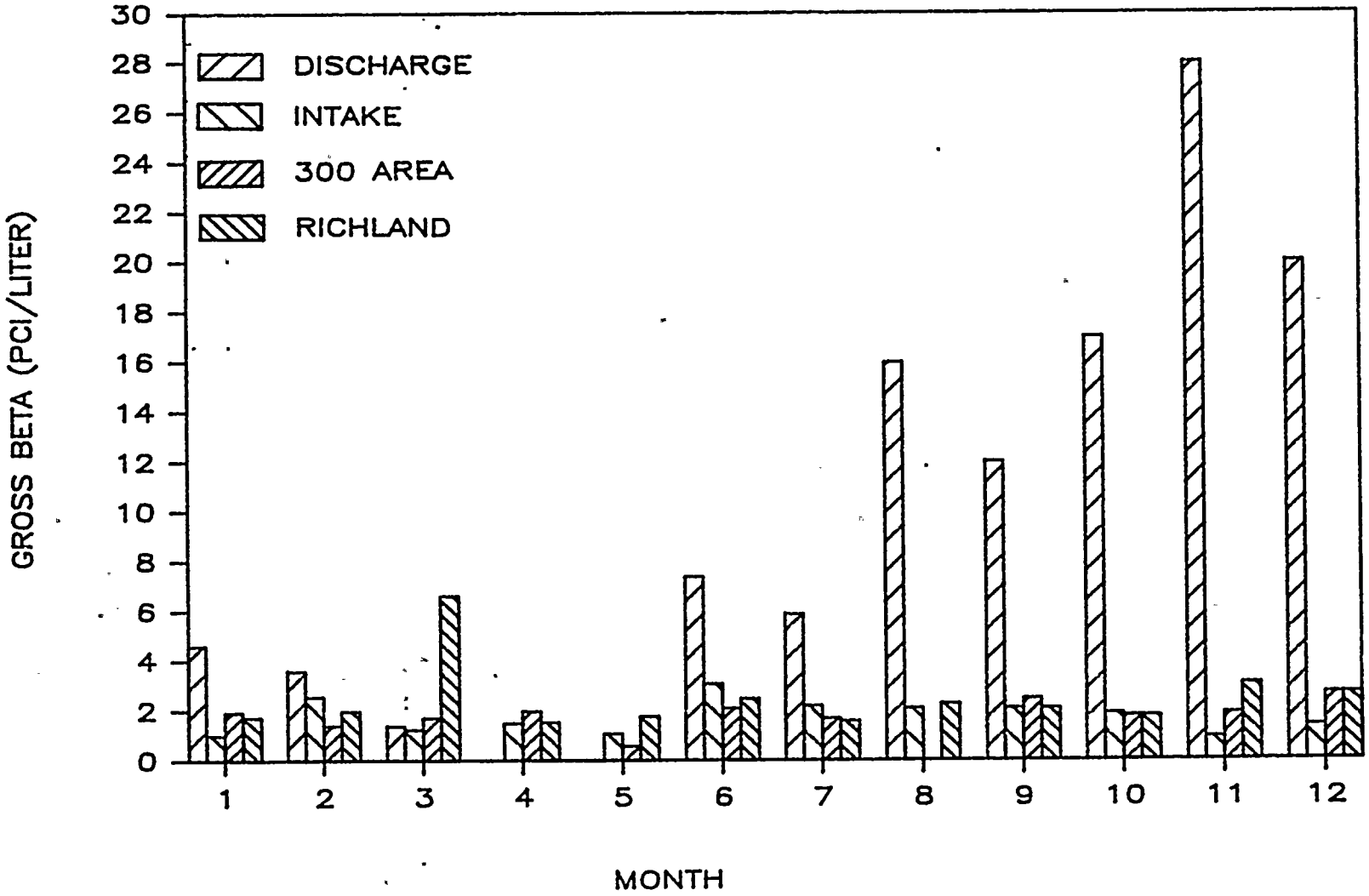


FIGURE 5-10

1986 GROSS BETA IN RIVER AND DRINKING WATER

Such an increase in the reporting level is justified by the fact that the reporting level is based on the Washington State standard of 8 pCi/liter Sr-90 in drinking water and the fact that the results for strontium analyses on the discharge water have been less than the detection limits. In addition, the gross beta levels at the first downstream drinking water intake at the 300 Area, have remained unchanged since the current mode of discharging was begun.

Tritium results for river/drinking water and ground water samples are presented in Tables A-7.1 through A-7.3. In general, the results have been at or slightly above detection limits and far below any reporting levels. The tritium levels observed for Station 27 and its duplicate, Station 72, were elevated over those observed for the other stations. This was likely attributable to the change in discharge practices discussed above.

The results of gamma spectrometry of water samples are presented in Tables A-8.1 through A-8.3. All results were below detection limits, so there was no indication of fission products or activation products contributing to the elevated gross beta results discussed above. No indication of any radiological impact of plant operations on water quality was evident.

5.4 Soil

Gamma spectrometry was performed on five soil samples collected in May. The Cs-137 levels in these samples ranged from 37.7 pCi/kg to 735 pCi/kg, which is within the range observed for the preoperational period. However, because the Cs-137 levels in the Station 1 and Station 23 samples were ten times the level observed for the control location, Station 9, a strontium-90 analysis was performed on these two samples. The strontium-90 levels found in the two samples (260 and 455 pCi/kg) were within the range observed for offsite locations sampled by the Hanford Environmental Monitoring Program.[11]

All the Cs-134 values determined for these samples were less than the detection limit. The other radionuclides indicated in the soil sample (Tables 1-10.1 and A-10.2) are the normal decay products of naturally occurring radionuclides from the Th-232 and U-238 decay series.

5.5 Sediment Sampling

The results of gamma spectrometry of shoreline sediment are presented in Tables A-12.1 through A-12.3 in Appendix A. Two activation products which have not been previously reported, Mn-54 and Co-57, were reported in the 1986 sediment samples. The concentrations of both radionuclides were less than the detection limits so their concentrations were insignificant, in terms of environmental impact. Their presence, however, did warrant resampling the sediment above and below the discharge and sampling the river sediment further upstream. Analyses of both upstream and downstream sediments indicated the presence of Co-57 at concentrations above detection limits. Therefore, the evidence of Co-57 in sediment downstream of the Plant 2 discharge probably does not indicate release of this radionuclide as a result of Plant 2 operations. Nevertheless, the 1987 sediment samples will be closely monitored for Co-57 levels above the detection limits. The concentrations of Mn-54 in all samples were below detection limits.

The other radionuclides present in the sediment samples, i.e. Cs-137, Cs-134 and Co-60, were generally within the ranges of results observed in previous operational and preoperational periods. One elevated Cs-134 result, 173 pCi/kg, was observed in the non-routine downstream sample collected in June. However, the results of duplicate samples processed by the Supply System and Teledyne Isotopes indicated levels much lower, i.e. a maximum of 82.4 pCi/kg. Sediment samples collected in October at the same upstream and downstream locations indicated Cs-134 levels below detection limits.

5.6 Fish

The results of fish samples taken in the vicinity of Plant-2 discharge and in the control location on the Snake River are presented in Tables A-13.1 through A-13.3 of Appendix A. All results were less than detection limits.

5.7 Milk

The effects of the Chernobyl fallout were particularily evident in the results of milk samples processed during 1986. As shown in Tables A-14.1 through A-14.3 and Tables A-15.1 through A-15.3 of Appendix A, gamma spectrometry and iodine-131 (resin method) results for milk samples taken before the fallout from the accident reached this region were all below detection limits, except for some of the naturally occurring radionuclides such as potassium-40. Following the Chernobyl accident, however, the cesium-137 and cesium-134 concentrations reached levels 20-200 times normal concentrations. In addition, I-131 concentrations in milk samples increased above detection limits. The milk sample concentrations of cesium-137, cesium-134 and iodine-131 peaked during the period from mid May to the first week in June at 47.3, 20.2 and 170 pCi/liter, respectively.

Iodine-131 in milk results obtained using the resin method were significantly lower than those obtained through gamma spectroscopy. An investigation into this problem indicated that stable iodine present in the milk might be causing erroneously high recoveries and, therefore, low results, for that analysis.

The peak concentrations of the radiocesiums and iodine-131 observed following the accident were much lower than the response levels for milk corresponding to the Food and Drug Administration (FDA) and Washington State Protective Action Guides (PAGs) for preventative level:[12, 13]

	Response Level (pCi/l)	Highest Result (pCi/l)
I-131	15,000	170
Cs-137	240,000	47.3
Cs-134	150,000	20.2

Had the concentrations exceeded these levels, recommendations would have been made by State and Federal authorities for such actions as using stored feed for dairy cattle and diverting fresh milk to stored milk products, to prevent further contamination of the milk and ingestion of milk with the higher radionuclide concentrations.

The results of strontium-89 and 90 analyses performed on milk samples are presented in Table A-16.2. These analyses were performed only in cases in which the Cs-137 or Cs-134 levels exceeded 30 pCi/liter. The high levels of radiocesiums were the result of Chernobyl fallout. All strontium-89 results were less than detection limits. Sr-90 results were above detection limits but within ranges normally observed in offsite locations[11].

5.8 Garden Produce

The results of gamma spectrometry of root crops, fruits and vegetables are presented in Tables A-17.1 through A-19.3 in Appendix A. All results except those from one raspberry sample collected in June and two spinach samples collected in May, were less than the detection limits. The three samples with positive results had elevated Cs-137 or I-131 levels as a result of fallout from the Chernobyl accident.

The elevated I-131 levels observed on spinach and lettuce samples collected during the period of greatest Chernobyl fallout ranged from 4.22-319 pCi/kg. This was far below the preventative level PAGs for I-131 on leafy vegetables 550,000 pCi/kg.[13]

6.0 PLANT EFFLUENTS AND DOSE ASSESSMENT

The Offsite Dose Calculation Manual (ODCM) details the site specific information and methodologies used to predict concentrations of radioactive materials in the environment and subsequent radiation doses, based on effluent releases to the environment.[14] The following is a summary of the assessed doses for 1986.

6.1 Liquid Effluents

6.1.1 Liquid Source Terms

The radwaste liquid effluents from Plant 2 were released in a batch mode only. All liquid effluents from the radwaste building are recirculated in a vented hold-up tank at atmospheric pressure prior to sampling and discharge analysis.

Doses from liquid effluents were calculated using LADTAP II.[15] Table 6-1 lists the liquid source terms used in the LADTAP II computer run.

6.1.2 Doses to Man: Liquid Pathways

Doses for the Maximum Individual, Average Individual, and the 50-Mile Population Dose estimates are listed in Tables 6-2, 6-3 and 6-4, respectively. Technical Specification limits and the balance at year end are listed in Table 6-2, verifying compliance with Technical Specifications. The maximum exposed individual is assumed to be an adult whose exposure pathways include potable water and fish consumption. The choice of the maximum exposed individual is based on the highest fish and water consumption rates shown by that age group and the fact that most of the dose obtained from the Plant 2 liquid effluent comes from these two pathways.

The design base doses listed in Table 6-4 were calculated using design base source terms obtained from the GALE-Liquid computer code.[16]

6.2 Gaseous Effluents

6.2.1 Gaseous Source Terms

The gaseous source terms listed in Table 6-5 were used in the annual GASPAR computer code for dose determinations.[17] Sampling and analyses were performed in accordance with pertinent plant procedures. The gaseous effluents from Plant 2 were released in a continuous mode from three release points:

a. Main Plant Vent - mixed mode release
b. Turbine Building - ground level release
c. Radwaste Building - ground level release

6.2.2 Dose to Man: Airborne Pathway

6.2.2.1 Site Boundary and Nearest Resident

Gaseous effluents were released in a continuous mode. An annual GASPAR computer run was performed in order to calculate the doses at the 1.2 mile site boundary and at Taylor Flats (4.2 miles SE)*. Annual average atmospheric dispersion factors (X/Q) and deposition rates (D/Q) were obtained from the XOQDOQ computer code.[18] Two sets of X/Q amd D/Q values were used: one set for the mixed mode release and the other for the ground level releases.

The calculations at the 1.2-mile site boundary were used to verify compliance with Technical Specifications for air dose limits. The sector showing the highest X/Q value for the Main Plant Vent was used in the calculations.

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*The nearest residence; milk and garden produce are assumed at this location.

Table 6-6 summarizes the air dose estimates at the site boundary and the maximum organ dose to a member of the public located at Taylor Flats. The average individual doses from gaseous effluents are listed in Table 6-7. Table 6-8 lists the 50-mile population dose estimates, along with the preoperational population dose projections.

6.2.2.2 Exposure to "A Member of the Public"

There are five special locations within the 1.2 mile exclusion area for which the access is not completely controlled by the Supply System. These areas are:

a. Bye burial site - normally controlled by DOE
b. The DOE railroad through the area
c. The BPA Ashe Substation
d. The WNP-2 Visitor Center
e. WNP-1/4 parking lot and construction site

The Plant 2 Visitor Center was assumed to be the location with the highest potential for exposure to a member of the public due to its close proximity to the plant. Although the workers at the BPA Ashe Substation have a higher assumed occupancy (2000 hr/yr versus 8 hr/yr for the Visitor Center), they are not considered members of the public because they are "occupationally associated with the plant".

The Plant 2 Visitor Center was evaluated for assessment of radiation doses to "Members of the Public", due to their activities within the site boundary. The ODCM assumes an eight hours per year occupancy by "A Member of the Public" at the Visitor Center. The dose assessment resulted in an annual calculated whole body dose of 1.1 E-02 mrem. The maximum annual organ dose (other than the thyroid) was 1.3 E-02 mrem and the annual thyroid dose was 6.9 E-02 mrem.

The annual assessment of radiation doses to the most likely exposed "Member of the Public" to show conformance with 40CFR Part 190 is assumed to be located in the Taylor Flats vicinity (4.2 miles SE). The GASPAR computer code with annual source terms and XOQDOX meteorological data was used to obtain the dose assessment from gaseous effluents. There was assumed to be no dose contribution from liquid effluents at Taylor Flats. The assessment resulted in an annual whole body dose of 9.0 E-03 mrem. The maximum annual organ dose (other than the thyroid) was 9.7 E-03 mrem and the annual thyroid dose was 4.7 E-02 mrem. The direct radiation contribution was not significantly above normal background (approximately 80 mrem/yr) for that area.

TABLE 6-1

PLANT 2 1986 LIQUID EFFLUENTS - SOURCE TERMS

Nuclides Released	Unit	Annual
Strontium-89	Ci	4.3 E-05
Strontium-90	Ci	1.2 E-06
Cesium-134	Ci	2.4 E-04
Cesium-137	Ci	2.1 E-04
Iodine-131	Ci	2.1 E-04
Iodine-133	Ci	1.6 E-05
Sodium-24	Ci	5.3 E-04
Cobalt-58	Ci	2.2 E-03
Cobalt-60	Ci	2.2 E-03
Iron-59	Ci	2.9 E-05
Zinc-65	Ci	1.3 E-02
Manganese-54	Ci	6.4 E-04
Chromium-51	Ci	1.8 E-03
Copper-64	Ci	2.6 E-03
Zirconium-Niobium-95	Ci	4.5 E-05
Molybdenum-99	Ci	1.4 E-04
Technetium-99m	Ci	1.0 E-04
Barium-Lanthanum-140	Ci	6.0 E-04
Cerium-141	Ci	2.3 E-04
Cerium-144	Ci	1.0 E-03
Tritium	Ci	3.3 E+00
Iron-55	Ci	1.1 E-04
Silver-110m	Ci	1.7 E-05
Total for Period (above)	Ci	3.3 E+00

TABLE 6-2

SUMMARY OF DOSES FROM 1986 LIQUID EFFLUENTS
MAXIMUM INDIVIDUAL[a]

Location: Richland
Exposure pathway - fishing, drinking, shoreline and food ingestion. Fishing and boating at the Plant 2 slough area.

Age Group: Adult (An individual residing in Richland).

Pathway	Annual 1986 Whole Body (mrem/yr)	Annual 1986 Maximum Organ. (mrem/yr)
Drinking	3.8 E-06	5.5 E-06
Shoreline	4.5 E-06	5.2 E-06
Fishing	2.4 E-02	4.6 E-02
Boating	2.3 E-07	2.3 E-07
Swimming	1.8 E-08	1.8 E-08
Leafy Vegetables	1.0 E-06	1.8 E-06
Vegetables	6.4 E-06	1.1 E-05
Cow Milk	5.2 E-06	1.0 E-05
Meat	1.6 E-06	3.0 E-06
Total[b]:	2.4 E-02	4.6 E-02
Technical Specification Limits: (mrem/yr)	(3.0 E+00)	(1.0 E+01)
Balance at Year End: (mrem)	2.97 E+00	9.95 E+00

[a]The Maximum Individual is an adult assumed to reside in Richland, consume food grown in the Riverview area in Pasco, Washington, and fish at the Plant 2 slough area.

[b]WNP-2 Annual Effluent Report - January 1 to December 31, 1986

TABLE 6-3

AVERAGE INDIVIDUAL DOSES FROM 1986 LIQUID EFFLUENTS

Pathway	Whole Body (mrem)	Max. Organ (mrem)
Fish[a]	5.9 E-05	1.1 E-04
Drinking Water[a]	2.3 E-06	2.8 E-06
Shoreline[a]	1.5 E-07	1.8 E-07
Swimming[a]	2.0 E-09	2.0 E-09
Boating[a]	1.1 E-09	1.1 E-09
Vegetables[b]	2.0 E-05	3.2 E-05
Leafy Vegetables[b]	1.5 E-05	2.5 E-05
Milk[b]	3.1 E-06	6.2 E-06
Meat[b]	8.9 E-07	5.2 E-07
Total:	1.0 E-04	1.8 E-04

(a) The adult dose "FOR AS LOW AS REASONABLY ACHIEVABLE".

(b) The population doses divided by the 50-mile radius production population served.

NOTE: Data obtained from Annual LADTAP II Analysis.

TABLE 6-4

50-MILE POPULATION DOSES FROM 1986 LIQUID EFFLUENTS[a]

	ANNUAL 1986		DESIGN BASE[b]	
	Whole Body (man-rem)	Max. Organ (man-rem)	Whole Body (man-rem)	Max. Organ (man-rem)
Drinking Water	7.2 E-05	1.4 E-04	8.3 E-04	3.4 E-03
Shoreline	4.9 E-05	5.8 E-05	1.9 E-04	2.2 E-04
Fishing	7.2 E-05	3.7 E-05	5.4 E-04	1.0 E-03
Swimming	6.3 E-07	6.3 E-07	3.1 E-06	3.1 E-06
Boating	1.6 E-07	1.6 E-07	7.7 E-07	7.7 E-07
Vegetables	2.2 E-04	3.5 E-04	4.3 E-04	6.2 E-04
Leafy Vegetables	1.6 E-04	2.8 E-04	2.7 E-05	4.0 E-05
Milk	4.4 E-05	9.0 E-05	2.7 E-04	4.7 E-04
Meat	9.1 E-06	5.3 E-06	5.7 E-05	9.6 E-05
Total	6.3 E-04	9.6 E-04	2.4 E-03	5.9 E-03

[a]All age groups combined.

[b]Based on design base source terms (i.e., GALE Liquid Computer Code).

TABLE 6-5

PLANT 2 1986 GASEOUS EFFLUENTS-SOURCE TERMS

Nuclides Released	Unit	Reactor Building	Turbine Building	Radwaste Building
1. Fission Gases				
Krypton-85	Ci	1.4 E+01	1.2 E+02	3.1 E+01
Krypton-85m	Ci	1.4 E+00	1.6 E+00	4.0 E-01
Krypton-87	Ci	1.4 E+00	5.2 E+00	2.4 E+00
Krypton-88	Ci	5.0 E+00	7.7 E+00	3.4 E+00
Xenon-133	Ci	5.2 E+00	9.7 E+00	3.2 E+00
Xenon-135	Ci	9.1 E+00	2.3 E+00	2.3 E+00
Xenon-135m	Ci	3.9 E+00	1.3 E+00	3.0 E+00
Xenon-138	Ci	6.9 E+00	2.8 E+01	4.9 E+00
Xenon-133m	Ci	7.8 E+00	3.1 E+01	6.1 E+00
Total for period	Ci	5.5 E+01	8.5 E+01	2.5 E+01
2. Iodines				
Iodine-131	Ci	1.4 E-03	2.5 E-03	2.4 E-04
Iodine-133	Ci	7.5 E-03	2.5 E-02	9.1 E-04
Total for period	Ci	8.9 E-03	2.8 E-02	1.2 E-03

TABLE 6-5 (Cont.)

PLANT 2 1986 GASEOUS EFFLUENTS-SOURCE TERMS

3. Particulates

Strontium-89	Ci	2.8 E-05	5.4 E-05	3.1 E-05
Strontium-90	Ci	1.0 E-05	4.5 E-05	2.1 E-05
Cesium-134	Ci	8.6 E-04	3.5 E-05	1.2 E-04
Cesium-137	Ci	8.3 E-05	3.7 E-05	1.0 E-04
Barium-Lanthanum-140	Ci	2.5 E-03	4.7 E-04	3.9 E-04
Molybdenum-99	Ci	2.5 E-02	3.6 E-04	5.5 E-04
Cerium-141	Ci	6.7 E-04	9.2 E-04	1.2 E-04
Cerium-144	Ci	6.4 E-05	3.7 E-03	5.0 E-04
Cobalt-58	Ci	3.5 E-03	3.5 E-04	1.2 E-04
Cobalt-60	Ci	3.5 E-03	7.0 E-04	1.8 E-04
Chromium-51	Ci	4.3 E-03	2.9 E-03	8.8 E-05
Zinc-65	Ci	1.4 E-02	2.8 E-03	3.1 E-04
Zirconium-95	Ci	6.2 E-04	1.6 E-04	5.3 E-04
Iron-59	Ci	2.1 E-04	2.0 E-03	3.0 E-04
Manganese-54	Ci	5.2 E-04	1.3 E-03	1.4 E-04
Total for Period	Ci	5.2 E-02	7.9 E-03	5.0 E-05

4. Tritium	Ci	5.4 E-01	4.7 E+00	2.4 E-01

Total Building release	Ci	5.6 E+01	8.8 E+01	2.5 E+01

TABLE 6-6

SUMMARY OF ORGAN AND AIR DOSES FROM 1986 GASEOUS EFFLUENTS

Location: 1.2 miles ESE (site boundary)

	Balance as of Year-End (mrad)
Beta air dose: 1.4 E-01 mrad/yr (20 mrad/yr)[a]	19.8
Gamma air dose: 2.1 E-01 mrad/yr (10 mrad/yr)[a]	9.7

Location: 4.2 miles SE Taylor Flats

Age Group: Infant

Total Max. Organ Dose (mrem/yr)
4.7 E-02 (1.5 E+01)[a]

Contributions to total maximum organ dose (mrem)[b]:

Plume:	2.6 E-03
Ground:	1.9 E-03
Goat Milk:	3.7 E-02
Inhalation:	5.3 E-03

[a]Numbers in parentheses represent Technical Specification limits.

[b]Dose to thyroid

TABLE 6-7

AVERAGE INDIVIDUAL DOSES FROM 1986 GASEOUS EFFLUENTS[a]

Exposure Pathway	Whole Body (mrem)	Max. Organ (mrem)
Plume	9.1 E-05	3.8 E-04
Ground	5.6 E-05	6.4 E-05
Inhalation	2.6 E-05	1.7 E-04
Vegetables	7.5 E-10	2.6 E-09
Cow Milk	5.7 E-10	2.4 E-09
Meat	4.5 E-10	6.2 E-10
Total:	1.7 E-04	6.1 E-04

(a) The projected population doses divided by the population for the 50-mile radius in the year 1980.

TABLE 6-8

50-MILE POPULATION DOSES FROM 1986 GASEOUS EFFLUENTS[a]

Exposure Pathway	1986 DATA		DESIGN BASE DATA[b]	
	Whole Body (man-Rem	Max. Organ (man-Rem)	Whole Body (man-Rem)	Max. Organ (man-Rem)
Plume	2.3 E-02	9.5 E-02	2.4 E-01	6.9 E-01
Ground	1.4 E-02	1.6 E-02	4.3 E-02	5.1 E-02
Inhalation	6.6 E-03	4.4 E-02	1.1 E-02	1.3 E+0
Vegetables	1.9 E-07	6.4 E-07	1.9 E-02	2.7 E+0
Cow Milk	1.4 E-07	6.0 E-07	9.2 E-03	1.8 E+0
Meat	1.3 E-07	1.6 E-07	1.9 E-03	6.8 E-02
Total:	4.4 E-02	1.6 E-01	3.2 E-01	6.6 E+0

[a]All age groups combined.

[b]Based on design base source terms.

7.0 SUMMARY

During 1986 small quantities of radionuclides were released to the environment as a result of Plant 2 operations. The impact of these releases, in terms of radionuclide concentrations measured in the environment and estimated doses to the public, were discussed in this report.

All 1986 estimated doses to the public, resulting from the liquid and gaseous effluents from the plant were far below the limits in the WPPSS Nuclear Plant No. 2 Technical Specifications and 10 CFR 50 Appendix I. The absence of any significant radiological impact of Plant 2 releases on the environment was verified by the 1986 Radiological Environmental Monitoring Program (REMP) results.

During a portion of the year, concentrations of radiocesiums, iodine-131 and certain other fission products contained in the fallout from the Chernobyl nuclear accident completely overshadowed the environmental levels normally observed. Evaluation of the impact of Plant 2 operations was accomplished through the evaluation of REMP results prior to the accident and after the radiological effects of the accident had subsided and comparison of results from stations near Plant 2 to the results from remote stations and the control location throughout the year.

In light of the low concentrations of radionuclides observed in the environmental media sampled and the similarity of analytical and TLD results for near plant and remote stations and the control location, the radiological impact of Plant 2 operations on the environment was negligible during 1986.

8.0 REFERENCES

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APPENDIX A: ROUTINE RESULTS

TABLE A-1

1986 QUARTERLY TLD RESULTS

Results in mR/day

LOCATION	COLLECTION PERIOD	RESULT	ERROR (2σ)
1	851226 to 860327	0.21	0.02
1	860327 to 860626	0.23	0.04
1	860626 to 860925	0.24	0.01
1	860925 to 861230	0.25	0.01
2	851226 to 860327	0.21	0.02
2	860327 to 860626	0.22	0.05
2	860626 to 860925	0.24	0.02
2	860925 to 861230	0.23	0.01
3	851226 to 860327	0.20	0.01
3	860327 to 860626	0.21	0.01
3	860626 to 860925	0.24	0.01
3	860925 to 861230	0.24	0.01
4	851226 to 860327	0.20	0.01
4	860327 to 860626	0.21	0.03
4	860626 to 860925	0.21	0.01
4	860925 to 861230	0.22	0.00
5	851226 to 860327	0.20	0.01
5	860327 to 860626	0.21	0.02
5	860626 to 860925	0.23	0.01
5	860925 to 861230	0.24	0.01
6	851226 to 860327	0.20	0.01
6	860327 to 860626	0.20	0.02
6	860626 to 860925	0.22	0.01
6	860925 to 861230	0.23	0.01
7	851226 to 860327	0.21	0.01
7	860327 to 860626	0.22	0.01
7	860626 to 860925	0.24	0.01
7	860925 to 861230	0.25	0.01
8	851226 to 860327	0.23	0.01
8	860327 to 860626	0.23	0.04
8	860626 to 860925	0.26	0.01
8	860925 to 861230	0.27	0.01

TABLE A-1 (Cont.)

1986 QUARTERLY TLD RESULTS

Results in mR/day

LOCATION	COLLECTION PERIOD	RESULT	ERROR (2σ)
9	851226 to 860327	0.19	0.01
9	860327 to 860626	0.20	0.02
9	860626 to 860925	0.22	0.01
9	860925 to 861230	0.23	0.02
10	851226 to 860327	0.21	0.01
10	860327 to 860626	0.22	0.02
10	860626 to 860925	0.23	0.01
10	860925 to 861230	0.24	0.01
11	851226 to 860327	0.21	0.01
11	860327 to 860626	0.21	0.03
11	860626 to 860925	0.23	0.01
11	860925 to 861230	0.25	0.01
12	851226 to 860327	0.22	0.01
12	860327 to 860626	0.23	0.03
12	860626 to 860925	0.24	0.01
12	860925 to 861230	0.27	0.01
13	851226 to 860327	0.21	0.01
13	860327 to 860626	0.23	0.01
13	860626 to 860925	0.24	0.01
13	860925 to 861230	0.25	0.01
14	851226 to 860327	0.21	0.01
14	860327 to 860626	0.22	0.02
14	860626 to 860925	0.24	0.01
14	860925 to 861230	0.25	0.01
15	851226 to 860327	0.23	0.02
15	860327 to 860626	0.23	0.03
15	860626 to 860925	0.25	0.01
15	860925 to 861230	0.26	0.01
16	851226 to 860327	0.22	0.01
16	860327 to 860626	0.22	0.05
16	860626 to 860925	0.24	0.01
16	860925 to 861230	0.26	0.01

TABLE A-1 (Cont.)

1986 QUARTERLY TLD RESULTS

Results in mR/day

LOCATION	COLLECTION PERIOD	RESULT	ERROR (2σ)
17	851226 to 860327	0.21	0.01
17	860327 to 860626	0.22	0.02
17	860626 to 860925	0.23	0.01
17	860925 to 861230	0.26	0.01
18	851226 to 860327	0.22	0.01
18	860327 to 860626	0.22	0.03
18	860626 to 860925	0.23	0.02
18	860925 to 861230	0.25	0.01
19	851226 to 860327	0.21	0.01
19	860327 to 860626	0.22	0.04
19	860626 to 860925	0.24	0.01
19	860925 to 861230	0.25	0.01
20	851226 to 860327	0.22	0.02
20	860327 to 860626	0.21	0.05
20	860626 to 860925	0.23	0.02
20	860925 to 861230	0.25	0.01
21	851226 to 860327	0.21	0.05
21	860327 to 860626	0.21	0.01
21	860626 to 860925	0.22	0.01
21	860925 to 861230	0.24	0.01
22	851226 to 860327	0.22	0.01
22	860327 to 860626	0.21	0.02
22	860626 to 860925	0.24	0.02
22	860925 to 861230	0.25	0.01
23	851226 to 860327	0.20	0.01
23	860327 to 860626	0.21	0.03
23	860626 to 860925	0.23	0.01
23	860925 to 861230	0.24	0.01
24	851226 to 860327	0.22	0.01
24	860327 to 860626	0.22	0.07
24	860626 to 860925	0.25	0.01
24	860925 to 861230	0.25	0.01
25	851226 to 860327	0.22	0.01
25	860327 to 860626	0.22	0.04
25	860626 to 860925	0.26	0.01
25	860925 to 861230	0.28	0.01

TABLE A-1 (Cont.)

1986 QUARTERLY TLD RESULTS

Results in mR/day

LOCATION	COLLECTION PERIOD	RESULT	ERROR (2σ)
40	851226 to 860327	0.19	0.02
40	860327 to 860626	0.21	0.05
40	860626 to 860925	0.24	0.01
40	860925 to 861230	0.24	0.01
41	851226 to 860327	0.23	0.01
41	860327 to 860626	0.23	0.05
41	860626 to 860925	0.28	0.04
41	860925 to 861230	0.27	0.02
42	851226 to 860327	0.21	0.01
42	860327 to 860626	0.21	0.03
42	860626 to 860925	0.25	0.02
42	860925 to 861230	0.25	0.00
43	851226 to 860327	0.22	0.02
43	860327 to 860626	0.23	0.02
43	860626 to 860925	0.27	0.02
43	860925 to 861230	0.27	0.01
44	851226 to 860327	0.21	0.01
44	860327 to 860626	0.21	0.03
44	860626 to 860925	0.24	0.01
44	860925 to 861230	0.25	0.01
45	851226 to 860327	0.21	0.01
45	860327 to 860626	0.21	0.03
45	860626 to 860925	0.24	0.01
45	860925 to 861230	0.24	0.01
46	851226 to 860327	0.25	0.01
46	860327 to 860626	0.27	0.02
46	860626 to 860925	0.30	0.01
46	860925 to 861230	0.31	0.01
47	851226 to 860327	0.20	0.01
47	860327 to 860626	0.20	0.04
47	860626 to 860925	0.23	0.01
47	860925 to 861230	0.24	0.01
49	851226 to 860327	0.22	0.01
49	860327 to 860626	0.22	0.05
49	860626 to 860925	0.24	0.00
49	860925 to 861230	0.25	0.01

TABLE A-1 (Cont.)

1986 QUARTERLY TLD RESULTS

Results in mR/day

LOCATION	COLLECTION PERIOD	RESULT	ERROR (2σ)
50	851226 to 860327	0.21	0.02
50	860327 to 860626	0.22	0.04
50	860626 to 860925	0.25	0.01
50	860925 to 861230	0.25	0.01
51	851226 to 860327	0.21	0.02
51	860327 to 860626	0.21	0.03
51	860626 to 860925	0.24	0.01
51	860925 to 861230	0.24	0.01
53	851226 to 860327	0.23	0.02
53	860327 to 860626	0.25	0.04
53	860626 to 860925	0.28	0.01
53	860925 to 861230	0.28	0.01
54	851226 to 860327	0.24	0.01
54	860327 to 860626	0.23	0.01
54	860626 to 860925	0.25	0.01
54	860925 to 861230	0.26	0.01
55	851226 to 860327	0.21	0.01
55	860327 to 860626	0.21	0.03
55	860626 to 860925	0.24	0.01
55	860925 to 861230	0.25	0.02
56	851226 to 860327	0.21	0.03
56	860327 to 860626	0.22	0.02
56	860626 to 860925	0.24	0.01
56	860925 to 861230	0.25	0.01
71 (1S)	851226 to 860327	0.23	0.03
71	860327 to 860626	0.22	0.02
71	860626 to 860925	0.30	0.01
71	860925 to 861230	0.30	0.02
72 (2S)	851226 to 860327	0.23	0.01
72	860327 to 860626	0.23	0.03
72	860626 to 860925	0.29	0.03
72	860925 to 861230	0.28	0.01
73 (3S)	851226 to 860327	0.21	0.01
73	860327 to 860626	0.22	0.01
73	860626 to 860925	0.24	0.01
73	860925 to 861230	0.24	0.01

TABLE A-1 (Cont.)

1986 QUARTERLY TLD RESULTS

Results in mR/day

LOCATION	COLLECTION PERIOD	RESULT	ERROR (2σ)
74 (4S)	851226 to 860327	0.23	0.01
74	860327 to 860626	0.23	0.03
74	860626 to 860925	0.28	0.01
74	860925 to 861230	0.27	0.01
75 (5S)	851226 to 860327	0.22	0.03
75	860327 to 860626	0.20	0.01
75	860626 to 860925	0.26	0.01
75	860925 to 861230	0.26	0.01
76 (6S)	851226 to 860327	0.21	0.01
76	860327 to 860626	0.22	0.02
76	860626 to 860925	0.25	0.02
76	860925 to 861230	0.25	0.01
77 (7S)	851226 to 860327	0.22	0.01
77	860327 to 860626	0.22	0.02
77	860626 to 860925	0.28	0.00
77	860925 to 861230	0.26	0.01
78 (8S)	851226 to 860327	0.22	0.01
78	860327 to 860626	0.22	0.02
78	860626 to 860925	0.24	0.02
78	860925 to 861230	0.25	0.00
79 (9S)	851226 to 860327	0.22	0.01
79	860327 to 860626	0.22	0.03
79	860626 to 860925	0.25	0.01
79	860925 to 861230	0.26	0.01
80 (10S)	851226 to 860327	0.21	0.01
80	860327 to 860626	0.22	0.03
80	860626 to 860925	0.24	0.01
80	860925 to 861230	0.24	0.01
81 (11S)	851226 to 860327	0.22	0.01
81	860327 to 860626	0.22	0.02
81	860626 to 860925	0.24	0.02
81	860925 to 861230	0.26	0.01
82 (12S)	851226 to 860327	0.22	0.01
82	860327 to 860626	0.22	0.02
82	860626 to 860925	0.26	0.02
82	860925 to 861230	0.26	0.01

TABLE A-1 (Cont.)

1986 QUARTERLY TLD RESULTS

Results in mR/day

LOCATION	COLLECTION PERIOD	RESULT	ERROR (2σ)
83 (13S)	851226 to 860327	0.22	0.01
83	860327 to 860626	0.22	0.02
83	860626 to 860925	0.26	0.02
83	860925 to 861230	0.26	0.01
84 (14S)	851226 to 860327	0.23	0.02
84	860327 to 860626	0.23	0.01
84	860626 to 860925	0.26	0.01
84	860925 to 861230	0.26	0.01
85 (15S)	851226 to 860327	0.22	0.01
85	860327 to 860626	0.24	0.02
85	860626 to 860925	0.27	0.01
85	860925 to 861230	0.28	0.02
86 (16S)	851226 to 860327	0.24	0.00
86	860327 to 860626	0.22	0.03
86	860626 to 860925	0.30	0.01
86	860925 to 861230	0.30	0.02

BADGE TYPE	MEAN	LOW	HIGH
Control (Station 9)	0.21	0.19	0.23
Indicator	0.24	0.19	0.31

TABLE A-2

1986 ANNUAL TLD RESULTS[a]

Results in mR/day

LOCATION	RESULT	ERROR (2σ)
1	0.20	0.02
2	0.20	0.02
3	0.20	0.02
4	0.18	0.02
5	0.20	0.02
6	0.19	0.00
7	0.21	0.02
8	0.23	0.04
9	0.19	0.02
10	0.19	0.02
11	0.20	0.02
12	0.22	0.02
13	0.21	0.01
14	0.19	0.02
15	0.21	0.02
16	0.21	0.02
17	0.21	0.01
18	0.21	0.01
19	0.21	0.02
20	0.21	0.02
21	0.19	0.02
22	0.21	0.02
23	0.20	0.02
24	0.21	0.02
25	0.21	0.04
40	0.20	0.02
41	0.23	0.02
42	0.21	0.00
43	0.22	0.02
44	0.21	0.02
45	0.21	0.02
46	0.26	0.02
47	0.19	0.02
49	0.21	0.00
50	0.20	0.00
51	0.20	0.00
53	0.23	0.02
54	0.23	0.00
55	0.20	0.02
56	0.21	0.02
71	0.23	0.00

(a) Collection Period: 12-26-85 to 12-30-86

TABLE A-2 (Cont.)

1986 ANNUAL TLD RESULTS(a)

Results in mR/day

LOCATION	RESULT	ERROR (2σ)
72	0.23	0.00
73	0.20	0.02
74	0.22	0.02
75	0.20	0.00
76	0.21	0.02
77	0.20	0.02
78	0.20	0.00
79	0.20	0.02
80	0.20	0.02
81	0.20	0.02
82	0.22	0.02
83	0.21	0.02
84	0.21	0.00
85	0.22	0.02
86	0.24	0.02

BADGE TYPE	MEAN	LOW	HIGH
Control (Station 9)	0.20		
Indicator	0.21	0.18	0.26

(a) Collection Period: 12-26-85 to 12-30-86

TABLE A-3.1

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
1	851230 to 860106	6.16 E-02	7.77 E-03
	860106 to 860113	2.18 E-02	3.84 E-03
	860113 to 860120	3.03 E-02	4.79 E-03
	860120 to 860127	1.53 E-02	3.08 E-03
	860127 to 860203	2.47 E-02	4.17 E-03
	860203 to 860210	3.17 E-02	4.94 E-03
	860210 to 860218	2.38 E-02	3.87 E-03
	860218 to 860224	1.51 E-02	3.26 E-03
	860224 to 860303	1.99 E-02	3.62 E-03
	860303 to 860311	2.27 E-02	3.77 E-03
	860311 to 860317	9.12 E-03	2.50 E-03
	860317 to 860324	9.95 E-03	2.37 E-03
	860324 to 860331	1.13 E-02	2.58 E-03
	860331 to 860407	1.67 E-02	3.23 E-03
	860407 to 860414	1.59 E-02	3.13 E-03
	860414 to 860421	1.68 E-02	3.26 E-03
	860421 to 860428	1.67 E-02	3.29 E-03
	860428 to 860505	1.26 E-02	2.74 E-03
	860505 to 860512	6.53 E-01	6.37 E-02
	860512 to 860519	7.41 E-01	7.20 E-02
	860519 to 860527	2.68 E-01	2.71 E-02

TABLE A-3.1 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
4	851230 to 860106	4.32 E-02	5.60 E-03
	860106 to 860113	2.48 E-02	4.18 E-03
	860113 to 860120	2.49 E-02	4.19 E-03
	860120 to 860127	1.32 E-02	2.76 E-03
	860127 to 860203	2.53 E-02	4.22 E-03
	860203 to 860210	3.41 E-02	5.21 E-03
	860210 to 860218	3.05 E-02	4.61 E-03
	860218 to 860224	1.22 E-02	2.87 E-03
	860224 to 860303	2.30 E-02	3.98 E-03
	860303 to 860311	2.88 E-02	4.61 E-03
	860311 to 860317	1.06 E-02	2.53 E-03
	860317 to 860324	1.32 E-02	2.83 E-03
	860324 to 860331	1.19 E-02	2.68 E-03
	860331 to 860407	2.02 E-02	3.63 E-03
	860407 to 860414	1.63 E-02	3.23 E-03
	860414 to 860421	1.80 E-02	3.29 E-03
	860421 to 860428	1.37 E-02	2.92 E-03
	860428 to 860505	1.35 E-02	2.86 E-03
	860505 to 860512	6.38 E-01	6.85 E-02
	860512 to 860519	7.20 E-01	7.70 E-02
	860519 to 860527	2.27 E-01	2.53 E-02

TABLE A-3.1 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
5	851230 to 860106	4.83 E-02	6.45 E-03
	860106 to 860113	1.82 E-02	3.32 E-03
	860113 to 860120	2.88 E-02	4.42 E-03
	860120 to 860127	1.16 E-02	2.62 E-03
	860127 to 860203	2.28 E-02	3.79 E-03
	860203 to 860210	1.89 E-02	3.98 E-03
	860210 to 860218	2.34 E-02	3.68 E-03
	860218 to 860224	1.23 E-02	2.89 E-03
	860224 to 860303	2.16 E-02	3.81 E-03
	860303 to 860311	2.30 E-02	3.95 E-03
	860311 to 860317	9.19 E-03	2.30 E-03
	860317 to 860324	7.92 E-03	2.19 E-03
	860324 to 860331	8.76 E-03	2.25 E-03
	860331 to 860407	1.34 E-02	2.80 E-03
	860407 to 860414	1.25 E-02	2.69 E-03
	860414 to 860421	1.20 E-02	2.72 E-03
	860421 to 860428	1.05 E-02	2.44 E-03
	860428 to 860505	8.73 E-03	2.21 E-03
	860505 to 860512	4.73 E-01	5.12 E-02
	860512 to 860519	5.21 E-01	5.63 E-02
	860519 to 860527	1.99 E-01	2.24 E-02

TABLE A-3.1 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
6	851230 to 860106	6.88 E-02	8.49 E-03
	860106 to 860113	2.55 E-02	4.26 E-03
	860113 to 860120	4.64 E-02	6.99 E-03
	860120 to 860127	1.38 E-02	2.92 E-03
	860127 to 860203	2.88 E-02	4.60 E-03
	860203 to 860210	3.39 E-02	5.18 E-03
	860210 to 860218	2.81 E-02	4.35 E-03
	860218 to 860224	1.54 E-02	3.30 E-03
	860224 to 860303	2.49 E-02	4.18 E-03
	860303 to 860311	2.55 E-02	4.07 E-03
	860311 to 860317	1.09 E-02	2.72 E-03
	860317 to 860324	1.17 E-02	2.67 E-03
	860324 to 860331	9.82 E-03	2.40 E-03
	860331 to 860407	1.85 E-02	3.44 E-03
	860407 to 860414	1.46 E-02	3.02 E-03
	860414 to 860421	1.52 E-02	3.07 E-03
	860421 to 860428	1.37 E-02	2.88 E-03
	860428 to 860505	1.13 E-02	2.61 E-03
	860505 to 860512	6.02 E-01	6.47 E-02
	860512 to 860519	6.74 E-01	7.23 E-02
	860519 to 860529	1.54 E-01	1.73 E-02

TABLE A-3.1 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
7	851230 to 860106	5.16 E-02	6.78 E-03
	860106 to 860113	2.07 E-02	3.73 E-03
	860113 to 860120	2.53 E-02	4.24 E-03
	860120 to 860127	1.43 E-02	2.96 E-03
	860127 to 860203	2.21 E-02	3.87 E-03
	860203 to 860210	2.34 E-02	4.03 E-03
	860210 to 860218	2.00 E-02	3.45 E-03
	860218 to 860224	1.40 E-02	3.14 E-03
	860224 to 860303	1.33 E-02	2.77 E-03
	860303 to 860311	2.32 E-02	3.82 E-03
	860311 to 860317	7.51 E-03	2.33 E-03
	860317 to 860324	8.93 E-03	2.27 E-03
	860324 to 860331	9.07 E-03	2.35 E-03
	860331 to 860407	1.28 E-02	2.78 E-03
	860407 to 860414	1.12 E-02	2.59 E-03
	860414 to 860421	1.11 E-02	2.57 E-03
	860421 to 860428	9.56 E-03	2.39 E-03
	860428 to 860505	1.30 E-02	2.81 E-03
	860505 to 860512	5.38 E-01	5.80 E-02
	860512 to 860519	6.10 E-01	6.56 E-02
	860519 to 860527	1.94 E-01	2.19 E-02

TABLE A-3.1 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
8	851230 to 860106	5.33 E-02	6.95 E-03
	860106 to 860113	2.17 E-02	3.82 E-03
	860113 to 860120	2.57 E-02	4.27 E-03
	860120 to 860127	1.41 E-02	2.94 E-03
	860127 to 860203	2.59 E-02	4.29 E-03
	860203 to 860210	2.82 E-02	4.56 E-03
	860210 to 860218	2.43 E-02	3.94 E-03
	860218 to 860224	1.37 E-02	3.03 E-03
	860224 to 860303	2.41 E-02	4.09 E-03
	860303 to 860310	2.78 E-02	4.50 E-03
	860310 to 860312	4.66 E-02	1.55 E-02
	860312 to 860317	1.02 E-02	3.00 E-03
	860317 to 860324	1.09 E-02	2.56 E-03
	860324 to 860331	1.59 E-02	3.15 E-03
	860331 to 860407	1.76 E-02	3.34 E-03
	860407 to 860414	1.56 E-02	3.11 E-03
	860414 to 860421	9.11 E-03	2.32 E-03
	860421 to 860428	1.20 E-02	2.73 E-03
	860428 to 860505	1.23 E-02	2.72 E-03
	860505 to 860512	5.88 E-01	6.33 E-02
	860512 to 860519	6.77 E-01	7.26 E-02
	860519 to 860527	2.45 E-01	2.72 E-02

TABLE A-3.1 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
9	851230 to 860106	5.08 E-02	6.30 E-03
	860106 to 860113	1.72 E-02	3.31 E-03
	860113 to 860120	3.06 E-02	4.82 E-03
	860120 to 860127	1.63 E-02	3.19 E-03
	860127 to 860203	2.26 E-02	3.92 E-03
	860203 to 860210	2.74 E-02	4.48 E-03
	860210 to 860218	2.53 E-02	4.04 E-03
	860218 to 860224	1.01 E-02	2.61 E-03
	860224 to 860303	1.88 E-02	3.49 E-03
	860303 to 860310	2.67 E-02	4.20 E-03
	860310 to 860317	6.45 E-03	1.96 E-03
	860317 to 860324	8.02 E-03	2.16 E-03
	860324 to 860331	1.32 E-02	2.81 E-03
	860331 to 860407	1.64 E-02	3.20 E-03
	860407 to 860414	1.40 E-02	2.90 E-03
	860414 to 860421	1.49 E-02	3.03 E-03
	860421 to 860428	1.25 E-02	2.79 E-03
	860428 to 860505	1.19 E-02	2.66 E-03
	860505 to 860512	5.13 E-01	5.04 E-02
	860512 to 860519	5.11 E-01	5.03 E-02
	860519 to 860527	1.92 E-01	2.17 E-02

TABLE A-3.1 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
21	851230 to 860106	5.07 E-02	6.68 E-03
	860106 to 860113	1.77 E-02	3.37 E-03
	860113 to 860120	2.76 E-02	4.31 E-03
	860120 to 860127	1.08 E-02	2.47 E-03
	860127 to 860203	1.98 E-02	3.61 E-03
	860203 to 860210	2.58 E-02	4.14 E-03
	860210 to 860218	2.87 E-02	4.41 E-03
	860218 to 860224	1.30 E-02	3.00 E-03
	860224 to 860303	1.77 E-02	3.37 E-03
	860303 to 860310	1.68 E-02	3.09 E-03
	860310 to 860317	9.07 E-03	2.57 E-03
	860317 to 860324	1.01 E-02	2.45 E-03
	860324 to 860331	1.17 E-02	2.67 E-03
	860331 to 860407	1.17 E-02	2.60 E-03
	860407 to 860414	1.53 E-02	3.10 E-03
	860414 to 860421	1.20 E-02	2.63 E-03
	860421 to 860428	1.24 E-02	2.66 E-03
	860428 to 860505	1.11 E-02	2.57 E-03
	860505 to 860512	4.51 E-01	4.90 E-02
	860512 to 860519	4.78 E-01	5.17 E-02
	860519 to 860527	2.06 E-01	2.12 E-02

TABLE A-3.1 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
23	851230 to 860106	5.99 E-02	7.60 E-03
	860106 to 860113	2.33 E-02	3.87 E-03
	860113 to 860120	3.08 E-02	4.83 E-03
	860120 to 860127	1.50 E-02	3.03 E-03
	860127 to 860203	2.52 E-02	4.05 E-03
	860203 to 860210	3.05 E-02	4.80 E-03
	860210 to 860218	3.23 E-02	4.58 E-03
	860218 to 860224	1.71 E-02	3.50 E-03
	860224 to 860303	1.68 E-02	3.25 E-03
	860303 to 860310	1.96 E-02	3.40 E-03
	860310 to 860317	1.03 E-02	2.63 E-03
	860317 to 860324	8.17 E-03	2.24 E-03
	860324 to 860331	9.87 E-03	2.39 E-03
	860331 to 860407	1.83 E-02	3.42 E-03
	860407 to 860414	1.86 E-02	3.37 E-03
	860414 to 860421	1.60 E-02	3.21 E-03
	860421 to 860428	1.34 E-02	2.84 E-03
	860428 to 860505	1.39 E-02	2.82 E-03
	860505 to 860512	6.28 E-01	6.75 E-02
	860512 to 860519	6.38 E-01	6.84 E-02
	860519 to 860527	2.50 E-01	2.77 E-02

TABLE A-3.1 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
40	851230 to 860106	5.17 E-02	6.79 E-03
	860106 to 860113	2.20 E-02	3.86 E-03
	860113 to 860120	3.15 E-02	4.91 E-03
	860120 to 860127	1.19 E-02	2.70 E-03
	860127 to 860203	2.16 E-02	3.63 E-03
	860203 to 860210	3.39 E-02	5.44 E-03
	860210 to 860218	3.12 E-02	4.68 E-03
	860218 to 860224	1.28 E-02	2.92 E-03
	860224 to 860303	2.25 E-02	3.91 E-03
	860303 to 860310	2.57 E-02	4.25 E-03
	860310 to 860311 (a)	5.69 E-02	2.35 E-02
	860311 to 860317	1.83 E-02	5.08 E-03
	860317 to 860324	1.07 E-02	2.56 E-03
	860324 to 860331	1.51 E-02	3.04 E-03
	860331 to 860407	1.68 E-02	3.25 E-03
	860407 to 860414	1.41 E-02	2.97 E-03
	860414 to 860421	1.74 E-02	3.32 E-03
	860421 to 860428	1.57 E-02	3.14 E-03
	860428 to 860505	1.33 E-02	2.86 E-03
	860505 to 860512	6.21 E-01	6.67 E-02
	860512 to 860519	6.33 E-01	6.80 E-02
	860519 to 860527	2.28 E-01	2.54 E-02

(a) Power interrupted; shortened sampling time.

TABLE A-3.1 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
48	851230 to 860106	4.54 E-02	5.81 E-03
	860106 to 860113	2.20 E-02	3.88 E-03
	860113 to 860120	5.54 E-02	8.59 E-03
	860120 to 860127	1.18 E-02	2.67 E-03
	860127 to 860203	2.26 E-02	3.92 E-03
	860203 to 860210	2.47 E-02	4.17 E-03
	860210 to 860218	2.72 E-02	4.25 E-03
	860218 to 860224	1.49 E-02	3.22 E-03
	860224 to 860303	1.94 E-02	3.44 E-03
	860303 to 860310	2.47 E-02	4.15 E-03
	860310 to 860317	8.08 E-03	2.22 E-03
	860317 to 860324	1.01 E-02	2.40 E-03
	860324 to 860331	1.14 E-02	2.63 E-03
	860331 to 860407	1.24 E-02	2.72 E-03
	860407 to 860414	1.47 E-02	3.01 E-03
	860414 to 860421	1.36 E-02	2.86 E-03
	860421 to 860428	6.35 E-03	2.02 E-03
	860428 to 860505	1.39 E-02	2.91 E-03
	860505 to 860512	5.75 E-01	6.20 E-02
	860512 to 860519	5.86 E-01	6.31 E-02
	860519 to 860527	2.34 E-01	2.61 E-02

TABLE A-3.1 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
57	851230 to 860106	6.26 E-02	7.87 E-03
	860106 to 860113	3.00 E-02	4.75 E-03
	860113 to 860120	3.69 E-02	5.50 E-03
	860120 to 860127	1.81 E-02	3.41 E-03
	860127 to 860203	2.84 E-02	4.57 E-03
	860203 to 860210	3.53 E-02	5.34 E-03
	860210 to 860218	3.39 E-02	5.00 E-03
	860218 to 860224	1.70 E-02	3.48 E-03
	860224 to 860303	2.41 E-02	4.09 E-03
	860303 to 860311	2.88 E-02	4.24 E-03
	860311 to 860317	1.20 E-02	2.91 E-03
	860317 to 860324	1.13 E-02	2.60 E-03
	860324 to 860331	1.51 E-02	3.13 E-03
	860331 to 860407	1.78 E-02	3.36 E-03
	860407 to 860414	1.54 E-02	3.09 E-03
	860414 to 860421	1.29 E-02	2.79 E-03
	860421 to 860428	1.51 E-02	3.09 E-03
	860428 to 860505	1.39 E-02	2.91 E-03
	860505 to 860512	7.18 E-01	7.68 E-02
	860512 to 860519	7.36 E-01	7.87 E-02
	860519 to 860527	2.12 E-01	2.37 E-02

TABLE A-3.2

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
1	860527 to 860602	9.7 E-02	5.0 E-03
	860602 to 860609	4.6 E-02	3.0 E-03
	860609 to 860616	2.0 E-02	3.0 E-03
	860616 to 860623	1.7 E+00 (a)	9.0 E-01
	860623 to 860630	1.9 E-02	3.0 E-03
	860630 to 860707	1.0 E-02	2.0 E-03
	860707 to 860714	8.9 E-03	2.4 E-03
	860714 to 860721	1.3 E-02	3.0 E-03
	860721 to 860728	1.4 E-02	2.0 E-03
	860728 to 860804	1.6 E-02	3.0 E-03
	860804 to 860811	2.0 E-02	3.0 E-03
	860811 to 860818	2.2 E-02	3.0 E-03
	860818 to 860825	2.1 E-02	3.0 E-03
	860825 to 860902	1.9 E-02	2.0 E-03
	860902 to 860908	2.0 E-02	3.0 E-03
	860908 to 860915	1.5 E-02	2.0 E-03
	860915 to 860922	1.5 E-02	2.0 E-03
	860922 to 860929	1.2 E-02	2.0 E-03
	860929 to 861006	1.5 E-02	3.0 E-03
	861006 to 861013	2.7 E-02	3.0 E-03
	861013 to 861020	7.0 E-02	4.0 E-03
	861020 to 861027	1.3 E-01	1.0 E-02
	861027 to 861103	1.4 E-02	2.0 E-03
	861103 to 861110	1.6 E-02	3.0 E-03
	861110 to 861117	4.6 E-02	3.0 E-03
	861117 to 861124	5.6 E-03	2.2 E-03
	861124 to 861201	1.2 E-02	2.0 E-03
	861201 to 861208	3.1 E-02	3.0 E-03
	861208 to 861215	5.3 E-02	4.0 E-03
	861215 to 861222	5.6 E-02	4.0 E-03
	861222 to 861229	1.8 E-02	2.0 E-03

(a) Results are in total pCi since no volume was stated.

TABLE A-3.2 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
4	860527 to 860602	8.4 E-02	5.0 E-03
	860602 to 860609	3.8 E-02	3.0 E-03
	860609 to 860616	2.9 E-02	3.0 E-03
	860616 to 860623	8.0 E-03	2.2 E-03
	860623 to 860630 (a)	1.5 E-02	2.0 E-03
	860630 to 860707	7.1 E-03	2.2 E-03
	860707 to 860714	8.8 E-03	2.4 E-03
	860714 to 860721	9.6 E-03	2.4 E-03
	860721 to 860728	1.1 E-02	2.0 E-03
	860728 to 860804	1.3 E-02	2.0 E-03
	860804 to 860811	1.6 E-02	3.0 E-03
	860811 to 860818	2.0 E-02	3.0 E-03
	860818 to 860825	2.0 E-02	3.0 E-03
	860825 to 860902	1.7 E-02	2.0 E-03
	860902 to 860908	1.6 E-02	3.0 E-03
	860908 to 860915	1.4 E-02	2.0 E-03
	860915 to 860922	1.2 E-02	2.0 E-03
	860922 to 860929	9.7 E-03	2.2 E-03
	860929 to 861006	1.5 E-02	3.0 E-03
	861006 to 861013	2.2 E-02	3.0 E-03
	861013 to 861020	6.4 E-02	4.0 E-03
	861020 to 861027	1.1 E-01	1.0 E-02
	861027 to 861103	1.3 E-02	2.0 E-03
	861103 to 861110	1.7 E-02	3.0 E-03
	861110 to 861117	4.0 E-02	3.0 E-03
	861117 to 861124	4.9 E-03	1.8 E-03
	861124 to 861201	1.0 E-02	2.0 E-03
	861201 to 861208	3.6 E-02	4.0 E-03
	861208 to 861215	5.4 E-02	4.0 E-03
	861215 to 861222	5.9 E-02	4.0 E-03
	861222 to 861229	1.9 E-02	2.0 E-03

(a) Slightly shortened sampling time due to electrical work at site.

TABLE A-3.2 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
5	860527 to 860602	9.2 E-02	5.0 E-03
	860602 to 860609	3.1 E-02	3.0 E-03
	860609 to 860616	2.2 E-02	3.0 E-03
	860616 to 860623	8.4 E-03	2.3 E-03
	860623 to 860630	1.3 E-02	2.0 E-03
	860630 to 860707	6.9 E-03	2.2 E-03
	860707 to 860714	6.7 E-03	2.3 E-03
	860714 to 860721	8.2 E-03	2.3 E-03
	860721 to 860728	1.3 E-02	2.0 E-03
	860728 to 860804	1.4 E-02	2.0 E-03
	860804 to 860811	1.4 E-02	3.0 E-03
	860811 to 860818	2.0 E-02	3.0 E-03
	860818 to 860825	1.8 E-02	3.0 E-03
	860825 to 860902	1.6 E-02	2.0 E-03
	860902 to 860908	1.4 E-02	3.0 E-03
	860908 to 860915	1.0 E-02	2.0 E-03
	860915 to 860922	1.0 E-02	2.0 E-03
	860922 to 860929	1.2 E-02	2.0 E-03
	860929 to 861006	1.4 E-02	2.0 E-03
	861006 to 861013	2.2 E-02	3.0 E-03
	861013 to 861020	6.0 E-02	4.0 E-03
	861020 to 861027	1.1 E-01	1.0 E-02
	861027 to 861103	1.4 E-02	2.0 E-03
	861103 to 861110	1.3 E-02	2.0 E-03
	861110 to 861117	3.6 E-02	3.0 E-03
	861117 to 861124	4.8 E-03	2.1 E-03
	861124 to 861201	9.6 E-03	2.0 E-03
	861201 to 861208	3.2 E-02	3.0 E-03
	861208 to 861215	5.2 E-02	4.0 E-03
	861215 to 861222	5.6 E-02	4.0 E-03
	861222 to 861229	1.5 E-02	2.0 E-03

TABLE A-3.2 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
6	860529 to 860602	9.9 E-02	7.0 E-03
	860602 to 860609	4.1 E-02	3.0 E-03
	860609 to 860616	2.8 E-02	3.0 E-03
	860616 to 860623	1.1 E-02	2.0 E-03
	860623 to 860630	1.8 E-02	3.0 E-03
	860630 to 860707	7.9 E-03	2.2 E-03
	860707 to 860714	1.1 E-02	2.0 E-03
	860714 to 860721	1.1 E-02	2.0 E-03
	860721 to 860728	1.4 E-02	2.0 E-03
	860728 to 860804	1.6 E-02	3.0 E-03
	860804 to 860811	1.5 E-02	3.0 E-03
	860811 to 860818	2.2 E-02	3.0 E-03
	860818 to 860825	1.8 E-02	3.0 E-03
	860825 to 860902	1.7 E-02	2.0 E-03
	860902 to 860908	1.5 E-02	3.0 E-03
	860908 to 860915	1.3 E-02	2.0 E-03
	860915 to 860922	1.1 E-02	2.0 E-03
	860922 to 860929	9.0 E-03	2.1 E-03
	860929 to 861006	1.4 E-02	2.0 E-03
	861006 to 861013	2.2 E-02	3.0 E-03
	861013 to 861020	5.9 E-02	4.0 E-03
	861020 to 861027	1.1 E-01	1.0 E-02
	861027 to 861103	1.4 E-02	2.0 E-03
	861103 to 861110	1.5 E-02	3.0 E-03
	861110 to 861117	3.6 E-02	3.0 E-03
	861117 to 861124	5.5 E-03	1.9 E-03
	861124 to 861201	1.1 E-02	2.0 E-03
	861201 to 861208	3.4 E-02	3.0 E-03
	861208 to 861215	4.5 E-02	3.0 E-03
	861215 to 861222	5.2 E-02	4.0 E-03
	861222 to 861229	1.7 E-02	2.0 E-03

TABLE A-3.2 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
7	860527 to 860602	6.9 E-02	5.0 E-03
	860602 to 860609	3.5 E-02	3.0 E-03
	860609 to 860616	2.2 E-02	3.0 E-03
	860616 to 860623	8.2 E-03	2.3 E-03
	860623 to 860630	1.5 E-02	2.0 E-03
	860630 to 860707	8.6 E-03	2.3 E-03
	860707 to 860714	1.1 E-02	2.0 E-03
	860714 to 860721	9.3 E-03	2.4 E-03
	860721 to 860728	2.0 E-02	3.0 E-03
	860728 to 860804	1.9 E-02	3.0 E-03
	860804 to 860811	1.5 E-02	3.0 E-03
	860811 to 860818	2.2 E-02	3.0 E-03
	860818 to 860825	1.9 E-02	3.0 E-03
	860825 to 860902	1.7 E-02	2.0 E-03
	860902 to 860908	1.6 E-02	3.0 E-03
	860908 to 860915	1.3 E-02	2.0 E-03
	860915 to 860922	9.3 E-03	2.1 E-03
	860922 to 860929	1.2 E-02	2.0 E-03
	860929 to 861006	1.2 E-02	2.0 E-03
	861006 to 861013	1.7 E-02	3.0 E-03
	861013 to 861020	3.9 E-02	3.0 E-03
	861020 to 861027	9.2 E-02	5.0 E-03
	861027 to 861103	1.1 E-02	2.0 E-03
	861103 to 861110	1.3 E-02	3.0 E-03
	861110 to 861117	3.2 E-02	3.0 E-03
	861117 to 861124	3.6 E-03	1.8 E-03
	861124 to 861201	1.1 E-02	2.0 E-03
	861201 to 861208	3.1 E-02	3.0 E-03
	861208 to 861215	4.7 E-02	3.0 E-03
	861215 to 861222	5.0 E-02	4.0 E-03
	861222 to 861229	1.9 E-02	2.0 E-03

TABLE A-3.2 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
8	860527 to 860602	1.0 E-01	1.0 E-02
	860602 to 860609	4.0 E-02	3.0 E-03
	860609 to 860616	2.4 E-02	3.0 E-03
	860616 to 860623	1.3 E-02	2.0 E-03
	860623 to 860630	1.5 E-02	2.0 E-03
	860630 to 860707	9.4 E-03	2.3 E-03
	860707 to 860714	8.5 E-03	2.4 E-03
	860714 to 860721	1.0 E-02	2.0 E-03
	860721 to 860728	1.3 E-02	2.0 E-03
	860728 to 860804	1.4 E-02	2.0 E-03
	860804 to 860811	1.8 E-02	3.0 E-03
	860811 to 860818	2.2 E-02	3.0 E-03
	860818 to 860825	2.0 E-02	3.0 E-03
	860825 to 860902	1.7 E-02	2.0 E-03
	860902 to 860908	1.5 E-02	3.0 E-03
	860908 to 860915	1.3 E-02	2.0 E-03
	860915 to 860922	1.3 E-02	2.0 E-03
	860922 to 860929	1.2 E-02	2.0 E-03
	860929 to 861006	1.3 E-02	2.0 E-03
	861006 to 861013	1.9 E-02	3.0 E-03
	861013 to 861020	3.8 E-02	3.0 E-03
	861020 to 861027	9.0 E-02	5.0 E-03
	861027 to 861103	1.2 E-02	2.0 E-03
	861103 to 861110	1.4 E-02	3.0 E-03
	861110 to 861117	4.1 E-02 (a)	5.0 E-03
	861118 to 861124	* 2.8 E-03	1.9 E-03
	861124 to 861201	9.0 E-03	2.0 E-03
	861201 to 861208	3.0 E-02	3.0 E-03
	861208 to 861215	4.6 E-02	3.0 E-03
	861215 to 861222	5.4 E-02	4.0 E-03
	861222 to 861229	1.7 E-02	2.0 E-03

* Denotes a result less than the detection limit.
(a) Low sample volume due to power outage.

TABLE A-3.2 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
9	860527 to 860602	8.4 E-02	5.0 E-03
	860602 to 860609	3.5 E-02	3.0 E-03
	860609 to 860616	2.1 E-02	3.0 E-03
	860616 to 860623	8.6 E-03	2.3 E-03
	860623 to 860630	1.5 E-02	2.0 E-03
	860630 to 860707	7.4 E-03	2.2 E-03
	860707 to 860714	1.5 E-02	3.0 E-03
	860714 to 860721	8.5 E-03	2.3 E-03
	860721 to 860728	9.5 E-03	2.2 E-03
	860728 to 860804	1.1 E-02	2.0 E-03
	860804 to 860811	1.5 E-02	3.0 E-03
	860811 to 860818	2.2 E-02	3.0 E-03
	860818 to 860825	1.6 E-02	3.0 E-03
	860825 to 860902	1.4 E-02	2.0 E-03
	860902 to 860908	1.4 E-02	3.0 E-03
	860908 to 860915	1.1 E-02	2.0 E-03
	860915 to 860922	9.2 E-03	2.1 E-03
	860922 to 860929	1.0 E-02	2.0 E-03
	860929 to 861006	1.2 E-02	2.0 E-03
	861006 to 861013	1.8 E-02	3.0 E-03
	861013 to 861020	5.6 E-02	4.0 E-03
	861020 to 861027	1.0 E-01	1.0 E-02
	861027 to 861103	1.1 E-02	2.0 E-03
	861103 to 861110	1.5 E-02	3.0 E-03
	861110 to 861117	4.0 E-02	3.0 E-03
	861117 to 861124	3.3 E-03	1.7 E-03
	861124 to 861201	9.0 E-03	2.0 E-03
	861201 to 861208	3.0 E-02	3.0 E-03
	861208 to 861215	4.0 E-02	3.0 E-03
	861215 to 861222	5.3 E-02	4.0 E-03
	861222 to 861229	1.4 E-02	2.0 E-03

TABLE A-3.2 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
21	860527 to 860602	9.7 E-02	5.0 E-03
	860602 to 860609	3.5 E-02	3.0 E-03
	860609 to 860616	2.0 E-02	3.0 E-03
	860616 to 860623	8.6 E-03	2.3 E-03
	860623 to 860630	1.3 E-02	2.0 E-03
	860630 to 860707	9.4 E-03	2.3 E-03
	860707 to 860714	6.5 E-03	2.3 E-03
	860714 to 860721	8.3 E-03	2.3 E-03
	860721 to 860728	1.2 E-02	2.0 E-03
	860728 to 860804	1.2 E-02	2.0 E-03
	860804 to 860811	1.2 E-02	2.0 E-03
	860811 to 860818	1.6 E-02	3.0 E-03
	860818 to 860825	1.6 E-02	3.0 E-03
	860825 to 860902	1.4 E-02	2.0 E-03
	860902 to 860908	1.6 E-02	3.0 E-03
	860908 to 860915	1.0 E-02	2.0 E-03
	860915 to 860922	1.0 E-02	2.0 E-03
	860922 to 860929	9.9 E-03	2.2 E-03
	860929 to 861006	1.4 E-02 (a)	6.0 E-03
	861006 to 861013	1.8 E-02	3.0 E-03
	861013 to 861020	5.3 E-02	4.0 E-03
	861020 to 861027	9.4 E-02	5.0 E-03
	861027 to 861103	1.0 E-02	2.0 E-03
	861103 to 861110	1.4 E-02 (b)	3.0 E-03
	861110 to 861117	2.5 E-02	1.0 E-03
	861117 to 861124	4.5 E-03	1.0 E-03
	861124 to 861201	7.1 E-03	1.9 E-03
	861201 to 861208	2.8 E-02	3.0 E-03
	861208 to 861215	4.3 E-02	3.0 E-03
	861215 to 861222	4.9 E-02	4.0 E-03
	861222 to 861229	1.4 E-02	2.0 E-03

(a) Shortened sampling time due to power outage.
(b) Low sample volume due to power outage.

TABLE A-3.2 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
23	860527 to 860602	9.6 E-02	5.0 E-03
	860602 to 860609	4.2 E-02	3.0 E-03
	860609 to 860616	2.6 E-02	3.0 E-03
	860616 to 860623	1.3 E-02	2.0 E-03
	860623 to 860630	1.9 E-02	3.0 E-03
	860630 to 860707	1.0 E-02	2.0 E-03
	860707 to 860714	6.4 E-03	2.3 E-03
	860714 to 860721	1.3 E-02	3.0 E-03
	860721 to 860728	1.2 E-02	2.0 E-03
	860728 to 860804	1.7 E-02	3.0 E-03
	860804 to 860811	1.6 E-02	3.0 E-03
	860811 to 860818	2.4 E-02	3.0 E-03
	860818 to 860825	2.3 E-02	3.0 E-03
	860825 to 860902	2.0 E-02	2.0 E-03
	860902 to 860908	1.7 E-02	3.0 E-03
	860908 to 860915	1.6 E-02	2.0 E-03
	860915 to 860922	1.3 E-02	2.0 E-03
	860922 to 860929	1.4 E-02	2.0 E-03
	860929 to 861006	1.5 E-02	3.0 E-03
	861006 to 861013	2.7 E-02	3.0 E-03
	861013 to 861020	6.8 E-02	4.0 E-03
	861020 to 861027	1.3 E-01	1.0 E-02
	861027 to 861103	1.5 E-02	2.0 E-03
	861103 to 861110	1.8 E-02	3.0 E-03
	861110 to 861117	4.6 E-02	3.0 E-03
	861117 to 861124	6.2 E-03	1.9 E-03
	861124 to 861201	9.9 E-03	2.0 E-03
	861201 to 861208	3.0 E-02	3.0 E-03
	861208 to 861215	5.0 E-02	4.0 E-03
	861215 to 861222	5.8 E-02	4.0 E-03
	861222 to 861229	2.0 E-02	2.0 E-03

TABLE A-3.2 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
40	860527 to 860602	9.5 E-02	5.0 E-03
	860602 to 860609	4.5 E-02	3.0 E-03
	860609 to 860616	2.6 E-02	3.0 E-03
	860616 to 860623	1.4 E-02	3.0 E-03
	860623 to 860630	2.1 E-02	3.0 E-03
	860630 to 860707	9.8 E-03	2.3 E-03
	860707 to 860714	1.3 E-02	3.0 E-03
	860714 to 860721	1.3 E-02	3.0 E-03
	860721 to 860728	2.0 E-02	3.0 E-03
	860728 to 860804	2.6 E-02	3.0 E-03
	860804 to 860811	1.6 E-02	3.0 E-03
	860811 to 860818	2.1 E-02	3.0 E-03
	860818 to 860825	1.7 E-02	3.0 E-03
	860825 to 860902	1.5 E-02	2.0 E-03
	860902 to 860908	1.4 E-02	3.0 E-03
	860908 to 860915	1.5 E-02	2.0 E-03
	860915 to 860922	1.1 E-02	2.0 E-03
	860922 to 860929	9.7 E-03	2.2 E-03
	860929 to 861006	1.5 E-02	3.0 E-03
	861006 to 861013	1.9 E-02	3.0 E-03
	861013 to 861020	4.9 E-02	4.0 E-03
	861020 to 861027	9.7 E-02	5.0 E-03
	861027 to 861103	1.0 E-02	2.0 E-03
	861103 to 861110	1.3 E-02	3.0 E-03
	861110 to 861117	3.5 E-02	3.0 E-03
	861117 to 861124	4.6 E-03	1.8 E-03
	861124 to 861201	8.7 E-03	2.0 E-03
	861201 to 861208	3.3 E-02	3.0 E-03
	861208 to 861215	5.0 E-02	4.0 E-03
	861215 to 861222	5.2 E-02	4.0 E-03
	861222 to 861229	1.6 E-02	2.0 E-03

TABLE A-3.2 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
48	860527 to 860602	9.2 E-02	5.0 E-03
	860602 to 860609	3.9 E-02	3.0 E-03
	860609 to 860616	2.5 E-02	3.0 E-03
	860616 to 860623	1.2 E-02	2.0 E-03
	860623 to 860630	1.6 E-02	2.0 E-03
	860630 to 860707	7.9 E-03	2.2 E-03
	860707 to 860714	9.7 E-03	2.4 E-03
	860714 to 860721	8.3 E-03	2.3 E-03
	860721 to 860728	1.3 E-02	2.0 E-03
	860728 to 860804	1.5 E-02	2.0 E-03
	860804 to 860811	1.7 E-02	3.0 E-03
	860811 to 860818	2.5 E-02	3.0 E-03
	860818 to 860825	2.1 E-02	3.0 E-03
	860825 to 860902	1.9 E-02	2.0 E-03
	860902 to 860908	1.7 E-02	3.0 E-03
	860908 to 860915	1.4 E-02	2.0 E-03
	860915 to 860922	1.5 E-02	2.0 E-03
	860922 to 860929	1.2 E-02	2.0 E-03
	860929 to 861006	1.8 E-02	3.0 E-03
	861006 to 861013	2.4 E-02	3.0 E-03
	861013 to 861020	7.5 E-02	4.0 E-03
	861020 to 861027	1.1 E-01	1.0 E-02
	861027 to 861103	1.6 E-02	3.0 E-03
	861103 to 861110	1.8 E-02	3.0 E-03
	861110 to 861117	3.9 E-02	3.0 E-03
	861117 to 861124	5.7 E-03	1.9 E-03
	861124 to 861201	1.2 E-02	2.0 E-03
	861201 to 861208	3.7 E-02	4.0 E-03
	861208 to 861215	5.7 E-02	4.0 E-03
	861215 to 861222	6.1 E-02	4.0 E-03
	861222 to 861229	1.8 E-02	2.0 E-03

TABLE A-3.2 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
57	860527 to 860602	8.0 E-02	5.0 E-03
	860602 to 860609	3.1 E-02	3.0 E-03
	860609 to 860616	2.9 E-02	3.0 E-03
	860616 to 860623	8.7 E-03	2.3 E-03
	860623 to 860630	1.7 E-02	3.0 E-03
	860630 to 860707	7.8 E-03	2.2 E-03
	860707 to 860714	6.4 E-03	2.3 E-03
	860714 to 860721	9.0 E-03	2.3 E-03
	860721 to 860728	1.4 E-02	2.0 E-03
	860728 to 860804	1.4 E-02	2.0 E-03
	860804 to 860811	1.7 E-02	3.0 E-03
	860811 to 860818	2.0 E-02	3.0 E-03
	860818 to 860825	1.7 E-02	3.0 E-03
	860825 to 860902	1.5 E-02	2.0 E-03
	860902 to 860908	1.5 E-02	3.0 E-03
	860908 to 860915	1.4 E-02	2.0 E-03
	860915 to 860922	1.0 E-02	2.0 E-03
	860922 to 860929	1.2 E-02	2.0 E-03
	860929 to 861006	1.5 E-02	2.0 E-03
	861006 to 861013	2.1 E-02	3.0 E-03
	861013 to 861020	6.5 E-02	4.0 E-03
	861020 to 861027	1.1 E-01	1.0 E-02
	861027 to 861103	1.4 E-02	2.0 E-03
	861103 to 861110	1.7 E-02	3.0 E-03
	861110 to 861117	3.9 E-02	3.0 E-03
	861117 to 861124	4.6 E-03	1.8 E-03
	861124 to 861201	1.2 E-02	2.0 E-03
	861201 to 861208	3.5 E-02	3.0 E-03
	861208 to 861215	5.5 E-02	4.0 E-03
	861215 to 861222	5.9 E-02	4.0 E-03
	861222 to 861229	1.8 E-02	2.0 E-03

TABLE A-3.3

GROSS BETA ON AIR PARTICULAR FILTERS

Results in pCi/cubic meter

Indicator Stations

Average Results (without control) = 5.0 E-02

Low = 3.0 E-03 High = 7.41 E-01

573 Positive Results in 574 Samples

Control Stations

Average Results for control = 4.4 E-02

Low = 3.0 E-03 High = 5.13 E-01

52 Positive Results in 52 Samples

TABLE A-4.1

GAMMA SPECTROMETRY OF PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
1	851230 to 860331	Cs-137	* 2.87 E-04	2.88 E-04
		Cs-134	*-1.10 E-03	1.04 E-03
		Be-7	7.96 E-02	2.03 E-02
	860505 to 860512 (a)	Cs-137	1.38 E-01	2.16 E-02
		Cs-134	7.31 E-02	1.51 E-02
		Ru-103	1.04 E-01	1.94 E-02
		I-131	3.87 E-01	6.60 E-02
		Be-7	8.35 E-02	6.63 E-02
	860512 to 860519 (a)	Nb-95	* 1.73 E-02	7.28 E-03
		Cs-137	1.29 E-01	1.94 E-02
		Cs-134	6.53 E-02	1.28 E-02
		Ru-106	* 4.14 E-02	4.11 E-02
		Ru-103	1.69 E-01	2.30 E-02
		I-131	2.89 E-01	4.25 E-02
		Be-7	1.05 E-01	7.08 E-02
	860519 to 860527 (a)	Cs-137	4.42 E-02	8.57 E-03
		Cs-134	2.18 E-02	6.58 E-03
		Ru-103	7.49 E-02	1.25 E-02
		I-131	5.24 E-02	1.64 E-02
		Be-7	1.51 E-01	6.03 E-02

* Denotes a result less than the detection limit.
(a) Gamma analysis performed on weekly air samples during the period of greatest Chernobyl fallout.

TABLE A-4.1 (Cont.)

GAMMA SPECTROMETRY OF PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
4	851230 to 860331	Cs-137	* 1.78 E-04	5.23 E-04
		Cs-134	*-3.64 E-04	7.73 E-04
		Be-7	7.91 E-02	2.09 E-02
	860505 to 860512 (a)	Cs-137	9.86 E-02	1.54 E-02
		Cs-134	6.00 E-02	1.22 E-02
		Ru-103	9.33 E-02	1.67 E-02
		I-131	2.79 E-01	4.33 E-02
		Be-7	8.09 E-02	5.90 E-02
	860512 to 860519 (a)	Cs-137	1.56 E-01	2.17 E-02
		Cs-134	7.15 E-02	1.41 E-02
		Ru-103	2.08 E-01	2.95 E-02
		I-131	3.04 E-01	4.51 E-02
		Be-7	2.03 E-01	7.88 E-02
	860519 to 860527 (a)	Cs-137	2.91 E-02	6.81 E-03
		Cs-134	2.04 E-02	6.29 E-03
		Ru-103	6.61 E-02	1.13 E-02
		I-131	4.51 E-02	1.54 E-02
		Be-7	1.86 E-01	5.09 E-02

* Denotes a result less than the detection limit.
(a) Gamma analysis performed on weekly air samples during the period of greatest Chernobyl fallout.

TABLE A-4.1 (Cont.)

GAMMA SPECTROMETRY OF PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
5	851230 to 860331	Cs-137	* 1.19 E-04	5.13 E-04
		Cs-134	*-5.07 E-04	8.36 E-04
		Be-7	9.83 E-02	2.45 E-02
	860505 to 860512 (a)	Cs-137	8.59 E-02	1.52 E-02
		Cs-134	4.70 E-02	1.09 E-02
		Ru-103	6.65 E-02	1.42 E-02
		I-131	1.97 E-01	3.87 E-02
		Be-7	*-1.58 E-02	5.78 E-02
	860512 to 860519 (a)	Cs-137	1.00 E-01	1.59 E-02
		Cs-134	5.19 E-02	1.15 E-02
		Ru-103	1.37 E-01	2.02 E-02
		I-131	2.09 E-01	3.63 E-02
		Be-7	1.69 E-01	6.25 E-02
	860519 to 860527 (a)	Cs-137	3.51 E-02	7.88 E-03
		Cs-134	1.59 E-02	1.03 E-02
		Ru-103	5.89 E-02	1.08 E-02
		I-131	3.42 E-02	1.39 E-02
		Be-7	1.64 E-01	5.61 E-02

* Denotes a result less than the detection limit.
(a) Gamma analysis performed on weekly air samples during the period of greatest Chernobyl fallout.

TABLE A-4.1 (Cont.)

GAMMA SPECTROMETRY OF PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
6	851230 to 860331	Cs-137	* 1.19 E-04	5.13 E-04
		Cs-134	* 1.01 E-04	2.03 E-04
		Be-7	1.00 E-01	2.26 E-02
	860505 to 860512 (a)	Cs-137	1.41 E-01	2.21 E-02
		Cs-134	8.26 E-02	1.71 E-02
		Ru-103	1.12 E-01	2.01 E-02
		I-131	3.51 E-01	5.78 E-02
		Be-7	*-9.70 E-03	8.61 E-02
	860512 to 860519 (a)	Cs-137	1.18 E-01	1.89 E-02
		Cs-134	5.70 E-02	1.26 E-02
		Ru-103	1.73 E-01	2.41 E-02
		I-131	2.54 E-01	4.15 E-02
		Be-7	9.91 E-02	5.90 E-02
	860519 to 860527 (a)	Cs-137	3.52 E-02	7.17 E-03
		Cs-134	1.49 E-02	5.98 E-03
		Ru-103	6.04 E-02	1.07 E-02
		I-131	4.81 E-02	1.43 E-02
		Be-7	1.41 E-01	4.16 E-02

* Denotes a result less than the detection limit.
(a) Gamma analysis performed on weekly air samples during the period of greatest Chernobyl fallout.

TABLE A-4.1 (Cont.)

GAMMA SPECTROMETRY OF PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
7	851230 to 860331	Cs-137	*-6.05 E-04	7.05 E-04
		Cs-134	* 4.55 E-04	4.08 E-04
		Be-7	7.62 E-02	1.75 E-02
	860505 to 860512 (a)	Cs-137	9.69 E-02	1.61 E-02
		Cs-134	5.61 E-02	1.25 E-02
		Ru-103	6.69 E-02	1.26 E-02
		I-131	1.92 E-01	3.90 E-02
		Be-7	7.26 E-02	5.46 E-02
	860512 to 860519 (a)	Nb-95	* 1.20 E-02	8.64 E-03
		Cs-137	1.30 E-01	2.08 E-02
		Cs-134	6.88 E-02	1.50 E-02
		Ru-103	1.76 E-01	2.58 E-02
		I-131	2.61 E-01	4.58 E-02
		Be-7	1.72 E-01	7.46 E-02
	860519 to 860527 (a)	Cs-137	3.07 E-02	1.01 E-02
		Cs-134	1.83 E-02	5.96 E-03
		Ru-103	5.53 E-02	1.23 E-02
		I-131	4.25 E-02	1.77 E-02
		Be-7	1.24 E-01	4.92 E-02

* Denotes a result less than the detection limit.
(a) Gamma analysis performed on weekly air samples during the period of greatest Chernobyl fallout.

TABLE A-4.1 (Cont.)

GAMMA SPECTROMETRY OF PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
8	851230 to 860331	Cs-137	*-2.91 E-04	6.17 E-04
		Cs-134	*-9.30 E-05	8.52 E-04
		Be-7	1.07 E-01	2.12 E-02
	860505 to 860512 (a)	Cs-137	1.08 E-01	1.76 E-02
		Cs-134	5.62 E-02	1.51 E-02
		Ru-103	7.85 E-02	1.39 E-02
		I-131	2.47 E-01	4.65 E-02
		Be-7	*-1.72 E-02	6.78 E-02
	860512 to 860519 (a)	Cs-137	1.25 E-01	2.07 E-02
		Cs-134	6.79 E-02	1.60 E-02
		Ru-103	2.12 E-01	3.02 E-02
		I-131	3.07 E-01	5.29 E-02
		Be-7	2.12 E-01	8.93 E-02
	860519 to 860527 (a)	Cs-137	3.70 E-02	9.37 E-03
		Cs-134	1.90 E-02	5.41 E-03
		Ru-106	* 3.66 E-02	3.28 E-02
		Ru-103	7.08 E-02	1.20 E-02
		I-131	3.56 E-02	1.54 E-02
		Be-7	1.42 E-01	5.11 E-02

* Denotes a result less than the detection limit.
(a) Gamma analysis performed on weekly air samples during the period of greatest Chernobyl fallout.

TABLE A-4.1 (Cont.)

GAMMA SPECTROMETRY OF PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
9	851230 to 860331	Cs-137	* 0.00 E 00	6.72 E-04
		Cs-134	* 0.00 E 00	9.50 E-04
		Be-7	1.02 E-01	2.45 E-02
	860505 to 860512 (a)	Cs-137	1.16 E-01	1.93 E-02
		Cs-134	5.93 E-02	1.38 E-02
		Ru-103	8.81 E-02	1.72 E-02
		I-131	2.62 E-01	5.14 E-02
		Be-7	*-4.69 E-02	8.16 E-02
	860512 to 860519 (a)	Cs-137	9.50 E-02	1.48 E-02
		Cs-134	4.39 E-02	1.03 E-02
		Ru-103	1.31 E-01	1.89 E-02
		I-131	2.04 E-01	3.53 E-02
		Be-7	1.23 E-01	5.97 E-02
	860519 to 860527 (a)	Cs-137	3.17 E-02	7.29 E-03
		Cs-134	1.77 E-02	6.05 E-03
		Ru-103	6.24 E-02	1.16 E-02
		I-131	3.41 E-02	1.46 E-02
		Be-7	1.44 E-01	4.86 E-02

* Denotes a result less than the detection limit.
(a) Gamma analysis performed on weekly air samples during the period of greatest Chernobyl fallout.

TABLE A-4.1 (Cont.)

GAMMA SPECTROMETRY OF PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
21	851230 to 860331	Cs-137	* 0.00 E 00	6.81 E-04
		Cs-134	* 3.59 E-04	7.82 E-04
		Be-7	7.17 E-02	2.13 E-02
	860505 to 860512 (a)	Cs-137	7.57 E-02	1.29 E-02
		Cs-134	4.67 E-02	1.14 E-02
		Ru-103	5.75 E-02	1.17 E-02
		I-131	2.16 E-01	4.12 E-02
		Be-7	* 6.86 E-02	5.27 E-02
	860512 to 860519 (a)	Cs-137	9.74 E-02	1.75 E-02
		Cs-134	5.65 E-02	1.29 E-02
		Ru-103	1.62 E-01	2.38 E-02
		I-131	2.56 E-01	4.74 E-02
		Be-7	*-3.18 E-03	7.11 E-02
	860519 to 860527 (a)	Cs-137	3.98 E-02	8.66 E-03
		Cs-134	1.80 E-02	6.85 E-03
		Ru-103	5.89 E-02	1.07 E-02
		I-131	4.42 E-02	1.47 E-02
		Be-7	1.62 E-01	5.51 E-02

* Denotes a result less than the detection limit.
(a) Gamma analysis performed on weekly air samples during the period of greatest Chernobyl fallout.

TABLE A-4.1 (Cont.)

GAMMA SPECTROMETRY OF PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
23	851230 to 860331	Cs-137	*-7.93 E-05	6.54 E-04
		Cs-134	*-6.59 E-04	1.04 E-03
		Be-7	8.40 E-02	2.17 E-02
	860505 to 860512 (a)	Cs-137	1.31 E-01	2.14 E-02
		Cs-134	7.11 E-02	1.60 E-02
		Ru-103	9.76 E-02	1.79 E-02
		I-131	3.24 E-01	5.97 E-02
		Be-7	1.89 E-01	6.45 E-02
	860512 to 860519 (a)	Cs-137	1.31 E-01	1.86 E-02
		Cs-134	5.40 E-02	1.16 E-02
		Ru-106	* 6.15 E-02	4.23 E-02
		Ru-103	1.71 E-01	2.33 E-02
		I-131	2.27 E-01	3.68 E-02
		Be-7	1.12 E-01	5.09 E-02
	860519 to 860527 (a)	Cs-137	3.59 E-02	7.42 E-03
		Cs-134	1.79 E-02	6.92 E-03
		Ru-103	6.15 E-02	1.13 E-02
		I-131	4.81 E-02	1.41 E-02
		Be-7	1.43 E-01	4.55 E-02

* Denotes a result less than the detection limit.
(a) Gamma analysis performed on weekly air samples during the period of greatest Chernobyl fallout.

TABLE A-4.1 (Cont.)

GAMMA SPECTROMETRY OF PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
40	851230 to 860331	Cs-137	*-7.45 E-05	6.83 E-04
		Cs-134	*-2.86 E-04	8.31 E-04
		Be-7	9.62 E-02	2.91 E-02
	860505 to 860512 (a)	Cs-137	1.15 E-01	1.75 E-02
		Cs-134	7.09 E-02	1.51 E-02
		Ru-103	9.58 E-02	1.62 E-02
		I-131	2.85 E-01	4.95 E-02
		Be-7	* 6.14 E-02	6.14 E-02
	860512 to 860519 (a)	Cs-137	1.22 E-01	1.96 E-02
		Cs-134	8.34 E-02	1.50 E-02
		Ru-103	1.77 E-01	2.47 E-02
		I-131	2.95 E-01	4.72 E-02
		Be-7	1.45 E-01	7.01 E-02
	860519 to 860527 (a)	Cs-137	3.82 E-02	8.43 E-03
		Cs-134	2.74 E-02	7.31 E-03
		Ru-103	8.14 E-02	1.28 E-02
		I-131	5.75 E-02	1.75 E-02
		Be-7	2.31 E-01	6.07 E-02

* Denotes a result less than the detection limit.
(a) Gamma analysis performed on weekly air samples during the period of greatest Chernobyl fallout.

TABLE A-4.1 (Cont.)

GAMMA SPECTROMETRY OF PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
48	851230 to 860331	Cs-137	*-1.42 E-04	6.36 E-04
		Cs-134	* 1.36 E-04	6.43 E-04
		Be-7	8.67 E-02	2.08 E-02
	860505 to 860512 (a)	Cs-137	1.14 E-01	1.79 E-02
		Cs-134	5.55 E-02	1.13 E-02
		Ru-103	7.75 E-02	1.54 E-02
		I-131	2.19 E-01	4.13 E-02
		Be-7	1.06 E-01	5.34 E-02
	860512 to 860519 (a)	Cs-137	1.19 E-01	1.78 E-02
		Cs-134	6.38 E-02	1.19 E-02
		Ru-103	1.49 E-01	2.10 E-02
		I-131	2.08 E-01	3.91 E-02
		Be-7	8.26 E-02	5.57 E-02
	860519 to 860527 (a)	Cs-137	3.73 E-02	7.98 E-03
		Cs-134	1.48 E-02	5.46 E-03
		Ru-103	6.98 E-02	1.22 E-02
		I-131	4.53 E-02	1.46 E-02
		Be-7	8.33 E-02	4.48 E-02

* Denotes a result less than the detection limit.
(a) Gamma analysis performed on weekly air samples during the period of greatest Chernobyl fallout.

TABLE A-4.1 (Cont.)

GAMMA SPECTROMETRY OF PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
57	851230 to 860331	Cs-137	*-7.50 E-04	6.79 E-04
		Cs-134	*-1.05 E-03	8.49 E-04
		Be-7	9.73 E-02	2.25 E-02
	860505 to 860512 (a)	Cs-137	1.32 E-01	1.92 E-02
		Cs-134	7.59 E-02	1.42 E-02
		Ru-103	9.83 E-02	1.71 E-02
		I-131	3.06 E-01	5.15 E-02
		Be-7	9.61 E-02	5.16 E-02
	860512 to 860519 (a)	Cs-137	1.36 E-01	1.91 E-02
		Cs-134	6.27 E-02	1.19 E-02
		Ru-106	* 5.02 E-02	5.20 E-02
		Ru-103	1.80 E-01	2.45 E-02
		I-131	2.72 E-01	4.43 E-02
		Be-7	1.80 E-01	6.70 E-02
	860519 to 860527 (a)	Cs-137	3.28 E-02	7.45 E-03
		Cs-134	2.18 E-02	6.25 E-03
		Ru-103	6.32 E-02	1.11 E-02
		I-131	4.90 E-02	1.86 E-02
		Be-7	1.45 E-01	4.83 E-02

* Denotes a result less than the detection limit.
(a) Gamma analysis performed on weekly air samples during the period of greatest Chernobyl fallout.

TABLE A-4.2

GAMMA SPECTROMETRY OF PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
1	860331 to 860630	Be-7	9.69 E-02	1.34 E-02
		Ru-103	1.64 E-02	1.90 E-03
		Ru-106	* 5.19 E-03	4.65 E-03
		Cs-134	1.35 E-02	1.40 E-03
		Cs-137	2.86 E-02	2.90 E-03
	860630 to 860929	Be-7	9.17 E-02	9.20 E-03
		Ru-103	* 1.20 E-04	2.64 E-04
		Ru-106	* 1.39 E-04	1.72 E-03
		Cs-134	* 0.00 E-01	1.98 E-04
		Cs-137	* 1.31 E-04	1.99 E-04
	860929 to 861229	Be-7	5.96 E-02	6.00 E-03
		Ru-103	*-1.20 E-05	3.51 E-04
		Ru-106	* 3.30 E-04	1.84 E-03
		Cs-134	* 1.50 E-04	2.20 E-04
		Cs-137	* 2.00 E-04	2.30 E-04

* Denotes a result less than the detection limit.

TABLE A-4.2 (Cont.)

GAMMA SPECTROMETRY OF PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
4	860331 to 860630	Be-7	9.37 E-02	1.28 E-02
		Ru-103	1.54 E-02	2.00 E-03
		Ru-106	* 9.77 E-03	4.56 E-03
		Cs-134	1.23 E-02	1.20 E-03
		Cs-137	2.73 E-02	2.70 E-03
	860630 to 860929	Be-7	8.63 E-02	8.60 E-03
		Ru-103	* 1.46 E-04	2.83 E-04
		Ru-106	*-5.45 E-04	1.56 E-03
		Cs-134	* 1.23 E-04	1.78 E-04
		Cs-137	* 1.12 E-04	1.83 E-04
	860929 to 861229	Be-7	6.83 E-02	6.80 E-03
		Ru-103	*-1.70 E-04	3.20 E-04
		Ru-106	* 8.20 E-04	1.82 E-03
		Cs-134	* 0.00 E-04	2.00 E-04
		Cs-137	*-3.80 E-05	1.91 E-04

* Denotes a result less than the detection limit.

TABLE A-4.2 (Cont.)

GAMMA SPECTROMETRY OF PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
5	860331 to 860630	Be-7	8.28 E-02	1.70 E-02
		Ru-103	1.48 E-02	2.40 E-03
		Ru-106	* 7.14 E-03	6.79 E-03
		Cs-134	1.07 E-02	1.70 E-03
		Cs-137	2.42 E-02	2.40 E-03
	860630 to 860929	Be-7	8.26 E-02	8.30 E-03
		Ru-103	*-6.34 E-05	3.62 E-04
		Ru-106	* 7.66 E-04	2.26 E-03
		Cs-134	* 1.38 E-04	2.39 E-04
		Cs-137	*-6.89 E-06	2.47 E-04
	860929 to 861229	Be-7	5.57 E-02	6.40 E-03
		Ru-103	* 3.50 E-04	4.60 E-04
		Ru-106	* 7.10 E-05	2.46 E-03
		Cs-134	* 2.80 E-04	2.80 E-04
		Cs-137	* 2.40 E-05	2.73 E-04

* Denotes a result less than the detection limit.

TABLE A-4.2 (Cont.)

GAMMA SPECTROMETRY OF PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
6	860331 to 860630	Be-7	9.24 E-02	1.79 E-02
		Ru-103	1.70 E-02	2.30 E-03
		Ru-106	* 1.23 E-02	5.71 E-03
		Cs-134	1.24 E-02	1.40 E-03
		Cs-137	2.89 E-02	2.90 E-03
	860630 to 860929	Be-7	9.00 E-02	9.00 E-03
		Ru-103	*-1.37 E-04	4.23 E-04
		Ru-106	* 8.01 E-04	2.78 E-03
		Cs-134	* 3.53 E-04	3.36 E-04
		Cs-137	* 2.75 E-04	3.13 E-04
	860929 to 861229	Be-7	5.32 E-02	5.30 E-03
		Ru-103	* 3.50 E-05	2.97 E-04
		Ru-106	* 4.00 E-04	1.46 E-03
		Cs-134	*-9.30 E-05	1.55 E-04
		Cs-137	*-5.70 E-05	1.77 E-04

* Denotes a result less than the detection limit.

TABLE A-4.2 (Cont.)

GAMMA SPECTROMETRY OF PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
7	860331 to 860630	Be-7	9.20 E-02	1.71 E-02
		Ru-103	1.48 E-02	2.10 E-03
		Ru-106	* 6.77 E-03	5.12 E-03
		Cs-134	1.14 E-02	1.30 E-03
		Cs-137	2.82 E-02	2.80 E-03
	860630 to 860929	Be-7	8.64 E-02	8.60 E-03
		Ru-103	* 1.13 E-04	2.25 E-04
		Ru-106	*-6.75 E-05	1.27 E-03
		Cs-134	* 0.00 E-01	1.60 E-04
		Cs-137	* 2.56 E-04	1.66 E-04
	860929 to 861229	Be-7	5.37 E-02	5.90 E-03
		Ru-103	* 2.70 E-04	3.30 E-04
		Ru-106	*-6.80 E-04	1.73 E-03
		Cs-134	* 1.10 E-04	1.90 E-04
		Cs-137	* 1.70 E-04	2.10 E-04

* Denotes a result less than the detection limit.

TABLE A-4.2 (Cont.)

GAMMA SPECTROMETRY OF PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
8	860331 to 860630	Be-7	1.14 E-01	1.70 E-02
		Ru-103	1.87 E-02	2.40 E-03
		Ru-106	* 1.14 E-02	6.19 E-03
		Cs-134	1.38 E-02	1.50 E-03
		Cs-137	2.86 E-02	2.90 E-03
	860630 to 860929	Be-7	8.96 E-02	9.00 E-03
		Ru-103	* 1.65 E-04	4.70 E-04
		Ru-106	*-7.00 E-04	2.89 E-03
		Cs-134	* 1.83 E-04	3.32 E-04
		Cs-137	* 2.26 E-04	3.21 E-04
	860929 to 861229	Be-7	5.09 E-02	5.10 E-03
		Ru-103	*-1.20 E-04	2.80 E-04
		Ru-106	*-3.60 E-04	1.54 E-03
		Cs-134	* 9.90 E-06	1.76 E-04
		Cs-137	* 1.10 E-04	1.80 E-04

* Denotes a result less than the detection limit.

TABLE A-4.2 (Cont.)

GAMMA SPECTROMETRY OF PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
9	860331 to 860630	Be-7	9.89 E-02	2.00 E-02
		Ru-103	1.41 E-02	2.70 E-03
		Ru-106	* 9.71 E-03	7.09 E-03
		Cs-134	9.26 E-03	1.94 E-03
		Cs-137	2.37 E-02	2.40 E-03
	860630 to 860929	Be-7	7.78 E-02	7.80 E-03
		Ru-103	*-1.11 E-04	2.60 E-04
		Ru-106	* 7.08 E-04	1.65 E-03
		Cs-134	* 9.03 E-05	1.84 E-04
		Cs-137	* 1.50 E-04	2.03 E-04
	860929 to 861229	Be-7	4.84 E-02	5.20 E-03
		Ru-103	*-7.80 E-05	2.68 E-04
		Ru-106	*-2.20 E-04	1.52 E-03
		Cs-134	* 2.90 E-05	1.70 E-04
		Cs-137	* 5.80 E-05	1.59 E-04

* Denotes a result less than the detection limit.

TABLE A-4.2 (Cont.)

GAMMA SPECTROMETRY OF PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
21	860331 to 860630	Be-7	7.91 E-02	1.55 E-02
		Ru-103	1.24 E-02	2.00 E-03
		Ru-106	* 4.90 E-03	4.98 E-03
		Cs-134	1.06 E-02	1.30 E-03
		Cs-137	2.20 E-02	2.20 E-03
	860630 to 860929	Be-7	6.18 E-02	6.40 E-03
		Ru-103	* 6.71 E-05	3.89 E-04
		Ru-106	*-2.31 E-03	3.17 E-03
		Cs-134	* 1.91 E-05	3.83 E-04
		Cs-137	*-3.41 E-05	3.68 E-04
	860929 to 861229	Be-7	6.15 E-02	9.30 E-03
		Ru-103	*-1.10 E-04	6.60 E-04
		Ru-106	* 1.40 E-03	3.30 E-03
		Cs-134	* 0.00 E-04	3.60 E-04
		Cs-137	* 1.10 E-04	3.80 E-04

* Denotes a result less than the detection limit.

TABLE A-4.2 (Cont.)

GAMMA SPECTROMETRY OF PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
23	860331 to 860630	Be-7	1.27 E-01	2.70 E-02
		Ru-103	1.67 E-02	3.30 E-03
		Ru-106	* 1.28 E-02	7.96 E-03
		Cs-134	1.34 E-02	1.70 E-03
		Cs-137	3.23 E-02	3.20 E-03
	860630 to 860929	Be-7	1.05 E-01	1.10 E-02
		Ru-103	* 3.10 E-05	2.17 E-04
		Ru-106	*-2.89 E-04	1.42 E-03
		Cs-134	* 1.11 E-04	1.45 E-04
		Cs-137	* 1.36 E-05	1.54 E-04
	860929 to 861229	Be-7	6.28 E-02	7.10 E-03
		Ru-103	*-1.00 E-04	4.50 E-04
		Ru-106	*-1.50 E-03	2.40 E-03
		Cs-134	* 4.70 E-05	2.78 E-04
		Cs-137	* 2.40 E-04	3.20 E-04

* Denotes a result less than the detection limit.

TABLE A-4.2 (Cont.)

GAMMA SPECTROMETRY OF PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
40	860331 to 860630	Be-7	1.18 E-01	1.70 E-02
		Ru-103	1.94 E-02	2.50 E-03
		Ru-106	* 1.19 E-02	5.94 E-03
		Cs-134	1.49 E-02	1.50 E-03
		Cs-137	3.56 E-02	3.60 E-03
	860630 to 860929	Be-7	7.77 E-02	7.80 E-03
		Ru-103	*-3.32 E-05	2.24 E-04
		Ru-106	*-7.87 E-04	1.24 E-03
		Cs-134	* 0.00 E-01	1.47 E-04
		Cs-137	* 1.76 E-04	1.60 E-04
	860929 to 861229	Be-7	5.27 E-02	7.00 E-03
		Ru-103	*-1.90 E-04	3.40 E-04
		Ru-106	* 2.30 E-04	1.72 E-03
		Cs-134	*-6.20 E-05	1.87 E-04
		Cs-137	* 1.10 E-04	1.80 E-04

* Denotes a result less than the detection limit.

TABLE A-4.2 (Cont.)

GAMMA SPECTROMETRY OF PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
48	860331 to 860630	Be-7	1.05 E-01	1.70 E-02
		Ru-103	1.78 E-02	2.80 E-03
		Ru-106	1.08 E-02	4.90 E-03
		Cs-134	1.39 E-02	1.50 E-03
		Cs-137	3.38 E-02	3.40 E-03
	860630 to 860929	Be-7	1.21 E-01	1.20 E-02
		Ru-103	* 1.21 E-05	4.71 E-04
		Ru-106	* 1.10 E-03	2.66 E-03
		Cs-134	* 8.68 E-05	2.73 E-04
		Cs-137	* 4.57 E-04	2.91 E-04
	860929 to 861229	Be-7	7.34 E-02	7.30 E-03
		Ru-103	* 4.80 E-04	4.70 E-04
		Ru-106	*-1.60 E-04	2.84 E-03
		Cs-134	* 2.60 E-04	3.00 E-04
		Cs-137	* 2.30 E-04	2.90 E-04

* Denotes a result less than the detection limit.

TABLE A-4.2 (Cont.)

GAMMA SPECTROMETRY OF PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
57	860331 to 860630	Be-7	9.54 E-02	1.68 E-02
		Ru-103	1.69 E-02	2.40 E-03
		Ru-106	* 4.59 E-03	5.64 E-03
		Cs-134	1.39 E-02	1.40 E-03
		Cs-137	2.95 E-02	3.00 E-03
	860630 to 860929	Be-7	8.01 E-02	8.00 E-03
		Ru-103	* 2.58 E-05	3.66 E-04
		Ru-106	* 2.85 E-04	2.24 E-03
		Cs-134	* 2.60 E-05	2.72 E-04
		Cs-137	* 9.67 E-04	2.95 E-04
	860929 to 861229	Be-7	4.19 E-02	4.50 E-03
		Ru-103	*-7.30 E-05	3.14 E-04
		Ru-106	* 1.20 E-03	2.30 E-03
		Cs-134	* 1.20 E-04	2.60 E-04
		Cs-137	* 1.30 E-04	2.60 E-04

* Denotes a result less than the detection limit.

TABLE A-4.3

GAMMA SPECTROMETRY OF PARTICLE FILTERS*

Results in pCi/cubic meter

NUCLIDE	AVERAGE	LOW	HIGH	NUMBER SAMPLES	NUMBER POSITIVE
Cs-137 (I)	9.0 E-03	-1.0 E-03	3.6 E-02	44	11
Cs-137 (C)	6.0 E-03	0.0 E+00	2.4 E-02	4	1
Cs-134 (I)	2.0 E-03	-1.0 E-03	1.5 E-02	44	11
Cs-134 (C)	2.0 E-03	0.0 E+00	9.0 E-03	4	1
Ru-103 (I)	5.0 E-03	-1.9 E-04	1.9 E-02	44	11
Ru-103 (C)	5.0 E-03	-8.0 E-05	1.4 E-02	4	1
Ru-106 (I)	3.0 E-03	-2.3 E-03	1.3 E-02	44	1
Ru-106 (C)	3.0 E-03	-2.0 E-04	9.0 E-03	4	0

(I) = Indicator

(C) = Control

* Quarterly composite results only

TABLE A-5.1

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
1	851230 to 860106	* 1.08 E-02	1.08 E-02
	860106 to 860113	*-1.87 E-03	1.16 E-02
	860113 to 860120	*-1.05 E-02	8.56 E-03
	860120 to 860127	*-1.02 E-02	8.58 E-03
	860127 to 860203	*-2.66 E-03	8.01 E-03
	860203 to 860210	* 4.60 E-03	8.88 E-03
	860210 to 860218	*-1.45 E-03	6.92 E-03
	860218 to 860224	* 1.85 E-02	1.85 E-02
	860224 to 860303	*-4.73 E-03	1.07 E-02
	860303 to 860311	*-1.27 E-03	7.87 E-03
	860311 to 860317	*-8.75 E-03	1.44 E-02
	860317 to 860324	* 4.64 E-03	6.93 E-03
	860324 to 860331	*-3.86 E-03	1.00 E-02
	860331 to 860407	* 2.23 E-03	8.48 E-03
	860407 to 860414	*-1.43 E-03	7.45 E-03
	860414 to 860421	*-7.42 E-03	1.09 E-02
	860421 to 860428	*-5.86 E-03	8.52 E-03
	860428 to 860505	* 2.64 E-03	9.63 E-03
	860505 to 860512	8.01 E-01	9.14 E-02
	860512 to 860519	6.61 E-01	7.75 E-02
	860519 to 860527	1.95 E-01	2.95 E-02

* Denotes a result less than the detection limit.

TABLE A-5.1 (Cont.)

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
4	851230 to 860106	*-5.59 E-03	1.12 E-02
	860106 to 860113	*-1.65 E-03	1.38 E-02
	860113 to 860120	*-4.76 E-03	7.50 E-03
	860120 to 860127	*-1.03 E-02	1.03 E-02
	860127 to 860203	*-5.07 E-04	7.38 E-03
	860203 to 860210	*-2.05 E-03	8.45 E-03
	860210 to 860218	*-1.87 E-03	1.04 E-02
	860218 to 860224	*-1.17 E-03	8.45 E-03
	860224 to 860303	*-9.79 E-03	8.72 E-03
	860303 to 860311	* 1.68 E-03	9.69 E-03
	860311 to 860317	* 8.66 E-04	9.27 E-03
	860317 to 860324	* 8.22 E-03	8.21 E-03
	860324 to 860331	*-9.67 E-03	1.04 E-02
	860331 to 860407	*-4.49 E-03	1.14 E-02
	860407 to 860414	* 4.08 E-03	8.03 E-03
	860414 to 860421	*-7.28 E-03	9.43 E-03
	860421 to 860428	* 5.38 E-03	8.80 E-03
	860428 to 860505	*-1.65 E-03	1.03 E-02
	860505 to 860512	7.95 E-01	9.23 E-02
	860512 to 860519	6.85 E-01	8.09 E-02
	860519 to 860527	1.59 E-01	2.55 E-02

* Denotes a result less than the detection limit.

TABLE A-5.1 (Cont.)

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
5	851230 to 860106	* 2.83 E-03	1.03 E-02
	860106 to 860113	*-4.34 E-03	1.15 E-02
	860113 to 860120	* 6.83 E-03	8.93 E-03
	860120 to 860127	* 5.86 E-03	7.66 E-03
	860127 to 860203	*-3.41 E-03	9.06 E-03
	860203 to 860210	* 1.17 E-02	1.18 E-02
	860210 to 860218	*-1.04 E-02	8.75 E-03
	860218 to 860224	*-2.64 E-03	7.40 E-03
	860224 to 860303	* 7.08 E-04	8.58 E-03
	860303 to 860310	*-1.54 E-02	1.16 E-02
	860310 to 860317	*-8.00 E-03	8.72 E-03
	860317 to 860324	* 0.00 E+00	0.00 E+00
	860324 to 860331	*-4.43 E-03	8.86 E-03
	860331 to 860407	* 8.20 E-03	8.20 E-03
	860407 to 860414	*-9.52 E-03	1.01 E-02
	860414 to 860421	* 1.30 E-03	7.99 E-03
	860421 to 860428	*-1.62 E-02	1.25 E-02
	860428 to 860505	*-1.16 E-02	1.10 E-02
	860505 to 860512	6.46 E-01	7.62 E-02
	860512 to 860519	5.80 E-01	6.91 E-02
	860519 to 860527	1.57 E-01	2.57 E-02

* Denotes a result less than the detection limit.

TABLE A-5.1 (Cont.)

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
6	851230 to 860106	* 8.40 E-04	7.64 E-03
	860106 to 860113	*-5.88 E-03	1.36 E-02
	860113 to 860120	*-1.88 E-03	9.46 E-03
	860120 to 860127	* 3.32 E-03	8.58 E-03
	860127 to 860203	*-1.69 E-03	9.36 E-03
	860203 to 860210	* 2.61 E-03	1.07 E-02
	860210 to 860218	* 4.32 E-04	6.40 E-03
	860218 to 860224	*-1.35 E-03	8.39 E-03
	860224 to 860303	*-2.92 E-03	1.08 E-02
	860303 to 860311	* 1.97 E-03	6.17 E-03
	860311 to 860317	* 8.01 E-03	1.28 E-02
	860317 to 860324	*-7.00 E-04	8.32 E-03
	860324 to 860331	* 4.63 E-03	8.18 E-03
	860331 to 860407	*-5.54 E-03	1.11 E-02
	860407 to 860414	* 6.50 E-03	7.37 E-03
	860414 to 860421	* 6.52 E-03	1.01 E-02
	860421 to 860428	* 7.50 E-03	8.12 E-03
	860428 to 860505	*-3.86 E-03	7.74 E-03
	860505 to 860512	6.97 E-01	7.98 E-02
	860512 to 860519	5.95 E-01	7.16 E-02
	860519 to 860529	1.36 E-01	2.96 E-02

* Denotes a result less than the detection limit.

TABLE A-5.1 (Cont.)

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
7	851230 to 860106	* 4.29 E-03	8.54 E-03
	860106 to 860113	* 1.88 E-03	1.03 E-02
	860113 to 860120	*-2.98 E-03	1.05 E-02
	860120 to 860127	*-7.01 E-03	1.05 E-02
	860127 to 860203	* 7.25 E-03	8.22 E-03
	860203 to 860210	* 1.72 E-02	9.56 E-03
	860210 to 860218	* 1.06 E-02	1.06 E-02
	860218 to 860224	* 6.91 E-03	9.04 E-03
	860224 to 860303	*-6.58 E-03	8.72 E-03
	860303 to 860311	*-2.38 E-04	6.35 E-03
	860311 to 860317	*-6.37 E-03	1.00 E-02
	860317 to 860324	*-4.94 E-03	7.91 E-03
	860324 to 860331	*-4.82 E-03	9.64 E-03
	860331 to 860407	* 9.06 E-03	9.06 E-03
	860407 to 860414	* 4.36 E-03	8.43 E-03
	860414 to 860421	*-1.18 E-02	1.19 E-02
	860421 to 860428	*-6.74 E-03	9.95 E-03
	860428 to 860505	* 2.91 E-03	8.93 E-03
	860505 to 860512	7.20 E-01	8.23 E-02
	860512 to 860519	6.29 E-01	7.58 E-02
	860519 to 860527	9.16 E-02	1.70 E-02

* Denotes a result less than the detection limit.

TABLE A-5.1 (Cont.)

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
8	851230 to 860106	* 1.68 E-02	1.68 E-02
	860106 to 860113	*-6.73 E-03	1.35 E-02
	860113 to 860120	* 1.18 E-03	8.64 E-03
	860120 to 860127	*-2.63 E-03	7.12 E-03
	860127 to 860203	*-2.08 E-03	1.04 E-02
	860203 to 860210	*-5.42 E-03	1.23 E-02
	860210 to 860218	*-2.79 E-03	7.41 E-03
	860218 to 860224	* 2.68 E-03	8.37 E-03
	860224 to 860303	* 2.10 E-03	7.98 E-03
	860303 to 860310	* 7.13 E-03	9.66 E-03
	860310 to 860312	*-2.33 E-02	5.36 E-02
	860312 to 860317	* 2.74 E-03	8.67 E-03
	860317 to 860324	* 2.33 E-03	8.50 E-03
	860324 to 860331	*-3.62 E-03	9.61 E-03
	860331 to 860407	* 0.00 + 00	9.46 E-03
	860407 to 860414	* 1.77 E-03	9.29 E-03
	860414 to 860421	* 8.31 E-03	8.98 E-03
	860421 to 860428	*-1.26 E-03	1.84 E-02
	860428 to 860505	* 2.24 E-03	7.00 E-03
	860505 to 860512	6.29 E-01	7.54 E-02
	860512 to 860519	6.11 E-01	7.24 E-02
	860519 to 860527	1.46 E-01	2.64 E-02

* Denotes a result less than the detection limit.

TABLE A-5.1 (Cont.)

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
9	851230 to 860106	*-6.67 E-03	9.82 E-03
	860106 to 860113	* 8.49 E-04	1.26 E-02
	860113 to 860120	* 1.05 E-03	7.86 E-03
	860120 to 860127	*-2.46 E-03	9.08 E-03
	860127 to 860203	*-1.77 E-03	9.78 E-03
	860203 to 860210	*-8.78 E-04	1.04 E-02
	860210 to 860218	* 2.41 E-03	7.55 E-03
	860218 to 860224	*-7.37 E-04	1.24 E-02
	860224 to 860303	* 3.34 E-03	7.46 E-03
	860303 to 860310	*-1.91 E-03	6.77 E-03
	860310 to 860317	*-1.42 E-03	1.01 E-02
	860317 to 860324	*-1.18 E-03	7.34 E-03
	860324 to 860331	* 9.75 E-03	9.75 E-03
	860331 to 860407	*-1.04 E-02	1.04 E-02
	860407 to 860414	* 0.00 E+00	7.58 E-03
	860414 to 860421	* 1.04 E-02	1.11 E-02
	860421 to 860428	* 2.04 E-03	9.51 E-03
	860428 to 860505	* 9.05 E-03	9.05 E-03
	860505 to 860512	6.39 E-01	7.57 E-02
	860512 to 860519	5.34 E-01	6.45 E-02
	860519 to 860527	8.77 E-02	1.75 E-02

* Denotes a result less than the detection limit.

TABLE A-5.1 (Cont.)

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
21	851230 to 860106	* 2.01 E-03	7.65 E-03
	860106 to 860113	*-3.08 E-03	1.01 E-02
	860113 to 860120	* 3.58 E-03	6.92 E-03
	860120 to 860127	* 1.45 E-03	7.29 E-03
	860127 to 860203	*-2.11 E-03	1.06 E-02
	860203 to 860210	* 6.18 E-04	1.06 E-02
	860210 to 860218	*-2.37 E-03	7.49 E-03
	860218 to 860224	*-2.34 E-03	8.29 E-03
	860224 to 860303	* 3.78 E-03	1.09 E-02
	860303 to 860311	* 5.31 E-03	7.20 E-03
	860311 to 860317	* 2.97 E-04	9.48 E-03
	860317 to 860324	*-5.28 E-04	7.69 E-03
	860324 to 860331	* 4.98 E-03	1.11 E-02
	860331 to 860407	* 5.89 E-03	6.37 E-03
	860407 to 860414	*-2.03 E-03	1.02 E-02
	860414 to 860421	*-2.07 E-03	9.85 E-03
	860421 to 860428	* 4.17 E-03	8.07 E-03
	860428 to 860505	*-8.49 E-04	7.47 E-03
	860505 to 860512	6.73 E-01	7.87 E-02
	860512 to 860519	5.99 E-01	7.19 E-02
	860519 to 860527	1.64 E-01	2.46 E-02

* Denotes a result less than the detection limit.

TABLE A-5.1 (Cont.)

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
23	851230 to 860106	* 5.93 E-03	7.39 E-03
	860106 to 860113	*-1.03 E-03	1.08 E-02
	860113 to 860120	*-3.87 E-03	1.03 E-02
	860120 to 860127	* 2.69 E-03	8.11 E-03
	860127 to 860203	*-2.81 E-04	7.49 E-03
	860203 to 860210	*-8.18 E-03	1.20 E-02
	860210 to 860218	* 1.69 E-03	7.86 E-03
	860218 to 860224	*-1.48 E-03	7.74 E-03
	860224 to 860303	*-7.77 E-04	9.24 E-03
	860303 to 860311	*-2.48 E-03	6.85 E-03
	860311 to 860317	*-5.45 E-03	9.25 E-03
	860317 to 860324	* 4.36 E-03	8.72 E-03
	860324 to 860331	*-2.49 E-03	1.15 E-02
	860331 to 860407	* 1.71 E-03	8.60 E-03
	860407 to 860414	*-2.43 E-02	6.81 E-03
	860414 to 860421	* 1.24 E-02	1.24 E-02
	860421 to 860428	* 4.47 E-03	7.71 E-03
	860428 to 860505	* 5.43 E-03	8.18 E-03
	860505 to 860512	6.26 E-01	7.45 E-02
	860512 to 860519	6.35 E-01	7.53 E-02
	860519 to 860527	1.82 E-01	2.68 E-02

* Denotes a result less than the detection limit.

TABLE A-5.1 (Cont.)

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
40	851230 to 860106	* 3.29 E-03	7.26 E-03
	860106 to 860113	*-1.05 E-02	1.72 E-02
	860113 to 860120	*-1.83 E-03	9.22 E-03
	860120 to 860127	*-1.53 E-03	5.62 E-03
	860127 to 860203	*-3.06 E-03	7.97 E-03
	860203 to 860210	* 3.08 E-04	1.11 E-02
	860210 to 860218	* 4.22 E-03	8.31 E-03
	860218 to 860224	*-1.76 E-03	8.36 E-03
	860224 to 860303	*-3.27 E-03	1.03 E-02
	860303 to 860310	*-2.53 E-03	9.34 E-03
	860310 to 860311 (a)	*-2.88 E-02	9.42 E-02
	860311 to 860317	* 1.27 E-03	1.89 E-02
	860317 to 860324	*-5.40 E-04	1.02 E-02
	860324 to 860331	* 1.31 E-02	1.31 E-02
	860331 to 860407	*-4.81 E-04	8.11 E-03
	860407 to 860414	*-9.81 E-03	8.99 E-03
	860414 to 860421	*-5.69 E-03	1.14 E-02
	860421 to 860428	*-1.14 E-02	1.05 E-02
	860428 to 860505	*-7.86 E-03	9.99 E-03
	860505 to 860512	6.75 E-01	7.92 E-02
	860512 to 860519	6.39 E-01	7.65 E-02
	860519 to 860527	6.37 E-02	1.50 E-02

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

TABLE A-5.1 (Cont.)

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
48	851230 to 860106	*-1.06 E-02	1.04 E-02
	860106 to 860113	* 1.28 E-02	1.28 E-02
	860113 to 860120	*-4.98 E-03	7.68 E-03
	860120 to 860127	*-2.40 E-03	7.85 E-03
	860127 to 860203	* 2.47 E-03	4.74 E-03
	860203 to 860210	*-7.79 E-04	8.14 E-03
	860210 to 860218	* 7.76 E-03	7.76 E-03
	860218 to 860224	*-3.87 E-03	8.86 E-03
	860224 to 860303	*-1.37 E-02	1.06 E-02
	860303 to 860310	* 0.00 E+00	8.85 E-03
	860310 to 860317	* 8.88 E-03	8.99 E-03
	860317 to 860324	*-2.59 E-03	8.18 E-03
	860324 to 860331	* 3.01 E-04	9.60 E-03
	860331 to 860407	* 1.83 E-03	6.96 E-03
	860407 to 860414	* 5.90 E-03	8.37 E-03
	860414 to 860421	*-2.72 E-03	1.06 E-02
	860421 to 860428	*-1.31 E-03	9.29 E-03
	860428 to 860505	* 5.64 E-04	9.64 E-03
	860505 to 860512	7.18 E-01	8.24 E-02
	860512 to 860519	6.27 E-01	7.51 E-02
	860519 to 860527	1.53 E-01	2.45 E-02

* Denotes a result less than the detection limit.

TABLE A-5.1 (Cont.)

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
57	851230 to 860106	* 5.10 E-03	6.49 E-03
	860106 to 860113	* 5.80 E-03	9.98 E-03
	860113 to 860120	* 0.00 E+00	8.87 E-03
	860120 to 860127	* 7.10 E-03	1.01 E-02
	860127 to 860203	* 2.41 E-04	7.68 E-03
	860203 to 860210	* 2.30 E-03	1.21 E-02
	860210 to 860218	*-1.07 E-03	8.94 E-03
	860218 to 860224	* 5.19 E-04	7.70 E-03
	860224 to 860303	*-4.48 E-03	8.90 E-03
	860303 to 860311	*-9.50 E-03	7.84 E-03
	860311 to 860317	* 4.24 E-03	7.56 E-03
	860317 to 860324	* 1.08 E-03	8.07 E-03
	860324 to 860331	*-4.04 E-03	1.03 E-02
	860331 to 860407	* 3.09 E-03	8.00 E-03
	860407 to 860414	*-4.73 E-03	9.46 E-03
	860414 to 860421	*-1.97 E-03	1.09 E-02
	860421 to 860428	*-5.56 E-03	1.11 E-02
	860428 to 860505	* 5.79 E-03	9.27 E-03
	860505 to 860512	8.18 E-01	9.37 E-02
	860512 to 860519	6.43 E-01	7.84 E-02
	860519 to 860527	7.46 E-02	1.66 E-02

* Denotes a result less than the detection limit.

TABLE A-5.2

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
1	860527 to 860602	4.44 E-02	9.60 E-03
	860602 to 860609	* 3.13 E-02	8.48 E-03
	860609 to 860616	* 1.72 E-02	2.10 E-02
	860616 to 860623	* 3.77 E+00 (a)	4.17 E 00
	860623 to 860630	* 0.00 E-01	1.04 E-02
	860630 to 860707	*-2.38 E-03	1.42 E-02
	860707 to 860714	* 0.00 E-01	1.51 E-02
	860714 to 860721	*-3.30 E-03	1.45 E-02
	860721 to 860728	*-1.51 E-03	1.49 E-02
	860728 to 860804	*-4.26 E-03	1.50 E-02
	860804 to 860811	* 8.74 E-03	1.48 E-02
	860811 to 860818	*-7.36 E-03	1.47 E-02
	860818 to 860825	*-6.12 E-03	1.44 E-02
	860825 to 860902	* 1.37 E-03	7.31 E-03
	860902 to 860908	*-7.77 E-03	1.17 E-02
	860908 to 860915	* 4.31 E-03	1.46 E-02
	860915 to 860922	* 7.17 E-04	9.68 E-03
	860922 to 860929	*-4.35 E-03	1.38 E-02
	860929 to 861006	*-3.62 E-03	1.47 E-02
	861006 to 861013	* 3.62 E-03	1.50 E-02
	861013 to 861020	* 1.99 E-03	9.84 E-03
	861020 to 861027	* 0.00 E-01	1.44 E-02
	861027 to 861103	*-1.68 E-03	1.14 E-02
	861103 to 861110	* 4.50 E-03	1.50 E-02
	861110 to 861117	*-2.71 E-03	1.52 E-02
	861117 to 861124	*-2.20 E-03	1.31 E-02
	861124 to 861201	* 0.00 E-02	1.40 E-02
	861201 to 861208	* 3.50 E-03	1.05 E-02
	861208 to 861215	* 3.40 E-03	1.55 E-02
	861215 to 861222	* 1.10 E-02	1.30 E-02
	861222 to 861229	* 7.30 E-03	1.51 E-02

* Denotes a result less than the detection limit.
(a) Results in total pCi; volume not furnished.

TABLE A-5.2 (Cont.)

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
4	860527 to 860602	8.55 E-02	1.49 E-02
	860602 to 860609	2.76 E-02	1.23 E-02
	860609 to 860616	* 1.67 E-02	2.04 E-02
	860616 to 860623	* 8.73 E-03	9.65 E-03
	860623 to 860630 (a)	* 0.00 E-01	1.04 E-02
	860630 to 860707	*-2.35 E-03	1.40 E-02
	860707 to 860714	* 0.00 E-01	1.49 E-02
	860714 to 860721	*-3.24 E-03	1.42 E-02
	860721 to 860728	*-1.50 E-03	1.48 E-02
	860728 to 860804	*-4.19 E-03	1.47 E-02
	860804 to 860811	* 8.58 E-03	1.45 E-02
	860811 to 860818	*-7.18 E-03	1.44 E-02
	860818 to 860825	*-5.98 E-03	1.41 E-02
	860825 to 860902	*-1.36 E-03	7.25 E-03
	860902 to 860908	*-7.63 E-03	1.15 E-02
	860908 to 860915	* 4.25 E-03	1.44 E-02
	860915 to 860922	* 7.07 E-04	9.54 E-03
	860922 to 860929	*-4.27 E-03	1.35 E-02
	860929 to 861006	*-3.56 E-03	1.45 E-02
	861006 to 861013	* 3.58 E-03	1.48 E-02
	861013 to 861020	* 1.95 E-03	9.63 E-03
	861020 to 861027	* 0.00 E-01	1.42 E-02
	861027 to 861103	*-1.64 E-03	1.11 E-02
	861103 to 861110	* 4.40 E-03	1.40 E-02
	861110 to 861117	*-2.67 E-03	1.50 E-02
	861117 to 861124	*-2.20 E-03	1.29 E-02
	861124 to 861201	* 0.00 E-02	1.40 E-02
	861201 to 861208	* 3.50 E-03	1.03 E-02
	861208 to 861215	* 3.30 E-03	1.52 E-02
	861215 to 861222	* 1.10 E-02	1.20 E-02
	861222 to 861229	* 7.20 E-03	1.48 E-02

* Denotes a result less than the detection limit.
(a) Slightly shortened sampling time due to electrical work at site.

TABLE A-5.2 (Con't.)

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
5	860527 to 860602	7.45 E-02	1.34 E-02
	860602 to 860609	3.10 E-02	9.00 E-03
	860609 to 860616	* 1.67 E-02	2.04 E-02
	860616 to 860623	* 8.78 E-03	9.70 E-03
	860623 to 860630	* 0.00 E-01	1.03 E-02
	860630 to 860707	*-2.36 E-03	1.40 E-02
	860707 to 860714	* 0.00 E-01	1.50 E-02
	860714 to 860721	*-3.26 E-03	1.43 E-02
	860721 to 860728	*-1.50 E-03	1.48 E-02
	860728 to 860804	*-4.21 E-03	1.48 E-02
	860804 to 860811	* 8.63 E-03	1.46 E-02
	860811 to 860818	*-7.22 E-03	1.44 E-02
	860818 to 860825	*-6.03 E-03	1.42 E-02
	860825 to 860902	*-1.36 E-03	7.25 E-03
	860902 to 860908	*-7.67 E-03	1.15 E-02
	860908 to 860915	* 4.25 E-03	1.44 E-02
	860915 to 860922	* 7.08 E-04	9.55 E-03
	860922 to 860929	*-4.29 E-03	1.36 E-02
	860929 to 861006	*-3.58 E-03	1.46 E-02
	861006 to 861013	* 3.59 E-03	1.49 E-02
	861013 to 861020	* 1.96 E-03	9.68 E-03
	861020 to 861027	* 0.00 E-01	1.42 E-02
	861027 to 861103	*-1.66 E-03	1.13 E-02
	861103 to 861110	* 4.40 E-03	1.40 E-02
	861110 to 861117	*-2.69 E-03	1.51 E-02
	861117 to 861124	*-2.20 E-03	1.30 E-02
	861124 to 861201	* 0.00 E-02	1.40 E-02
	861201 to 861208	* 3.50 E-03	1.04 E-02
	861208 to 861215	* 3.30 E-03	1.53 E-02
	861215 to 861222	* 1.10 E-02	1.20 E-02
	861222 to 861229	* 7.20 E-03	1.49 E-02

* Denotes a result less than the detection limit.

TABLE A-5.2 (Cont.)

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
6	860529 to 860602	7.10 E-02	1.56 E-02
	860602 to 860609	3.15 E-02	9.20 E-03
	860609 to 860616	* 1.69 E-02	2.07 E-02
	860616 to 860623	* 8.89 E-03	9.83 E-03
	860623 to 860630	* 0.00 E-01	1.04 E-02
	860630 to 860707	*-2.38 E-03	1.41 E-02
	860707 to 860714	* 0.00 E-01	1.51 E-02
	860714 to 860721	*-3.28 E-03	1.44 E-02
	860721 to 860728	*-1.51 E-03	1.50 E-02
	860728 to 860804	*-4.25 E-03	1.50 E-02
	860804 to 860811	* 8.71 E-03	1.47 E-02
	860811 to 860818	*-7.36 E-03	1.47 E-02
	860818 to 860825	*-6.08 E-03	1.43 E-02
	860825 to 860902	* 1.37 E-03	7.33 E-03
	860902 to 860908	*-7.74 E-03	1.17 E-02
	860908 to 860915	* 4.29 E-03	1.45 E-02
	860915 to 860922	* 7.15 E-04	9.64 E-03
	860922 to 860929	*-4.33 E-03	1.38 E-02
	860929 to 861006	*-3.61 E-03	1.47 E-02
	861006 to 861013	* 3.63 E-03	1.50 E-02
	861013 to 861020	* 2.09 E-03	1.03 E-02
	861020 to 861027	* 0.00 E-01	1.45 E-02
	861027 to 861103	*-1.68 E-03	1.14 E-02
	861103 to 861110	* 4.40 E-03	1.50 E-02
	861110 to 861117	*-2.70 E-03	1.51 E-02
	861117 to 861124	*-2.20 E-03	1.31 E-03
	861124 to 861201	* 0.00 E-02	1.40 E-02
	861201 to 861208	* 3.50 E-03	1.05 E-02
	861208 to 861215	* 3.40 E-03	1.55 E-02
	861215 to 861222	* 1.10 E-02	1.30 E-02
	861222 to 861229	* 7.30 E-03	1.51 E-02

* Denotes a result less than the detection limit.

TABLE A-5.2 (Cont.)

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
7	860527 to 860602	1.01 E-01	1.10 E-02
	860602 to 860609	2.18 E-02	1.21 E-02
	860609 to 860616	* 1.11 E-02	1.64 E-02
	860616 to 860623	* 3.95 E-03	1.14 E-02
	860623 to 860630	* 0.00 E-01	7.26 E-03
	860630 to 860707	*-1.26 E-03	7.50 E-03
	860707 to 860714	* 0.00 E-01	1.51 E-02
	860714 to 860721	*-1.74 E-03	7.65 E-03
	860721 to 860728	*-8.22 E-04	8.13 E-03
	860728 to 860804	*-2.25 E-03	7.93 E-03
	860804 to 860811	* 4.89 E-03	8.28 E-03
	860811 to 860818	*-3.91 E-03	7.83 E-03
	860818 to 860825	*-3.23 E-03	7.58 E-03
	860825 to 860902	* 9.36 E-04	5.00 E-03
	860902 to 860908	*-4.49 E-03	6.75 E-03
	860908 to 860915	* 2.28 E-03	7.70 E-03
	860915 to 860922	* 4.12 E-04	5.56 E-03
	860922 to 860929	*-2.30 E-03	7.31 E-03
	860929 to 861006	*-1.92 E-03	7.81 E-03
	861006 to 861013	* 1.92 E-03	7.94 E-03
	861013 to 861020	* 1.14 E-03	5.64 E-03
	861020 to 861027	* 0.00 E-01	7.69 E-03
	861027 to 861103	*-1.68 E-03	1.14 E-02
	861103 to 861110	* 2.40 E-03	7.70 E-03
	861110 to 861117	*-1.43 E-03	8.03 E-03
	861117 to 861124	*-1.20 E-03	7.00 E-03
	861124 to 861201	* 0.00 E-03	7.40 E-03
	861201 to 861208	* 2.00 E-03	6.10 E-03
	861208 to 861215	* 1.80 E-03	8.20 E-03
	861215 to 861222	* 7.50 E-03	8.40 E-03
	861222 to 861229	* 3.90 E-03	8.00 E-03

* Denotes a result less than the detection limit.

TABLE A-5.2 (Cont.)

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
8	860527 to 860602	8.69 E-02	1.88 E-02
	860602 to 860609	* 1.89 E-02	1.68 E-02
	860609 to 860616	* 1.08 E-02	1.59 E-02
	860616 to 860623	* 3.86 E-03	1.11 E-02
	860623 to 860630	* 4.99 E-04	9.91 E-03
	860630 to 860707	* 6.50 E-03	1.03 E-02
	860707 to 860714	*-6.10 E-03	1.02 E-02
	860714 to 860721	*-4.44 E-03	1.04 E-02
	860721 to 860728	*-2.89 E-03	1.02 E-02
	860728 to 860804	*-7.28 E-03	1.03 E-02
	860804 to 860811	*-1.06 E-02	1.03 E-02
	860811 to 860818	*-9.75 E-03	1.01 E-02
	860818 to 860825	* 6.56 E-03	1.04 E-02
	860825 to 860902	* 7.77 E-05	5.71 E-03
	860902 to 860908	* 2.01 E-02	2.31 E-02
	860908 to 860915	* 2.59 E-04	1.03 E-02
	860915 to 860922	* 2.86 E-03	1.39 E-02
	860922 to 860929	*-4.06 E-03	1.03 E-02
	860929 to 861006	* 3.83 E-03	1.05 E-02
	861006 to 861013	*-5.10 E-03	1.06 E-02
	861013 to 861020	*-5.13 E-03	1.48 E-02
	861020 to 861027	*-8.87 E-04	1.02 E-02
	861027 to 861103	* 8.58 E-03	1.55 E-02
	861103 to 861110	*-1.10 E-03	1.00 E-02
	861110 to 861117 (a)	*-5.00 E-03	2.06 E-02
	861117 to 861124	* 2.50 E-03	1.04 E-02
	861124 to 861201	*-2.20 E-03	1.00 E-02
	861201 to 861208	*-6.10 E-03	1.48 E-02
	861208 to 861215	* 1.40 E-03	1.04 E-02
	861215 to 861222	* 8.20 E-03	9.30 E-03
	861222 to 861229	*-4.20 E-04	1.05 E-02

* Denotes a result less than the detection limit.
(a) Shortened sampling time due to power outage.

TABLE A-5.2 (Cont.)

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
9	860527 to 860602	6.31 E-02	1.42 E-02
	860602 to 860609	* 1.37 E-02	1.67 E-02
	860609 to 860616	* 1.08 E-02	1.60 E-02
	860616 to 860623	* 3.89 E-03	1.12 E-02
	860623 to 860630	* 5.04 E-04	1.00 E-02
	860630 to 860707	* 6.54 E-03	1.04 E-02
	860707 to 860714	*-6.13 E-03	1.02 E-02
	860714 to 860721	*-4.41 E-03	1.04 E-02
	860721 to 860728	*-2.91 E-03	1.03 E-02
	860728 to 860804	*-7.49 E-03	1.06 E-02
	860804 to 860811	*-1.05 E-02	1.02 E-02
	860811 to 860818	*-9.81 E-03	1.01 E-02
	860818 to 860825	* 6.60 E-03	1.05 E-02
	860825 to 860902	* 7.83 E-05	5.75 E-03
	860902 to 860908	* 2.02 E-02	2.33 E-02
	860908 to 860915	* 2.61 E-04	1.04 E-02
	860915 to 860922	* 2.86 E-03	1.39 E-02
	860922 to 860929	*-4.08 E-03	1.03 E-02
	860929 to 861006	* 3.87 E-03	1.07 E-02
	861006 to 861013	*-5.13 E-03	1.07 E-02
	861013 to 861020	*-5.16 E-03	1.48 E-02
	861020 to 861027	*-8.95 E-04	1.03 E-02
	861027 to 861103	* 8.60 E-03	1.56 E-02
	861103 to 861110	*-1.00 E-03	1.00 E-02
	861110 to 861117	*-2.58 E-03	1.07 E-02
	861117 to 861124	* 2.20 E-03	9.30 E-03
	861124 to 861201	*-2.30 E-03	1.01 E-02
	861201 to 861208	*-6.20 E-03	1.49 E-02
	861208 to 861215	* 1.41 E-03	1.05 E-02
	861215 to 861222	* 8.30 E-03	9.30 E-03
	861222 to 861229	*-4.20 E-04	1.06 E-02

* Denotes a result less than the detection limit.

TABLE A-5.2 (Cont.)

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
21	860527 to 860602	7.05 E-02	1.39 E-02
	860602 to 860609	* 2.77 E-02	2.12 E-02
	860609 to 860616	* 1.09 E-02	1.61 E-02
	860616 to 860623	* 3.96 E-03	1.14 E-02
	860623 to 860630	* 5.01 E-04	9.95 E-03
	860630 to 860707	* 6.60 E-03	1.05 E-02
	860707 to 860714	*-6.18 E-03	1.03 E-02
	860714 to 860721	*-4.49 E-03	1.06 E-02
	860721 to 860728	*-2.92 E-03	1.03 E-02
	860728 to 860804	*-7.44 E-03	1.06 E-02
	860804 to 860811	*-1.07 E-02	1.04 E-02
	860811 to 860818	*-9.97 E-03	1.03 E-02
	860818 to 860825	* 6.67 E-03	1.06 E-02
	860825 to 860902	* 7.86 E-05	5.77 E-03
	860902 to 860908	* 2.05 E-02	2.36 E-02
	860908 to 860915	* 2.64 E-04	1.05 E-02
	860915 to 860922	* 2.90 E-03	1.41 E-02
	860922 to 860929	*-4.14 E-03	1.04 E-02
	860929 to 861006 (a)	* 1.25 E-02	3.45 E-02
	861006 to 861013	*-5.16 E-03	1.08 E-02
	861013 to 861020	*-5.23 E-03	1.50 E-02
	861020 to 861027	*-8.97 E-04	1.03 E-02
	861027 to 861103 (a)	* 8.66 E-03	1.57 E-02
	861103 to 861110	*-1.40 E-03	1.30 E-02
	861110 to 861117	*-1.44 E-02	5.96 E-02
	861117 to 861124	* 2.30 E-03	9.40 E-03
	861124 to 861201	*-2.30 E-03	1.02 E-02
	861201 to 861208	*-6.20 E-03	1.51 E-02
	861208 to 861215	* 1.43 E-03	1.05 E-02
	861215 to 861222	* 8.40 E-03	9.40 E-03
	861222 to 861229	*-4.30 E-04	1.07 E-02

* Denotes a result less than the detection limit.
(a) Shortened sampling time due to power outage.

TABLE A-5.2 (Cont.)

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
23	860527 to 860602	7.86 E-02	1.72 E-02
	860602 to 860609	3.21 E-02	1.45 E-02
	860609 to 860616	* 4.69 E-02	3.30 E-02
	860616 to 860623	* 3.37 E-03	1.56 E-02
	860623 to 860630	* 5.03 E-04	1.00 E-02
	860630 to 860707	* 6.58 E-03	1.05 E-02
	860707 to 860714	*-6.18 E-03	1.03 E-02
	860714 to 860721	*-4.49 E-03	1.06 E-02
	860721 to 860728	*-2.92 E-03	1.03 E-02
	860728 to 860804	*-7.43 E-03	1.05 E-02
	860804 to 860811	*-1.07 E-02	1.04 E-02
	860811 to 860818	*-9.97 E-03	1.03 E-02
	860818 to 860825	* 6.75 E-03	1.07 E-02
	860825 to 860902	* 7.85 E-05	5.76 E-03
	860902 to 860908	* 2.05 E-02	2.35 E-02
	860908 to 860915	* 2.63 E-04	1.05 E-02
	860915 to 860922	* 2.89 E-03	1.41 E-02
	860922 to 860929	*-4.13 E-03	1.04 E-02
	860929 to 861006	* 3.89 E-03	1.07 E-02
	861006 to 861013	*-5.14 E-03	1.07 E-02
	861013 to 861020	*-5.23 E-03	1.50 E-02
	861020 to 861027	*-8.96 E-04	1.03 E-02
	861027 to 861103	* 8.65 E-03	1.57 E-02
	861103 to 861110	*-1.00 E-03	1.00 E-02
	861110 to 861117	*-2.60 E-03	1.07 E-02
	861117 to 861124	* 2.20 E-03	9.40 E-03
	861124 to 861201	*-2.30 E-03	1.02 E-02
	861201 to 861208	*-6.20 E-03	1.51 E-02
	861208 to 861215	* 1.43 E-03	1.05 E-02
	861215 to 861222	* 8.40 E-03	9.40 E-03
	861222 to 861229	*-4.20 E-04	1.07 E-02

* Denotes a result less than the detection limit.

TABLE A-5.2 (Cont.)

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
40	860527 to 860602	7.84 E-02	1.40 E-02
	860602 to 860609	2.62 E-02	1.36 E-02
	860609 to 860616	* 4.63 E-02	3.26 E-02
	860616 to 860623	* 3.29 E-03	1.52 E-02
	860623 to 860630	* 2.90 E-04	5.75 E-03
	860630 to 860707	* 2.24 E-03	1.49 E-02
	860707 to 860714	*-6.11 E-03	1.02 E-02
	860714 to 860721	*-2.54 E-03	5.97 E-03
	860721 to 860728	*-1.67 E-03	5.88 E-03
	860728 to 860804	*-4.19 E-03	5.94 E-03
	860804 to 860811	*-6.08 E-03	5.91 E-03
	860811 to 860818	*-5.61 E-03	5.79 E-03
	860818 to 860825	* 3.77 E-03	5.99 E-03
	860825 to 860902	* 6.75 E-05	4.95 E-03
	860902 to 860908	* 1.08 E-02	1.24 E-02
	860908 to 860915	* 1.49 E-04	5.94 E-03
	860915 to 860922	* 1.51 E-03	7.34 E-03
	860922 to 860929	*-2.34 E-03	5.90 E-03
	860929 to 861006	* 2.20 E-03	6.07 E-03
	861006 to 861013	*-2.93 E-03	6.12 E-03
	861013 to 861020	*-2.73 E-03	7.84 E-03
	861020 to 861027	*-5.11 E-04	5.88 E-03
	861027 tp 861103	* 4.91 E-03	8.89 E-03
	861103 to 861110	*-6.00 E-04	5.90 E-03
	861110 to 861117	*-1.49 E-03	6.13 E-03
	861117 to 861124	* 1.30 E-03	5.30 E-03
	861124 to 861201	*-1.30 E-03	5.80 E-03
	861201 to 861208	*-3.30 E-03	7.90 E-03
	861208 to 861215	* 8.10 E-04	5.99 E-03
	861215 to 861222	* 7.10 E-03	8.00 E-03
	861222 to 861229	*-2.40 E-04	6.06 E-03

* Denotes a result less than the detection limit.

TABLE A-5.2 (Cont.)

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
48	860527 to 860602	1.05 E-01	1.10 E-02
	860602 to 860609	3.14 E-02	1.13 E-02
	860609 to 860616	* 4.61 E-02	3.25 E-02
	860616 to 860623	* 3.28 E-03	1.52 E-02
	860623 to 860630	*-3.09 E-03	1.13 E-02
	860630 to 860707	* 2.24 E-03	1.48 E-02
	860707 to 860714	*-1.22 E-02	1.54 E-02
	860714 to 860721	*-3.71 E-03	1.17 E-02
	860721 to 860728	*-4.64 E-03	1.31 E-02
	860728 to 860804	* 4.20 E-03	1.45 E-02
	860804 to 860811	*-4.57 E-03	1.47 E-02
	860811 to 860818	*-1.24 E-02	1.44 E-02
	860818 to 860825	*-4.14 E-03	1.42 E-02
	860825 to 860902	*-7.53 E-03	1.01 E-02
	860902 to 860908	*-6.48 E-04	1.71 E-02
	860908 to 860915	*-1.36 E-03	6.51 E-03
	860915 to 860922	* 1.27 E-03	1.05 E-02
	860922 to 860929	* 2.94 E-04	1.25 E-02
	860929 to 861006	* 6.92 E-03	1.21 E-02
	861006 to 861013	*-5.38 E-04	1.49 E-02
	861013 to 861020	*-1.06 E-02	1.02 E-02
	861020 to 861027	* 1.79 E-04	1.31 E-02
	861027 to 861103	* 6.77 E-03	1.39 E-02
	861103 to 861110	* 7.30 E-03	1.30 E-02
	861110 to 861117	*-6.03 E-03	9.19 E-03
	861117 to 861124	* 2.90 E-03	1.44 E-02
	861124 to 861201	*-4.50 E-03	6.50 E-03
	861201 to 861208	*-6.90 E-04	1.09 E-02
	861208 to 861215	* 8.60 E-03	1.47 E-02
	861215 to 861222	* 1.60 E-02	2.10 E-02
	861222 to 861229	* 9.50 E-04	1.01 E-02

* Denotes a result less than the detection limit.

TABLE A-5.2 (Cont.)

I-131 IN CHARCOAL FILTER

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
57	860527 to 860602	9.76 E-02	1.29 E-02
	860602 to 860609	3.12 E-02	1.15 E-02
	860609 to 860616	* 4.69 E-02	3.31 E-02
	860616 to 860623	* 3.38 E-03	1.56 E-02
	860623 to 860630	*-3.12 E-03	1.14 E-02
	860630 to 860707	* 2.28 E-03	1.51 E-02
	860707 to 860714	*-1.24 E-02	1.57 E-02
	860714 to 860721	*-3.80 E-03	1.20 E-02
	860721 to 860728	*-4.71 E-03	1.33 E-02
	860728 to 860804	* 4.30 E-03	1.48 E-02
	860804 to 860811	*-4.64 E-03	1.49 E-02
	860811 to 860818	*-1.27 E-02	1.48 E-02
	860818 to 860825	*-4.22 E-03	1.45 E-02
	860825 to 860902	*-7.62 E-03	1.03 E-02
	860902 to 860908	*-6.61 E-04	1.75 E-02
	860908 to 860915	*-1.38 E-03	6.63 E-03
	860915 to 860922	* 1.30 E-03	1.07 E-02
	860922 to 860929	* 3.00 E-04	1.28 E-02
	860929 to 861006	* 7.05 E-03	1.24 E-02
	861006 to 861013	*-5.45 E-04	1.50 E-02
	861013 to 861020	*-1.08 E-02	1.04 E-02
	861020 to 861027	* 1.82 E-04	1.33 E-02
	861027 tp 861103	* 6.89 E-03	1.41 E-02
	861103 to 861110	* 7.50 E-03	1.30 E-02
	861110 to 861117	*-6.10 E-03	9.31 E-03
	861117 to 861124	* 3.00 E-03	1.47 E-02
	861124 to 861201	*-4.60 E-03	6.60 E-03
	861201 to 861208	*-7.00 E-04	1.11 E-02
	861208 to 861215	* 8.70 E-03	1.50 E-02
	861215 to 861222	* 1.60 E-02	2.20 E-03
	861222 to 861229	* 9.70 E-04	1.03 E-02

* Denotes a result less than the detection limit.

TABLE A-5.3

IODINE 131 ON CHARCOAL FILTER

Results in pCi/cubic meter

Indicator Stations

Average Results (without control) = 0.031

Low = -0.024 High = 0.818

52 Positive Results in 574 Samples

Control Stations

Average Results = 0.026

Low = -0.011 High = 0.639

4 Positive Results in 52 Samples

TABLE A-6.1

GROSS BETA IN WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
26	851218 to 860122	* 1.02 E+00	1.04 E+00
	860122 to 860219	* 2.60 E+00	1.34 E+00
	860219 to 860319	* 1.27 E+00	1.15 E+00
	860319 to 860423	* 1.51 E+00	1.20 E+00
	860423 to 860521	* 1.10 E+00	1.10 E+00
27	851218 to 860122	4.63 E+00	1.83 E+00
	860122 to 860219	* 3.62 E+00	1.61 E+00
	860219 to 860319	* 1.40 E+00	1.24 E+00
	860319 to 860423(a)		
	860423 to 860521(a)		
28	851218 to 860122	* 1.96 E+00	1.28 E+00
	860122 to 860219	* 1.42 E+00	1.16 E+00
	860219 to 860319	* 1.73 E+00	1.18 E+00
	860319 to 860423	* 2.01 E+00	1.30 E+00
	860423 to 860521	* 5.87 E+00	9.87 E+00
29	851218 to 860122	* 1.76 E+00	1.28 E+00
	860122 to 860219	* 2.00 E+00	1.28 E+00
	860219 to 860319	6.66 E+00	2.11 E+00
	860319 to 860423	* 1.55 E+00	1.26 E+00
	860423 to 860521	* 1.78 E+00	1.18 E+00
72	851218 to 860122	* 3.11 E+00	1.56 E+00
	860122 to 860219(b)		
	860219 to 860319	* 2.23 E+00	1.32 E+00
	860319 to 860423(a)		
	860423 to 860521(a)		

*Denotes a result less than the detection limit.
(a)Sample not collected due to plant outage.
(b)Not enough discharge for this duplicate.

TABLE A-6.2

GROSS BETA IN WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
26	860521 to 860618	3.10 E+00	1.90 E+00
	860618 to 860723	2.20 E+00	7.00 E-01
	860723 to 860820	2.10 E+00	7.00 E-01
	860820 to 860923	2.10 E+00	7.00 E-01
	860923 to 861022	1.90 E+00	7.00 E-01
	861022 to 861118	* 9.30 E-01	8.38 E-01
	861118 to 861217	1.40 E+00	8.00 E-01
27	860521 to 860618	7.40 E+00	1.40 E+00
	860618 to 860723	5.90 E+00	1.10 E+00
	860723 to 860820	1.60 E+01	2.00 E+00
	860820 to 860923	1.20 E+01	3.00 E+00
	860923 to 861022	1.70 E+01	2.00 E+00
	861022 to 861118	2.80 E+01	3.00 E+00
	861118 to 861217	2.00 E+01	2.00 E+00
	861217 to 861223	2.60 E+01	3.00 E+00
28	860521 to 860618	* 2.10 E+00	1.69 E+00
	860618 to 860618	1.70 E+00	6.00 E-01
	860723 to 860820(a)		
	860820 to 860923	2.50 E+00	8.00 E-01
	860923 to 861022	1.80 E+00	7.00 E-01
	861022 to 861118	1.90 E+00	9.00 E-01
	861118 to 861217	2.70 E+00	9.00 E-01
29	860521 to 860618	2.50 E+00	1.88 E+00
	860618 to 860723	1.60 E+00	7.00 E-01
	860723 to 860820	2.30 E+00	7.00 E-01
	860820 to 860923	2.10 E+00	8.00 E-01
	860923 to 861022	1.80 E+00	7.00 E-01
	861022 to 861118	3.10 E+00	1.10 E+00
	861118 to 861217	2.70 E+00	9.00 E-01
72	860521 to 860618(a)		
	860618 to 860723	3.30 E+00	8.00 E-01
	860723 to 860820	1.50 E+01	3.00 E+00
	860820 to 860923	9.80 E+00	1.60 E+00
	860923 to 861022	1.70 E+01	2.00 E+00
	861022 to 861118	2.60 E+01	3.00 E+00
	861118 to 861217(a)		

*Denotes a result less than the detection limit.
(a)Sample not collected.

TABLE A-6.3

GROSS BETA IN WATER

Results in pCi/liter

Indicator Station*

Average Results (without control) = 5.75

Low = 0.59 E+00 High = 2.80 E+01

22 Positive Results in 37 Samples

Control Stations

Average Results for Control = 1.77

Low = 0.93 E+00 High = 3.10 E+00

6 Positive Results in 12 Samples

*Without duplicate Station 72

TABLE A-7.1

TRITIUM IN WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
26	851218 to 860319	* 2.08 E+02	2.26 E+02
27	851218 to 860319	* 1.80 E+02	2.25 E+02
28	851218 to 860319	* 2.19 E+02	2.27 E+02
29	851218 to 860319	* 1.20 E+02	2.23 E+02
31	860319 to 860319	*-2.47 E+01	2.09 E+02
32	860319 to 860319	* 1.09 E+02	2.15 E+02
52	860319 to 860319	* 2.00 E+02	2.18 E+02
72	851218 to 860319	* 2.88 E+02	2.29 E+02

*Denotes a result less than the detection limit.

TABLE A-7.2

TRITIUM IN WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
26	860319 to 860423(a)	* 1.50 E+02	1.40 E+02
	860423 to 860521(a)	*-6.10 E+00	9.64 E+01
	860521 to 860618(a)	* 7.80 E+01	6.80 E+01
	860319 to 860618	1.60 E+02	8.00 E+01
	860618 to 860923	1.10 E+02	7.44 E+01
	860923 to 861217	3.00 E+02	1.00 E+02
27	860319 to 860618	6.20 E+02	1.00 E+02
	860521 to 860618(a)	9.00 E+02	8.00 E+01
	860618 to 860923	4.20 E+02	9.00 E+01
	860923 to 861217	1.30 E+02	1.00 E+02
28	860319 to 860423(a)	2.20 E+02	9.00 E+01
	860423 to 860521(a)	* 3.50 E+01	1.30 E+02
	860521 to 860618(a)	1.50 E+02	8.00 E+01
	860319 to 860618	* 1.30 E+02	1.33 E+02
	860618 to 860923	2.30 E+02	7.00 E+01
	860923 to 861217	2.00 E+02	1.10 E+02
29	860319 to 860423(a)	* 6.20 E+01	7.30 E+01
	860423 to 860521(a)	*-2.90 E+01	1.41 E+02
	860521 to 860618(a)	* 4.20 E+01	6.70 E+01
	860319 to 860618	* 1.20 E+02	8.16 E+01
	860618 to 860923	1.90 E+02	7.00 E+01
	860923 to 861217	3.20 E+02	1.10 E+02
72	860319 to 860618(b)		
	860618 to 860923(b)		
	860923 to 861217	2.30 E+02	1.00 E+02
31	860618 (Well-1)	* 8.80 E+01	7.90 E+01
	860923	* 4.10 E+00	7.83 E+01
	861217	* 3.40 E+01	8.53 E+01
32	860618 (Well-2)	* 1.30 E+02	8.00 E+01
	860923	* 5.40 E+01	6.16 E+01
	861217	* 1.00 E+02	7.35 E+01
52	860619 (Well-3)	* 4.70 E+01	8.20 E+01
	860923	2.20 E+02	8.00 E+01
	861217	* 9.40 E+01	8.51 E+01

*Denotes a result less than the detection limit.
(a)Individual sample analyzed instead of composite; not included in data summary Table 5-3.
(b)Sample not collected due to plant outage.

TABLE A-7.3

TRITIUM IN WATER

Results in pCi/liter

Surface/Drinking Water

Indicator Station*

Average Results (without control) = 239.9

Low = 120 High = 620

9 Positive Results in 12 Samples

Control Stations

Average Results for Control = 194.5

Low = -6.1 High = 300

3 Positive Results in 4 Samples

Ground Water

Indicator Stations

Average Result = 87.95

Low = -24.7 High = 220

1 Positive Result in 12 Samples

*Quarterly composites only; without duplicate Station 72.

TABLE A-8.1

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
26	851218 to 860122	La-140	* 5.00 E+00	3.54 E+00
		Co-60	*-1.95 E-01	1.95 E+00
		Fe-59	* 1.07 E+00	2.48 E+00
		Zn-65	*-6.69 E-01	3.28 E+00
		Mn-54	*-1.04 E+00	1.56 E+00
		Co-58	*-1.93 E-01	1.45 E+00
		Nb-95	* 1.87 E-01	1.46 E+00
		Zr-95	*-1.41 E+00	2.24 E+00
		Cs-137	*-1.72 E+00	1.51 E+00
		Cs-134	* 5.76 E-01	1.47 E+00
		Ba-140	*-2.46 E-01	5.60 E+00
	860122 to 860219	La-140	*-4.36 E-01	2.14 E+00
		Co-60	* 2.35 E+00	1.36 E+00
		Fe-59	* 2.78 E+00	3.36 E+00
		Zn-65	* 1.39 E+00	3.80 E+00
		Mn-54	* 7.36 E-01	1.09 E+00
		Co-58	*-8.75 E-01	1.80 E+00
		Nb-95	*-5.60 E-01	1.74 E+00
		Zr-95	*-1.12 E+00	2.66 E+00
		Cs-137	* 1.01 E+00	1.05 E+00
		Cs-134	* 1.53 E+00	1.35 E+00
		Ba-140	*-6.84 E+00	1.50 E+01
	860219 to 860319	La-140	* 8.79 E-01	1.02 E+00
		Co-60	* 9.78 E-02	1.44 E+00
		Fe-59	* 2.23 E+00	4.21 E+00
		Zn-65	* 1.56 E+00	2.90 E+00
		Mn-54	*-2.01 E-01	1.50 E+00
		Co-58	* 1.46 E-01	1.40 E+00
		Nb-95	*-2.41 E-01	1.80 E+00
		Zr-95	*-2.62 E+00	3.34 E+00
		Cs-137	* 8.89 E-01	1.02 E+00
		Cs-134	* 2.19 E-01	1.03 E+00
		Ba-140	* 5.92 E+00	1.05 E+01

* Denotes a result less than the detection limit.

TABLE A-8.1 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
26	860319 to 860423	La-140	*-4.62 E-01	2.09 E+00
		Co-60	* 1.36 E+00	1.04 E+00
		Fe-59	*-2.28 E+00	3.08 E+00
		Zn-65	*-2.17 E+00	3.82 E+00
		Mn-54	*-6.50 E-02	1.48 E+00
		Co-58	*-7.07 E-01	1.35 E+00
		Nb-95	* 9.30 E-01	1.07 E+00
		Zr-95	* 1.95 E+00	1.32 E+00
		Cs-137	* 5.33 E-01	9.34 E-01
		Cs-134	*-1.01 E+00	1.75 E+00
		Ba-140	* 2.92 E+00	5.15 E+00
	860423 to 860521	La-140	*-7.93 E-01	2.06 E+00
		Co-60	*-6.49 E-01	2.08 E+00
		Fe-59	* 2.26 E+00	3.35 E+00
		Zn-65	*-5.78 E-01	2.37 E+00
		Mn-54	* 1.46 E-01	1.40 E+00
		Co-58	*-1.75 E+00	1.84 E+00
		Nb-95	* 1.49 E+00	1.55 E+00
		Zr-95	*-1.36 E-01	3.11 E+00
		Cs-137	* 9.13 E-01	1.41 E+00
		Cs-134	* 2.07 E+00	1.89 E+00
		Ba-140	*-5.74 E+00	1.58 E+01

* Denotes a result less than the detection limit.

TABLE A-8.1 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
27	851218 to 860122	La-140	* 2.87 E+00	2.87 E+00
		Co-60	*-6.46 E-01	2.07 E+00
		Fe-59	* 3.39 E+00	2.16 E+00
		Zn-65	* 1.11 E+00	3.72 E+00
		Mn-54	*-4.96 E-01	1.54 E+00
		Co-58	*-1.41 E-01	1.35 E+00
		Nb-95	*-2.18 E+00	1.93 E+00
		Zr-95	*-3.69 E+00	3.00 E+00
		Cs-137	*-1.95 E-01	1.46 E+00
		Cs-134	*-3.15 E-01	1.41 E+00
		Ba-140	*-5.81 E+00	6.94 E+00
	860122 to 860219	La-140	* 1.60 E+00	1.42 E+00
		Co-60	* 1.30 E+00	1.06 E+00
		Fe-59	*-1.65 E+00	3.49 E+00
		Zn-65	* 3.08 E+00	2.19 E+00
		Mn-54	*-1.46 E+00	1.70 E+00
		Co-58	*-5.57 E-01	1.73 E+00
		Nb-95	*-7.00 E-01	2.21 E+00
		Zr-95	*-6.82 E-01	3.01 E+00
		Cs-137	* 3.91 E-01	1.20 E+00
		Cs-134	* 7.16 E-01	1.25 E+00
		Ba-140	* 1.05 E+00	1.27 E+01
	860219 to 860319	La-140	* 2.25 E+00	1.70 E+00
		Co-60	*-1.08 E-01	1.53 E+00
		Fe-59	*-3.09 E+00	4.17 E+00
		Zn-65	*-1.16 E+00	3.36 E+00
		Mn-54	* 0.00 E+00	1.37 E+00
		Co-58	* 1.04 E+00	1.34 E+00
		Nb-95	* 0.00 E+00	1.65 E+00
		Zr-95	* 4.10 E-01	1.93 E+00
		Cs-137	* 1.44 E+00	1.50 E+00
		Cs-134	*-8.76 E-01	1.67 E+00
		Ba-140	* 1.48 E+01	1.20 E+01
	860319 to 860423	(a)		
	860423 to 860521	(a)		

* Denotes a result less than the detection limit.
(a) No sample collected.

TABLE A-8.1 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
28	851218 to 860122	La-140	*-2.73 E+00	3.54 E+00
		Co-60	*-1.66 E+00	2.15 E+00
		Fe-59	* 0.00 E+00	3.11 E+00
		Zn-65	*-4.51 E+00	3.39 E+00
		Mn-54	* 7.15 E-01	1.06 E+00
		Co-58	*-1.03 E+00	1.55 E+00
		Nb-95	* 4.97 E-01	1.27 E+00
		Zr-95	*-3.26 E+00	3.11 E+00
		Cs-137	* 2.13 E+00	1.01 E+00
		Cs-134	* 0.00 E+00	1.35 E+00
		Ba-140	*-4.90 E-01	6.42 E+00
	860122 to 860219	La-140	* 8.78 E-01	1.01 E+00
		Co-60	* 4.89 E-01	1.54 E+00
		Fe-59	* 1.86 E-01	2.73 E+00
		Zn-65	* 3.12 E+00	2.09 E+00
		Mn-54	* 3.08 E+00	1.30 E+00
		Co-58	*-1.97 E+00	1.88 E+00
		Nb-95	* 1.84 E+00	1.52 E+00
		Zr-95	*-2.25 E+00	2.96 E+00
		Cs-137	*-5.33 E-01	1.27 E+00
		Cs-134	* 1.24 E+00	1.29 E+00
		Ba-140	* 1.97 E+00	1.33 E+01
	860219 to 860319	La-140	*-1.67 E-01	2.37 E+00
		Co-60	* 4.51 E-01	6.38 E-01
		Fe-59	*-3.81 E+00	5.01 E+00
		Zn-65	* 2.57 E+00	3.31 E+00
		Mn-54	* 6.72 E-01	1.18 E+00
		Co-58	* 3.26 E-01	1.60 E+00
		Nb-95	*-1.43 E+00	2.15 E+00
		Zr-95	*-5.58 E-01	2.50 E+00
		Cs-137	* 6.64 E-02	1.54 E+00
		Cs-134	* 8.14 E-02	1.10 E+00
		Ba-140	* 5.29 E-01	6.52 E+00

* Denotes a result less than the detection limit.

TABLE A-8.1 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
28	860319 to 860423	La-140	* 1.84 E+00	1.52 E+00
		Co-60	* 1.36 E+00	1.04 E+00
		Fe-59	*-3.35 E+00	3.51 E+00
		Zn-65	*-6.68 E-01	3.27 E+00
		Mn-54	*-4.55 E-01	1.41 E+00
		Co-58	*-4.50 E-01	1.40 E+00
		Nb-95	*-1.42 E+00	1.64 E+00
		Zr-95	* 2.82 E+00	1.59 E+00
		Cs-137	*-3.55 E-01	1.52 E+00
		Cs-134	* 2.16 E-01	1.69 E+00
		Ba-140	* 7.27 E-01	5.69 E+00
	860423 to 860521	La-140	* 1.70 E+00	3.17 E+00
		Co-60	*-4.94 E+00	3.03 E+00
		Fe-59	* 1.20 E+00	3.77 E+00
		Zn-65	* 2.23 E+00	2.01 E+00
		Mn-54	* 2.49 E+00	1.75 E+00
		Co-58	* 8.41 E-01	1.47 E+00
		Nb-95	*-2.97 E+00	3.26 E+00
		Zr-95	* 3.84 E+00	2.25 E+00
		Cs-137	* 7.63 E-02	1.77 E+00
		Cs-134	* 1.59 E+00	1.66 E+00
		Ba-140	* 9.83 E+00	1.26 E+01

* Denotes a result less than the detection limit.

TABLE A-8.1 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
29	851218 to 860122	La-140	*-6.82 E+00	5.47 E+00
		Co-60	*-9.69 E-01	1.26 E+00
		Fe-59	* 5.08 E-01	2.39 E+00
		Zn-65	*-5.76 E+00	4.68 E+00
		Mn-54	* 0.00 E+00	1.33 E+00
		Co-58	* 7.03 E-01	1.46 E+00
		Nb-95	*-3.74 E+00	2.31 E+00
		Zr-95	*-5.95 E-01	2.63 E+00
		Cs-137	* 1.04 E+00	1.43 E+00
		Cs-134	*-8.65 E-01	1.65 E+00
		Ba-140	*-5.77 E+00	6.89 E+00
	860122 to 860219	La-140	* 0.00 E+00	1.15 E+00
		Co-60	*-3.61 E+00	2.71 E+00
		Fe-59	*-1.69 E+00	3.58 E+00
		Zn-65	* 1.97 E-01	2.68 E+00
		Mn-54	* 1.34 E+00	9.00 E-01
		Co-58	* 2.45 E-01	1.15 E+00
		Nb-95	* 2.68 E-01	2.10 E+00
		Zr-95	* 5.57 E-01	2.73 E+00
		Cs-137	*-7.97 E-01	2.06 E+00
		Cs-134	* 1.22 E+00	1.40 E+00
		Ba-140	*-6.81 E+00	1.46 E+01
	860219 to 860319	La-140	* 7.36 E-01	2.46 E+00
		Co-60	* 2.93 E-01	1.49 E+00
		Fe-59	* 2.05 E+00	3.21 E+00
		Zn-65	*-2.60 E+00	3.90 E+00
		Mn-54	* 8.70 E-01	1.12 E+00
		Co-58	* 2.34 E+00	1.18 E+00
		Nb-95	* 8.03 E-01	1.67 E+00
		Zr-95	* 7.50 E-01	2.50 E+00
		Cs-137	* 1.19 E-01	1.59 E+00
		Cs-134	*-6.56 E-01	1.56 E+00
		Ba-140	* 3.47 E+00	1.20 E+01

* Denotes a result less than the detection limit.

TABLE A-8.1 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
29	860319 to 860423	La-140	*-4.55 E+00	3.43 E+00
		Co-60	* 8.61 E-01	8.65 E-01
		Fe-59	* 5.06 E-01	2.39 E+00
		Zn-65	*-9.28 E-01	2.17 E+00
		Mn-54	*-1.77 E+00	1.86 E+00
		Co-58	*-5.61 E-01	1.19 E+00
		Nb-95	*-6.77 E-01	1.69 E+00
		Zr-95	*-2.37 E+00	2.78 E+00
		Cs-137	* 0.00 E+00	1.22 E+00
		Cs-134	* 7.08 E-01	1.24 E+00
		Ba-140	*-1.30 E+00	6.75 E+00
	860423 to 860521	La-140	*-1.52 E+00	3.57 E+00
		Co-60	* 3.90 E-01	1.98 E+00
		Fe-59	* 2.63 E+00	4.12 E+00
		Zn-65	*-4.24 E+00	4.87 E+00
		Mn-54	*-3.51 E+00	2.60 E+00
		Co-58	* 0.00 E+00	1.76 E+00
		Nb-95	*-6.16 E-01	2.63 E+00
		Zr-95	* 4.80 E+00	2.53 E+00
		Cs-137	* 1.07 E+00	8.14 E-01
		Cs-134	* 1.96 E+00	1.74 E+00
		Ba-140	* 1.23 E+00	1.08 E+01

* Denotes a result less than the detection limit.

TABLE A-8.1 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
31	860319 to 860319	La-140	*-2.13 E-01	3.02 E+00
		Co-60	* 2.24 E-01	4.49 E-01
		Fe-59	*-1.02 E+00	2.97 E+00
		Zn-65	* 1.90 E-01	2.57 E+00
		Mn-54	*-3.62 E-01	1.60 E+00
		Co-58	* 7.82 E-01	1.16 E+00
		Nb-95	* 7.47 E-01	1.10 E+00
		Zr-95	* 1.20 E+00	2.49 E+00
		Cs-137	*-1.26 E+00	1.29 E+00
		Cs-134	*-4.10 E+00	2.32 E+00
		Ba-140	*-1.31 E+01	8.42 E+00

* Denotes a result less than the detection limit.

TABLE A-8.1 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
32	860319 to 860319	La-140	* 0.00 E+00	1.01 E+00
		Co-60	* 6.81 E-01	1.58 E+00
		Fe-59	* 2.40 E+00	1.70 E+00
		Zn-65	*-2.17 E+00	3.80 E+00
		Mn-54	* 9.08 E-01	1.40 E+00
		Co-58	*-1.72 E+00	1.64 E+00
		Nb-95	* 5.47 E-01	9.57 E-01
		Zr-95	* 8.58 E-01	2.19 E+00
		Cs-137	*-7.70 E-01	1.65 E+00
		Cs-134	* 5.75 E-01	1.47 E+00
		Ba-140	* 9.19 E-01	4.50 E+00

* Denotes a result less than the detection limit.

TABLE A-8.1 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
52	860319 to 860319	La-140	* 3.60 E+00	2.41 E+00
		Co-60	* 1.29 E+00	1.06 E+00
		Fe-59	*-6.64 E-01	2.97 E+00
		Zn-65	* 1.48 E+00	1.48 E+00
		Mn-54	* 1.06 E+00	1.22 E+00
		Co-58	*-7.64 E-01	1.46 E+00
		Nb-95	*-1.73 E+00	1.94 E+00
		Zr-95	* 4.69 E-01	2.30 E+00
		Cs-137	* 1.95 E-01	1.53 E+00
		Cs-134	*-1.65 E+00	2.10 E+00
		Ba-140	* 3.92 E+00	5.00 E+00

* Denotes a result less than the detection limit.

TABLE A-8.1 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
72	851218 to 860122	La-140	* 2.86 E+00	2.86 E+00
		Co-60	*-2.02 E+00	1.85 E+00
		Fe-59	*-1.74 E-01	2.25 E+00
		Zn-65	*-1.90 E+00	3.14 E+00
		Mn-54	* 1.23 E+00	1.28 E+00
		Co-58	*-5.04 E-01	1.56 E+00
		Nb-95	* 1.25 E+00	8.35 E-01
		Zr-95	* 7.29 E-01	2.43 E+00
		Cs-137	* 5.31 E-01	1.35 E+00
		Cs-134	* 1.77 E+00	1.07 E+00
		Ba-140	* 0.00 E+00	6.32 E+00
	860219 to 860319	La-140	*-5.05 E-01	2.28 E+00
		Co-60	* 1.13 E+00	1.01 E+00
		Fe-59	* 0.00 E+00	3.97 E+00
		Zn-65	*-2.17 E+00	4.14 E+00
		Mn-54	* 1.12 E+00	1.29 E+00
		Co-58	* 1.31 E+00	9.27 E-01
		Nb-95	* 8.08 E-01	1.41 E+00
		Zr-95	*-1.26 E+00	2.98 E+00
		Cs-137	* 7.97 E-01	1.41 E+00
		Cs-134	* 1.79 E+00	1.09 E+00
		Ba-140	*-2.65 E+00	1.05 E-01

* Denotes a result less than the detection limit.

TABLE A-8.2 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
26	08/20/86 to 09/23/86	Be-7	*-2.03 E+00	1.82 E+01
		K-40	* 1.03 E+02	2.33 E+01
		Mn-54	* 1.42 E-01	1.67 E+00
		Co-58	* 1.69 E+00	1.70 E+00
		Fe-59	* 2.33 E+00	3.67 E+00
		Co-60	* 3.36 E-01	1.76 E+00
		Zn-65	* 1.19 E-01	3.58 E+00
		Zr-95	* 2.88 E-01	3.58 E+00
		Nb-95	* 2.03 E+00	1.77 E+00
		Cs-134	* 5.14 E-01	1.89 E+00
		Cs-137	* 1.90 E+00	1.79 E+00
		Ba-140	*-1.81 E+00	8.48 E+00
		La-140	*-2.11 E+00	3.30 E+00
	09/23/86 to 10/22/86	Be-7	* 3.70 E+00	1.90 E+01
		K-40	* 5.00 E+01	2.20 E+01
		Mn-54	* 1.40 E+00	1.90 E+00
		Co-58	* 1.10 E+00	2.00 E+00
		Fe-59	*-1.20 E+00	4.20 E+00
		Co-60	* 1.90 E+00	1.90 E+01
		Zn-65	* 5.10 E-01	4.10 E+00
		Zr-95	* 4.30 E-01	4.00 E+00
		Nb-95	* 1.30 E+00	2.00 E+00
		Cs-134	*-5.40 E-01	2.10 E+00
		Cs-137	* 1.20 E-01	2.00 E+00
		Ba-140	* 0.00 E+00	9.40 E+00
		La-140	*-1.60 E+00	4.10 E+00
	10/22/86 to 11/18/86	Be-7	*-3.10 E+00	1.80 E+00
		K-40	* 9.40 E+01	2.30 E+01
		Mn-54	*-3.20 E-01	1.60 E+00
		Co-58	*-1.30 E+00	1.80 E+00
		Fe-59	* 1.70 E+00	3.80 E+00
		Co-60	* 8.00 E-01	2.00 E+00
		Zn-65	*-5.70 E+00	3.80 E+00
		Zr-95	* 8.90 E-02	3.63 E+00
		Nb-95	* 0.00 E+00	1.80 E+00
		Cs-134	*-1.40 E+00	1.90 E+00
		Cs-137	* 4.30 E+00	1.90 E+00
		Ba-140	*-4.60 E+00	7.30 E+00
		La-140	*-1.30 E-01	3.10 E+00

* Denotes a result less than the detection limit.

TABLE A-8.2 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
26	11/18/86 to 12/17/86	Be-7	* 5.60 E+00	2.10 E+01
		K-40	* 9.80 E+01	2.70 E+01
		Mn-54	* 2.20 E+00	1.80 E+00
		Co-58	* 5.30 E-01	1.80 E+00
		Fe-59	*-9.80 E-01	3.80 E+00
		Co-60	* 0.00 E+00	1.80 E+00
		Zn-65	*-3.70 E+00	4.00 E+00
		Zr-95	* 4.20 E+00	4.00 E+00
		Nb-95	* 1.00 E-01	1.90 E+00
		Cs-134	* 1.60 E-01	1.90 E+00
		Cs-137	* 2.70 E+00	2.20 E+00
		Ba-140	* 6.00 E+00	7.90 E+00
		La-140	*-1.10 E+00	4.10 E+00

* Denotes a result less than the detection limit.

TABLE A-8.2 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
27	05/21/86 to 06/18/86	Be-7	*-1.50 E+01	2.45 E+01
		K-40	* 8.98 E+01	2.50 E+01
		Mn-54	* 6.50 E-01	2.18 E+00
		Co-58	* 1.59 E-01	2.24 E+00
		Fe-59	* 1.33 E+00	4.53 E+00
		Co-60	* 9.80 E-02	2.05 E+00
		Zn-65	*-3.54 E-01	4.65 E+00
		Zr-95	*-2.12 E+00	4.77 E+00
		Nb-95	* 1.01 E+00	2.38 E+00
		Cs-134	*-1.72 E+00	2.25 E+00
		Cs-137	* 0.00 E-01	2.27 E+00
		Ba-140	* 4.01 E+00	1.28 E+01
		La-140	*-3.29 E+00	4.93 E+00
	06/18/86 to 07/23/86	Be-7	* 1.50 E+01	2.26 E+01
		K-40	* 8.69 E+01	2.93 E+01
		Mn-54	* 4.23 E+00	2.43 E+00
		Co-58	* 2.68 E+00	2.47 E+00
		Fe-59	* 2.57 E+00	4.63 E+00
		Co-60	*-3.26 E-01	2.39 E+00
		Zn-65	*-4.93 E+00	4.84 E+00
		Zr-95	* 1.62 E-01	4.76 E+00
		Nb-95	* 2.54 E-01	2.50 E+00
		Cs-134	*-1.47 E+00	2.46 E+00
		Cs-137	* 1.06 E+00	2.31 E+00
		Ba-140	* 4.22 E+00	1.15 E+01
		La-140	* 1.88 E+00	5.22 E+00
	07/23/86 to 08/20/86	Be-7	*-4.00 E-01	2.08 E+01
		K-40	* 1.25 E+02	2.67 E+01
		Mn-54	* 3.28 E-01	1.87 E+00
		Co-58	* 7.11 E-01	1.93 E+00
		Fe-59	*-4.23 E-01	3.94 E+00
		Co-60	* 6.05 E-01	1.90 E+00
		Zn-65	*-4.86 E+00	3.88 E+00
		Zr-95	* 0.00 E-01	4.11 E+00
		Nb-95	* 1.71 E+00	2.09 E+00
		Cs-134	* 1.77 E-01	2.02 E+00
		Cs-137	* 1.21 E+00	2.07 E+00
		Ba-140	*-5.71 E+00	9.75 E+00
		La-140	* 2.28 E+00	3.86 E+00

* Denotes a result less than the detection limit.

TABLE A-8.2 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
27	08/20/86 to 09/23/86	Be-7	*-1.90 E+00	1.83 E+01
		K-40	* 7.29 E+01	2.17 E+01
		Mn-54	*-6.17 E-01	1.66 E+00
		Co-58	* 1.20 E-01	1.79 E+00
		Fe-59	* 8.49 E-01	3.86 E+00
		Co-60	* 2.29 E-01	1.73 E+00
		Zn-65	*-2.73 E-01	3.70 E+00
		Zr-95	*-2.09 E+00	3.55 E+00
		Nb-95	* 2.40 E+00	1.88 E+00
		Cs-134	* 7.78 E-01	1.89 E+00
		Cs-137	* 9.18 E-01	1.86 E+00
		Ba-140	* 1.88 E+00	8.70 E+00
		La-140	*-1.94 E+00	3.66 E+00
	09/23/86 to 10/22/86	Be-7	*-8.40 E+00	2.10 E+01
		K-40	* 1.10 E+02	2.70 E+01
		Mn-54	* 2.00 E-01	2.10 E+00
		Co-58	* 0.00 E+00	2.20 E+00
		Fe-59	*-2.30 E+00	4.40 E+00
		Co-60	* 2.70 E+00	2.10 E+00
		Zn-65	*-4.30 E+00	4.20 E+00
		Zr-95	*-1.40 E-01	4.60 E+00
		Nb-95	* 5.60 E-01	2.20 E+00
		Cs-134	* 5.10 E-01	2.20 E+00
		Cs-137	*-1.20 E-01	2.10 E+00
		Ba-140	*-2.20 E+00	1.00 E+01
		La-140	*-3.00 E+00	4.30 E+00
	10/22/86 to 11/18/86	Be-7	* 0.00 E+01	1.90 E+01
		K-40	* 1.20 E+02	2.40 E+01
		Mn-54	* 5.50 E-01	1.80 E+00
		Co-58	* 5.30 E-01	1.80 E+00
		Fe-59	*-9.80 E-01	3.80 E+00
		Co-60	* 0.00 E+00	1.80 E+00
		Zn-65	*-3.70 E+00	4.00 E+00
		Zr-95	* 4.20 E+00	4.00 E+00
		Nb-95	* 1.00 E-01	1.90 E+00
		Cs-134	* 1.60 E-01	1.90 E+00
		Cs-137	* 2.70 E+00	2.20 E+00
		Ba-140	* 6.00 E+00	7.90 E+00
		La-140	*-1.10 E+00	3.30 E+00

* Denotes a result less than the detection limit.

TABLE A-8.2 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
27	11/18/86 to 12/17/86	Be-7	* 1.80 E+01	2.30 E+01
		K-40	* 8.70 E+01	2.40 E+01
		Mn-54	* 6.70 E-01	1.90 E+00
		Co-58	* 0.00 E+00	1.80 E+00
		Fe-59	*-3.30 E-01	4.10 E+00
		Co-60	* 2.80 E-01	2.10 E+00
		Zn-65	*-1.60 E+00	4.50 E+00
		Zr-95	* 5.40 E-01	4.40 E-01
		Nb-95	* 6.20 E-01	2.20 E+00
		Cs-134	* 9.50 E-01	2.30 E+00
		Cs-137	* 1.80 E+00	2.20 E+00
		Ba-140	* 5.50 E+00	9.40 E+00
		La-140	* 1.80 E+00	3.70 E+00
	12/17/86 to 12/23/86	Be-7	*-2.00 E+00	1.82 E+01
		K-40	* 6.20 E+01	1.90 E+01
		Mn-54	* 1.10 E+00	1.80 E+00
		Co-58	* 5.00 E-02	1.87 E-01
		Fe-59	* 2.00 E+00	3.90 E+00
		Co-60	* 2.00 E+00	1.80 E+00
		Zn-65	*-2.60 E+00	4.00 E+00
		Zr-95	*-2.80 E+00	4.00 E+00
		Nb-95	* 2.00 E-01	2.00 E+00
		Cs-134	*-2.70 E+00	2.10 E+00
		Cs-137	* 1.30 E+00	1.80 E+00
		Ba-140	*-5.30 E+00	8.80 E+00
		La-140	*-9.40 E-01	3.70 E+00

* Denotes a result less than the detection limit.

TABLE A-8.2 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
28	05/21/86 to 06/18/86	Be-7	* 9.88 E-01	3.28 E+01
		K-40	* 1.02 E+03	6.43 E+01
		Mn-54	* 1.83 E+00	2.95 E+00
		Co-58	*-7.21 E-01	3.13 E+00
		Fe-59	* 4.86 E+00	6.78 E+00
		Co-60	* 1.35 E+00	2.89 E+00
		Zn-65	*-5.83 E+00	6.78 E+00
		Zr-95	*-4.78 E+00	6.41 E+00
		Nb-95	* 1.70 E+00	3.30 E+00
		Cs-134	* 2.76 E+00	3.35 E+00
		Cs-137	* 3.94 E+00	3.08 E+00
		Ba-140	*-5.65 E+00	1.76 E+01
		La-140	*-1.40 E+00	6.65 E+00
	06/18/86 to 07/23/86	Be-7	* 2.58 E+01	2.55 E+01
		K-40	* 4.36 E+01	2.39 E+01
		Mn-54	* 4.53 E-01	2.11 E+00
		Co-58	*-6.61 E-01	2.13 E+00
		Fe-59	* 2.74 E+00	4.76 E+00
		Co-60	* 3.08 E-01	2.22 E+00
		Zn-65	*-1.16 E+01	5.06 E+00
		Zr-95	* 2.04 E+00	4.82 E+00
		Nb-95	* 1.21 E+00	2.34 E+00
		Cs-134	*-1.47 E+00	2.28 E+00
		Cs-137	*-5.52 E-01	2.32 E+00
		Ba-140	*-3.65 E+00	1.29 E+01
		La-140	* 1.76 E+00	4.44 E+00
	07/23/86 to 08/20/86	(a)		

* Denotes a result less than the detection limit.
(a) Sampler malfunction; no sample available.

TABLE A-8.2 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
28	08/20/86 to 09/23/86	Be-7	*-4.43 E-01	2.20 E+01
		K-40	* 9.83 E+01	2.64 E+01
		Mn-54	* 6.32 E-02	2.03 E+00
		Co-58	*-6.85 E-02	2.19 E+00
		Fe-59	*-3.36 E+00	4.49 E+00
		Co-60	* 3.66 E-01	2.04 E+00
		Zn-65	*-4.02 E+00	4.79 E+00
		Zr-95	* 1.15 E+00	4.33 E+00
		Nb-95	* 1.26 E+00	2.31 E+00
		Cs-134	*-2.73 E-01	2.24 E+00
		Cs-137	* 3.73 E+00	2.15 E+00
		Ba-140	*-3.22 E+00	1.02 E+01
		La-140	*-2.83 E+00	4.27 E+00
	09/23/86 to 10/22/86	Be-7	* 4.60 E+00	2.30 E+01
		K-40	* 1.10 E+02	2.70 E+01
		Mn-54	*-5.00 E-01	2.20 E+00
		Co-58	* 0.00 E+00	2.00 E+00
		Fe-59	* 5.50 E-01	4.60 E+00
		Co-60	* 1.20 E+00	2.10 E+00
		Zn-65	* 0.00 E+00	4.60 E+00
		Zr-95	* 7.20 E-01	4.10 E+00
		Nb-95	* 2.20 E+00	2.40 E+00
		Cs-134	* 4.60 E-01	2.20 E+00
		Cs-137	* 1.00 E+00	2.10 E+00
		Ba-140	*-4.30 E+00	1.00 E+01
		La-140	*-2.90 E+00	4.10 E+00
	10/22/86 to 11/18/86	Be-7	* 1.07 E+01	1.85 E+01
		K-40	* 1.22 E+02	2.49 E+01
		Mn-54	* 1.25 E+00	1.76 E+00
		Co-58	*-1.54 E+00	1.78 E+00
		Fe-59	*-6.16 E-01	3.61 E+00
		Co-60	* 1.43 E-01	1.92 E+00
		Zn-65	*-6.06 E+00	3.95 E+00
		Zr-95	* 1.64 E+00	4.02 E+00
		Nb-95	* 1.55 E+00	2.09 E+00
		Cs-134	*-1.13 E-01	1.96 E+00
		Cs-137	* 4.19 E-01	1.99 E+00
		Ba-140	* 0.00 E-01	7.68 E+00
		La-140	* 1.50 E-01	3.30 E+00

* Denotes a result less than the detection limit.

TABLE A-8.2 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
28	11/18/86-12/17/86	Be-7	* 1.73 E+01	2.02 E+01
		K-40	* 1.28 E+02	2.70 E+01
		Mn-54	* 3.45 E-01	1.91 E+00
		Co-58	*-8.78 E-01	1.97 E+00
		Fe-59	* 0.00 E-01	4.00 E+00
		Co-60	* 1.67 E+00	2.17 E+00
		Zn-65	*-5.35 E+00	4.25 E+00
		Zr-95	* 2.33 E+00	3.92 E+00
		Nb-95	* 2.34 E+00	2.14 E+00
		Cs-134	*-4.50 E-01	2.00 E+00
		Cs-137	* 6.24 E-01	1.99 E+00
		Ba-140	* 1.18 E+00	8.63 E+00

* Denotes a result less than the detection limit.

TABLE A-8.2 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
29	05/21/86 to 06/18/86	Be-7	* 1.27 E+01	2.17 E+01
		K-40	* 6.79 E+01	2.36 E+01
		Mn-54	* 0.00 E-01	2.18 E+00
		Co-58	*-1.18 E+00	2.37 E+00
		Fe-59	*-5.07 E-01	4.67 E+00
		Co-60	* 8.63 E-01	2.08 E+00
		Zn-65	*-4.72 E-01	4.72 E+00
		Zr-95	*-1.25 E+00	4.83 E+00
		Nb-95	* 1.16 E+00	2.36 E+00
		Cs-134	*-2.68 E+00	2.44 E+00
		Cs-137	* 1.74 E+00	2.06 E+00
		Ba-140	* 0.00 E-01	1.22 E+01
		La-140	* 1.13 E+00	5.43 E+00
	06/18/86 to 07/23/86	Be-7	* 9.24 E+00	2.26 E+01
		K-40	* 1.02 E+03	4.65 E+01
		Mn-54	* 1.09 E+00	2.09 E+00
		Co-58	*-2.18 E+00	2.22 E+00
		Fe-59	*-5.40 E-01	4.89 E+00
		Co-60	* 4.72 E-01	2.08 E+00
		Zn-65	*-1.26 E+01	5.06 E+00
		Zr-95	* 2.06 E+00	4.84 E+00
		Nb-95	* 4.06 E-01	2.42 E+00
		Cs-134	* 1.85 E+00	2.41 E+00
		Cs-137	* 3.75 E+00	2.15 E+00
		Ba-140	* 4.95 E+00	1.20 E+01
		La-140	*-2.59 E+00	4.64 E+00
	07/23/86 to 08/20/86	Be-7	* 6.43 E+00	1.79 E+01
		K-40	* 5.34 E+01	2.07 E+01
		Mn-54	* 0.00 E-01	1.68 E+00
		Co-58	* 1.31 E-01	1.91 E+00
		Fe-59	*-7.63 E-01	3.65 E+00
		Co-60	* 1.97 E+00	1.86 E+00
		Zn-65	* 1.75 E+00	3.78 E+00
		Zr-95	* 1.58 E+00	3.89 E+00
		Nb-95	* 4.45 E-01	1.92 E+00
		Cs-134	*-5.22 E-01	1.86 E+00
		Cs-137	* 4.72 E-01	1.73 E+00
		Ba-140	*-6.46 E+00	8.86 E+00
		La-140	*-4.71 E+00	3.78 E+00

* Denotes a result less than the detection limit.

TABLE A-8.2 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
29	08/20/86 to 09/23/86	Be-7	*-3.56 E+00	2.40 E+01
		K-40	* 1.14 E+02	2.59 E+01
		Mn-54	*-5.55 E-01	2.06 E+00
		Co-58	* 6.78 E-01	2.23 E+00
		Fe-59	* 2.51 E+00	4.81 E+00
		Co-60	* 1.44 E+00	2.26 E+00
		Zn-65	*-1.37 E+00	4.48 E+00
		Zr-95	* 1.42 E+00	4.51 E+00
		Nb-95	* 1.96 E+00	2.40 E+00
		Cs-134	* 5.24 E-01	2.16 E+00
		Cs-137	* 0.00 E-01	2.33 E+00
		Ba-140	* 3.67 E+00	1.16 E+01
		La-140	* 5.18 E+00	4.57 E+00
	09/23/86 to 10/22/86	Be-7	* 2.80 E+00	2.20 E+01
		K-40	* 1.10 E+02	2.00 E+01
		Mn-54	* 1.70 E-01	2.10 E+00
		Co-58	* 7.20 E-01	2.20 E+00
		Fe-59	*-2.10 E-01	4.50 E+00
		Co-60	* 3.20 E+00	2.20 E+00
		Zn-65	*-2.00 E-01	4.40 E+00
		Zr-95	* 2.50 E+00	4.20 E+00
		Nb-95	* 1.90 E+00	2.20 E+00
		Cs-134	*-8.90 E-01	2.20 E+00
		Cs-137	* 1.50 E-01	2.20 E+00
		Ba-140	*-6.50 E+00	1.00 E+01
		La-140	*-1.30 E+00	4.50 E+00
	10/22/86 to 11/18/86	Be-7	* 9.60 E+00	1.70 E+01
		K-40	* 6.90 E+01	2.00 E+01
		Mn-54	* 7.30 E-01	1.80 E+00
		Co-58	* 6.70 E-01	1.90 E+00
		Fe-59	* 1.60 E+00	3.70 E+00
		Co-60	* 1.40 E+00	1.80 E+00
		Zn-65	*-3.20 E+00	4.00 E+00
		Zr-95	* 7.20 E-01	3.70 E+00
		Nb-95	*-5.10 E-01	2.00 E+00
		Cs-134	*-1.60 E+00	2.20 E+00
		Cs-137	* 2.20 E+00	1.80 E+00
		Ba-140	* 4.60 E+00	7.70 E+00
		La-140	*-3.50 E+00	3.20 E+00

* Denotes a result less than the detection limit.

TABLE A-8.2 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
29	11/18/86 to 12/17/86	Be-7	*-1.00 E+01	2.90 E+01
		K-40	* 9.90 E+02	6.20 E+01
		Mn-54	* 2.90 E+00	2.70 E+00
		Co-58	*-3.90 E-01	2.90 E+00
		Fe-59	* 2.10 E+00	6.20 E+00
		Co-60	* 2.40 E+00	2.70 E+00
		Zn-65	*-2.50 E+00	6.40 E+00
		Zr-95	* 6.90 E+00	6.20 E+00
		Nb-95	* 2.00 E+00	3.10 E+00
		Cs-134	*-2.00 E-01	3.10 E+00
		Cs-137	*-4.00 E+00	3.10 E+00
		Ba-140	* 4.50 E+00	1.30 E+01
		La-140	* 0.00 E+00	4.80 E+00

* Denotes a result less than the detection limit.

TABLE A-8.2 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
72	06/18/86 to 07/23/86	Be-7	* 3.47 E+00	2.27 E+01
		K-40	* 6.37 E+01	2.44 E+01
		Mn-54	* 1.31 E+00	2.21 E+00
		Co-58	* 1.50 E+00	2.45 E+00
		Fe-59	* 2.73 E+00	4.96 E+00
		Co-60	* 2.04 E+00	2.33 E+00
		Zn-65	*-4.83 E+00	5.06 E+00
		Zr-95	* 8.48 E-01	4.81 E+00
		Nb-95	* 8.10 E-01	2.40 E+00
		Cs-134	*-1.79 E+00	2.39 E+00
		Cs-137	* 9.54 E-01	2.20 E+00
		Ba-140	* 5.87 E-01	1.22 E+01
		La-140	* 4.38 E-01	4.82 E+00
	07/23/86 to 08/20/86	Be-7	* 3.82 E-01	1.95 E+01
		K-40	* 1.10 E+02	2.54 E+01
		Mn-54	*-1.71 E-01	1.84 E+00
		Co-58	* 6.17 E-02	1.94 E+00
		Fe-59	*-4.24 E-01	4.25 E+00
		Co-60	* 1.16 E+00	1.86 E+00
		Zn-65	*-1.49 E+00	4.07 E+00
		Zr-95	*-3.47 E+00	4.09 E+00
		Nb-95	* 4.23 E-01	2.18 E+00
		Cs-134	*-1.23 E-01	2.13 E+00
		Cs-137	* 2.98 E+00	2.07 E+00
		Ba-140	* 0.00 E-01	9.63 E+00
		La-140	*-5.74 E-01	4.00 E+00
	08/20/86 to 09/23/86	Be-7	* 3.82 E-01	1.95 E+01
		K-40	* 9.14 E+01	2.61 E+01
		Mn-54	*-2.01 E+00	1.76 E+00
		Co-58	*-8.34 E-01	2.14 E+00
		Fe-59	* 3.11 E+00	4.63 E+00
		Co-60	* 1.15 E+00	2.10 E+00
		Zn-65	* 1.67 E+00	4.05 E+00
		Zr-95	* 2.01 E+00	4.56 E+00
		Nb-95	* 1.05 E-01	2.31 E+00
		Cs-134	*-8.29 E-02	2.07 E+00
		Cs-137	* 1.33 E+00	2:09 E+00
		Ba-140	*-3.56 E+00	9.76 E+00
		La-140	*-2.78 E+00	4.13 E+00

* Denotes a result less than the detection limit.

TABLE A-8.2 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR*
72	09/23/86 to 10/22/86	Be-7	* 6.20 E+00	3.10 E+01
		K-40	* 1.00 E+03	6.00 E+01
		Mn-54	*-7.90 E-01	2.80 E+00
		Co-58	*-2.10 E-01	3.00 E+00
		Fe-59	* 3.40 E-01	6.60 E+00
		Co-60	* 2.50 E+00	2.80 E+00
		Zn-65	* 8.40 E+00	6.60 E+00
		Zr-95	* 1.70 E-01	6.30 E+00
		Nb-95	* 3.10 E+00	3.30 E+00
		Cs-134	*-1.40 E+00	3.30 E+00
		Cs-137	* 3.30 E+00	3.00 E+00
		Ba-140	*-3.10 E+00	1.50 E+01
	10/22/86 to 11/28/86	Be-7	* 8.84 E+00	1.69 E+01
		K-40	* 5.97 E+01	2.10 E+01
		Mn-54	* 5.00 E-01	1.67 E+00
		Co-58	*-1.75 E-01	1.69 E+00
		Fe-59	* 6.66 E-01	3.44 E+00
		Co-60	* 1.74 E+00	1.74 E+00
		Zn-65	* 2.27 E+00	3.56 E+00
		Zr-95	* 2.92 E+00	3.54 E+00
		Nb-95	* 4.51 E-01	1.90 E+00
		Cs-134	*-3.60 E-01	1.81 E+00
		Cs-137	* 1.16 E+00	1.75 E+00
		Ba-140	* 3.51 E-01	7.48 E+00
	11/28/86-12/17/86	(a)		

* Denotes a result less than the detection limit.
(a) Sample not collected.

TABLE A-8.2 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
31 (Well 1)	06/18/86	Be-7	*-4.84 E+00	2.95 E+01
		K-40	* 8.39 E+01	3.76 E+01
		Mn-54	* 1.26 E+00	2.75 E+00
		Co-58	*-6.23 E-01	2.93 E+00
		Fe-59	* 1.84 E+00	6.31 E+00
		Co-60	*-1.65 E-01	2.68 E+00
		Zn-65	*-3.20 E+00	6.40 E+00
		Zr-95	* 0.00 E-01	6.52 E+00
		Nb-95	* 9.66 E-01	2.83 E+00
		Cs-134	*-8.62 E-01	3.17 E+00
		Cs-137	* 3.47 E+00	2.95 E+00
		Ba-140	* 1.26 E+01	1.55 E+01
		La-140	* 1.23 E+00	6.61 E+00
	09/23/86	Be-7	* 1.60 E+01	2.30 E+01
		K-40	* 1.16 E+02	2.93 E+01
		Mn-54	* 1.67 E+00	2.11 E+00
		Co-58	*-6.27 E-01	2.28 E+00
		Fe-59	* 1.62 E+00	4.91 E+00
		Co-60	* 1.57 E+00	2.24 E+00
		Zn-65	*-3.79 E+00	4.33 E+00
		Zr-95	*-1.18 E+00	4.83 E+00
		Nb-95	* 2.30 E-01	2.35 E+00
		Cs-134	* 9.39 E-01	2.47 E+00
		Cs-137	* 1.67 E+00	2.29 E+00
		Ba-140	* 3.84 E+00	1.12 E+01
		La-140	* 0.00 E-01	4.98 E+00
	12/17/86	Be-7	*-5.50 E+00	2.00 E+01
		K-40	* 9.50 E+01	2.50 E+01
		Mn-54	* 2.20 E+00	1.90 E+00
		Co-58	* 0.00 E+00	2.00 E+00
		Fe-59	*-8.00 E-01	4.40 E+00
		Co-60	*-1.80 E-01	2.20 E+00
		Zn-65	*-5.40 E+00	4.70 E+00
		Zr-95	* 5.50 E+00	4.30 E+00
		Nb-95	* 2.50 E+00	2.30 E+00
		Cs-134	* 1.60 E+00	2.20 E+00
		Cs-137	* 1.50 E+00	2.20 E+00
		Ba-140	*-2.50 E+00	8.90 E+00
		La-140	*-1.90 E+00	3.60 E+00

* Denotes a result less than the detection limit.

TABLE A-8.2 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
32 (Well 2)	06/18/86	Be-7	* 1.21 E+01	3.12 E+01
		K-40	* 1.39 E+02	3.85 E+01
		Mn-54	*-3.77 E-01	2.85 E+00
		Co-58	*-1.51 E+00	2.94 E+00
		Fe-59	*-2.62 E+00	5.96 E+00
		Co-60	* 2.25 E+00	2.95 E+00
		Zn-65	*-4.03 E+00	5.88 E+00
		Zr-95	* 3.87 E+00	6.53 E+00
		Nb-95	* 1.45 E+00	3.40 E+00
		Cs-134	* 9.47 E-01	2.97 E+00
		Cs-137	* 2.28 E+00	3.33 E+00
		Ba-140	* 0.00 E-01	1.61 E+01
		La-140	* 8.48 E-01	5.74 E+00
	09/23/86	Be-7	* 4.72 E+00	2.13 E+01
		K-40	* 1.44 E+02	2.86 E+01
		Mn-54	* 1.05 E+00	1.94 E+00
		Co-58	*-4.98 E-01	2.07 E+00
		Fe-59	* 6.87 E-01	4.33 E+00
		Co-60	* 2.13 E+00	2.18 E+00
		Zn-65	*-4.77 E+00	4.20 E+00
		Zr-95	* 6.68 E-01	4.14 E+00
		Nb-95	* 2.07 E+00	2.22 E+00
		Cs-134	* 2.27 E+00	2.20 E+00
		Cs-137	* 1.19 E-01	2.14 E+00
		Ba-140	* 8.92 E+00	1.09 E+01
		La-140	*-3.70 E+00	4.34 E+00
	12/17/86	Be-7	* 6.40 E+00	2.20 E+01
		K-40	* 1.10 E+02	2.80 E+01
		Mn-54	* 2.70 E-01	2.90 E+00
		Co-58	* 5.10 E-01	2.20 E+00
		Fe-59	* 1.40 E+00	4.20 E+00
		Co-60	* 2.90 E-01	2.20 E+00
		Zn-65	*-3.40 E-01	4.40 E+00
		Zr-95	* 3.60 E+00	4.60 E+00
		Nb-95	* 1.20 E+00	2.30 E+00
		Cs-134	*-7.50 E-02	2.27 E+01
		Cs-137	* 2.30 E+00	2.30 E+00
		Ba-140	* 4.80 E-01	9.50 E+00
		La-140	*-7.60 E-01	3.70 E+00

* Denotes a result less than the detection limit.

TABLE A-8.2 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
52 (Well 3)	06/19/86	Be-7	* 9.23 E+00	2.72 E+01
		K-40	* 6.30 E+01	3.35 E+01
		Mn-54	* 1.39 E-01	2.61 E+00
		Co-58	* 1.50 E-01	2.86 E+00
		Fe-59	* 1.05 E+00	5.71 E+00
		Co-60	*-1.50 E+00	2.87 E+00
		Zn-65	* 2.68 E+00	6.21 E+00
		Zr-95	* 2.24 E+00	5.85 E+00
		Nb-95	* 3.06 E+00	2.92 E+00
		Cs-134	* 0.00 E-01	2.84 E+00
		Cs-137	* 1.56 E+00	2.66 E+00
		Ba-140	* 2.67 E+00	1.32 E+01
		La-140	*-4.54 E+00	5.47 E+00
	09/23/86	Be-7	* 9.92 E+00	2.17 E+01
		K-40	* 8.30 E+01	2.64 E+01
		Mn-54	*-3.09 E-01	2.11 E+00
		Co-58	*-2.73 E+00	2.09 E+00
		Fe-59	*-2.53 E+00	4.36 E+00
		Co-60	* 1.89 E+00	2.01 E+00
		Zn-65	*-9.41 E-01	4.53 E+00
		Zr-95	* 2.42 E+00	4.32 E+00
		Nb-95	* 5.50 E-01	2.25 E+00
		Cs-134	* 1.16 E+00	2.15 E+00
		Cs-137	* 1.62 E+00	2.25 E+00
		Ba-140	* 4.85 E+00	1.01 E+01
		La-140	* 1.20 E+00	4.32 E+00
	12/17/86	Be-7	* 7.40 E+00	3.20 E+01
		K-40	* 2.60 E+02	3.70 E+01
		Mn-54	* 2.30 E+00	2.90 E+00
		Co-58	* 1.20 E+00	3.10 E+00
		Fe-59	*-4.80 E-01	6.10 E+00
		Co-60	* 8.40 E+00	3.10 E+00
		Zn-65	*-4.60 E+00	6.00 E+00
		Zr-95	* 4.90 E+00	6.60 E+00
		Nb-95	* 1.60 E+00	3.20 E+00
		Cs-134	* 1.40 E+00	3.30 E+00
		Cs-137	* 1.90 E+00	3.20 E+00
		Ba-140	* 9.50 E+00	1.50 E+01
		La-140	*-3.80 E+00	4.20 E+00

* Denotes a result less than the detection limit.

TABLE A-8.2 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
72	06/18/86-07/23/86	Be-7	* 3.47 E+00	2.27 E+01
		K-40	* 6.37 E+01	2.44 E+01
		Mn-54	* 1.31 E+00	2.21 E+00
		Co-58	* 1.50 E+00	2.45 E+00
		Fe-59	* 2.73 E+00	4.96 E+00
		Co-60	* 2.04 E+00	2.33 E+00
		Zn-65	*-4.83 E+00	5.06 E+00
		Zr-95	* 8.48 E-01	4.81 E+00
		Nb-95	* 8.10 E-01	2.40 E+00
		Cs-134	*-1.79 E+00	2.39 E+00
		Cs-137	* 9.54 E-01	2.20 E+00
		Ba-140	* 5.87 E-01	1.22 E+01
		La-140	* 4.38 E-01	4.82 E+00
	07/23/86-08/20/86	Be-7	* 3.82 E-01	1.95 E+01
		K-40	* 1.10 E+02	2.54 E+01
		Mn-54	*-1.71 E-01	1.84 E+00
		Co-58	* 6.17 E-02	1.94 E+00
		Fe-59	*-4.24 E-01	4.25 E+00
		Co-60	* 1.16 E+00	1.86 E+00
		Zn-65	*-1.49 E+00	4.07 E+00
		Zr-95	*-3.47 E+00	4.09 E+00
		Nb-95	* 4.23 E-01	2.18 E+00
		Cs-134	*-1.23 E-01	2.13 E+00
		Cs-137	* 2.98 E+00	2.07 E+00
		Ba-140	* 0.00 E-01	9.63 E+00
		La-140	*-5.74 E-01	4.00 E+00
	08/20/86-09/23/86	Be-7	* 3.82 E-01	1.95 E+01
		K-40	* 9.14 E+01	2.61 E+01
		Mn-54	*-2.01 E+00	1.76 E+00
		Co-58	*-8.34 E-01	2.14 E+00
		Fe-59	* 3.11 E+00	4.63 E+00
		Co-60	* 1.15 E+00	2.10 E+00
		Zn-65	* 1.67 E+00	4.05 E+00
		Zr-95	* 2.01 E+00	4.56 E+00
		Nb-95	* 1.05 E-01	2.31 E+00
		Cs-134	*-8.29 E-02	2.07 E+00
		Cs-137	* 1.33 E+00	2.09 E+00
		Ba-140	*-3.56 E+00	9.76 E+00
		La-140	*-2.78 E+00	4.13 E+00

* Denotes a result less than the detection limit.

TABLE A-8.2 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
72	09/23/86-10/22/86	Be-7	* 6.20 E+00	3.10 E+01
		K-40	* 1.00 E+03	6.00 E+01
		Mn-54	*-7.90 E-01	2.80 E+00
		Co-58	*-2.10 E-01	3.00 E+00
		Fe-59	* 3.40 E-01	6.60 E+00
		Co-60	* 2.50 E+00	2.80 E+00
		Zn-65	* 8.40 E+00	6.60 E+00
		Zr-95	* 1.70 E-01	6.30 E+00
		Nb-95	* 3.10 E+00	3.30 E+00
		Cs-134	*-1.40 E+00	3.30 E+00
		Cs-137	* 3.30 E+00	3.00 E+00
		Ba-140	*-3.10 E+00	1.50 E+01
		La-140	* 0.00 E+00	5.80 E+00
	10/22/86-11/18/86	Be-7	* 8.84 E+00	1.69 E+01
		K-40	* 5.97 E+01	2.10 E+01
		Mn-54	* 5.00 E-01	1.67 E+00
		Co-58	*-1.75 E-01	1.69 E+00
		Fe-59	* 6.66 E-01	3.44 E+00
		Co-60	* 1.74 E+00	1.74 E+00
		Zn-65	* 2.27 E+00	3.56 E+00
		Zr-95	* 2.92 E+00	3.54 E+00
		Nb-95	* 4.51 E-01	1.90 E+00
		Cs-134	*-3.60 E-01	1.81 E+00
		Cs-137	* 1.16 E+00	1.75 E+00
		Ba-140	* 3.51 E-01	7.48 E+00
		La-140	*-7.50 E-01	3.00 E+00
	11/18/86-12/17/86	(a)		

* Denotes a result less than the detection limit.
(a) Sample not collected.

TABLE A-8.3

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

NUCLIDE	AVERAGE	LOW	HIGH	NUMBER SAMPLES	NUMBER POSITIVE
		Surface/Drinking Water*			
Co-60 (I)	4.5 E-01	-4.94 E+00	3.20 E+00	32	0
Co-60 (C)	5.4 E-01	-6.5 E-01	2.35 E+00	12	0
Co-58 (I)	9.0 E-02	-2.18 E+00	2.68 E+00	32	0
Co-58 (C)	-1.1 E-01	-1.75 E+00	1.99 E+00	12	0
Cs-137 (I)	7.10 E-01	-4.00 E+00	3.94 E+00	32	0
Cs-137 (C)	1.38 E+00	-1.72 E+00	4.30 E+00	12	0
Cs-134 (I)	4.00 E-02	-2.70 E+00	2.76 E+00	32	0
Cs-134 (C)	2.00 E-01	-1.40 E+00	2.07 E+00	12	0
Nb-95 (I)	3.80 E-01	-3.74 E+00	2.34 E+00	32	0
Nb-95 (C)	1.10 E+00	-0.56 E+00	3.20 E+00	12	0
Zr-95 (I)	4.80 E-01	-4.78 E+00	6.90 E+00	32	0
Zr-95 (C)	1.80 E-01	-2.62 E+00	4.20 E+00	12	0
Zn-65 (I)	-2.23 E+00	-1.26 E+00	3.12 E+00	32	0
Zn-65 (C)	-1.99 E+00	-6.85 E+00	1.56 E+00	12	0
Fe-59 (I)	2.50 E-01	-3.81 E+00	4.86 E+00	32	0
Fe-59 (C)	1.51 E-00	-2.28 E+00	4.52 E+00	12	0

(I) = Indicator

(C) = Control

*Without duplicate Station 72.

TABLE A-8.3 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

NUCLIDE	AVERAGE	LOW	HIGH	NUMBER SAMPLES	NUMBER POSITIVE
		Ground Water*			
Co-60	1.41 E+00	-1.70 E-01	8.40 E+00	12	0
Co-58	-0.49 E-01	-2.73 E+00	1.20 E+00	12	0
Cs-137	1.22 E+00	-1.26 E+00	3.47 E+00	12	0
Cs-134	1.80 E-01	-4.10 E+00	2.27 E+00	12	0
Nb-95	1.11 E+00	-1.73 E+00	3.06 E+00	12	0
Zr-95	2.05 E+00	-1.18 E+00	5.50 E+00	12	0
Zn-65	-2.08 E+00	-5.40 E+00	2.68 E+00	12	0
Fe-59	7.00 E-02	-2.62 E+00	2.40 E+00	12	0

*No control station, so only indicator results are summarized.

TABLE A-9.1

STRONTIUM 90 IN WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
27	7/23/86 to 8/20/86	Sr-89	*2.6 E+00	3.3 E+00
		Sr-90	*1.0 E-01	7.0 E-01
27	8/20/86 to 9/23/86	Sr-89	*-3.0 E+00	3.9 E+00
		Sr-90	*3.0 E-01	4.0 E-01
27	9/23/86 to 10/22/86	Sr-89	*-1.1 E+00	2.5 E+00
		Sr-90	8.0 E-01	6.0 E-01
27	10/22/86 to 11/18/86	Sr-89	2.4 E+00	6.6 E+00
		Sr-90	1.1 E+00	8.0 E-01
27	11/18/86 to 12/17/86	Sr-89	*-1.1 E+00	2.8 E+00
		Sr-90	1.0 E+00	8.0 E-01

*Denotes a result less than the detection limit.

TABLE A-10.1

GAMMA SPECTROMETRY OF SOIL

Results in pCi/kg

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
1	860514	Cs-137	7.35 E+02	9.22 E+01
		Cs-134	* 5.32 E+01	2.48 E+01
		Ra-224DA	8.29 E+02	1.04 E+02
		Ra-226DA	7.64 E+02	1.10 E+02
		Th-232DA	8.18 E+02	1.03 E+02

* Denotes a result less than the detection limit.

TABLE A-10.1 (Cont.)

GAMMA SPECTROMETRY OF SOIL

Results in pCi/kg

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
7	860514	Cs-137	* 5.77 E+01	2.54 E+01
		Cs-134	* 4.46 E+01	2.43 E+01
		Ra-224DA	7.14 E+02	9.31 E+01
		Ra-226DA	5.68 E+02	8.80 E+01
		Th-232DA	7.05 E+02	9.19 E+01

* Denotes a result less than the detection limit.

TABLE A-10.1 (Cont.)

GAMMA SPECTROMETRY OF SOIL

Results in pCi/kg

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
9	860514	Cs-137	* 3.66 E+01	2.48 E+01
		Cs-134	* 4.19 E+01	2.83 E+01
		Ra-224DA	8.74 E+02	1.10 E+02
		Ra-226DA	6.26 E+02	1.01 E+02
		Th-232DA	8.62 E+02	1.09 E+02

* Denotes a result less than the detection limit.

TABLE A-10.1 (Cont.)

GAMMA SPECTROMETRY OF SOIL

Results in pCi/kg

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
21	860514	Cs-137	* 3.77 E+01	2.65 E+01
		Cs-134	* 7.11 E+00	2.20 E+01
		Ra-224DA	5.22 E+02	7.12 E+01
		Ra-226DA	4.98 E+02	7.91 E+01
		Th-232DA	5.28 E+02	7.20 E+01

* Denotes a result less than the detection limit.

TABLE A-10.1 (Cont.)

GAMMA SPECTROMETRY OF SOIL

Results in pCi/kg

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
23	860514	Cs-137	6.91 E+02	9.39 E+01
		Cs-134	* 4.34 E+01	3.27 E+01
		Ra-224DA	7.64 E+02	1.03 E+02
		Ra-226DA	5.62 E+02	9.78 E+01
		Th-232DA	7.54 E+02	1.02 E+02

* Denotes a result less than the detection limit.

TABLE A-10.2

GAMMA SPECTROMETRY OF SOIL

Results in pCi/kg

NUCLIDE	AVERAGE	LOW	HIGH	NUMBER SAMPLES	NUMBER POSITIVE
Cs-137 (I)	3.80 E+02	3.77 E+01	7.35 E+02	4	2
Cs-137 (C)	3.66 E+01	-	-	1	0
Cs-134 (I)	3.71 E+01	7.11 E+00	5.32 E+01	4	0
Cs-134 (C)	4.19 E+01	-	-	1	0
Ra-224DA(I)	7.07 E+02	5.22 E+02	8.29 E+02	4	5
Ra-224DA(C)	8.74 E+02	-	-	1	1
Ra-226DA(I)	5.98 E+02	4.98 E+02	7.64 E+02	1	5
Ra-226DA(C)	6.26 E+02	-	-	1	0
Th-232DA(I)	7.01 E+02	5.28 E+02	8.18 E+02	4	5
Th-232DA(C)	8.62 E+02	-	-	1	0

TABLE A-11.1

STRONTIUM 90 IN SOIL

Results in pCi/kg

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
1	860514	4.55 E+02	8.47 E+01
23	860514	2.60 E+02	4.95 E+01

TABLE A-12.1

GAMMA SPECTROMETRY OF SEDIMENT

Results in pCi/kg

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
33 (Upstream)	860416	Co-60	* 4.58 E+01	2.51 E+01
		Cs-137	1.20 E+02	3.81 E+01
		Cs-134	* 4.61 E+01	2.97 E+01
		Ra-224DA	1.21 E+03	1.04 E+02
		Ra-226DA	7.38 E+02	9.29 E+01
	860625	Co-60	* 4.13 E+01	2.27 E+01
		Cs-137	1.90 E+02	2.67 E+01
		Cs-134	* 8.93 E+01	2.39 E+01
		Co-57	* 3.93 E+01	1.70 E+01
		RA-224DA	2.09 E+03	6.68 E+01
		RA-226DA	1.23 E+03	6.97 E+01

* Denotes a result less than the detection limit.

TABLE A-12.1 (Cont.)

GAMMA SPECTROMETRY OF SEDIMENT

Results in pCi/kg

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
34 (Downstream)	860416	Co-60	* 3.99 E+01	2.32 E+01
		Mn-54	* 3.69 E+01	2.07 E+01
		Cs-137	2.41 E+02	4.50 E+01
		Cs-134	* 7.46 E+01	3.80 E+01
		Co-57	* 4.60 E+01	2.77 E+01
		Ra-224DA	2.23 E+03	1.67 E+02
		Ra-226DA	1.26 E+03	1.27 E+02
	860625	Co-60	* 5.14 E+01	2.13 E+01
		Mn-54	* 5.19 E+01	2.05 E+01
		Cs-137	2.15 E+02	3.18 E+01
		Cs-134	1.72 E+02	2.91 E+01
		Co-57	* 4.95 E+01	2.16 E+01
		Ra-224DA	3.47 E+03	8.60 E+01
		Ra-226DA	1.88 E+03	8.73 E+01

* Denotes a result less than the detection limit.

TABLE A-12.2

GAMMA SPECTROMETRY OF SEDIMENT

Results in pCi/kg

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
33 (Upstream)	860625	Co-60	* 3.50 E+01	1.99 E+01
		Cs-134	* 8.24 E+01	2.32 E+01
		Cs-137	2.33 E+02	3.57 E+01
		Ra-226DA	2.44 E+03	5.32 E+02
	861021	Co-60	* 2.10 E+01	1.60 E+01
		Cs-134	* 9.80 E+01	2.00 E+01
		Cs-137	1.06 E+02	1.49 E+02
		Ra-226DA	2.22 E+03	4.20 E+02

* Denotes a result less than the detection limit.

TABLE A-12.2 (Cont.)

GAMMA SPECTROMETRY OF SEDIMENT

Results in pCi/kg

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
34 (Downstream)	860625	Co-60	* 3.44 E+01	2.38 E+01
		Cs-134	* 1.08 E+02	2.88 E+01
		Cs-137	2.42 E+02	2.79 E+01
		Ra-226	2.82 E+03	5.35 E+02
		Co-57	* 5.40 E+01	2.37 E+01
	861021	Co-60	5.66 E+01	2.12 E+01
		Cs-134	* 7.00 E+00	1.70 E+00
		Cs-137	3.06 E+02	3.10 E+01
		Ra-226	1.37 E+03	3.70 E+02
		Co-57	* 3.45 E+01	1.79 E+01

* Denotes a result less than the detection limit.

TABLE A-12.3

GAMMA SPECTROMETRY OF SEDIMENT

Results in pCi/kg

NUCLIDE	AVERAGE	LOW	HIGH	NUMBER SAMPLES	NUMBER POSITIVE
Co-60 (I)	4.56 E+01	3.44 E+01	5.66 E+01	4	1
Co-60 (C)	3.58 E+01	2.10 E+01	4.58 E+01	4	0
Co-57 (I)	4.60 E+01	3.45 E+01	5.40 E+01	4	0
Co-57 (C)	3.93 E+01	-	-	4	0
Cs-137 (I)	2.51 E+02	2.15 E+02	3.06 E+02	4	4
Cs-137 (C)	1.62 E+02	1.06 E+02	2.33 E+02	4	4
Cs-134 (I)	9.03 E+01	7.00 E+00	1.72 E+02	4	1
Cs-134 (C)	7.90 E+01	4.61 E+01	9.80 E+01	4	0

TABLE A-13.1

GAMMA SPECTROMETRY OF FISH

Results in pCi/kg (wet)

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
30				
Carp	860505	Co-60	*-5.74 E+00	1.05 E+01
		Fe-59	* 0.00 E+00	3.03 E+01
		Zn-65	* 4.10 E+00	2.78 E+01
		Mn-54	*-3.96 E-01	9.03 E+00
		Co-58	* 7.11 E+00	9.76 E+00
		Cs-137	* 1.61 E+01	8.43 E+00
		Cs-134	*-1.73 E+01	1.43 E+01
Sucker	860505	Co-60	* 6.48 E+00	1.02 E+01
		Fe-59	*-3.28 E+01	3.39 E+01
		Zn-65	* 4.21 E+00	2.06 E+01
		Mn-54	*-8.13 E-01	1.07 E+01
		Co-58	* 1.73 E+01	8.13 E+00
		Cs-137	* 3.53 E+01	1.26 E+01
		Cs-134	* 1.02 E+01	8.47 E+00
Squaw Fish	860505	Co-60	* 7.17 E+00	5.90 E+00
		Fe-59	*-1.66 E+01	3.18 E+01
		Zn-65	*-1.38 E+01	2.42 E+01
		Mn-54	*-1.24 E+00	1.21 E+01
		Co-58	* 4.63 E-01	1.07 E+01
		Cs-137	* 5.49 E+01	1.64 E+01
		Cs-134	* 3.15 E+00	1.09 E+01
Salmon	860508	Co-60	* 9.57 E+00	6.45 E+00
		Fe-59	* 2.11 E+01	1.96 E+01
		Zn-65	* 8.43 E+00	2.47 E+01
		Mn-54	* 2.19 E+00	7.30 E+00
		Co-58	* 8.80 E+00	5.38 E+00
		Cs-137	* 2.66 E+00	1.11 E+01
		Cs-134	* 4.80 E+00	8.47 E+00

* Denotes a result less than the detection limit.

TABLE A-13.1 (Cont.)

GAMMA SPECTROMETRY OF FISH

Results in pCi/kg (wet)

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
38				
Carp	860507	Co-60	* 9.80 E+00	7.47 E+00
		Fe-59	*-1.88 E+01	3.61 E+01
		Zn-65	*-1.10 E+01	2.88 E+01
		Mn-54	* 9.69 E-01	1.30 E+01
		Co-58	* 9.73 E+00	1.21 E+01
		Cs-137	*-2.75 E+00	1.17 E+01
		Cs-134	*-1.33 E+01	1.40 E+01
Steelhead	860507	Co-60	*-6.68 E+00	1.17 E+01
		Fe-59	* 1.48 E+01	2.70 E+01
		Zn-65	* 4.54 E+00	2.34 E+01
		Mn-54	*-2.47 E+00	7.68 E+00
		Co-58	* 2.34 E+00	7.82 E+00
		Cs-137	* 1.35 E+01	8.54 E+00
		Cs-134	*-1.01 E+01	1.13 E+01
Salmon	860507	Co-60	* 1.24 E+01	8.34 E+00
		Fe-59	* 6.58 E+00	3.39 E+01
		Zn-65	*-3.96 E+01	4.17 E+01
		Mn-54	* 7.60 E+00	1.04 E+01
		Co-58	*-2.12 E+00	1.37 E+01
		Cs-137	*-7.18 E+00	1.37 E+01
		Cs-134	*-5.24 E+00	1.31 E+01
Sucker	860507	Co-60	* 9.14 E+00	6.53 E+00
		Fe-59	* 8.83 E+00	3.06 E+01
		Zn-65	* 1.93 E+01	1.85 E+01
		Mn-54	* 7.86 E+00	8.92 E+00
		Co-58	*-3.47 E+00	1.10 E+01
		Cs-137	* 1.39 E+01	1.24 E+01
		Cs-134	* 4.72 E+00	1.07 E+01

* Denotes a result less than the detection limit.

TABLE A-13.2

GAMMA SPECTROMETRY OF FISH

Results in pCi/kg (wet)

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
30				
Chinook Salmon	09/30/86	Mn-54	* 0.00 E+00	4.70 E+00
		Co-58	*-4.00 E+00	6.50 E+00
		Fe-59	* 1.10 E+01	2.00 E+01
		Co-60	*-6.30 E-01	5.50 E+00
		Zn-65	*-1.80 E+00	1.50 E+01
		Cs-134	* 2.00 E+00	5.20 E+00
		Cs-137	* 1.91 E+01	8.70 E+00
Carp	09/30/86	Mn-54	*-5.50 E+00	7.20 E+00
		Co-58	*-6.50 E-01	9.60 E+00
		Fe-59	*-4.60 E+00	2.70 E+01
		Co-60	* 3.80 E+00	8.10 E+00
		Zn-65	*-1.30 E+01	1.90 E+01
		Cs-134	* 0.00 E+00	7.80 E+00
		Cs-137	* 1.20 E+01	7.50 E+00
Sucker	09/30/86	Mn-54	* 2.40 E-01	5.80 E+00
		Co-58	*-1.20 E+00	6.60 E+01
		Fe-59	*-1.00 E+01	2.30 E+01
		Co-60	* 1.60 E+00	6.70 E+00
		Zn-65	* 4.80 E+00	1.50 E+01
		Cs-134	* 2.70 E+00	6.50 E+00
		Cs-137	* 3.36 E+01	1.02 E+01
Steelhead	10/02/86	Mn-54	*-7.90 E-01	5.00 E+00
		Co-58	* 1.50 E+00	5.80 E+00
		Fe-59	* 4.10 E+00	1.80 E+01
		Co-60	* 2.60 E+00	4.90 E+00
		Zn-65	* 5.40 E+00	1.20 E+01
		Cs-134	* 2.10 E+00	4.70 E+00
		Cs-137	* 6.90 E+00	4.80 E+00

* Denotes a result less than the detection limit.

TABLE A-13.2 (Cont.)

GAMMA SPECTROMETRY OF FISH

Results in pCi/kg (wet)

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
38				
Steelhead	10/01/86	Mn-54	* 3.60 E+00	6.30 E+00
		Co-58	*-3.60 E+00	8.00 E+00
		Fe-59	* 0.00 E+01	2.40 E+01
		Co-60	* 6.20 E+00	6.70 E+00
		Zn-65	*-5.50 E+00	1.90 E+01
		Cs-134	* 1.50 E+00	6.90 E+00
		Cs-137	* 9.50 E+00	6.70 E+00
Chinook Salmon	10/01/86	Mn-54	*-1.90 E+00	7.60 E+00
		Co-58	* 3.10 E-01	1.04 E+01
		Fe-59	* 4.90 E+00	2.70 E+01
		Co-60	* 3.00 E-01	7.40 E+00
		Zn-65	*-1.80 E+01	2.00 E+01
		Cs-134	* 1.30 E+01	9.00 E+00
		Cs-137	* 2.95 E+01	1.15 E+01
Carp	10/01/86	Mn-54	* 7.00 E-01	5.60 E+00
		Co-58	* 1.40 E+00	7.20 E+00
		Fe-59	* 1.20 E+00	1.90 E+01
		Co-60	* 1.20 E+00	5.70 E+00
		Zn-65	*-1.80 E+01	1.40 E+01
		Cs-134	* 3.10 E+00	6.00 E+00
		Cs-137	* 4.90 E+00	5.70 E+00
Sucker	10/01/86	Mn-54	* 1.80 E+00	5.10 E+00
		Co-58	* 0.00 E+00	5.50 E+00
		Fe-59	* 1.30 E+01	1.80 E+01
		Co-60	* 2.90 E+00	5.20 E+00
		Zn-65	*-3.50 E+00	1.30 E+01
		Cs-134	* 0.00 E+00	5.10 E+00
		Cs-137	* 1.30 E+01	5.10 E+00

* Denotes a result less than the detection limit.

TABLE A-13.3

GAMMA SPECTROMETRY OF FISH

Results in pCi/kg (wet)

NUCLIDE	AVERAGE	LOW	HIGH	NUMBER SAMPLES	NUMBER POSITIVE
Co-60 (I)	3.11 E+00	-5.74 E+00	9.57 E+00	8	0
Co-60 (C)	4.75 E+00	-6.68 E+00	1.24 E+01	8	0
Fe-59 (I)	-3.48 E+00	-3.28 E+01	2.11 E+01	8	0
Fe-59 (C)	3.81 E+00	-1.88 E+01	1.48 E+01	8	0
Zn-65 (I)	-2.08 E-01	-1.38 E+01	8.43 E+00	8	0
Zn-65 (C)	-8.97 E+00	-3.96 E+01	1.93 E+01	8	0
Co-58 (I)	3.67 E+00	-4.00 E+00	1.73 E+01	8	0
Co-58 (C)	5.73 E-01	-3.60 E+00	9.73 E+00	8	0
Cs-134(I)	9.56 E-01	-1.73 E+01	1.02 E+01	8	0
Cs-134(C)	-7.90 E-01	-1.33 E+01	1.30 E+01	8	0
Cs-137(I)	2.26 E+01	2.66 E+00	5.49 E+01	8	0
Cs-137(C)	9.30 E+00	-7.18 E+00	2.95 E+01	8	0

(I) = Indicator Station
(C) = Control Station

TABLE A-14.1

I-131 IN RAW MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
9	860121	*-2.43 E-01	2.54 E-01
	860212	* 8.03 E-02	2.07 E-01
	860318	* 7.76 E-02	1.50 E-01
	860409	* 2.83 E-02	1.18 E-01
	860422	* 1.58 E-02	1.16 E-01
	860506	1.03 E+00	3.07 E-01
	860520	2.82 E+01	5.27 E+00

* Denotes a result less than the detection limit.

TABLE A-14.1 (Cont.)

I-131 IN RAW MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
35	860121	*-1.96 E-01	2.37 E-01
	860212	* 1.76 E-01	1.82 E-01
	860318	* 7.76 E-02	1.23 E-01
	860409	* 5.30 E-02	1.33 E-01
	860422	*-2.75 E-01	1.67 E-01
	860506	* 3.27 E-01	2.63 E-01

* Denotes a result less than the detection limit.

TABLE A-14.1 (Cont.)

I-131 IN RAW MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
36	860121	*-1.95 E-01	2.16 E-01
	860212	*-5.21 E-02	1.09 E-01
	860318	*-9.94 E-02	1.62 E-01
	860409	*-5.58 E-02	1.27 E-01
	860422	* 4.14 E-02	1.31 E-01
	860506	* 3.88 E-01	2.20 E-01
	860520	9.91 E+01	1.82 E+01

* Denotes a result less than the detection limit.

TABLE A-14.1 (Cont.)

I-131 IN RAW MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
37	860121	* 1.26 E-01	2.15 E-01
	860212	* 1.15 E-01	1.79 E-01
	860318	*-3.13 E-02	9.68 E-02
	860409	* 3.54 E-03	1.02 E-01
	860422	*-1.40 E-01	1.31 E-01
	860506	* 2.46 E-01	2.02 E-01
	860520	9.91 E+01	1.82 E+01

* Denotes a result less than the detection limit.

TABLE A-14.1 (Cont.)

I-131 IN RAW MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
40	860121	*-5.04 E-03	2.02 E-01
	860212	*-9.60 E-04	1.74 E-01
	860318	* 1.34 E-01	1.46 E-01
	860409	*-6.95 E-02	1.32 E-01
	860422	*-2.72 E-01	1.53 E-01
	860506	* 3.00 E-01	2.45 E-01
	860520	7.01 E+01	1.30 E+01

* Denotes a result less than the detection limit.

TABLE A-14.1 (Cont.)

I-131 IN RAW MILK

Results in pCi/liter

LOCATION.	COLLECTION PERIOD	RESULT	OVERALL ERROR
96	860422	* 1.13 E-01	1.30 E-01
	860506	* 6.64 E-01	2.91 E-01
	860520	1.10 E+00	3.03 E-01

* Denotes a result less than the detection limit.

TABLE A-14.2

I-131 IN RAW MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
9	860603	3.80 E+00	4.00 E-01
	860617	* 1.30 E-02	1.90 E-01
	860709	* 3.00 E-01	3.16 E-01
	860722	* 1.10 E-02	1.77 E-01
	860805	* 1.10 E-01	1.80 E-01
	860819	* 1.50 E-01	2.19 E-01
	860903	* 8.00 E-02	1.51 E-01
	860916	* 2.40 E-01	1.90 E-01
	861014	* 2.00 E-02	1.87 E-01
	861118	* 6.40 E-02	2.98 E-01
	861216	*-3.00 E-02	2.01 E-01

* Denotes a result less than the detection limit.

TABLE A-14.2 (Cont.)

I-131 IN RAW MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
36	860603	2.30 E+01	0.00 E+00
	860617	* 3.50 E-01	2.42 E-01
	860709	* 1.60 E-01	2.39 E-01
	860722	* 2.70 E-01	2.09 E-01
	860805	* 2.00 E-01	3.10 E-01
	860819	* 1.10 E-02	1.76 E-01
	860903	* 5.30 E-02	1.97 E-01
	860916	* 7.70 E-01	2.20 E-01
	861014	* 2.00 E-01	1.87 E-01
	861118	* 2.50 E-01	2.30 E-01
	861216	*-1.30 E-01	2.21 E-01

* Denotes a result less than the detection limit.

TABLE A-14.2 (Cont.)

I-131 IN RAW MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
37	860603	2.20 E+01	0.00 E+00
	860617	9.10 E-01	2.80 E-01
	860709	* 2.10 E-01	3.10 E-01
	860722	* 1.50 E-02	1.56 E-01
	860805	* 1.90 E-01	2.20 E-01
	860819	* 4.30 E-02	2.51 E-01
	860903	* 3.00 E-02	1.93 E-01
	860916	* 9.60 E-02	2.31 E-01
	861014	* 7.10 E-02	2.15 E-01
	861118	* 2.30 E-01	2.58 E-01
	861216	*-5.50 E-02	1.66 E-01

* Denotes a result less than the detection limit.

TABLE A-14.2 (Cont.)

I-131 IN RAW MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
40	860603	1.10 E+01	1.00 E+00
	860617	* 5.80 E-02	1.96 E-01
	860709	* 3.30 E-01	2.61 E-01
	860722	* 1.80 E-01	2.59 E-01
	860805	* 1.10 E-01	2.50 E-01
	860819	* 1.90 E-01	2.00 E-01
	860903	* 6.90 E-02	1.71 E-01
	860916	* 1.80 E-01	1.90 E-01
	861014	* 3.50 E-01	2.25 E-01
	861118	* 6.70 E-01	2.74 E-01
	861216	* 1.00 E-01 (a)	5.70 E-01

* Denotes a result less than the detection limit.

(a) Small sample analyzed due to spillage in transit.

TABLE A-14.2 (Cont.)

I-131 IN RAW MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
58	860603	9.90 E+00	5.00 E-01
	860617	4.20 E+00	4.00 E-01
	860709	7.00 E-01	1.90 E-01
	860722	* 4.50 E-01	2.69 E-01
	860805	* 1.50 E-01	3.30 E-01
	860819	* 6.10 E-02	2.40 E-01
	860903	* 1.70 E-01	2.33 E-01
	860916	* 6.90 E-02	2.07 E-01
	861014	* 2.30 E-01	1.87 E-01
	861110	* 1.80 E-01	3.12 E-01
	861216	*-1.50 E-02	1.64 E-01

* Denotes a result less than the detection limit.

TABLE A-14.2 (Cont.)

I-131 IN RAW MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL ERROR
96	860603	* 2.40 E-01	2.10 E-01
	860617	* 2.40 E-01	2.00 E-01
	860709	6.90 E-01	3.10 E-01
	860722	* 9.80 E-02	1.41 E-01
	860805	* 2.10 E-01	2.40 E-01
	860819	* 1.10 E-01	1.30 E-01
	860903	* 7.50 E-03	1.62 E-01
	860916	* 1.10 E-01	2.80 E-01
	861014	* 1.70 E-02	1.59 E-01
	861118	* 6.40 E-02	2.69 E-01
	861216	*-3.90 E-02	2.03 E-01

* Denotes a result less than the detection limit.

TABLE A-14.3

IODINE IN MILK

Results in pCi/liter

Indicator Station*

Average Results (without control) = 5.83 E+00

Low = -2.75 E-01 High = 9.91 E+01

10 Positive Results in 67 Samples

Control Stations

Average Results = 1.98 E-01

Low = -2.4 E-01 High = 1.10 E+00

2 Positive Results in 18 Samples

*Without duplicate Station 37.

TABLE A-15.1

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
9	860121	La-140	*-6.64 E+00	4.79 E+00
		Cs-137	* 7.07 E-01	3.15 E+00
		Cs-134	*-5.35 E+00	3.68 E+00
		Ba-140	* 5.11 E+00	1.30 E+01
	860212	La-140	* 5.65 E+00	4.26 E+00
		Cs-137	*-2.12 E+00	3.25 E+00
		Cs-134	* 2.97 E+00	3.53 E+00
		Ba-140	* 6.16 E-01	1.36 E+01
	860318	La-140	* 3.02 E-01	4.71 E+00
		Cs-137	*-8.31 E-01	3.36 E+00
		Cs-134	*-3.07 E+00	3.43 E+00
		Ba-140	*-1.55 E+00	1.19 E+01
	860409	La-140	* 1.27 E+00	3.85 E+00
		Cs-137	* 3.49 E+00	3.15 E+00
		Cs-134	* 1.53 E+00	3.07 E+00
		Ba-140	* 3.41 E+00	1.13 E+01
	860422	La-140	*-2.64 E-01	3.59 E+00
		Cs-137	* 1.18 E+00	2.95 E+00
		Cs-134	*-1.08 E+00	3.43 E+00
		Ba-140	* 1.04 E+01	1.11 E+01
	860506	La-140	*-5.88 E+00	5.50 E+00
		Cs-137	* 3.04 E-01	2.95 E+00
		Cs-134	*-5.89 E-01	3.09 E+00
		Ba-140	4.37 E+01	1.53 E+01
	860520	La-140	*-4.37 E+00	4.41 E+00
		Cs-137	* 8.23 E+00	3.00 E+00
		Cs-134	* 1.69 E-01	3.27 E+00
		Ba-140	* 2.18 E+00	1.21 E+01
		I-131 (a)	4.54 E+01	6.40 E+00

* Denotes a result less than the detection limit.
(a) I-131 analysis by gamma spectroscopy

TABLE A-15.1 (Cont.)

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
35	860121	La-140	* 3.05 E+00	3.93 E+00
		Cs-137	* 4.94 E+00	2.48 E+00
		Cs-134	*-1.35 E-01	2.98 E+00
		Ba-140	*-4.90 E+00	1.25 E+01
	860212	La-140	* 8.71 E-01	3.78 E+00
		Cs-137	*-2.41 E-01	3.11 E+00
		Cs-134	*-3.67 E+00	3.47 E+00
		Ba-140	* 8.44 E+00	1.10 E+01
	860318	La-140	* 1.75 E+00	3.87 E+00
		Cs-137	* 1.90 E-01	2.90 E+00
		Cs-134	* 4.96 E-01	3.02 E+00
		Ba-140	*-2.29 E+01	1.32 E+01
	860409	La-140	*-7.57 E+00	6.57 E+00
		Cs-137	*-3.15 E+00	3.24 E+00
		Cs-134	*-1.44 E+00	3.31 E+00
		Ba-140	* 1.44 E+01	1.24 E+01
	860422	La-140	*-2.27 E+00	4.53 E+00
		Cs-137	* 1.48 E+00	2.59 E+00
		Cs-134	*-9.54 E-02	3.46 E+00
		Ba-140	*-5.20 E+00	1.17 E+01
	860506	La-140	* 1.27 E+00	6.58 E+00
		Cs-137	* 1.85 E+00	3.79 E+00
		Cs-134	* 2.83 E+00	4.00 E+00
		Ba-140	* 6.23 E+00	2.04 E+01

* Denotes a result less than the detection limit.

TABLE A-15.1 (Cont.)

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
36	860121	La-140	* 0.00 E+00	4.13 E+00
		Cs-137	* 1.44 E+00	2.97 E+00
		Cs-134	* 4.77 E-01	3.25 E+00
		Ba-140	* 4.17 E+00	1.21 E+01
	860212	La-140	*-5.87 E+00	4.95 E+00
		Cs-137	* 6.38 E+00	2.48 E+00
		Cs-134	* 2.97 E+00	3.11 E+00
		Ba-140	* 1.16 E+01	1.13 E+01
	860318	La-140	* 5.11 E-01	4.47 E+00
		Cs-137	*-2.17 E+00	3.16 E+00
		Cs-134	*-1.72 E+00	3.37 E+00
		Ba-140	* 3.43 E+00	1.14 E+01
	860409	La-140	* 1.32 E+00	5.74 E+00
		Cs-137	* 5.21 E-01	3.26 E+00
		Cs-134	* 8.59 E-01	3.28 E+00
		Ba-140	*-1.88 E+00	1.26 E+01
	860422	La-140	*-2.90 E+00	5.71 E+00
		Cs-137	*-1.25 E+00	3.09 E+00
		Cs-134	*-3.16 E-01	3.20 E+00
		Ba-140	*-2.35 E+00	1.28 E+01
	860506	La-140	*-4.06 E+00	6.89 E+00
		Cs-137	* 8.36 E-01	2.90 E+00
		Cs-134	*-2.27 E-01	3.34 E+00
		Ba-140	*-3.85 E+00	1.84 E+01
	860520	La-140	*-4.07 E+00	5.79 E+00
		Cs-137	1.57 E+01	4.20 E+00
		Cs-134	* 7.62 E+00	4.60 E+00
		Ba-140	* 4.11 E-01	1.16 E+01
		I-131 (a)	1.70 E+02	1.89 E+01

* Denotes a result less than the detection limit.
(a) I-131 analysis by gamma spectroscopy

TABLE A-15.1 (Cont.)

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
37	860121	La-140	* 6.11 E+00	4.44 E+00
		Cs-137	* 7.62 E-01	2.72 E+00
		Cs-134	*-1.62 E+00	3.38 E+00
		Ba-140	* 3.43 E+00	1.20 E+01
	860212	La-140	*-4.41 E+00	6.99 E+00
		Cs-137	* 4.24 E+00	2.86 E+00
		Cs-134	* 2.58 E+00	3.38 E+00
		Ba-140	*-7.15 E+00	1.46 E+01
	860318	La-140	*-4.40 E+00	6.30 E+00
		Cs-137	* 3.58 E+00	3.22 E+00
		Cs-134	* 3.32 E+00	2.95 E+00
		Ba-140	* 6.33 E+00	1.34 E+01
	860409	La-140	* 7.45 E+00	7.38 E+00
		Cs-137	* 1.52 E+00	2.84 E+00
		Cs-134	* 3.48 E+00	2.97 E+00
		Ba-140	* 3.71 E+00	1.41 E+01
	860422	La-140	*-4.55 E+00	5.35 E+00
		Cs-137	*-1.48 E+00	3.25 E+00
		Cs-134	* 2.58 E+00	3.27 E+00
		Ba-140	*-5.92 E+00	1.15 E+01
	860506	La-140	*-5.64 E+00	6.97 E+00
		Cs-137	* 2.57 E+00	2.88 E+00
		Cs-134	* 4.66 E+00	3.37 E+00
		Ba-140	*-6.00 E+00	1.95 E+01
	860520	La-140	*-1.16 E+00	5.83 E+00
		Cs-137	1.82 E+01	5.19 E+00
		Cs-134	* 8.91 E+00	4.72 E+00
		Ba-140	* 7.76 E+00	1.51 E+01
		I-131 (a)	1.62 E+02	1.89 E+01

* Denotes a result less than the detection limit.
(a) I-131 analysis by gamma spectroscopy

TABLE A-15.1 (Cont.)

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
40	860121	La-140	* 2.29 E+00	5.73 E+00
		Cs-137	* 4.82 E+00	2.98 E+00
		Cs-134	* 2.25 E-01	2.76 E+00
		Ba-140	* 2.93 E+00	1.24 E+01
	860212	La-140	*-7.09 E-01	6.07 E+00
		Cs-137	* 2.41 E-01	3.02 E+00
		Cs-134	*-7.16 E-01	3.25 E+00
		Ba-140	*-4.05 E+00	1.25 E+01
	860318	La-140	*-1.42 E-01	6.12 E+00
		Cs-137	* 3.53 E+00	2.92 E+00
		Cs-134	* 3.48 E+00	3.13 E+00
		Ba-140	*-1.96 E+01	1.36 E+01
	860409	La-140	* 0.00 E+00	8.82 E+00
		Cs-137	* 2.01 E+00	3.02 E+00
		Cs-134	*-5.25 E-01	3.50 E+00
		Ba-140	*-5.43 E+00	1.30 E+01
	860422	La-140	*-1.33 E+01	1.05 E+01
		Cs-137	* 7.59 E-01	2.98 E+00
		Cs-134	*-3.07 E+00	3.45 E+00
		Ba-140	*-7.58 E+00	1.46 E+01
	860506	La-140	* 2.36 E+00	6.68 E+00
		Cs-137	* 5.17 E+00	2.82 E+00
		Cs-134	* 1.82 E-01	3.20 E+00
		Ba-140	*-3.58 E+00	2.11 E+01
	860520	La-140	*-1.22 E+01	6.79 E+00
		Cs-137	3.37 E+01	5.43 E+00
		Cs-134	1.90 E+01	5.08 E+00
		Ba-140	* 9.98 E+00	1.15 E+01
		I-131 (a)	8.75 E+01	1.09 E+01

* Denotes a result less than the detection limit.
(a) I-131 analysis by gamma spectroscopy

TABLE A-15.1 (Cont.)

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
96	860422	La-140	* 4.64 E 00	7.97 E+00
		Cs-137	* 8.82 E-01	3.32 E+00
		Cs-134	*-2.96 E+00	3.55 E+00
		Ba-140	* 1.62 E+01	1.26 E+01
	860506	La-140	* 3.13 E+00	5.87 E+00
		Cs-137	* 1.00 E+00	3.20 E+00
		Cs-134	* 3.13 E+00	3.27 E+00
		Ba-140	* 3.54 E+00	1.94 E+01
	860520	La-140	* 1.90 E+00	5.74 E+00
		Cs-137	* 1.75 E+00	2.87 E+00
		Cs-134	*-1.03 E+00	3.02 E+00
		Ba-140	* 1.03 E+01	1.12 E+01

* Denotes a result less than the detection limit.

TABLE A-15.2

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
9	860603	Cs-134	* 9.49 E-01	2.74 E+00
		Cs-137	* 2.68 E+00	2.53 E+00
		Ba-140	* 3.19 E+00	1.03 E+01
		La-140	*-1.86 E-01	3.39 E+00
	860617	Cs-134	*-1.45 E+00	3.86 E+00
		Cs-137	* 2.72 E+00	3.57 E+00
		Ba-140	*-2.67 E+00	1.50 E+01
		La-140	* 2.29 E+00	5.97 E+00
	860709	Cs-134	* 8.28 E-01	2.56 E+00
		Cs-137	* 3.89 E+00	2.46 E+00
		Ba-140	*-4.18 E-01	9.16 E+00
		La-140	* 0.00 E-01	3.55 E+00
	860722	Cs-134	* 1.93 E+00	2.62 E+00
		Cs-137	* 3.24 E+00	2.50 E+00
		Ba-140	*-2.19 E-01	8.89 E+00
		La-140	*-1.64 E+00	3.55 E+00
	860805	Cs-134	* 5.92 E+00	3.84 E+00
		Cs-137	* 6.59 E+00	3.62 E+00
		Ba-140	*-2.50 E+00	1.31 E+01
		La-140	* 8.18 E-01	3.93 E+00
	860819	Cs-134	* 4.08 E+00	2.79 E+00
		Cs-137	1.04 E+01	3.99 E+00
		Ba-140	* 2.15 E+00	1.02 E+01
		La-140	*-1.14 E+00	3.93 E+00
	860903	Cs-134	* 3.78 E+00	4.90 E+00
		Cs-137	* 5.06 E+00	4.64 E+00
		Ba-140	* 1.31 E+01	1.65 E+01
		La-140	* 4.77 E+00	5.39 E+00
	860916	Cs-134	* 2.37 E-01	2.69 E+00
		Cs-137	* 4.28 E+00	2.62 E+00
		Ba-140	*-6.27 E+00	9.37 E+00
		La-140	* 1.93 E+00	3.27 E+00

* Denotes a result less than the detection limit.

TABLE A-15.2 (Cont.)

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
9	861014	Cs-134	* 1.60 E+00	2.90 E+00
		Cs-137	* 3.00 E+00	2.60 E+00
		Ba-140	* 1.70 E+00	9.10 E+00
		La-140	* 5.70 E-01	3.80 E+00
	861118	Cs-134	* 9.30 E-01	3.80 E+00
		Cs-137	* 3.10 E+00	3.60 E+00
		Ba-140	*-8.80 E+00	1.30 E+01
		La-140	* 3.30 E+00	5.40 E+00
	861216	Cs-134	* 6.50 E+00	3.70 E+00
		Cs-137	* 6.40 E+00	3.50 E+00
		Ba-140	* 7.00 E+00	1.30 E+01
		La-140	*-2.40 E+00	4.00 E+00

* Denotes a result less than the detection limit.

TABLE A-15.2 (Cont.)

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
36	860603	Cs-134	* 5.77 E+00	2.84 E+00
		Cs-137	8.48 E+00	3.74 E+00
		Ba-140	* 0.00 E-01	9.62 E+00
		La-140	* 2.02 E-01	3.92 E+00
		I-131 (a)	2.71 E+01	7.70 E+00
	860617	Cs-134	*-5.82 E-01	3.21 E+00
		Cs-137	* 1.14 E+01	3.57 E+00
		Ba-140	*-6.80 E+00	1.31 E+01
		La-140	*-3.49 E+00	5.20 E+00
	860709	Cs-134	* 2.65 E-00	2.81 E+00
		Cs-137	* 8.19 E+00	4.56 E+00
		Ba-140	*-6.88 E+00	9.88 E+00
		La-140	*-3.79 E-01	3.56 E+00
	860722	Cs-134	* 9.08 E-02	2.68 E+00
		Cs-137	* 4.11 E+00	2.78 E+00
		Ba-140	*-3.81 E+00	9.30 E+00
		La-140	*-4.28 E-01	3.43 E+00
	860805	Cs-134	* 1.22 E+00	3.67 E+00
		Cs-137	* 4.00 E+00	3.55 E+00
		Ba-140	*-7.35 E+00	1.24 E+01
		La-140	*-1.12 E+00	4.77 E+00
	860819	Cs-134	* 2.09 E+00	2.84 E+00
		Cs-137	* 2.34 E+00	2.56 E+00
		Ba-140	*-1.50 E+00	1.10 E+01
		La-140	*-2.90 E+00	3.87 E+00
	860903	Cs-134	* 4.39 E+00	3.61 E+00
		Cs-137	* 7.49 E+00	3.42 E+00
		Ba-140	* 3.50 E+00	1.12 E+01
		La-140	* 7.25 E-01	3.82 E+00
	860916	Cs-134	*-9.72 E-01	2.34 E+00
		Cs-137	* 1.49 E+00	2.25 E+00
		Ba-140	* 6.45 E+00	8.44 E+00
		La-140	*-2.67 E+00	3.19 E+00

* Denotes a result less than the detection limit.
(a) I-131 analysis by gamma spectroscopy.

TABLE A-15.2 (Cont.)

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
36	861014	Cs-134	* 3.00 E+00	2.80 E+00
		Cs-137	* 2.80 E+00	2.40 E+00
		Ba-140	* 9.40 E-01	8.80 E+00
		La-140	* 0.00 E+00	3.00 E+00
	861118	Cs-134	*-1.70 E+00	3.50 E+00
		Cs-137	* 7.80 E+00	3.60 E+00
		Ba-140	* 1.40 E+00	1.20 E+01
		La-140	*-1.10 E+00	4.60 E+00
	861216	Cs-134	* 2.70 E-01	2.60 E+00
		Cs-137	* 5.00 E+00	2.60 E+00
		Ba-140	*-1.80 E+00	8.30 E+00
		La-140	*-1.20 E+00	3.10 E+00

* Denotes a result less than the detection limit.

TABLE A-15.2 (Cont.)

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
37	860603	Cs-134	* 8.59 E-01	4.05 E+00
		Cs-137	1.10 E+01	5.08 E+00
		Ba-140	* 4.06 E+00	1.47 E+01
		La-140	*-4.80 E+00	5.29 E+00
		I-131 (a)	2.87 E+01	1.12 E+01
	860617	Cs-134	* 2.03 E-01	3.46 E+00
		Cs-137	* 8.39 E+00	3.60 E+00
		Ba-140	* 7.56 E+00	1.40 E+01
		La-140	* 5.05 E-01	5.19 E+00
	860709	Cs-134	* 2.80 E+00	3.92 E+00
		Cs-137	* 6.63 E+00	3.67 E+00
		Ba-140	* 2.70 E+00	1.41 E+01
		La-140	*-1.06 E+00	4.28 E+00
	860722	Cs-134	*-5.32 E-01	2.86 E+00
		Cs-137	* 1.96 E+00	2.41 E+00
		Ba-140	*-1.31 E+00	9.16 E+00
		La-140	*-3.75 E+00	3.71 E+00
	860805	Cs-134	*-1.84 E-01	3.10 E+00
		Cs-137	* 9.10 E+00	3.49 E+00
		Ba-140	* 3.76 E+00	1.07 E+01
		La-140	* 1.62 E+00	4.23 E+00
	860819	Cs-134	* 1.24 E+00	2.71 E+00
		Cs-137	* 3.02 E+00	2.58 E+00
		Ba-140	*-2.54 E+00	1.07 E+01
		La-140	*-1.35 E+00	3.52 E+00
	860903	Cs-134	* 1.20 E+00	2.62 E+00
		Cs-137	1.22 E+01	3.85 E+00
		Ba-140	*-2.88 E+00	8.15 E+00
		La-140	* 1.59 E-01	2.76 E+00
	860916	Cs-134	*-2.86 E-01	3.56 E+00
		Cs-137	* 3.94 E+00	3.11 E+00
		Ba-140	* 1.03 E+00	1.23 E+01
		La-140	*-1.14 E+00	4.63 E+00

* Denotes a result less than the detection limit.
(a) I-131 analysis by gamma spectroscopy.

TABLE A-15.2 (Cont.)

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
37	861014	Cs-134	*-5.90 E-01	3.82 E+01
		Cs-137	* 3.60 E+00	3.50 E+00
		Ba-140	* 1.10 E+00	1.30 E+01
		La-140	* 4.00 E+00	5.10 E+00
	861118	Cs-134	*-1.00 E-01	3.50 E+00
		Cs-137	* 3.00 E+00	3.30 E+00
		Ba-140	*-8.80 E+00	1.30 E+01
		La-140	* 0.00 E-01	4.30 E+00
	861216	Cs-134	* 3.40 E+00	2.90 E+00
		Cs-137	* 7.40 E+00	3.00 E+00
		Ba-140	*-6.40 E+00	9.10 E+00
		La-140	* 0.00 E-01	3.50 E+00

* Denotes a result less than the detection limit.

TABLE A-15.2 (Cont.)

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
40	860603	Cs-134	1.86 E+01	5.55 E+00
		Cs-137	3.48 E+01	6.17 E+00
		Ba-140	* 3.82 E+00	1.28 E+01
		La-140	* 1.90 E+00	4.41 E+00
		I-131 (a)	4.37 E+01	1.12 E+01
	860617	Cs-134	1.54 E+01	7.27 E+00
		Cs-137	4.52 E+01	8.67 E+00
		Ba-140	*-6.74 E+00	2.13 E+01
		La-140	* 0.00 E-01	7.04 E+00
	860709	Cs-134	* 4.67 E+00	3.09 E+00
		Cs-137	2.17 E+01	4.23 E+00
		Ba-140	* 4.24 E+00	9.55 E+00
		La-140	* 2.12 E-01	3.47 E+00
	860722	Cs-134	*-7.26 E-02	2.58 E+00
		Cs-137	* 5.74 E+00	2.65 E+00
		Ba-140	* 8.51 E-01	9.40 E+00
		La-140	*-1.31 E+00	4.08 E+00
	860805	Cs-134	* 4.82 E-01	3.44 E+00
		Cs-137	* 6.99 E+00	3.30 E+00
		Ba-140	*-6.13 E+00	1.18 E+01
		La-140	* 1.43 E+00	4.46 E+00
	860819	Cs-134	* 1.60 E-01	2.52 E+00
		Cs-137	* 2.59 E+00	2.35 E+00
		Ba-140	* 7.81 E+00	9.97 E+00
		La-140	* 2.51 E+00	3.67 E+00
	860903	Cs-134	* 8.78 E-02	2.71 E+00
		Cs-137	* 2.70 E+00	2.58 E+00
		Ba-140	*-8.81 E-01	8.34 E+00
		La-140	* 2.42 E+00	3.43 E+00
	860916	Cs-134	* 7.52 E-02	2.28 E+00
		Cs-137	* 4.75 E+00	2.42 E+00
		Ba-140	* 2.13 E-01	8.22 E+00
		La-140	*-1.95 E+00	3.26 E+00

* Denotes a result less than the detection limit.
(a) I-131 analysis by gamma spectroscopy.

TABLE A-15.2 (Cont.)

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
40	861014	Cs-134	* 5.70 E-01	3.30 E+00
		Cs-137	* 9.60 E+00	3.50 E+00
		Ba-140	*-5.80 E+00	1.20 E+01
		La-140	* 1.60 E+00	4.40 E+00
	861118	Cs-134	* 1.70 E+00	4.80 E+00
		Cs-137	* 5.50 E+00	4.20 E+00
		Ba-140	* 0.00 E-01	1.70 E+01
		La-140	*-2.30 E+00	5.40 E+00
	861216 (a)	Cs-134	* 8.20 E+00	5.10 E+00
		Cs-137	* 2.39 E+01	6.90 E+00
		Ba-140	*-1.90 E+00	1.60 E+01
		La-140	* 2.30 E+00	5.30 E+00

* Denotes a result less than the detection limit.

(a) Small sample analyzed due to spillage in transit.

TABLE A-15.2 (Cont.)

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
58	860603	Cs-134	* 7.43 E+00	4.12 E+00
		Cs-137	9.58 E+00	5.61 E+00
		Ba-140	* 9.08 E+00	1.40 E+01
		La-140	* 2.41 E-01	5.01 E+00
	860617	Cs-134	9.01 E+00	4.54 E+00
		Cs-137	1.90 E+01	4.33 E+00
		Ba-140	*-9.18 E-01	1.41 E+01
		La-140	* 7.22 E-01	5.00 E+00
	860709	Cs-134	1.31 E+01	5.22 E+00
		Cs-137	2.40 E+01	5.34 E+00
		Ba-140	* 3.10 E+00	9.85 E+00
		La-140	*-2.13 E+00	3.76 E+00
	860722	Cs-134	* 9.17 E+00	3.10 E+00
		Cs-137	2.20 E+01	4.40 E+00
		Ba-140	*-9.66 E-01	1.02 E+01
		La-140	*-1.93 E-01	3.73 E+00
	860805	Cs-134	* 1.10 E+01	5.00 E+00
		Cs-137	2.34 E+01	6.02 E+00
		Ba-140	* 5.46 E+00	1.67 E+01
		La-140	* 5.97 E+00	5.44 E+00
	860819	Cs-134	* 9.28 E+00	3.94 E+00
		Cs-137	2.79 E+01	5.12 E+00
		Ba-140	*-1.02 E+01	1.39 E+01
		La-140	*-1.25 E+00	4.72 E+00
	860903	Cs-134	* 8.15 E+00	3.20 E+00
		Cs-137	1.88 E+01	4.65 E+00
		Ba-140	*-5.69 E-01	8.58 E+00
		La-140	* 0.00 E-01	2.95 E+00
	860916	Cs-134	* 4.64 E+00	2.94 E+00
		Cs-137	1.66 E+01	4.43 E+00
		Ba-140	*-4.40 E+00	9.07 E+00
		La-140	* 1.44 E+00	3.75 E+00

* Denotes a result less than the detection limit.

TABLE A-15.2 (Cont.)

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
58	861014	Cs-134	2.02 E+01	5.50 E+00
		Cs-137	4.73 E+01	6.20 E+00
		Ba-140	* 5.50 E+01	1.30 E+01
		La-140	* 1.10 E+00	4.60 E+00
	861118	Cs-134	* 3.40 E+00	3.60 E+00
		Cs-137	1.48 E+01	7.40 E+00
		Ba-140	* 0.00 E+01	1.20 E+01
		La-140	*-1.80 E+00	4.50 E+00
	861216	Cs-134	* 3.70 E+00	2.70 E+00
		Cs-137	* 6.00 E+00	2.60 E+00
		Ba-140	*-8.60 E-01	8.70 E+00
		La-140	*-1.40 E+00	3.10 E+00

* Denotes a result less than the detection limit.

TABLE A-15.2 (Cont.)

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
96	860603	Cs-134	*-2.74 E+00	4.82 E+00
		Cs-137	* 1.62 E-01	4.48 E+00
		Ba-140	*-1.53 E+00	1.95 E+01
		La-140	* 5.66 E+00	6.97 E+00
	860617	Cs-134	*-6.71 E-01	2.42 E+00
		Cs-137	* 4.07 E+00	2.47 E+00
		Ba-140	* 4.24 E+00	9.80 E+00
		La-140	*-3.71 E+00	3.94 E+00
	860709	Cs-134	* 3.58 E+00	2.72 E+00
		Cs-137	* 5.75 E+00	2.69 E+00
		Ba-140	*-2.52 E+00	9.31 E+00
		La-140	* 1.91 E+00	3.19 E+00
	860722	Cs-134	* 1.59 E+00	2.72 E+00
		Cs-137	* 5.41 E+00	2.67 E+00
		Ba-140	*-2.54 E-01	9.65 E+00
		La-140	* 0.00 E-01	3.75 E+00
	860805	Cs-134	* 1.19 E+00	2.72 E+00
		Cs-137	* 1.91 E+00	2.69 E+00
		Ba-140	*-1.12 E+01	9.20 E+00
		La-140	*-1.82 E-01	3.52 E+00
	860819	Cs-134	* 1.73 E+00	2.66 E+00
		Cs-137	* 4.05 E+00	2.50 E+00
		Ba-140	* 0.00 E-01	9.43 E+00
		La-140	* 7.89 E-01	3.77 E+00
	860903	Cs-134	*-2.36 E-01	4.59 E+00
		Cs-137	* 2.61 E+00	4.11 E+00
		Ba-140	*-5.67 E+00	1.50 E+01
		La-140	*-4.53 E+00	4.97 E+00
	860916	Cs-134	* 1.02 E+00	3.72 E+00
		Cs-137	* 1.04 E+01	3.74 E+00
		Ba-140	* 3.44 E+00	1.53 E+01
		La-140	*-2.28 E+00	5.80 E+00

* Denotes a result less than the detection limit.

TABLE A-15.2 (Cont.)

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
96	861014	Cs-134	* 1.40 E+00	4.90 E+00
		Cs-137	*-5.20 E-01	4.60 E+00
		Ba-140	*-4.10 E+00	1.80 E+01
		La-140	* 5.40 E+00	6.00 E+00
	861118	Cs-134	*-3.00 E-01	2.60 E+00
		Cs-137	* 1.10 E+00	2.40 E+00
		Ba-140	* 3.00 E+00	9.20 E+00
		La-140	*-8.90 E-01	3.10 E+00
	861216	Cs-134	*-1.10 E+00	3.40 E+00
		Cs-137	* 2.50 E+00	3.20 E+00
		Ba-140	*-7.00 E+00	1.20 E+01
		La-140	*-2.90 E+00	4.10 E+00

* Denotes a result less than the detection limit.

TABLE A-15.3

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

NUCLIDE	AVERAGE	LOW	HIGH	NUMBER SAMPLES	NUMBER POSITIVE
Cs-134 (I)	3.36 E+00	-3.07 E+00	2.02 E+01	67	8
Cs-134 (C)	3.79 E-02	-5.35 E+00	3.58 E+00	18	0
Cs-137 (I)	8.90 E+00	-3.15 E+00	4.73 E+01	67	17
Cs-137 (C)	2.35 E+00	-2.12 E+00	1.04 E+01	18	0
I-131(I)(a)	74.7	27.1	1.70 E+02	67	7
I-131(C)(a)	-	-	-	18	0

(I) = Indicator Station
(C) = Control Station
(a) Considering only the positive I-131 results.

TABLE A-16.1

STRONTIUM 89 AND 90 IN MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
40	5/20/86	Sr-89	*3.9 E-01	1.2 E+00
		Sr-90	1.3 E+00	6.7 E-01

*Denotes a result less than the detection limit.

TABLE A-16.2

STRONTIUM 89 AND 90 IN MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
40	6/03/86	Sr-89	*-2.6 E-01	2.9 E+00
		Sr-90	1.3 E+00	9.0 E-01
40	6/17/86	Sr-89	*-4.9 E-01	3.3 E+00
		Sr-90	3.9 E+00	9.0 E-01
58	10/14/86	Sr-89	* 5.3 E+00	4.1 E+00
		Sr-90	1.3 E+00	6.0 E-01

*Denotes a result less than the detection limit.

TABLE A-17.1

GAMMA SPECTROMETRY OF ROOT

Results in pCi/kg (wet)

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
9 Beets	860528	Cs-137	* 2.70 E+00	1.23 E+01
		Cs-134	*-1.13 E+01	1.43 E+01
		I-131	* 1.01 E+01	2.00 E+01
37 Onions	860528	Cs-137	*-5.48 E+00	1.49 E+01
		Cs-134	* 1.20 E+01	1.26 E+01
		I-131	* 3.35 E+01	1.80 E+01

* Denotes a result less than the contractual detection limit.

TABLE A-17.2 (Cont.)

GAMMA SPECTROMETRY OF ROOT

Results in pCi/kg (wet)

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
9				
Onion	860617	Cs-134	* 1.30 E+01	7.42 E+00
		Cs-137	* 6.70 E+00	7.06 E+00
		I-131	* 1.61 E+01	2.86 E+01
Carrot	860722	Cs-134	* 7.05 E-01	3.82 E+00
		Cs-137	* 2.83 E+00	3.68 E+00
		I-131	*-8.22 E+00	8.84 E+00
Beet Top	860819	Cs-134	* 1.67 E+00	4.06 E+00
		Cs-137	* 2.54 E+00	3.85 E+00
		I-131	* 7.90 E+00	1.07 E+01
Carrot	860819	Cs-134	* 1.19 E-01	3.87 E+00
		Cs-137	* 4.84 E+00	3.71 E+00
		I-131	*-5.11 E+00	9.30 E+00
Onion	860916	Cs-134	* 5.43 E-01	6.70 E+00
		Cs-137	* 3.25 E+00	6.31 E+00
		I-131	*-7.39 E-01	1.61 E+01

* Denotes a result less than the detection limit.

TABLE A-17.2 (Cont.)

GAMMA SPECTROMETRY OF ROOT

Results in pCi/kg (wet)

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
37				
Onion	860617	Cs-134	*-3.48 E+00	6.04 E+00
		Cs-137	* 7.79 E+00	5.46 E+00
		I-131	*-1.29 E+01	2.39 E+01
Carrot	860722	Cs-134	* 1.39 E+00	3.43 E+00
		Cs-137	* 5.64 E+00	3.33 E+00
		I-131	*-2.01 E+00	8.56 E+00
Carrot	860819	Cs-134	*-3.00 E+00	6.55 E+00
		Cs-137	* 1.56 E+01	6.17 E+00
		I-131	*-7.72 E+00	1.57 E+01
Carrot	860916	Cs-134	* 0.00 E-01	4.58 E+00
		Cs-137	* 3.65 E-01	4.33 E+00
		I-131	* 0.00 E-01	1.08 E+01

* Denotes a result less than the detection limit.

TABLE A-17.3

GAMMA SPECTROMETRY OF ROOT

Results in pCi/kg (wet)

NUCLIDE	AVERAGE	LOW	HIGH	NUMBER SAMPLES	NUMBER POSITIVE
Cs-134 (I)	1.38 E+00	-3.48 E+00	1.20 E+01	5	0
Cs-134 (C)	7.90 E-01	-1.13 E+01	1.30 E+01	6	0
Cs-137 (I)	4.78 E+00	-5.48 E+00	1.56 E+01	5	0
Cs-137 (C)	3.81 E+00	2.54 E+00	6.70 E+00	6	0
I-131 (I)	2.17 E+00	-1.29 E+01	3.35 E+01	5	0
I-131 (C)	3.34 E+00	-8.22 E+00	1.61 E+01	6	0

(I) = Indicator Station
(C) = Control Station

TABLE A-18.1

GAMMA SPECTROMETRY OF FRUIT

Results in pCi/kg (wet)

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
37				
Strawberries	860528	Cs-137	* 1.33 E+01	9.95 E+00
		Cs-134	* 8.11 E-01	1.09 E+01
		I-131	* 9.03 E+00	1.28 E+01

* Denotes a result less than the detection limit.

TABLE A-18.2

GAMMA SPECTROMETRY OF FRUIT

Results in pCi/kg (wet)

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
9				
Cherries	860617	Cs-134	* 4.22 E+00	4.77 E+00
		Cs-137	* 6.07 E+00	4.59 E+00
		I-131	* 7.79 E+00	1.89 E+01
Apple	860722	Cs-134	* 8.79 E-01	4.64 E+00
		Cs-137	* 5.15 E+00	4.69 E+00
		I-131	*-6.35 E+00	1.30 E+01
Apple	860819	Cs-134	* 0.00 E-01	7.17 E+00
		Cs-137	* 1.01 E+01	6.42 E+00
		I-131	* 3.03 E+00	1.76 E+01
Apple	860916	Cs-134	* 3.82 E+00	9.85 E+00
		Cs-137	*-4.02 E-01	8.58 E+00
		I-131	* 6.04 E+00	2.00 E+01

* Denotes a result less than the detection limit.

TABLE A-18.2 (Cont.)

GAMMA SPECTROMETRY OF FRUIT

Results in pCi/kg (wet)

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
37				
Raspberry	860617	Cs-134	* 4.43 E+00	3.41 E+00
		Cs-137	9.99 E+00	4.78 E+00
		I-131	* 9.21 E+00	1.29 E+01
Apple	860722	Cs-134	* 8.44 E+00	5.52 E+00
		Cs-137	* 5.30 E+00	5.19 E+00
		I-134	*-5.60 E+00	1.49 E+01
Apple	860819	Cs-134	* 7.67 E+00	1.01 E+01
		Cs-137	*-3.62 E+00	9.58 E+00
		I-131	*-5.79 E+00	2.71 E+01
Apple	860916	Cs-134	* 4.83 E-01	4.40 E+00
		Cs-137	* 2.75 E+00	4.37 E+00
		I-131	* 3.06 E+00	1.01 E+01

* Denotes a result less than the detection limit.

TABLE A-18.3

GAMMA SPECTROMETRY OF FRUIT

Results in pCi/kg (wet)

NUCLIDE	AVERAGE	LOW	HIGH	NUMBER SAMPLES	NUMBER POSITIVE
Cs-134 (I)	4.37 E+00	4.83 E-01	8.44 E+00	5	0
Cs-134 (C)	2.30 E-01	8.79 E-01	4.22 E+00	4	0
Cs-137 (I)	5.54 E+00	-3.62 E+00	1.33 E+01	5	1
Cs-137 (C)	-4.72 E+00	-4.02 E+01	1.01 E+01	4	0
I-131 (I)	1.98 E+00	-5.79 E+00	9.21 E+00	5	0
I-131 (C)	2.63 E+00	-6.35 E+00	7.79 E+00	4	0

(I) = Indicator Station
(C) = Control Station

TABLE A-19.1

GAMMA SPECTROMETRY OF VEGETABLES

Results in pCi/kg (wet)

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
9				
Spinach	860514	Cs-137	* 1.72 E+01	1.68 E+01
		Cs-134	* 1.12 E+00	1.84 E+01
		Ru-103	* 1.49 E+01	1.37 E+01
		I-131	2.56 E+02	3.79 E+01
Spinach	860514	Cs-137	* 3.56 E+01	1.66 E+01
		Cs-134	* 3.07 E+00	1.46 E+01
		Ru-103	* 1.78 E+01	1.75 E+01
		I-131	3.19 E+02	4.61 E+01
Lettuce	860528	Cs-137	* 5.08 E+00	1.31 E+01
		Cs-134	* 3.86 E+00	1.33 E+01
		I-131	* 4.22 E+00	1.91 E+01

* Denotes a result less than the detection limit.

TABLE A-19.1 (Cont.)

GAMMA SPECTROMETRY OF VEGETABLES

Results in pCi/kg (wet)

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
37				
Lettuce	860528	Cs-137	* 1.05 E+01	1.32 E+01
		Cs-134	* 1.62 E+01	1.46 E+01
		I-131	* 2.67 E+01	1.65 E+01

* Denotes a result less than the detection limit.

TABLE A-19.2

GAMMA SPECTROMETRY OF VEGETABLES

Results in pCi/kg (wet)

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
9				
Lettuce	860617	Cs-134	* 3.48 E+00	6.96 E+00
		Cs-137	*-7.12 E-01	6.26 E+00
		I-131	* 9.13 E+00	2.39 E+01
Cabbage	860722	Cs-134	* 1.11 E-01	3.94 E+00
		Cs-137	* 4.74 E+00	3.57 E+00
		I-131	*-6.97 E+00	9.09 E+00
Lettuce	860916	Cs-134	* 5.10 E+00	5.66 E+00
		Cs-137	* 1.11 E+01	5.54 E+00
		I-131	*-2.36 E+00	1.25 E+01

* Denotes a result less than the detection limit.

TABLE A-19.2 (Cont.)

GAMMA SPECTROMETRY OF VEGETABLES

Results in pCi/kg (wet)

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
37				
Lettuce	860617	Cs-134	* 5.29 E+00	6.01 E+00
		Cs-137	* 9.97 E+00	6.46 E+00
		I-131	*-2.13 E+01	2.51 E+01
Cabbage	860722	Cs-134	* 1.04 E+00	4.86 E+00
		Cs-137	* 7.38 E+00	4.53 E+00
		I-131	*-1.00 E+01	1.12 E+01
Cabbage	860819	Cs-134	* 0.00 E-01	7.23 E+00
		Cs-137	* 1.04 E+01	7.70 E+00
		I-131	*-1.87 E+00	1.82 E+01

* Denotes a result less than the detection limit.

TABLE A-19.3

GAMMA SPECTROMETRY OF VEGETABLES

Results in pCi/kg (wet)

NUCLIDE	AVERAGE	LOW	HIGH	NUMBER SAMPLES	NUMBER POSITIVE
Cs-134 (I)	5.63 E+00	1.04 E+00	1.62 E+01	4	0
Cs-134 (C)	2.79 E+00	1.10 E-01	5.10 E+00	6	0
Cs-137 (I)	9.56 E+00	7.38 E+00	1.05 E+01	4	0
Cs-137 (C)	4.20 E-01	-7.12 E+01	3.56 E+01	6	0
I-131 (I)	-1.62 E+00	-2.13 E+01	2.67 E+01	4	0
I-131 (C)	9.65 E+01	-6.97 E+00	3.19 E+02	6	2

(I) = Indicator Station
(C) = Control Station

APPENDIX B: RESULTS OF SPECIAL SAMPLING FOLLOWING THE CHERNOBYL ACCIDENT

TABLE B-1

TLD RESULTS

Results in mR/day

LOCATION	COLLECTION PERIOD	RESULT	ERROR (2σ)
71	860501 to 860508	0.32	0.07
72	"	0.32	0.07
73	"	0.29	0.02
74	"	0.33	0.07
75	"	0.28	0.10
76	"	0.29	0.04
77	"	0.30	0.03
78	"	0.28	0.10
79	"	0.30	0.05
80	"	0.29	0.04
81	"	0.29	0.02
82	"	0.30	0.02
83	"	0.31	0.02
84	"	0.30	0.03
85	"	0.30	0.03
86	"	0.29	0.07
71	860508 to 860515	0.38	0.05
72	"	0.40	0.05
73	"	0.37	0.01
74	"	0.39	0.06
75	"	0.36	0.02
76	"	0.37	0.04
77	"	0.39	0.02
78	"	0.38	0.05
79	"	0.42	0.06
80	"	0.39	0.06
81	"	0.39	0.06
82	"	0.40	0.05
83	"	0.39	0.04
84	"	0.38	0.02
85	"	0.38	0.08
86	"	0.37	0.01

TABLE B-1 (Cont.)

TLD RESULTS

Results in mR/day

LOCATION	COLLECTION PERIOD	RESULT	ERROR (2σ)
71	860515 to 860522	0.36	0.05
72	"	0.38	0.08
73	"	0.31	0.14
74	"	0.36	0.04
75	"	0.34	0.05
76	"	0.35	0.03
77	"	0.37	0.01
78	"	0.35	0.03
79	"	0.34	0.06
80	"	0.36	0.05
81	"	0.40	0.03
82	"	0.37	0.03
83	"	0.41	0.05
84	"	0.36	0.03
85	"	0.39	0.04
86	"	0.35	0.05
71	860522 to 860529	0.30	0.06
72	"	0.33	0.02
73	"	0.31	0.08
74	"	0.32	0.05
75	"	0.28	0.03
76	"	0.31	0.04
77	"	0.31	0.05
78	"	0.31	0.06
79	"	0.31	0.04
80	"	0.31	0.03
81	"	0.33	0.04
82	"	0.32	0.05
83	"	0.34	0.04
84	"	0.30	0.08
85	"	0.32	0.04
86	"	0.31	0.03

TABLE B-1 (Cont.)

TLD RESULTS

Results in mR/day

LOCATION	COLLECTION PERIOD	RESULT	ERROR (2σ)
71	860529 to 860605	0.33	0.02
72	"	0.32	0.03
73	"	0.31	0.03
74	"	0.33	0.02
75	"	0.30	0.04
76	"	0.30	0.06
77	"	0.30	0.05
78	"	0.20 (a)	0.30
79	"	0.10 (a)	0.19
80	"	0.28	0.05
81	"	0.11 (a)	0.12
82	"	0.30	0.03
83	"	0.29	0.03
84	"	0.29	0.03
85	"	0.29	0.07
86	"	0.27	0.02
71	860605 to 860619	0.26	0.03
72	"	0.26	0.01
73	"	0.23	0.01
74	"	0.26	0.01
75	"	0.24	0.01
76	"	0.25	0.02
77	"	0.30	0.16
78	"	0.26	0.02
79	"	0.25	0.02
80	"	0.25	0.05
81	"	0.26	0.01
82	"	0.26	0.04
83	"	0.26	0.04
84	"	0.26	0.01
85	"	0.27	0.03
86	"	0.25	0.05

(a) Badge processing problems; these results not included in the summary.

TABLE B-1 (Cont.)

TLD RESULTS

Results in mR/day

LOCATION	COLLECTION PERIOD	RESULT	ERROR (2σ)
71	860619 to 860703	0.31	0.04
72	"	0.31	0.04
73	"	0.28	0.02
74	"	0.29	0.01
75	"	0.28	0.03
76	"	0.29	0.03
77	"	0.30	0.03
78	"	0.28	0.03
79	"	0.28	0.01
80	"	0.27	0.02
81	"	0.28	0.03
82	"	0.28	0.05
83	"	0.30	0.03
84	"	0.29	0.03
85	"	0.28	0.02
86	"	0.29	0.04

COLLECTION PERIOD	MEAN RESULT	ERROR (2σ)
860501 to 860508	0.30	0.04
860508 to 860515	0.39	0.02
860515 to 860522	0.36	0.04
860522 to 860529	0.31	0.02
860529 to 860605	0.30	0.02
860605 to 860619	0.26	0.02
860619 to 860703	0.28	0.02

TABLE B-2

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION[a]	COLLECTION PERIOD	RESULT	OVERALL ERROR
102	860502 to 860505	1.1 E-02	4.0 E-03
121	860502 to 860505	8.0 E-03	4.0 E-03
102	860505 to 860508	1.4 E-02	5.0 E-03
121	860505 to 860508	1.6 E-02	5.0 E-03
102	860508 to 860512	9.5 E-01	1.0 E-01
121	860508 to 860512	9.3 E-01	1.0 E-01
102	860512 to 860515	3.6 E-01	4.0 E-02
121	860512 to 860515	3.3 E-01	4.0 E-02
102	860515 to 860519	8.0 E-01	9.0 E-02
121	860515 to 860519	8.0 E-01	9.0 E-02
102	860519 to 860522	2.1 E-01	3.0 E-02
121	860519 to 860522	1.8 E-01	3.0 E-02
102	860522 to 860527	2.7 E-01	3.0 E-02
121	860522 to 860527	1.8 E-01	3.0 E-02
102	860527 to 860529	1.0 E-01	2.0 E-02
121	860527 to 860529	1.0 E-01	2.0 E-02
102	860529 to 860602	1.2 E-01	1.0 E-02
121	860529 to 860602	1.0 E-01	1.0 E-02
102	860602 to 860605	5.3 E-02	1.0 E-02
121	860602 to 860605	5.2 E-02	1.0 E-02
102	860605 to 860609	4.5 E-02	1.0 E-02
121	860605 to 860609	4.1 E-02	1.0 E-02
102	860609 to 860613	3.7 E-02	1.0 E-02
121	860609 to 860613	3.5 E-02	1.0 E-02
102	860613 to 860616	3.3 E-02	1.0 E-02
121	860613 to 860616	2.2 E-02	1.0 E-02
102	860616 to 860620	1.4 E-02	4.0 E-02
121	860616 to 860620	1.1 E-02	3.0 E-02

(a) Station #102 was located at the Plant 2 Sanitation Facility
Station #121 was located at the Security Firing Range

TABLE B-3

IODINE-131 IN CHARCOAL FILTERS

Results in pCi/cubic meter

LOCATION[a]	COLLECTION PERIOD	RESULT	OVERALL ERROR
102	860502 to 860505	1.8 E-02	1.0 E-02
121	860502 to 860505	4.0 E-03	1.0 E-02
102	860505 to 860508	4.2 E-02	1.0 E-02
121	860505 to 860508	2.6 E-02	2.0 E-02
102	860508 to 860512	1.5 E+00	1.6 E-01
121	860508 to 860512	1.3 E+00	1.4 E-01
102	860512 to 860515	6.0 E-01	8.0 E-02
121	860512 to 860515	5.4 E-01	6.0 E-02
102	860515 to 860519	8.1 E-01	1.0 E-01
121	860515 to 860519	7.5 E-01	9.0 E-02
102	860519 to 860522	1.2 E-01	3.0 E-02
121	860519 to 860522	1.2 E-01	3.0 E-02
102	860522 to 860527	1.8 E-01	2.0 E-02
121	860522 to 860527	7.4 E-02	3.0 E-02
102	860527 to 860529	4.0 E-02	3.0 E-02
121	860527 to 860529	6.4 E-02	4.0 E-02
102	860529 to 860602	5.9 E-02	3.0 E-02
121	860529 to 860602	3.7 E-02	2.0 E-02
102	860602 to 860605	4.4 E-02	2.0 E-02
121	860602 to 860605	2.0 E-02	2.0 E-02
102	860605 to 860609	3.4 E-02	1.0 E-02
121	860605 to 860609	7.0 E-03	2.0 E-02
102	860609 to 860613	5.0 E-03	1.0 E-02
121	860609 to 860613	9.0 E-03	1.0 E-02
102	860613 to 860616	7.0 E-03	2.0 E-02
121	860613 to 860616	1.0 E-03	2.0 E-02
102	860616 to 860620	-6.0 E-03	2.0 E-02
121	860616 to 860620	-8.0 E-03	1.0 E-02

(a) Station #102 was located at the Plant 2 Sanitation Facility
Station #121 was located at the Security Firing Range

TABLE B-4

GAMMA SPECTROMETRY OF PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
102	860505 to 860508	Cs-137	7.0 E-03	1.0 E-02
		Cs-134	-1.0 E-03	1.0 E-02
121	860505 to 860508	Cs-137	2.1 E-02	1.0 E-02
		Cs-134	-2.0 E-03	2.0 E-02
102	860508 to 860512	I-131	2.4 E-01	4.0 E-02
		Cs-137	2.6 E-01	5.0 E-02
		Cs-134	1.1 E-01	3.0 E-02
		Ru-103	1.6 E-01	3.0 E-02
121	860508 to 860512	I-131	2.7 E-01	5.0 E-02
		Cs-137	2.3 E-01	4.0 E-02
		Cs-134	9.2 E-02	3.0 E-02
102	860512 to 860515	I-131	1.3 E-01	6.0 E-02
		Cs-137	7.3 E-02	2.0 E-02
		Cs-134	3.7 E-02	2.0 E-02
		Ru-103	9.8 E-02	2.0 E-02
121	860512 to 860515	I-131	8.3 E-02	6.0 E-02
		Cs-137	7.9 E-02	2.0 E-02
		Cs-134	4.5 E-02	2.0 E-02
		Ru-103	9.0 E-02	2.0 E-02
		Ce-144	2.8 E-02	5.0 E-02
102	860515 to 860519	I-131	1.6 E-01	4.0 E-02
		Cs-137	1.3 E-01	3.0 E-02
		Cs-134	7.2 E-02	2.0 E-02
		Ru-103	2.0 E-01	3.0 E-02
121	860515 to 860519	I-131	1.4 E-01	4.0 E-02
		Cs-137	1.2 E-01	2.0 E-02
		Cs-134	6.9 E-02	2.0 E-02
		Ru-103	1.6 E-01	3.0 E-02
102	860519 to 860522	I-131	3.7 E-02	2.0 E-02
		Cs-137	3.2 E-02	1.0 E-02
		Cs-134	1.5 E-02	1.0 E-02
		Ru-103	6.3 E-02	1.0 E-02
121	860519 to 860522	I-131	3.5 E-02	2.0 E-02
		Cs-137	4.6 E-02	1.0 E-02
		Cs-134	1.8 E-02	1.0 E-02
		Ru-103	4.7 E-02	2.0 E-02

TABLE B-4 (Cont.)

GAMMA SPECTROMETRY OF PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
102	860522 to 860527	I-131	5.8 E-02	2.0 E-02
		Cs-137	4.7 E-02	1.0 E-02
		Cs-134	1.9 E-02	1.0 E-02
		Ru-103	9.3 E-02	2.0 E-02
121	860522 to 860527	I-131	2.8 E-02	2.0 E-02
		Cs-137	4.4 E-02	1.0 E-02
		Cs-134	1.8 E-02	1.0 E-02
		Ru-103	6.6 E-02	2.0 E-02

TABLE B-5

IODINE-131 IN RAW MILK

Results in pCi/liter

LOCATION[a]	COLLECTION PERIOD	RESULT	OVERALL ERROR
136	860514	1.44 E+02	2.64 E+01
140	860514	8.43 E+01	1.56 E+01
136	860528	2.34 E+01	4.3 E+00
140	860528	4.10 E+01	7.6 E+00

(a) Stations 136 and 140 are the routine milk stations 36 and 40 located in Franklin County.

TABLE B-6

GAMMA SPECTROMETRY OF RAW MILK

Results in pCi/liter

LOCATION[a]	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
136	860514	I-131	1.81 E+02	1.97 E+01
		Cs-137	1.18 E+01	3.80 E+00
		Cs-134	6.40 E+00	3.50 E+00
140	860514	I-131	9.77 E+01	1.16 E+01
		Cs-137	2.62 E+01	5.40 E+00
		Cs-134	1.55 E+01	4.20 E+00
136	860528	I-131	6.17 E+01	8.10 E+00
		Cs-137	1.67 E+01	4.40 E+00
		Cs-134	8.30 E+00	3.60 E+00
140	860528	I-131	4.77 E+01	7.50 E+00
		Cs-137	4.18 E+01	6.80 E+00
		Cs-134	2.26 E+01	4.60 E+00
136	860604	I-131	2.43 E+01	4.80 E+00
		Cs-137	8.00 E+00	3.70 E+00
		Cs-134	1.20 E+00	3.40 E+00
136	860611	I-131	9.04 E+00	3.20 E+00
		Cs-137	6.50 E+00	4.20 E+00
		Cs-134	3.40 E+00	3.30 E+00

(a) Milk Stations 136 and 140 are the routine milk stations 36 and 40 located in Franklin County.

TABLE B-7

STRONTIUM 89 AND 90 IN RAW MILK

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
140	860528	Sr-89	1.2 E+00	1.1 E+00
		Sr-90	9.7 E-01	3.9 E-01

TABLE B-8

GAMMA SPECTROMETRY OF VEGETATION

Results in pCi/kg

LOCATION	SAMPLE TYPE	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL ERROR
9	Pasture Grass	860514	I-131	1.05 E+03	1.32 E+02
			Cs-137	6.68 E+01	4.09 E+01
			Cs-134	-2.09 E+00	3.36 E+01
			Ru-103	6.35 E+01	2.76 E+01
9	Pasture Grass	860516	I-131	1.02 E+03	1.19 E+02
			Cs-137	9.38 E+01	3.02 E+01
			Cs-134	6.92 E+01	2.14 E+01
			Ru-103	7.16 E+01	2.15 E+01
9	Pasture Grass	860528	I-131	9.88 E+01	3.03 E+01
			Cs-137	8.14 E+00	1.99 E+01
			Cs-134	2.39 E+01	1.48 E+01

TABLE B-9

GAMMA SPECTROMETRY OF POULTRY/EGGS

Results in pCi/kg

LOCATION	SAMPLE TYPE	COLLECTION PERIOD	NUCLIDE	RESULTS	OVERALL ERROR
40	Eggs	860604	I-131	7.1 E+01	3.3 E+01
			Cs-137	8.4 E+00	4.7 E+00
			Cs-134	*3.3 E+00	4.0 E+00
40	Chicken	860604	Cs-137	1.6 E+01	5.5 E+00
			Cs-134	7.5 E+00	3.7 E+00
40	Eggs	860825	Cs-137	*4.9 E+00	4.6 E+00
			Cs-134	*8.0 E-01	5.0 E+00
40	Chicken	860825	Cs-137	1.2 E+01	4.7 E+00
			Cs-134	*5.1 E+00	4.5 E+00

APPENDIX C: SAMPLE DEVIATIONS

SAMPLE DEVIATIONS

Deviations from the 1986 sampling schedule or analytical procedures are listed in Table C-1. In each case, the problems resulting in the deviations were resolved, so no long term impact on the program resulted.

The majority of the sampling problems encountered during 1986 resulted from malfunction of composite water samples, particularly the composite sampler located on the plant discharge line. Following the plant outage in June, the crosstie flow from the tower makeup system, which had previously provided a continuous water flow down the discharge line, was discontinued. The lack of continuous flow resulted in the burnup of several sampler motors due to lack of water for lubricating the O-rings. As a result, from June until October, the discharge sampler was manually turned on and off during each blowdown cycle, in order to ensure sampler integrity and consistent sample collection. In October a flow switch was finally installed in the sampling line, enabling automatic operation of the sampler. However, the rapid buildup of crud in the sampling line, due to the intermittent blowdown flow caused sample line plugging. The line is now blown out with compressed air on a weekly basis to keep the line clear. Despite these problems, samples were collected each period, as scheduled. The discharge line sampling system will be modified in CY 1987 to prevent line plugging and permit automatic sampling anytime a discharge occurs.

Problems meeting water sampler calibration schedules were also experienced during 1986. Redundant calibration date tracking and notification are now used to prevent recurrence of this problem.

During 1986, the problem of using nonflow proportional composite water samplers when the Technical Specification require proportional sampling was resolved. Because the flow rate of three of the lines being sampled are fairly constant and/or the concentration of radionuclides are not expected to change dramatically, the current method of sampling based on timed intervals was determined to be

essentially equivalent to a flow proportional system. So no changes in the sampling methods for the plant intake, 300 Area and Richland water will be made. Because of the potential for large changes in both flow rate and radionuclide concentrations, the discharge line sampling system will be modified in 1987 to permit flow proportional sampling.

Also noted in Table C-1 are three reports of noncomforming data (NCD) issued by U.S. Testing during 1986. One NCD documented the miscalculation of an iodine in air result for Station 23. A second documented the cross contamination of Supply System water samples during gross beta analysis. The third NCD documented the miscalculation of La-140 results in milk samples collected in May. Steps were taken by U.S. Testing to prevent future occurrence of these problems and the affected results were corrected.

TABLE C-1

1986 SAMPLE DEVIATIONS

SAMPLE MEDIA	SAMPLING PERIOD	LOCATION	PROBLEM
Air Particulate/ Iodine	12/30/85 - 1/06/86	23	Wrong midpoint used by analytical contractor in calculation of this result; result corrected.
	1/13/86 - 5/19/86	57	Sampler found out of tolerance during routine calibrations; cfm pulled was 1.747 instead of 1.5, a difference of 16%. No corrections were made to the results for that period, since the reported results actually overestimate the airborne activity.
	3/10/86 - 3/17/86	40	Power interrupted; shortened sampling time.
	5/19/86 - 5/29/86	6	Sample inadvertently missed during exchange on 5/27/86; picked up 5/29/86.
	6/16/86 - 6/23/86	1	Sampler malfunction; no air volume obtained so gross results were determined.
	6/23/86 - 6/30/86	4	Operation time short 1.5 hours due to electrical work required for new sampler installation.
	9/27/86 - 10/6/86	21	Power outage; shortened sampling time.
	11/3/86 - 11/10/86	21	Power outage; low sample volume.
	11/10/86 - 11/17/86	8	Power outage; shortened sampling time.
Water	1/22/86 - 2/19/86	26,27 28,29	Cross-contamination of these samples with higher level samples during gross beta analysis. Results were corrected.

TABLE C-1 (Cont.)

1986 SAMPLE DEVIATIONS

SAMPLE MEDIA	SAMPLING PERIOD	LOCATION	PROBLEM
Water (Cont.)	2/19/86 - 3/19/86	29	Sampler malfunctioned; aliquots not collected during entire period so small sample volume.
	3/19/86 - 4/23/86	27	No discharge due to plant outage.
	4/23/86 - 5/21/86	27	No discharge due to plant outage.
	3/19/86 - 4/23/86	28	Algae growth plugged sampling line so motor burned out. Sampler repaired.
	5/21/86 - 6/18/86	28	Sampler malfunction during period; small sample volume.
	7/23/86 - 8/20/86	28	Sampler malfunction; no sample
	4/24/86 - 10/24/86	26,27 28,29	Samplers were not calibrated on due dates so operated 3-13 days out of calibration. This had no effect on samples since none were found out of tolerance.
Milk	12/16/86	40	Sample spilled in transit to lab; small sample analyzed; replacement sample taken 12/23/86.
	5/06/86	35,36,37 40,9,96	La-140 results determined directly rather than from Ba-La-140 value adjusted for equilibrium. Results were corrected.
Vegetables	4/23/86	37,9	Local produce unavailable; no samples.
Fish	4/22/86 - 4/25/86	30,38	Fish sampling delayed until May due to lack of available salmon and steelhead.
TLD	12/31/85 - 3/28/86	43	Quarterly TLD missing; replaced on 2/4/86.

APPENDIX D: QUALITY CONTROL PROGRAMS

D-1 SUPPLY SYSTEM ENVIRONMENTAL TLD QUALITY CONTROL PROGRAM

The Quality Control Program for the environmental TLD preparation, processing and evaluation is described in Figures D-1 and D-2. QA dosimeters, which are annealed along with the field dosimeters, stored in a lead container, exposed to 100 mR of Cesium-137 gamma radiation and processed among the field dosimeters, serve as indicators that the annealing, exposure and evaluation of the field dosimeters were properly performed. If the QA dosimeter results are greater than $\pm$ 5% (or 5mR) of the given exposure, an investigation into the source of the discrepancy is initiated. The number of QA dosimeters used during each processing is generally 10% of the number of field dosimeters.

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

Problems encountered during the processing of the third and fourth quarter dosimeters involved inconsistencies in the methods used to perform QA and field dosimeter calibration exposures and the inaccurate readout of the exposure measured by the condenser R meter. These problems have been reduced by securing the condenser R meter to the exposure table so that the source to detector distance remains constant and by promoting more careful interpretation of the detector readout.

An additional step taken to improve the quality of each run was to set aside two groups of environmental dosimeters which would be alternately used throughout the year so that the thermoluminescent response of each dosimeter could be tracked over several exposures. In this way, an unusual dosimeter response or trend in the run could be more easily investigated and resolved.

Audit dosimeters, which are exposed to known levels of radiation below the 100 mR given to the control dosimeters, were processed each quarter with the field dosimeters to verify the accuracy of the environmental TLD evaluations. The results of these audit dosimeters processed during 1986 are presented in Table D-1.1. The close agreement between the given audit exposures and the reported results indicates that dosimeter evaluation was performed without significant problems.

An additional aspect of the Quality Control program is participation in intercomparison studies. Participation in the Eighth International Intercomparison of Environmental Dosimeters was begun in late 1985 and results were received in October 1986. The dosimeters were exposed to two types of natural background radiation and also to a Cs-137 source. The two natural background sources differed in the levels of cosmic radiation relative to terrestrial radiation. Noted in the preliminary report from this study was the general underresponse of the participants' TLDs to cosmic radiation and to the Cs-137 source. The Supply System results from this intercomparison are presented in Table D-1.2.

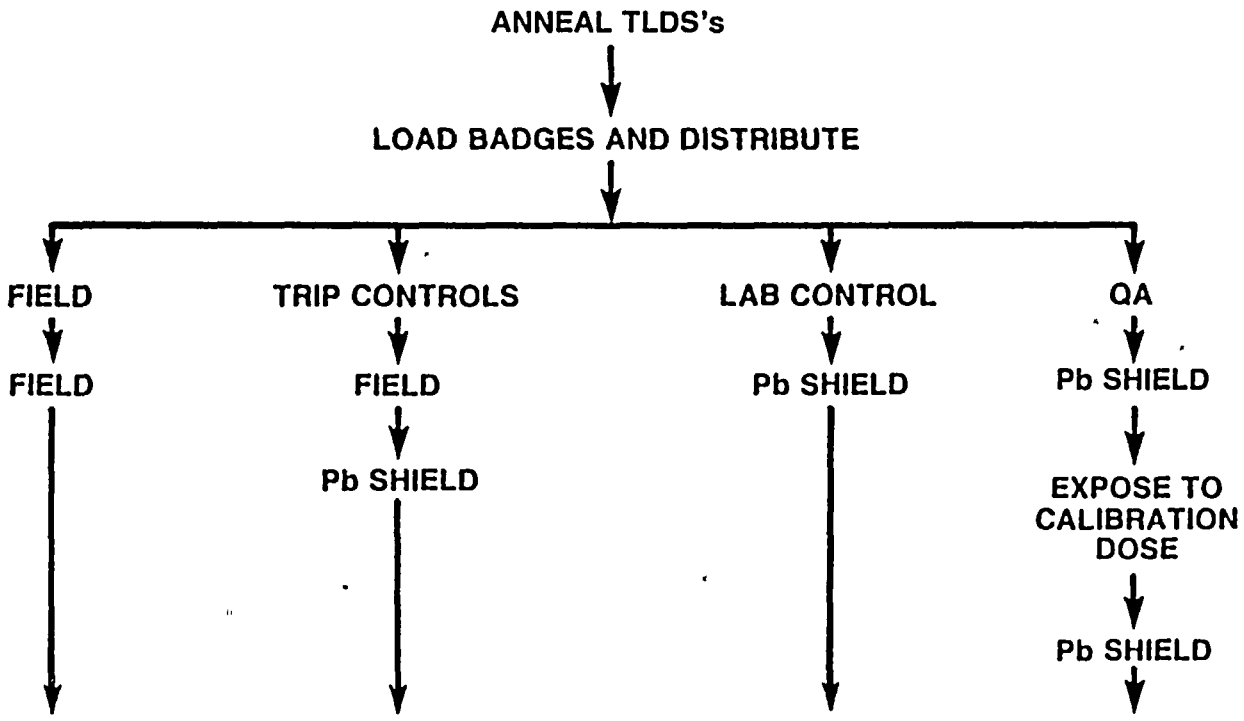

FIGURE D-1

SUPPLY SYSTEM ENVIRONMENTAL TLD PREPARATION - USE CYCLE

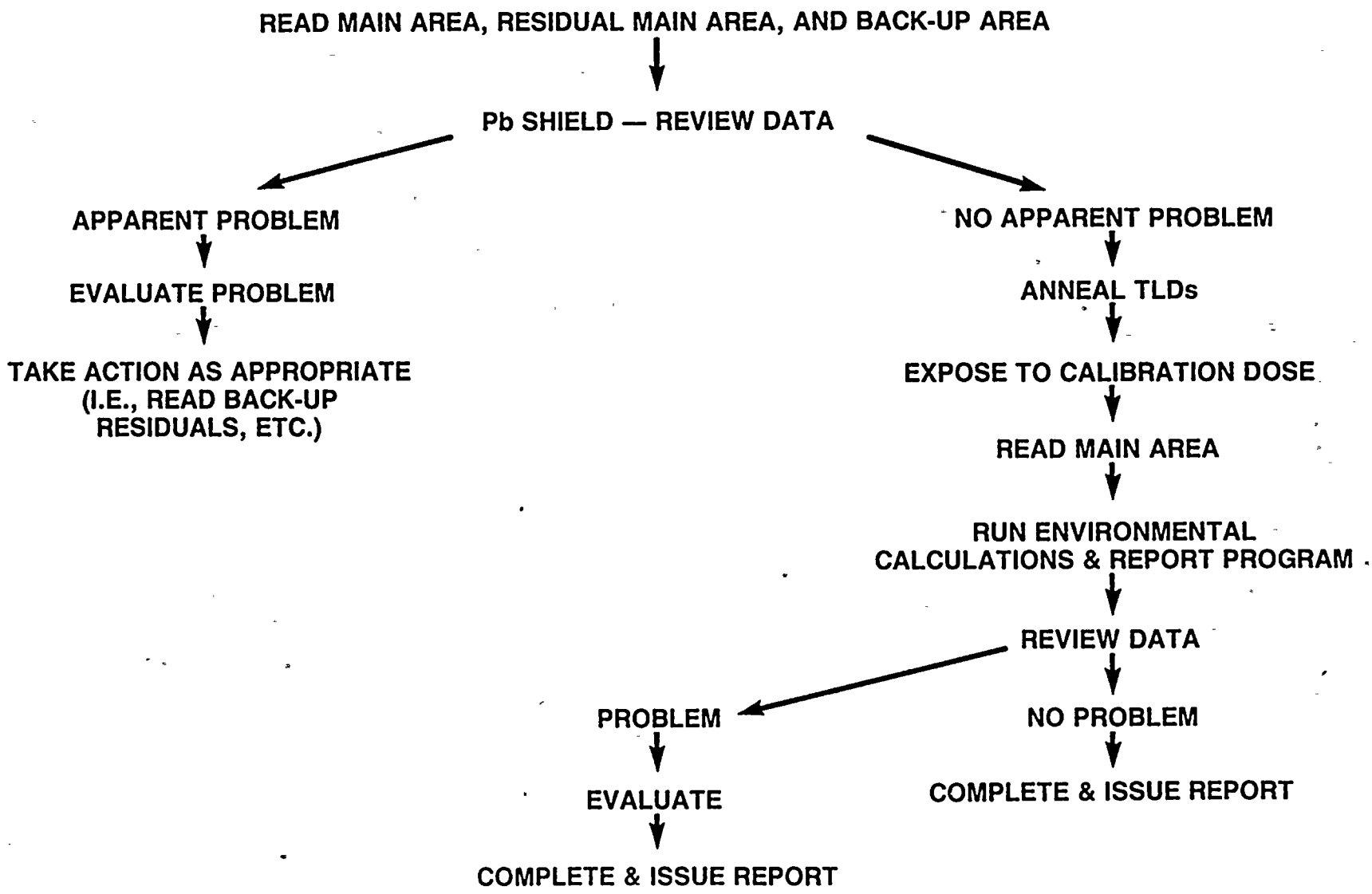

FIGURE D-2

SUPPLY SYSTEM TLD EVALUATION

TABLE D-1.1

ENVIRONMENTAL AUDIT DOSIMETER RESULTS FOR 1986

Results in mR

TLD Processing Run	Given Exposure	Reported Exposure ± 2σ Error
First Quarter	50	46.3 ± 1.2
	50	46.0 ± 1.4
	41	37.1 ± 1.5
	26	22.9 ± 0.4
	26	20.2 ± 0.8
	0	0.2 ± 0.1
Second Quarter	50	49.3 ± 2.2
	50	48.0 ± 1.4
	40	40.5 ± 1.9
	40	40.5 ± 2.6
	30	29.0 ± 1.4
	30	29.9 ± 1.2
	20	19.6 ± 0.6
	20	20.3 ± 1.2
	0	0.1 ± 0.1
	0	1.0 ± 0.2
Third Quarter	41	41.3 ± 0.1
	41	41.1 ± 1.3
	30	28.9 ± 0.4
	30	28.3 ± 0.8
	19	19.3 ± 0.6
	19	19.8 ± 0.7
	0	1.8 ± 0.3
	0	1.8 ± 0.2
Fourth Quarter	60	55.6 ± 2.3
	60	56.0 ± 1.8
	51	51.3 ± 3.0
	51	50.7 ± 2.8
	20	20.6 ± 1.2
	20	20.9 ± 1.4
	12	11.4 ± 0.4
	12	10.2 ± 0.2
	0	0.6 ± 0.2
	0	0.5 ± 0.2

TABLE D-1.1 (Cont.)

ENVIRONMENTAL AUDIT DOSIMETER RESULTS FOR 1986

Results in mR

TLD Processing Run	Given Exposure	Reported Exposure ± 2σ Error
Annual	80	83.2 ± 2.0
	80	83.3 ± 2.8
	60	61.6 ± 3.6
	60	62.8 ± 1.4
	40	41.5 ± 1.3
	40	41.5 ± 1.8
	31	33.9 ± 0.9
	31	31.9 ± 0.8
	0	0.4 ± 0.4
	0	0.4 ± 0.3

TABLE D-1.2

RESULTS OF SEVENTH INTERNATIONAL INTERCOMPARISON

OF ENVIRONMENTAL DOSIMETERS PROGRAM

Results in mR

EXPOSURE CATEGORY	GIVEN EXPOSURES (± ERROR)	SUPPLY SYSTEM RESULTS (± ERROR)	RESULTS OF ALL PARTICIPANTS (± ERROR)
Field Site #1 (75% Terrestrial, 25% Cosmic)	29.7 ± 1.5	27.6 ± 3.0	28.9 ± 6.2
Field Site #2 (20% Terrestrial, 80% Cosmic)	10.4 ± 0.5	8.6 ± 2.5	10.1 ± 4.5
Laboratory (Cesium-137)	17.2 ± 0.9	16.2 ± 2.5	16.2 ± 3.4

D-2 United States Testing Quality Control Program

To address the needs of the Supply System, UST-RD implemented a Quality Control (QC) system based on statistical concepts, as described most recently by Currie in NUREG/CR-4007. The goal of the UST-RD QC program is to demonstrate control of the analytical systems and the quality of analytical results. The primary criteria used by UST-RD to assess the effectiveness of the analytical systems are the:

- Decision Limit (Lc)
- Mean Blank Value (MBV)
- Detection Limit (Ld)
- Total Propagated Uncertainty (TPU)
- Contractual Detection Limit (CL)
- Allowed Uncertainty (AU)
- Radiochemical Yield of QC Samples (BIAS)
- Recovery of Constituent of Interest (YIELD)

The criteria above provide a means by which the acceptability of the analytical results and the QC samples, which accompany the Supply System samples through the radiochemical analyses can be assessed.

The QC "spikes" are prepared in a separate QC laboratory and submitted to the analytical laboratory for addition to the appropriate matrix material and subsequent processing along with routine samples. The QC laboratory also prepares yield monitors (tracers and stable carriers) using NBS traceable radioactivity standards, where feasible.

QC sample results are control charted and compared to the internal QC limits derived from the Lc, MBV, and TPU concepts. The values for MBV, Lc and Ld have been measured and are accurately known for analyses and matrices which are frequently requested. Comparison of TPU to AU indicates whether or not the analysis achieved the contractual specifications. Unless the number of spikes observed outside of the AU limits are greater than 5%, the analytical systems are considered to be in control. The quality of the QC data is a measure of the

quality of the actual sample results. Analyses of replicate spiked samples are used as a check of the precision of the sytems. The measure of the accuracy of the analytical systems is obtained by comparing the "found" value of the QC spikes to the "expected" value considering the AU limit at the activity level of the spikes. The TPU of the actual sample is compared to the AU limit at the activity level of the sample. The result of the comparison indicates whether or not a sample needs additional counting, re-work, or a complete re-run.

Data review occurs at a minimum of two distinct points. The first is the evaluation by the data handler and the second is a review by laboratory supervision or technical personnel. At both of these steps, sample and QC data are compared to established criteria.

When nonconforming data (NCD) is detected, UST-RD reports the occurrence to the customer. The NCD is investigated and corrective actions are suggested by the appropriate laboratory supervisor and director and reviewed by the QA/QC Departments. The NCD is documented using a nonconforming data report which describes the reason(s) for the nonconformance and the corrective actions taken or planned to minimize recurrence in the future. Copies of the NCD report are forwarded to the director, supervisor, the technician involved and the customer.

Traceability of the sample data is ensured by using positive log-in and laboratory flow procedures. Customer turn-around-time requirements are addressed by manually scheduling the analyses. Positive control of the potential for cross contamination of the samples is provided by analyzing samples, which historically contain higher than environmental levels of activity, in laboratories that are separate from the low level laboratories.

General flow diagrams (Figures D-3 to D-6) summarize some of the key elements in analyzing samples at United States Testing Company. Further details may be obtained by consulting these documents: Quality Assurance Manual - UST-RD-QA-7-80, Rev. 6; Quality Control Manual - UST-RD-QC-9-80, Rev. 3 and Counting Room Control Manual - UST-RD-CRC-10-85, Rev. 0.

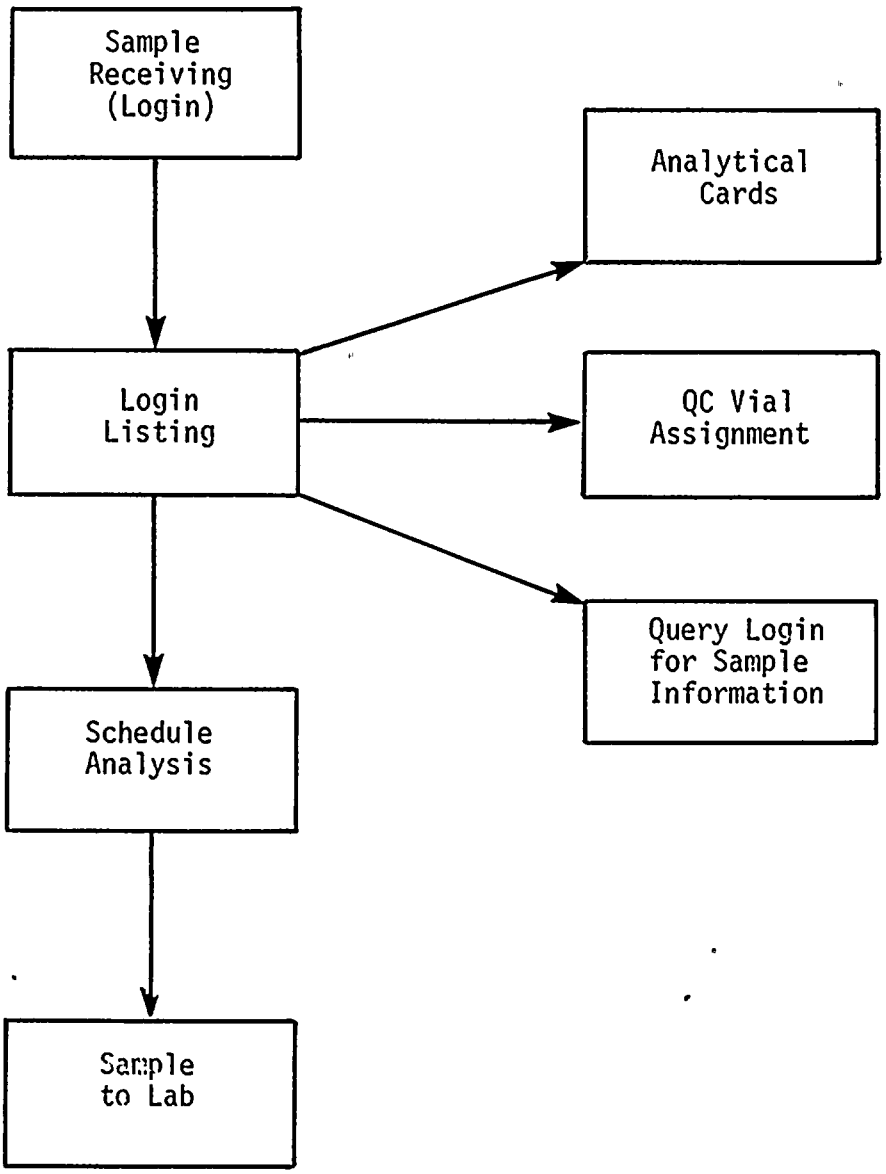

FIGURE D-3
SAMPLE RECEIVING

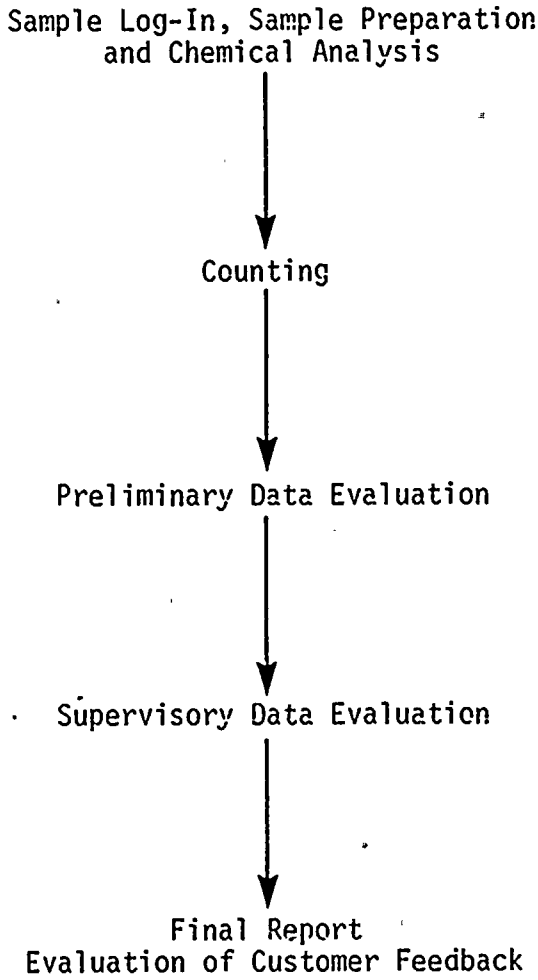

FIGURE D-4

GENERAL WORK FLOW PLAN

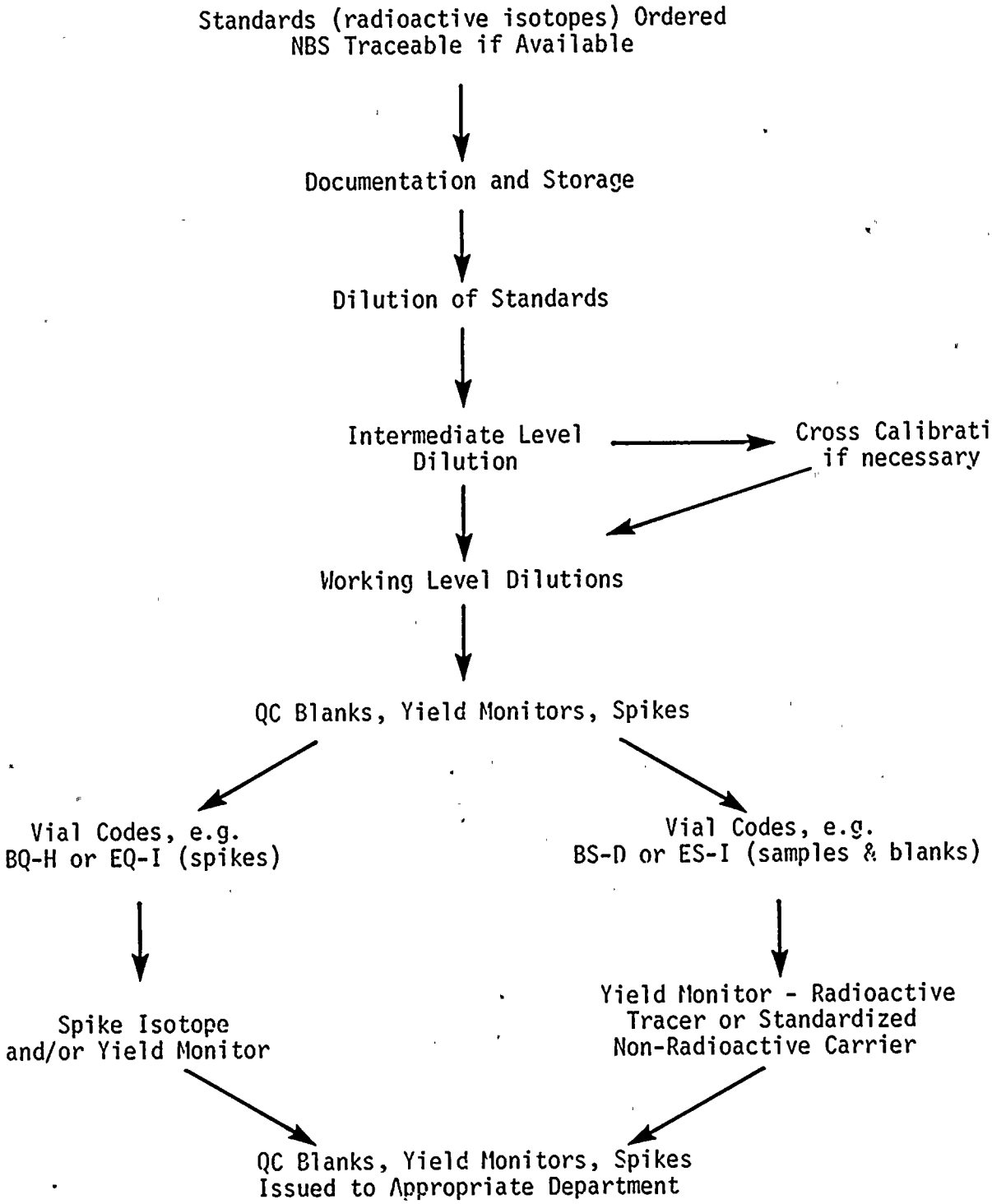

FIGURE D-5

PREPARATION OF BLANKS AND SPIKES

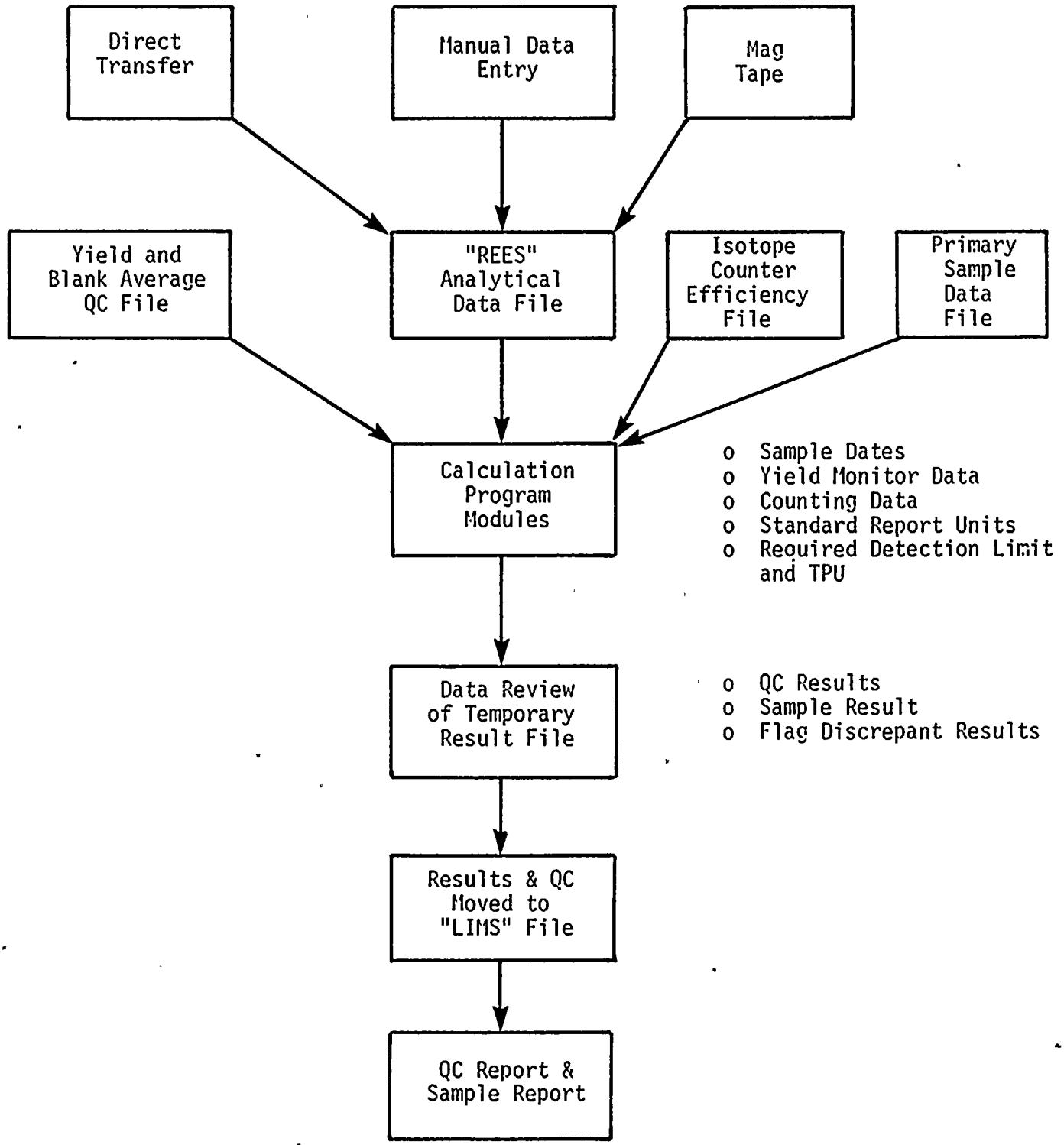

FIGURE D-6

DATA EVALUATION

Following is a summary of Quality Control data pertinent to each radiochemical analysis used for Supply System environmental samples processed during the first and second quarters of 1986. In addition, summaries of the spike and blank QC samples processed during the report period are presented in Tables D-2.1 and D-2.2. The EPA Intercomparison Program results are presented in Table D-2.3.

Iodine-131 in Water and Milk

All of the I-131-W spikes (6) and blanks (7) processed during this period were within limits, as were all the I-131-M blanks (9). There was one I-131-M spike, of a total of 10, that was slightly out of limits. This did not indicate a significant problem, so the procedure was determined to be in control.

One problem that arose with the I-131-M analysis was a low trend in the results for this procedure compared to the I-131 results from gamma scans of the same samples. This trend became evident during the period of fallout from the Chernobyl accident when the iodine levels were high enough to measure. Investigation into the problem indicated that stable iodine present in the milk might be causing erroneously high recoveries, and, therefore, low results.

Iodine-131 in Charcoal Filters

Blank charcoal filter results were all below the decision limit, Lc, indicating that the counting process is in control. Yield and efficiency data pertinent to this analysis are covered in the gamma spectroscopy section and methodology.

Gross Beta on Air Particulate Filters

The blanks for this analysis continued to run slightly higher (approximately 1 dpm) in the second quarter of 1986 than during 1985. The problem was investigated, yet there was no clear explanation for the phenomenon. Evaluation of QC instrument control charts for efficiency and background did not show a sustained rise in background or increase in efficiency that would account for such a trend. There was no appreciable difference observed in the Supply System blank filters and the in-house blank filters so it is not likely that the difference was related to storage, radon daughter adsorption or batch number.

A calculation of the detection limit for the first two quarters of 1986 indicated a value of 0.0042 pCi/m^3 or slightly above the contractual detection limit of 0.003 pCi/m^3. It would be necessary to subtract the blank filter's contribution in future analyses in order to assure compliance with contractual detection limits.

Another phenomenon investigated during the report period was the cycling of gross beta in air results observed during the first quarter of 1986. No clear evidence of cycling of QC data for that period was apparent, although cycling was evident in the results obtained for other UST customers. It is likely, therefore, that the cycling was due to weather conditions, i.e., inversions.

Gross Beta in Water

All the blanks processed during this period were below the decision level, Lc. All the spikes processed were within limits, so this analysis was determined to be in control.

Despite spike and blank data indicating no problems with this procedure, a significant cross contamination of several Supply System water samples being analyzed for gross beta occurred in February. This occurred when a high activity ground water sample from another customer

was improperly screened and was processed along with the low level Supply System surface/drinking water samples. The affected samples were re-analyzed and the original results were corrected. The corrective action taken to prevent future occurrences involved separate processing and drying of ground water and surface/drinking water samples. In addition, UST will be installing a system for categorizing the probable level of sample activity, based upon past results. In this way, samples with historically high activity will be segregated from low level samples.

Tritium in Water

The blanks for this procedure were reported as net dpm, since background was subtracted. A separate background was determined for each liquid scintillation detector and subtracted from the blanks processed on each one.

The overall QC results for spikes and blanks indicated 7.5% of the blanks and 4.3% of the spikes were out of limits. In light of these low percentages, this procedure was determined to be in control.

Gamma Spectroscopy/Gamma Isotopes

The detector performance during the reporting period indicated this analysis was in control. Two nonconformance reports, however, were issued concerning gamma measurements. First, the I-131 in charcoal filters result for Station 23 dated 1/9/86 was determined using the wrong midpoint of the sample period. The result was corrected and the computer program was modified to automatically calculate the midpoint from sample on and off dates. Second, the La-140 results for milk samples dated 5/6/86 were determined directly rather than using the Ba-La-140 value adjusted for equilibrium. The results were subsequently corrected.

TABLE D-2.1

SUMMARY OF 1986 QUALITY CONTROL DATA: BLANKS

Results in Disintegrations Per Minute (dpm)

NUCLIDE	MEDIUM	NUMBER	AVERAGE RESULTS
I-131	Milk	9	0.62 ± 0.82
I-131	Water	7	0.58 ± 0.32
		9	0.62 ± 0.82
Gross Beta	Water	15	0.473 ± 0.52
Gross Beta	A P Filter	17	2.42 ± 0.81
I-131	Charcoal Filter	11	0.082 ± 0.32
H-3	Water	36	0.24 ± 1.10

TABLE D-2.2

SUMMARY OF 1986 QUALITY CONTROL DATA: SPIKES

Results in pCi/liter

NUCLIDE	MEDIUM	NUMBER	AVERAGE RESULTS	SPIKE LEVEL
I-131	Milk	2	8.56 ± 0.17	10.19 ± 0.31
		8	18.64 ± 0.24	20.27 ± 0.61
		2	8.56 ± 0.12	10.18 ± 0.42
		8	18.64 ± 0.24	20.27 ± 0.61
I-131	Water	2	19.68 ± 3.60	19.22 ± 0.58
		1	12.0 ± 1.81	10.4 ± 0.31
		2	21.12 ± 6.62	21.39 ± 0.64
		1	26.2 ± 26.6	25.4 ± 0.76
Gross Beta	Water	15	19.98 ± 0.16	20.17 ± 0.61
		9	10.72 ± 0.10	10.26 ± 0.31
		2	19.82 ± 0.11	21.73 ± 0.65
H-3	Water	10	8.27 ± 0.87	8.09 ± 0.24
		3	94.97 ± 7.2	98.68 ± 2.96
		1	4.35 ± 1.47	4.02 ± 1.21
		18	7.67 ± 1.09	8.07 ± 0.24
		7	89.64 ± 5.15	98.68 ± 2.96
		5	4.03 ± 0.76	4.03 ± 0.12
		1	934 ± 23.3	952 ± 28.6

TABLE D-2.3

1986 EPA INTERCOMPARISON PROGRAM RESULTS

ISOTOPE	COLLECTION DATE	UST RESULTS (b)	EPA RESULTS (b)	OTHER LABS (b)
		MEDIUM - AIR FILTERS (pCi/Cu.M)		
Gross Alpha	Mar.	12.0 ± 0.6	15.00 ± 5.0	15.70 ± 2.9
Gross Beta		43.0 ± 1.0	47.00 ± 5.0	51.40 ± 6.2
Sr-90		21.0 ± 1.0	18.00 ± 1.5	17.40 ± 6.2
Cs-137		11.3 ± 1.5	10.00 ± 5.0	11.50 ± 2.1
		MEDIUM - FOOD (pCi/kg)		
Sr-89	Jan.	27.7 ± 0.6	25.00 ± 5.00	18.93 ± 6.90
Sr-90		21.7 ± 3.5 (c)	10.00 ± 1.50	13.12 ± 5.88
I-131		23.3 ± 0.6	20.00 ± 6.00	21.03 ± 2.35
Cs-137		17.7 ± 1.2	15.00 ± 5.00	16.52 ± 1.80
		MEDIUM - MILK (pCi/liter)		
I-131	Feb.	6.33 ± 1.15	9.00 ± 6.00	9.01 ± 1.72

* Footnotes are located at end of table

TABLE D-2.3 (Cont.)

1986 EPA INTERCOMPARISON PROGRAM RESULTS

ISOTOPE	COLLECTION DATE	UST RESULTS (b)	EPA RESULTS (b)	OTHER LABS (b)
		MEDIUM - WATER (pCi/liter) (Cont.)		
Gross Beta	Jan.	7.4 ± 0.4	7.00 ± 5.00	7.20 ± 1.83
Gross Beta	Mar.	9.7 ± 1.2	8.00 ± 5.00	9.73 ± 2.76
Gross Beta	April (d)	31.7 ± 0.6	35.00 ± 5.0	32.50 ± 4.50
Gross Beta	May	15.9 ± 1.2	15.00 ± 5.00	14.75 ± 2.83
Gross Beta	Jul.	16.0 ± 1.0	18.00 ± 5.00	17.85 ± 2.68
Cr-51	Feb.	31.7 ± 0.9	38.00 ± 5.00	38.80 ± 6.14
Co-60		16.3 ± 0.5	18.00 ± 5.00	18.35 ± 2.52
Zn-65		42.3 ± 2.0	40.00 ± 5.00	41.21 ± 3.66
Cs-134		26.3 ± 0.5	30.00 ± 5.00	27.55 ± 3.68
Cs-137		21.0 ± 0.8	22.00 ± 5.00	22.49 ± 3.12
CO-60	April (d)	9.7 ± 0.6	10.00 ± 5.0	10.50 ± 2.00
Cs-134		4.7 ± 0.6	5.00 ± 5.0	5.30 ± 1.30
Cs-137		4.7 ± 0.6	5.00 ± 5.0	5.60 ± 1.20
Cr-51	June	<10	0	-
Co-60		61.0 ± 2.0	66.00 ± 5.00	64.50 ± 4.20
Zn-65		86.8 ± 4.0	86.00 ± 5.0	85.60 ± 5.70
Ru-106		41.0 ± 6.1	50.00 ± 5.0	49.80 ± 11.0
Cs-134		41.9 ± 0.4	49.00 ± 5.0	45.80 ± 4.10
Cs-137		9.3 ± 0.2	10.00 ± 5.0	10.50 ± 1.90

* Footnotes are located at end of table.

TABLE D-2.3 (Cont.)

1986 EPA INTERCOMPARISON PROGRAM RESULTS

ISOTOPE	COLLECTION DATE	UST RESULTS (b)	EPA RESULTS (b)	OTHER LABS (b)
		MEDIUM - WATER (pCi/liter) (Cont.)		
I-131	Apr.	10.3 ± 0.6	9.00 ± 6.00	8.62 ± 1.86
H-3	Feb.	4860 ± 154 (e)	5227 ± 523	5105 ± 340
H-3	June	3043 ± 113	3125 ± 360	3052 ± 347
Sr-89	Jan.	27.7 ± 0.9	31.00 ± 5.00	30.63 ± 5.02
Sr-90		11.7 ± 0.5	15.00 ± 1.50	14.02 ± 2.16
Sr-89	April (d)	5.3 ± 0.5	7.00 ± 5.0	6.30 ± 2.20
Sr-90		6.3 ± 0.6	7.00 ± 1.5	7.00 ± 1.20
Sr-89	May	5.3 ± 0.6	5.00 ± 5.00	4.97 ± 1.59
Sr-90		4.0 ± 0.3	5.00 ± 1.50	4.79 ± 0.99

FOOTNOTES:

(a) The Environmental Protection Agency prepares spiked samples and distributes them to radiochemistry laboratories who wish to participate in the interlaboratory comparison.

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

(c) Reanalysis confirmed the Sr-90 result.

(d) Lab Performance Evaluation

(e) Recalibrated since this was analyzed.

D-3 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 adquate documentation. The program is based on the requirements of 10CFR50, Appendix B, Nuclear 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 NBS. For alpha and beta counting check sources are prepared and counted every week day except holidays. Control charts are maintained with three sigma limits specified. Control of the alpha beta counting equipment is described in procedure PRO-032-27, "Utilization of Standards for Alpha and Beta Counters and Evaluation of Control Chart Data". Backgrounds are usually measured at least once per week.

The efficiency of the gamma spectrometers is calibrated yearly with an NBS 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. This procedure is described in PRO-042-44, "Calibration of Ge(Li) Gamma Ray Spectrometers".

The efficiency of the liquid scintillation counters is determined every six months by counting an NBS traceable standard on three consecutive days and arriving at an average efficiency. A sealed source is counted every other day and plotted on a control chart with three sigma limits. A background is counted every other day. This control system is described in PRO-052-35 "Determination of Tritium in Water by Liquid Scintillation".

The flow chart of how samples are controlled from time of receipt to reporting of results is presented in Figure D-6. 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 work sheets by the quality assurance manager or a qualified designated.

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.

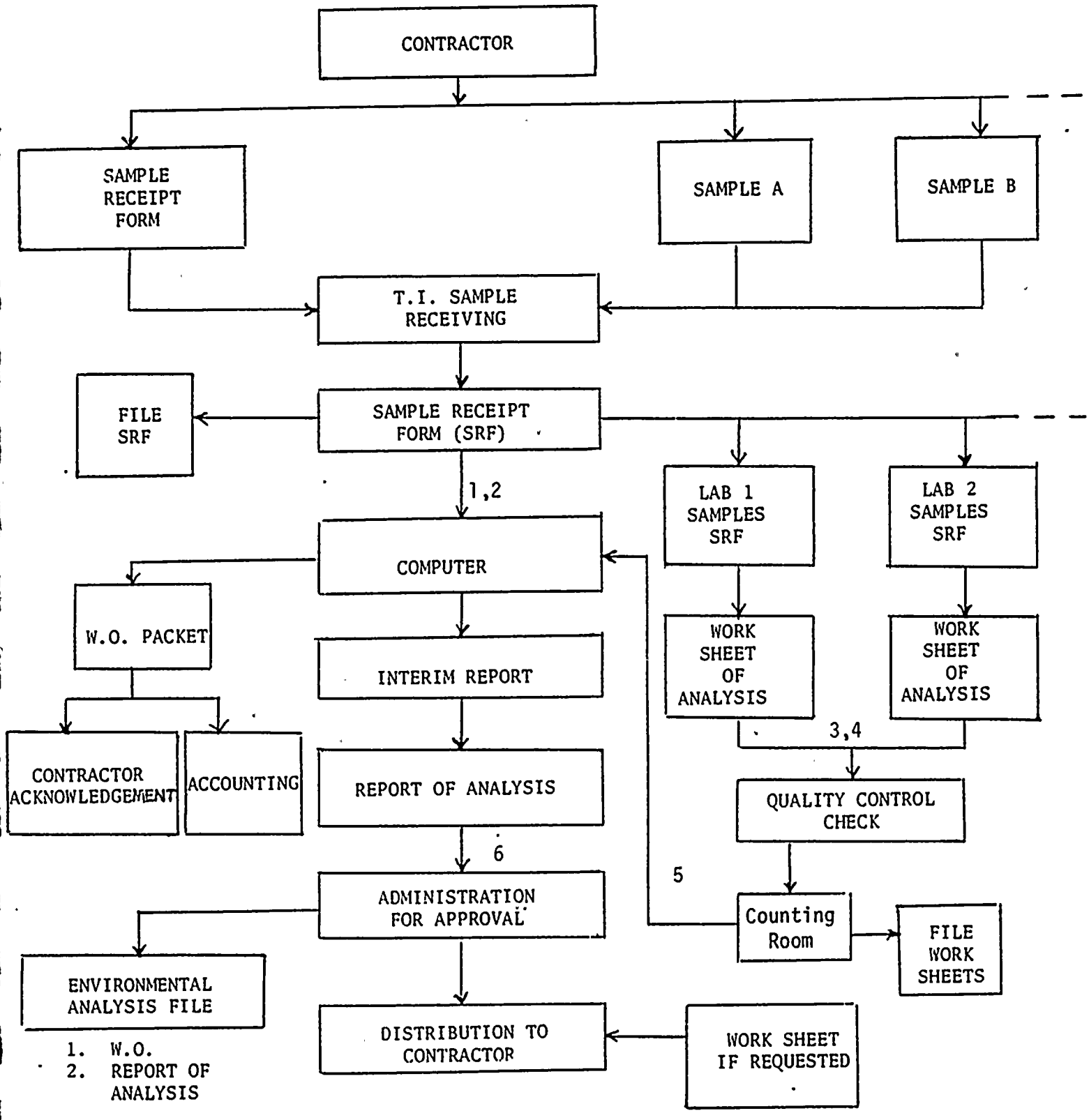

FIGURE D-6

FLOW CHART FOR TELEDYNE ISOTOPES SAMPLES

Control of sample identity is maintained by the assignment of a unique five digit number which is maintained throughout the samples history. The control of sample receipt, log-in number assignment, designation of analysis, assignment of blank samples to a group, etc. is described in procedure PRO-032-48, "Procedure for Receipt of Samples". Also included in this procedure are instructions for storage and prevention of contamination of samples.

Preparation of carrier solutions and acceptability criteria are contained in procedure PRO-032-49."Standardization of Radiochemical Carrier Solutions". Preparation of efficiency calibration standards and check sources is described in procedure PRO-032-27, "Utilization of Standards for Alpha and Beta Counters and Evaluation of Control Chart Data".

Results are reviewed before being entered into the data system by the quality control manager and/or the technical vice president for reasonableness of the parameters (background, efficiency, decay, etc). Any results which are suspect, being 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 work sheet(s).

No deviations from written procedures occurred during 1986. A summary of the quality control blank and spiked sample results of analyses follows.

Iodine-131 in 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 D-3.1(a)) indicated that

there was no bias on the low background counters, which are isotope specific. The average activity for eleven samples was 0.080 ± 0.17 pCi/ℓ which shows a variation over a small range. This was calculated from quality control samples without considering detection limits.

Gross Beta on Air Particulate Filters

One blank filter was measured with each set of filters assayed. Twenty-seven blanks were counted. The resultant average activity in total pCi was 1.30 ± 0.42, which indicated a relatively stable background for the filter including the background of the gross beta proportional counters.

Gross Beta in Water

Twenty-two blanks were prepared from distilled water. The resultant average based on the highest detection level measured was less than 1.0 pCi/ℓ. No contamination was indicated and the background level was low and stable. During 1986 fifty-three gross beta spike samples were analyzed. The average result was 20.54 ± 2.49 pCi/ℓ with a spike level of 22. ± 5. pCi/ℓ. This was well within the guidelines outlined in Table 2 of EPA-600/4-81-004 "Environmental Radioactivity Laboratory Intercomparison Studies Program".

Tritium in Water

Forty-four blank samples were analyzed by gas counting. The average result was 1.95 ± 0.82 E 02 pCi/ℓ. The water used for blank tritium samples was from the local water utility company which uses surface collected water. The positive results are attributable to local environmental surface water tritium levels. It is planned to use well water in the future. A total of 52 spike H-3 samples were analyzed. The spike level was changed during the year as new solutions were prepared. At all spike levels the results were well within the allowable limits.

Strontium-90 in Milk and Water

Blank water samples were analyzed weekly during 1986. The average activity was less than 1.0 pCi/ℓ based on the highest detection level. No contamination in the strontium laboratory was indicated. Fifty spiked water samples were analyzed with an average level of 45.52 ± 2.44 pCi/ℓ as compared to a spike level of 47. ± 7., the limits as allowed by the EPA Environmental Laboratory Intercomparison Studies Program. A total of 40 milk samples were spiked to a level of 47. ± 7. pCi/ℓ. The average activity was 44.65 ± 3.72 pCi/ℓ, well within the limits as specified by the EPA Intercomparison Studies Program.

Gamma Spectroscopy

The various gamma isotopes specified are all contained in the computerized isotope library. The isotope library includes information on the energy, branching intensities of various gamma emitting nuclides as well as the efficiency values of several different geometries. Calibrations were performed with NBS traceable standards selected to cover the energy range of the nuclides to be monitored. Check sources are used to monitor key parameters. The parameters routinely monitored include background, energy resolution, and efficiency. The information was monitored weekly and control charts plotted to make certain that detectors remain within three sigma limits.

Tables D-3.1 and D-3.2 summarize the blank and spike data discussed above. There were no deviations from written procedures in analyzing the samples received from the Supply System or QC samples during 1986. Several QC milk samples spiked with strontium 90 showed low results and had to be repeated. These low results are attributed to incomplete separation of calcium in the radiochemical process. Traces of calcium on the final $SrCO_3$ mount give rise to erroneously high strontium yields, resulting in erroneously low activities.

The supervisor in the strontium laboratory has been instructed to increase the training effort for the separation of calcium in the radiostrontium analysis. Moreover, because this separation is difficult and even an experienced analyst cannot always judge whether it is complete, research is under way to find a method for determining the amount of calcium on the strontium mount and for correcting the chemical yield accordingly.

A low trend was observed in QC water samples spiked with Cs-137 (analyzed for gross beta activity). This trend did not violate the aceptance limits for the analysis. An experiment was conducted which showed the spiking solution to be accurate. The low trend is attributed to sample loss before mounting on planchets. A memorandum was issued to call attention to procedure for lowering hotplate temperature during the final stages of evaporation in order to prevent sample loss by spattering from beakers. Technicians were also instructed to be thorough in policing beakers when transferring samples to the planchets.

A discussion of any EPA results which were beyond the ± 2 sigma deviation from the known are discussed at the end of Table D-3.3. No problems appeared as a trend except for Sr-89,90 in the food samples. Only a small number of laboratories analyze this sample for Sr-89,90 and approximately 80% of the laboratories obtain results that are beyond the ± 3 sigma deviation from the known. The EPA has changed the formula for this sample in an attempt to improve the results for all laboratories. It appears that the sample is flawed.

TABLE D-3.1

SUMMARY OF 1986 QUALITY CONTROL DATA: BLANKS

NUCLIDE	MEDIUM	BLANKS NUMBER	AVERAGE BLANK	UNITS
I-131	Milk	11	(a) 0.074 ± 0.16	pCi/l
		53	(d) L.T. 8. E-01	pCi/l
Gross Beta	AP Filter	27	(b) 1.30 ± 0.42 E 00	Total pCi
H-3 (Gas Counting)	Water	44	(e) 1.95 ± 0.82 E 02	pCi/l
I-131	Charcoal	16	(b) L.T. 1. E 01	Total pCi
Sr-90	Water	53	(d) L.T. 1. E+00	pCi/l
Gamma	Water	53	*	pCi/l
Gross Beta	Water	22	(d) L.T. 1. E+00	pCi/l

* All nuclides less than minimum detection level.

(a) This average is calculated from 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. The highest detection level was used as the average.

(c) This average includes only the blank AP filters analyzed for the Supply System. A blank planchet (counter backgroun) 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.

(e) The water used for the blank tritium sampls was from the local water utility company which uses surface-collected water. The positive results are attributable to local environmental surface water tritium levels.

TABLE D-3.2

SUMMARY OF 1986 QUALITY CONTROL DATA: SPIKES

NUCLIDE	MEDIUM	BLANKS NUMBER	AVERAGE BLANK	SPIKE LEVEL (pCi/liter)
Gross Beta	Water	53	20.54 ± 2.49	22. ± 5.
H-3	Water	3	1.17 ± 0.06 E 05	1.2 E 05
(Gas Counting)		28	1.15 ± 0.08 E 04	1.2 E 04
		21	2.65 ± 0.11 E 03	2.6 E 03
Sr-90	Water	50	45.52 ± 2.44	47. ± 7.
Sr-90	Milk	40	44.65 ± 3.72	47. ± 7.

TABLE D-3.3

1986 EPA INTERCOMPARISON PROGRAM RESULTS

ISOTOPE	COLLECTION DATE	TI RESULTS (a)	EPA RESULTS (b)	OTHER LABS (c)	
		MEDIUM - AIR FILTERS (pCi/Cu.M)			
Gross Alpha	04/25/86	17.66 ± 0.58	15.00 ± 5.00	15.74 ± 2.89	
Gross Beta	"	44.66 ± 3.21	47.00 ± 5.00	51.36 ± 6.18	
Sr-90	"	15.66 ± 1.15	18.00 ± 1.50	17.38 ± 2.17	(d)
Cs-137	"	10.33 ± 0.58	10.00 ± 5.00	11.48 ± 2.13	
Gross Alpha	09/12/86	23.00 ± 0.00	22.00 ± 5.00	21.53 ± 4.27	
Gross Beta	"	64.33 ± 0.58	66.00 ± 5.00	70.59 ± 8.07	
Sr-90	"	18.00 ± 1.00	22.00 ± 1.50	21.84 ± 2.67	(e)
Cs-137	"	23.33 ± 2.08	22.00 ± 5.00	24.12 ± 3.63	
		MEDIUM - FOOD (pCi/kg)			
Sr-89	01/31/86	23.66 ± 1.15	25.00 ± 5.00	18.93 ± 6.90	
Sr-90	"	23.66 ± 1.52	10.00 ± 1.50	13.12 ± 5.88	(f)
I-131	"	18.00 ± 1.00	20.00 ± 6.00	21.03 ± 2.35	
Cs-137	"	19.00 ± 1.00	15.00 ± 5.00	16.52 ± 1.80	
K	"	959.00 ± 62.35	950.00 ± 143.00	956.63 ± 89.58	
Sr-89	07/25/86	23.66 ± 1.15	30.00 ± 5.00	24.56 ± 3.03	
Sr-90	"	22.33 ± 1.52	19.00 ± 1.50	19.48 ± 6.59	(g)
I-131	"	25.66 ± 1.15	30.00 ± 6.00	28.24 ± 3.03	
Cs-137	"	22.00 ± 4.58	20.00 ± 5.00	21.49 ± 2.55	
K	"	1126.66 ± 57.74	1150.00 ± 58.00	1150.97 ± 103.95	

* Footnotes are located at end of table.

TABLE D-3.3 (Cont.)

1986 EPA INTERCOMPARISON PROGRAM RESULTS

ISOTOPE	Collection DATE	TI RESULTS (a)	EPA RESULTS (b)	OTHER LABS (c)
		MEDIUM - MILK (pCi/liter)		
I-131	02/28/86	9.00 ± 0.00	9.00 ± 6.00	9.01 ± 1.72
I-131	04/04/86	10.00 ± 0.00	9.00 ± 6.00	8.62 ± 1.86
Sr-89	06/27/86	<3.66	0.00 ± 5.00	2.93 ± 2.66
Sr-90	"	15.00 ± 0.00	16.00 ± 1.50	15.05 ± 2.84
I-131	"	41.00 ± 1.00	41.00 ± 6.00	43.94 ± 4.49
Cs-137	"	39.00 ± 1.73	31.00 ± 5.00	36.55 ± 3.11 (h)
K	"	1593.33 ± 32.14	1600.00 ± 80.00	1600.71 ±110.72
Sr-89	11/04/86	8.67 ± 0.58	9.00 ± 5.00	8.63 ± 2.55
Sr-90	"	<1.33	0.00 ± 1.50	0.98 ± 0.57
I-131	"	54.33 ± 2.88	40.00 ± 6.00	49.25 ± 4.72
Cs-137	"	48.00 ± 5.29	39.00 ± 5.00	43.51 ± 3.42 (m)
K	"	1530.00 ± 95.39	1565.00 ± 78.00	1565.11 ± 106.05

* Footnotes are located at end of table

TABLE D-3.3 (Cont.)

1986 EPA INTERCOMPARISON PROGRAM RESULTS

ISOTOPE	COLLECTION DATE	TI RESULTS (a)	EPA RESULTS (b)	OTHER LABS (c)
		MEDIUM - WATER (pCi/liter)		
Gross Alpha	01/24/86	4.00 ± 0.00	3.00 ± 5.00	3.59 ± 1.38
Gross Alpha	03/21/86	12.00 ± 2.00	15.00 ± 5.00	13.11 ± 3.46
Gross Alpha	04/20/86 (i)	21.33 ± 1.52	17.00 ± 5.00	14.82 ± 3.92
Gross Alpha	05/23/86	9.00 ± 0.00	8.00 ± 5.00	7.35 ± 2.13
Gross Alpha	07/18/86	6.00 ± 0.00	6.00 ± 5.00	6.18 ± 1.79
Gross Alpha	09/19/86	18.66 ± 0.58	15.00 ± 5.00	14.96 ± 3.86
Gross Alpha	10/22/86	51.00 ± 2.00	40.00 ± 5.00	35.67 ± 9.52 (m)
Gross Alpha	11/21/86	16.33 ± 1.15	20.00 ± 5.00	17.21 ± 5.00
Gross Beta	01/24/86	7.33 ± 0.58	7.00 ± 5.00	7.20 ± 1.83
Gross Beta	03/21/86	9.33 ± 0.58	8.00 ± 5.00	9.73 ± 2.76
Gross Beta	04/20/86 (i)	32.66 ± 2.31	35.00 ± 5.00	32.46 ± 4.51
Gross Beta	05/23/86	15.33 ± 1.15	15.00 ± 5.00	14.75 ± 2.83
Gross Beta	07/18/86	14.66 ± 0.58	18.00 ± 5.00	17.85 ± 2.68
Gross Beta	09/19/86	11.00 ± 0.00	8.00 ± 5.00	9.53 ± 2.82
Gross Beta	10/22/86	48.00 ± 1.00	51.00 ± 5.00	46.63 ± 6.08
Gross Beta	11/21/86	21.00 ± 1.73	20.00 ± 5.00	20.54 ± 3.07

* Footnotes are located at end of table.

TABLE D-3.3 (Cont.)

1986 EPA INTERCOMPARISON PROGRAM RESULTS

ISOTOPE	COLLECTION DATE	TI RESULTS (a)	EPA RESULTS (b)	OTHER LABS (c)
		MEDIUM - WATER (pCi/liter)(Cont.)		
Cr-51	02/07/86	<86.66	38.00 ± 5.00	38.80 ± 6.14
Co-60	"	18.66 ± 0.58	18.00 ± 5.00	18.35 ± 2.52
Zn-65	"	46.33 ± 5.77	40.00 ± 5.00	41.21 ± 3.66 (j)
Cs-134	"	26.00 ± 3.60	30.00 ± 5.00	27.55 ± 3.68
Cs-137	"	21.66 ± 4.93	22.00 ± 5.00	22.49 ± 3.12
Co-60	04/20/86(i)	14.00 ± 1.00	10.00 ± 5.00	10.47 ± 2.00
Cs-134	"	<5.67	5.00 ± 5.00	5.31 ± 1.52
Cs-137	"	8.00 ± 2.00	5.00 ± 5.00	5.58 ± 1.17
Cr-51	06/06/86	<92.7	0.00 ± 5.00	8.67 ± 15.00
Co-60	"	66.67 ± 1.15	66.00 ± 5.00	64.47 ± 4.23
Zn-65	"	87.67 ± 8.50	86.00 ± 5.00	85.65 ± 5.73
Cs-134	"	47.66 ± 0.58	49.00 ± 5.00	45.76 ± 4.07
Cs-137	"	9.33 ± 2.08	10.00 ± 5.00	10.53 ± 1.89
H-3	02/14/86	5266.67 ± 57.72	5227.00 ± 523.00	5104.69 ± 340.01
H-3	06/13/86	3033.33 ± 152.75	3125.00 ± 360.00	3052.41 ± 347.18
I-131	08/08/86	27.00 ± 1.00	45.00 ± 6.00	41.64 ± 6.15 (k)
Sr-89	01/10/86	30.00 ± 1.00	31.00 ± 5.00	30.63 ± 5.02
Sr-90	"	15.33 ± 0.58	15.00 ± 1.50	14.02 ± 2.16
Sr-89	04/20/86(i)	4.33 ± 0.58	7.00 ± 5.00	6.26 ± 2.23
Sr-90	"	7.67 ± 0.58	7.00 ± 15.0	6.96 ± 1.23
Sr-89	05/09/86	4.66 ± 0.58	5.00 ± 5.00	4.97 ± 1.59

* Footnotes are located at end of table.

TABLE D-3.3 (Cont.)

1986 EPA INTERCOMPARISON PROGRAM RESULTS

ISOTOPE	COLLECTION DATE	TI RESULTS (a)	EPA RESULTS (b)	OTHER LABS (c)	
		MEDIUM - WATER (pCi/liter) (Cont.)			
Sr-90	05/09/86	5.00 ± 0.00	5.00 ± 1.50	4.79 ± 0.99	
H-3	10/17/86	5900.00 ± 99.98	5973.00 ± 597.00	5693.56 ± 406.04	
Cr-51	10/10/86	<113.0	59.00 ± 5.00	56.11 ± 9.66	
Co-60	"	30.33 ± 0.58	31.00 ± 5.00	31.23 ± 2.66	
Zn-65	"	84.00 ± 5.29	85.00 ± 5.00	85.48 ± 7.15	
Ru-106	"	<70.00	74.00 ± 5.00	68.18 ± 7.86	
Cs-134	"	27.33 ± 2.51	28.00 ± 5.00	26.31 ± 2.60	
Cs-137	"	52.67 ± 0.58	44.00 ± 5.00	45.23 ± 3.64	(1)
Sr-89	10/22/86	11.33 ± 0.58	10.00 ± 5.00	9.14 ± 2.58	
Sr-90	"	4.00 ± 0.00	4.00 ± 1.50	3.84 ± 0.90	
Co-60	"	29.33 ± 4.04	24.00 ± 5.00	24.45 ± 2.23	
Cs-134	"	12.00 ± 1.00	12.00 ± 5.00	11.30 ± 1.86	
Cs-137	"	7.67 ± 0.58	8.00 ± 5.00	8.83 ± 1.89	

* Footnotes are located at end of table.

TABLE D-3.3 (Cont.)

1986 EPA INTERCOMPARISON PROGRAM RESULTS

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

Footnotes:

(a) Teledyne Results - Average ± one sigma.

(b) EPA Results - Expected laboratory precision (1 sigma).

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

(d) These air filters are counted for gross alpha, beta and gamma before being analyzed for Sr-90. It was felt that some of the activity had been lost in handling. The air particulate filters will be handled more carefully in the future. This had not been a problem in previous analyses.

(e) It is believed that too much $NaCO_3$ was used in the final precipitation of $SrCO_3$ resulting in a falsely high strontium-89 yield. Less $NaCO_3$ will be used in the future precipitation of $SrCO_3$.

(f) This sample is a synthetic food which may contain a substance which interferes with the strontium 89 and 90 analysis. Only 21 laboratories participated in the strontium analyses. Of the 21 who did participate 42.9% had results beyond the three sigma control limits.

(g) For Sr-90 fourteen of the seventeen laboratories participating were beyond the ± 3 sigma level. For Sr-89 thirteen of the fifteen laboratories had low results. It would appear that the sample is flawed in some way for this analysis.

(h) The efficiency calibration for Cs-137 for the gamma spectrometer detectors was ckecked and no reason for the high result was evident. Previous analyses did not exceed the 2 sigma limits. If this situation recurs, a new efficiency for Cs-137 will be determined.

(i) Lab Performance Evaluation

TABLE D-3.3 (Cont.)

1986 EPA INTERCOMPARISON PROGRAM RESULTS

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

Footnotes: (Cont.)

(j) The three results reported were 43.0, 43.0 and 53.0. The one high result of 53.0 caused the average result to be above the 2 sigma limit. This sample was aliquoted last of the three samples and more of the spike may have settled in the bottom of the container.

(k) This analysis was performed by an inexperienced technician who has since received additional training and is performing satisfactorily.

(l) The data for the samples was examined and no obvious reason for the high result could be found. The Cs-137 calibration was checked and found to be in agreement with previous readings. Since this was not a trend in previous analyses for Cs-137 in Water (Test 418 -0.23; Test 406 -0.11) it was decided to follow the results to see if a trend developed.

(m) An investigation is being conducted and an explanation will be available shortly.

D-4 Supply System Analytical Quality Control

In order to provide some additional information concerning the consistency and accuracy of the analytical results, spiked and duplicate samples are submitted to the analytical contractor for analysis. During 1986, one water spike was submitted to Teledyne Isotopes for analysis. The known concentrations of radionuclides and the results reported for this sample were as follows:

	Known Concentration (pCi/Liter)	Reported Result (pCi/Liter)
Cs-134	12	8.68 ± 2.09
Co-58	12	9.51 ± 2.15
Cs-137	12	11.4 ± 3.4
Mn-54	12	9.33 ± 3.46
Co-57	12	Not reported

Although present in the sample, Co-57 was not reported because the system Teledyne uses to determine gamma result requires the presence of the 136 Kev peak (8% abundance) in addition to the 122 peak (88% abundance) for Co-57 to be detected. Because of the above results, Teledyne was asked to determine the Co-57 from the 122 Kev peak.

Each collection period, a duplicate sample of milk was collected from Station 36 and labelled Station 37. A duplicate water sample from the discharge line, Station 27, was also collected monthly and labelled Station 72. The gamma results for the milk and water duplicates are found in Tables A-8.1 and A-8.2 and A-13.1 and A-13.2 of Appendix A. Since throughout the year, these gamma results are generally below detection limits, drawing conclusions from a comparison of the results is difficult. However, during the period following the Chernobyl accident, the levels of some radionuclides in milk exceeded the detection levels, so comparison of these results was more interesting. A comparison of the gamma results for duplicate milk samples taken during

May and June 1986 are presented in Table D-4.1. The I-131 in milk results and the gross beta and tritium in water results are presented in Tables D-4.2, D-4.3 and D-4.4, respectively.

In general, the duplicate gamma, gross beta and iodine-131 results agree within the two sigma error. Wider variability was observed in the tritium results. Special attention will be paid to the consistency of these results during 1987.

TABLE D-4.1

GAMMA RESULTS FOR DUPLICATE MILK STATIONS

Results in pCi/liter

COLLECTION PERIOD	NUCLIDE	STATION 36	STATION 37
860506	Ba-140	-3.9 ± 18.4	-6.0 ± 19.5
	La-140	-4.1 ± 6.9	5.6 ± 7.0
	Cs-137	0.8 ± 2.9	2.6 ± 2.9
	Cs-134	-0.2 ± 3.3	4.7 ± 3.4
860520	Ba-140	0.4 ± 11.6	7.8 ± 15.1
	La-140	-4.1 ± 5.8	-1.2 ± 5.8
	Cs-137	15.7 ± 4.2	18.2 ± 5.2
	Cs-134	7.6 ± 4.6	8.9 ± 4.7
	I-131	170 ± 18.9	162 ± 18.9
860603	Ba-140	0.0 ± 9.6	4.0 ± 14.7
	La-140	0.2 ± 3.9	-4.8 ± 5.3
	Cs-137	8.5 ± 3.7	11.0 ± 5.1
	Cs-134	5.8 ± 2.8	0.9 ± 4.1
	I-131	27.1 ± 7.7	28.7 ± 11.2
860617	Ba-140	-6.8 ± 13.1	7.6 ± 14.0
	La-140	-3.5 ± 5.2	0.5 ± 5.2
	Cs-137	11.4 ± 3.6	8.4 ± 3.6
	Cs-134	-0.6 ± 3.2	0.2 ± 3.5

TABLE D-4.2

IODINE-131 IN MILK RESULTS FOR DUPLICATE STATIONS

Results ± Error in pCi/liter

COLLECTION PERIOD	STATION 36	STATION 37
860121	0.20 ± 0.22	0.13 ± 0.22
860212	0.52 ± 0.11	0.12 ± 0.18
860318	0.10 ± 0.16	-0.03 ± 0.10
860409	0.06 ± 0.13	0.004 ± 0.10
860422	0.04 ± 0.13	-0.14 ± 0.13
860506	0.39 ± 0.22	0.25 ± 0.20
860520	99.1 ± 18.2	99.1 ± 18.2
860602	23.0 ± 0.0	22.0 ± 0.0
860617	0.35 ± 0.24	0.91 ± 0.28
860709	0.16 ± 0.24	0.21 ± 0.31
860722	0.27 ± 0.21	0.02 ± 0.16
860805	0.20 ± 0.31	0.19 ± 0.22
860819	0.01 ± 0.18	0.04 ± 0.25
860903	0.05 ± 0.20	0.03 ± 0.19
860916	0.77 ± 0.22	0.10 ± 0.23
861014	0.20 ± 0.19	0.07 ± 0.22
861118	0.25 ± 0.23	0.23 ± 0.26
861216	-0.13 ± 0.22	-0.06 ± 0.17

TABLE D-4.3

GROSS BETA IN WATER RESULTS FOR DUPLICATE STATIONS

Results ± Error in pCi/liter

COLLECTION PERIOD	STATION 27	STATION 72
851218 to 860122	4.6 ± 1.8	3.1 ± 1.6
860122 to 860219	3.6 ± 1.6	a)
860219 to 860319	1.4 ± 1.2	2.2 ± 1.3
860319 to 860423	a)	a)
860423 to 860521	a)	a)
860521 to 860618	7.4 ± 1.4	a)
860618 to 860723	5.9 ± 1.1	3.3 ± 0.8
860723 to 860820	16.0 ± 2.0	15.0 ± 3.0
860820 to 860923	12.0 ± 3.0	9.8 ± 1.6
860923 to 861022	17.0 ± 2.0	17.0 ± 2.0
861022 to 861118	28.0 ± 3.0	26.0 ± 3.0
861118 to 861217	20.0 ± 2.0	a)

a) Sample not collected due to plant outage, equipment failures or sample shortage.

TABLE D-4.4

TRITIUM IN WATER RESULTS FOR DUPLICATE STATIONS

Results ± Error in pCi/liter

COLLECTION PERIOD	STATION 27	STATION 72
851218 to 860319	180 ± 225	188 ± 229
860319 to 860618	620 ± 100	a)
860618 to 860923	420 ± 90	190 ± 70
860923 to 861218	130 ± 95	230 ± 100

a) Sample not collected.

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Radiological Environmental Monitoring Program 1988 Annual Report for Nuclear Plant 2

WASHINGTON PUBLIC POWER SUPPLY SYSTEM

8902

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1988 Radiological Environmental Monitoring Program

Annual Report - Plant 2

April 1989

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WASHINGTON PUBLIC POWER SUPPLY SYSTEM

NUCLEAR PLANT NUMBER 2

RADIOLOGICAL ENVIRONMENTAL

MONITORING PROGRAM

1988 ANNUAL REPORT

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1.0 EXECUTIVE SUMMARY

The Washington Public Power Supply System Radiological Environmental Monitoring Program (REMP) activities during 1988 are discussed in this report. The REMP is designed to provide an assessment of the levels of radioactivity in the environment around Plant 2, in order to detect any radiological effect of plant operations over time. To accomplish this objective, the REMP provides for the collection of air, water, milk, soil, sediment and garden produce on a regular basis from the region surrounding the plant. In addition, direct radiation from the plant and plant effluents is measured using thermoluminescent dosimeters (TLDs).

Milk, air, soil, and vegetation samples collected in the Grandview/ Sunnyside area are considered control samples; i.e., samples that provide an indication of the natural radioactivity background inherent in the region and that are unlikely to be affected by Plant 2 operations. The control locations for water and river sediment are upstream from the plant discharge line. Fish samples collected from the Snake River are considered control samples.

Samples taken from locations near the plant and in directions likely to be affected by plant effluents are regarded as indicator samples. Determining whether Plant 2 operations have had a radiological impact on the environment involves comparing the indicator sample results to the control sample results, the results of samples taken prior to plant operation, the calculated lower limits of detection (LLDs) and the regulatory guidance and limits.

REMP monitoring results for 1988 were within the ranges previously observed for samples collected during the preoperational period and most of the results were less than the respective LLDs. The results above the detection levels were generally naturally-occurring radionuclides or radionuclides generally present in the environment as a result of past Hanford activities and fallout from past nuclear weapons testing.

The Supply System REMP participated in several intercomparison programs during 1988, including the Environmental Protection Agency (EPA) Intercomparison Program, the Environmental Measurements Laboratory (EML) Quality Assessment Program, and the Hanford Reservation/Columbia River Sediment and Water Sampling Intercomparison. These intercomparison activities helped to ensure the continued quality of REMP data.

The 1988 direct radiation (TLD) measurements were very similar to those observed during 1987, with a mean exposure rate of 0.27 mR/day. During 1988 the Supply System participated in a TLD intercomparison study with other environmental monitoring programs on the Hanford Reservation. The study provided an important comparison of the measurement characteristics of the different TLD systems used to monitor in this region.

Evaluation of the 1988 REMP were performed using comparisons of the results of indicator and control stations, current data and past operational and preoperational data and current data and LLDs and reporting levels. Based on these evaluations, no radiological impact of plant operations on the environment around Plant 2 was detected during 1988.

2.0 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 for assessment of 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.

The results of environmental measurments made during CY 1988 are presented in this 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.

2.1 Site Description

The Washington Public Power Supply System Plant 2 is located in a sparsely populated shrub-steppe region within the Department of Energy-operated Hanford Reservation in southeastern Washington. The plant is approximately three miles west of the Columbia River and is surrounded on all sides by unoccupied 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 east of the plant, across the Columbia River. Given the prevailing wind directions, as shown in the 1988 wind frequency distribution in Figure 2-1, the focus of REMP sampling is this farming region across the river.

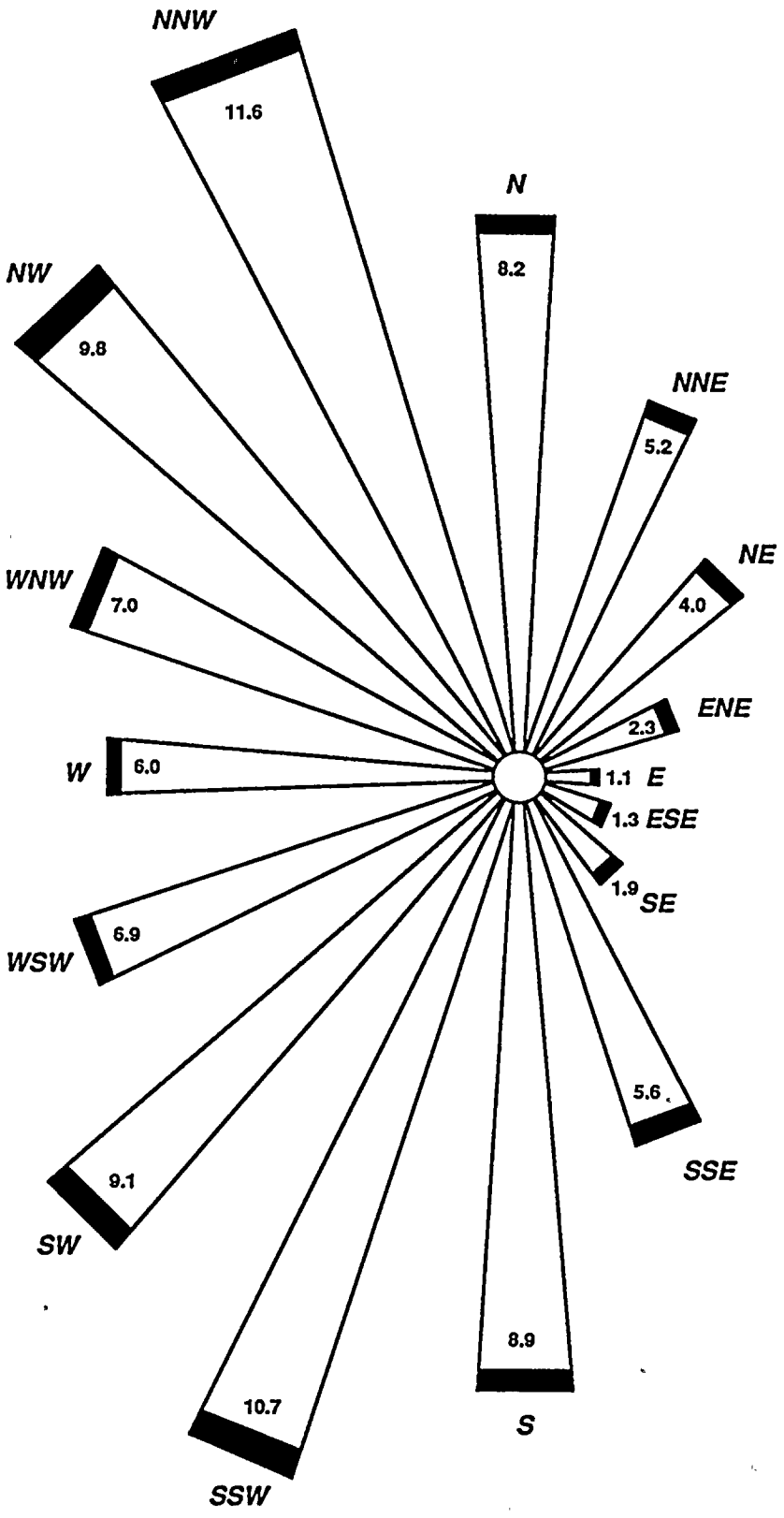


Figure 2-1

1988 WIND FREQUENCY DISTRIBUTION IN PERCENT FROM EACH DIRECTION RELATIVE TO PLANT 2

2.2 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 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 of 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.

Analysis of REMP environmental samples has always been performed by an analytical laboratory contractor. 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 determine the direct radiation are processed by the Supply System External Dosimetry Laboratory under the Radiological Programs and Instrument Calibration Department.

2.3 Program Objectives

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[6] and 10CFR50[7] 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 the plant on the environment must be distinguished from the normal variation in background radiation levels. 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 prevent further releases.

3.0 PROGRAM DESCRIPTION

The REMP plan for Plant 2, presented in Table 3-1, 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.

3.1 Sample Locations

Seventy-six locations were included in the 1988 monitoring program. Sixty-nine indicator and two control, i.e. background, locations were within 10 miles (16 kilometers) of 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 3-2 by meteorological sector, sample media and approximate distance from the plant. The number and locations of sample stations is 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 3-1 and 3-2 are presented in Figure 3-1 for sampling locations within the 10-mile radius and Figure 3-2 for sampling locations outside the 10-mile radius. A detailed presentation of sampling locations in the Sunnyside/Grandview area is given in Figure 3-3. Maps indicating the sampling locations for each specific type of sample media described in Section 3.3 are presented in Figures 3-4 through 3-12.

3.2 Land Use Census

In August the annual land use census was performed, as required by Plant Technical Specificatons.[8] One purpose of the land use census is to identify, within a distance of 5 miles, the locations of the nearest milk animal, residence and garden greater than 50 m^2 in each of the 16 meteorological sectors. Another objective of the census is

TABLE 3-1

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, 4-9, 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)	9, 1, 7, 21 and 23	Annually	Gamma isotopic[e]
2.	DIRECT RADIATION			
	TLD[g] (34/56)	1-9, 10-25, 40-47, 49-51, 53-56, 71-86 (S1-S16)[h]	Quarterly, annually	Thermoluminescent output; quarterly and annual processing.
	PIC[i] (0/3)	1, 21, and 23	Continuous recording, monthly tape exchange	Monthly data tape analysis (when used)
3.	WATERBORNE			
	Surface/ Drinking Water[k] (3/4)	26, 27, 28 and 29	Composite aliquots[j] monthly	Gamma isotopic,[e] gross beta, quarterly tritium composite, strontium-90[l], iodine-131[m]
	Ground Water (2/3)	31, 32, and 52	Quarterly	Gamma isotopic[e], quarterly tritium grab sample

TABLE 3-1 (Cont.)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM PLAN

SAMPLE TYPE[a]	SAMPLE STATION NO.[b]	SAMPLING AND COLLECTION FREQUENCY[c]	TYPE AND FREQUENCY OF ANALYSIS
Sediment from shoreline (1/2)	33 and 34	Semiannually	Gamma isotopic[e]
4. INGESTION			
Milk[n] (5/4)	9, 36, 40, 59, and 96	Semimonthly during grazing season, monthly at other times	Gamma isotopic[e] Iodine-131
Fish[o] (2/2)	30 and 38	Seasonal or Semiannually	Gamma isotopic[e]
Garden Produce[p] (1/3)	9, 91[q] 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 sample locations to total number of sample locations currently being monitored in the surveillance program.

[b]The underlined sample location designates a control station.

[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.

[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.

TABLE 3-1 (Cont.)

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

(f)Soil samples are collected to satisfy the requirements of the Site Certification Agreement (SCA)[9] for Plant 2.

(g)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 (ANSI N545-1975), except for specified energy-dependence response. Correction factors are available for energy ranges with response outside of the specified tolerances.

(h)TLD stations 71-86 are special interest stations and are not included among the 34 routine TLD stations required by Plant Technical Specifications, Table 3.12-1. Their alternate designations are S1-S16.

(i)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.

(j)Composite (integrated grab) samples are collected with equipment which is capable of collecting an aliquot at time intervals which are short relative to the compositing period.

(k)Station 26, Plant 2 makeup water intake from the Columbia River is both an upstream surface water sample and drinking water control sample location. The Station 28 (300 Area) sample is both a downstream surface water sample and drinking water sample. Two week composite sample analysis for iodine-131 is initiated when the dose calculated for the consumption of water is greater than 1 mrem per year maximum organ dose using ODCM methodology and parameters.

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

(m) 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.

(n)Milk samples will be obtained from farms or individual milk animals which are located in sectors with high calculated annual average ground-level D/Qs and high dose potential. Routine milk samples are collected in areas of high dose potential instead of within 5 kilometers, due to location of milk animals. 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.

TABLE 3-1 (Cont.)

(o)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. 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 (38A).

(p)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 sample will be dependent on seasonal availability.

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

TABLE 3-2

REMP SAMPLE LOCATIONS BY SECTOR

SECTOR[a]	STATION[b] NUMBER	DISTANCE[c] MILES	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)	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	4.3	6919	AP/AI
	39	4.4	7084	FI
	46	4.7	7562	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	4.2	6758	TLD
	44	5.7	9171	TLD
E (5)	75(5S)	0.4	644	TLD
	22	2.1	3379	TLD
	10	3.1	4988	TLD
	26	3.2	5149	PW
	27	3.2	5149	DW
	30	3.3	5311	FI
	43	5.7	9171	TLD

TABLE 3-2 (Cont.)

REMP SAMPLE LOCATIONS BY SECTOR

SECTOR[a]	STATION[b] NUMBER	DISTANCE[c] MILES	METERS	SAMPLE TYPE[d]
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	4.7	7562	AP/AI/TLD
	42	5.6	9010	TLD
	36	7.2	11585	MI
	5	7.7	12389	AP/AI/TLD
	38	26.5	42639	FI
	91	4.8	7723	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
	58	8.6	13838	MI
	59	9.6	15443	MI
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	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

TABLE 3-2 (Cont.)

REMP SAMPLE LOCATIONS BY SECTOR

SECTOR[a]	STATION[b] NUMBER	DISTANCE[c] MILES	METERS	SAMPLE TYPE[d]
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
	9[e]	30.0	48270	AP/AI/MI/GP/ TLD/SO
W (13)	83(13S)	0.5	805	TLD
	15	1.4	2253	TLD
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

TABLE 3-2 (Cont.)

REMP SAMPLE LOCATIONS BY SECTOR

SECTOR[a]	STATION[b] NUMBER	DISTANCE[c] MILES	METERS	SAMPLE TYPE[d]

(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	- Drinking/ Surface Water
AI	- Air Iodine	GW	- Ground Water
SE	- Sediment	DW	- Discharge Water
FI	- Fish	GP	- Garden Produce
SO	- Soil	FR	- Fruit

(d) Station 9 designates the Sunnyside-Grandview control area for TLD, AI/AP, SO, and GP and is actually three separate stations within a few miles of each other and all within 30-35 miles of Plant 2. Station 96, which is the new control station for milk, is also located within the control area. It is 36 miles from Plant 2.

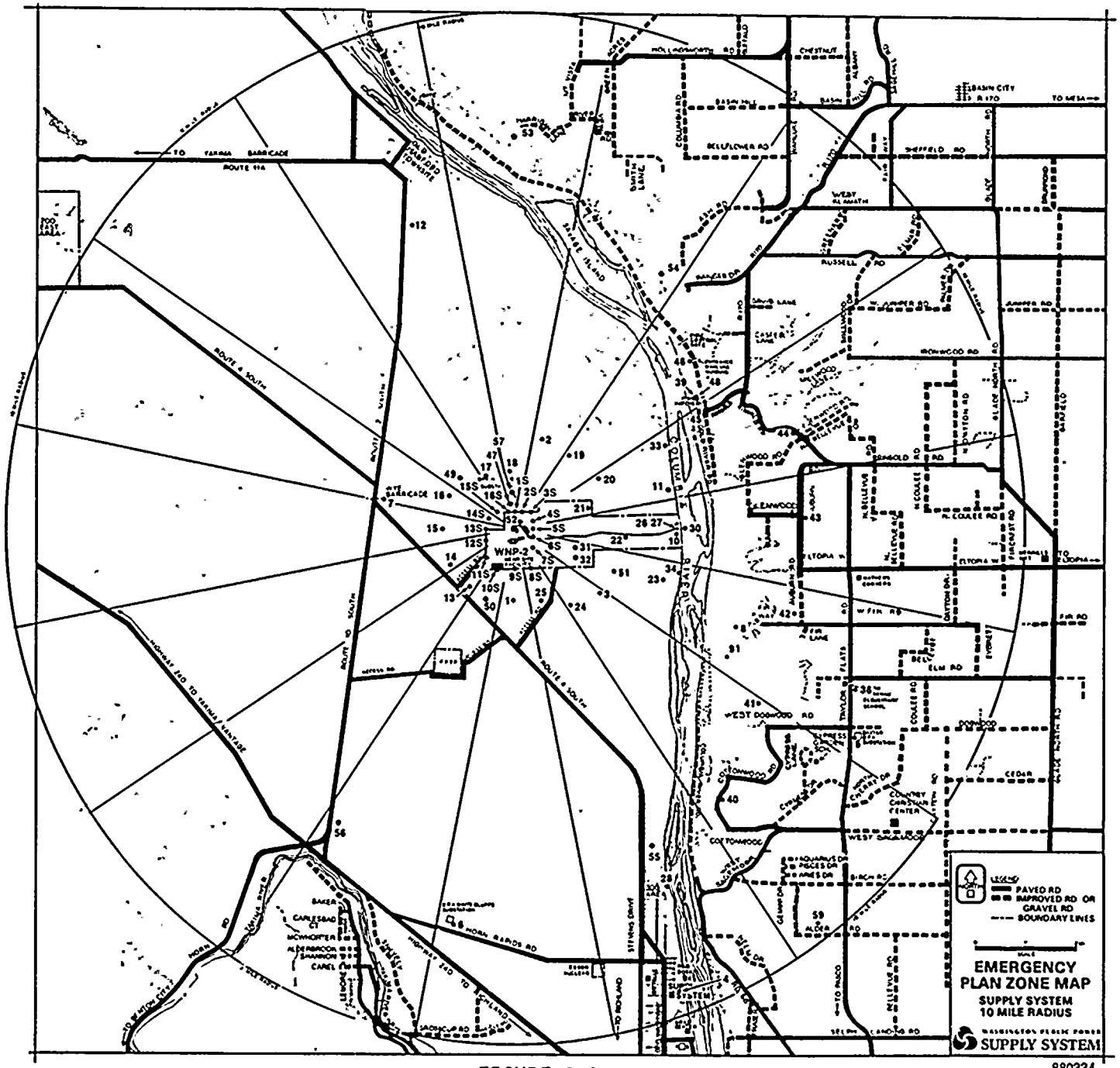


FIGURE 3-1
REMP SAMPLING LOCATIONS WITHIN THE 10-MILE RADIUS

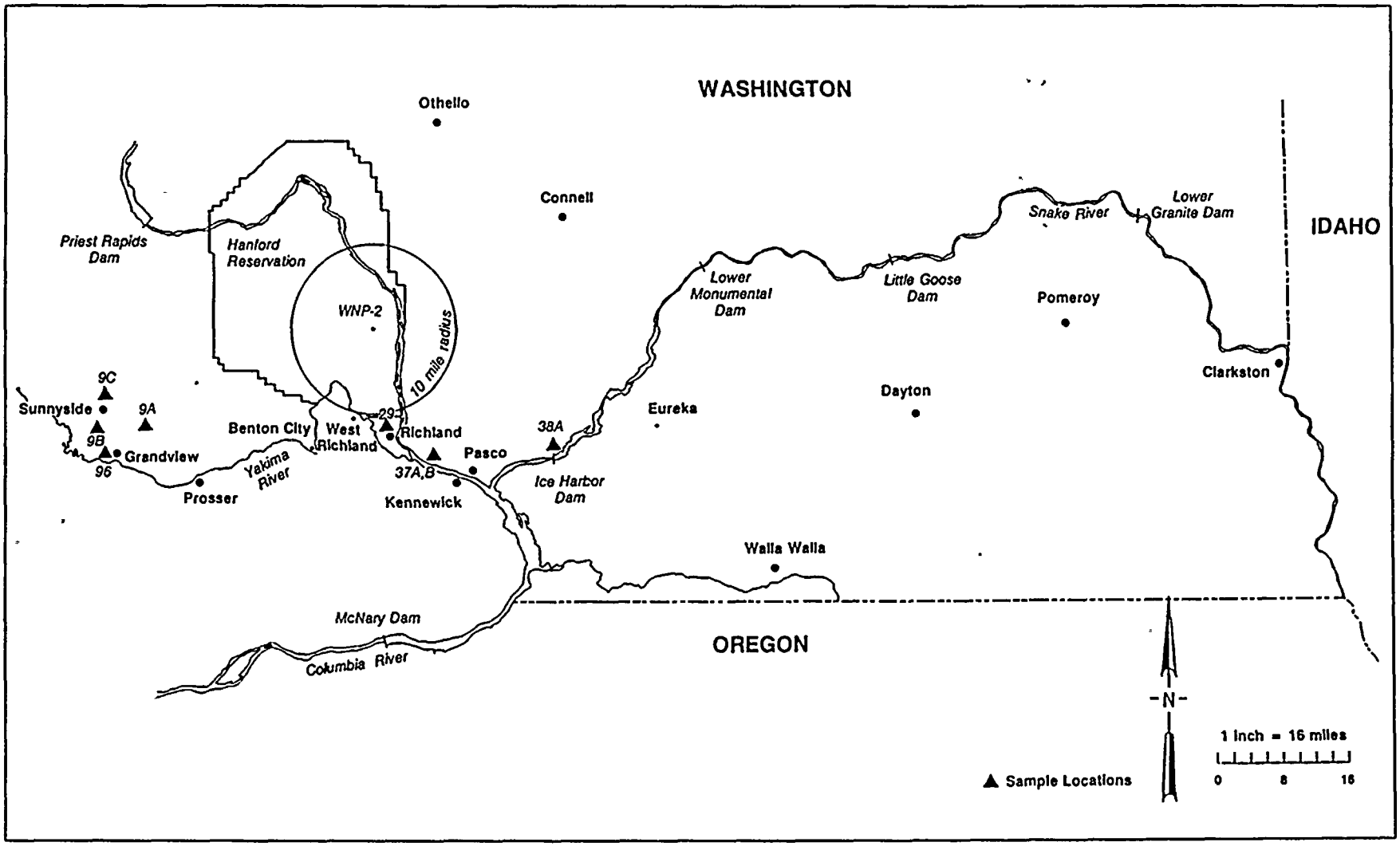


FIGURE 3-2
REMP SAMPLING LOCATIONS OUTSIDE THE 10-MILE RADIUS

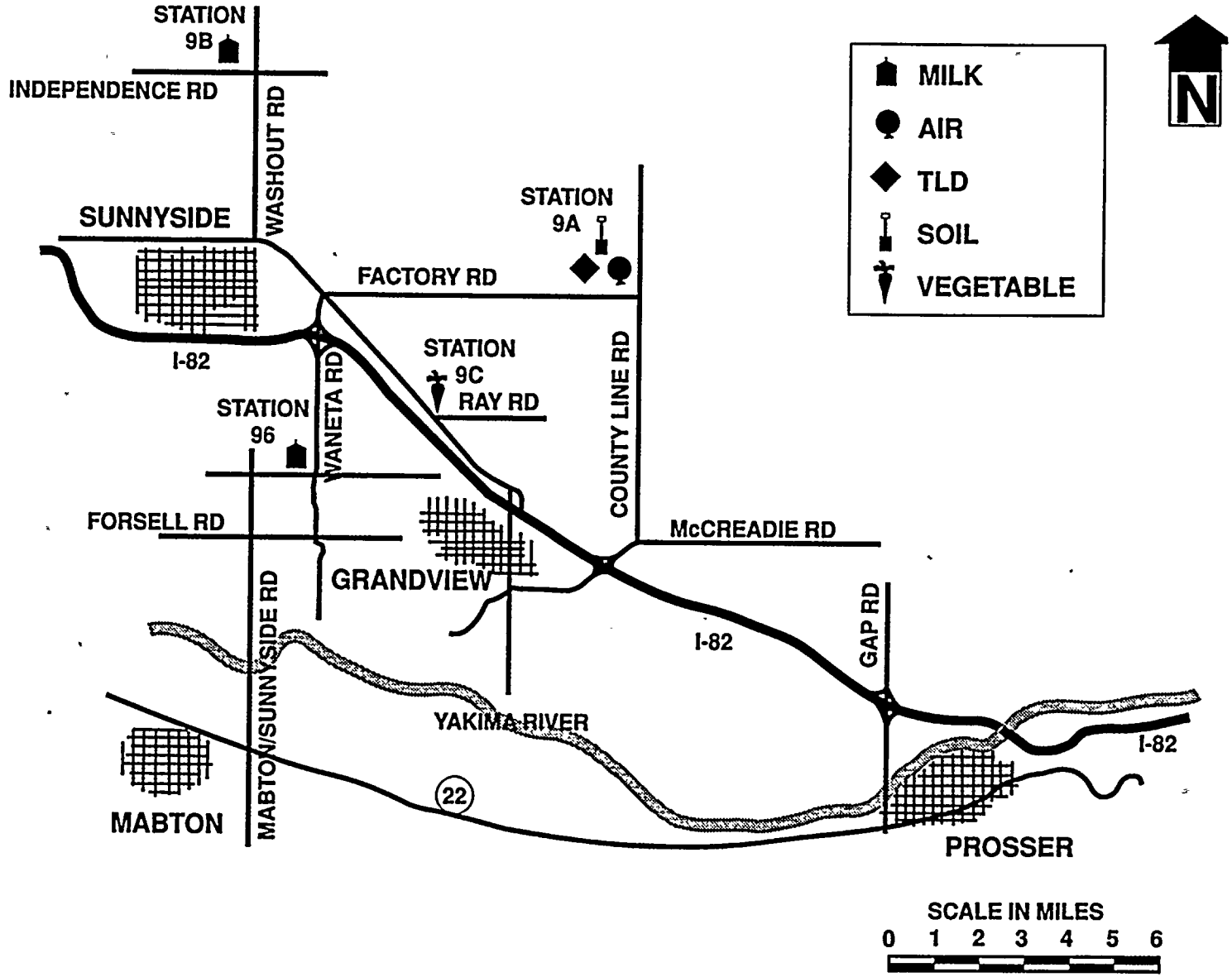


FIGURE 3-3
REMP SAMPLING LOCATIONS IN THE SUNNYSIDE/GRANDVIEW AREA

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 exposure pathway would be initiated at that new site.

The results of the 1988 land use census within 5 miles are given in Table 3-3. 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. The gardens located by the land use census were either not irrigated by Columbia River water, located upstream from Plant 2 or did not contain broad leaf vegetation, so no vegetation sampling will be conducted at these locations.

3.3 Sampling Methods

The collection of environmental samples for the REMP was performed according to the schedule in Table 3-1. All samples were collected by Supply System personnel. The 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.

3.3.1 Direct Radiation

Thermoluminescent dosimeters (TLDs) were used to determine the direct radiation levels at the fifty-six (56) monitoring locations shown in Figures 3-4, 3-5 and 3-6. 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[10]. 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.

TABLE 3-3

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

SECTOR[a] PARAMETER	NEAREST RESIDENT	GARDEN ($>50M^2$)	DAIRY[b] ANIMALS	LIVESTOCK
NE	4.5	0	0	0
ENE	4.1	4.1	0	4.7
E	4.5	4.5	0	4.5 (c)
ESE	4.2	4.2	0	4.7 (c)
SE	4.8	0	0	0

(a) 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.

(b) The closest dairy animal locations are at 6.4 miles, 8.3 miles and 9.6 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.

(c) Horses are present here.

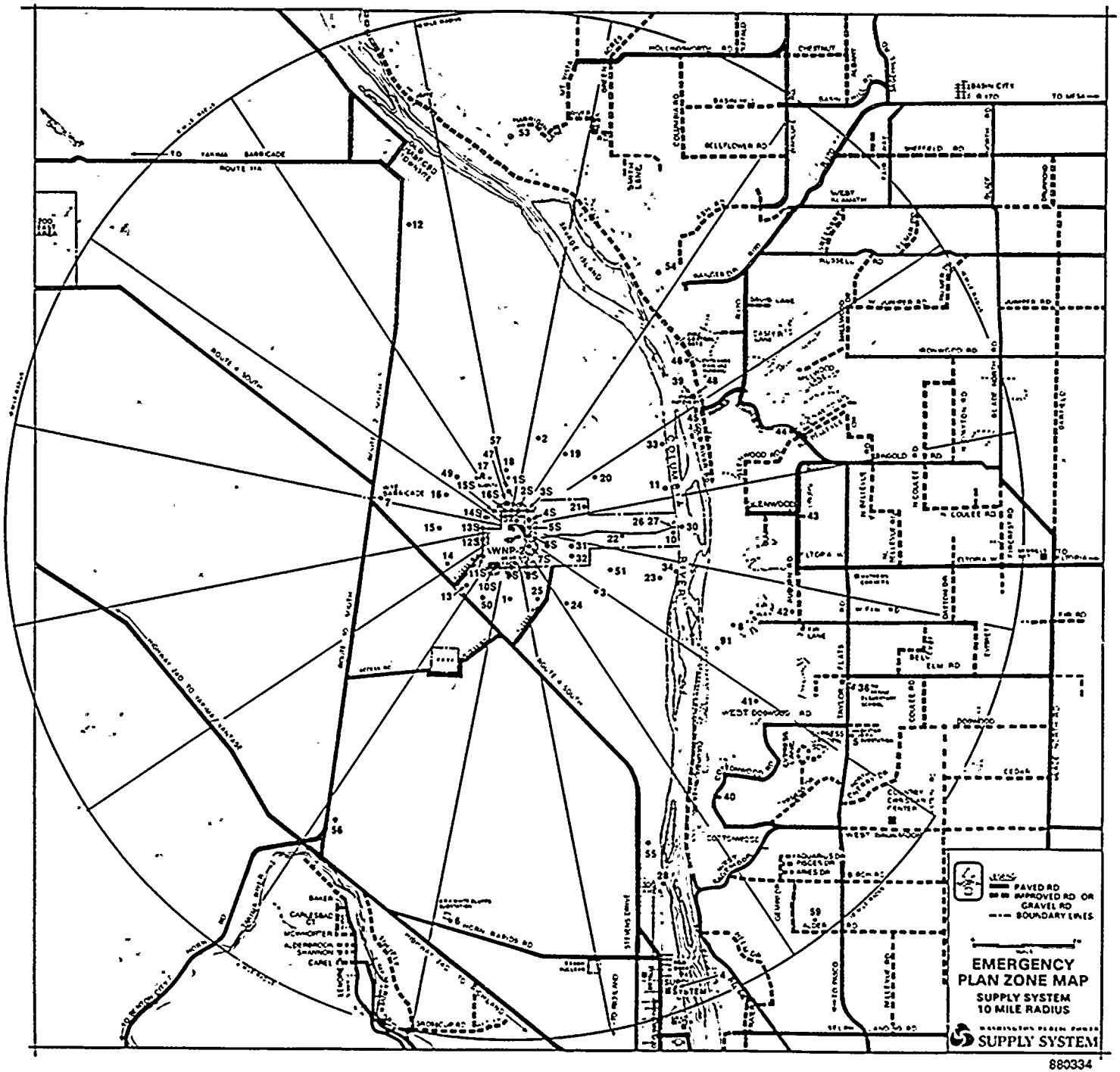


FIGURE 3-4
INNER CIRCLE TLD LOCATIONS

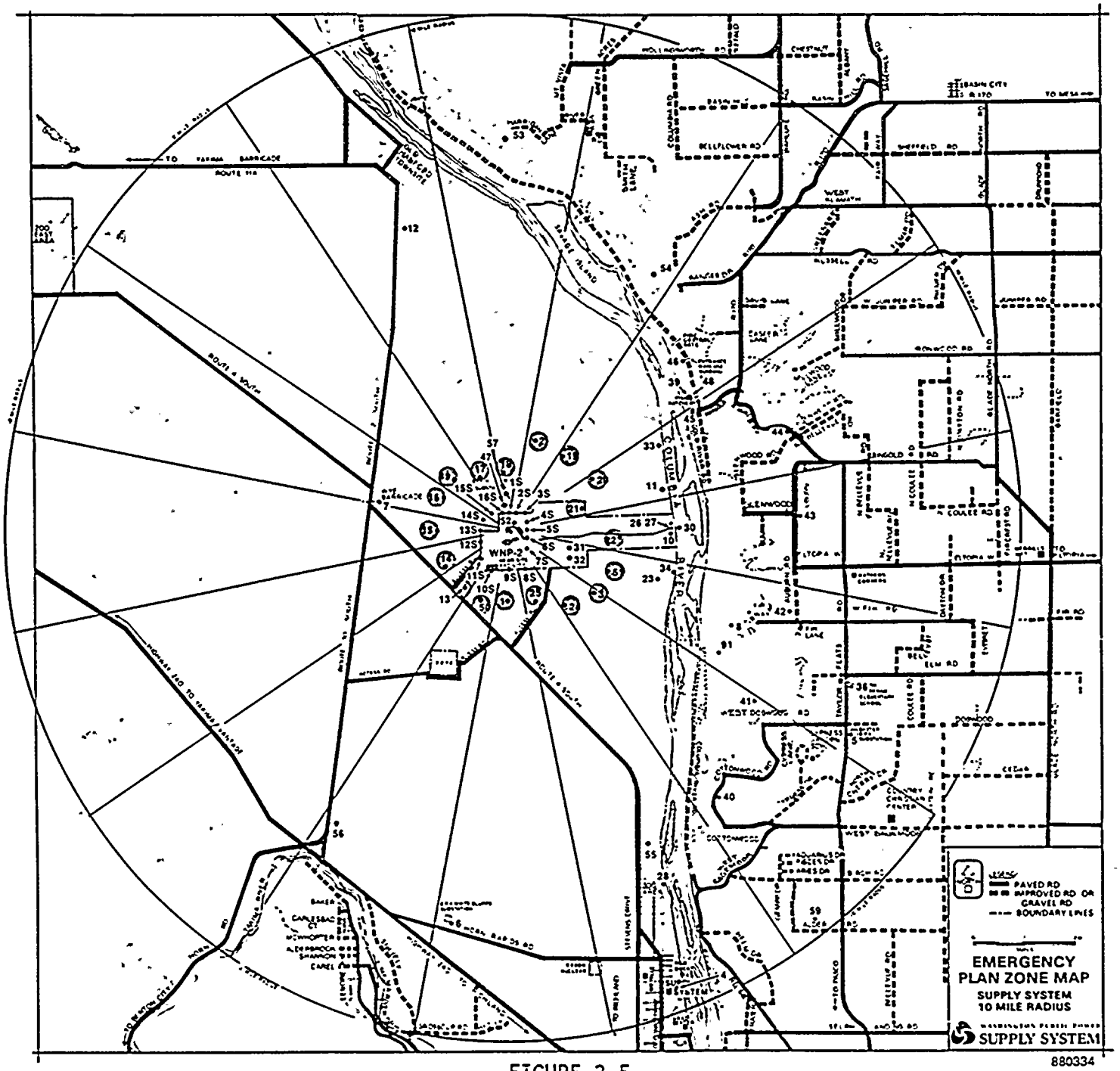


FIGURE 3-5
NEAR-PLANT TLD LOCATIONS

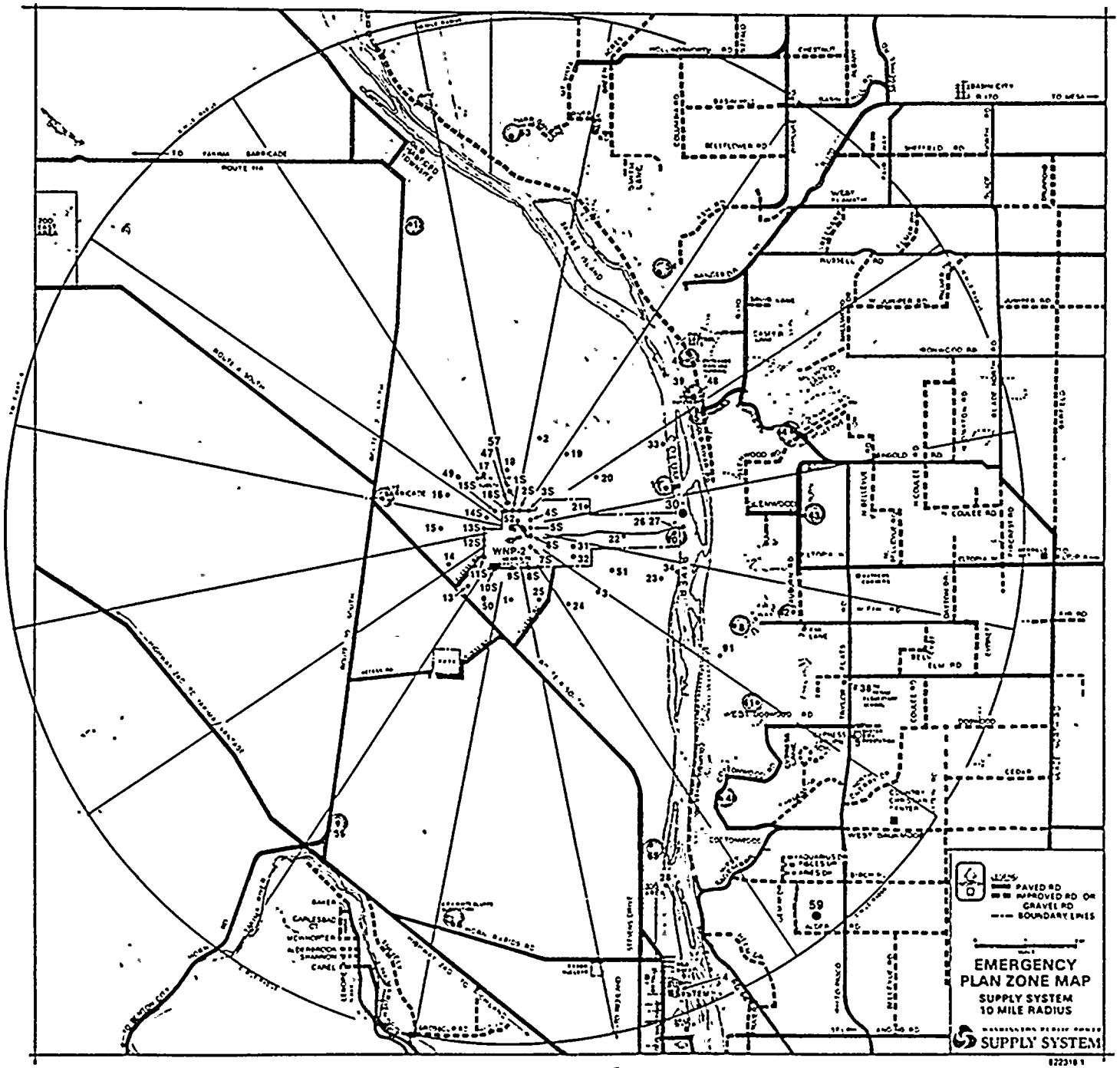


FIGURE 3-6
OUTLYING TLD LOCATIONS WITHIN THE 10-MILE RADIUS

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 control dosimeters that accompanied the field dosimeters to and from the field locations.

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 to approximately 100 mR of Cs-137 gamma, in order to determine dose response (i.e, calibration) factors for each dosimeter. The calibration factors were then used to determine the total exposure received by each TLD.

Until late 1985, the Site Certification Agreement for Plant 2 required the use of pressurized ion chambers (PICs) to measure direct radiation at three locations on the site boundary. Because of lightning damage to these units and frequent malfunctioning, the requirement for the routine use of the PICs was waived. The units are currently maintained for use in special monitoring situations or as back-up monitoring systems. Solar panels have been constructed for the units to eliminate the occurrence of power surges and lightning damage.

3.3.2 Airborne Particulate/Air 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 9 (Figure 3-3) are considered control, or background, samples; the ones drawn at the other locations (Figure 3-7) are 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 all weather housings mounted on elevated platforms at each air sample location.

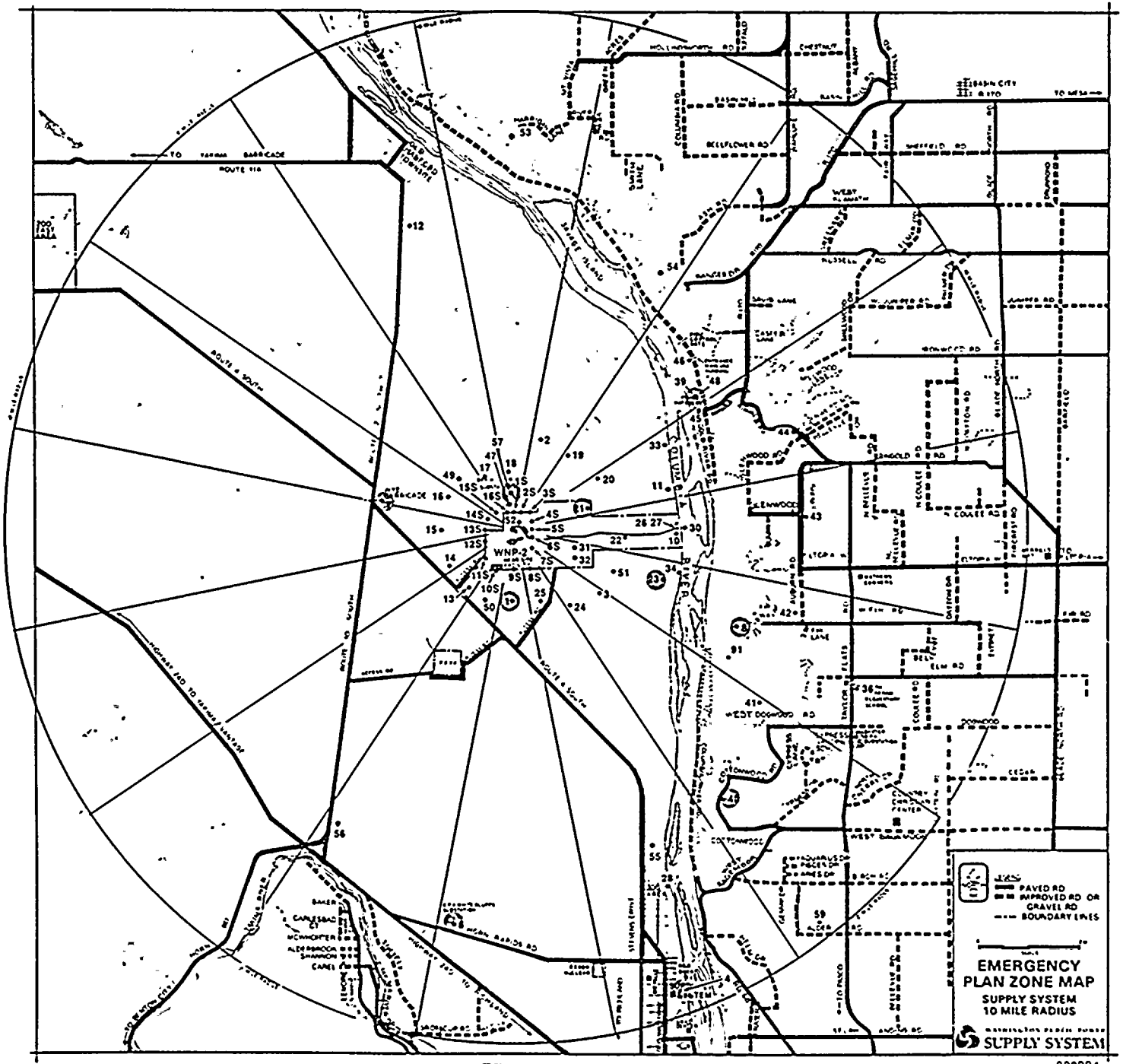


FIGURE 3-7
AIR SAMPLING LOCATIONS WITHIN THE 10-MILE RADIUS

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.

3.3.3 Water

The water sampling network consists of seven sampling locations: three for evaluation of river/drinking water, one for evaluation of plant discharge water and three for the evaluation of groundwater (Figures 3-8 and 3-9). The river/drinking water stations are located at the plant intake (Station 26), the DOE 300 Area river intake (Station 28) and the Richland Water Treatment Plant (Station 29 in Figure 3-2). The discharge water sample is drawn from the plant discharge line (Station 27) to the Columbia River. The sample drawn from the plant intake line is considered the control sample, while the samples drawn from the other locations are indicator samples. A Collins Model 42 composite sampler is installed at each of these locations to periodically collect 25-ml aliquots of water, which 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. The composite sampler drawing samples from the discharge line is capable of operating in a flow-proportional mode. Installation of a low-range flow meter and the associated electrical system to permit operation in the flow-proportional mode will be completed in 1989.

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, in order to inhibit biological growth and plateout of dissolved ions on the bottle wall. Acid was not added to the collection bottles receiving the tritium water

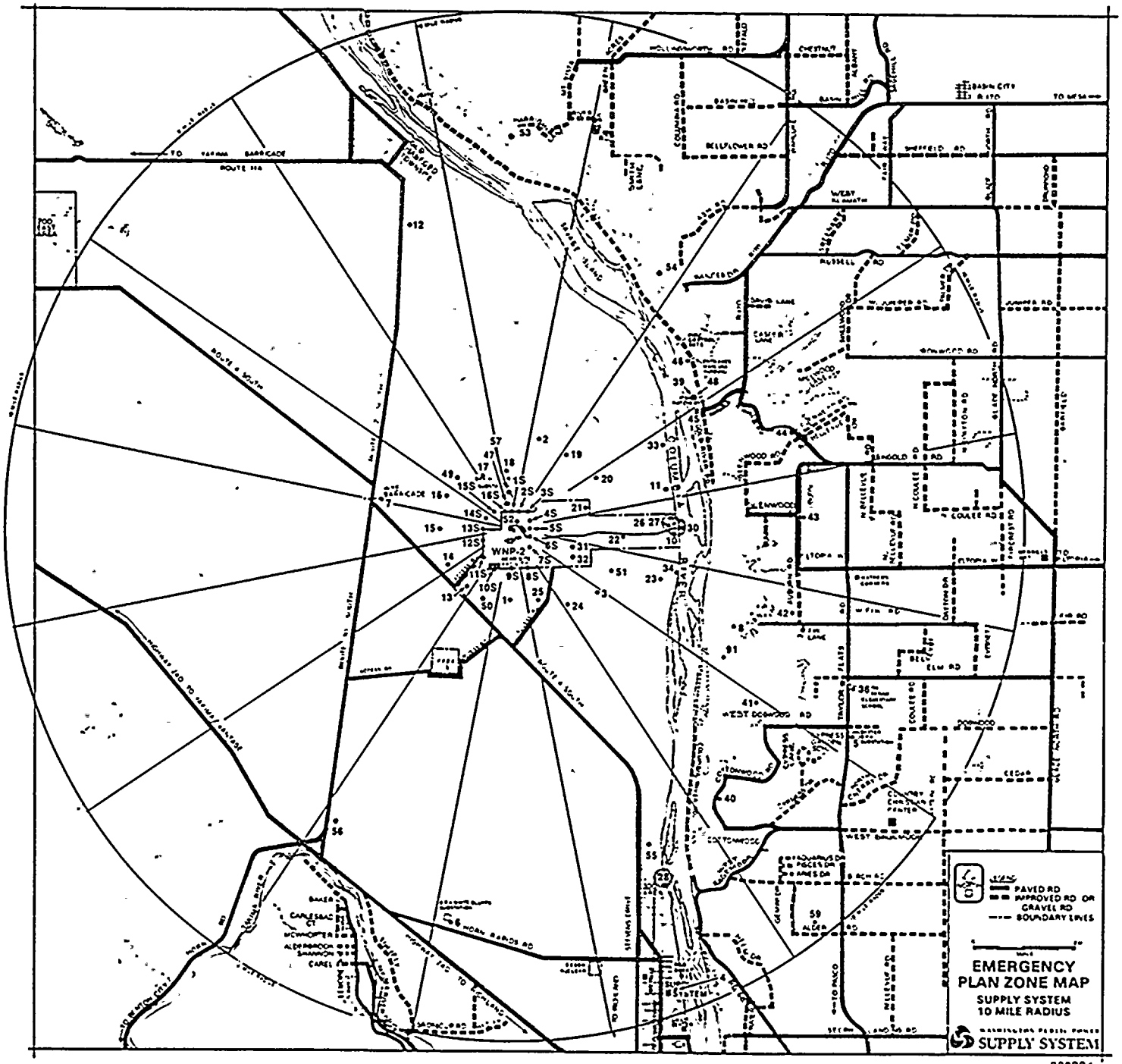


FIGURE 3-8
RIVER/DRINKING AND DISCHARGE WATER SAMPLING LOCATIONS WITHIN THE 10-MILE RADIUS

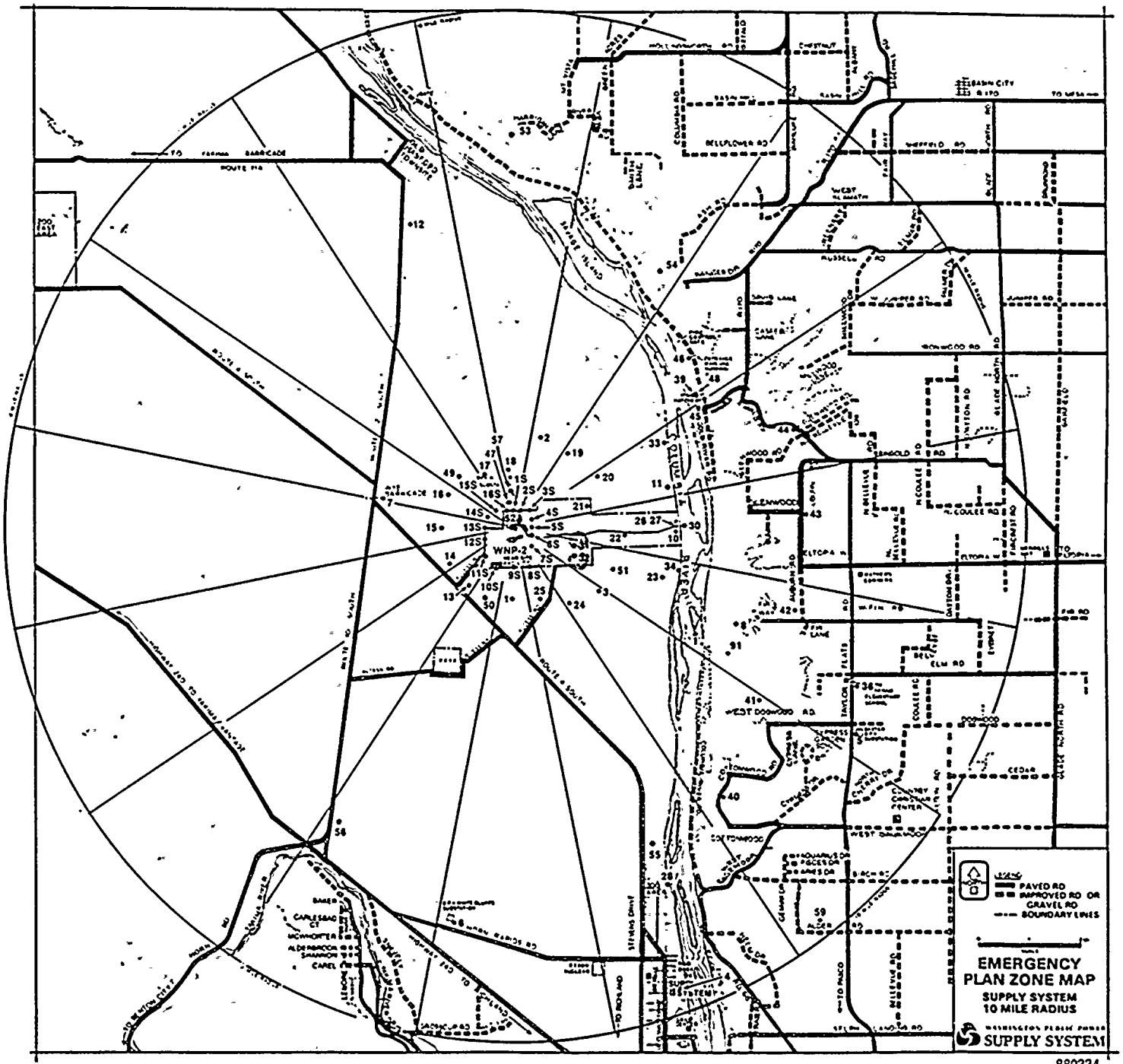


FIGURE 3-9
GROUNDWATER SAMPLING LOCATIONS

samples. One gallon 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 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.

The 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). Water from the Plant 2 well is used as a backup source for drinking and fire protection. Water from the WNP-1 wells supplies some of the drinking and fire protection water for the WNP-1 site and, until November, 1987, supplied drinking water to the Plant Support Facility at Plant 2. 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.

3.3.4 Soil

Soil samples were collected once during 1988, as required by the Site Certification Agreement. Samples were taken from the four indicator locations (Stations 1, 7, 21 and 23) shown in Figure 3-10. One sample was taken at the control location, Station 9 (Figure 3-3). 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.

Each sample was submitted for gamma isotopic analysis. No soil samples were submitted for strontium analysis because the cesium results for the indicator stations did not exceed ten (10) times the results for the control station.

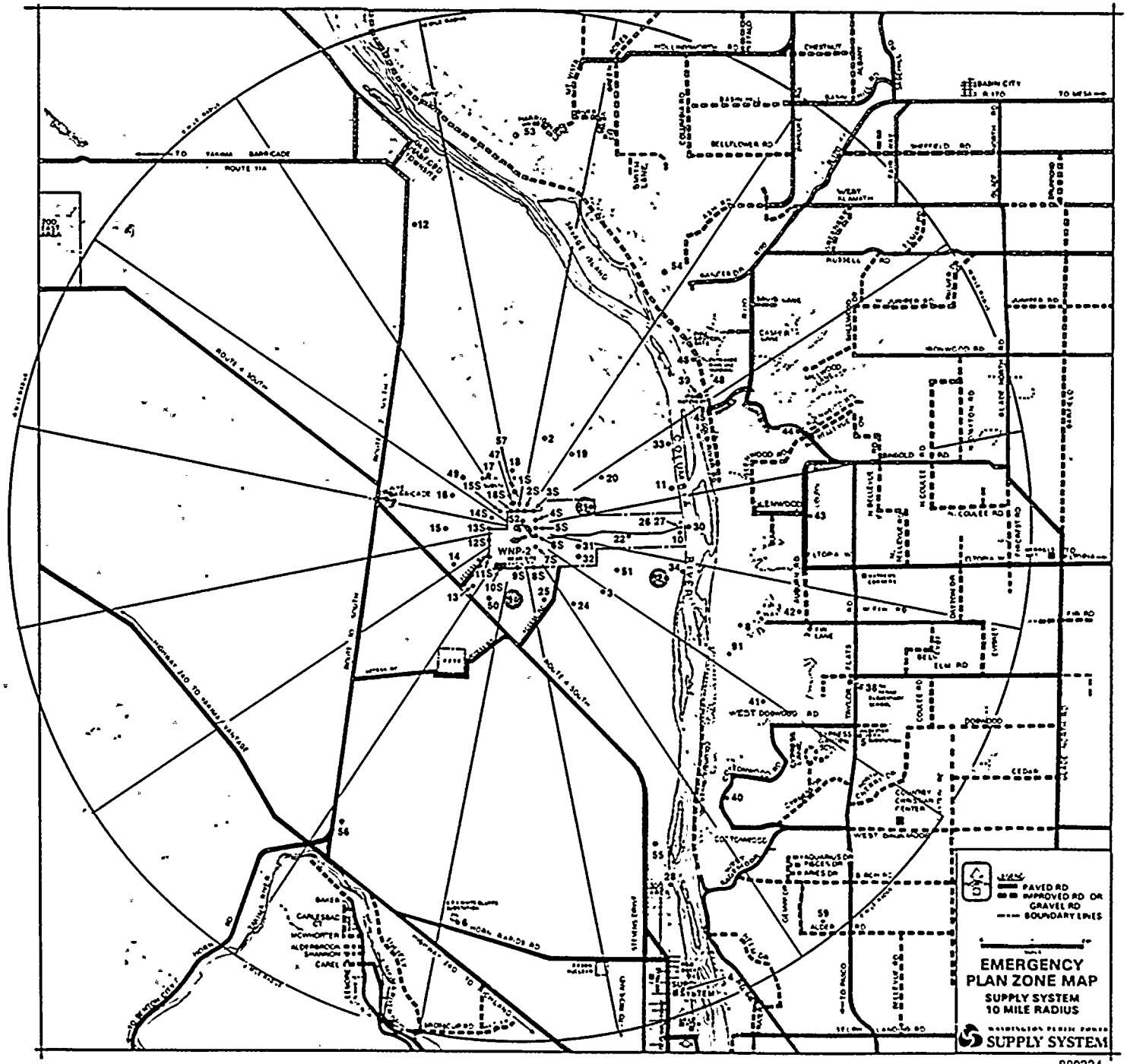


FIGURE 3-10
SOIL SAMPLING LOCATIONS WITHIN THE 10-MILE RADIUS

3.3.5 Shoreline Sediment

Two shoreline sediment samples were collected twice during 1988 in accordance with the routine sampling schedule. The upstream sediment sampling location (Station 33) is approximately two miles up the Columbia River from the plant discharge point and the other location (Station 34) is approximately one mile downstream of the discharge point (Figure 3-11). Samples were scooped from underwater 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.

3.3.6 Fish

Fish sampling was performed during two weeks in April and September, when the likelihood of obtaining anadromous* species was high. Fish samples collected from the Columbia River (Station 30 in Figure 3-1) were indicator samples, while the fish collected on the Snake River (Station 38 in Figure 3-2) were control samples.

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 electroshock, but samples of the anadromous species were also collected from the fish trap at Ice Harbor Dam 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 overnight, and shipped to the analytical contractor.

*Fish species, such as salmonids, known to ascend rivers from the sea for breeding.

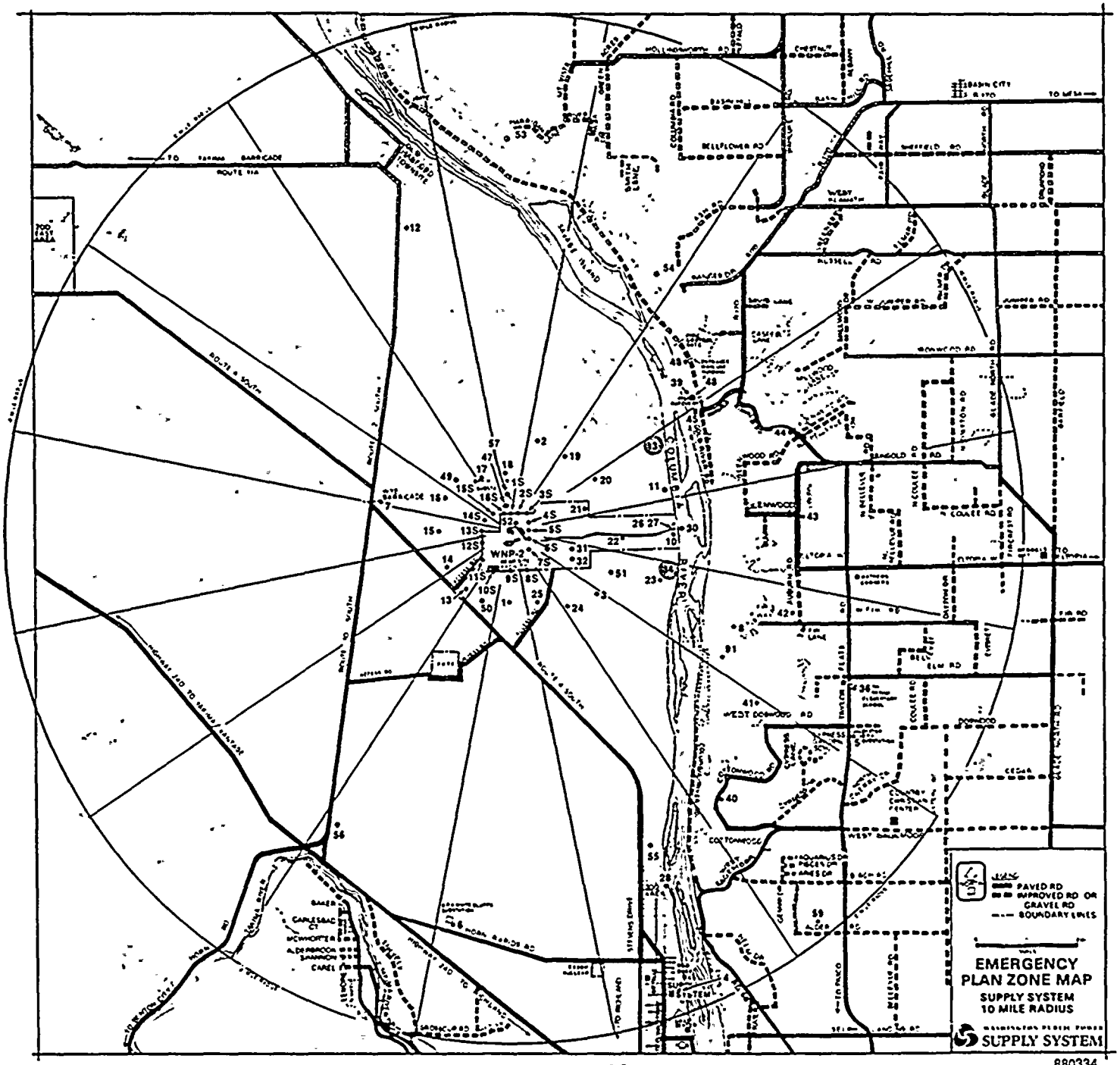


FIGURE 3-11
SEDIMENT SAMPLING LOCATIONS

3.3.7 Milk

Milk samples were collected monthly during January, February, March, October, November and December and semi-monthly 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 frozen overnight and shipped to the analytical contractor.

Routine samples were collected from three indicator locations (Stations 36, 40, and 59) across the Columbia River in Franklin County, as shown in Figure 3-12. Samples were also collected at one indicator station (Station 9) and one control location (Station 96) in the Sunnyside/ Grandview area (in Figure 3-3). Station 9 in Grandview continued to serve as an indicator station in 1988 because a portion of the feed for the cows at that location is hay from the north Pasco area of Franklin County, making it unsuitable for use as a control location.

3.3.8 Garden Produce

Samples of local garden produce were collected monthly during the four months 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 the predominant downwind direction (Station 37 in Figure 3-2) where crops are irrigated with Columbia River water. The control samples were obtained from produce stands in the Sunnyside area (Station 9 in Figure 3-3), the direction least likely to be affected by plant effluents. During 1988, apples were also collected in August from Station 91, the Rio Vista Farms orchard, which is irrigated with Columbia River water (Figure 3-1).

3.4 Analytical Procedures

The analytical procedures used for the 1988 REMP samples are described below. Teledyne Isotopes performed all analyses of REMP samples during 1988.

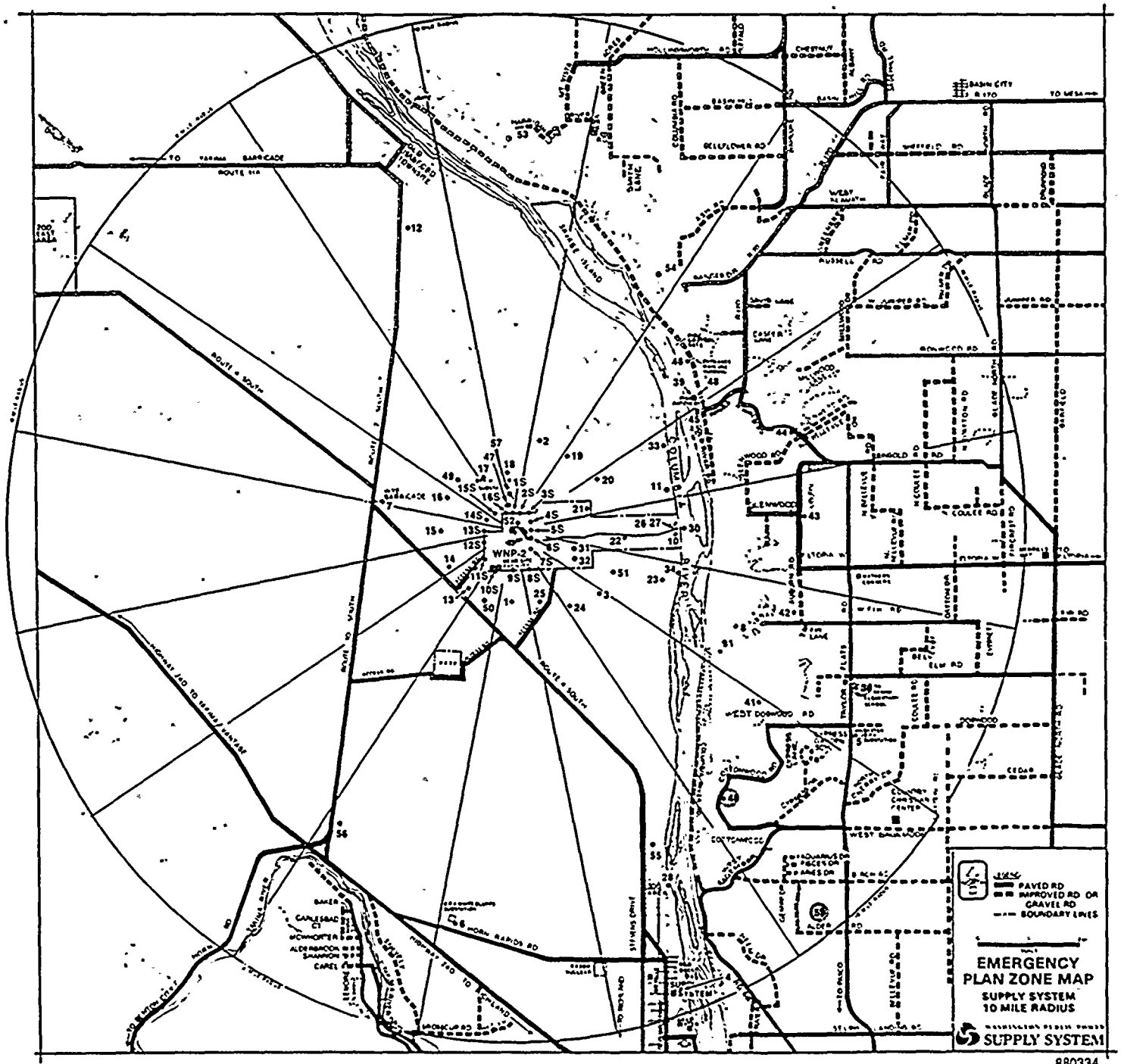


FIGURE 3-12
MILK SAMPLING LOCATIONS WITHIN THE 10-MILE RADIUS

3.4.1 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, supplied by the Supply System, was counted as the blank with each weekly set of filters.

3.4.2 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 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 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 I-131 of each charcoal cartridge was determined (assuming no positive I-131) uniquely from the volume of air which passed through it. In the event that I-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

Three 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.

3.4.3 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.

3.4.4 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 1988, 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 3-1, footnote m).

3.4.5 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, anticoincidence system provided additional shielding from cosmic rays.

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

Water

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.

Milk

Stable strontium carrier was added to one liter of sample and trichloroacetic acid (TCA) was added to produce a curd. The curd was separated by filtration and discarded. An oxalate precipitation was performed on the filtrate and the precipitate was ashed in a muffle furnace. The ash was dissolved 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 nitric acid. The mixture was filtered and the liquid portion was reduced in volume by evaporation. 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 7 to 10 days for yttrium ingrowth. Yttrium was then precipitated as hydroxide, dissolved and re-precipitated as oxalate. The yttrium oxalate was mounted on a nylon planchet and

counted in a low-level beta counter to infer Sr-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.

These procedures were not used during 1988 on routine REMP samples. However, they were employed in the analyses of intercomparison samples.

3.4.7 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.

3.5 Data Analysis Methods

Since 1985 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" 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 lower limit of detection. A listing of the current lower limits of detection determined for each analysis is also provided 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, 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 (TLD) output minus the TLD background, minus any transit 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.

4.0 RESULTS AND DISCUSSION

During 1988 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 4-1 presents the means and ranges of the 1988 results for each type of sample collected. The means and ranges of the preoperational and the previous operational data from 1984 to 1987 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 lower limits of detection (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 1985. Since then, REMP data has been reported as net results, i.e. total (gross) results minus the detector counting background. Comparison of the mean results for 1988 to the mean preoperational results is difficult due to the high bias stemming from the "less than" data. However, comparison of the range of results observed for each period, in order to determine whether the 1988 results are significantly greater than during preoperational and previous operational periods, is a viable approach. Careful interpretation of the data ranges for the previous operational data is still required because the effects of the Chernobyl accident in 1986 and the use of "less than" values for part of the 1984 data result in higher values on the high end of the ranges for some radionuclides.

The 1988 REMP data compares well to the ranges of data from previous periods. The quarterly TLD results of 1988 were very similar to those determined for 1987. The annual TLD results, however, were lower than observed in 1987 and within the same range observed during 1986 when the same set of annual TLDs was used. Further discussion of the annual TLD results is included in Subsection 4.1 below.

TABLE 4-1

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM COMPARATIVE SUMMARY

MEDIA/ANALYSIS	PREOPERATIONAL[a] MEAN	PREOPERATIONAL[a] RANGE	PREVIOUS OPERATIONAL[b][c] MEAN	PREVIOUS OPERATIONAL[b][c] RANGE	1988[d] MEAN	1988[d] RANGE
Air: pCi/m^3						
Gross Beta	<0.02	(<0.003 - 0.130)	0.03	(0.003 - 0.741)	0.018	(0.003 - 0.098)
I-131[e]	<0.05	(<0.01 - 0.11)	0.01	(-0.033 - 0.818)	-0.001	(-0.038 - 0.025)
Gamma						
Cs-134	<0.01	(<0.001 - 0.040)	<0.001	(-0.001 - 0.015)	0.0001	(-0.0001 - 0.0003)
Cs-137	<0.01	(<0.001 - 0.040)	<0.003	(-0.001 - 0.036)	0.0001	(-0.0001 - 0.0003)
Ru-103	Not Reported		0.003	(0.000 - 0.010)	0.0000	(-0.0002 - 0.0003)
Ru-106	Not Reported		0.002	(-0.017 - 0.020)	0.0002	(-0.0014 - 0.0017)
Water: pCi/l						
Gross Beta[f]	<4.4	(<1.0 - <22.0)	5.5	(-0.2 - 36.0)	8.2	(0.8 - 33.0)
Gamma[g]						
Cs-134	<3.8	(<1.0 - <12.0)	<0.5	(-5.4 - 7.0)	1.0	(-1.4 - 5.4)
Cs-137	<3.8	(<0.8 - <16.0)	<1.0	(-4.0 - 7.0)	1.6	(-1.0 - 7.9)

[a] All stations, all years.
[b] Indicator stations only for the years 1984 to 1987. 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 included "less than" (<) values.
[d] Indicator stations only.
[e] Charcoal cartridge results.
[f] Includes river/drinking water and discharge water results only.
[g] Includes ground water, river/drinking water and discharge water results.

TABLE 4-1 (Cont.)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM COMPARATIVE SUMMARY

MEDIA/ANALYSIS	PREOPERATIONAL[a]		PREVIOUS OPERATIONAL[b][c]		1988[d]	
	MEAN	RANGE	MEAN	RANGE	MEAN	RANGE
Water: pCi/l (Cont.)						
Gamma[e]						
Co-58	<4.6	(<1.0 - <25.0)	<0.3	(-3.3 -<6.0)	0.4	(-0.2 - 2.9)
Co-60	<4.6	(<0.1 - <13.0)	<1.2	(-2.4 - 10.5)	1.6	(-0.8 - 7.2)
Fe-59	<12.1	(<2.0 - <93.0)	<1.2	(-6.4 - 6.6)	0.9	(-2.8 - 5.7)
Ba-140	<50.5	(<4.0 - <300.0)	2.4	(-22.9 - <14.0)	-0.5	(-60.0 - 14.0)
La-140	<25.5	(<3.0 - <160.0)	<-0.3	(-64.8 - 13.5)	1.1	(-3.1 - 7.5)
Mn-54	<4.2	(<1.0 - <16.0)	<0.7	(-3.2 -<6.0)	1.0	(-1.8 - 4.2)
Nb-95	<5.1	(<1.0 - <29.0)	<1.0	(-3.7 - 6.0)	1.4	(-0.6 - 6.5)
Zn-65	<8.0	(<1.4 - 27.0)	<0.5	(-16.2 - 86.7)	-1.3	(-47.0 - 16.0)
Zr-95	<10.6	(<2.0 - 63.0)	<1.4	(-7.0 -<12.0)	1.1	(-11.0 - 5.8)
H-3[e]	<463.1	(<10.0 - 2600.0)	234.6	(-165.0 - 2300.0)	361.3	(-69.0 - 4,400.0)
Sr-90[f]	Analysis Not Performed		0.6	(0.1 - 1.1)	Analysis Not Performed	

[a] All stations, all years.
[b] Indicator stations only for the years 1984 to 1987. 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 included "less than" (<) values.
[d] Indicator stations only.
[e] Includes ground water, river/drinking water and discharge water results.
[f] Performed on drinking water samples having gross beta levels greater than 8.0 pCi/liter.

TABLE 4-1 (Cont.)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM COMPARATIVE SUMMARY

MEDIA/ANALYSIS	PREOPERATIONAL[a] MEAN	PREOPERATIONAL[a] RANGE	PREVIOUS OPERATIONAL[b][c] MEAN	PREVIOUS OPERATIONAL[b][c] RANGE	1988[d] MEAN	1988[d] RANGE
Sediment: pCi/kg						
Gamma						
Co-60	<254.6	(130.0 - 610.0)	75.0	(28.5 - 93.6)	41.1	(27.1 - 55.1)
Cs-134	<112.5	(<50.0 - <150.0)	57.0	(7.0 - 172.0)	64.8	(57.9 - 71.6)
Cs-137	<287.0	(<50.0 - <560.0)	<491.4	(215.0 - 1890.0)	220.5	(153.0 - 288.0)
Co-57	Not Reported		46.0	(34.0 - 54.0)	Not Reported	
Eu-152	Not Reported		143.0	(140.0 - 146.0)	Not Reported	
Soil: pCi/kg						
Gamma						
Cs-134	<65.3	(<20.0 -<150.0)	<54.4	(7.1 -<130.0)	15.7	(13.6 - 19.3)
Cs-137	<364.3	(<20.0 - 1880.0)	<281.4	(9.4 - 735.0)	324.0	(29.0 - 468.0)
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)	<1.98	(-7.4 - 20.2)	0.6	(-3.6 - 4.3)
Cs-137	<3.8	(<1.0 - <12.0)	<4.5	(-7.4 - 47.3)	2.4	(-0.4 - 8.0)

(a) All stations, all years.
(b) Indicator stations only for the years 1984 to 1987. 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 included "less than" (<) values.
(d) Indicator stations only.

TABLE 4-1 (Cont.)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM COMPARATIVE SUMMARY

MEDIA/ANALYSIS	PREOPERATIONAL[a]		PREVIOUS OPERATIONAL[b][c]		1988[d]	
	MEAN	RANGE	MEAN	RANGE	MEAN	RANGE
Milk: pCi/l						
Gamma						
Ba-140	<72.1	(<6.0 - <2000.0)	<3.8	(-44.3 - 55.0)	-0.6	(-9.9 - 11.0)
La-140	<33.3	(<5.0 - <1000.0)	<0.6	(-24.2 - <15.0)	-0.3	(-4.3 - 9.7)
I-131[e]	<0.5	(<0.1 - <1.0)	<1.46	(-0.7 - 99.0)	0.0	(-0.3 - 0.2)
Sr-90	Not Reported		2.2	(-1.3 - 3.9)	Not Reported	
Fish: pCi/kg						
Gamma						
Cs-134	<61.2	(<6.0 - <130.0)	<8.7	(-20.4 - <70.0)	1.6	(-1.2 - 4.6)
Cs-137	<88.8	(<10.0 - <130.0)	<21.5	(-35.1 - <80.0)	20.3	(9.8 - 36.8)
Co-58	<87.7	(<9.0 - <130.0)	<9.5	(-16.8 - <80.0)	-0.3	(-2.1 - 1.6)
Co-60	<80.6	(<9.0 - <130.0)	<8.7	(-18.4 - <110.0)	2.0	(-0.2 - 6.5)
Fe-59	<130.0	(<30.0 - <260.0)	<18.1	(-34.6 - <190.0)	1.3	(-4.8 - 8.4)
Mn-54	<88.3	(<8.0 - <130.0)	<9.8	(-10.3 - <80.0)	1.3	(0.2 - 3.0)

[a] All stations, all years.
[b] Indicator stations only for the years 1984 to 1987. 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 included "less than" (<) values.
[d] Indicator stations only.
[e] Resin method for I-131 determination.

TABLE 4-1 (Cont.)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM COMPARATIVE SUMMARY

MEDIA/ANALYSIS	PREOPERATIONAL[a]		PREVIOUS OPERATIONAL[b][c]		1988[d]	
	MEAN	RANGE	MEAN	RANGE	MEAN	RANGE
Produce: pCi/kg						
Gamma						
Cs-134	<49.1	(<10.0 - <140.0)	4.0	(-24.8 - 19.8)	1.5	(-3.3 - 8.4)
Cs-137	<69.8	(<10.0 - <140.0)	<6.6	(-9.8 - <30.8)	5.0	(0.6 - 8.7)
I-131	<105.6	(<10.0 - <1000.0)	<6.5	(-21.3 - 33.5)	-0.2	(-7.3 - 9.3)
TLD: mR/day						
Quarterly	0.24	(0.11 - 0.32)	0.24	(0.16 - 0.33)	0.27	(0.23 - 0.35)
Annual	0.23	(0.20 - 0.31)	0.23	(0.18 - 0.32)	0.22	(0.19 - 0.26)

[a] All stations, all years.
[b] Indicator stations only for the years 1984 to 1987. 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 included "less than" (<) values.
[d] Indicator stations only.

The LLDs generally determined by Teledyne Isotopes for each analysis performed and each radionuclide of interest are listed in Table 4-2. Presented alongside the Teledyne LLDs are the LLDs required by the NRC Branch Technical Position (BTP).

A summary of the REMP results above detection limits is presented in Table 4-3. If a particular radionuclide of interest was not detected in the 1988 samples, the term "LLD" is noted in the data mean and range columns. In this table the discharge water, river/drinking water, and groundwater results are listed separately to delineate the higher levels observed in the gross beta and tritium levels reported for the discharge water samples.

In general, the positive, or detected, 1988 results compare well with the results from previous years. Any significant differences or increases evident in the 1988 results are discussed in Subsections 4.1 - 4.8.

4.1 Direct Radiation

Summaries of the environmental radiation exposure rates, determined by thermoluminescent dosimeters (TLDs) are presented in Tables 4-4 and 4-5. 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 4-1 and 4-2 show the mean quarterly and annual results for near-plant and remote TLD locations from the preoperational period to 1988. In general, the results for the control location (Station 9) show the same fluctuations as the indicator locations (Stations 18, 47, 10, 11, 24, 25, 40 and 42).

Figure 4-3 presents the mean 1988 results for each of the sixteen meteorological sectors. The increase observed in 1987 and continued in 1988 is shown to be generally consistant for all meteorological sectors and TLD locations and, therefore, not related to Plant 2 operations.

TABLE 4-2

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

MEDIA (UNITS)	ANALYSIS	TELEDYNE LLDs	BTP REQUIRED LLDs
Air	Gross Beta	0.003	0.01
Particulates:	Gamma Spectrometry	--	--
(pCi/m^3)	Cs-134	0.001	0.05
	Cs-137	0.001	0.06
Air Iodine: (pCi/m^3)	I-131	0.01	0.07
Water:	Gross Beta	4	4
(pCi/l)	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

TABLE 4-2 (Cont.)

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

MEDIA (UNITS)	ANALYSIS	TELEDYNE LLDs	BTP REQUIRED LLDs
Soil/	Gamma Spectrometry		
Sediment:	Co-60	30	--
(pCi/kg)	Cs-134	30	150
	Cs-137	40	180
	Sr-90	10	--
Fish:	Gamma Spectrometry		
(pCi/kg)	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
Milk:	I-131	1	1
(pCi/l)	Gamma Spectrometry		
	Cs-134	10	15
	Cs-137	10	18
	Ba-140	20	60
	La-140	10	15
	Sr-90	1	--
Garden	Gamma Spectrometry		
Produce:	Cs-134	20	60
(pCi/kg)	Cs-137	20	80
	I-131	30	60

TABLE 4-3

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

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

HANFORD, WASHINGTON . JANUARY 1 to DECEMBER 31, 1988

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) RANGE	CONTROL LOCATION MEAN RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
AIR PARTICULATES (pCi/m^3)	Gross Beta 623 (0.003-0098)	0.003	0.016(570/571) (0.005-0.084)	4 9.3 mi SSE	0.026(52/52) (0.004-0.061)	0.015(52/52)	0
	Gamma 48 (Quarterly)						
	Be-7 (0.026-0.083)	0.01	0.058(44/44) (0.039-0.074)	48 4.3 mi NE	0.061(4/4) (0.030-0.068)	0.052(4/4)	0
	K-40	0.01	(0.005(6/44) (0.003-0.006)	1 1.3 mi S	0.006(1/4) -	5.43(2/4) (0.004-0.006)	0
	Cs-137	0.001	LLD			LLD	0
	Cs-134	0.001	LLD			LLD	0
AIR IODINE (pCi/m^3)	I-131 623	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 4-3 (Cont.)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

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

HANFORD, WASHINGTON JANUARY 1 to DECEMBER 31, 1988

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] RANGE	CONTROL LOCATION MEAN RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
WATER (River/Drinking) (pCi/liter)	Gross Beta 36	4	2.22(22/24) (1.2-3.6)	28 7.4 mi SSE	2.38(10/12) (1.3-3.6)	2.26(12/12) (1.1-4.7)	0
	Tritium 12	200	264(5/8) (200-380)	29 11.0 mi SSE	335(2/4) (290-380)	280(1/4)	0
	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.

TABLE 4-3 (Cont.)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

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

HANFORD, WASHINGTON JANUARY 1 to DECEMBER 31, 1988

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) RANGE	CONTROL LOCATION MEAN RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
WATER (Discharge) (pCi/liter)	Gross Beta 11	4	21.3(11/11) (3.8-33)	27 3.2 mi E	21.3(11/11) (3.8-33)	None	0
	Tritium 4	200	1558(4/4) (470-4400)	27 3.2 mi E	1558(4/4) (470-4400)	None	0
	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.

TABLE 4-3 (Cont.)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

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

HANFORD, WASHINGTON JANUARY 1 to DECEMBER 31, 1988

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) RANGE	CONTROL LOCATION MEAN RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
WATER (Ground) (pCi/liter)	Tritium 12	200	190(5/12) (120-280)	52 0.1 mi N	235(2/4) (190-280)	None	0
	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.

TABLE 4-3 (Cont.)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

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

HANFORD, WASHINGTON JANUARY 1 to DECEMBER 31, 1988

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) RANGE	CONTROL LOCATION MEAN RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
SOIL (pCi/kg dry)	Gamma 5						
	Cs-134	30	LLD			LLD	0
	Cs-137	40	422(3/4) (363-468)	7 2.7 mi WNW	468(1/1)	72(1/1)	0
	Ra-226	400	768(4/4) (615-1050)	9 30 mi WSW	1440(1/1)	1440(1/1)	0
	Th-228	50	545(4/4) (452-689)	9 30 mi WSW	712(1/1)	712(1/1)	0
SEDIMENT (pCi/kg dry)	Gamma 4						
	K-40	700	13800(2/2) (13500-14100)	33 3.6 mi ENE	14150(2/2) (13400-14900))	14150(2/2) (13400-14900)	0
	Co-60	30	41.1(2/2) (27.1-55.1)	34 3.5 mi ESE	41.1(2/2) (27.1-55.1)	-(0/2) -	0
	Cs-134	30	53(2/2) (48-58)	34 3.5 mi ESE	71.6(1/2) -	-(0/2) -	0
	Cs-137	40	221(2/2) (153-288)	34 3.5 mi ESE	221(2/2) (153-288)	198(2/2) (193-202)	0
	Ra-226	400	1222(2/2) (813-1630)	34 3.5 mi ESE	1222(2/2) (813-1630)	991(2/2) (852-1130)	0
	Th-228	50	1079(2/2) (667-1490)	34 3.5 mi ESE	1079(2/2) (667-1490)	752(2/2) (655-849)	0

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

TABLE 4-3 (Cont.)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

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

HANFORD, WASHINGTON JANUARY 1 to DECEMBER 31, 1988

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] RANGE	CONTROL LOCATION MEAN RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
MILK (pCi/liter)	I-131	92	1	LLD			LLD	0
	Cs-134	92	10	LLD			LLD	0
	Cs-137	92	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 4-3 (Cont.)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

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

HANFORD, WASHINGTON JANUARY 1 to DECEMBER 31, 1988

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) RANGE	CONTROL LOCATION MEAN RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
FISH (pCi/kg wet)	Gamma 17						
	K-40	1000	3390(8/8) (2780-4150)	38 26.5 mi ESE	3660(9/9) (2520-5780)	3660(9/9) (2520-5780)	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	20.3(8/8) (9.80-36.8)	38 26.5 mi ESE	20.5(3/9) (11.5-26.6)	20.5(3/9) (11.5-26.6)	0

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

TABLE 4-3 (Cont.)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

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

HANFORD, WASHINGTON JANUARY 1 to DECEMBER 31, 1988

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) RANGE	CONTROL LOCATION MEAN RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
ROOTS (pCi/kg wet)	Gamma 8						
	I-131	30	LLD			LLD	0
	Cs-134	20	LLD			LLD	0
	Cs-137	20	LLD			LLD	0
FRUITS (pCi/kg wet)	Gamma 8						
	I-131	30	LLD			LLD	0
	Cs-134	20	LLD			LLD	0
	Cs-137	20	LLD			LLD	0
VEGETABLES (pCi/kg wet)	Gamma 11						
	I-131	30	LLD			LLD	0
	Cs-134	20	LLD			LLD	0
	Cs-137	20	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 4-3 (Cont.)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

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

HANFORD, WASHINGTON JANUARY 1 to DECEMBER 31, 1988

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] RANGE	CONTROL LOCATION MEAN RANGE	NUMBER OF NONROUTINE REPORTED MEASUREMENTS
DIRECT RADIATION Quarterly TLD's (mR/day)	TLD 220	-	0.27(224/224) (0.23-0.35)	46 4.7 mi NE	0.33(4/4) (0.31-0.35)	0.24(4/4) (0.23-0.26)	0
DIRECT RADIATION Annual TLD's (mR/day)	TLD 56	-	0.22(55/55) (0.19-0.26)	46 4.7 mi NE	0.26(1/1)	0.19(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 4-4

MEAN QUARTERLY TLD DATA SUMMARY FOR THE PREOPERATIONAL AND OPERATIONAL PERIODS

Results in mR/day

STATION	PREOPERATIONAL		1984 - 1987 OPERATIONAL		1988 OPERATIONAL	
	MEAN	STANDARD ERROR	MEAN	STANDARD ERROR	MEAN	STANDARD ERROR
1	0.24	0.02	0.24	0.02	0.27	0.03
2	0.23	0.02	0.23	0.01	0.26	0.00
3	0.22	0.01	0.24	0.02	0.26	0.00
4	0.22	0.02	0.21	0.01	0.24	0.01
5	0.23	0.01	0.22	0.01	0.25	0.01
6	0.22	0.01	0.22	0.01	0.25	0.02
7	0.23	0.01	0.24	0.01	0.26	0.01
8	0.26	0.01	0.25	0.02	0.29	0.01
9	0.22	0.01	0.22	0.01	0.25	0.01
10	0.23	0.01	0.23	0.01	0.25	0.01
11	0.24	0.01	0.23	0.01	0.26	0.01
12	0.25	0.01	0.25	0.01	0.28	0.01
13	0.24	0.01	0.24	0.01	0.26	0.02
14	0.24	0.02	0.24	0.01	0.26	0.01
15	0.25	0.01	0.25	0.01	0.28	0.01
16	0.24	0.01	0.24	0.01	0.27	0.01
17	0.25	0.01	0.24	0.01	0.27	0.01
18	0.24	0.01	0.24	0.01	0.27	0.01
19	0.24	0.01	0.24	0.01	0.26	0.02
20	0.24	0.01	0.24	0.01	0.26	0.02
21	0.23	0.01	0.22	0.01	0.24	0.01
22	0.24	0.01	0.24	0.01	0.27	0.01
23	0.24	0.01	0.23	0.01	0.26	0.02
24	0.24	0.01	0.24	0.01	0.26	0.02
25	0.25	0.01	0.25	0.01	0.28	0.02
40	0.22	0.01	0.23	0.01	0.25	0.02
41	0.26	0.02	0.26	0.01	0.28	0.01
42	0.25	0.01	0.24	0.01	0.27	0.02

TABLE 4-4 (Cont.)

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

STATION	PREOPERATIONAL		1984 - 1987 OPERATIONAL		1987 OPERATIONAL	
	MEAN	STANDARD ERROR	MEAN	STANDARD ERROR	MEAN	STANDARD ERROR
43	0.25	0.01	0.25	0.01	0.28	0.01
44	0.23	0.01	0.23	0.01	0.26	0.01
45	0.23	0.01	0.23	0.01	0.26	0.01
46	0.28	0.02	0.28	0.02	0.33	0.02
47	0.22	0.02	0.22	0.01	0.25	0.02
49	0.24	0.00	0.24	0.01	0.26	0.02
50	0.22	0.00	0.24	0.01	0.26	0.02
51	0.23	0.01	0.23	0.01	0.26	0.01
53	0.27	0.00	0.26	0.01	0.30	0.02
54	0.26	0.00	0.25	0.01	0.27	0.01
55	0.23	0.00	0.23	0.01	0.26	0.01
56	0.24	0.00	0.24	0.01	0.27	0.01
71(S1)	0.24	0.02	0.26	0.02	0.30	0.03
72(S2)	0.25	0.01	0.25	0.01	0.29	0.02
73(S3)	0.23	0.01	0.23	0.01	0.25	0.02
74(S4)	0.26	0.01	0.25	0.01	0.29	0.02
75(S5)	0.22	0.02	0.23	0.02	0.27	0.02
76(S6)	0.24	0.01	0.23	0.01	0.27	0.02
77(S7)	0.25	0.01	0.24	0.01	0.27	0.02
78(S8)	0.25	0.01	0.24	0.01	0.26	0.01
79(S9)	0.25	0.01	0.24	0.01	0.27	0.01
80(S10)	0.24	0.01	0.23	0.01	0.26	0.02
81(S11)	0.24	0.02	0.24	0.01	0.26	0.02
82(S12)	0.25	0.02	0.24	0.01	0.27	0.02
83(S13)	0.25	0.01	0.25	0.01	0.27	0.01
84(S14)	0.24	0.01	0.24	0.01	0.27	0.02
85(S15)	0.26	0.01	0.25	0.02	0.28	0.02
86(S16)	0.25	0.01	0.26	0.02	0.30	0.03
All	0.24	0.00	0.24	0.00	0.27	0.02

TABLE 4-5

ANNUAL TLD DATA SUMMARY FOR THE PREOPERATIONAL AND OPERATIONAL PERIODS

Results in mR/day

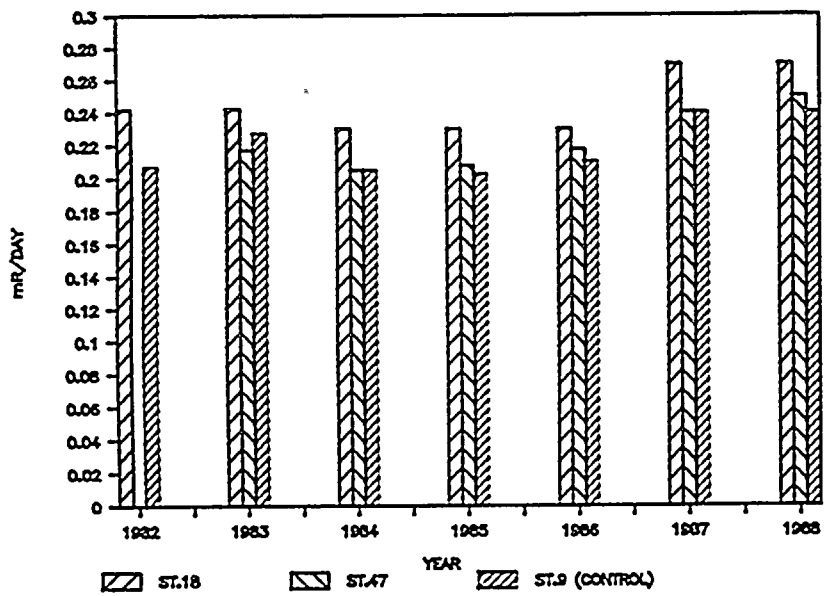
STATION	PREOPERATIONAL		1984 - 1987 OPERATIONAL		1988 OPERATIONAL	
	MEAN[a]	STANDARD ERROR	MEAN	STANDARD ERROR	MEAN	STANDARD DEVIATION(2σ)
1	0.23	0.04	0.23	0.02	0.24	0.00
2	0.22	0.04	0.22	0.02	0.21	0.01
3	0.21	0.04	0.21	0.02	0.20	0.00
4	0.22	0.06	0.20	0.02	0.19	0.00
5	0.22	0.04	0.21	0.02	0.20	0.01
6	0.21	0.04	0.21	0.02	0.19	0.00
7	0.22	0.02	0.23[b]	0.02	0.21	0.01
8	0.25	0.04	0.25[b]	0.03	0.24	0.01
9	0.20	0.02	0.20	0.02	0.19	0.00
10	0.22	0.04	0.22	0.02	0.21	0.00
11	0.22	0.04	0.22	0.02	0.20	0.01
12	0.24	0.04	0.24	0.02	0.23	0.01
13	0.22	0.04	0.23	0.02	0.21	0.01
14	0.22	0.04	0.22	0.02	0.21	0.01
15	0.23	0.06	0.24	0.03	0.22	0.01
16	0.23	0.04	0.23	0.02	0.21	0.01
17	0.23	0.02	0.23[b]	0.03	0.22	0.01
18	0.25	0.02	0.23	0.02	0.21	0.01
19	0.22	0.04	0.23	0.02	0.22	0.00
20	0.23	0.04	0.23	0.02	0.21	0.01
21	0.23	0.02	0.21	0.02	0.19	0.00
22	0.22	0.02	0.22	0.02	0.21	0.01
23	0.24	0.02	0.22	0.02	0.21	0.00
24	0.22	0.02	0.23	0.02	0.21	0.01
25	0.24	0.02	0.23	0.03	0.22	0.02
40	0.21[c]	0.02	0.22	0.02	0.20	0.00
41	0.26[c]	0.04	0.24	0.02	0.22	0.00
42	0.24(c)	0.02	0.23	0.02	0.21	0.01
43	0.24(c)	0.02	0.24	0.03	0.23	0.01
44	0.24	0.02	0.22	0.02	0.21	0.00

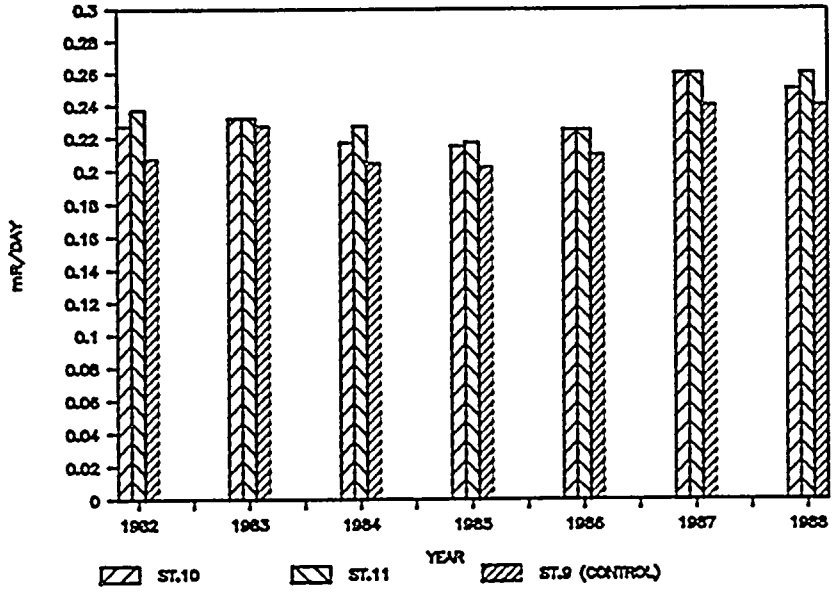
TABLE 4-5 (Cont.)

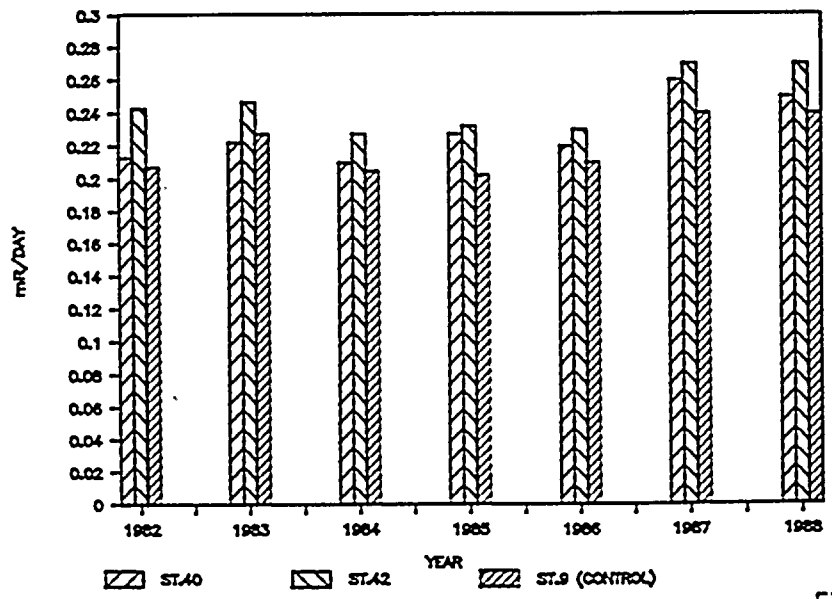
ANNUAL TLD DATA SUMMARY FOR THE PREOPERATIONAL AND OPERATIONAL PERIODS
Results in mR/day

STATION	PREOPERATIONAL		1984 - 1987 OPERATIONAL		1988 OPERATIONAL	
	MEAN[a]	STANDARD ERROR	MEAN	STANDARD ERROR	MEAN	STANDARD DEVIATION(2σ)
45	0.24	0.01	0.22	0.02	0.21	0.00
46	0.29	0.01	0.28	0.03	0.26	0.01
47	0.22(c)	0.03	0.21	0.02	0.20	0.00
49	(d)		0.22	0.02	0.21	0.01
50	(d)		0.23	0.03	0.21	0.00
51	(d)		0.22	0.02	0.20	0.00
53	(d)		0.25	0.02	0.24	0.01
54	(d)		0.24	0.02	0.22	0.00
55	(d)		0.22	0.02	0.21	0.01
56	(d)		0.22	0.02	0.21	0.01
71	0.24(c)	0.02	0.25	0.02	0.24	0.01
72	0.25(c)	0.02	0.25	0.02	0.24	0.00
73	0.23(c)	0.01	0.22	0.02	0.20	0.01
74	0.24(c)	0.01	0.24	0.02	0.23	0.01
75	0.24(c)	0.01	0.22	0.03	0.22	0.01
76	0.24(c)	0.02	0.23	0.02	0.22	0.01
77	0.25(c)	0.02	0.22	0.02	0.22	0.01
78	0.25(c)	0.04	0.24	0.03	0.21	0.00
79	0.25(c)	0.02	0.23	0.02	0.21	0.00
80	0.23(c)	0.05	0.22	0.02	0.21	0.01
81	0.23(c)	0.02	0.22	0.02	0.21	0.01
82	0.25(c)	0.03	0.24	0.02	0.23	0.01
83	0.25(c)	0.02	0.23	0.02	0.23	0.01
84	0.23(c)	0.02	0.23	0.03	0.22	0.00
85	0.26(c)	0.02	0.25	0.03	0.23	0.01
86	0.24	0.02	0.25	0.02	0.25	0.01
All	0.23	0.02	0.23	0.00	0.22	0.03

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







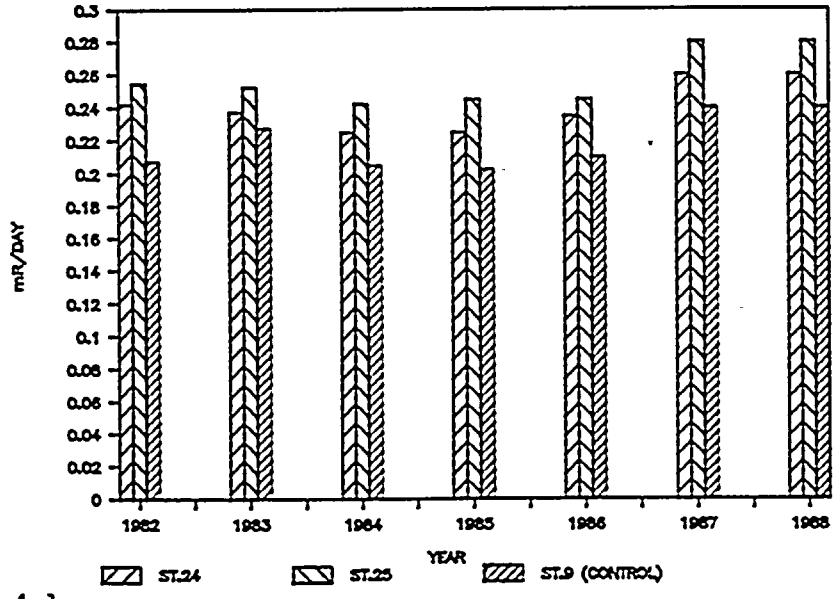
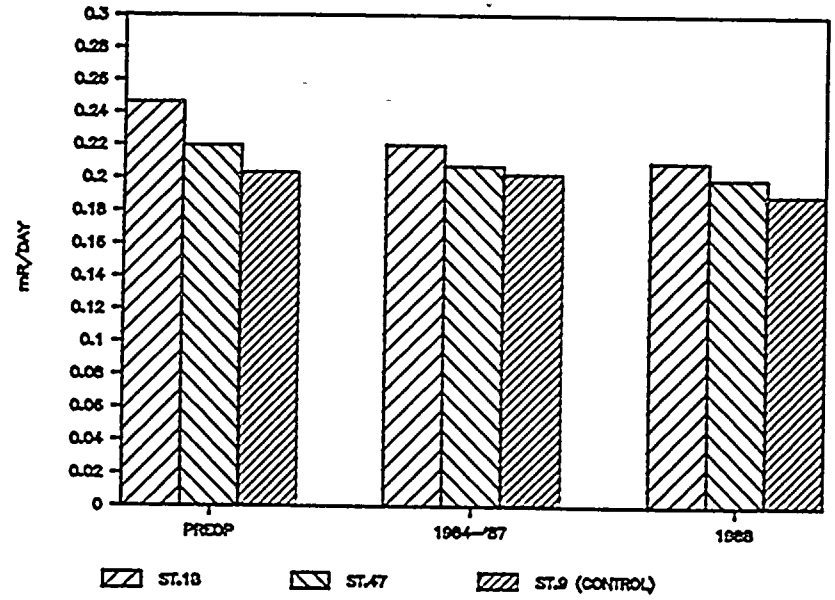
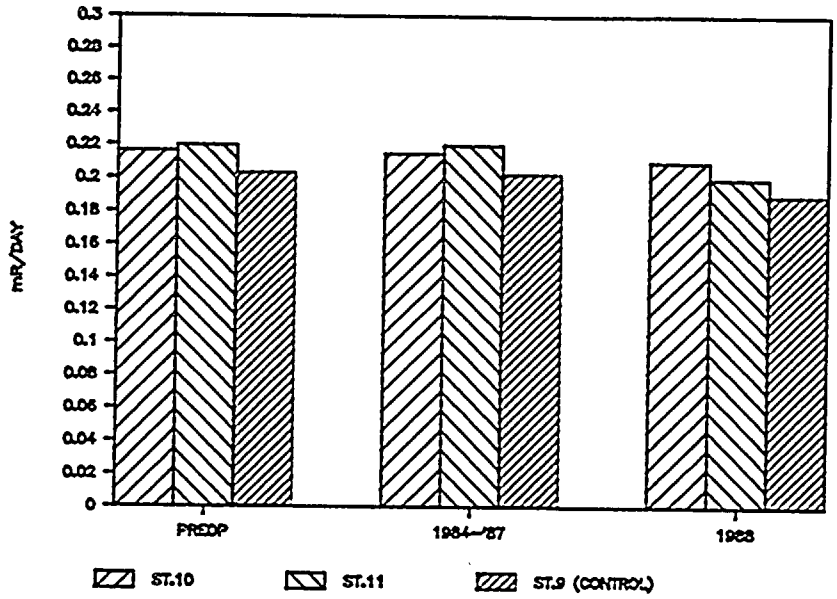
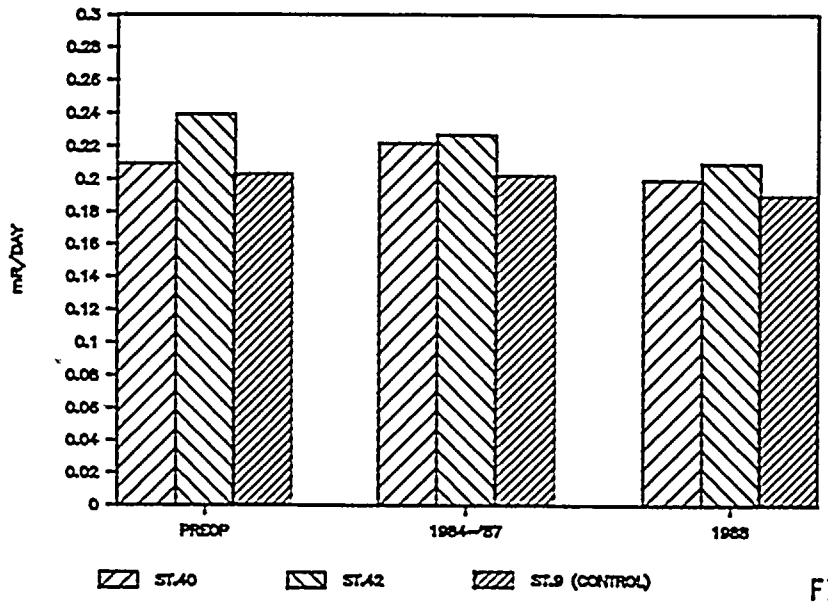


FIGURE 4-1

AVERAGE QUARTERLY TLD RESULTS FOR NEAR-PLANT LOCATIONS, PASCO LOCATIONS AND THE CONTROL LOCATION (STATION 9) FOR THE PERIOD 1982-1988







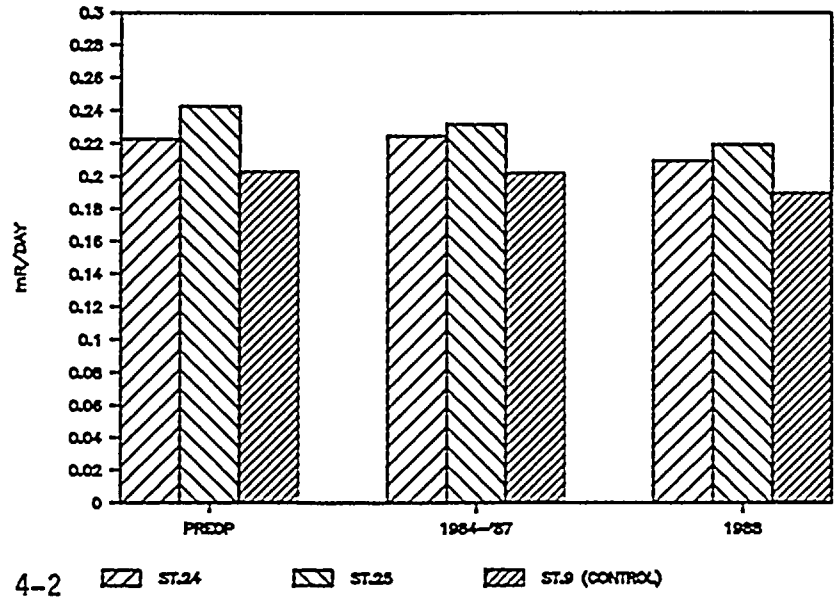


FIGURE 4-2

ANNUAL TLD RESULTS FOR NEAR-PLANT LOCATIONS, PASCO LOCATIONS AND THE CONTROL LOCATION (STATION 9) FOR THE PERIOD 1982-1988

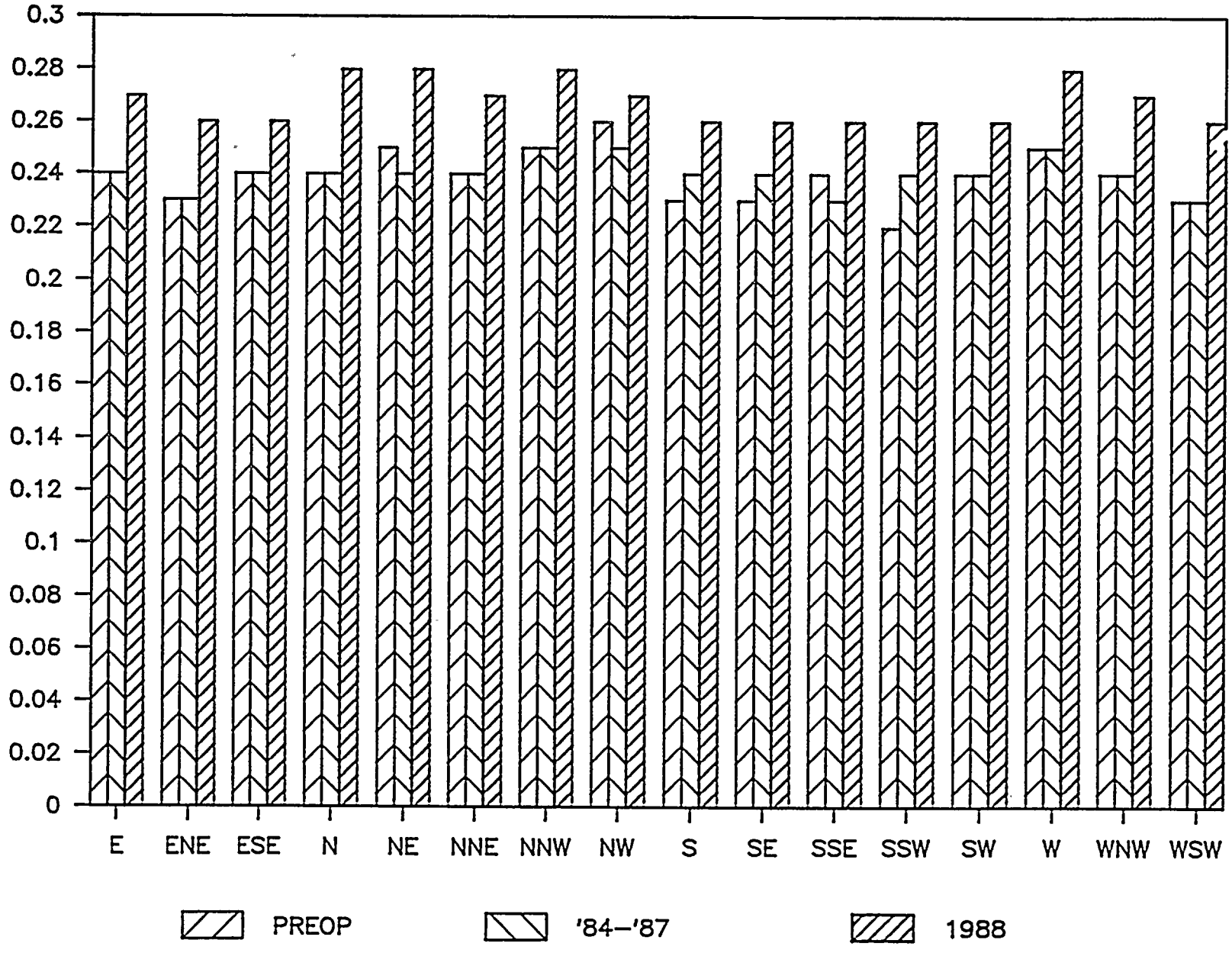


FIGURE 4-3

MEAN 1988 QUARTERLY TLD RESULTS FOR LOCATIONS IN EACH METEOROLOGICAL SECTOR COMPARED TO PREOPERATIONAL AND PREVIOUS OPERATIONAL RESULTS

Station 46 in the Wahluke Reserve remained the location with the highest mean exposure rate, 0.33 mR/day. 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 4-4 illustrates the Station 46 results relative to the results of Station 9, the control location. The relationship between the results at these two locations has remained fairly consistent from the preoperational period (1982-1983) to the present. Aside from the routine quarterly evaluation of direct radiation at Station 46, the Hanford TLD Intercomparison Study (Section 5.0) involved placement of ten TLDs at Station 46 for the entire fourth quarter. The results from this independent evaluation (0.31 $\pm$ 0.01 mR/day) compared well with the result for the fourth quarter, 0.33 $\pm$ 0.02 mR/day.

A comparison of the 1988 annual and mean quarterly TLD results is presented in Table 4-6. The 1988 annual TLD results are significantly lower than the mean quarterly results. Evaluation of the annual TLD processing and calibration indicated that the batch of TLDs used for the 1988 annual distribution was likely subject to more signal fading than other batches used previously. The same batch was used for the 1986 annual TLDs and the same relationship between the quarterly and annual TLDs was evident then. A fading study involving this batch of TLDs and a study of the short-term and long-term fading of the environmental TLDs are in progress.

The log probability plots of the 1988 and previous operational (1984-1987) quarterly TLD results are presented in Figure 4-5. The slopes of the lines in both plots are nearly the same (1.06 - 1.09) although the 1988 quarterly data is slightly higher than the averages of the 1984-1987 results.

The log probability plots of the 1988 annual results and the results from previous years of operation are presented in Figure 4-6. The

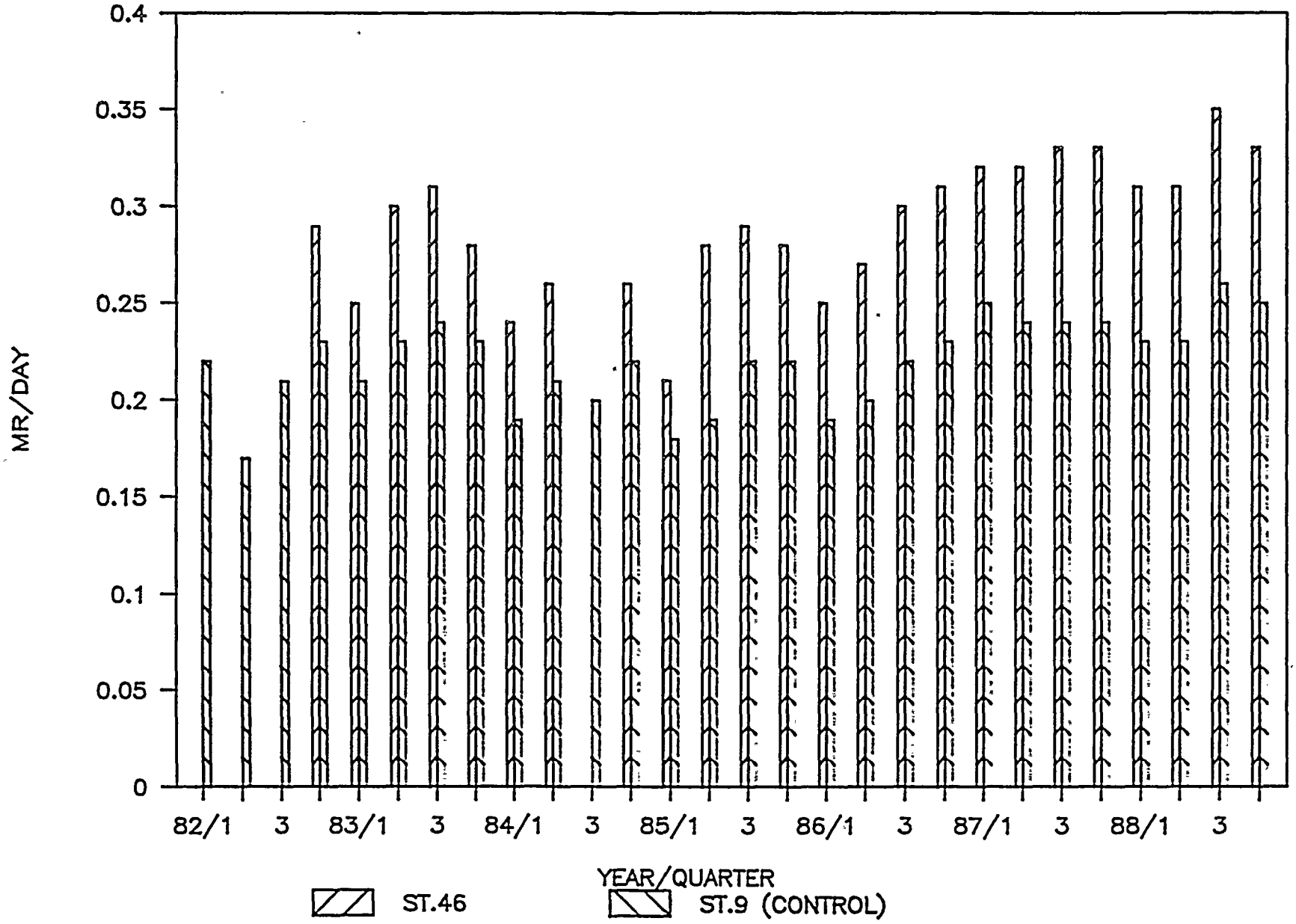


FIGURE 4-4

QUARTERLY TLD RESULTS FOR STATION 46 AND THE CONTROL LOCATION (STATION 9) FOR THE PERIOD 1982-1988

TABLE 4-6

1988 MEAN QUARTERLY VERSUS ANNUAL TLD DATA

Results in mR/day

STATION	QUARTERLY TLDS MEAN*	QUARTERLY TLDS STANDARD ERROR	ANNUAL TLDS MEAN**	ANNUAL TLDS STANDARD DEVIATION(2σ)
1	0.27	0.01	0.24	0.00
2	0.26	0.01	0.21	0.01
3	0.26	0.01	0.20	0.00
4	0.24	0.01	0.19	0.00
5	0.25	0.01	0.20	0.01
6	0.25	0.01	0.19	0.00
7	0.26	0.01	0.21	0.01
8	0.29	0.01	0.24	0.01
9	0.25	0.01	0.19	0.00
10	0.25	0.01	0.21	0.00
11	0.26	0.01	0.20	0.01
12	0.28	0.01	0.23	0.01
13	0.26	0.01	0.21	0.01
14	0.26	0.01	0.21	0.01
15	0.28	0.01	0.22	0.01
16	0.27	0.01	0.21	0.01
17	0.27	0.01	0.22	0.01
18	0.27	0.01	0.21	0.01
19	0.26	0.01	0.22	0.00
20	0.26	0.01	0.21	0.01
21	0.24	0.01	0.19	0.00
22	0.27	0.01	0.21	0.01
23	0.26	0.01	0.21	0.00
24	0.26	0.01	0.21	0.01
25	0.28	0.01	0.22	0.02
40	0.25	0.01	0.20	0.00
41	0.28	0.01	0.22	0.00
42	0.27	0.01	0.21	0.01

*Mean of the four quarterly results.

**Mean of four readout areas on each TLD.

TABLE 4-6 (Cont.)

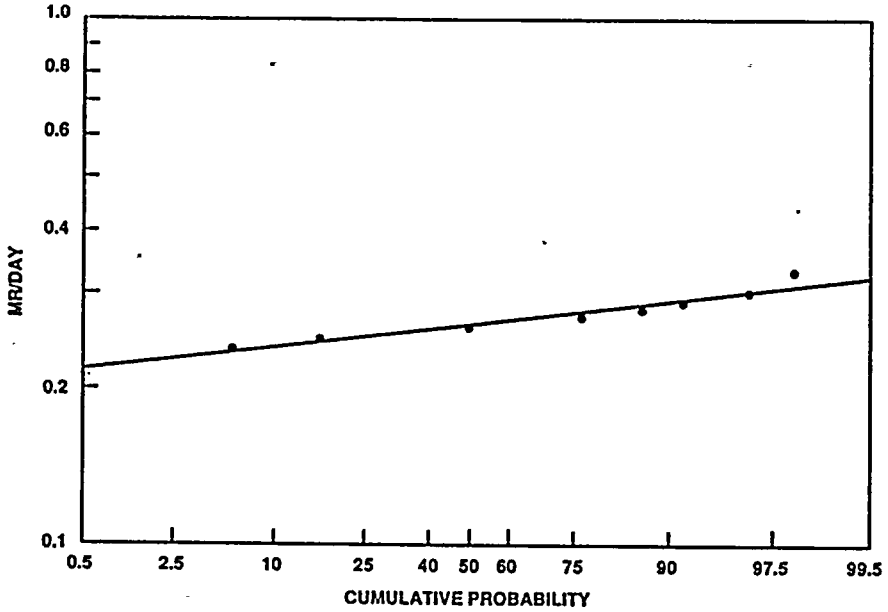
1988 MEAN QUARTERLY VERSUS ANNUAL TLD DATA

Results in mR/day

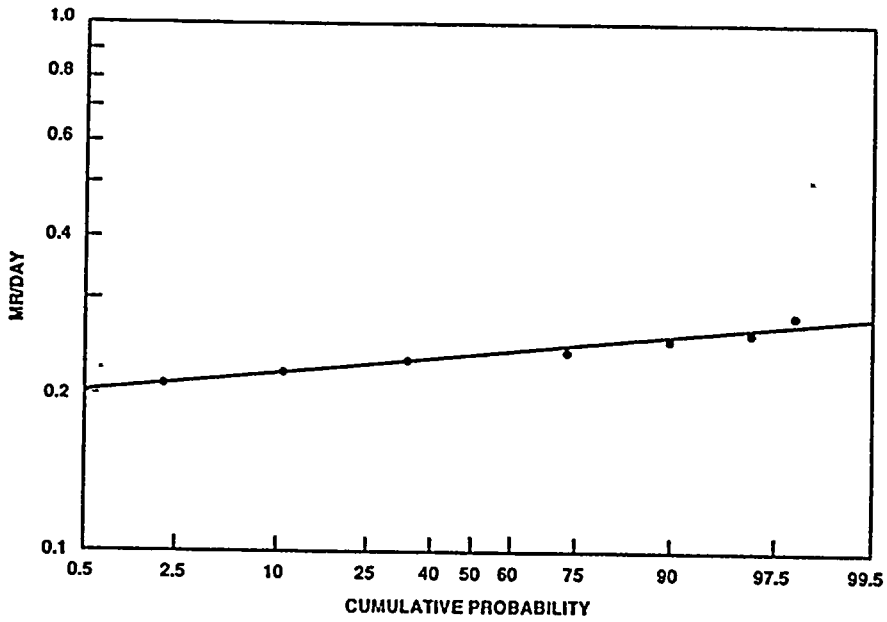
STATION	QUARTERLY TLDS MEAN*	QUARTERLY TLDS STANDARD ERROR	ANNUAL TLDS MEAN**	ANNUAL TLDS STANDARD DEVIATION (2σ)
43	0.28	0.01	0.23	0.01
44	0.26	0.01	0.21	0.00
45	0.26	0.01	0.21	0.00
46	0.33	0.02	0.26	0.01
47	0.25	0.01	0.20	0.00
49	0.26	0.01	0.21	0.01
50	0.26	0.01	0.21	0.00
51	0.26	0.01	0.20	0.00
53	0.30	0.01	0.24	0.01
54	0.27	0.01	0.22	0.00
55	0.26	0.01	0.21	0.01
56	0.27	0.01	0.21	0.01
71 (S1)	0.30	0.02	0.24	0.01
72 (S2)	0.29	0.01	0.24	0.00
73 (S3)	0.25	0.01	0.20	0.01
74 (S4)	0.29	0.01	0.23	0.01
75 (S5)	0.27	0.01	0.22	0.01
76 (S6)	0.27	0.01	0.22	0.01
77 (S7)	0.27	0.01	0.22	0.01
78 (S8)	0.26	0.01	0.21	0.00
79 (S9)	0.27	0.01	0.21	0.00
80 (S10)	0.26	0.01	0.21	0.01
81 (S11)	0.26	0.01	0.21	0.01
82 (S12)	0.27	0.01	0.23	0.01
83 (S13)	0.27	0.01	0.23	0.01
84 (S14)	0.27	0.01	0.22	0.00
85 (S15)	0.28	0.01	0.23	0.01
86 (S16)	0.30	0.02	0.25	0.01

*Mean of the four quarterly mean results.

**Mean of four readout areas on each TLD.



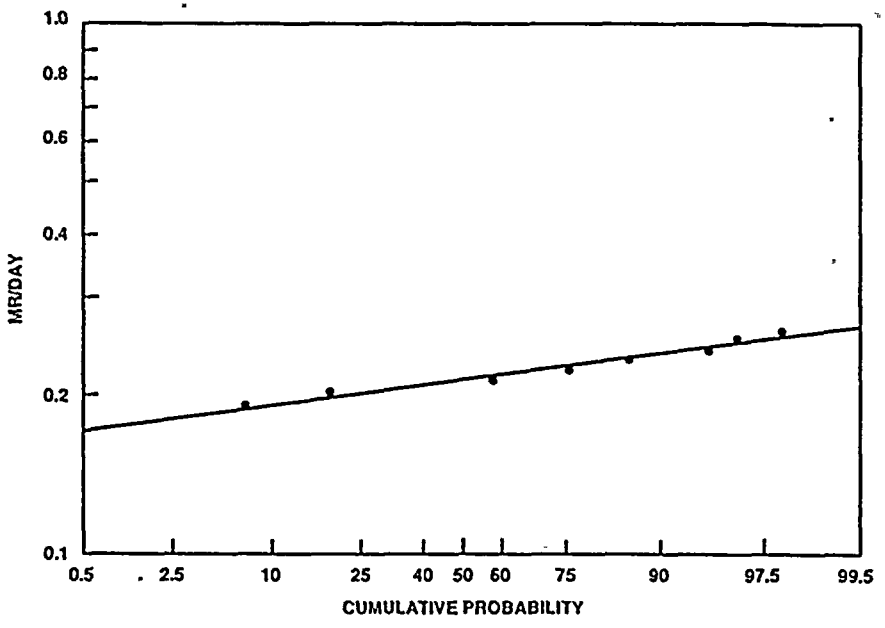
1988



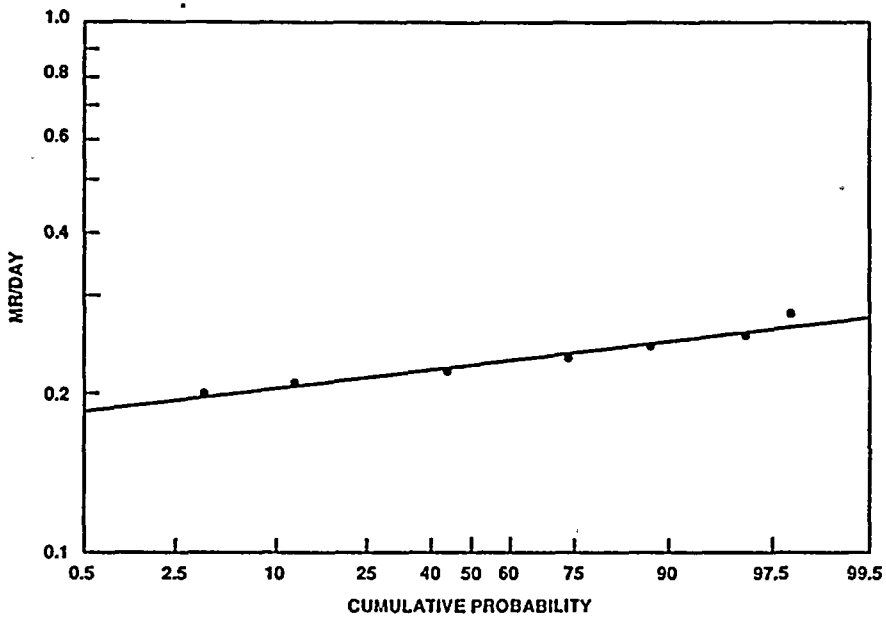
1984 - 1987

FIGURE 4-5

LOG PROBABILITY PLOTS OF THE 1988 AND 1984-1987 QUARTERLY TLD RESULTS



1988



1984 - 1987

FIGURE 4-6

LOG PROBABILITY PLOTS OF THE 1988 AND 1984-1987 ANNUAL TLD RESULTS

1988 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 1988 mean quarterly TLD results were very similar to the 1987 mean quarterly results. The direct radiation exposure rates determined for all the TLD locations continued at about the same level observed since the fourth quarter of 1986, when a 15-20% increase over previous levels occurred.[13]

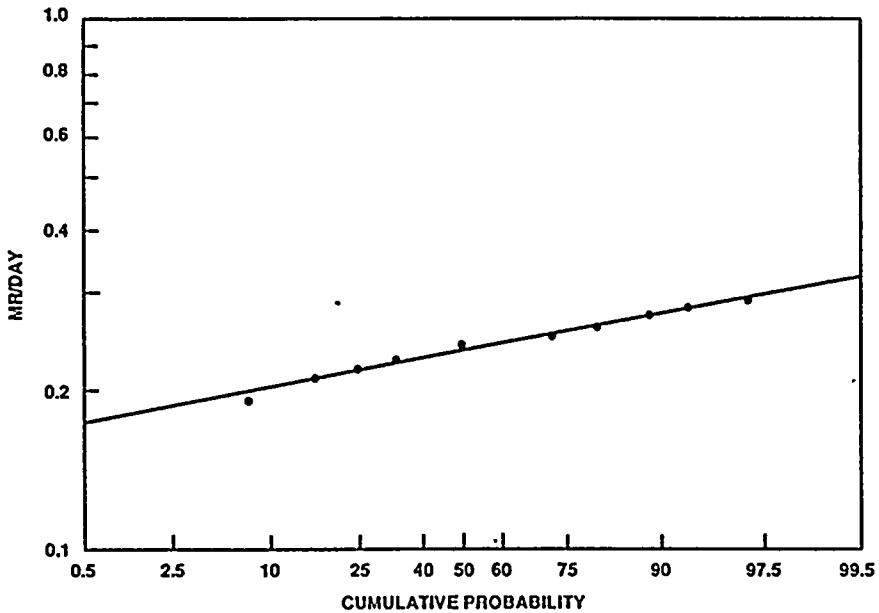
Two steps were taken to determine why that increase occurred: extensive evaluation of the 1986 and 1987 TLD exposure, handling and processing information and participation in a TLD intercomparison study with other environmental programs monitoring the Hanford Reservation. The evaluation of the TLD exposure, processing and handling produced no evidence of problems that would cause significant high biases in the results. The TLD intercomparison, which involved exposures to Cs-137, Co-60, and Ra-226 sources, indicated that the Supply System TLD system over-responds to Ra-226 by approximately 20%, making it very sensitive to changes in the environmental radiation levels. Details of these results are given in Section 5.0.

The log probability plots of the quarterly data for a near-plant location, Station 76, (S-6) and the control location, Station 9, from 1982 to 1988 are presented in Figure 4-7. The linearity of the plots indicates that the results are all within the same log normal distribution.

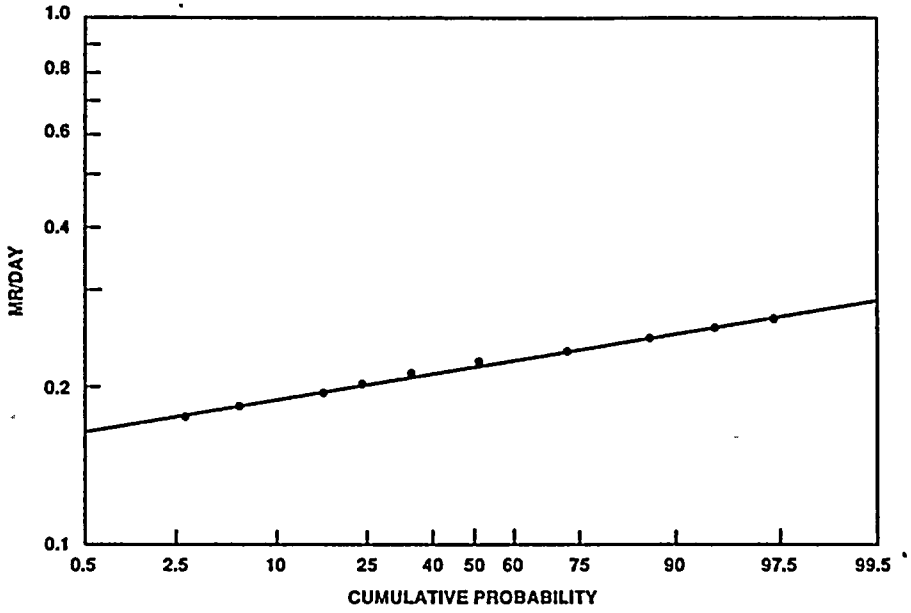
The above comparisons of 1988 TLD results to preoperational and previous operational data and the analysis of results by meteorological sector and distance from the plant provide no indication that Plant 2 operations have impacted the direct radiation levels in the environment around the plant.

4.2 Airborne Particulate/Iodine

The results of the 1988 gross beta in air analyses are presented in Tables A-2.1 and A-2.2 of Appendix A. The 1988 mean weekly results of



Station 76



Station 9

FIGURE 4-7

LOG PROBABILITY PLOTS OF QUARTERLY TLD DATA FOR A NEAR-PLANT LOCATION (STATION 76) AND THE CONTROL LOCATION (STATION 9) FOR THE PERIOD 1982-1988

all indicator stations are plotted in Figure 4-8. The gross beta in air results for 1988 were within the ranges observed during the pre-operational period and during previous operational periods, as shown in Table 4-1 and in Figure 4-9. As observed previously, gross beta levels increased during periods of inversion occurring in the fall and winter months. The increase, which was evident in the results of all the air sampling locations, including the control location at Station 9, was likely due to an increase in radon and radon daughter concentrations during the inversions. In Figure 4-10, plots of the weekly gross beta results for near-plant and remote locations and for the control location at Station 9 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 Be-7 and K-40, two naturally-occurring radionuclides, at levels above detection limits at indicator locations and the control location. In addition, the third quarter 1988 composite result for Station 21 indicated a Cs-137 result above detection levels. Investigation into the result revealed that the filters had been counted for a much longer period than usual, thus lowering the LLD. A recount of the filter was performed and Cs-137 was not detected. The results of special sampling and analyses performed in response to the initial filter results indicating detectable Cs-137 are presented in Appendix C. 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 1988 were less than the 0.01 pCi/cubic meter lower limit of detection.

No evidence of any impact of plant operations on the environment was apparent in the particulate filter and charcoal cartridge results for 1988.

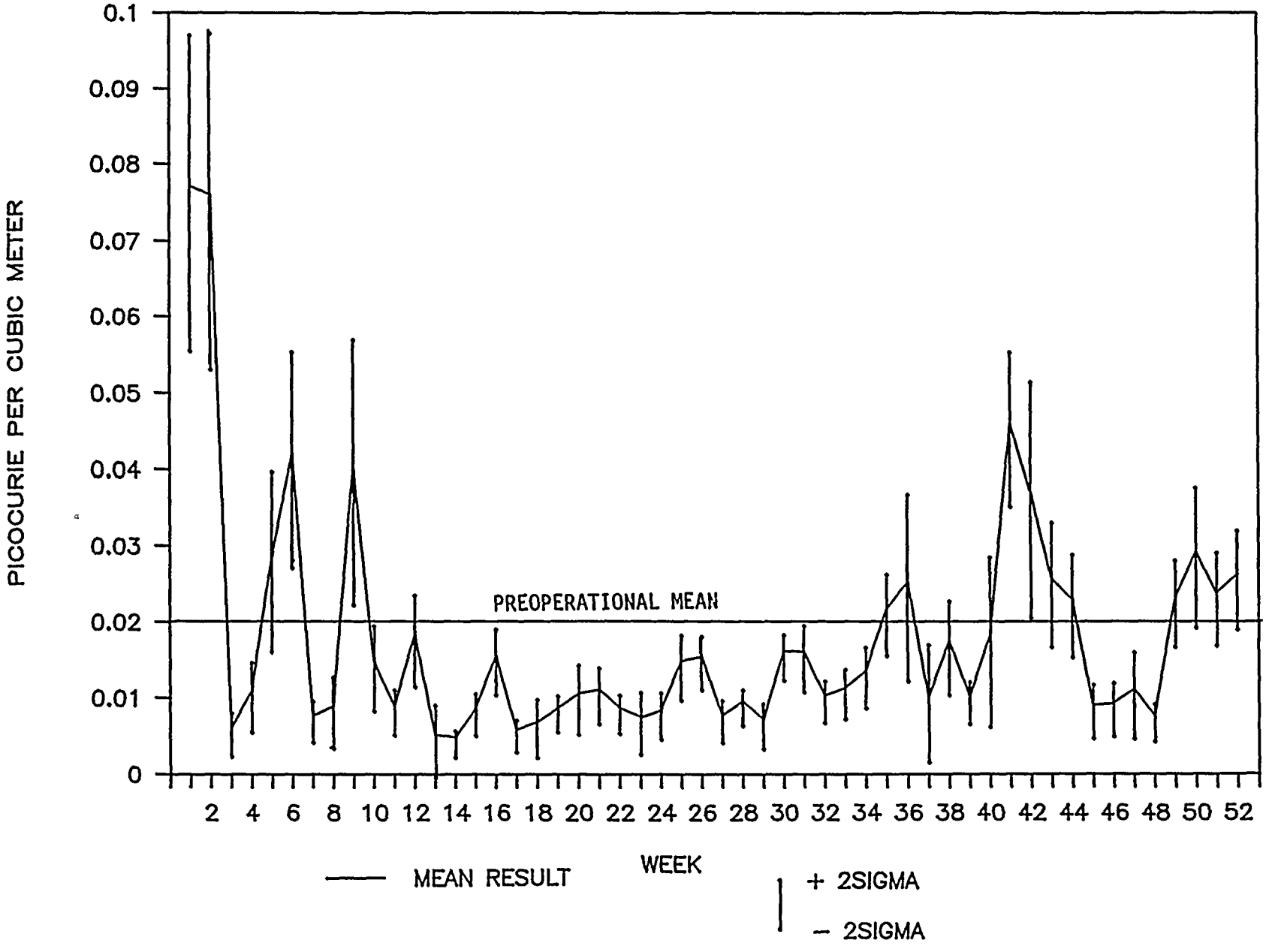


FIGURE 4-8

MEAN WEEKLY 1988 GROSS BETA IN AIR RESULTS

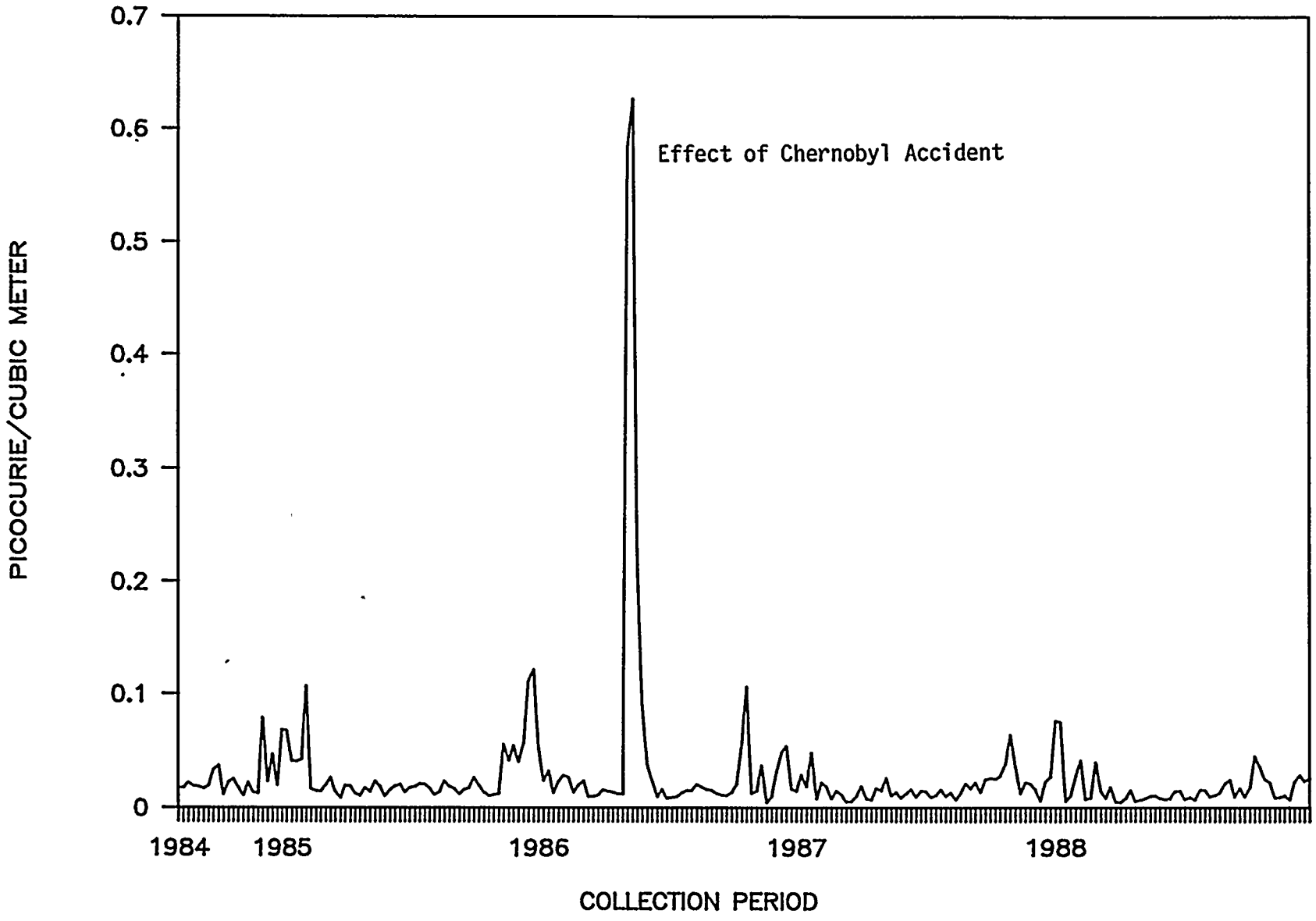
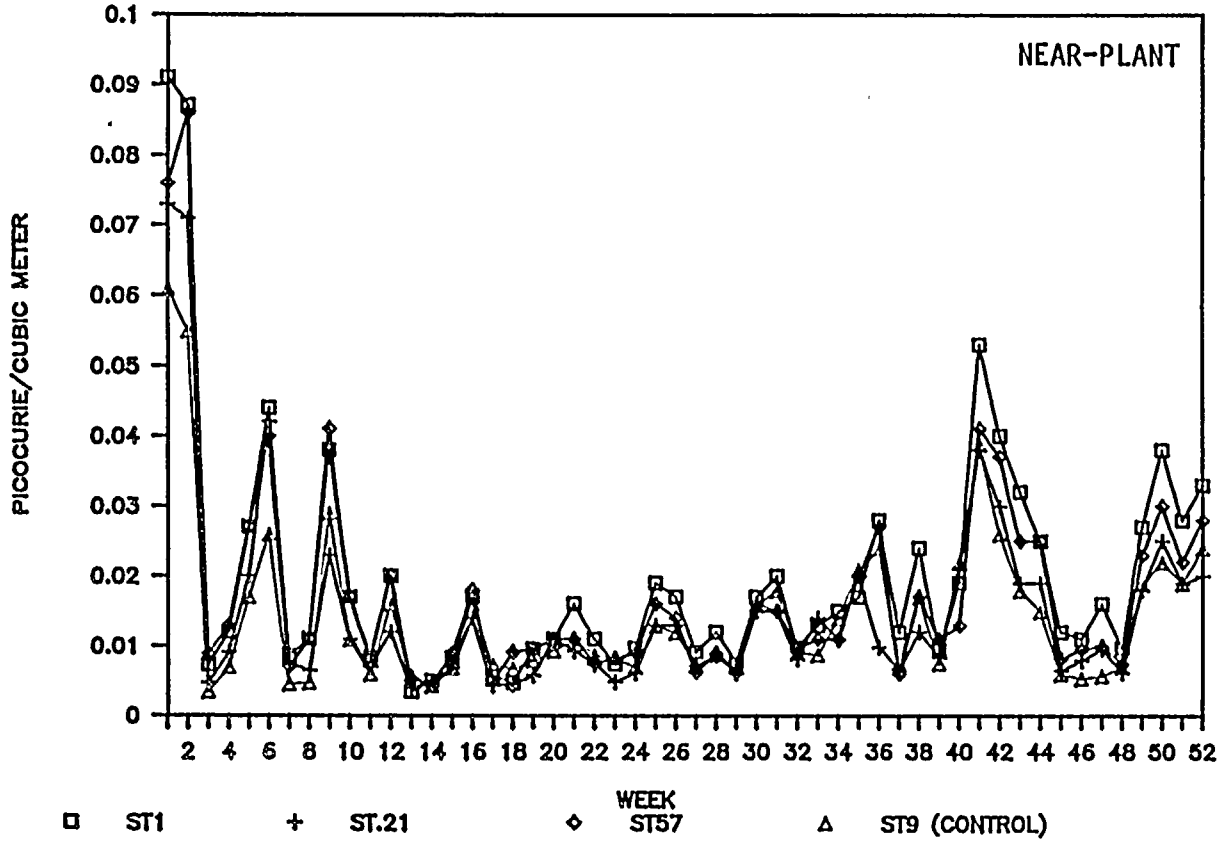


FIGURE 4-9

MEAN WEEKLY GROSS BETA IN AIR RESULTS FROM 1984 TO 1988



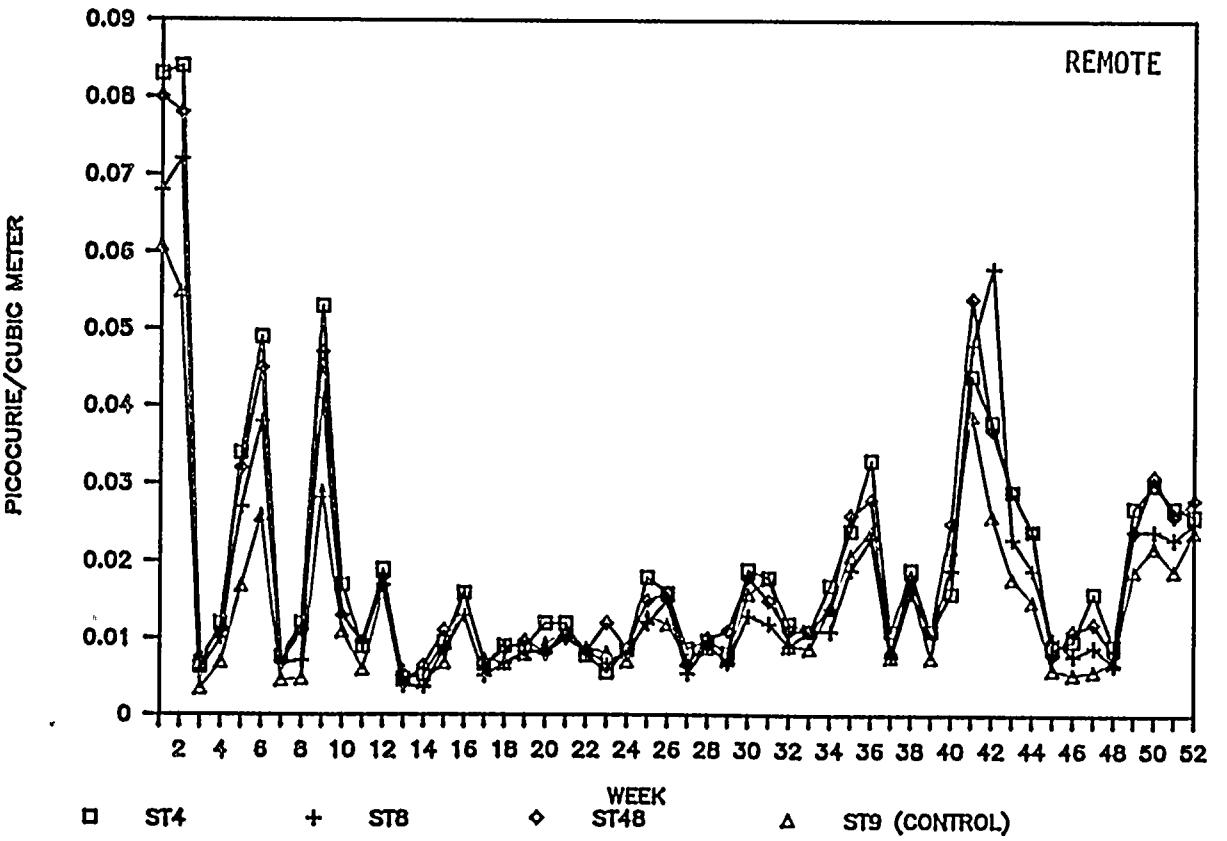


FIGURE 4-10
WEEKLY GROSS BETA IN AIR RESULTS FOR NEAR-PLANT AND REMOTE SAMPLING LOCATIONS VERSUS THE RESULTS FOR THE CONTROL LOCATION (STATION 9)

4.3 Water

During 1988 there were periods in May, June, and December when sampler inoperability prevented the collection of composite water samples from the intake and/or discharge lines. During these periods, grab samples were taken. These periods when the samplers were out of operation are documented in the sample deviations section, Appendix D. The results of the grab samples taken during these periods are presented in Appendix C.

The gross beta in river/drinking 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. A graph of the gross beta in river/drinking water results during 1988 is presented in Figure 4-11. The gross beta in river/drinking water results from 1984 to 1988 are presented in Figure 4-12. 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 1988 gross beta levels in the discharge water remained consistent with previous levels observed since the last half of 1986. These gross beta levels resulted from the current mode of plant operations using higher cycles of circulating water concentration. Under these conditions, the gross beta levels in the discharge sample would reflect the concentration of naturally-occurring radionuclides, principally K-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 1988 gross beta results for the discharge sample are presented in Figure 4-13. The temporary, or interim level for reporting to DSHS (75 pCi/liter) is also given for comparison. The establishment of a

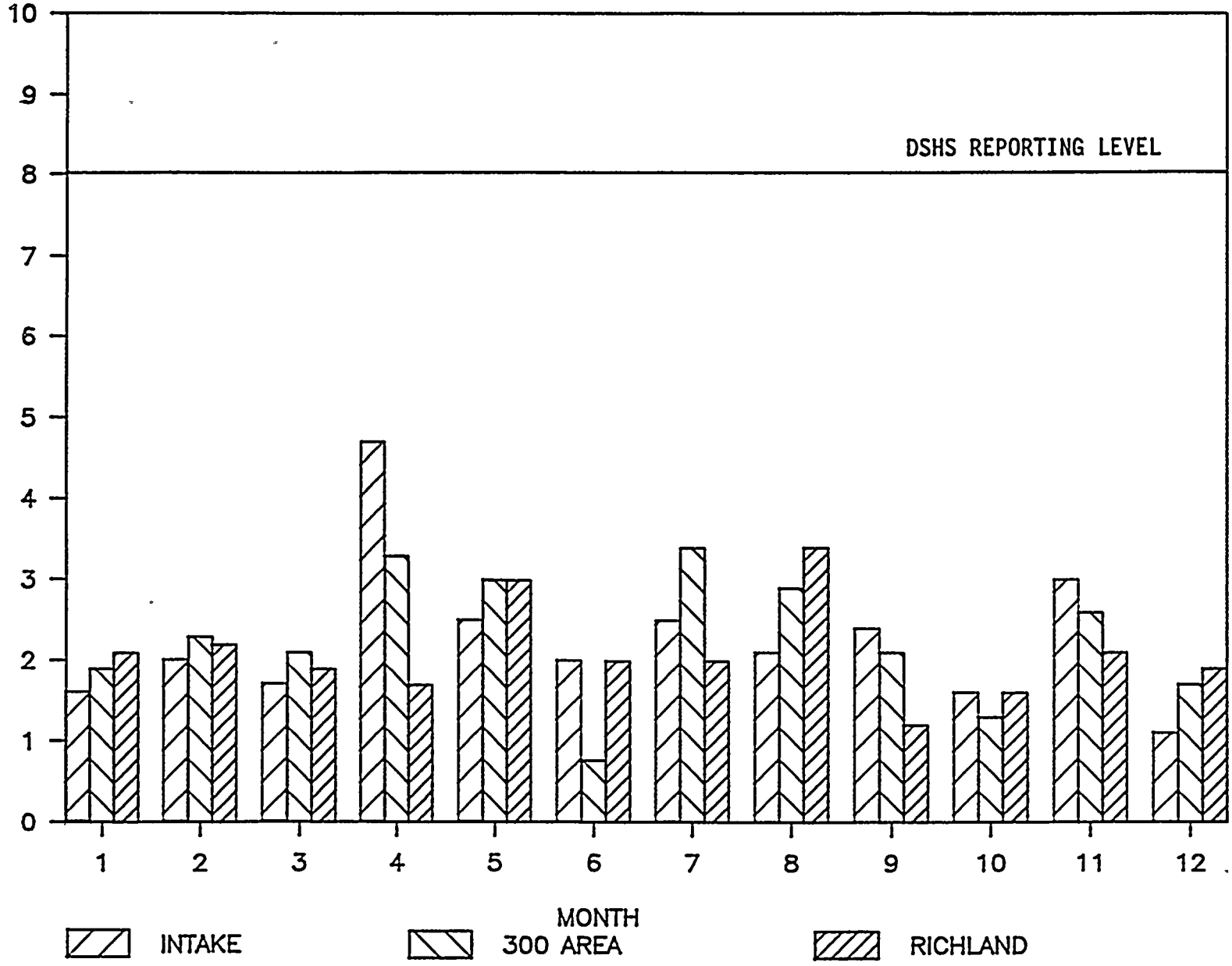
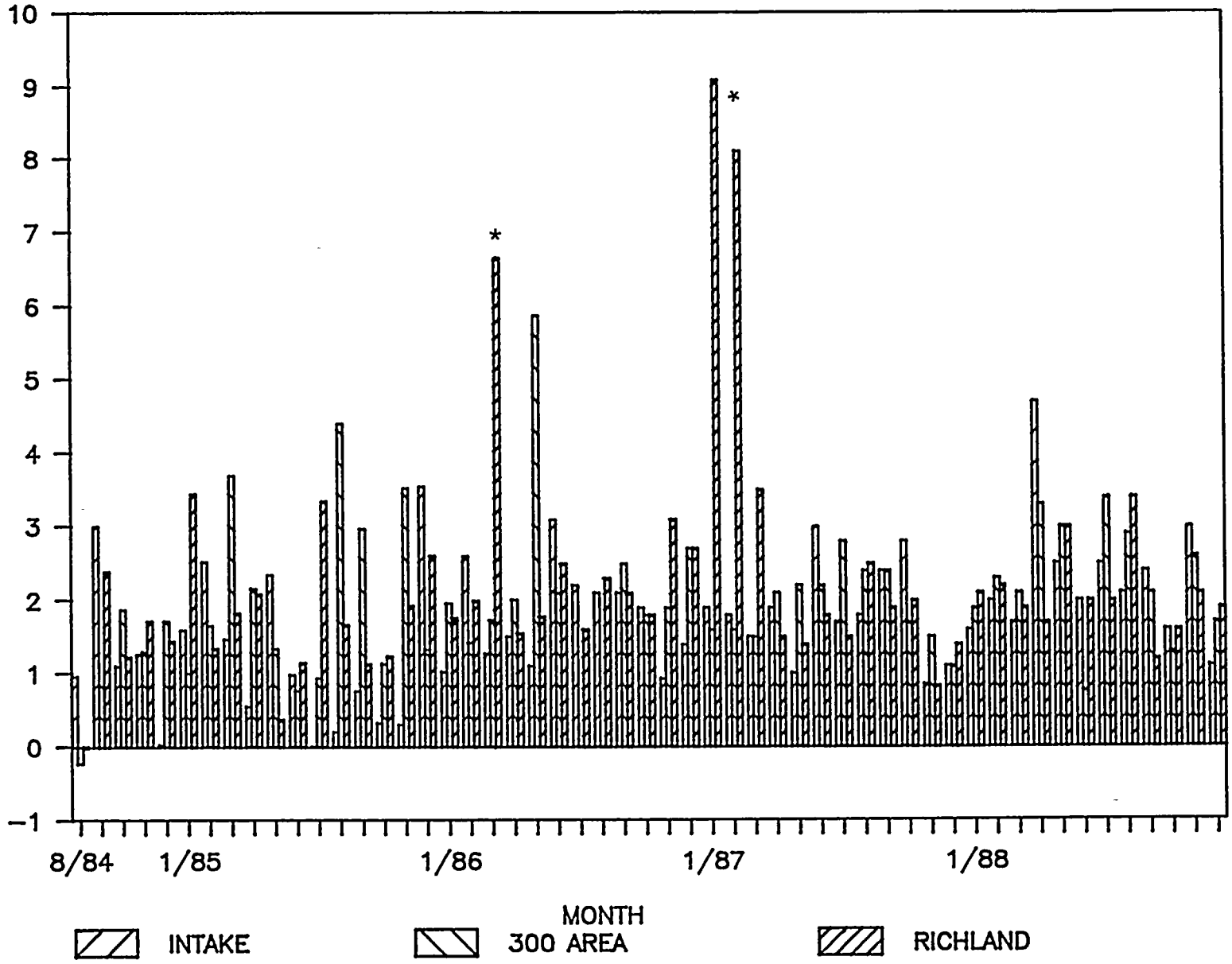


FIGURE 4-11

1988 GROSS BETA IN RIVER/DRINKING WATER RESULTS



*Samples taken during period when Richland water was supplied by groundwater wells.

FIGURE 4-12

GROSS BETA IN RIVER/DRINKING WATER FROM 1984 TO 1988

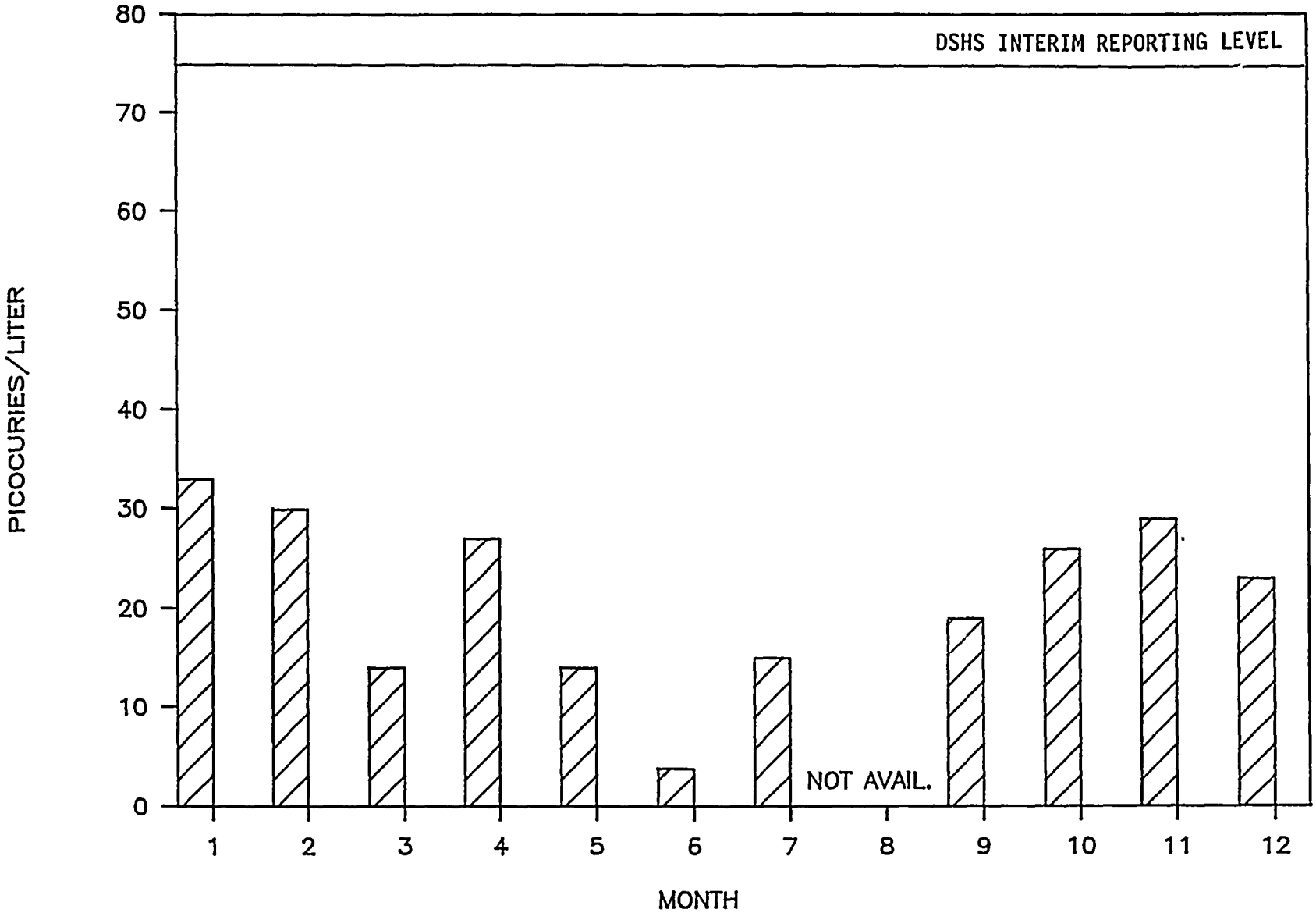


FIGURE 4-13

1988 GROSS BETA IN DISCHARGE WATER RESULTS

final reporting level for gross beta in the discharge sample is pending approval of the proposed reporting levels by the Washington State Department of Social and Health Services.

The tritium results for river/drinking water, discharge water and groundwater are presented in Tables A-6 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 4-14. All the results were within the range normally observed in such water and within the range of the preoperational and previous operational results for the same stations.

The tritium results for the quarterly groundwater samples were also low and within the range previously observed. A graph of the groundwater results is presented in Figure 4-15.

The tritium levels in the discharge water were higher than the levels observed for the river/drinking water samples because of plant releases. The levels observed are reasonable for samples taken directly from the discharge line prior to any river dilution. Compared to the maximum allowable level for tritium in drinking water, 20,000 pCi/liter, the results were low[14]. A graph of the discharge water tritium levels for 1987 and 1988 is presented in Figure 4-16. The Third Quarter 1988 result exceeded the DSHS interim reporting level, 1000 pCi/liter. The interim tritium reporting level was also exceeded by the tritium result (16,000 pCi/liter) determined for a composite of grab samples taken on May 31 through June 1, when the discharge sampler was inoperable (Appendix C). This reporting level was set during a period when there was significant dilution of the blowdown water before it reached the sampling point. Since that dilution no longer occurs prior to sampling, DSHS has been requested to modify the reporting level, in order to permit better identification of significant changes in the tritium levels under the current method of discharging.

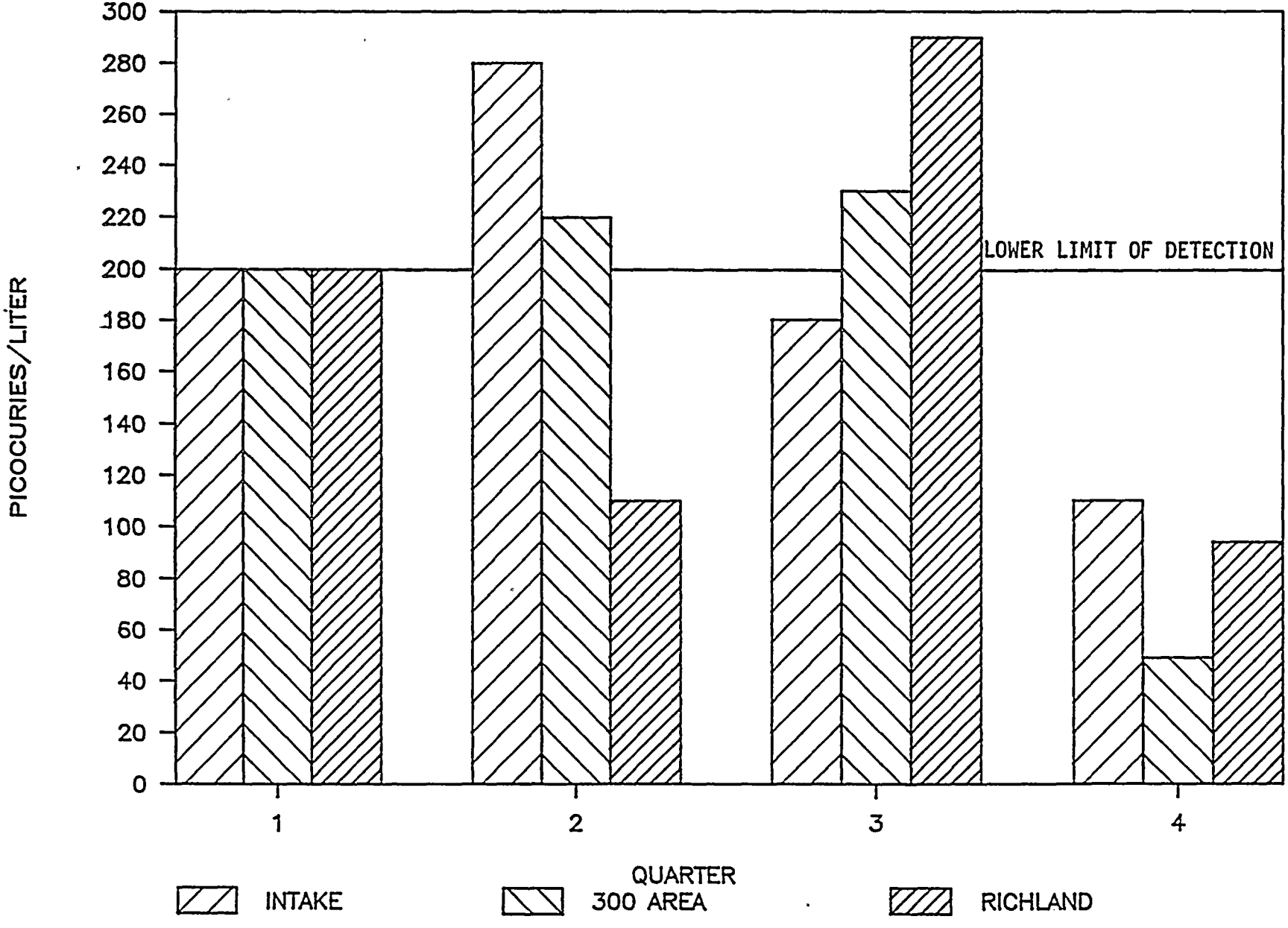


FIGURE 4-14

1988 TRITIUM IN RIVER/DRINKING WATER RESULTS

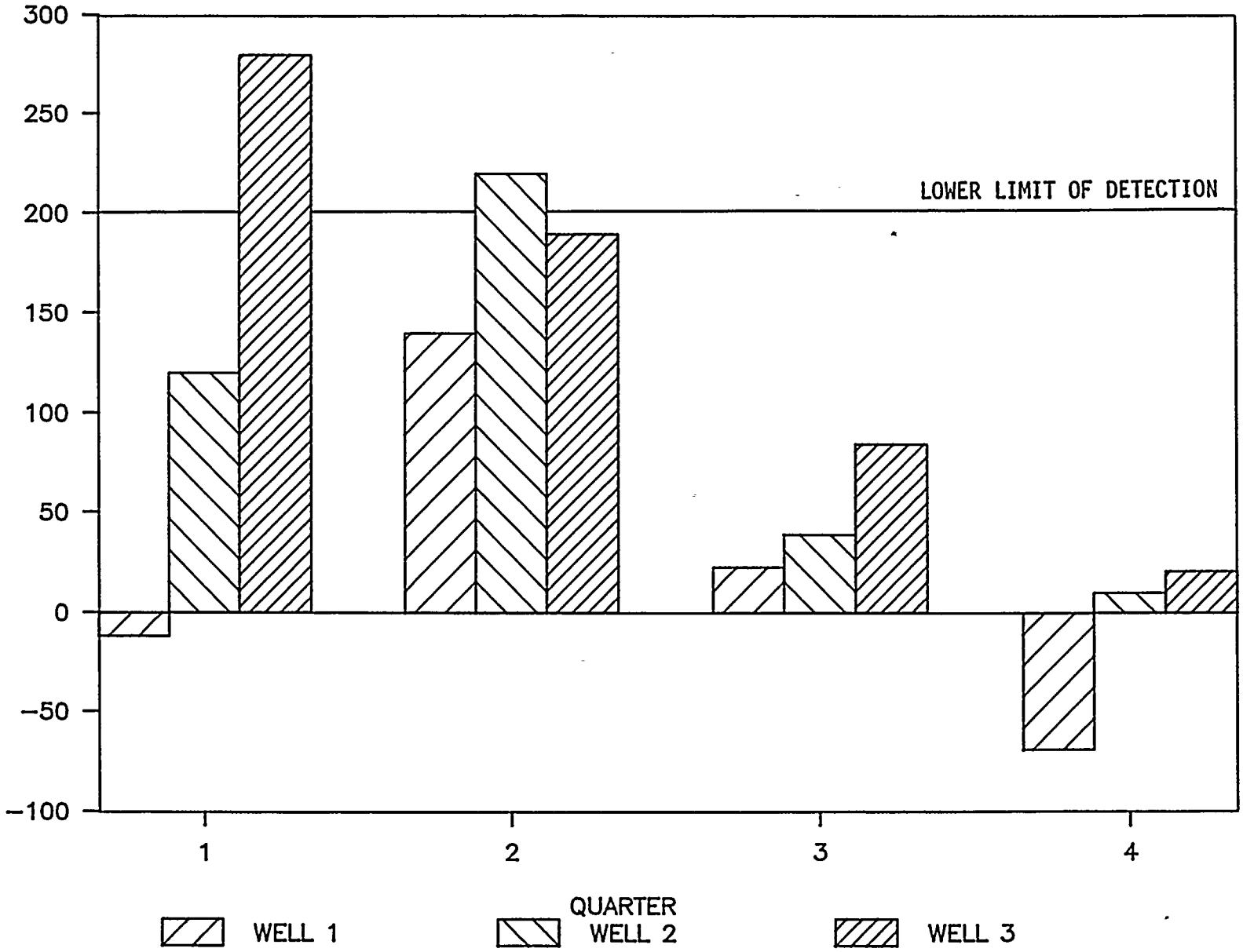


FIGURE 4-15

1988 TRITIUM IN GROUNDWATER RESULTS

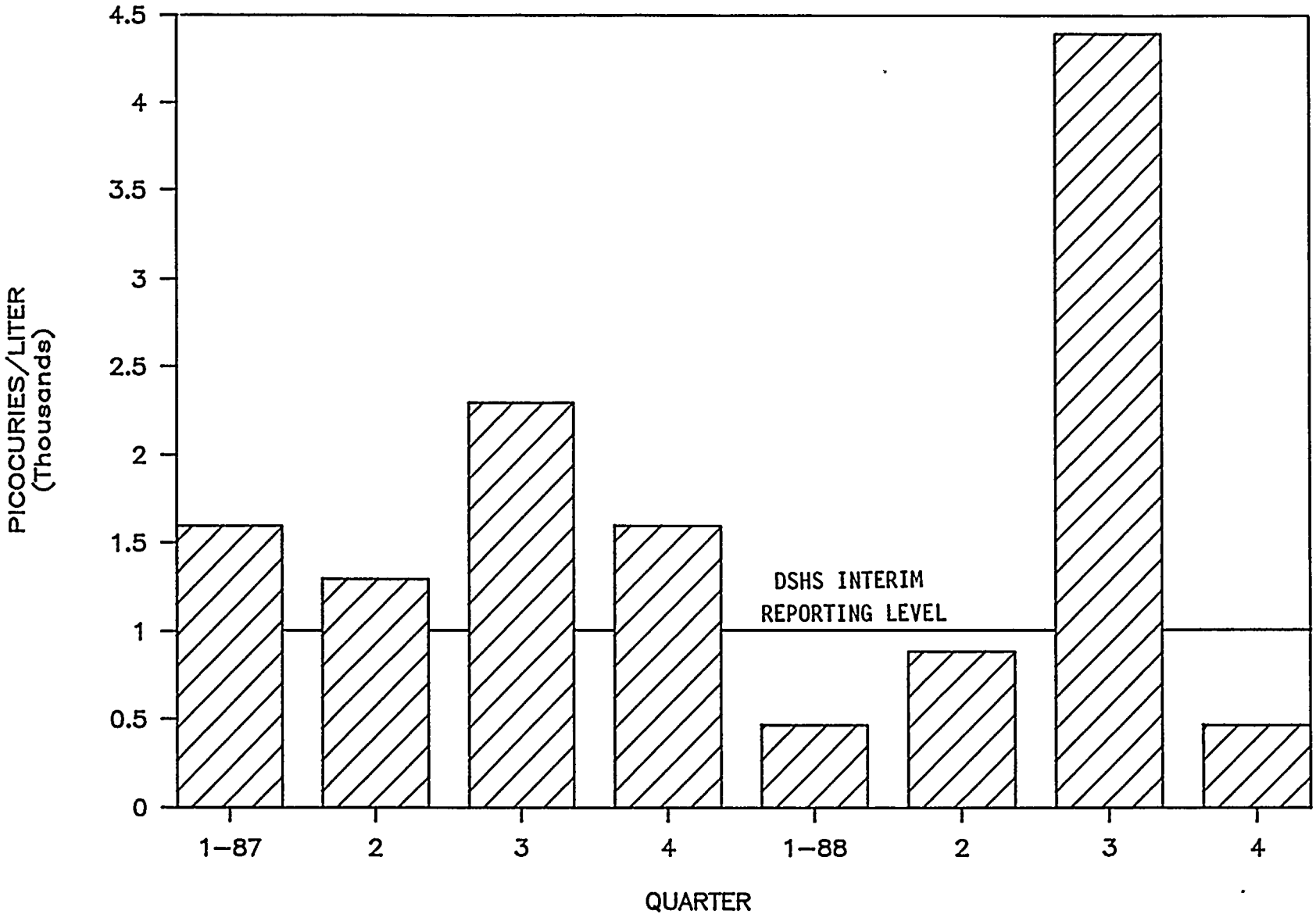


FIGURE 4-16

1987-1988 TRITIUM IN DISCHARGE WATER RESULTS

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. 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 results for two grab samples taken on May 31, during the plant outage (Appendix C). In those samples, Zn-65 and Co-60 were present at detectable levels (33.0 and 13.0 pCi/liter, respectively), along with Ag-110m (28 pCi/liter). None of the results exceeded DSHS or Nuclear Regulatory Commission (NRC) reporting levels.

4.4 Soil

Gamma spectrometry was performed on five soil samples collected in May. The cesium-137 levels in the samples ranged from 29.3 pCi/kilogram at Station 21, to 468 pCi/kilogram at Station 7 near the Wye Barricade. 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.

The cesium-137 levels in the soil samples were well within the range observed during preoperational and previous operational sampling. No strontium analyses were required for any of the indicator samples because none contained cesium concentrations ten times the levels determined for the control. The gamma spectrometry results for the soil samples are given in Tables A-8.1 and A-8.2 in Appendix A.

4.5 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), cobalt-60 and cesium-137 were detected downstream of the plant (Station 34). Cesium-137 was also detected in the control location (Station 33) sample. Both of these radionuclides have been detected in preoperational samples and in samples taken since plant operation began. They have also been previously identified as components of the

Columbia River sediment originating from the operation of the old Hanford Reservation reactors[15]. There was no evidence in these results of any detectable accumulation of radionuclides from Plant 2 operations in the river sediment downstream.

4.6 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, except for potassium-40, a naturally occurring radionuclide, and cesium-137 were below detection limits. The Cs-137 levels for the fish taken from the Columbia River ranged from 9.8 to 36.8 pCi/kilogram and the levels for fish taken from the Snake River ranged from 1.1 to 26.6 pCi/kilogram. These results were within the range observed during the preoperational and previous operational periods.

4.7 Milk

The results of iodine-131 analyses of milk samples collected during 1988 were all less than detection limits. These results are listed in Tables A-11.1 and A-11.2 of Appendix A.

The gamma spectrometry results for the same milk samples are listed in Tables A-12.1 and A-12.2. Cesium-137 was detected in two samples collected from the control location, Station 96. Although above detection limits, the concentrations of cesium-137 in these samples were low (5.6 and 7.5 pCi/liter). All other results for the indicator and control locations were less then the detection limits.

4.8 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, are listed in Tables A-13.1 through A-15.2 of Appendix A.

5.0 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.

The following sections summarize the quality assurance and quality control aspects of the TLD and analytical components of the REMP.

5.1 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 5-1 and 5-2. 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. If the QA dosimeter results are greater than ± 5% (or 5 mR) of the given exposure, an investigation into the source of the discrepancy is initiated. The number of QA dosimeters used during each processing is generally 10% of the number of field dosimeters. During 1988 the same QA dosimeters were used repeatedly throughout the year in order to track their sensitivity from run to run. Evaluation of the QA dosimeter results indicated only small biases of 3-5% 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 to their field locations. The radiation background in the storage area is also monitored by a separate set of

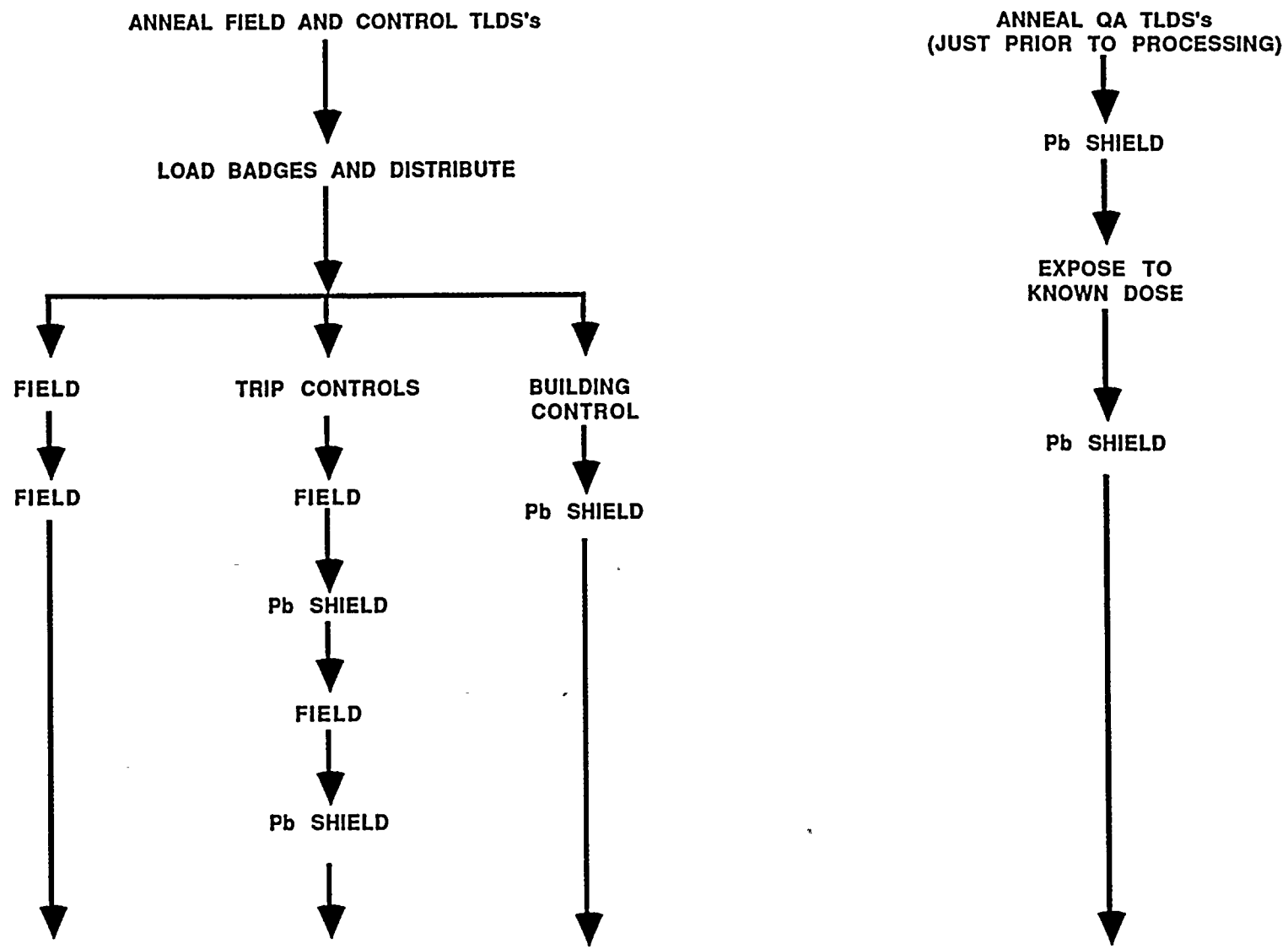


FIGURE 5-1
SUPPLY SYSTEM ENVIRONMENTAL TLD PREPARATION - USE CYCLE

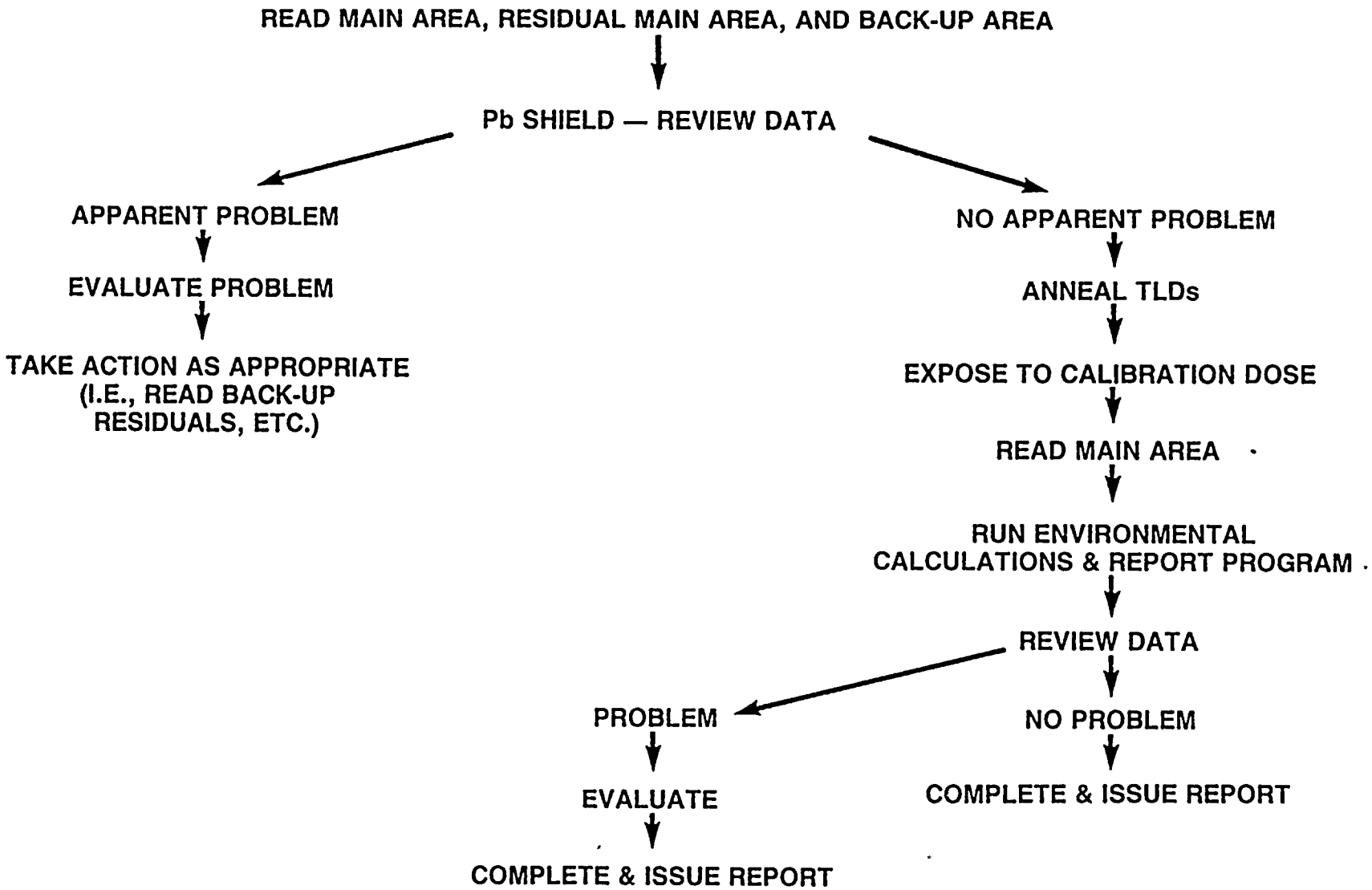


FIGURE 5-2
SUPPLY SYSTEM TLD EVALUATION

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 each quarter with the field dosimeters to verify the accuracy of the environmental TLD evaluations. The results of these audit dosimeters processed during 1988 are presented in Table 5-1. The close agreement between the given audit exposures and the reported results provided another indication that the dosimeter evaluations were performed without significant problems.

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. The Supply System results were reported in the 1986 Annual Report.[12] During the fourth quarter of 1988, the Supply System participated in the first Hanford TLD Intercomparison. The purpose of this intercomparison was to compare the responses of the various TLD systems used on the Hanford Reservation to different levels and types of radiation. This first study involved exposures to Cs-137, Co-60 and Ra-226 sources, as well as exposure at the Supply System Station 46 in the Wahluke Reserve.

The Supply System results, along with those of the other participants (Washington State DSHS, Oregon State Health Department (OSHD), and the U.S. Department of Energy (USDOE)), are presented in Table 5-2. Graphs of the results of the intercomparison are presented in Figure 5-3. The Supply System results compared well with the given exposures, except in the case of Ra-226, where the TLD over-responds approximately 20%. The Supply System environmental TLDs are, therefore, quite sensitive to fluctuations in environmental radiation.

TABLE 5-1

1988 ENVIRONMENTAL AUDIT DOSIMETER RESULTS

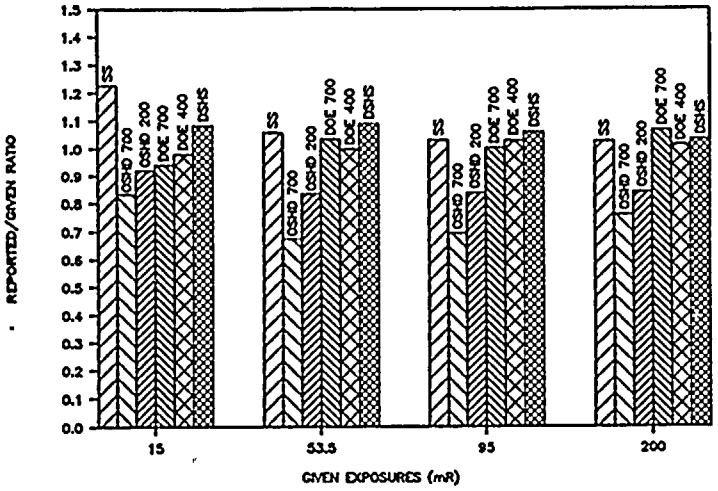
DISTRIBUTION	GIVEN EXPOSURE (mR)	REPORTED EXPOSURE (mR)	BIAS (%)
First Quarter	62.5	60.0	-4.0
		60.2	-3.7
		60.9	-3.6
Second Quarter	42.8	41.7	-2.6
		41.6	-2.8
		41.6	-2.9
Third Quarter	51.9	52.5	1.1
		51.9	0.0
		52.5	1.2
Fourth Quarter	31.5	31.1	-1.3
		30.3	-3.8
		30.7	-2.5

TABLE 5-2

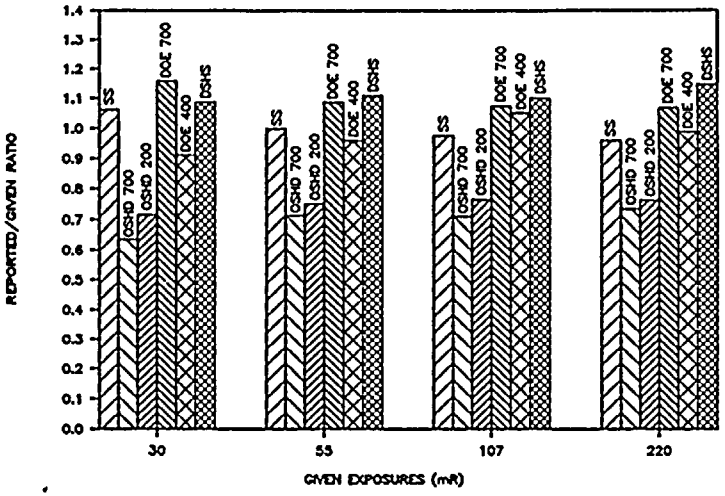
1988 HANFORD THERMOLUMINESCENT DOSIMETER (TLD) INTERCOMPARISON RESULTS

Exposure Type and Designation	Cs-137 A	Cs-137 B	Cs-137 C	Cs-137 D	Co-60 A	Co-60 B	Co-60 C	Co-60 D	Ra-226 A	Ra-226 B	Ra-226 C	Ra-226 D	Supply System Station 46[1]
Given Exposure (mR)	15	53.5	96	200	30	55	107	220	25	56.3	126	244	——
Supply System													
Reported Result (mR)	18.4	56.6	97.0	204.9	31.9	55.0	104.4	211.2	31.1	66.0	131.3	292.7	28.4
2 Sigma	0.6	1.7	2.2	4.6	1.0	1.6	2.2	4.2	0.8	1.9	4.0	7.7	1.0
% Error	3.2	3.0	2.3	2.2	3.1	2.9	2.1	2.0	2.6	2.9	3.0	2.6	——
Reported/Given	1.23	1.06	1.03	1.02	1.06	1.00	0.98	0.96	1.24	1.17	1.04	1.20	——
OSHD-TLD 700													
Reported Result (mR)	12.5	36.1	66.0	152.0	19.1	39.3	76.2	162.0	22.8	50.2	83.0	240.0	13.8
2 Sigma	0.4	1.0	3.0	7.0	2.1	3.0	6.3	16.0	1.1	2.8	8.0	17.0	0.8
% Error	3.2	2.8	4.5	4.6	11.0	7.6	8.3	9.9	4.8	5.6	9.6	7.1	——
Reported/Given	0.83	0.67	0.69	0.76	0.64	0.71	0.71	6.74	0.91	0.89	0.66	0.98	——
OSHD-TLD 200													
Reported Result (mR)	13.8	44.6	79.5	168.0	21.5	41.3	82.0	168.0	20.1	46.5	94.0	191.0	16.8
2 Sigma	0.2	0.6	3.3	8.0	1.0	0.8	5.0	2.0	0.6	3.0	1.0	8.0	0.5
% Error	1.4	1.3	4.2	4.8	4.7	1.9	6.1	1.2	3.0	6.5	1.1	4.2	——
Reported/Given	0.92	0.83	0.84	0.84	0.72	0.75	0.77	0.76	0.80	0.83	0.75	0.78	——
DOE/PNL-TLD 700													
Reported Result (mR)	14.1	55.3	96.2	213.0	34.8	59.8	114.9	235.3	33.8	79.3	160.0	388.9	22.5
2 Sigma	1.8	4.4	8.3	17.4	3.2	4.3	12.4	14.4	3.7	7.5	11.2	31.6	3.1
% Error	12.8	8.0	8.6	8.2	9.2	7.2	10.8	6.1	10.9	9.5	7.0	8.1	——
Reported/Given	0.94	1.03	1.00	1.07	1.16	1.09	1.07	1.07	1.35	1.41	1.27	1.59	——
DOE/PNL-TLD 400													
Reported Result (mR)	14.7	53.4	97.7	202.9	27.4	52.8	112.6	217.8	28.9	59.8	122.6	266.6	24.0
2 Sigma	2.3	2.9	5.3	13.1	3.0	4.7	16.4	38.3	3.8	10.5	4.8	58.5	3.1
% Error	15.7	5.4	5.4	6.5	13.1	8.9	14.6	17.6	13.1	17.6	3.9	22.9	——
Reported/Given	0.98	1.00	1.03	1.01	0.91	0.96	1.05	0.99	1.16	1.06	0.97	1.09	——
DSHS													
Reported Result (mR)	16.3	58.3	100.6	206.7	32.7	61.0	117.8	252.4	35.3	84.9	173.0	388.2	23.0
2 Sigma	1.1	2.8	7.0	12.5	1.3	3.8	7.4	30.4	3.8	2.8	4.9	12.9	1.8
% Error	6.8	4.8	7.0	6.0	4.0	6.2	6.3	12.0	10.8	3.3	2.8	3.3	——
Reported/Given	1.08	1.09	1.06	1.03	1.09	1.11	1.10	1.15	1.41	1.51	1.37	1.59	——

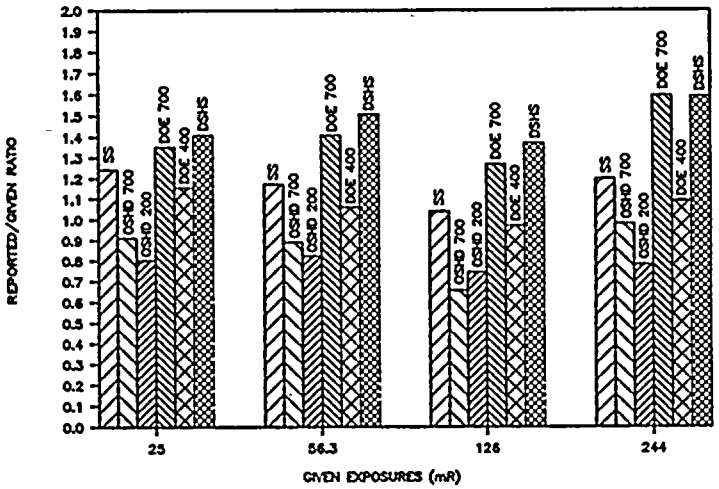
[1]Pressurized ionization chamber readings taken at this location in August 1988 ranged from 11 to 13 micro-R per hour or 0.26 to 0.31 mR/day. For the 92 day period used for this study, the total exposure would range from 23.9 to 28.5 mR.



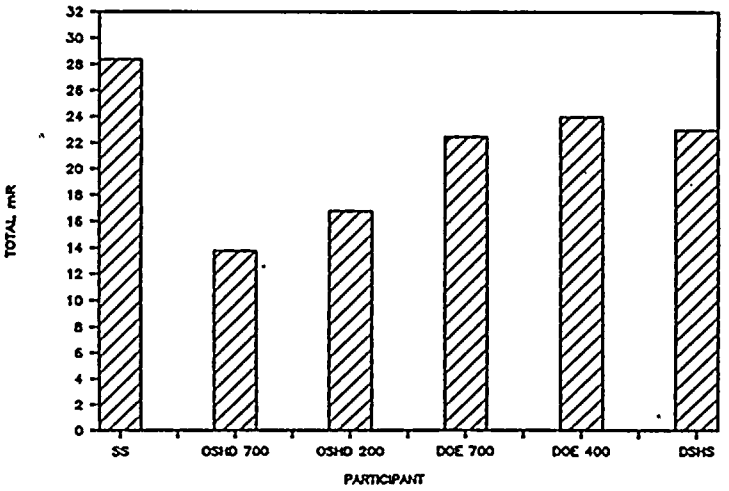
Cs-137



Co-60



Ra-226



TLD Station 46

FIGURE 5-3
HANFORD THERMOLUMINISCENT DOSIMETER (TLD) INTERCOMPARISON RESULTS FOR EACH RADIATION SOURCE

5.2 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.

5.2.1 Supply System Quality Control Activities

During 1988, several environmental samples were submitted to Teledyne Isotopes for intercomparison with other analytical laboratories. One set of intercomparison samples consisted of river and well water and sediment collected on the Department of Energy Hanford Reservation for the 1988 Hanford/Columbia River Sediment and Water Sampling Intercomparison. The samples were mostly collected along the Columbia River from the N Reactor to the 300 Area. One sediment sample, however, was collected at McNary Dam. 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 are presented in Table 5-3. Explanations for the Supply System results that appear to differ significantly from the results of the other participants are contained in the footnotes to this table.

The Supply System has participated in the U.S. Department of Energy Environmental Measurements Laboratory (EML) Quality Assessment Program since 1987. In March 1988, soil, vegetation, water and air samples were submitted to Teledyne Isotopes for analysis as a part of this intercomparison program. Another set of intercomparison samples was submitted to Teledyne in September, as well. The reported results, along with the EML expected values, are presented in Table 5-4. The footnotes to this table give additional information on the Supply System results that vary significantly from the EML values.

In addition to the intercomparison samples, duplicate milk 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 pre-

sented in Table 5-5. Most of the gamma isotopic results and all of the iodine-131 results for duplicate milk samples were below detection levels, making the value of the comparison somewhat limited. However, considering the uncertainty associated with numbers below detection levels, the duplicate results agreed well.

TABLE 5-3

1988 HANFORD RESERVATION/COLUMBIA RIVER SEDIMENT AND WATER SAMPLING INTERCOMPARISON RESULTS[1]

Location	Isotope	Washington	Oregon	DOE	WPPSS	HEAL
			Water (pCi/liter ± 2 Sigma)			
N8T Well						
	Gross Beta	15,800 ± 200	18,500 ±100	13,800 ± 100	19,000 ± 440	NR
	Sr-89	-2.0 ± 352	<300	<1030	730 ± 130	NR
	Sr-90	8,310 ± 120	8,500 ± 300	6,680 ± 260	7,500 ± 100	NR
	Co-60	49.0 ± 3.0	54.0 ± 6.0	45.0 ± 4.5	57.6 ± 6.9	44.7 ± 9.5
	Ru-106	ND	ND	ND	ND	NR
	Sb-125	32.0 ± 3.0	45.0 ± 16.0	43.1 ± 6.4	37.2 ± 9.4	NR
	Cs-137	ND	ND	ND	ND	NR
	H-3	66,900 ± 1400	77,800 ± 800	74,000 ± 700	190,000 ± 10,000[2]	NR
Downstream N Reactor	Gross Beta	42.0 ± 4.0	41.6 ± 1.1	73.8 ± 7.8	50.0 ± 4.0	NR
	Sr-89	-0.1 ± 1.5	ND	ND	ND	NR
	Sr-90	0.2 ± 0.5	ND	0.31 ± 0.09	ND	NR
	Co-60	33.5 ± 2.4	41.1 ± 4.8	30.0 ± 4.0	39.5 ± 5.5	31.2 ± 1.7
	Ru-106	15.2 ± 8.7	ND	13.5 ± 14.6	ND	8.7 ± 6.3
	Sb-125	ND	ND	NR	ND	NR
	Cs-137	ND	ND	0.4 ± 1.1	ND	NR
	H-3	106,000 ± 2000	121,000 ± 1200	111,000 ± 870	110,000 ± 10,000[2]	NR
Hanford Ferry Landing	Gross Beta	0.8 ± 0.5	1.8 ± 1.2	5.0 ± 2.3	29 ± 2[3]	NR
	Sr-89	-0.1 ± 1.5	ND	0.6 ± 1.1	ND	NR
	Sr-90	0.2 ± 0.5	ND	7.2 ± 0.3	ND	NR
	Co-60	ND	ND	0.15 ± 0.97	ND	0.008 ± 0.004
	Ru-106	ND	ND	ND	ND	0.52 ± 0.18
	Sb-125	ND	ND	NR	ND	NR
	Cs-137	ND	ND	0.4 ± 0.8	ND	NR
	H-3	-80 ±190	ND	31.0 ± 111.0	ND	NR
River Mile 28	Gross Beta	28 ± 5	64.9 ± 3.7	168 ± 11	59 ± 4	NR
	Sr-89	0.03 ± 1.00	ND	0.06 ± 0.11	ND	NR
	Sr-90	-0.3 ± 0.5	ND	0.79 ± 0.11	ND	NR
	Co-60	4.6 ± 1.2	ND	4.0 ± 1.8	ND	3.98 ± 0.2
	Ru-106	ND	ND	3.0 ± 7.6	ND	NR
	Sb-125	ND	ND	ND	ND	NR
	Cs-137	ND	ND	ND	ND	0.27 ± 0.13
	Tc-99	NR	NR	228 ± 3	NR	NR
	H-3	127,000 ± 3000	150,000 ± 1500	143,000 ± 980	140,000 ± 10,000	NR

[1] Does not include results of analyses that the Supply System did not perform.
[2] Rounded errors for the N8T and the Downstream N Reactor samples; actual errors were 2,103 pCi/liter and 1,677 pCi/liter, respectively.
[3] Reanalysis performed; corrected result was 1.6 ± 1.7 pCi/liter.
ND = Analysis performed, but radionuclide not detected.
NR = Analysis not performed, so result not reported.

TABLE 5-3 (Cont.)

1988 HANFORD RESERVATION/COLUMBIA RIVER SEDIMENT AND WATER SAMPLING INTERCOMPARISON RESULTS[1]

Location	Isotope	Washington	Oregon	DOE	WPPSS	HEAL
300 Area Seep						
	Gross Beta	15.0 ± 1.0	11.0 ± 2.0	11.6 ± 33.0	27.0 ± 2.0[2]	NR
	Sr-89	1.0 ± 1.9	ND	0.13 ± 0.11	ND	NR
	Sr-90	1.3 ± 0.6	ND	0.16 ± 0.07	180.0 ± 10.0[2]	NR
	Co-60	ND	ND	0.25 ± 0.80	ND	NR
	Ru-106	ND	ND	ND	ND	NR
	Sb-125	ND	ND	ND	ND	0.093 ± 0.063
	Cs-137	ND	ND	0.4 ± 0.6		
	H-3	150.0 ± 190.0	ND	168.0 ± 115.0	290.0 ± 150.0	NR
			Sediment (pCi/gram[3] ± 2 Sigma)			
100F Slough						
	K-40	NR	12.0 ± 0.6	13.9 ± 0.7	13.2 ± 1.3	NR	14.3 ± 0.1
	Ra-226	0.83 ± 0.02	0.6 ± 0.1	NR	0.98 ± 0.37	NR	0.77 ± 0.02
	Th-232	0.82 ± 0.03	0.6 ± 0.1	NR	NR	NR	0.97 ± 0.03
	Co-60	0.067 ± 0.009	0.05 ± 0.02	0.08 ± 0.02	0.05 ± 0.03	NR	0.05 ± 0.01
	Cs-134	ND	NR	NR	NR	NR	NR
	Cs-137	0.257 ± 0.011	0.16 ± 0.03	0.27 ± 0.03	0.23 ± 0.03	0.15 ± 0.08	0.19 ± 0.01
	Eu-152	0.070 ± 0.028	NR	NR	NR	0.12 ± 0.08	NR
McNary Dam						
	K-40	NR	16.0 ± 0.5	12.5 ± 0.7	13.7 ± 1.4	NR	14.6 ± 0.2
	Ra-226	1.0 ± 0.1	0.9 ± 0.1	NR	0.98 ± 0.37	NR	0.89 ± 0.03
	Th-232	0.91 ± 0.02	1.2 ± 0.1	NR	NR	NR	0.98 ± 0.03
	Pb-210	NR	NR	NR	NR	NR	1.83 ± 0.11
	Co-60	0.28 ± 0.02	0.31 ± 0.02	0.24 ± 0.04	0.28 ± 0.05	NR	0.25 ± 0.01
	Cs-134	0.03 ± 0.02	0.07 ± 0.02	0.02 ± 0.02	0.07 ± 0.03	NR	NR
	Cs-137	0.75 ± 0.03	0.85 ± 0.04	0.75 ± 0.05	0.77 ± 0.07	0.75 ± 0.13	0.74 ± 0.01
	Eu-152	0.53 ± 0.04	0.58 ± 0.04	0.61 ± 0.13	0.66 ± 0.16	0.36 ± 0.06	0.44 ± 0.02

(1) Results listed do not include results from gross alpha, Tc-99, uranium or plutonium analyses since the Supply System did not perform these analyses. They are not included in the Supply System's routine program.
(2) Reanalysis of this sample resulted in 9.0 ± 1.7 pCi/liter gross beta, the Sr-90 result is being investigated.
(3) Dry weight

ND = Analysis performed, but radionuclide not detected.
NR = Analysis not performed, so result not reported.

TABLE 5-4

1988 ENVIRONMENTAL MEASUREMENTS LABORATORY (EML)

QUALITY ASSESSMENT PROGRAM RESULTS

Date	Sample Type	Radio-nuclide	Reported Result	Percent Error (2σ)	EML Value	Ratio Reported/EML	+/-
8803	Particulate filter (total pCi)	Be-7	0.490E+04	10	0.473E+04	1.04	0.11
		Mn-54	0.458E+03	10	0.363E+03	1.26	0.13
		Co-57	0.182E+03	9	0.162E+03	1.12	0.12
		Co-60	0.332E+03	9	0.282E+03	1.18	0.13
		Cs-134	0.369E+03	10	0.381E+03	0.97	0.10
		Cs-137	0.278E+03	10	0.211E+03	1.32	0.15
8803	Soil (pCi/gr)	K-40	0.484E+00	32	0.600E+00	0.81	0.27
		Cs-137	0.393E+00	9	0.400E+00	0.98	0.11
8803	Vegetation (pCi/gr)	K-40	0.399E+02	10	0.360E+02	1.11	0.11
		Cs-137	0.516E+01	10	0.462E+01	1.12	0.12
8803	Water (pCi/ml)[2]	H-3	0.200E+02	5	0.207E+02	0.97	0.06
		Mn-54	0.662E+01	9	0.680E+01	0.97	0.11
		Co-57	0.180E+01	10	0.205E+01	0.88	0.12
		Co-60	0.173E+01	9	0.203E+01	0.85	0.12
		Sr-90	0.520E+00	1	0.530E+00	0.98	0.03
		Cs-134	0.271E+01	9	0.356E+01	0.76	0.10
		Cs-137	0.169E+01	10	0.184E+01	0.92	0.11
8809	Particulate filter (Total pCi)[3]	Be-7	0.160E+04	6	0.216E+04	0.74	0.05
		Mn-54	0.155E+03	10	0.185E+03	0.84	0.09
		Co-57	0.286E+03	10	0.394E+03	0.73	0.08
		Co-60	0.292E+03	9	0.374E+03	0.78	0.08
		Cs-134	0.118E+03	10	0.191E+03	0.62	0.06
		Cs-137	0.207E+03	10	0.245E+03	0.84	0.09
8809	Soil (pCi/gr)[4]	K-40	0.869E+01	10	0.748E+01	1.16	0.12
		Sr-90	0.890E+00	12	0.139E+01	0.64	0.08
		Cs-137	0.106E+01	10	0.910E+00	1.16	0.14
8809	Vegetation (pCi/gr)	K-40	0.137E+02	10	0.105E+02	1.30	0.17
		Cs-137	0.224E+01	9	0.152E+01	1.47	0.15
8809	Water (pCi/ml)[5]	H-3	0.890E+01	3	0.106E+02	0.84	0.05
		Mn-54	0.139E+01	10	0.152E+01	0.91	0.10
		Co-57	0.342E+01	9	0.336E+01	1.02	0.10
		Co-60	0.344E+01	9	0.368E+01	0.93	0.10
		Sr-90	0.530E+00	1	0.930E+00	0.57	0.04
		Cs-134	0.945E+00	10	0.970E+00	0.97	0.11
		Cs-137	0.186E+01	10	0.195E+01	0.95	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]The results were based on new calibration factors determined for a new standard that was discontinued shortly after these samples were counted. Using the factors determined during re-calibration, the results would have been:

Radionuclide	Reported Value	Ratio Reported/EML
Mn-54	0.727E+01	1.07
Co-57	0.200E+01	0.98
Co-60	0.190E+01	0.94
Cs-134	0.289E+01	0.84
Cs-137	0.186E+01	1.01

[3]The filter size was larger than those routinely analyzed and used in detector calibration. Recounts of the filter confirmed this result.

[4]The low Sr-90 in soil was caused by difficulty in the strontium chemistry which resulted in erroneously high strontium yield. The result from reanalysis was 1.5 ± 0.1 pCi/gram.

[5]Reanalysis for tritium yielded a result of 1.0 ± 0.1 E+01 pCi/ml. The Sr-90 result was incorrectly calculated; when corrected, the result was 0.88 ± 0.01 pCi/ml.

TABLE 5-5

COMPARISON OF IODINE-131 AND GAMMA ISOTOPIC RESULTS

FOR DUPLICATE MILK SAMPLES

SAMPLE LOCATION	COLLECTION DATE	RESULTS (pCi/liter) I-131[(a)]	Cs-134	Cs-137
Station 36	880105	-1.6 ± 2.06E-01	-0.7 ± 23.9E-01	-0.4 ± 2.3E+00
Station 37		0.9 ± 2.5 E-01	-6.9 ± 21.9E-01	1.7 ± 2.3E+00
Station 36	880308	-1.8 ± 12.1E-02	-1.1 ± 2.3E+00	0.9 ± 2.2E+00
Station 37		-0.8 ± 12.3E-02	0.1 ± 3.1E+00	2.3 ± 3.1E+00
Station 36	880920	6.5 ± 12.8E-02	-1.1 ± 2.7E+00	0.2 ± 2.7E+00
Station 37		9.1 ± 14.4E-02	0.0 ± 2.7E+00	2.5 ± 2.7E+00

(a) Resin Method

5.2.2 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 NBS. For alpha and beta counting, check sources are prepared and counted every week day except holidays. Control charts are maintained with three sigma limits specified. Control of the alpha-beta counting equipment is described in procedure PRO-032-27, "Calibration and Control of Alpha and Beta Counters. Backgrounds are usually measured at least once per week.

The efficiency of the gamma spectrometers is calibrated yearly with an NBS 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. This procedure is described in PRO-042-44, "Calibration of Ge(Li) Gamma Ray Spectrometers".

The efficiency of the liquid scintillation counters is determined every six months by counting an NBS traceable standard on three consecutive days and arriving at an average efficiency. A sealed source is counted every other day and plotted on a control chart with three sigma limits. A background is counted every other day. This control system is described in PRO-052-35 "Determination of Tritium in Water by Liquid Scintillation".

The flow-chart of sample control from the time of receipt to reporting of results is presented in Figure 5-4. 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.

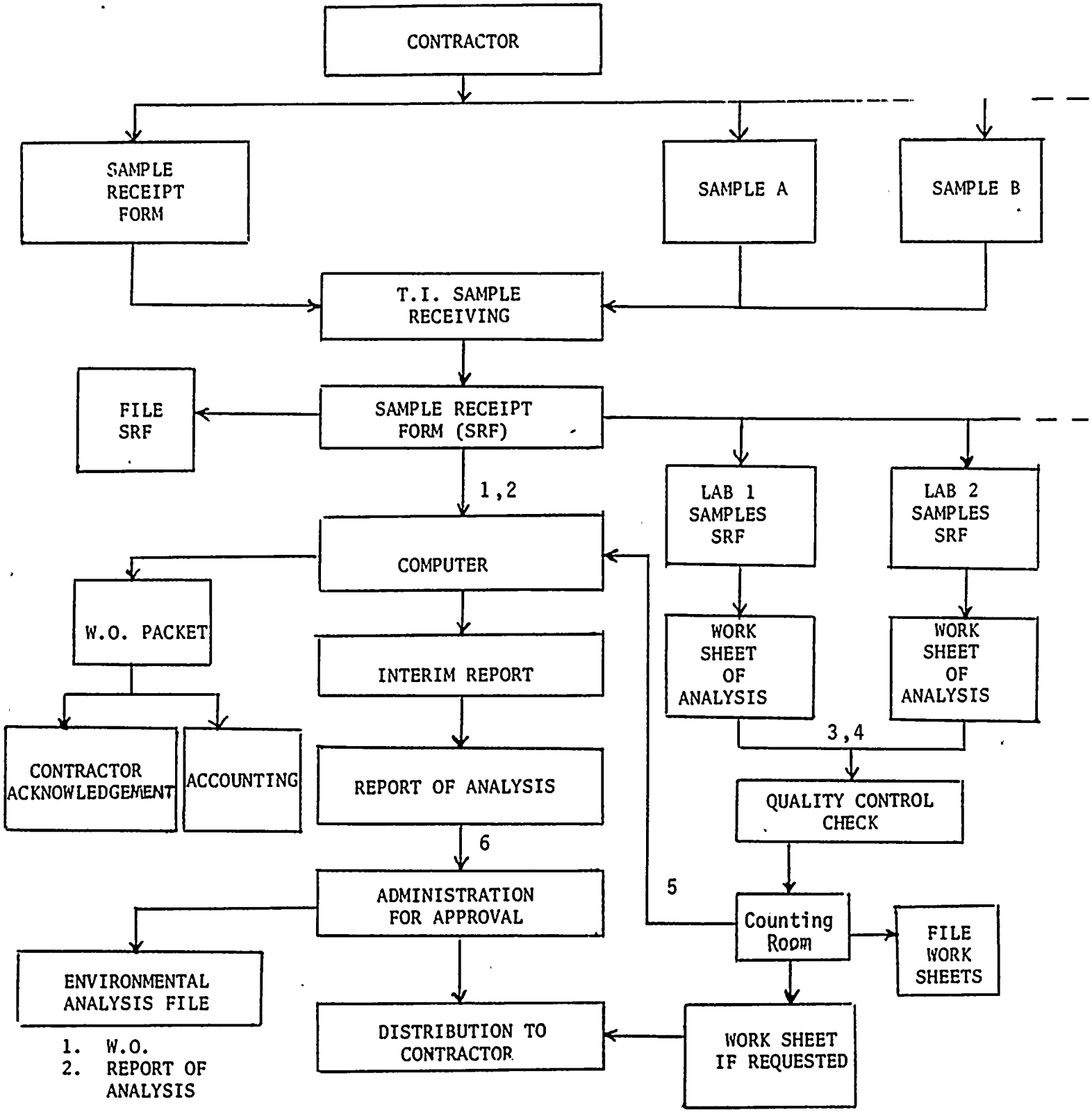


FIGURE 5-4

FLOW CHART FOR TELEDYNE ISOTOPES SAMPLES

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 work sheets 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. The control of sample receipt, log-in number assignment, designation of analysis, assignment of blank sample to a group, etc., is described in procedure PRO-032-48. "Procedure for Receipt of Samples". Also included in this procedure are instructions for storage and prevention of contamination of samples.

Preparation of carrier solutions and acceptability criteria are contained in procedure PRO-032-49, "Standardization of Radiochemical Carrier Solutions". Preparation of efficiency calibration standards and check sources is described in procedure PRO-032-27, "Calibration and Control of Alpha and Beta Counters.

Results and associated parameters, such as decay, background, efficiency, etc. are reviewed by the quality control manager and/or the technical vice president before being entered into the data system. Any results which are

suspect, ie 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 work sheets(s).

No deviations from written procedures occurred during 1988. A summary of the quality control blank and spiked sample results of analyses follows.

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 5-6)(a)) indicated that there was no bias on the low background counters. The average activity for eighteen samples was -0.024 ± 0.10 pCi/liter. This was calculated from quality control samples without considering detection limits.

Gross Beta - Filters

One blank filter was measured with each set of filters assayed. Fifty-one blanks were counted. The resultant average activity in total pCi was 1.0 ± 0.6, which indicated a relatively stable background for the filter including the background of the gross beta proportional counters.

Gross Beta - Water

Fifty-two blanks were prepared from distilled water. The resultant average based on the highest detection level measured was less than 1.0 pCi/liter. No contamination was indicated and the background level was low and stable. During 1988 fifty gross beta spike samples were analyzed. The average result was 2.0 ± 0.2E+01 pCi/liter with a spike level of 2.1 ± 0.5 E+01. This was well within the guidelines outlined in Table 2 of the EPA-600/4-81-004, "Environmental Radioactivity Laboratory Intercomparison Studies Program".

Tritium in Water

Fifty-two blank samples were analyzed by gas counting. The average result was less than 200 pCi/liter. The resultant average is based on the highest detection level measured. A total of 52 spike tritium samples were analyzed. The average result was 2.4 ± 0.2 E+03 pCi/liter, as compared with a spike level of 2.6 ± 0.3E+03 pCi/liter.

Sr-90 - Milk and Water

Bi-monthly blank and spike milk and water samples were analyzed for strontium-90. The average activity based on the highest detection level was less than 1 pCi/liter. Forty-five spiked water samples were analyzed with an average level of 4.3 ± 0.2 E+01 pCi/liter, as compared with a spike level of 44 ± 7 the limits allowed by the EPA Environmental Laboratory Intercomparison Studies Program. A total of 24 spiked milk samples were spiked to a level of 44 ± 7 pCi/liter. The average activity was 3.9 ± 0.3 E+01 pCi/liter, which was within the limits as specified by the EPA Intercomparison Studies Program. A total of 26 blank milk samples were analyzed with an average activity of 1.4 ± 0.5 pCi/liter of strontium-90.

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 1.50 ± 0.15E+05 pCi/liter, as compared with a spike level of 1.4 ± 0.10E+05 pCi/liter.

Tables summarizing the results of internal blanks and spike samples are presented in Tables 5-5 and 5-6. A summary of the EPA cross-check samples is presented in Appendix B. Any result above the ± two sigma normalized deviation from the known is explained, giving the reason for the deviation and the corrective action to be taken.

TABLE 5-6

SUMMARY OF 1988 QUALITY CONTROL DATA: BLANKS

NUCLIDE	MEDIUM	BLANKS NUMBER	AVERAGE BLANK	UNITS
I-131	Milk	18	(a)-2.4 ± 10.0E-02	pCi/l
		52	(d) L. T. 1. E+00	pCi/l
Sr-90	Milk	26	1.4 ± 0.5 E+00	pCi/l
Gross Beta	AP Filter	51	(c)(d) 1.0 ± 0.6E+00	Total pCi
H-3 (Gas Counting)	Water	52	(d) L. T. 2. E+02	pCi/l
I-131	Charcoal	48	(a) -8.5 ± 4.0E-01	Total pCi
Sr-90	Water	46	(d) L. T. 1. E+00	pCi/l
Sr-90	Milk	26	1.4 ± 0.5 E+00	pCi/l
Gamma	Water	52	*	pCi/l
Gross Beta	Water	52	(d) L. T. 1. E+00	pCi/l

* 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 5-7

SUMMARY OF 1988 QUALITY CONTROL DATA: SPIKES

NUCLIDE	MEDIUM	SPIKED SAMPLES NUMBER	AVERAGE RESULT	SPIKE LEVEL UNITS-pCi/l
Gross Beta	Water	52	2.0 ± 0.2E+01	2.1 ± 0.5E+01
H-3 (Gas Counting)	Water	52	2.4 ± 0.2E+03	2.6 ± 0.4E+03
Sr-90	Water	45	4.3 ± 0.2E+01	4.4 ± 0.7E+01
Sr-90	Milk	24	3.9 ± 0.3E+01	4.4 ± 0.7E+01
Eu-154	Water	52	1.5 ± 0.2E+05	1.4 ± 0.1E+05

6.0 PLANT EFFLUENTS AND DOSE ASSESSMENT

The Supply System Offsite Dose Calculation Manual (ODCM) provides the site specific information and methodologies used to ensure compliance with dose requirements stated in the Technical Specifications for Plant 2. The following is a summary of the assessed doses for 1988.

6.1 Liquid Effluents

6.1.1 Liquid Source Terms

Liquid radwaste effluents released from Plant 2 are required to meet the 10CFR20 Appendix B limits at the point of discharge into the Columbia River and the 10CFR50 Appendix I limits for unrestricted areas.[6,7] To ensure that these requirements are met, limits are set for the concentration of radioactivity in each liquid radwaste release.

The radwaste liquid effluents from Plant 2 were released in a batch mode only. All liquid effluents from the radwaste building are recirculated in a vented hold-up tank at atmospheric pressure prior to sampling and discharge analysis. The radioactivity of each batch of liquid radwaste is determined by batch sampling. The Radwaste Liquid Effluent Radiation Monitoring System measures the radioactivity of the liquid effluents prior to the effluents entering the cooling tower blowdown line.

Doses from liquid effluents are calculated using the LADTAP II computer codes. Table 6-1 lists the source terms used for the LADTAP II calculations of the doses due to Plant 2 1988 liquid effluents.

6.1.2 Doses to Man: Liquid Pathways

Dose estimates for the Maximum Individual and the Average Individual are listed in Table 6-2. Technical Specification limits and the dose balance at year end are also listed in Table 6-2, verifying compliance with Technical Specifications. The maximally exposed individual is

assumed to be an adult whose exposure pathways include potable water and fish consumption. The maximally exposed individual is assumed to consume fish at water at the highest consumption rates for adults. Most of the dose obtained from the Plant 2 liquid effluents is assumed to come from these two pathways. The doses to the population within a 50-mile radius from the plant are presented in Table 6-3, along with the design base doses calculated from the design base source terms obtained from the GALE liquid computer code.

6.2 Gaseous Effluents

6.2.1 Gaseous Source Terms

The gaseous effluents from Plant 2 were released in a continuous mode from three release points:

a. Main Plant Vent - ground and elevated release characteristics, dependent upon meteorological conditions
b. Turbine Building - ground level release
c. Radwaste Building - ground level release

Each gaseous release point is equipped with radiation monitoring systems and particulate and iodine filters for determining the radioactivity of the releases and verifying that the releases are well within limits.

The total gaseous, particulate and tritium releases during 1988 are listed in Table 6-4. These are the source terms used for determining the doses from Plant 2 gaseous effluents.

6.2.2 Dose to Man: Airborne Pathway

Dose calculations for gaseous effluent releases from Plant 2 are required to meet the dose rate limits in 10CFR20, 10CFR50 Appendix I and 40CFR190 for locations at and beyond the Site Boundary.[6,7,16]

To verify compliance with these limits, doses at the 1.2 mile Site Boundary, doses to the nearest resident (i.e. maximum individual) and the average individual and the population dose within a 50-mile radius were calculated using the GASPAR computer code. The annual average atmospheric dispersion factors (X/Q) and deposition rates (D/Q) were determined from the XOQDOQ computer code and used in the calculations.

Compliance with the air dose limits at the 1.2 mile Site Boundary and the dose limits to a member of the public is demonstrated in Table 6-5. The calculated maximum organ dose for a member of the public is presented for a person located in the Taylor Flats area (4.2 miles ESE) of North Pasco and compared to the Technical Specification limit. The doses calculated for the average individual are also presented. Doses calculated for the population within a 50-mile radius of the plant are presented in Table 6-6, along with the preoperational population dose projection, referred to as design base data.

The Plant 2 Visitor Center was evaluated for assessment of radiation doses to "Members of the Public", due to their activities within the site boundary. The ODCM assumes an eight-hour-per-year occupancy by a member of the public at the Visitor Center. The dose assessment resulted in an annual calculated whole body dose of 2.6 E-03 mrem. The maximum annual organ dose (other than the thyroid) was 4.8 E-03 mrem and the annual thyroid dose was 5.0 E-03 mrem.

To show conformance with 40CFR190, radiation doses to the most likely exposed member of the public, were assessed. The individual for whom the doses were calculated was located in the Taylor Flats (4.2 miles ESE) area of Franklin County. The GASPAR computer code, with annual source terms and meteorological data, was used to obtain the dose assessment from gaseous effluents only, since it is assumed that there is no dose contribution from liquid effluents at Taylor Flats. The assessment resulted in an annual whole body dose of 2.6 E-02 mrem. The maximum annual organ dose (other than the thyroid) was 4.3 E-02 mrem and the annual thyroid dose was 6.8 E-01 mrem. The direct radiation contribution, which was approximately 99 mrem for the year 1988, was not significantly above normal background.

TABLE 6-1

PLANT 2 1988 LIQUID EFFLUENTS - SOURCE TERMS

NUCLIDES RELEASED	ACTIVITY (CURIES)
Strontium-89	4.2 E-05
Strontium-90	1.9 E-06
Cesium-134	2.9 E-04
Cesium-137	3.7 E-04
Iodine-131	2.1 E-04
Cobalt-58	1.5 E-04
Cobalt-60	1.0 E-03
Iron-59	< 2.0 E-04
Zinc-65	2.0 E-03
Manganese-54	6.4 E-05
Chromium-51	1.0 E-03
Zirconium-Niobium-95	6.6 E-05
Molybdenum-99	< 8.9 E-04
Technetium-99m	< 9.7 E-05
Barium-Lanthanum-140	< 4.3 E-04
Cerium-141	< 1.7 E-04
Cerium-144	< 6.7 E-04
Tritium	1.4 E+00
Iron-55	4.8 E-05
Silver-110m	7.8 E-04
Total for Period[1]	1.4 E+00

[1] Less that (<) values are not included in the "Total for Period" value.

TABLE 6-2

MAXIMUM AND AVERAGE INDIVIDUAL DOSES FROM 1988 LIQUID EFFLUENTS

	MAXIMUM INDIVIDUAL[a]		AVERAGE INDIVIDUAL	
PATHWAY	WHOLE BODY (mrem/year)	MAXIMUM ORGAN (mrem/yr)	WHOLE BODY (mrem/year)	MAXIMUM ORGAN (mrem/year)
Drinking	4.1E-06	1.3E-05	1.9E-05(d)	6.2E-06(d)
Shoreline	2.5E-06	2.9E-06	4.7E-07(d)	5.6E-07(d)
Fishing	2.1E-03	3.5E-03	3.3E-05(d)	4.9E-05(d)
Boating	2.0E-07	1.9E-07	9.6E-10(d)	9.6E-10(d)
Swimming	7.0E-09	7.1E-09	3.8E-09(d)	3.8E-09(d)
Leafy Vegetables	1.8E-06	4.8E-06	1.2E-06(e)	3.3E-06(e)
Vegetables	8.9E-06	1.8E-05	4.9E-06(e)	1.3E-05(e)
Milk	5.3E-06	1.5E-05	3.8E-06(e)	1.0E-05(e)
Meat	1.4E-06	3.2E-06	5.5E-07(e)	1.3E-06(e)
Total[b]	2.1E-03	3.6E-03	4.6E-05	8.3E-05
Technical Spec. Limits	3.0E+00	1.0E+01	--	--
Balance at Year End (mrem)[c]	2.99E+00	9.99E+00	--	--

[a] The Maximum Individual is an adult assumed to reside in Richland, consume food grown in the Riverview area of Pasco and fish at the Plant 2 outfall area.

[b] Data obtained from WNP-2 Semi-Annual Effluent Report, July to December 1988.

[c] Technical Specification Limit minus Total.

[d] The adult dose for the "Richland Average Individual" category in the LADTAP calculations.

[e] Population ALARA doses divided by the population served by irrigated production.

TABLE 6-3

50-MILE POPULATION DOSES FROM 1988 LIQUID EFFLUENTS[a]

	ANNUAL 1988		DESIGN BASE[b]	
	WHOLE BODY (person-rem)	MAX. ORGAN (person-rem)	WHOLE BODY (person-rem)	MAX. ORGAN (person-rem)
Fish	3.6 E-05	1.2 E-04	5.4 E-04	1.0 E-03
Drinking Water	1.4 E-04	5.1 E-04	8.3 E-04	3.4 E-03
Shoreline	8.3 E-05	9.7 E-05	1.9 E-04	2.2 E-04
Swimming	6.8 E-07	6.8 E-07	3.1 E-06	3.1 E-06
Boating	1.7 E-07	1.7 E-07	7.7 E-07	7.7 E-07
Vegetables	4.9 E-05	1.3 E-04	4.3 E-04	6.2 E-04
Leafy Vegetables	1.0 E-05	3.6 E-05	2.7 E-05	4.0 E-05
Milk	3.6 E-05	9.8 E-05	2.7 E-04	4.7 E-04
Meat	5.5 E-06	1.3 E-05	5.7 E-05	9.6 E-05
Total	3.6 E-04	1.0 E-03	2.4 E-03	5.9 E-03

[a] All age groups combined.

[b] Based on design base source terms (i.e., GALE Liquid Computer Code).

TABLE 6-4

PLANT 2 1988 GASEOUS EFFLUENTS-SOURCE TERMS

NUCLIDES RELEASED	ACTIVITY RELEASED (CURIES) REACTOR BUILDING	TURBINE BUILDING	RADWASTE BUILDING
1. Fission Gases			
Krypton-85	3.4 E+02	<7.8 E-01	<3.4 E-01
Krypton-85m	4.4 E+01	3.4 E+01	<1.0 E+00
Krypton-87	1.2 E+01	3.1 E+00	1.3 E+00
Krypton-88	4.3 E+01	6.4 E+00	2.9 E+00
Xenon-131m	6.2 E+00	ND (1)	ND (1)
Xenon-133	4.8 E+02	3.5 E+01	4.6 E+01
Xenon-133m	1.7 E+01	1.6 E+01	6.9 E+00
Xenon-135	1.1 E+02	4.7 E+00	2.8 E+00
Xenon-135m	4.3 E+01	9.9 E-01	1.2 E+00
Xenon-138	6.5 E+00	7.8 E+00	2.2 E+00
Argon-41	6.2 E-01	ND (1)	ND (1)
Total for Period (2)	7.6 E+02	7.4 E+01	6.3 E+01
2. Iodines			
Iodine-131	7.7 E-02	8.4 E-03	4.2 E-03
Iodine-132	6.7 E-03	ND (1)	7.3 E-05
Iodine-133	3.4 E-02	3.0 E-03	3.5 E-03
Iodine-135	1.1 E-03	1.5 E-04	8.2 E-05
Total for Period (2)	1.2 E-01	1.2E-02	7.9 E-03

(1) ND = Not detected
(2) Less than (<) values are not included in the "Total for Period" values.

TABLE 6-4 (Cont.)

PLANT 2 1988 GASEOUS EFFLUENTS-SOURCE TERMS

NUCLIDES RELEASED	ACTIVITY RELEASED (CURIES) REACTOR BUILDING	TURBINE BUILDING	RADWASTE BUILDING
3. Particulates			
Strontium-89	3.2 E-05	5.4 E-05	2.0 E-06
Strontium-90	3.8 E-07	1.5 E-06	<1.5 E-06
Cesium-134	4.5 E-04	< 7.9 E-04	<8.4 E-05
Cesium-137	2.8 E-04	< 7.0 E-04	<7.8 E-05
Barium-Lanthanum-140	< 2.2 E-03	< 2.9 E-03	<2.7 E-04
Molybdenum-99	< 1.2 E-02	< 7.5 E-03	<7.9 E-04
Cerium-141	< 7.0 E-04	< 9.7 E-04	<1.1 E-04
Cerium-144	< 3.2 E-03	< 3.9 E-03	<4.2 E-04
Cobalt-58	2.7 E-03	< 6.5 E-04	<6.9 E-05
Cobalt-60	6.8 E-03	< 9.4 E-04	<1.0 E-04
Chromium-51	1.5 E-02	< 7.8 E-03	<6.3 E-04
Zinc-65	4.3 E-02	1.8 E-04	<1.8 E-04
Zirconium-Niobium-95	1.3 E-04	< 1.0 E-03	<1.3 E-04
Iron-59	< 1.6 E-03	< 1.6 E-03	<1.7 E-04
Manganese-54	7.0 E-04	< 5.6 E-03	<7.3 E-05
Cesium-138	< 1.1 E-03	2.5 E-01	ND
Technetium-99m	8.8 E-03	4.4 E-05	2.6 E-06
Sodium-24	2.9 E-03	(1) ND	(1) ND
Bromine-82	(1) ND	1.8 E-05	1.9 E-06
Barium-139	(1) ND	1.0 E-02	(1) ND

(1) ND = Not Detected.

TABLE 6-4 (Cont.)

PLANT 2 1988 GASEOUS EFFLUENTS-SOURCE TERMS

NUCLIDES RELEASED	ACTIVITY RELEASED (CURIES) REACTOR BUILDING	TURBINE BUILDING	RADWASTE BUILDING
3. Particulates			
Zinc-69m	7.1 E-04	ND (1)	4.7 E-07
Copper-64	1.4 E-02	ND (1)	ND (1)
Arsenic-76	4.8 E-05	ND (1)	ND (1)
Silver-110m	4.2 E-06	ND (1)	ND (1)
Total for Period	9.7 E-02	2.6 E-01	7.0 E-06
4. Tritium	1.5 E+00	5.8 E+00	1.3 E+00
Total Building release (2)	7.6 E+02	8.0 E+01	6.4 E+01

(1) ND = Not Detected.

(2) Less than (<) values are not included in the "Total for Period" and "Total Building Release" values.

TABLE 6-5

MAXIMUM AND AVERAGE INDIVIDUAL DOSES FROM 1988 GASEOUS EFFLUENTS

SOURCE/ PATHWAY	MAXIMUM INDIVIDUAL AIR DOSE[a] (mrad/year)	MAXIMUM INDIVIDUAL MAXIMUM ORGAN[b] (mrem/year)	AVERAGE INDIVIDUAL[d] WHOLE BODY (mrem/year)	AVERAGE INDIVIDUAL[d] MAXIMUM ORGAN mrem/year
Beta	1.2 E-01			
Gamma	1.2 E-01			
Plume		3.7 E-02	6.7 E-04	2.2 E-03
Ground		3.4 E-03	1.3 E-04	1.5 E-04
Inhalation		5.9 E-02	4.8 E-05	4.8 E-03
Vegetables			5.9 E-05	8.3 E-05
Milk		6.0 E-01[c]	5.9 E-04	1.8 E-03
Meat			2.3 E-05	1.1 E-04
Total		7.0 E-01	1.5 E-03	9.1 E-03
Tech. Spec. Limits (mrem/year)	20 (Beta) 10 (Gamma)	1.5 E+01		
Balance at Year End (mrem)	19.9 (Beta) 9.9 (Gamma)			

(a)For the Site Boundary, 1.2 miles ESE.

(b)For infant residing at 4.2 miles ESE in the Taylor Flats area.

(c)Goat milk

(d)The 50-mile population doses divided by the population within 50 miles of Plant 2 by direction and sector and then converted to mrem.

TABLE 6-6

50-MILE POPULATION DOSES FROM 1988 GASEOUS EFFLUENTS[a]

EXPOSURE PATHWAY	1988 DATA		DESIGN BASE DATA[b]	
	WHOLE BODY (person-rem)	MAX. ORGAN (person-rem)	WHOLE BODY (person-rem)	MAX. ORGAN (person-rem)
Plume	1.7 E-01	5.6 E-01	2.4 E-01	6.9 E-01
Ground	3.3 E-02	3.9 E-02	4.3 E-02	5.1 E-02
Inhalation	1.2 E-02	1.2 E-00	1.1 E-02	1.3 E+00
Vegetables	1.5 E-02	2.1 E-02	1.9 E-02	2.7 E+00
Cow Milk	1.5 E-02	4.5 E-01	9.2 E-03	1.8 E+00
Meat	5.8 E-03	2.7 E-02	1.9 E-03	6.8 E-02
Total:	2.5 E-01	2.3 E+00	3.2 E-01	6.6 E+00

[a] All age groups combined.

[b] Based on design-base source terms.

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APPENDIX A: ROUTINE RESULTS

TABLE A-1.1

1988 QUARTERLY TLD RESULTS

Results in mR/day

LOCATION	COLLECTION PERIOD	RESULT	UNCERTAINTY 2σ
1	871230 to 880331	0.26	0.02
	880331 to 880630	0.25	0.01
	880630 to 880930	0.29	0.01
	880930 to 881229	0.27	0.02
2	871230 to 880331	0.25	0.01
	880331 to 880630	0.25	0.01
	880630 to 880930	0.28	0.02
	880930 to 881229	0.26	0.01
3	871230 to 880331	0.24	0.01
	880331 to 880630	0.25	0.01
	880630 to 880930	0.27	0.01
	880930 to 881229	0.26	0.01
4	871230 to 880331	0.23	0.00
	880331 to 880630	0.23	0.01
	880630 to 880929	0.25	0.01
	880929 to 881229	0.25	0.01
5	871231 to 880401	0.24	0.01
	880401 to 880701	0.24	0.01
	880701 to 880930	0.26	0.00
	880930 to 881230	0.25	0.01
6	871230 to 880331	0.24	0.00
	880331 to 880630	0.24	0.01
	880630 to 880929	0.26	0.01
	880929 to 881229	0.25	0.00
7	871230 to 880331	0.25	0.01
	880331 to 880630	0.25	0.00
	880630 to 880929	0.27	0.01
	880929 to 881229	0.27	0.00
8	871231 to 880401	0.28	0.01
	880401 to 880701	0.28	0.01
	880701 to 880930	0.30	0.01
	880930 to 881230	0.29	0.01

1988 QUARTERLY TLD RESULTS

Results in mR/day

LOCATION	COLLECTION PERIOD	RESULT	UNCERTAINTY 2σ
9	871231 to 880401	0.23	0.00
	880401 to 880701	0.23	0.01
	880701 to 880930	0.26	0.01
	880930 to 881230	0.25	0.00
10	871230 to 880331	0.24	0.01
	880331 to 880630	0.24	0.01
	880630 to 880930	0.27	0.01
	880930 to 881229	0.26	0.01
11	871230 to 880331	0.25	0.00
	880331 to 880630	0.25	0.01
	880630 to 880930	0.27	0.00
	880930 to 881229	0.26	0.00
12	871230 to 880331	0.27	0.01
	880331 to 880630	0.27	0.01
	880630 to 880930	0.29	0.01
	880930 to 881229	0.29	0.01
13	871230 to 880331	0.25	0.01
	880331 to 880630	0.25	0.00
	880630 to 880930	0.28	0.01
	880930 to 881229	0.27	0.01
14	871230 to 880331	0.25	0.02
	880331 to 880630	0.25	0.01
	880630 to 880930	0.28	0.01
	880930 to 881229	0.26	0.00
15	871230 to 880331	0.27	0.01
	880331 to 880630	0.27	0.01
	880630 to 880930	0.29	0.02
	880930 to 881229	0.28	0.01
16	871230 to 880331	0.26	0.01
	880331 to 880630	0.26	0.01
	880630 to 880930	0.29	0.01
	880930 to 881229	0.27	0.01

TABLE A-1.1 (Cont.)

1988 QUARTERLY TLD RESULTS

Results in mR/day

LOCATION	COLLECTION PERIOD	RESULT	UNCERTAINTY 2σ
17	871230 to 880331	0.26	0.01
	880331 to 880630	0.26	0.01
	880630 to 880930	0.29	0.02
	880930 to 881229	0.28	0.01
18	871230 to 880331	0.26	0.00
	880331 to 880630	0.25	0.01
	880630 to 880930	0.28	0.01
	880930 to 881229	0.27	0.00
19	871230 to 880331	0.25	0.01
	880331 to 880630	0.25	0.01
	880630 to 880930	0.28	0.01
	880930 to 881229	0.27	0.00
20	871230 to 880331	0.25	0.01
	880331 to 880630	0.25	0.00
	880630 to 880930	0.28	0.01
	880930 to 881229	0.27	0.01
21	871230 to 880331	0.23	0.00
	880331 to 880630	0.23	0.01
	880630 to 880930	0.26	0.01
	880930 to 881229	0.25	0.01
22	871230 to 880331	0.26	0.02
	880331 to 880630	0.25	0.01
	880630 to 880930	0.28	0.02
	880930 to 881229	0.27	0.01
23	871230 to 880331	0.25	0.01
	880331 to 880630	0.24	0.01
	880630 to 880930	0.28	0.01
	880930 to 881229	0.26	0.00
24	871230 to 880331	0.25	0.00
	880331 to 880630	0.25	0.01
	880630 to 880930	0.28	0.02
	880930 to 881229	0.27	0.01

TABLE A-1.1 (Cont.)

1988 QUARTERLY TLD RESULTS

Results in mR/day

LOCATION	COLLECTION PERIOD	RESULT	UNCERTAINTY 2σ
25	871230 to 880331	0.26	0.01
	880331 to 880630	0.26	0.01
	880630 to 880930	0.30	0.01
	880930 to 881229	0.28	0.01
40	871231 to 880401	0.24	0.01
	880401 to 880701	0.24	0.00
	880701 to 880930	0.27	0.01
	880930 to 881230	0.26	0.01
41	871231 to 880401	0.27	0.00
	880401 to 880701	0.27	0.02
	880701 to 880930	0.30	0.02
	880930 to 881230	0.29	0.01
42	871231 to 880401	0.25	0.00
	880401 to 880701	0.26	0.01
	880701 to 880930	0.29	0.01
	880930 to 881230	0.28	0.00
43	871231 to 880401	0.27	0.00
	880401 to 880701	0.27	0.01
	880701 to 880930	0.30	0.02
	880930 to 881230	0.29	0.01
44	871231 to 880401	0.25	0.01
	880401 to 880701	0.25	0.00
	880701 to 880930	0.27	0.01
	880930 to 881230	0.26	0.01
45	871231 to 880401	0.25	0.01
	880401 to 880701	0.25	0.01
	880701 to 880930	0.28	0.01
	880930 to 881230	0.26	0.01
46	871231 to 880401	0.31	0.01
	880401 to 880701	0.31	0.01
	880701 to 880930	0.35	0.01
	880930 to 881230	0.33	0.02

TABLE A-1.1 (Cont.)

1988 QUARTERLY TLD RESULTS

Results in mR/day

LOCATION	COLLECTION PERIOD	RESULT	UNCERTAINTY 2σ
47	871230 to 880331	0.23	0.00
	880331 to 880630	0.24	0.00
	880630 to 880929	0.27	0.00
	880929 to 881229	0.24	0.01
49	871230 to 880331	0.25	0.01
	880331 to 880630	0.25	0.01
	880630 to 880930	0.28	0.01
	880930 to 881229	0.27	0.01
50	871230 to 880331	0.25	0.01
	880331 to 880630	0.25	0.01
	880630 to 880930	0.28	0.02
	880930 to 881229	0.27	0.01
51	871230 to 880331	0.24	0.00
	880331 to 880630	0.27	0.00
	880630 to 880930	0.27	0.00
	880930 to 881229	0.26	0.01
53	871231 to 880401	0.28	0.00
	880401 to 880701	0.28	0.01
	880630 to 880930	0.31	0.01
	880930 to 881230	0.31	0.01
54	871231 to 880401	0.26	0.01
	880401 to 880701	0.26	0.01
	880630 to 880930	0.29	0.01
	880930 to 881230	0.28	0.01
55	871230 to 880331	0.25	0.01
	880331 to 880630	0.25	0.01
	880630 to 880929	0.28	0.02
	880929 to 881229	0.26	0.01
56	871231 to 880331	0.25	0.01
	880331 to 880630	0.26	0.01
	880630 to 880929	0.28	0.01
	880929 to 881229	0.27	0.01

TABLE A-1.1 (Cont.)

1988 QUARTERLY TLD RESULTS

Results in mR/day

LOCATION	COLLECTION PERIOD	RESULT	UNCERTAINTY 2σ
71	871230 to 880331	0.28	0.01
	880331 to 880630	0.27	0.01
	880630 to 880929	0.33	0.02
	880929 to 881229	0.33	0.01
72	871230 to 880331	0.27	0.01
	880331 to 880630	0.27	0.01
	880630 to 880929	0.31	0.01
	880929 to 881229	0.31	0.01
73	871230 to 880331	0.24	0.00
	880331 to 880630	0.24	0.00
	880630 to 880929	0.27	0.00
	880929 to 881229	0.26	0.00
74	871230 to 880331	0.28	0.01
	880331 to 880630	0.27	0.00
	880630 to 880929	0.31	0.01
	880929 to 881229	0.30	0.01
75	871230 to 880331	0.26	0.01
	880331 to 880630	0.25	0.01
	880630 to 880929	0.29	0.01
	880929 to 881229	0.28	0.01
76	871230 to 880331	0.25	0.01
	880331 to 880630	0.25	0.00
	880630 to 880929	0.29	0.02
	880929 to 881229	0.28	0.01
77	871230 to 880331	0.25	0.02
	880331 to 880630	0.25	0.01
	880630 to 880929	0.28	0.01
	880929 to 881229	0.28	0.01
78	871230 to 880331	0.25	0.01
	880331 to 880630	0.25	0.01
	880630 to 880929	0.28	0.00
	880929 to 881229	0.26	0.01

TABLE A-1.1 (Cont.)

1988 QUARTERLY TLD RESULTS

Results in mR/day

LOCATION	COLLECTION PERIOD	RESULT	UNCERTAINTY 2σ
79	871230 to 880331	0.26	0.00
	880331 to 880630	0.26	0.01
	880630 to 880929	0.28	0.01
	880929 to 881229	0.27	0.01
80	871230 to 880331	0.24	0.01
	880331 to 880630	0.25	0.01
	880630 to 880929	0.28	0.01
	880929 to 881229	0.27	0.01
81	871230 to 880401	0.24	0.01
	880331 to 880630	0.25	0.01
	880630 to 880929	0.28	0.01
	880929 to 881229	0.26	0.01
82	871230 to 880401	0.25	0.01
	880331 to 880630	0.26	0.00
	880630 to 880929	0.29	0.01
	880929 to 881229	0.27	0.01
83	871230 to 880401	0.26	0.00
	880331 to 880630	0.26	0.01
	880630 to 880929	0.29	0.01
	880929 to 881229	0.28	0.01
84	871230 to 880401	0.25	0.01
	880331 to 880630	0.26	0.00
	880630 to 880929	0.29	0.01
	880929 to 881229	0.28	0.01
85	871230 to 880401	0.26	0.00
	880331 to 880630	0.27	0.01
	880630 to 880929	0.30	0.01
	880929 to 881229	0.29	0.01
86	871230 to 880401	0.28	0.01
	880331 to 880630	0.27	0.01
	880630 to 880929	0.33	0.01
	880929 to 881229	0.32	0.01

TABLE A-1.2

1988 ANNUAL TLD RESULTS

Results in mR/day

LOCATION	COLLECTION PERIOD	RESULT	UNCERTAINTY 2σ
1	871230 TO 881229	0.24	0.00
2	871230 TO 881229	0.21	0.01
3	871230 TO 881229	0.20	0.00
4	871230 TO 881229	0.19	0.00
5	871230 TO 881229	0.20	0.01
6	871230 TO 881229	0.19	0.00
7	871230 TO 881229	0.21	0.01
8	871230 TO 881229	0.24	0.01
9	871230 TO 881229	0.19	0.00
10	871230 TO 881229	0.21	0.00
11	871230 TO 881229	0.20	0.01
12	871230 TO 881229	0.23	0.01
13	871230 TO 881229	0.21	0.01
14	871230 TO 881229	0.21	0.01
15	871230 TO 881229	0.22	0.01
16	871230 TO 881229	0.21	0.01
17	871230 TO 881229	0.22	0.01
18	871230 TO 881229	0.21	0.01
19	871230 TO 881229	0.22	0.00
20	871230 TO 881229	0.21	0.01
21	871230 TO 881229	0.19	0.00
22	871230 TO 881229	0.21	0.01
23	871230 TO 881229	0.21	0.00
24	871230 TO 881229	0.21	0.01
25	871230 TO 881229 (a)	0.22	0.02
40	871230 TO 881229	0.20	0.00
41	871230 TO 881229	0.22	0.00
42	871230 to 881229	0.21	0.01
43	871230 to 881229	0.23	0.01

(a) Forward area result lost during processing; back-up readings used to determine results.

TABLE A-1.2

1988 ANNUAL TLD RESULTS

Results in mR/day

LOCATION	COLLECTION PERIOD	RESULT	UNCERTAINTY 2σ
44	871230 to 881229	0.21	0.00
45	871230 TO 881229	0.21	0.00
46	871230 to 881229	0.26	0.01
47	871230 to 881229	0.20	0.00
49	871230 to 881229	0.21	0.01
50	871230 to 881229	0.21	0.00
51	871230 to 881229	0.20	0.00
53	871230 to 881229	0.24	0.01
54	871230 to 881229	0.22	0.00
55	871230 to 881229	0.21	0.01
56	871230 to 881229	0.21	0.01
71	871230 to 881229	0.24	0.01
72	871230 to 881229	0.24	0.00
73	871230 to 881229	0.20	0.01
74	871230 to 881229	0.23	0.01
75	871230 to 881229	0.22	0.01
76	871230 to 881229	0.22	0.01
77	871230 to 881229	0.22	0.01
78	871230 to 881229	0.21	0.00
79	871230 to 881229	0.21	0.00
80	871230 to 881229	0.21	0.01
81	871230 to 881229	0.21	0.01
82	871230 to 881229	0.23	0.01
83	871230 to 881229	0.23	0.01
84	871230 to 881229	0.22	0.00
85	871230 to 881229	0.23	0.01
86	871230 to 881229	0.25	0.01

TABLE A-1.3

1988 TLD RESULTS - SUMMARY

Results in mR/day

NUCLIDE		AVERAGE	LOW	HIGH	NUMBER SAMPLES	NUMBER POSITIVE
			QUARTERLY TLD RESULTS			
TLD	(I)	0.27	0.23	0.35	220	220
TLD	(C)	0.24	0.23	0.26	4	4
			ANNUAL TLD RESULTS			
TLD	(I)	0.22	0.19	0.26	55	55
TLD	(C)	0.19	0.19	0.19	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	871228 to 880104	9.1 E-02	5.0 E-03
	880104 to 880111 (a)	8.7 E-02	5.0 E-03
	880111 to 880118	7.3 E-03	1.9 E-03
	880118 to 880125	1.2 E-02	2.0 E-03
	880125 to 880201	2.7 E-02	3.0 E-03
	880201 to 880208	4.4 E-02	4.0 E-03
	880208 to 880216 (b)	8.7 E-03	2.0 E-03
	880216 to 880222 (c)	1.1 E-02	2.0 E-03
	880222 to 880229	3.8 E-02	3.0 E-03
	880229 to 880307	1.7 E-02	2.0 E-03
	880307 to 880314	8.4 E-03	2.0 E-03
	880314 to 880321	2.0 E-02	2.0 E-03
	880321 to 880328	3.4 E-03	1.7 E-03
	880328 to 880404	5.0 E-03	2.0 E-03
	880404 to 880411	8.3 E-03	1.9 E-03
	880411 to 880418	1.7 E-02	3.0 E-03
	880418 to 880425	5.7 E-03	1.9 E-03
	880425 to 880502	4.7 E-03	2.0 E-03
	880502 to 880509	9.6 E-03	2.2 E-03
	880509 to 880516	1.1 E-02	2.0 E-03
	880516 to 880523 (d)	1.6 E-02	3.0 E-03
	880523 to 880531	1.1 E-02	2.0 E-03
	880531 to 880606	7.4 E-03	2.2 E-03
	880606 to 880613	9.7 E-03	2.2 E-03
	880613 to 880620	1.9 E-02	3.0 E-03
	880620 to 880627	1.7 E-02	2.0 E-03
	880627 to 880705	9.2 E-03	1.9 E-03
	880705 to 880711	1.2 E-02	3.0 E-03
	880711 to 880718	7.7 E-03	2.3 E-03
	880718 to 880725	1.7 E-02	2.0 E-03
	880725 to 880801	2.0 E-02	2.0 E-03
	880801 to 880808	1.0 E-02	2.0 E-03
	880808 to 880815	1.3 E-02	2.0 E-03
	880815 to 880822	1.5 E-02	2.0 E-03
	880822 to 880829	1.7 E-02	2.0 E-03
	880829 to 880906	2.8 E-02	3.0 E-03
	880906 to 880912	1.2 E 02	3.0 E-03
	880912 to 880919	2.4 E-02	3.0 E-03
	880919 to 880926	9.5 E-03	2.0 E-03

(a) Confirmed by a recount.
(b) Recount gave result of 9.5 ± 1.8E-03.
(c) Recount gave result of 1.2 ± 0.3E-02.
(d) 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
1	880926 to 881003	1.9 E-02	3.0 E-03
	881003 to 881010	5.3 E-02	4.0 E-03
	881010 to 881017	4.0 E-02	3.0 E-03
	881017 to 881024	3.2 E-02	3.0 E-03
	881024 to 881031	2.5 E-02	3.0 E-03
	881031 to 881107	1.2 E-02	2.0 E-03
	881107 to 881114	1.1 E-02	2.0 E-03
	881114 to 881121	1.6 E-02	2.0 E-03
	881121 to 881128	9.7 E-03	2.0 E-03
	881128 to 881205	2.7 E-02	3.0 E-03
	881205 to 881212	3.8 E-02	4.0 E-03
	881212 to 881219	2.8 E-02	3.0 E-03
	881219 to 881227	3.3 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
4	871228 to 880104	8.3 E-02	5.0 E-03
	880104 to 880111	8.4 E-02	5.0 E-03
	880111 to 880118	6.2 E-03	1.8 E-03
	880118 to 880125	1.2 E-02	2.0 E-03
	880125 to 880201	3.4 E-02	3.0 E-03
	880201 to 880208	4.9 E-02	4.0 E-03
	880208 to 880216	7.6 E-03	1.9 E-03
	880216 to 880222	1.2 E-02	2.0 E-03
	880222 to 880229	5.3 E-02	4.0 E-03
	880229 to 880307	1.7 E-02	2.0 E-03
	880307 to 880314	8.9 E-03	2.0 E-03
	880314 to 880321	1.9 E-02	2.0 E-03
	880321 to 880328	4.7 E-03	1.8 E-03
	880328 to 880404	5.1 E-03	2.0 E-03
	880404 to 880411	9.5 E-03	1.9 E-03
	880411 to 880418	1.6 E-02	3.0 E-03
	880418 to 880425	6.5 E-03	1.9 E-03
	880425 to 880502	9.0 E-03	2.2 E-03
	880502 to 880509	8.9 E-03	2.1 E-03
	880509 to 880516	1.2 E-02	2.0 E-03
	880516 to 880523	1.2 E-02	2.0 E-03
	880523 to 880531	7.8 E-03	2.0 E-03
	880531 to 880606	5.5 E-03	2.1 E-03
	880606 to 880613	8.5 E-03	2.1 E-03
	880613 to 880620	1.8 E-02	3.0 E-03
	880620 to 880627	1.6 E-02	2.0 E-03
	880627 to 880705	8.7 E-03	1.8 E-03
	880705 to 880711	9.7 E-03	2.4 E-03
	880711 to 880718	8.1 E-03	2.3 E-03
	880718 to 880725	1.9 E-02	2.0 E-03
	880725 to 880801	1.8 E-02	2.0 E-03
	880801 to 880808	1.2 E-02	2.0 E-03
	880808 to 880815	1.1 E-02	2.0 E-03
	880815 to 880822	1.7 E-02	3.0 E-03
	880822 to 880829	2.4 E-02	3.0 E-03
	880829 to 880906	3.3 E-02	3.0 E-03
	880906 to 880912	1.1 E-02	3.0 E-03
	880912 to 880919	1.9 E-02	3.0 E-03
	880919 to 880926	1.1 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
4	880926 to 881003	1.6 E-02	2.0 E-03
	881003 to 881010	4.4 E-02	3.0 E-03
	881010 to 881017	3.8 E-02	3.0 E-03
	881017 to 881024	2.9 E-02	3.0 E-03
	881024 to 881031	2.4 E-02	3.0 E-03
	881031 to 881107	8.8 E-03	2.0 E-03
	881107 to 881114	9.7 E-03	2.2 E-03
	881114 to 881121	1.6 E-02	2.0 E-03
	881121 to 881128	9.2 E-03	1.9 E-03
	881128 to 881205	2.7 E-02	3.0 E-03
	881205 to 881212	3.0 E-02	3.0 E-03
	881212 to 881219	2.7 E-02	3.0 E-03
	881219 to 881227	2.6 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	871228 to 880104	6.7 E-02	4.0 E-03
	880104 to 880111	7.0 E-02	4.0 E-03
	880111 to 880118	4.6 E-03	1.7 E-03
	880118 to 880125	9.9 E-03	2.2 E-03
	880125 to 880201	2.6 E-02	3.0 E-03
	880201 to 880208 (a)	4.0 E-02	8.0 E-03
	880208 to 880216	9.6 E-03	2.0 E-03
	880216 to 880222	6.6 E-03	2.2 E-03
	880222 to 880229	4.0 E-02	3.0 E-03
	880229 to 880307	1.3 E-02	2.0 E-03
	880307 to 880314	8.2 E-03	2.0 E-03
	880314 to 880321	1.7 E-02	2.0 E-03
	880321 to 880328	6.8 E-03	1.9 E-03
	880328 to 880404	4.5 E-03	1.9 E-03
	880404 to 880411	8.3 E-03	1.9 E-03
	880411 to 880418	1.3 E-02	3.0 E-03
	880418 to 880425	5.0 E-03	1.8 E-03
	880425 to 880502	6.6 E-03	2.1 E-03
	880502 to 880509	9.2 E-03	2.2 E-03
	880509 to 880516	8.6 E-03	2.2 E-03
	880516 to 880523	9.1 E-03	2.0 E-03
	880523 to 880531	7.8 E-03	2.0 E-03
	880531 to 880606	5.1 E-03	2.1 E-03
	880606 to 880613	7.4 E-03	2.1 E-03
	880613 to 880620	1.4 E-02	2.0 E-03
	880620 to 880627	1.6 E-02	2.0 E-03
	880627 to 880705	7.7 E-03	1.8 E-03
	880705 to 880711	8.2 E-03	2.4 E-03
	880711 to 880718	6.1 E-03	2.2 E-03
	880718 to 880725	1.6 E-02	2.0 E-03
	880725 to 880801	1.4 E-02	2.0 E-03
	880801 to 880808	1.1 E-02	2.0 E-03
	880808 to 880815	9.5 E-03	2.1 E-03
	880815 to 880822	1.5 E-02	2.0 E-03
	880822 to 880829	2.3 E-02	3.0 E-03
	880829 to 880906	2.4 E-02	3.0 E-03
	880906 to 880912	8.6 E-03	2.6 E-03
	880912 to 880919	1.7 E-02	3.0 E-03
	880919 to 880926	9.7 E-03	2.1 E-03

(a) Sampler malfunction; low sampling time.

TABLE A-2.1 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
5	880926 to 881003	5.0 E-03	1.9 E-03
	881003 to 881010	4.6 E-02	4.0 E-03
	881010 to 881017	3.4 E-02	3.0 E-03
	881017 to 881024	2.6 E-02	3.0 E-03
	881024 to 881031 (a)	2.6 E-02	3.0 E-03
	881031 to 881107	8.6 E-03	2.0 E-03
	881107 to 881114	9.7 E-03	2.2 E-03
	881114 to 881121	1.0 E-02	2.0 E-03
	881121 to 881128	7.4 E-03	1.8 E-03
	881128 to 881205	2.6 E-02	3.0 E-03
	881205 to 881212	2.6 E-02	3.0 E-03
	881212 to 881219	2.2 E-02	3.0 E-03
	881219 to 881227	2.4 E-02	3.0 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
6	871228 to 880104	9.8 E-02	5.0 E-03
	880104 to 880111	9.4 E-02	5.0 E-03
	880111 to 880118	6.2 E-03	1.8 E-03
	880118 to 880125	1.2 E-02	2.0 E-03
	880125 to 880201	3.6 E-02	3.0 E-03
	880201 to 880208	5.3 E-02	4.0 E-03
	880208 to 880216	7.9 E-03	1.9 E-03
	880216 to 880222	1.1 E-02	2.0 E-03
	880222 to 880229	4.9 E-02	4.0 E-03
	880229 to 880307	2.0 E-02	3.0 E-03
	880307 to 880314	1.1 E-02	2.0 E-03
	880314 to 880321	2.4 E-02	3.0 E-03
	880321 to 880328	4.4 E-03	1.8 E-03
	880328 to 880404	5.8 E-03	2.0 E-03
	880404 to 880411	1.1 E-02	2.0 E-03
	880411 to 880418	2.0 E-02	3.0 E-03
	880418 to 880425	7.6 E-03	2.0 E-03
	880425 to 880502	9.4 E-03	2.3 E-03
	880502 to 880509	1.0 E-02	2.0 E-03
	880509 to 880516	1.3 E-02	2.0 E-03
	880516 to 880523	1.2 E-02	2.0 E-03
	880523 to 880531	1.1 E-02	2.0 E-03
	880531 to 880606	9.5 E-03	2.4 E-03
	880606 to 880613	8.8 E-03	2.1 E-03
	880613 to 880620	1.5 E-02	2.0 E-03
	880620 to 880627	1.6 E-02	2.0 E-03
	880627 to 880705	7.3 E-03	1.8 E-03
	880705 to 880711	8.8 E-03	2.4 E-03
	880711 to 880718	8.1 E-03	2.3 E-03
	880718 to 880725	1.6 E-02	2.0 E-03
	880725 to 880801	1.6 E-02	2.0 E-03
	880801 to 880808	1.0 E-02	2.0 E-03
	880808 to 880815	1.3 E-02	2.0 E-03
	880815 to 880822	1.5 E-02	2.0 E-03
	880822 to 880829	2.0 E-02	3.0 E-03
	880829 to 880906	3.0 E-02	3.0 E-03
	880906 to 880912	1.7 E-02	3.0 E-03
	880912 to 880919	1.5 E-02	3.0 E-03
	880919 to 880926	1.0 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
6	880926 to 881003	1.5 E-02	2.0 E-03
	881013 to 881010	5.0 E-02	4.0 E-03
	881010 to 881017	3.7 E-02	3.0 E-03
	881017 to 881024	2.7 E-02	3.0 E-03
	881024 to 881031	2.4 E-02	3.0 E-03
	881031 to 881107	1.1 E-02	2.0 E-03
	881107 to 881114	9.5 E-03	2.2 E-03
	881114 to 881121	1.1 E-02	2.0 E-03
	881121 to 881128	7.1 E-03	1.8 E-03
	881128 to 881205	2.1 E-02	3.0 E-03
	881205 to 881212	3.1 E-02	3.0 E-03
	881212 to 881219	2.3 E-02	3.0 E-03
	881219 to 881226	2.6 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
7	871228 to 880104	7.1 E-02	4.0 E-03
	880104 to 880111 (a)	6.2 E-02	5.0 E-03
	880111 to 880118	5.8 E-03	1.8 E-03
	880118 to 880125	1.6 E-02	2.0 E-03
	880125 to 880201	3.2 E-02	3.0 E-03
	880201 to 880208	5.0 E-02	4.0 E-03
	880208 to 880216	8.7 E-03	2.0 E-03
	880216 to 880222	9.5 E-03	2.3 E-03
	880222 to 880229	5.0 E-02	4.0 E-03
	880229 to 880307	1.7 E-02	2.0 E-03
	880307 to 880314	9.9 E-03	2.0 E-03
	880314 to 880321	2.1 E-02	2.0 E-03
	880321 to 880328	3.9 E-03	1.7 E-03
	880328 to 880404	5.1 E-03	2.0 E-03
	880404 to 880411	7.4 E-03	1.8 E-03
	880411 to 880418	1.5 E-02	3.0 E-03
	880418 to 880425	6.6 E-03	1.9 E-03
	880425 to 880502	6.5 E-03	2.1 E-03
	880502 to 880509	8.9 E-03	2.2 E-03
	880509 to 880516	1.0 E-02	2.0 E-03
	880516 to 880523	1.2 E-02	2.0 E-03
	880523 to 880531	8.0 E-03	2.0 E-03
	880531 to 880606	8.6 E-03	2.3 E-03
	880606 to 880613	9.0 E-03	2.2 E-03
	880613 to 880620	1.5 E-02	2.0 E-03
	880620 to 880627	1.8 E-02	2.0 E-03
	880627 to 880705	9.2 E-03	1.9 E-03
	880705 to 880711	1.1 E-02	2.0 E-03
	880711 to 880718	6.2 E-03	2.3 E-03
	880718 to 880725	1.6 E-02	2.0 E-03
	880725 to 880801	1.5 E-02	2.0 E-03
	880801 to 880808	9.8 E-03	2.0 E-03
	880808 to 880815	9.8 E-03	2.2 E-03
	880815 to 880822	1.2 E-02	2.0 E-03
	880822 to 880829	2.4 E-02	3.0 E-03
	880829 to 880906	2.9 E-02	3.0 E-03
	880906 to 880912	8.9 E-03	2.6 E-03
	880912 to 880919	1.5 E-02	2.0 E-03
	880919 to 880926	1.2 E-02	2.0 E-03

(a) Confirmed by a recount. Shortened sampling time due to pump failure.

TABLE A-2.1 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
7	880926 to 881003	1.8 E-02	3.0 E-03
	881003 to 881010	4.6 E-02	3.0 E-03
	881010 to 881017	3.5 E-02	3.0 E-03
	881017 to 881024	2.7 E-02	3.0 E-03
	881024 to 881031	2.5 E-02	3.0 E-03
	881031 to 881107	9.9 E-03	2.1 E-03
	881107 to 881114	1.2 E-02	2.0 E-03
	881114 to 881121	1.1 E-02	2.0 E-03
	881121 to 881128	8.4 E-03	1.9 E-03
	881128 to 881205	2.4 E-02	3.0 E-03
	881205 to 881212	3.5 E-02	3.0 E-03
	881212 to 881219	2.6 E-02	3.0 E-03
	881219 to 881227	2.9 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
8	871228 to 880104	6.8 E-02	4.0 E-03
	880104 to 880111	7.2 E-02	4.0 E-03
	880111 to 880118	5.8 E-03	1.8 E-03
	880118 to 880125	1.0 E-02	2.0 E-03
	880125 to 880201	2.7 E-02	3.0 E-03
	880201 to 880208	3.8 E-02	3.0 E-03
	880208 to 880216	6.8 E-03	1.9 E-03
	880216 to 880222	7.1 E-03	2.2 E-03
	880222 to 880229	4.1 E-02	3.0 E-03
	880229 to 880307	1.3 E-02	2.0 E-03
	880307 to 880314	9.4 E-03	2.0 E-03
	880314 to 880321	1.7 E-02	2.0 E-03
	880321 to 880328	3.8 E-03	1.7 E-03
	880328 to 880404	3.7 E-03	1.9 E-03
	880404 to 880411	8.6 E-03	1.9 E-03
	880411 to 880418	1.3 E-02	3.0 E-03
	880418 to 880425	5.1 E-03	1.8 E-03
	880425 to 880502	6.7 E-03	2.1 E-03
	880502 to 880509	8.3 E-03	2.1 E-03
	880509 to 880516	8.1 E-03	2.1 E-03
	880516 to 880523	1.1 E-02	2.0 E-03
	880523 to 880531	8.5 E-03	2.0 E-03
	880531 to 880606	6.6 E-03	2.2 E-03
	880606 to 880613	8.5 E-03	2.1 E-03
	880613 to 880620	1.2 E-02	2.0 E-03
	880620 to 880627	1.5 E-02	2.0 E-03
	880627 to 880705	5.4 E-03	1.7 E-03
	880705 to 880711	9.2 E-03	2.4 E-03
	880711 to 880718	6.9 E-03	2.3 E-03
	880718 to 880725	1.3 E-02	2.0 E-03
	880729 to 880801 (a)	1.2 E-02	4.0 E-03
	880801 to 880808	9.0 E-03	2.0 E-03
	880808 to 880815	1.1 E-02	2.0 E-03
	880815 to 880822	1.1 E-02	2.0 E-03
	880822 to 880829	1.9 E-02	3.0 E-03
	880829 to 880906	2.3 E-02	3.0 E-03
	880906 to 880912	7.7 E-03	2.6 E-03
	880912 to 880919	1.6 E-02	3.0 E-03
	880919 to 880926	1.1 E-02	2.0 E-03

(a) Sampler malfunctioned from 7/25/88 to 7/28/88; low 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	880926 to 881003	1.9 E-02	3.0 E-03
	881003 to 881010	4.8 E-02	4.0 E-03
	881010 to 881017 (a)	5.8 E-02	1.5 E-02
	881017 to 881024	2.3 E-02	3.0 E-03
	881024 to 881031	1.9 E-02	3.0 E-03
	881031 to 881107	1.0 E-02	2.0 E-03
	881107 to 881114	7.8 E-03	2.1 E-03
	881114 to 881121	8.9 E-03	2.2 E-03
	881121 to 881128	6.6 E-03	1.8 E-03
	881128 to 881205	2.4 E-02	3.0 E-03
	881205 to 881212	2.4 E-02	3.0 E-03
	881212 to 881219	2.3 E-02	3.0 E-03
	881219 to 881226	2.5 E-02	3.0 E-03

(a) Sampler malfunction; low sampling time.

TABLE A-2.1 (Cont.)

GROSS BETA ON AIR PARTICULATE FILTERS

Results in pCi/cubic meter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
9	871228 to 880104	6.1 E-02	4.0 E-03
	880104 to 880111	5.5 E-02	4.0 E-03
	880111 to 880118	3.5 E-03	1.7 E-03
	880118 to 880125	7.0 E-03	2.0 E-03
	880125 to 880201	1.7 E-02	3.0 E-03
	880201 to 880208	2.6 E-02	3.0 E-03
	880208 to 880216	4.6 E-03	1.8 E-03
	880216 to 880222	4.8 E-03	2.1 E-03
	880222 to 880229	2.9 E-02	3.0 E-03
	880229 to 880307	1.1 E-02	2.0 E-03
	880307 to 880314	6.0 E-03	1.8 E-03
	880314 to 880321	1.6 E-02	2.0 E-03
	880321 to 880328	5.9 E-03	1.8 E-03
	880328 to 880404	4.3 E-03	1.9 E-03
	880404 to 880411	6.9 E-03	1.8 E-03
	880411 to 880418	1.6 E-02	3.0 E-03
	880418 to 880425	7.5 E-03	2.0 E-03
	880425 to 880502	6.8 E-03	2.1 E-03
	880502 to 880509	8.0 E-03	2:1 E-03
	880509 to 880516	9.4 E-03	2.2 E-03
	880516 to 880523	1.1 E-02	2.0 E-03
	880523 to 880531	8.8 E-03	2.0 E-03
	880531 to 880606	8.2 E-03	2.3 E-03
	880606 to 880613	7.1 E-03	2.1 E-03
	880613 to 880620	1.3 E-02	2.0 E-03
	880620 to 880627	1.2 E-02	2.0 E-03
	880627 to 880705	7.3 E-03	1.8 E-03
	880705 to 880711	8.8 E-03	2.4 E-03
	880711 to 880718	7.3 E-03	2.3 E-03
	880718 to 880725	1.6 E-02	2.0 E-03
	880725 to 880801	1.8 E-02	2.0 E-03
	880801 to 880808	9.1 E-03	2.0 E-03
	880808 to 880815	8.8 E-03	2.1 E-03
	880815 to 880822	1.4 E-02	2.0 E-03
	880822 to 880829	2.1 E-02	3.0 E-03
	880829 to 880906	2.4 E-02	3.0 E-03
	880906 to 880912	7.7 E-03	2.6 E-03
	880912 to 880919	1.7 E-02	3.0 E-03
	880919 to 880926	7.6 E-03	1.9 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	880926 to 881003	2.2 E-02	3.0 E-03
	881003 to 881010	3.9 E-02	3.0 E-03
	881010 to 881017	2.6 E-02	3.0 E-03
	881017 to 881024	1.8 E-02	2.0 E-03
	881024 to 881031	1.5 E-02	2.0 E-03
	881031 to 881107	6.0 E-03	1.8 E-03
	881107 to 881114	5.4 E-03	2.0 E-03
	881114 to 881121	5.8 E-03	2.0 E-03
	881121 to 881128	7.1 E-03	1.8 E-03
	881128 to 881205	1.9 E-02	2.0 E-03
	881205 to 881212	2.2 E-02	3.0 E-03
	881212 to 881219	1.9 E-02	3.0 E-03
	881219 to 881227	2.4 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
21	871228 to 880104	7.3 E-02	4.0 E-03
	880104 to 880111	7.1 E-02	4.0 E-03
	880111 to 880118	4.7 E-03	1.7 E-03
	880118 to 880125	9.1 E-03	2.1 E-03
	880125 to 880201	2.0 E-02	3.0 E-03
	880201 to 880208 (a)	4.2 E-02	3.0 E-03
	880208 to 880216 (a)	7.5 E-03	2.0 E-03
	880216 to 880222	6.5 E-03	2.2 E-03
	880222 to 880229 (a)	2.3 E-02	4.0 E-03
	880229 to 880307	1.1 E-02	2.0 E-03
	880307 to 880314	7.1 E-03	1.9 E-03
	880314 to 880321	1.2 E-02	2.0 E-03
	880321 to 880328	4.0 E-03	1.7 E-03
	880328 to 880404	5.0 E-03	2.0 E-03
	880404 to 880411	6.9 E-03	1.8 E-03
	880411 to 880418	1.4 E-02	3.0 E-03
	880418 to 880425	4.4 E-03	1.8 E-03
	880425 to 880502	4.5 E-03	2.0 E-03
	880502 to 880509	5.8 E-03	2.0 E-03
	880509 to 880516	1.1 E-02	2.0 E-03
	880516 to 880523	9.3 E-03	2.1 E-03
	880523 to 880531	7.4 E-03	2.0 E-03
	880531 to 880606 (a)	4.9 E-03	2.2 E-03
	880606 to 880613	6.1 E-03	2.0 E-03
	880613 to 880620	1.3 E-02	2.0 E-03
	880620 to 880627	1.3 E-02	2.0 E-03
	880627 to 880705	7.2 E-03	1.8 E-03
	880705 to 880711	8.7 E-03	2.4 E-03
	880711 to 880718	6.1 E-03	2.2 E-03
	880718 to 880725	1.5 E-02	2.0 E-03
	880725 to 880801	1.5 E-02	2.0 E-03
	880801 to 880808 (b)	8.2 E-03	5.3 E-03
	880808 to 880815	1.4 E-02	2.0 E-03
	880815 to 880822	1.1 E-02	2.0 E-03
	880822 to 880829	2.0 E-02	3.0 E-03
	880829 to 880906 (b)	9.9 E-03	2.5 E-03
	880906 to 880912	6.6 E-03	2.5 E-03
	880912 to 880919	1.2 E-02	2.0 E-03

(a) 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
21	880919 to 880926	8.4 E-03	2.0 E-03
	880926 to 881003	2.1 E-02	3.0 E-03
	881003 to 881010	3.8 E-02	3.0 E-03
	881010 to 881017	3.0 E-02	3.0 E-03
	881017 to 881024	1.9 E-02	3.0 E-03
	881024 to 881031	1.9 E-02	3.0 E-03
	881031 to 881107	6.5 E-03	1.9 E-03
	881107 to 881114	7.9 E-03	2.1 E-03
	881114 to 881121	9.6 E-03	2.2 E-03
	881121 to 881128	6.2 E-03	1.8 E-03
	881128 to 881205	1.8 E-02	2.0 E-03
	881205 to 881212	2.5 E-02	3.0 E-03
	881212 to 881219	1.9 E-02	3.0 E-03
	881219 to 881227	2.0 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
23	871228 to 880104	8.1 E-02	5.0 E-03
	880104 to 880111	8.0 E-02	5.0 E-03
	880111 to 880118	6.5 E-03	1.8 E-03
	880118 to 880125 (a)	1.1 E-02	3.0 E-03
	880125 to 880201	3.5 E-02	3.0 E-03
	880201 to 880208	4.1 E-02	3.0 E-03
	880208 to 880216	7.8 E-03	1.9 E-03
	880216 to 880222	7.9 E-03	2.2 E-03
	880222 to 880229	3.7 E-02	3.0 E-03
	880229 to 880307	1.4 E-02	2.0 E-03
	880307 to 880314	9.4 E-03	2.0 E-03
	880314 to 880321	1.7 E-02	2.0 E-03
	880321 to 880328	3.9 E-03	1.7 E-03
	880328 to 880404	3.3 E-03	1.9 E-03
	880404 to 880411	8.4 E-03	1.9 E-03
	880411 to 880418	1.4 E-02	3.0 E-03
	880418 to 880425	5.1 E-03	1.8 E-03
	880425 to 880502 (a)	3.7 E-03	2.3 E-03
	880502 to 880509	7.8 E-03	2.1 E-03
	880509 to 880516	9.9 E-03	2.2 E-03
	880516 to 880523	1.0 E-02	2.0 E-03
	880523 to 880531	9.4 E-03	2.1 E-03
	880531 to 880606	7.6 E-03	2.4 E-03
	880606 to 880613	7.2 E-03	2.1 E-03
	880613 to 880620	1.3 E-02	2.0 E-03
	880620 to 880627	1.6 E-02	2.0 E-03
	880627 to 880705	8.6 E-03	1.8 E-03
	880705 to 880711	8.9 E-03	2.4 E-03
	880711 to 880718	5.5 E-03	2.2 E-03
	880718 to 880725	1.6 E-02	2.0 E-03
	880725 to 880801	1.8 E-02	2.0 E-03
	880801 to 880808	1.1 E-02	2.0 E-03
	880808 to 880815	1.3 E-02	2.0 E-03
	880815 to 880822	1.3 E-02	2.0 E-03
	880822 to 880829 (a)	2.4 E-02	3.0 E-03
	880829 to 880906	2.9 E-02	3.0 E-03
	880906 to 880912	1.0 E-02	3.0 E-03
	880912 to 880919	1.9 E-02	3.0 E-03
	880919 to 880926	1.2 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
23	880926 to 881003	2.5 E-02	3.0 E-03
	881003 to 881010	4.8 E-02	4.0 E-03
	881010 to 881017	3.8 E-02	3.0 E-03
	881017 to 881024	2.8 E-02	3.0 E-03
	881024 to 881031	2.4 E-02	3.0 E-03
	881031 to 881107	1.0 E-02	2.0 E-03
	881107 to 881114	9.1 E-03	2.2 E-03
	881114 to 881121	1.2 E-02	2.0 E-03
	881121 to 881128	8.5 E-03	1.9 E-03
	881128 to 881205 (a)	2.3 E-02	3.0 E-03
	881205 to 881212	3.1 E-02	3.0 E-03
	881212 to 881219	2.7 E-02	3.0 E-03
	881219 to 881227	2.8 E-02	3.0 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
40	871228 to 880104	7.7 E-02	5.0 E-03
	880104 to 880111	7.4 E-02	4.0 E-03
	880111 to 880118	5.8 E-03	1.8 E-03
	880118 to 880125	9.2 E-03	2.1 E-03
	880125 to 880201	3.2 E-02	3.0 E-03
	880201 to 880208	3.8 E-02	3.0 E-03
	880208 to 880216	9.3 E-03	2.0 E-03
	880216 to 880222	9.2 E-03	2.3 E-03
	880222 to 880229	3.8 E-02	3.0 E-03
	880229 to 880307	1.4 E-02	2.0 E-03
	880307 to 880314	1.1 E-02	2.0 E-03
	880314 to 880321	2.0 E-02	2.0 E-03
	880321 to 880328 (a)	1.2 E-02	8.0 E-03
	880328 to 880404	5.4 E-03	2.0 E-03
	880404 to 880411	9.3 E-03	1.9 E-03
	880411 to 880418	1.6 E-02	3.0 E-03
	880418 to 880425	5.8 E-03	1.9 E-03
	880425 to 880502	7.0 E-03	2.1 E-03
	880502 to 880509	9.6 E-03	2.2 E-03
	880509 to 880516	1.6 E-02	3.0 E-03
	880516 to 880523	1.1 E-02	2.0 E-03
	880523 to 880531	9.4 E-03	2.1 E-03
	880531 to 880606	6.9 E-03	2.2 E-03
	880606 to 880613	1.2 E-02	2.0 E-03
	880613 to 880620	1.6 E-02	2.0 E-03
	880620 to 880627	1.7 E-02	2.0 E-03
	880627 to 880705	1.0 E-02	2.0 E-03
	880705 to 880711	1.1 E-02	3.0 E-03
	880711 to 880718	7.0 E-03	2.3 E-03
	880718 to 880725	1.7 E-02	2.0 E-03
	880725 to 880801	1.7 E-02	2.0 E-03
	880801 to 880808	1.3 E-02	2.0 E-03
	880808 to 880815	1.1 E-02	2.0 E-03
	880815 to 880822	1.5 E-02	2.0 E-03
	880822 to 880829	2.4 E-02	3.0 E-03
	880829 to 880906	1.9 E-02	2.0 E-03
	880906 to 880912	1.8 E-02	3.0 E-03
	880912 to 880919	2.1 E-02	3.0 E-03
	880919 to 880926	9.7 E-03	2.0 E-03

(a) Sampler malfunction; low 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	880926 to 881003	2.1 E-02	3.0 E-03
	881003 to 881010	4.6 E-02	3.0 E-03
	881010 to 881017	3.2 E-02	3.0 E-03
	881017 to 881024	2.5 E-02	3.0 E-03
	881024 to 881031	2.5 E-02	3.0 E-03
	881031 to 881107	9.6 E-03	2.0 E-03
	881107 to 881114	9.0 E-03	2.2 E-03
	881114 to 881121	1.2 E-02	2.0 E-03
	881121 to 881128	5.6 E-03	1.7 E-03
	881128 to 881205	2.3 E-02	3.0 E-03
	881205 to 881212	2.8 E-02	3.0 E-03
	881212 to 881219	2.4 E-02	3.0 E-03
	881219 to 881226	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	
48	871228 to 880104		8.0	E-02	5.0	E-03
	880104 to 880111		7.8	E-02	5.0	E-03
	880111 to 880118		7.5	E-03	1.9	E-03
	880118 to 880125		1.1	E-02	2.0	E-03
	880125 to 880201		3.2	E-02	3.0	E-03
	880201 to 880208		4.5	E-02	4.0	E-03
	880208 to 880216		6.9	E-03	1.9	E-03
	880216 to 880222		1.1	E-02	2.0	E-03
	880222 to 880229		4.7	E-02	4.0	E-03
	880229 to 880307		1.3	E-02	2.0	E-03
	880307 to 880314		9.6	E-03	2.0	E-03
	880314 to 880321		1.8	E-02	2.0	E-03
	880321 to 880328		4.1	E-03	1.7	E-03
	880328 to 880404		6.3	E-03	2.0	E-03
	880404 to 880411		1.1	E-02	2.0	E-03
	880411 to 880418	(a)	2.4	E-02	3.0	E-03
	880418 to 880425		6.3	E-03	1.9	E-03
	880425 to 880502		8.6	E-03	2.2	E-03
	880502 to 880509		9.6	E-03	2.2	E-03
	880509 to 880516	(b) *	8.2	E-03	1.3	E-02
	880516 to 880523		1.0	E-02	2.0	E-03
	880523 to 880531		8.3	E-03	2.3	E-03
	880531 to 880606	(c)	1.2	E-02	7.0	E-03
	880606 to 880613		8.7	E-03	2.1	E-03
	880613 to 880620		1.5	E-02	2.0	E-03
	880620 to 880627		1.6	E-02	2.0	E-03
	880627 to 880705		6.5	E-03	1.7	E-03
	880705 to 880711		1.0	E-02	2.0	E-03
	880711 to 880718		1.1	E-02	2.0	E-03
	880718 to 880725		1.8	E-02	2.0	E-03
	880725 to 880801		1.5	E-02	2.0	E-03
	880801 to 880808		1.1	E-02	2.0	E-03
	880808 to 880815		1.1	E-02	2.0	E-03
	880815 to 880822		1.4	E-02	2.0	E-03
	880822 to 880829		2.6	E-02	3.0	E-03
	880829 to 880906		2.8	E-02	3.0	E-03
	880906 to 880912		8.1	E-03	2.6	E-03
	880912 to 880919		1.8	E-02	3.0	E-03
	880919 to 880926		1.1	E-02	2.0	E-03

* Denotes a result less than the detection limit.
(a) Sample lost for one week, then submitted for analysis.
(b) LLD not met due to low air volume.
(c) Blown fuse; 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	880926 to 881003	2.5 E-02	3.0 E-03
	881003 to 881010	5.4 E-02	4.0 E-03
	881010 to 881017	3.7 E-02	3.0 E-03
	881017 to 881024	2.9 E-02	3.0 E-03
	881024 to 881031	2.4 E-02	3.0 E-03
	881031 to 881107	7.9 E-03	1.9 E-03
	881107 to 881114	1.1 E-02	2.0 E-03
	881114 to 881121	1.2 E-02	2.0 E-03
	881121 to 881128	8.0 E-03	1.9 E-03
	881128 to 881205	2.4 E-02	3.0 E-03
	881205 to 881212	3.1 E-02	3.0 E-03
	881212 to 881219	2.6 E-02	3.0 E-03
	881219 to 881226	2.8 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
57	871228 to 880104	7.6 E-02	4.0 E-03
	880104 to 880111	8.6 E-02	5.0 E-03
	880111 to 880118	8.8 E-03	2.0 E-03
	880118 to 880125	1.3 E-02	2.0 E-03
	880125 to 880201	2.7 E-02	3.0 E-03
	880201 to 880208	4.0 E-02	3.0 E-03
	880208 to 880216	7.1 E-03	1.9 E-03
	880216 to 880222	1.1 E-02	2.0 E-03
	880222 to 880229	4.1 E-02	3.0 E-03
	880229 to 880307	1.7 E-02	2.0 E-03
	880307 to 880314	8.2 E-03	1.9 E-03
	880314 to 880321	2.0 E-02	2.0 E-03
	880321 to 880328	5.1 E-03	1.8 E-03
	880328 to 880404	4.5 E-03	1.9 E-03
	880404 to 880411	9.0 E-03	1.9 E-03
	880411 to 880418	1.8 E-02	3.0 E-03
	880418 to 880425	4.9 E-03	1.8 E-03
	880425 to 880502	9.1 E-03	2.2 E-03
	880502 to 880509	9.6 E-03	2.2 E-03
	880509 to 880516	1.1 E-02	2.0 E-03
	880516 to 880523	1.1 E-02	2.0 E-03
	880523 to 880531	7.6 E-03	2.0 E-03
	880531 to 880606	8.2 E-03	2.3 E-03
	880606 to 880613	9.0 E-03	2.2 E-03
	880613 to 880620	1.6 E-02	2.0 E-03
	880620 to 880627	1.4 E-02	2.0 E-03
	880627 to 880705	6.3 E-03	1.7 E-03
	880705 to 880711	9.0 E-03	2.4 E-03
	880711 to 880718	6.3 E-03	2.3 E-03
	880718 to 880725	1.6 E-02	2.0 E-03
	880725 to 880801	1.5 E-02	2.0 E-03
	880801 to 880808	9.8 E-03	2.0 E-03
	880808 to 880815	1.1 E-02	2.0 E-03
	880815 to 880822	1.1 E-02	2.0 E-03
	880822 to 880829	2.0 E-02	3.0 E-03
	880829 to 880906	2.7 E-02	3.0 E-03
	880906 to 880912	6.0 E-03	2.5 E-03
	880912 to 880919	1.7 E-02	3.0 E-03
	880919 to 880926	1.1 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
57	880926 to 881003	1.3 E-02	2.0 E-03
	881003 to 881010	4.1 E-02	3.0 E-03
	881010 to 881017	3.7 E-02	3.0 E-03
	881017 to 881024	2.5 E-02	3.0 E-03
	881024 to 881031	2.5 E-02	3.0 E-03
	881031 to 881107	8.2 E-03	2.0 E-03
	881107 to 881114	9.5 E-03	2.2 E-03
	881114 to 881121	1.0 E-02	2.0 E-03
	881121 to 881128	7.4 E-03	1.8 E-03
	881128 to 881205	2.3 E-02	3.0 E-03
	881205 to 881212	3.0 E-02	3.0 E-03
	881212 to 881219	2.2 E-02	3.0 E-03
	881219 to 881227	2.8 E-02	3.0 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)	1.8E-02	3.3E-03	9.8E-02	572	571
Gr-Beta	(C)	1.5E-02	3.5E-03	6.1E-02	52	52

(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	871228 to 880328	Be-7	6.08 E-02	4.40 E-03
		K-40	* 8.71 E-03	3.04 E-03
		Ru-103	*-9.87 E-05	1.91 E-04
		Ru-106	* 6.24 E-04	1.59 E-03
		Cs-134	* 4.02 E-05	1.76 E-04
		Cs-137	* 2.61 E-04	2.02 E-04
		Ra-226	* 5.85 E-03	3.65 E-03
		Th-228	* 7.77 E-04	2.85 E-04
	880328 to 880627	Be-7	7.26 E-02	5.25 E-03
		K-40	6.25 E-03	3.14 E-03
		Ru-103	* 3.89 E-05	2.54 E-04
		Ru-106	* 1.01 E-03	1.55 E-03
		Cs-134	* 1.23 E-04	1.88 E-04
		Cs-137	* 2.12 E-04	1.94 E-04
		Ra-226	* 4.32 E-03	3.40 E-03
		Th-228	* 7.91 E-04	2.81 E-04
	880627 to 880926	Be-7	6.39 E-02	3.10 E-03
		K-40	* 4.60 E-02	3.18 E-03
		Ru-103	* 4.59 E-05	1.80 E-04
		Ru-106	* 3.97 E-05	1.15 E-03
		Cs-134	* 1.00 E-04	1.35 E-04
		Cs-137	* 1.95 E-04	1.33 E-04
		Ra-226	* 3.06 E-03	2.35 E-03
		Th-228	* 8.18 E-04	1.84 E-04
	880926 to 890103	Be-7	3.86 E-02	3.80 E-03
		K-40	* 6.17 E-03	2.47 E-03
		Ru-103	*-1.40 E-05	1.98 E-04
		Ru-106	* 3.26 E-04	1.54 E-03
		Cs-134	* 1.02 E-04	1.65 E-04
		Cs-137	* 1.73 E-04	1.79 E-04
		Ra-226	* 5.36 E-03	3.35 E-03
		Th-228	* 7.44 E-04	2.63 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
4	871228 to 880328	Be-7	7.72 E-02	4.80 E-03
		K-40	* 7.94 E-03	2.62 E-03
		Ru-103	* 4.83 E-05	1.91 E-04
		Ru-106	* 0.00 E-01	1.30 E-03
		Cs-134	* 0.00 E-01	1.69 E-04
		Cs-137	* 1.20 E-04	1.54 E-04
		Ra-226	* 2.62 E-03	2.75 E-03
		Th-228	* 5.12 E-04	2.36 E-04
	880328 to 880627	Be-7	7.70 E-02	5.51 E-03
		K-40	5.93 E-03	2.42 E-03
		Ru-103	*-1.90 E-05	2.53 E-04
		Ru-106	* 3.25 E-04	1.36 E-03
		Cs-134	* 2.72 E-05	1.54 E-04
		Cs-137	* 7.51 E-06	1.48 E-04
		Ra-226	* 4.70 E-03	2.76 E-03
		Th-228	* 5.59 E-04	2.41 E-04
	880627 to 880926	Be-7	7.06 E-02	2.47 E-03
		K-40	* 9.29 E-03	1.57 E-03
		Ru-103	*-4.00 E-05	1.15 E-04
		Ru-106	* 1.38 E-04	7.95 E-04
		Cs-134	* 7.69 E-05	9.17 E-05
		Cs-137	* 2.57 E-04	9.90 E-05
		Ra-226	* 4.01 E-03	1.32 E-03
		Th-228	* 2.04 E-03	1.46 E-04
	880926 to 890103	Be-7	3.67 E-02	3.74 E-03
		K-40	2.63 E-03	1.49 E-03
		Ru-103	* 1.03 E-04	1.69 E-04
		Ru-106	* 0.00 E-01	1.24 E-03
		Cs-134	*-4.24 E-05	1.41 E-04
		Cs-137	* 7.16 E-06	1.37 E-04
		Ra-226	* 5.20 E-04	2.76 E-03
		Th-228	* 3.86 E-04	2.31 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
5	871228 to 880328	Be-7	5.51 E-02	4.13 E-03
		K-40	* 1.96 E-02	3.82 E-03
		Ru-103	* 2.15 E-04	2.42 E-04
		Ru-106	* 1.25 E-03	1.95 E-03
		Cs-134	* 3.31 E-05	2.28 E-04
		Cs-137	* 4.16 E-05	2.24 E-04
		Ra-226	* 4.83 E-03	3.55 E-03
		Th-228	* 2.35 E-03	3.46 E-04
	880328 to 880627	Be-7	6.11 E-02	4.67 E-03
		K-40	* 1.96 E-02	3.57 E-03
		Ru-103	* 6.78 E-05	2.91 E-04
		Ru-106	* 2.24 E-04	1.87 E-03
		Cs-134	* 0.00 E-01	2.23 E-04
		Cs-137	* 1.31 E-04	2.19 E-04
		Ra-226	* 5.34 E-03	3.29 E-03
		Th-228	* 2.64 E-03	3.27 E-04
	880627 to 880926	Be-7	7.03 E-02	2.80 E-03
		K-40	* 6.73 E-02	3.35 E-03
		Ru-103	*-3.73 E-05	1.65 E-04
		Ru-106	* 1.17 E-03	1.10 E-03
		Cs-134	* 5.07 E-05	1.34 E-04
		Cs-137	* 1.71 E-05	1.25 E-04
		Ra-226	* 4.99 E-03	1.82 E-03
		Th-228	* 1.38 E-03	1.69 E-04
	880926 to 890103	Be-7	2.66 E-02	3.15 E-03
		K-40	* 1.73 E-02	3.38 E-03
		Ru-103	* 2.02 E-05	2.08 E-04
		Ru-106	* 5.31 E-04	1.63 E-03
		Cs-134	*-5.68 E-05	1.86 E-04
		Cs-137	* 8.21 E-05	1.95 E-04
		Ra-226	* 2.32 E-03	3.16 E-03
		Th-228	* 2.02 E-03	2.78 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	871228 to 880328	Be-7	7.13 E-02	4.27 E-03
		K-40	* 3.12 E-02	4.39 E-03
		Ru-103	*-5.47 E-05	2.47 E-04
		Ru-106	* 3.91 E-04	2.00 E-03
		Cs-134	* 2.82 E-04	2.46 E-04
		Cs-137	* 8.89 E-05	2.42 E-04
		Ra-226	* 6.24 E-03	4.11 E-03
		Th-228	* 8.83 E-04	3.37 E-04
	880328 to 880627	Be-7	8.17 E-02	5.10 E-03
		K-40	* 3.17 E-02	4.19 E-03
		Ru-103	*-2.73 E-05	2.87 E-04
		Ru-106	* 1.52 E-03	1.78 E-03
		Cs-134	* 1.36 E-04	2.09 E-04
		Cs-137	* 4.15 E-05	1.86 E-04
		Ra-226	* 2.64 E-03	3.29 E-03
		Th-228	* 3.54 E-04	2.81 E-04
	880627 to 880926	Be-7	7.76 E-02	2.87 E-03
		K-40	* 7.83 E-03	1.46 E-03
		Ru-103	* 3.30 E-05	1.38 E-04
		Ru-106	*-1.54 E-04	8.67 E-04
		Cs-134	*-1.37 E-05	9.59 E-05
		Cs-137	* 1.29 E-04	1.00 E-04
		Ra-226	* 5.46 E-03	1.84 E-03
		Th-228	* 7.34 E-04	1.47 E-04
	880926 to 890103	Be-7	3.11 E-02	3.15 E-03
		K-40	4.40 E-03	2.39 E-03
		Ru-103	*-1.16 E-04	2.01 E-04
		Ru-106	*-5.85 E-04	1.49 E-03
		Cs-134	* 2.57 E-05	1.82 E-04
		Cs-137	*-1.35 E-04	1.77 E-04
		Ra-226	* 4.05 E-03	3.17 E-03
		Th-228	* 6.08 E-04	2.52 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
7	871228 to 880328	Be-7	7.45 E-02	4.52 E-03
		K-40	* 5.95 E-03	2.27 E-03
		Ru-103	*-2.00 E-05	1.50 E-04
		Ru-106	*-6.58 E-05	1.16 E-03
		Cs-134	* 1.91 E-05	1.45 E-04
		Cs-137	*-1.60 E-05	1.47 E-04
		Ra-226	* 3.51 E-03	2.63 E-03
		Th-228	* 6.58 E-04	2.32 E-04
	880328 to 880627	Be-7	7.23 E-02	4.86 E-03
		K-40	* 6.08 E-03	2.34 E-03
		Ru-103	*-6.23 E-05	1.92 E-04
		Ru-106	* 2.65 E-04	1.12 E-03
		Cs-134	* 0.00 E-01	1.20 E-04
		Cs-137	* 8.57 E-05	1.40 E-04
		Ra-226	* 2.10 E-03	2.49 E-03
		Th-228	* 5.59 E-04	2.18 E-04
	880627 to 880926	Be-7	8.29 E-02	2.80 E-03
		K-40	* 8.15 E-03	1.37 E-03
		Ru-103	* 6.73 E-05	1.34 E-04
		Ru-106	* 1.22 E-04	7.29 E-04
		Cs-134	* 3.17 E-05	8.24 E-05
		Cs-137	* 8.69 E-05	7.97 E-05
		Ra-226	* 4.19 E-03	1.47 E-03
		Th-228	* 3.64 E-04	1.25 E-04
	880926 to 890103	Be-7	3.50 E-02	3.10 E-03
		K-40	* 6.79 E-03	2.25 E-03
		Ru-103	* 6.40 E-06	1.36 E-04
		Ru-106	* 3.65 E-04	1.17 E-03
		Cs-134	* 3.55 E-05	1.40 E-04
		Cs-137	* 1.03 E-04	1.33 E-04
		Ra-226	* 2.08 E-03	2.16 E-03
		Th-228	* 4.71 E-04	2.04 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
8	871228 to 880328	Be-7	6.31 E-02	4.63 E-03
		K-40	* 8.61 E-03	2.91 E-03
		Ru-103	* 0.00 E-01	1.95 E-04
		Ru-106	*-7.58 E-04	1.39 E-03
		Cs-134	* 1.10 E-05	1.73 E-04
		Cs-137	* 6.45 E-05	1.90 E-04
		Ra-226	* 4.08 E-03	3.36 E-03
		Th-228	* 3.08 E-04	2.76 E-04
	880328 to 880627	Be-7	6.27 E-02	5.04 E-03
		K-40	* 6.37 E-03	2.50 E-03
		Ru-103	* 1.90 E-05	2.54 E-04
		Ru-106	* 8.45 E-04	1.46 E-03
		Cs-134	* 4.00 E-05	1.72 E-04
		Cs-137	* 8.27 E-05	1.69 E-04
		Ra-226	* 5.02 E-03	3.20 E-03
		Th-228	* 8.90 E-04	2.72 E-04
	880627 to 880926	Be-7	6.08 E-02	2.50 E-03
		K-40	* 1.98 E-02	1.92 E-03
		Ru-103	* 3.54 E-05	1.59 E-04
		Ru-106	*-1.10 E-04	1.01 E-03
		Cs-134	* 1.14 E-04	1.19 E-04
		Cs-137	* 1.39 E-04	1.18 E-04
		Ra-226	* 4.90 E-03	1.80 E-03
		Th-228	* 2.56 E-03	1.79 E-04
	880926 to 890103	Be-7	3.00 E-02	3.43 E-03
		K-40	* 7.49 E-03	2.63 E-03
		Ru-103	*-1.75 E-04	1.92 E-04
		Ru-106	*-5.94 E-04	1.29 E-03
		Cs-134	* 0.00 E-01	1.66 E-04
		Cs-137	* 1.76 E-04	1.79 E-04
		Ra-226	* 2.85 E-03	2.84 E-03
		Th-228	* 4.74 E-04	2.49 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
9	871228 to 880328	Be-7	4.59 E-02	4.14 E-03
		K-40	* 5.44 E-03	2.72 E-03
		Ru-103	*-3.59 E-05	1.99 E-04
		Ru-106	* 0.00 E-01	1.48 E-04
		Cs-134	*-1.21 E-04	1.78 E-04
		Cs-137	* 1.35 E-04	1.92 E-04
		Ra-226	* 4.52 E-03	3.48 E-03
		Th-228	* 6.30 E-04	2.78 E-04
	880328 to 880627	Be-7	6.51 E-02	6.14 E-03
		K-40	6.38 E-03	2.86 E-03
		Ru-103	* 9.81 E-06	2.60 E-04
		Ru-106	* 7.21 E-05	1.43 E-03
		Cs-134	* 1.12 E-04	1.73 E-04
		Cs-137	* 1.95 E-04	1.92 E-04
		Ra-226	* 7.50 E-03	3.19 E-03
		Th-228	* 5.98 E-04	2.75 E-04
	880627 to 880926	Be-7	6.78 E-02	2.37 E-03
		K-40	4.48 E-03	1.54 E-03
		Ru-103	* 5.02 E-05	1.43 E-04
		Ru-106	*-4.75 E-04	8.89 E-04
		Cs-134	* 5.20 E-05	1.02 E-04
		Cs-137	* 3.19 E-05	1.00 E-04
		Ra-226	* 4.24 E-03	1.72 E-03
		Th-228	* 4.44 E-04	1.43 E-04
	880926 to 890103	Be-7	2.96 E-02	3.91 E-03
		K-40	* 6.59 E-03	2.51 E-03
		Ru-103	*-1.64 E-04	1.88 E-04
		Ru-106	* 1.96 E-04	1.42 E-03
		Cs-134	* 1.40 E-04	1.73 E-04
		Cs-137	* 1.49 E-04	1.81 E-04
		Ra-226	* 3.06 E-03	3.32 E-03
		Th-228	* 6.13 E-04	2.60 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
21	871228 to 880328	Be-7	5.48 E-02	4.16 E-03
		K-40	* 9.42 E-03	2.77 E-03
		Ru-103	* 2.89 E-05	1.92 E-04
		Ru-106	*-8.41 E-04	1.33 E-03
		Cs-134	* 9.16 E-06	1.54 E-04
		Cs-137	* 1.46 E-04	1.64 E-04
		Ra-226	* 1.51 E-03	2.76 E-03
		Th-228	* 5.74 E-04	2.46 E-04
	880328 to 880627	Be-7	5.32 E-02	4.67 E-03
		K-40	* 5.70 E-03	2.44 E-03
		Ru-103	* 7.74 E-05	2.01 E-04
		Ru-106	* 7.89 E-04	1.30 E-03
		Cs-134	* 0.00 E-01	1.36 E-04
		Cs-137	* 1.43 E-04	1.43 E-04
		Ra-226	*-3.64 E-04	2.64 E-03
		Th-228	* 5.19 E-04	2.40 E-04
	880627 to 880926	Be-7	5.95 E-02	2.39 E-03
		K-40	* 6.82 E-03	1.28 E-03
		Ru-103	* 8.80 E-05	1.08 E-04
		Ru-106	* 2.87 E-04	6.62 E-04
		Cs-134	* 1.09 E-05	7.82 E-05
		Cs-137	* 4.80 E-05	7.81 E-05
		Ra-226	* 2.92 E-03	1.39 E-03
		Th-228	* 5.63 E-04	1.21 E-04
	880926 to 890103	Be-7	2.61 E-02	3.07 E-03
		K-40	4.96 E-03	2.18 E-03
		Ru-103	*-1.04 E-04	1.64 E-04
		Ru-106	*-2.98 E-04	1.30 E-03
		Cs-134	* 5.09 E-05	1.59 E-04
		Cs-137	* 9.31 E-05	1.44 E-04
		Ra-226	* 2.32 E-03	2.79 E-03
		Th-228	* 3.81 E-04	2.28 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
23	871228 to 880328	Be-7	5.83 E-02	4.27 E-03
		K-40	* 2.03 E-02	3.59 E-03
		Ru-103	*-1.19 E-04	2.35 E-04
		Ru-106	* 1.65 E-04	1.89 E-03
		Cs-134	* 1.35 E-04	2.32 E-04
		Cs-137	* 2.06 E-04	2.18 E-04
		Ra-226	* 6.90 E-03	3.47 E-03
		Th-228	* 2.34 E-03	3.38 E-04
	880328 to 880627	Be-7	6.37 E-02	5.08 E-03
		K-40	* 5.99 E-03	2.34 E-03
		Ru-103	*-7.82 E-05	2.26 E-04
		Ru-106	* 5.16 E-04	1.41 E-03
		Cs-134	* 9.10 E-05	1.67 E-04
		Cs-137	* 7.58 E-05	1.42 E-04
		Ra-226	* 1.90 E-03	2.78 E-03
		Th-228	* 7.16 E-04	2.39 E-04
	880627 to 880926	Be-7	7.42 E-02	3.32 E-03
		K-40	* 5.10 E-02	3.52 E-03
		Ru-103	*-9.79 E-05	1.97 E-04
		Ru-106	*-2.65 E-04	1.23 E-03
		Cs-134	* 1.05 E-04	1.54 E-04
		Cs-137	*-4.17 E-05	1.43 E-04
		Ra-226	* 4.33 E-03	1.92 E-03
		Th-228	* 7.07 E-04	1.82 E-04
	880926 to 890103	Be-7	2.77 E-02	3.04 E-03
		K-40	* 1.91 E-02	3.48 E-03
		Ru-103	* 9.84 E-05	2.05 E-04
		Ru-106	* 6.82 E-04	1.71 E-03
		Cs-134	* 3.08 E-04	2.10 E-04
		Cs-137	* 3.54 E-05	1.93 E-04
		Ra-226	* 6.94 E-03	3.19 E-03
		Th-228	* 2.03 E-03	2.83 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
40	871228 to 880328	Be-7	6.15 E-02	4.35 E-03
		K-40	* 3.83 E-02	5.03 E-03
		Ru-103	*-1.08 E-05	2.71 E-04
		Ru-106	* 3.64 E-04	2.13 E-03
		Cs-134	* 1.58 E-04	2.50 E-04
		Cs-137	* 3.15 E-05	2.43 E-04
		Ra-226	* 3.18 E-03	4.32 E-03
		Th-228	* 8.62 E-04	3.50 E-04
	880328 to 880627	Be-7	6.94 E-02	4.32 E-03
		K-40	* 7.04 E-03	2.22 E-03
		Ru-103	*-2.17 E-05	1.80 E-04
		Ru-106	* 2.16 E-04	1.27 E-03
		Cs-134	*-6.95 E-05	1.45 E-04
		Cs-137	*-5.72 E-05	1.37 E-04
		Ra-226	* 2.13 E-03	1.87 E-03
		Th-228	* 3.33 E-04	1.67 E-04
	880627 to 880926	Be-7	6.63 E-02	2.62 E-03
		K-40	* 9.27 E-03	1.50 E-03
		Ru-103	* 3.48 E-05	1.26 E-04
		Ru-106	* 5.08 E-04	7.78 E-04
		Cs-134	* 3.21 E-05	9.24 E-05
		Cs-137	* 1.40 E-04	9.48 E-05
		Ra-226	* 2.73 E-03	1.63 E-03
		Th-228	* 7.52 E-04	1.43 E-04
	880926 to 890103	Be-7	2.95 E-02	3.28 E-03
		K-40	* 6.88 E-03	3.10 E-03
		Ru-103	*-4.93 E-06	2.06 E-04
		Ru-106	* 1.67 E-03	1.61 E-03
		Cs-134	* 7.71 E-05	1.78 E-04
		Cs-137	* 1.25 E-04	1.78 E-04
		Ra-226	* 2.77 E-03	3.14 E-03
		Th-228	* 5.12 E-04	2.55 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
48	871228 to 880328	Be-7	7.40 E-02	4.48 E-03
		K-40	* 9.69 E-03	2.63 E-03
		Ru-103	* 2.03 E-05	1.75 E-04
		Ru-106	*-6.16 E-05	1.33 E-03
		Cs-134	* 5.32 E-05	1.44 E-04
		Cs-137	* 5.94 E-05	1.49 E-04
		Ra-226	* 1.72 E-03	2.80 E-03
		Th-228	* 7.92 E-04	2.47 E-04
	880328 to 880627	Be-7	7.44 E-02	5.36 E-03
		K-40	* 4.28 E-03	2.47 E-03
		Ru-103	* 7.07 E-05	2.51 E-04
		Ru-106	*-1.13 E-03	1.39 E-03
		Cs-134	*-4.30 E-05	1.82 E-04
		Cs-137	*-8.85 E-06	1.64 E-04
		Ra-226	* 2.51 E-03	2.82 E-03
		Th-228	* 1.48 E-04	2.45 E-04
	880627 to 880926	Be-7	5.70 E-02	3.80 E-03
		K-40	* 5.18 E-02	3.48 E-03
		Ru-103	*-1.44 E-04	1.86 E-04
		Ru-106	* 2.33 E-04	1.18 E-03
		Cs-134	* 9.16 E-05	1.46 E-04
		Cs-137	* 1.40 E-04	1.39 E-04
		Ra-226	* 3.01 E-03	2.46 E-03
		Th-228	* 7.95 E-04	1.91 E-04
	880926 to 890103	Be-7	3.90 E-02	3.42 E-03
		K-40	4.44 E-03	2.42 E-03
		Ru-103	* 0.00 E-01	1.41 E-04
		Ru-106	*-2.43 E-04	1.12 E-03
		Cs-134	*-3.55 E-05	1.34 E-04
		Cs-137	* 1.99 E-04	1.50 E-04
		Ra-226	* 2.20 E-03	2.18 E-03
		Th-228	* 5.75 E-04	2.05 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
57	870328 to 880328	Be-7	5.80 E-02	3.65 E-03
		K-40	* 5.82 E-03	2.26 E-03
		Ru-103	*-6.89 E-05	1.42 E-04
		Ru-106	* 7.87 E-04	1.17 E-03
		Cs-134	*-6.08 E-05	1.43 E-04
		Cs-137	* 8.23 E-05	1.36 E-04
		Ra-226	* 5.82 E-04	1.88 E-03
		Th-228	* 4.15 E-04	1.71 E-04
	880328 to 880627	Be-7	6.86 E-02	6.95 E-03
		K-40	* 1.15 E-01	8.95 E-03
		Ru-103	* 2.76 E-04	4.75 E-04
		Ru-106	*-1.35 E-03	2.92 E-03
		Cs-134	* 7.08 E-05	3.44 E-04
		Cs-137	*-7.50 E-05	3.09 E-04
		Ra-226	* 3.11 E-03	4.93 E-03
		Th-228	* 1.37 E-03	4.25 E-04
	880627 to 880926	Be-7	6.45 E-02	6.49 E-03
		K-40	* 8.52 E-03	1.53 E-03
		Ru-103	*-1.04 E-04	1.17 E-04
		Ru-106	* 2.58 E-04	7.96 E-04
		Cs-134	* 1.46 E-04	9.96 E-05
		Cs-137	* 3.40 E-04	1.04 E-04
		Ra-226	* 3.94 E-03	1.33 E-03
		Th-228	* 1.85 E-03	1.47 E-04
	880926 to 890103	Be-7	3.21 E-02	3.97 E-03
		K-40	* 8.58 E-03	2.49 E-03
		Ru-103	*-1.21 E-04	1.75 E-04
		Ru-106	* 3.73 E-04	1.34 E-03
		Cs-134	*-3.60 E-05	1.68 E-04
		Cs-137	* 5.26 E-05	1.65 E-04
		Ra-226	* 3.32 E-03	2.71 E-03
		Th-228	* 6.42 E-04	2.34 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)	-3.27E-06	-1.75E-04	2.76E-04	44	0
Ru-103 (C)	-3.50E-05	-1.64E-04	5.02E-05	4	0
Ru-106 (I)	2.17E-04	-1.35E-03	1.67E-03	44	0
Ru-106 (C)	-5.17E-05	-4.75E-04	1.96E-04	4	0
Cs-134 (I)	5.07E-05	-6.95E-05	3.08E-04	44	0
Cs-134 (C)	4.58E-05	-1.21E-04	1.40E-04	4	0
Cs-137 (I)	9.28E-05	-1.35E-04	3.40E-04	44	0
Cs-137 (C)	1.28E-04	3.19E-05	1.95E-04	4	0
Be-7 (I)	5.83E-02	2.61E-02	8.29E-02	44	44
Be-7 (C)	5.21E-02	2.96E-02	6.78E-02	4	4
K-40 (I)	1.73E-02	2.63E-03	1.20E-01	44	6
K-40 (C)	5.72E-03	4.48E-03	6.60E-03	4	2

(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	871228 to 880104	* 7.24 E-03	1.10 E-02
	880104 to 880111	*-5.12 E-03	1.44 E-02
	880111 to 880118	*-1.62 E-03	5.90 E-03
	880118 to 880125	*-3.19 E-03	9.38 E-03
	880125 to 880201	* 4.41 E-04	8.55 E-03
	880201 to 880208	*-5.65 E-03	1.13 E-02
	880208 to 880216	*-3.03 E-03	7.38 E-03
	880216 to 880222	* 0.00 E-01	1.16 E-02
	880222 to 880229	* 1.17 E-04	9.06 E-03
	880229 to 880307	* 7.98 E-03	9.86 E-03
	880307 to 880314	* 7.65 E-04	9.84 E-03
	880314 to 880321	*-6.84 E-03	1.21 E-02
	880321 to 880328	* 1.94 E-03	8.93 E-03
	880328 to 880404	*-3.34 E-03	1.18 E-02
	880404 to 880411	*-5.61 E-04	1.09 E-02
	880411 to 880418	*-4.95 E-03	8.31 E-03
	880418 to 880425	*-8.45 E-03	9.64 E-03
	880425 to 880502	*-1.61 E-03	9.30 E-03
	880502 to 880509	*-8.97 E-04	1.18 E-02
	880509 to 880516	*-3.22 E-03	1.18 E-02
	880516 to 880523 (a)	* 1.67 E-03	1.28 E-02
	880523 to 880531	* 2.40 E-03	8.70 E-03
	880531 to 880606	* 4.34 E-03	1.24 E-02
	880606 to 880613	*-7.61 E-03	1.19 E-02
	880613 to 880620	* 2.93 E-03	1.05 E-02
	880620 to 880627	*-2.26 E-04	1.05 E-02
	880627 to 880705	* 2.55 E-03	9.94 E-03
	880705 to 880711	* 4.41 E-04	1.73 E-02
	880711 to 880718	* 2.19 E-03	1.11 E-02
	880718 to 880725	*-6.66 E-03	1.13 E-02
	880725 to 880801	* 2.27 E-03	9.55 E-03
	880801 to 880808	*-5.25 E-03	1.56 E-02
	880808 to 880815	*-5.57 E-03	1.22 E-02
	880815 to 880822	* 1.28 E-03	1.01 E-02
	880822 to 880829	*-4.27 E-03	1.12 E-02
	880829 to 880906	*-1.80 E-03	8.13 E-03
	880906 to 880912	*-6.93 E-04	1.55 E-02
	880912 to 880919	* 1.79 E-03	1.22 E-02
	880919 to 880926	* 1.92 E-03	1.20 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	880926 to 881003	* 2.37 E-02	1.52 E-02
	881003 to 881010	*-1.71 E-04	1.33 E-02
	881010 to 881017	* 1.53 E-03	1.22 E-02
	881017 to 881024	*-5.80 E-03	1.25 E-02
	881024 to 881031	*-1.58 E-02	1.46 E-02
	881031 to 881107	* 2.74 E-03	1.46 E-02
	881107 to 881114	* 2.50 E-03	1.29 E-02
	881114 to 881121	*-1.08 E-02	2.05 E-02
	881121 to 881128	* 2.97 E-03	9.87 E-03
	881128 to 881205	* 1.15 E-03	1.13 E-02
	881205 to 881212	* 1.86 E-03	1.46 E-02
	881212 to 881219	*-7.71 E-03	1.04 E-02
	881219 to 881227	* 2.26 E-03	8.60 E-03

* 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	871228 to 880104	* 7.09 E-03	1.08 E-02
	880104 to 880111	*-5.00 E-03	1.41 E-02
	880111 to 880118	*-1.60 E-03	5.82 E-03
	880118 to 880125	*-3.14 E-03	9.20 E-03
	880125 to 880201	* 4.33 E-04	8.39 E-03
	880201 to 880208	*-5.55 E-03	1.11 E-02
	880208 to 880216	*-2.98 E-03	7.27 E-03
	880216 to 880222	* 0.00 E-01	1.13 E-02
	880222 to 880229	* 1.15 E-04	8.89 E-03
	880229 to 880307	* 7.83 E-03	9.67 E-03
	880307 to 880314	* 7.50 E-04	9.64 E-03
	880314 to 880321	*-6.70 E-03	1.19 E-02
	880321 to 880328	* 1.90 E-03	8.75 E-03
	880328 to 880404	*-3.31 E-03	1.16 E-02
	880404 to 880411	*-5.52 E-04	1.07 E-02
	880411 to 880418	*-4.83 E-03	8.12 E-03
	880418 to 880425	*-8.32 E-03	9.49 E-03
	880425 to 880502	*-1.59 E-03	9.13 E-03
	880502 to 880509	*-8.83 E-04	1.17 E-02
	880509 to 880516	*-3.15 E-03	1.15 E-02
	880516 to 880523	* 1.48 E-03	1.13 E-02
	880523 to 880531	* 2.38 E-03	8.63 E-03
	880531 to 880606	* 4.26 E-03	1.22 E-02
	880606 to 880613	*-7.45 E-03	1.17 E-02
	880613 to 880620	* 2.89 E-03	1.04 E-02
	880620 to 880627	*-2.23 E-04	1.03 E-02
	880627 to 880705	* 2.49 E-03	9.72 E-03
	880705 to 880711	* 4.32 E-04	1.70 E-02
	880711 to 880718	* 2.16 E-03	1.10 E-02
	880718 to 880725	*-6.55 E-03	1.11 E-02
	880725 to 880801	* 2.22 E-03	9.35 E-03
	880801 to 880808	*-5.16 E-03	1.53 E-02
	880808 to 880815	*-5.45 E-03	1.20 E-02
	880815 to 880822	* 1.26 E-03	9.91 E-03
	880822 to 880829	*-4.19 E-03	1.10 E-02
	880829 to 880906	*-1.75 E-03	7.87 E-03
	880906 to 880912	*-6.83 E-04	1.53 E-02
	880912 to 990919	* 1.76 E-03	1.20 E-02
	880919 to 880926	* 1.88 E-03	1.18 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	880926 to 881003	* 2.32 E-03	1.49 E-02
	881003 to 881010	*-1.68 E-04	1.30 E-02
	881010 to 881017	* 1.50 E-03	1.20 E-02
	881017 to 881024	*-5.70 E-03	1.23 E-02
	881024 to 881031	*-1.56 E-02	1.43 E-02
	881031 to 881107	* 2.68 E-03	1.43 E-02
	881107 to 881114	* 2.46 E-03	1.26 E-02
	881114 to 881121	*-1.07 E-02	2.02 E-02
	881121 to 881128	* 2.90 E-03	9.62 E-03
	881128 to 881205	* 1.14 E-03	1.11 E-02
	881205 to 881212	* 1.84 E-03	1.44 E-02
	881212 to 881219	*-7.42 E-03	1.00 E-02
	881219 to 881227	* 2.23 E-03	8.47 E-03

* 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	871228 to 880104	* 7.13 E-03	1.08 E-02
	880104 to 880111	*-5.02 E-03	1.42 E-02
	880111 to 880118	*-1.61 E-03	5.86 E-03
	880118 to 880125	*-3.15 E-03	9.26 E-03
	880125 to 880201	* 4.36 E-04	8.44 E-03
	880201 to 880208 (a)	*-1.90 E-02	3.81 E-02
	880208 to 880216	*-3.00 E-03	7.31 E-03
	880216 to 880222	* 0.00 E-01	1.14 E-02
	880222 to 880229	* 1.15 E-04	8.94 E-03
	880229 to 880307	* 7.87 E-03	9.72 E-03
	880307 to 880314	* 7.54 E-04	9.70 E-03
	880314 to 880321	*-6.74 E-03	1.19 E-02
	880321 to 880328	* 1.91 E-03	8.80 E-03
	880328 to 880404	*-3.32 E-03	1.17 E-02
	880404 to 880411	*-5.56 E-04	1.08 E-02
	880411 to 880418	*-4.86 E-03	8.17 E-03
	880418 to 880425	*-8.34 E-03	9.51 E-03
	880425 to 880502	*-1.60 E-03	9.21 E-03
	880502 to 880509	*-8.88 E-04	1.17 E-02
	880509 to 880516	*-3.17 E-03	1.16 E-02
	880516 to 880523	* 1.49 E-03	1.13 E-02
	880523 to 880531	* 2.37 E-03	8.59 E-03
	880531 to 880606	* 4.26 E-03	1.22 E-02
	880606 to 880613	*-7.48 E-03	1.17 E-02
	880613 to 880620	* 2.90 E-03	1.04 E-02
	880620 to 880627	*-2.24 E-04	1.04 E-02
	880627 to 880705	* 2.51 E-03	9.77 E-03
	880705 to 880711	* 4.36 E-04	1.71 E-02
	880711 to 880718	* 2.16 E-03	1.10 E-02
	880718 to 880725	*-6.60 E-03	1.12 E-02
	880725 to 880801	* 2.23 E-03	9.37 E-03
	880801 to 880808	*-5.20 E-03	1.54 E-02
	880808 to 880815	*-5.50 E-03	1.21 E-02
	880815 to 880822	* 1.26 E-03	9.93 E-03
	880822 to 880829	*-4.21 E-03	1.11 E-02
	880829 to 880906	*-1.75 E-03	7.92 E-03
	880906 to 880912	*-6.86 E-04	1.53 E-02
	880912 to 880919	* 1.77 E-03	1.20 E-02
	880919 to 880926	* 1.89 E-03	1.19 E-02

(a) Sampler malfunction; low 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
5	880926 to 881003	* 2.33 E-03	1.50 E-02
	881003 to 881010	*-1.70 E-04	1.32 E-02
	881010 to 881017	* 1.51 E-03	1.20 E-02
	881017 to 881024	* 5.75 E-03	1.24 E-02
	881024 to 881031 (a)	*-1.92 E-02	1.77 E-02
	881031 to 881107	* 2.69 E-03	1.43 E-02
	881107 to 881114	* 2.47 E-03	1.27 E-02
	881114 to 881121	*-1.07 E-02	2.04 E-02
	881121 to 881128	* 2.91 E-03	9.64 E-03
	881128 to 881205	* 1.15 E-03	1.12 E-02
	881205 to 881212	* 1.85 E-03	1.45 E-02
	881212 to 881219	*-7.48 E-03	1.01 E-02
	881219 to 881227	* 2.23 E-03	8.50 E-03

(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
6	871228 to 881004	* 7.21 E-03	1.09 E-02
	881004 to 880111	*-5.11 E-03	1.44 E-02
	881011 to 880118	*-1.62 E-03	5.88 E-03
	880118 to 880125	*-3.19 E-03	9.35 E-03
	880125 to 880201	* 4.40 E-04	8.52 E-03
	880201 to 880208	*-5.64 E-03	1.13 E-02
	880208 to 880216	*-3.03 E-03	7.39 E-03
	880216 to 880222	* 0.00 E-01	1.15 E-02
	880222 to 880229	* 1.16 E-04	9.00 E-03
	880229 to 880307	* 7.98 E-03	9.85 E-03
	880307 to 880314	* 7.62 E-04	9.80 E-03
	880314 to 880321	*-6.78 E-03	1.20 E-02
	880321 to 880328	* 1.94 E-03	8.94 E-03
	880328 to 880404	*-3.34 E-03	1.18 E-02
	880404 to 880411	*-5.61 E-04	1.09 E-02
	880411 to 880418	*-4.92 E-03	8.27 E-03
	880418 to 880425	*-8.40 E-03	9.57 E-03
	880425 to 880502	*-1.61 E-03	9.30 E-03
	880502 to 880509	*-8.97 E-04	1.18 E-02
	880509 to 880516	*-3.21 E-03	1.17 E-02
	880516 to 880523	* 1.50 E-03	1.15 E-02
	880523 to 880531	* 2.39 E-03	8.67 E-03
	880531 to 880606	* 4.32 E-03	1.23 E-02
	880606 to 880613	*-7.58 E-03	1.19 E-02
	880613 to 880620	* 2.91 E-03	1.05 E-02
	880620 to 880627	*-2.26 E-04	1.05 E-02
	880627 to 880705	* 2.54 E-03	9.90 E-03
	880705 to 880711	* 4.39 E-04	1.72 E-02
	880711 to 880718	* 2.18 E-03	1.11 E-02
	880718 to 880725	*-6.66 E-03	1.13 E-02
	880725 to 880801	* 2.25 E-03	9.47 E-03
	880801 to 880808	*-5.24 E-03	1.56 E-02
	880808 to 880815	*-5.55 E-03	1.22 E-02
	880815 to 880822	* 1.27 E-03	9.99 E-03
	880822 to 880829	*-4.28 E-03	1.12 E-02
	880829 to 880906	*-1.77 E-03	8.00 E-03
	880906 to 880912	*-6.90 E-04	1.54 E-02
	880912 to 880919	* 1.78 E-03	1.21 E-02
	880919 to 880926	* 1.91 E-03	1.20 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	880926 to 881003	* 2.35 E-03	1.51 E-02
	881003 to 881010	*-1.71 E-04	1.33 E-02
	881010 to 881017	* 1.53 E-03	1.21 E-02
	881017 to 881024	*-5.78 E-03	1.24 E-02
	881024 to 881031	*-1.58 E-02	1.45 E-02
	881031 to 881107	* 2.72 E-03	1.45 E-02
	881107 to 881114	* 2.48 E-03	1.28 E-02
	881114 to 881121	*-1.08 E-02	2.06 E-02
	881121 to 881128	* 2.94 E-03	9.76 E-03
	881128 to 881205	* 1.15 E-03	1.13 E-02
	881205 to 881212	* 1.87 E-03	1.46 E-02
	881212 to 881219	*-7.64 E-03	1.03 E-02
	881219 to 881227	* 2.25 E-03	8.58 E-03

* 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	871228 to 880104	* 4.67 E-03	7.09 E-03
	880104 to 880111(a)	*-4.88 E-03	1.37 E-02
	880111 to 880118	*-1.17 E-03	4.25 E-03
	880118 to 880125	*-1.67 E-03	4.91 E-03
	880125 to 880201	* 2.61 E-04	5.06 E-03
	880201 to 880208	*-3.66 E-03	7.31 E-03
	880208 to 880216	*-2.40 E-03	5.85 E-03
	880216 to 880222	* 0.00 E-01	9.13 E-03
	880222 to 880229	* 9.19 E-05	7.13 E-03
	880229 to 880307	* 6.31 E-03	7.80 E-03
	880307 to 880314	* 6.03 E-04	7.76 E-03
	880314 to 880321	*-3.99 E-03	7.06 E-03
	880321 to 880328	* 1.54 E-03	7.08 E-03
	880328 to 880404	*-2.17 E-03	7.62 E-03
	880404 to 880411	*-3.64 E-04	7.06 E-03
	880411 to 880418	*-2.92 E-03	4.90 E-03
	880418 to 880425	*-4.41 E-03	5.03 E-03
	880425 to 880502	*-8.48 E-04	4.88 E-03
	880502 to 880509	*-5.81 E-04	7.67 E-03
	880509 to 880516	*-2.08 E-03	7.61 E-03
	880516 to 880523	* 9.70 E-04	7.40 E-03
	880523 to 880531	* 1.55 E-03	5.62 E-03
	880531 to 880606	* 2.80 E-03	8.00 E-03
	880606 to 880613	*-4.91 E-03	7.69 E-03
	880613 to 880620	* 1.90 E-03	6.82 E-03
	880620 to 880627	*-1.46 E-04	6.78 E-03
	880627 to 880705	* 1.65 E-03	6.44 E-03
	880705 to 880711	* 2.68 E-04	1.05 E-02
	880711 to 880718	* 1.44 E-03	7.33 E-03
	880718 to 880725	*-4.32 E-03	7.35 E-03
	880725 to 880801	* 1.33 E-03	5.62 E-03
	880801 to 880808	*-3.20 E-03	9.50 E-03
	880808 to 880815	*-3.60 E-03	7.90 E-03
	880815 to 880822	* 1.10 E-03	8.67 E-03
	880822 to 880829	*-2.77 E-03	7.28 E-03
	880829 to 880906	*-1.56 E-03	7.02 E-03
	880906 to 880912	*-4.22 E-04	9.43 E-03
	880912 to 880919	* 1.54 E-03	1.05 E-02
	880919 to 880926	* 1.24 E-03	7.78 E-03

(a) Pump failure; 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	880926 to 881003	* 1.46 E-03	9.35 E-03
	881003 to 881010	*-1.04 E-04	8.03 E-03
	881010 to 881017	* 9.90 E-04	7.86 E-03
	881017 to 881024	*-3.76 E-03	8.09 E-03
	881024 to 881031	*-9.73 E-03	8.97 E-03
	881031 to 881107	* 1.66 E-03	8.87 E-03
	881107 to 881114	* 2.02 E-03	1.04 E-02
	881114 to 881121	*-6.60 E-03	1.25 E-02
	881121 to 881128	* 1.75 E-03	5.80 E-03
	881128 to 881205	* 1.00 E-03	9.79 E-03
	881205 to 881212	* 1.15 E-03	9.00 E-03
	881212 to 881219	*-6.63 E-03	8.94 E-03
	881219 to 881227	* 1.96 E-03	7.44 E-03

* 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	871228 to 880104	*-8.21 E-03	8.90 E-03
	880104 to 880111	*-2.24 E-03	1.14 E-02
	880111 to 880118	*-9.98 E-03	9.33 E-03
	880118 to 880125	*-8.26 E-03	1.16 E-02
	880125 to 880201	* 5.72 E-04	1.20 E-02
	880201 to 880208	* 1.11 E-03	9.34 E-03
	880208 to 880216	* 3.46 E-03	6.75 E-03
	880216 to 880222	*-3.26 E-03	1.02 E-02
	880222 to 880229	* 5.17 E-03	8.36 E-03
	880229 to 880307	* 2.15 E-03	8.59 E-03
	880307 to 880314	* 1.72 E-03	9.21 E-03
	880314 to 880321	*-1.06 E-03	9.69 E-03
	880321 to 880328	* 4.46 E-03	1.19 E-02
	880328 to 880404	* 6.29 E-03	9.46 E-03
	880404 to 880411	* 1.45 E-03	8.62 E-03
	880411 to 880418	* 6.18 E-03	1.23 E-02
	880418 to 880425	*-2.65 E-03	8.15 E-03
	880425 to 880502	*-1.55 E-03	8.30 E-03
	880502 to 880509	* 8.01 E-04	9.41 E-03
	880509 to 880516	* 3.44 E-03	9.43 E-03
	880516 to 880523	*-2.17 E-03	8.78 E-03
	880523 to 880531	*-2.97 E-03	7.12 E-03
	880531 to 880606	* 5.74 E-04	1.04 E-02
	880606 to 880613	*-3.92 E-04	9.77 E-03
	880613 to 880620	* 1.21 E-03	8.79 E-03
	880620 to 880627	* 4.48 E-03	9.03 E-03
	880627 to 880705	*-3.66 E-03	7.92 E-03
	880705 to 880711	*-3.59 E-04	1.46 E-02
	880711 to 880718	*-4.70 E-03	9.18 E-03
	880718 to 880725	*-1.51 E-03	9.69 E-03
	880729 to 880801 (a)	*-2.16 E-03	3.11 E-02
	880801 to 880808	* 1.28 E-03	1.26 E-02
	880808 to 880815	*-3.38 E-03	9.80 E-03
	880815 to 880822	*-5.24 E-03	8.46 E-03
	880822 to 880829	*-2.08 E-03	9.61 E-03
	880829 to 880906	* 1.77 E-03	6.75 E-03
	880906 to 880912	*-2.92 E-03	1.26 E-02
	880912 to 880919	*-6.60 E-03	8.84 E-03
	880919 to 880926	* 7.88 E-04	9.37 E-03

(a) Sampler malfunction from 7/25/88 to 7/28/88; low 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	880926 to 881003		* 1.96 E-03	9.63 E-03
	881003 to 881010		* 7.64 E-03	1.09 E-02
	881010 to 881017	(a)	* 9.56 E-03	7.16 E-02
	881017 to 881024		* 2.13 E-03	9.97 E-03
	881024 to 881031		*-4.85 E-03	9.97 E-03
	881031 to 881107		*-1.82 E-03	9.45 E-03
	881107 to 881114		* 1.46 E-03	1.13 E-02
	881114 to 881121		*-1.66 E-02	1.71 E-02
	881121 to 881128		* 4.45 E-03	1.35 E-02
	881128 to 881205		* 1.18 E-03	8.67 E-03
	881205 to 881212		*-1.23 E-03	8.59 E-03
	881212 to 881219		* 2.50 E-03	9.19 E-03
	881219 to 881227		*-2.87 E-03	7.52 E-03

(a) Sampler malfunction; low 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	871228 to 880104	*-8.29 E-03	8.99 E-03
	881004 to 880111	*-2.27 E-03	1.15 E-02
	880111 to 880118	*-1.00 E-02	9.38 E-03
	880118 to 880125	*-8.31 E-03	1.17 E-02
	880125 to 880201	* 5.76 E-04	1.21 E-02
	880201 to 880208	* 1.12 E-03	9.40 E-03
	880208 to 880216	* 3.48 E-03	6.79 E-03
	880216 to 880222	*-3.28 E-03	1.03 E-02
	880222 to 880229	* 5.21 E-03	8.41 E-03
	880229 to 880307	* 2.17 E-03	8.69 E-03
	880307 to 880314	* 1.73 E-03	9.25 E-03
	880314 to 880321	* 4.46 E-03	1.19 E-02
	880321 to 880328	* 4.46 E-03	1.19 E-02
	880328 to 880404	* 6.33 E-03	9.52 E-03
	880404 to 880411	* 1.45 E-03	8.68 E-03
	880411 to 880418	* 6.23 E-03	1.24 E-02
	880418 to 880425	*-2.66 E-03	8.18 E-03
	880425 to 880502	*-1.57 E-03	8.38 E-03
	880502 to 880509	* 8.07 E-04	9.48 E-03
	880509 to 880516	* 3.46 E-03	9.47 E-03
	880516 to 880523	*-2.18 E-03	8.81 E-03
	880523 to 880531	*-2.99 E-03	7.16 E-03
	880531 to 880606	* 5.64 E-04	1.02 E-02
	880606 to 880613	*-3.96 E-04	9.85 E-03
	880613 to 880620	* 1.21 E-03	8.79 E-03
	880620 TO 880627	* 4.51 E-03	9.09 E-03
	880627 to 880705	*-3.70 E-03	8.00 E-03
	880705 to 880711	*-3.62 E-04	1.47 E-02
	880711 to 880718	*-4.72 E-03	9.22 E-03
	880718 to 880725	*-1.53 E-03	9.77 E-03
	880725 to 880801	*-9.45 E-04	1.36 E-02
	880801 to 880808	* 1.29 E-03	1.27 E-02
	880808 to 880815	*-3.40 E-03	9.84 E-03
	880815 to 880822	*-5.27 E-03	8.51 E-03
	880822 to 880829	*-2.10 E-03	9.67 E-03
	880829 to 880906	* 1.78 E-03	6.79 E-03
	880906 to 880912	*-2.95 E-03	1.27 E-02
	880912 to 880919	*-6.32 E-03	8.48 E-03
	880919 to 880926	* 7.93 E-04	9.42 E-03

* 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	880926 to 991003	* 1.96 E-03	9.66 E-03
	881003 to 881010	* 7.71 E-03	1.10 E-02
	881010 to 881017	* 1.32 E-03	9.87 E-03
	881017 to 881024	* 2.14 E-03	1.00 E-02
	881024 to 881031	*-4.87 E-03	1.00 E-02
	881031 to 881107	*-1.83 E-03	9.51 E-03
	881107 to 881114	* 1.46 E-03	1.13 E-02
	881114 to 881121	*-1.68 E-02	1.72 E-02
	881121 to 881128	* 4.48 E-03	1.36 E-02
	881128 to 881205	* 1.19 E-03	8.75 E-03
	881205 to 881212	*-1.24 E-03	8.61 E-03
	881212 to 881219	* 2.53 E-03	9.30 E-03
	881219 to 881227	*-2.88 E-03	7.56 E-03

* 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	871228 to 880104	*-8.35 E-03	9.05 E-03
	880104 to 880111	*-2.30 E-03	1.17 E-02
	880111 to 880118	*-1.01 E-02	9.44 E-03
	880118 to 880125	*-8.39 E-03	1.18 E-03
	880125 to 880201	* 5.81 E-04	1.22 E-02
	880201 to 880208 (a)	* 1.15 E-03	9.62 E-03
	880208 to 880216 (a)	* 3.67 E-03	7.16 E-03
	880216 to 880222	*-3.32 E-03	1.04 E-02
	880222 to 880229 (a)	* 7.47 E-03	1.21 E-02
	880229 to 880307	* 2.18 E-03	8.74 E-03
	880307 to 880314	* 1.76 E-03	9.40 E-03
	880314 to 880321	*-1.08 E-03	9.86 E-03
	880321 to 880328	* 4.50 E-03	1.20 E-02
	880328 to 880404	* 6.35 E-03	9.55 E-03
	880404 to 880411	* 1.47 E-03	8.75 E-03
	880411 to 880418	* 6.31 E-03	1.26 E-02
	880418 to 880425	*-2.69 E-03	8.28 E-03
	880425 to 880502	*-1.58 E-03	8.43 E-03
	880502 to 880509	* 8.14 E-04	9.56 E-03
	880509 to 880516	* 3.50 E-03	9.59 E-03
	880516 to 880523	*-2.21 E-03	8.93 E-03
	880523 to 880531 (a)	*-3.03 E-03	7.26 E-03
	880531 to 880606	* 6.14 E-04	1.11 E-02
	880606 to 880613	*-4.00 E-04	9.95 E-03
	880613 to 880620	* 1.22 E-03	8.88 E-03
	880620 to 880627	* 4.55 E-03	9.17 E-03
	880627 to 880705	*-3.73 E-03	8.07 E-03
	880705 to 880711	*-3.65 E-04	1.48 E-02
	880711 to 880718	*-4.76 E-03	9.30 E-03
	880718 to 880725	*-1.54 E-03	9.87 E-03
	880725 to 880801	*-9.59 E-04	1.38 E-02
	880801 to 880808 (b)	* 4.18 E-03	4.12 E-02
	880808 to 880815	*-3.43 E-03	9.92 E-03
	880815 to 880822	*-5.32 E-03	8.59 E-03
	880822 to 880829	* 2.12 E-03	9.79 E-03
	880829 to 880906 (b)	* 2.55 E-03	9.70 E-03
	880906 to 880912	*-2.96 E-03	1.28 E-02
	880912 to 880919	*-6.38 E-03	8.56 E-03
	880919 to 880926	* 8.00 E-04	9.51 E-03

(a) 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
21	880926 to 881003	* 1.97 E-03	9.70 E-03
	881003 to 881010	* 7.79 E-03	1.11 E-02
	881010 to 881017	* 1.33 E-03	9.95 E-03
	881017 to 881024	* 2.15 E-03	1.01 E-02
	881024 to 881031	*-4.91 E-03	1.01 E-02
	881031 to 881107	*-1.85 E-03	9.64 E-03
	881107 to 881114	* 1.48 E-03	1.14 E-02
	881114 to 881121	*-1.68 E-02	1.73 E-02
	881121 to 881128	* 4.57 E-03	1.39 E-02
	881128 to 881205	* 1.19 E-03	8.76 E-03
	881205 to 881212	*-1.24 E-03	8.66 E-03
	881212 to 881219	* 2.57 E-03	9.45 E-03
	881219 to 881227	*-2.90 E-03	7.62 E-03

* 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	871228 to 880104	*-8.35 E-03	9.05 E-03
	880104 to 880111	*-2.30 E-03	1.16 E-02
	880111 to 880118	*-1.01 E-02	9.43 E-03
	880118 to 880125 (a)	*-9.94 E-03	1.40 E-02
	880125 to 880201	* 5.81 E-04	1.22 E-02
	880202 to 880208	* 1.13 E-03	9.48 E-03
	880208 to 880216	* 3.50 E-03	6.83 E-03
	880216 to 880222	*-3.32 E-03	1.04 E-02
	880222 to 880229	* 5.25 E-03	8.49 E-03
	880229 to 880307	* 2.18 E-03	8.73 E-03
	880307 to 880314	* 1.75 E-03	9.37 E-03
	880314 to 880321	*-1.11 E-03	1.02 E-02
	880321 to 880328	* 4.50 E-03	1.20 E-02
	880328 to 880404	* 6.35 E-03	9.55 E-03
	880404 to 880411	* 1.46 E-03	8.71 E-03
	880411 to 880418	* 6.30 E-03	1.26 E-02
	880418 to 880425	*-2.69 E-03	8.27 E-03
	880425 to 880502 (a)	*-1.94 E-03	1.04 E-02
	880502 to 880509	* 8.13 E-04	9.55 E-03
	880509 to 880516	* 3.49 E-03	9.58 E-03
	880516 to 880523	*-2.20 E-03	8.88 E-03
	880523 to 880531	*-3.02 E-03	7.23 E-03
	880531 to 880606	* 6.21 E-04	1.13 E-02
	880606 to 880613	*-3.99 E-04	9.94 E-03
	880613 to 880620	* 1.22 E-03	8.87 E-03
	880620 to 880627	* 4.54 E-03	9.16 E-03
	880627 to 880705	*-3.72 E-03	8.06 E-03
	880705 to 880711	*-3.65 E-04	1.48 E-02
	880711 to 880718	*-4.75 E-03	9.29 E-03
	880718 to 880725	*-1.53 E-03	9.82 E-03
	880725 to 880801	*-9.59 E-04	1.38 E-02
	880801 to 880808	* 1.30 E-03	1.28 E-02
	880808 to 880815	*-3.43 E-03	9.92 E-03
	081588 to 880822	*-5.33 E-03	8.61 E-03
	880822 to 880829 (a)	*-2.16 E-03	9.97 E-03
	880829 to 880906	* 1.81 E-03	6.87 E-03
	880906 to 880912	*-2.96 E-03	1.28 E-02
	880912 to 880919	*-6.65 E-03	8.91 E-03
	880919 to 880926	* 8.00 E-04	9.50 E-03

(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
23	880926 to 881003	* 1.97 E-03	9.67 E-03
	881003 to 881010	* 7.78 E-03	1.11 E-02
	881010 to 881017	* 1.33 E-03	9.95 E-03
	881017 to 881024	* 2.15 E-03	1.01 E-02
	881024 to 881031	*-4.90 E-03	1.01 E-02
	881031 to 881107	*-1.85 E-03	9.63 E-03
	881107 to 881114	* 1.48 E-03	1.14 E-02
	881114 to 881121	*-1.68 E-02	1.73 E-02
	881121 to 881128	* 4.57 E-03	1.39 E-02
	881128 to 881205 (a)	* 1.24 E-03	9.08 E-03
	881205 to 881212	*-1.24 E-03	8.66 E-03
	881212 to 881219	* 2.57 E-03	9.44 E-03
	881219 to 881227	*-2.90 E-03	7.62 E-03

(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
40	871228 to 880104	*-4.32 E-03	4.68 E-03
	881004 to 880111	*-1.46 E-03	7.39 E-03
	880111 to 880118	*-8.11 E-03	7.58 E-03
	880118 to 880125	*-5.36 E-03	7.53 E-03
	880125 to 880201	* 3.36 E-04	7.06 E-03
	880201 to 880208	* 5.85 E-04	4.91 E-03
	880208 to 880216	* 2.06 E-03	4.01 E-03
	880216 to 880222	*-1.94 E-03	6.07 E-03
	880222 to 880229	* 3.08 E-03	4.97 E-03
	880229 to 880307	* 1.02 E-03	5.48 E-03
	880307 to 880314	* 1.02 E-03	5.48 E-03
	880314 to 880321	*-8.59 E-04	7.87 E-03
	880321 to 880328 (a)	* 1.28 E-02	3.41 E-02
	880328 to 880404	* 3.31 E-03	4.97 E-03
	880404 to 880411	* 7.59 E-04	4.53 E-03
	880411 to 880418	* 5.32 E-03	1.06 E-02
	880418 to 880425	*-1.57 E-03	4.84 E-03
	880425 to 880502	*-9.21 E-04	4.93 E-03
	880502 to 880509	* 4.21 E-04	4.95 E-03
	880509 to 880516	* 1.80 E-03	4.94 E-03
	880516 to 880523	*-1.14 E-03	4.61 E-03
	880523 to 880531	*-1.56 E-03	3.74 E-04
	880531 to 880606	* 2.94 E-04	5.33 E-03
	880606 to 880613	*-2.06 E-04	5.12 E-03
	880613 to 880620	* 6.35 E-04	4.61 E-03
	880620 to 880627	* 2.35 E-03	4.75 E-03
	880627 to 880705	*-1.93 E-03	4.17 E-03
	880705 to 880711	*-2.32 E-04	9.41 E-03
	880711 to 880718	*-2.46 E-03	4.82 E-03
	880718 to 880725	*-7.95 E-04	5.09 E-03
	880725 to 880801	*-5.52 E-04	7.92 E-03
	880801 to 880808	* 8.33 E-04	8.22 E-03
	880808 to 880815	*-1.78 E-03	5.14 E-03
	880815 to 880822	*-3.11 E-03	5.03 E-03
	880822 to 880829	* 1.10 E-03	5.06 E-03
	880829 to 880906	* 1.05 E-03	4.01 E-03
	880906 to 880912	*-1.90 E-03	8.19 E-03
	880912 to 880919	*-3.74 E-03	5.02 E-03
	880919 to 880926	* 4.14 E-04	4.92 E-03

(a) Sampler malfunction; low 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	880926 to 881003	* 1.16 E-03	5.71 E-03
	881003 to 881010	* 4.97 E-03	7.09 E-03
	881010 to 881017	* 6.88 E-04	5.16 E-03
	881017 to 881024	* 1.12 E-03	5.24 E-03
	881024 to 881031	*-2.88 E-03	5.92 E-03
	881031 to 881107	*-1.08 E-03	5.62 E-03
	881107 to 881114	* 9.43 E-04	7.29 E-03
	881114 to 881121	*-1.08 E-02	1.11 E-02
	881121 to 881128	* 2.62 E-03	7.95 E-03
	881128 to 881205	* 7.66 E-04	5.62 E-03
	881205 to 881212	*-7.22 E-04	5.03 E-03
	881212 to 881219	* 2.12 E-03	7.81 E-03
	881219 to 881227	*-2.44 E-03	6.41 E-03

* 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	871228 to 880104	* 2.17 E-03	7.37 E-03
	880104 to 880111	* 0.00 E+00	1.18 E-02
	880111 to 880118	* 0.00 E+00	1.44 E-02
	880118 to 880125	*-1.61 E-03	8.17 E-03
	880125 to 880201	* 2.62 E-03	1.06 E-02
	880201 to 880208	* 2.81 E-04	8.13 E-03
	880208 to 880216	* 5.80 E-03	9.74 E-03
	880216 to 880222	*-7.66 E-03	1.50 E-02
	880222 to 880229	*-1.84 E-03	1.18 E-02
	880229 to 880307	* 4.53 E-03	1.32 E-02
	880307 to 880314	* 4.01 E-03	1.30 E-02
	880314 to 880321	* 6.87 E-03	1.33 E-02
	880321 to 880328	* 1.13 E-02	1.04 E-02
	880328 to 880404	* 0.00 E+00	8.17 E-03
	880404 to 880411	* 4.26 E-04	7.68 E-03
	880411 to 880418	*-1.07 E-03	1.23 E-02
	880418 to 880425	* 1.67 E-03	1.00 E-02
	880425 to 880502	* 7.35 E-03	1.19 E-02
	880502 to 880509	* 2.27 E-03	8.22 E-03
	880509 to 880516 (a)	*-3.80 E-02	5.87 E-02
	880516 to 880523	* 7.16 E-03	7.53 E-03
	880523 to 880531	*-4.65 E-03	7.13 E-03
	880531 to 880606 (b)	* 2.52 E-02	2.91 E-02
	880606 to 880613	*-4.63 E-04	8.22 E-03
	880613 to 880620	* 3.21 E-03	7.45 E-03
	880620 to 880627	*-1.07 E-04	7.27 E-03
	880627 to 880705	* 1.02 E-03	6.92 E-03
	880705 to 880711	*-1.08 E-02	1.51 E-02
	880711 to 880718	* 2.66 E-03	7.77 E-03
	880718 to 880725	* 3.04 E-03	8.17 E-03
	880725 to 880801	*-8.80 E-04	1.21 E-02
	880801 to 880808	*-3.92 E-03	1.26 E-02
	880808 to 880815	*-5.41 E-03	8.55 E-03
	880815 to 880822	*-5.31 E-03	1.17 E-02
	880822 to 880829	* 8.50 E-03	8.36 E-03
	880829 to 880906	*-4.85 E-03	1.02 E-02
	880906 to 880912	* 1.30 E-03	1.35 E-02
	880912 to 880919	* 3.37 E-03	1.15 E-02
	880919 to 880926	*-8.37 E-04	8.31 E-03

(a) Low sampling time.
(b) Blown fuse; 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	880926 to 881003	*-1.63 E-02	1.19 E-02
	881003 to 881010	*-6.35 E-04	1.15 E-02
	881010 to 881017	*-7.25 E-04	8.14 E-03
	881017 to 881024	*-7.71 E-03	1.23 E-02
	881024 to 881031	* 7.69 E-04	1.38 E-02
	881031 to 881107	*-5.36 E-03	1.31 E-02
	881107 to 881114	* 1.94 E-03	7.96 E-03
	881114 to 881121	*-4.00 E-03	1.59 E-02
	881121 to 881128	*-4.54 E-04	1.17 E-02
	881128 to 881205	*-2.06 E-03	8.36 E-03
	881205 to 881212	*-3.23 E-03	9.32 E-03
	881212 to 881219	*-3.21 E-03	8.67 E-03
	881219 to 881227	*-7.54 E-03	7.16 E-03

* 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	871228 to 880104	* 2.21 E-03	7.51 E-03
	880104 to 880111	* 0.00 E+00	1.21 E-02
	880111 to 880118	* 0.00 E+00	1.46 E-02
	880118 to 880125	*-1.64 E-03	8.31 E-03
	880125 to 880202	* 2.67 E-03	1.08 E-02
	880202 to 880208	* 2.86 E-04	8.28 E-03
	880208 to 880216	* 5.88 E-03	9.88 E-03
	880216 to 880222	*-7.85 E-03	1.54 E-02
	880222 to 880229	*-1.87 E-03	1.20 E-02
	880229 to 880307	* 4.64 E-03	1.35 E-02
	880307 to 880314	* 4.08 E-03	1.32 E-02
	880314 to 880321	* 7.01 E-03	1.36 E-02
	880321 to 880328	* 1.15 E-02	1.06 E-02
	880328 to 880404	* 0.00 E+00	8.30 E-03
	880404 to 880411	* 4.33 E-04	7.81 E-03
	880411 to 880418	*-1.09 E-03	1.26 E-02
	880418 to 880425	* 1.70 E-03	1.02 E-02
	880425 to 880502	* 7.48 E-03	1.21 E-02
	880502 to 880509	* 2.31 E-03	8.36 E-03
	880509 to 880516	*-5.33 E-03	8.24 E-03
	880516 to 880523	* 7.26 E-03	7.64 E-03
	880523 to 880531	*-3.97 E-03	6.09 E-03
	880531 to 880606	* 7.96 E-03	9.16 E-03
	880606 to 880613	*-4.72 E-04	8.38 E-03
	880613 to 880620	* 3.25 E-03	7.54 E-03
	880620 to 880627	*-1.09 E-04	7.41 E-03
	880627 to 880705	* 1.04 E-03	7.06 E-03
	880705 to 880711	*-1.10 E-02	1.54 E-02
	880711 to 880718	* 2.69 E-03	7.88 E-03
	880718 to 880725	* 3.09 E-03	8.31 E-03
	880725 to 880801	*-8.96 E-04	1.23 E-02
	880801 to 880808	*-3.99 E-03	1.28 E-02
	880808 to 880815	* 5.50 E-03	8.70 E-03
	880815 to 880822	*-5.42 E-03	1.19 E-02
	880822 to 880829	*-8.65 E-03	8.51 E-03
	880829 to 880906	*-4.96 E-03	1.04 E-02
	880906 to 880912	* 1.32 E-03	1.37 E-02
	880912 to 880919	* 3.43 E-03	1.18 E-02
	880919 to 880926	*-8.51 E-04	8.45 E-03

* 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	880926 to 881003	*-1.65 E-02	1.21 E-02
	881003 to 881010	*-6.49 E-04	1.18 E-02
	881010 to 881017	*-7.34 E-04	8.25 E-03
	881017 to 881024	*-7.71 E-03	1.25 E-02
	881024 to 881031	* 7.81 E-04	1.40 E-02
	881031 to 881107	*-5.48 E-03	1.34 E-02
	881107 to 881114	* 1.98 E-03	8.10 E-03
	881114 to 881121	*-4.07 E-03	1.62 E-02
	881121 to 881128	*-4.59 E-04	1.18 E-02
	881128 to 881205	*-2.12 E-03	8.57 E-03
	881205 to 881212	*-3.27 E-03	9.42 E-03
	881212 to 881219	*-3.32 E-03	8.97 E-03
	881219 to 881227	*-7.66 E-03	7.27 E-03

* 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)	-7.48E-04	-3.80E-02	2.52E-02	572	0
I-131	(C)	-5.40E-04	-1.68E-02	7.71E-03	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	871216 to 880113	1.6 E+00	7.0 E-01
	880113 to 880216	2.0 E+00	7.0 E-01
	880216 to 880316	1.7 E+00	7.0 E-01
	880316 to 880413	4.7 E+00	9.0 E-01
	880413 to 880518 (a)	2.5 E+00	8.0 E-01
	880518 to 880615	2.0 E+00	8.0 E-01
	880615 to 880720 (a)	2.5 E+00	8.0 E-01
	880720 to 880817 (a)	2.1 E+00	7.0 E-01
	880817 to 880914	2.4 E+00	9.0 E-01
	880914 to 881012	1.6 E+00	7.0 E-01
	881012 to 881116	3.0 E+00	8.0 E-01
	881116 to 881215	1.1 E+00	7.0 E-01
28	871216 to 880113	1.9 E+00	7.0 E-01
	880113 to 880216	2.3 E+00	7.0 E-01
	880216 to 880316	2.1 E+00	7.0 E-01
	880316 to 880413	3.3 E+00	8.0 E-01
	880413 to 880518	3.6 E+00	8.0 E-01
	880518 to 880615	* 7.7 E-01	7.0 E-01
	880615 to 880720	3.4 E+00	8.0 E-01
	880720 to 880817	2.9 E+00	8.0 E-01
	880817 to 880914	2.1 E+00	8.0 E-01
	880914 to 881012	1.3 E+00	7.0 E-01
	881012 to 881116	2.6 E+00	8.0 E-01
	881116 to 881218	1.7 E+00	8.0 E-01
29	871216 to 880113	2.1 E+00	7.0 E-01
	880113 to 880216	2.2 E+00	7.0 E-01
	880216 to 880316	1.9 E+00	7.0 E-01
	880316 to 880413	1.7 E+00	7.0 E-01
	880413 to 880518	3.0 E+00	8.0 E-01
	880518 to 880615	2.0 E+00	8.0 E-01
	880615 to 880720	2.0 E+00	7.0 E-01
	880720 to 880817	3.4 E+00	8.0 E-01
	880817 to 880914	1.2 E+00	8.0 E-01
	880914 to 881012	1.6 E+00	7.0 E-01
	881012 to 881116	2.1 E+00	8.0 E+00
	881116 to 881215	1.9 E+00	8.0 E-01

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

TABLE A-5.1

GROSS BETA IN WATER

Results in pCi/liter

LOCATION	COLLECTION PERIOD	RESULT	OVERALL UNCERTAINTY
	Discharge		
27	871216 to 880113	3.3 E+01	3.0 E+00
	880113 to 880216	3.0 E+01	3.0 E+00
	880217 to 880316	1.4 E+01	2.0 E+00
	880316 to 880413 (a)	2.7 E+01	3.0 E+00
	880413 to 880518 (a)	1.4 E+01	2.0 E+00
	880518 to 880615 (a)	3.8 E+00	1.0 E+00
	880615 to 880720	1.5 E+01	2.0 E+00
	880720 to 880817 (b)		
	880817 to 880914 (a)	1.9 E+01	2.0 E+00
	880914 to 881012	2.6 E+01	3.0 E+00
	881012 to 881116	2.9 E+01	3.0 E+00
	881212 to 881215 (c)	2.3 E+01	3.0 E+00

(a) Sampler not operational during part of this period.

(b) Sample not collected due to equipment failure.

(c) Sample out of service until 12/12/89; grab samples collected from 12/09/88 to 12/11/88.

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)	2.22E+00	7.70E-01	3.60E+00	24	23
Gr-Beta (C)	2.26E+00	1.10E+00	4.70E+00	12	12
		Discharge (a)			
Gr-Beta (I)	2.13E+01	3.80E+00	3.30E+01	11	11

(a) Duplicate Station 72 results 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	871216 to 880316	* 6.0 E+01	7.08 E+01
	880316 to 880615 (a)	2.8 E+02	7.00 E+01
	880615 to 880914 (a)	* 1.8 E+02	1.50 E+02
	880914 to 881215	* 1.1 E+02	8.79 E+01
28	871216 to 880316	2.0 E+02	1.00 E+02
	880316 to 880615	2.2 E+02	1.30 E+02
	880615 to 880914	2.3 E+02	1.00 E+02
	880914 to 881215	* 4.9 E+01	7.33 E+01
29	871216 to 880316	2.0 E+02	1.00 E+02
	880316 to 880615	* 1.1 E+02	8.00 E+01
	880615 to 880914	2.9 E+02	1.00 E+02
	880914 to 881215	* 9.4 E+01	8.16 E+01
	Discharge		
27	871216 to 880316 (a)	4.7 E+02	1.30 E+02
	880316 to 880615 (a)	8.9 E+02	1.30 E+02
	880615 to 880914 (a)	4.4 E+03	1.00 E+02
	880914 to 881215 (a)	4.7 E+02	1.20 E+02
	Ground		
31 (Well 1)	880316	*-1.2 E+01	7.58 E+01
	880615	1.4 E+02	8.00 E+01
	880915	* 2.3 E+01	6.60 E+01
	881214	*-6.9 E+01	1.31 E+02
32 (Well 2)	880316	1.2 E+02	6.00 E+01
	880615	2.2 E+02	1.00 E+02
	880915	* 3.9 E+01	6.70 E+01
	881214	* 1.0 E+01	1.11 E+02

(a) 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	
52 (Well 3)	880316	2.8 E+02	1.10 E+02
	880615	1.9 E+02	1.00 E+02
	880615	* 8.5 E+01	8.50 E+01
	881214	* 2.1 E+01	8.90 E+01

* 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)	1.74E+02	4.90E+01	2.90E+02	8	5
H-3	(C)	1.58E+01	6.00E+01	2.80E+02	4	1
			Discharge (a)			
H-3	(I)	1.56E+03	4.70E+02	4.40E+03	4	4
			Ground			
H-3	(I)	8.70E+01	-6.90E+01	2.80E+02	12	5

(a) Duplicate Station 72 not included in averages.

(I) Indicator Station

(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	871216 to 880113	Be-7	*-6.08 E+00	1.70 E+01
		K-40	* 8.52 E+01	2.42 E+01
		Mn-54	*-6.66 E-02	1.69 E+00
		Co-58	*-5.31 E-01	1.85 E+00
		Fe-59	*-9.24 E-01	3.31 E+00
		Co-60	*-3.98 E-01	2.14 E+00
		Zn-65	*-2.20 E+00	3.82 E+00
		Zr-95	*-1.70 E+00	3.48 E+00
		Nb-95	* 1.38 E+00	1.85 E+00
		Cs-134	*-8.69 E-01	1.83 E+00
		Cs-137	*-6.40 E-02	2.00 E+00
		Ba-140	* 3.04 E+00	5.53 E+00
		La-140	* 1.05 E+00	2.16 E+00
		Ra-226	* 1.35 E+02	4.97 E+01
		Th-228	* 1.20 E+01	3.87 E+00
	880113 to 880216	Be-7	* 1.59 E+01	2.13 E+01
		K-40	* 6.17 E+02	4.08 E+01
		Mn-54	* 3.89 E-01	2.22 E+00
		Co-58	* 9.32 E-01	2.21 E+00
		Fe-59	* 2.87 E+00	4.58 E+00
		Co-60	* 3.68 E+00	2.36 E+00
		Zn-65	*-4.86 E+00	5.27 E+00
		Zr-95	*-1.32 E-01	4.55 E-01
		Nb-95	* 3.73 E-01	2.25 E+00
		Cs-134	* 2.15 E+00	2.54 E+00
		Cs-137	* 3.25 E+00	2.53 E+00
		Ba-140	*-8.69 E-01	7.55 E+00
		La-140	* 9.46 E-01	2.90 E+00
		Ra-226	* 6.36 E+01	5.45 E+01
		Th-228	* 1.34 E+01	4.34 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	880216 to 880316	Be-7	*-5.77 E+00	2.47 E+01
		K-40	* 9.03 E+02	5.99 E+01
		Mn-54	* 4.74 E-01	2.59 E+00
		Co-58	* 6.14 E-02	2.70 E+00
		Fe-59	* 2.19 E+00	5.65 E+00
		Co-60	* 1.48 E+00	2.61 E+00
		Zn-65	*-5.12 E+00	6.15 E+00
		Zr-95	* 3.17 E+00	5.37 E+00
		Nb-95	* 1.75 E-01	2.79 E+00
		Cs-134	* 6.41 E-01	2.78 E+00
		Cs-137	* 3.90 E+00	2.89 E+00
		Ba-140	* 4.75 E+00	9.74 E+00
		La-140	*-2.13 E+00	3.85 E+00
		Ra-226	* 5.99 E+01	5.40 E+01
		Th-228	* 1.52 E+01	4.73 E+00
	880316 to 880413	Be-7	*-3.48 E+00	1.36 E+01
		K-40	* 1.88 E+01	9.01 E+00
		Mn-54	* 5.33 E-01	7.28 E-01
		Co-58	* 3.05 E-01	1.19 E+00
		Fe-59	* 8.64 E-01	3.30 E+00
		Co-60	*-3.05 E-01	7.40 E-01
		Zn-65	* 7.46 E-02	1.83 E+00
		Zr-95	*-7.58 E-01	2.30 E+00
		Nb-95	*-4.34 E-02	1.18 E+00
		Cs-134	*-5.61 E-02	7.79 E-01
		Cs-137	* 4.90 E-01	7.32 E-01
		Ba-140	*-4.04 E-01	5.09 E+01
		La-140	* 1.03 E+01	2.24 E+01
		Ra-226	* 1.06 E+01	1.42 E+01
		Th-228	* 2.42 E+00	1.28 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	880413 to 880518 (a)	Be-7	*-4.22 E+00	1.48 E+01
		K-40	* 8.50 E+01	2.29 E+01
		Mn-54	* 1.09 E+00	1.61 E+00
		Co-58	*-4.93 E-02	1.51 E+00
		Fe-59	* 1.49 E+00	3.27 E+00
		Co-60	* 1.70 E+00	1.69 E+00
		Zn-65	*-2.89 E+00	3.70 E+00
		Zr-95	*-1.72 E+00	3.10 E+00
		Nb-95	* 7.44 E-01	1.59 E+00
		Cs-134	* 0.00 E+00	1.78 E+00
		Cs-137	* 2.52 E+00	1.83 E+00
		Ba-140	* 1.30 E+00	4.60 E+00
		La-140	* 6.89 E-01	1.83 E+00
		Ra-226	* 1.38 E+02	4.32 E+01
		Th-228	* 1.07 E+01	3.22 E+00
	880518 to 880615	Be-7	* 3.26 E-01	2.55 E+01
		K-40	* 4.36 E+02	3.87 E+01
		Mn-54	*-5.86 E-01	2.22 E+00
		Co-58	* 3.54 E-01	2.47 E+00
		Fe-59	*-1.16 E+00	5.30 E+00
		Co-60	* 3.13 E+00	2.33 E+00
		Zn-65	* 6.13 E+00	5.05 E+00
		Zr-95	* 5.38 E+00	5.15 E+00
		Nb-95	* 0.00 E+00	2.55 E+00
		Cs-134	* 3.84 E-01	2.40 E+00
		Cs-137	* 1.80 E+00	2.50 E+00
		Ba-140	* 5.66 E+00	1.53 E+01
		La-140	*-5.34 E+00	5.61 E+00
		Ra-226	* 2.90 E+01	5.30 E+01
		Th-228	* 1.16 E+00	4.17 E+00

(a) Sampler nonfunctional from 5/09/88 to 5/12/88.
* 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	880615 to 880720 (a)	Be-7	*-1.80 E+00	1.92 E+01
		K-40	* 9.26 E+01	2.86 E+01
		Mn-54	* 5.03 E-01	1.93 E+00
		Co-58	*-4.42 E-01	1.99 E+00
		Fe-59	*-1.69 E+00	3.96 E+00
		Co-60	* 2.16 E-01	2.26 E+00
		Zn-65	*-2.95 E+00	4.22 E+00
		Zr-95	*-0.00 E+00	3.92 E+00
		Nb-95	* 3.14 E+00	2.05 E+00
		Cs-134	* 1.40 E+00	2.15 E+00
		Cs-137	* 1.22 E+00	2.26 E+00
		Ba-140	* 1.33 E+00	7.27 E+00
		La-140	*-5.37 E-01	3.10 E+00
		Ra-226	* 1.15 E+02	5.23 E+01
		Th-228	* 1.04 E+01	4.00 E+00
	880811 to 880817	Be-7	* 8.05 E-01	1.59 E+01
		K-40	* 1.05 E+02	2.64 E+01
		Mn-54	* 1.05 E+00	1.78 E+00
		Co-58	* 1.07 E+00	1.81 E+00
		Fe-59	* 2.86 E+00	3.92 E+00
		Co-60	* 0.00 E+00	1.98 E+00
		Zn-65	*-8.43 E-01	4.18 E+00
		Zr-95	* 1.46 E+00	3.63 E+00
		Nb-95	* 0.00 E+00	1.80 E+00
		Cs-134	* 4.95 E-01	1.94 E+00
		Cs-137	*-1.24 E-01	1.93 E+00
		Ba-140	*-1.47 E+00	6.10 E+00
		La-140	* 1.55 E-01	2.68 E+00
		Ra-226	* 8.14 E+01	4.31 E+01
		Th-228	* 1.58 E+01	3.62 E+00

(a) Equipment malfunction; grab samples taken during a portion of this time.
* 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	880817 to 880914 (a)	Be-7	* 6.17 E+00	1.76 E+01
		K-40	* 1.02 E+02	2.28 E+01
		Mn-54	*-2.84 E-01	1.68 E+00
		Co-58	* 1.26 E+00	1.88 E+00
		Fe-59	* 3.74 E-01	3.76 E+00
		Co-60	* 1.07 E+00	1.96 E+00
		Zn-65	*-1.84 E+00	4.08 E+00
		Zr-95	*-5.55 E-01	3.63 E+00
		Nb-95	* 1.77 E+00	1.92 E+00
		Cs-134	* 2.53 E-01	1.79 E+00
		Cs-137	* 3.17 E+00	2.01 E+00
		Ba-140	*-1.45 E+00	7.90 E+00
		La-140	*-4.02 E+00	3.70 E+00
		Ra-226	* 1.11 E+02	3.86 E+01
		Th-228	* 1.47 E+01	3.22 E+00
	880914 to 881012	Be-7	* 1.29 E+00	2.65 E+01
		K-40	* 9.75 E+02	6.53 E+01
		Mn-54	* 1.78 E+00	2.79 E+00
		Co-58	* 2.75 E-01	2.83 E+00
		Fe-59	* 1.16 E+00	6.35 E+00
		Co-60	* 1.66 E+00	3.10 E+00
		Zn-65	*-5.05 E+00	6.70 E+00
		Zr-95	* 2.16 E+00	5.83 E+00
		Nb-95	* 7.19 E-01	2.87 E+00
		Cs-134	*-1.28 E+00	3.08 E+00
		Cs-137	* 1.25 E-01	3.03 E+00
		Ba-140	*-3.93 E+00	1.10 E+01
		La-140	*-3.03 E+00	4.79 E+00
		Ra-226	* 7.19 E+01	5.56 E+01
		Th-228	* 1.23 E+01	4.74 E+00

(a) Equipment malfunction; grab samples taken during a portion of this time.
* 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	881012 to 881116	Be-7	* 1.08 E+01	1.62 E+01
		K-40	* 9.49 E+01	2.27 E+01
		Mn-54	* 1.61 E+00	1.70 E+00
		Co-58	*-1.15 E+00	1.67 E+00
		Fe-59	*-1.17 E+00	3.76 E+00
		Co-60	*-1.39 E-01	1.80 E+00
		Zn-65	* 2.03 E+00	3.86 E+00
		Zr-95	* 2.02 E+00	3.50 E+00
		Nb-95	* 2.36 E+00	1.87 E+00
		Cs-134	* 3.47 E-01	1.77 E+00
		Cs-137	* 2.76 E+00	1.98 E+00
		Ba-140	* 2.69 E+00	6.80 E+00
		La-140	*-3.10 E+00	3.25 E+00
		Ra-226	* 7.61 E+01	3.84 E+01
		Th-228	* 1.42 E+01	3.17 E+00
	881116 to 881215	Be-7	* 2.55 E+00	1.86 E+01
		K-40	* 9.73 E+01	2.71 E+01
		Mn-54	* 1.48 E+00	1.93 E+00
		Co-58	*-1.54 E+00	1.99 E+00
		Fe-59	* 1.71 E-01	4.46 E+00
		Co-60	*-9.15 E-01	1.96 E+00
		Zn-65	* 2.44 E+00	4.50 E+00
		Zr-95	*-2.57 E-01	4.30 E+00
		Nb-95	* 3.97 E-01	2.16 E+00
		Cs-134	*-2.90 E-01	2.21 E+00
		Cs-137	* 3.34 E+00	2.31 E+00
		Ba-140	*-1.17 E+00	7.78 E+00
		La-140	*-7.51 E-01	3.85 E+00
		Ra-226	* 1.31 E+02	4.60 E+01
		Th-228	* 1.19 E+01	3.67 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	871216 to 880113	Be-7	* 7.46 E+00	2.41 E+01
		K-40	* 6.98 E+02	4.97 E+01
		Mn-54	* 2.23 E+00	2.52 E+00
		Co-58	*-1.99 E+00	2.57 E+00
		Fe-59	*-4.08 E+00	4.91 E+00
		Co-60	* 3.68 E+00	2.80 E+00
		Zn-65	* 3.57 E+00	5.89 E+00
		Zr-95	* 3.84 E+00	5.17 E+00
		Nb-95	* 1.84 E+00	2.58 E+00
		Cs-134	* 1.94 E+00	2.80 E+00
		Cs-137	* 8.82 E-01	2.91 E+00
		Ba-140	* 3.67 E+00	8.03 E+00
		La-140	*-2.93 E+00	3.02 E+00
		Ra-226	*-8.43 E+00	6.18 E+01
		Th-228	* 5.56 E+00	4.91 E+00
	880113 to 880216	Be-7	*-1.56 E+01	1.49 E+01
		K-40	* 9.85 E+01	2.12 E+01
		Mn-54	* 8.97 E-01	1.52 E+00
		Co-58	* 1.36 E-01	1.57 E+00
		Fe-59	* 1.06 E-01	3.18 E+00
		Co-60	* 6.68 E-02	1.67 E+00
		Zn-65	*-2.17 E+00	3.56 E+00
		Zr-95	* 3.17 E+00	3.13 E+00
		Nb-95	* 1.84 E+00	1.63 E+00
		Cs-134	* 4.38 E-01	1.71 E+00
		Cs-137	* 7.72 E-01	1.75 E+00
		Ba-140	* 2.60 E+00	4.94 E+00
		La-140	*-9.86 E-02	2.39 E+00
		Ra-226	* 1.24 E+02	4.09 E+01
		Th-228	* 8.78 E+00	3.19 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	880217 to 880316	Be-7	*-9.05 E-01	1.69 E+01
		K-40	* 8.82 E+01	2.48 E+01
		Mn-54	* 1.22 E+00	1.86 E+00
		Co-58	* 2.22 E-01	1.76 E+00
		Fe-59	*-2.86 E+00	3.70 E+00
		Co-60	* 1.19 E+00	2.19 E+00
		Zn-65	* 0.00 E+00	4.18 E+00
		Zr-95	*-1.77 E+00	3.44 E+00
		Nb-95	* 9.83 E-01	1.82 E+00
		Cs-134	* 1.55 E-01	2.02 E+00
		Cs-137	* 6.09 E-01	1.86 E+00
		Ba-140	*-2.80 E+00	6.85 E+00
		La-140	*-2.27 E+00	2.78 E+00
		Ra-226	* 1.31 E+02	4.64 E+01
		Th-228	* 1.36 E+01	3.64 E+00
	880316 to 880413	Be-7	* 1.39 E+01	1.91 E+01
		K-40	* 5.40 E+01	2.61 E+01
		Mn-54	*-1.42 E-01	1.96 E+00
		Co-58	*-1.10 E+00	2.07 E+00
		Fe-59	* 5.33 E-01	4.30 E+00
		Co-60	* 7.52 E-01	2.41 E+00
		Zn-65	* 2.75 E+00	4.32 E+00
		Zr-95	* 3.64 E+00	4.27 E+00
		Nb-95	* 1.11 E+00	2.15 E+00
		Cs-134	*-1.54 E-01	2.14 E+00
		Cs-137	* 6.03 E-01	2.22 E+00
		Ba-140	* 5.94 E+00	7.65 E+00
		La-140	*-5.63 E-01	3.55 E+00
		Ra-226	* 5.32 E+01	4.70 E+01
		Th-228	* 6.11 E+00	3.81 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	880413 to 880518	Be-7	* 6.33 E+00	1.49 E+01
		K-40	* 8.60 E+01	2.15 E+01
		Mn-54	* 1.11 E+00	1.49 E+00
		Co-58	*-1.87 E+00	1.51 E+00
		Fe-59	* 0.00 E+00	2.97 E+00
		Co-60	*-6.88 E-01	1.69 E+00
		Zn-65	* 9.41 E-01	3.47 E+00
		Zr-95	* 9.45 E-01	3.10 E+00
		Nb-95	* 1.46 E+00	1.57 E+00
		Cs-134	* 3.01 E-01	1.71 E+00
		Cs-137	* 1.86 E+00	1.75 E+00
		Ba-140	*-1.45 E+00	5.01 E+00
		La-140	*-5.08 E-01	2.20 E+00
		Ra-226	* 1.14 E+02	4.13 E+01
		Th-228	* 1.10 E+01	3.15 E+00
	880518 to 880615	Be-7	*-6.88 E+00	1.92 E+01
		K-40	* 9.50 E+01	2.35 E+01
		Mn-54	* 1.82 E+00	1.79 E+00
		Co-58	* 0.00 E+00	2.05 E+00
		Fe-59	*-9.82 E-01	4.42 E+00
		Co-60	* 6.68 E-01	1.96 E+00
		Zn-65	*-5.44 E+00	4.07 E+00
		Zr-95	* 0.00 E+00	3.86 E+00
		Nb-95	* 2.13 E+00	2.05 E+00
		Cs-134	* 1.21 E+00	2.03 E+00
		Cs-137	* 6.80 E-01	2.10 E+00
		Ba-140	*-1.69 E+00	1.20 E+01
		La-140	* 0.00 E+00	5.35 E+00
		Ra-226	* 1.09 E+02	4.60 E+01
		Th-228	* 9.76 E+00	3.54 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	880615 to 880720	Be-7	* 1.55 E+01	2.53 E+01
		K-40	* 1.75 E+02	3.82 E+01
		Mn-54	* 2.46 E+00	2.73 E+00
		Co-58	* 9.00 E-01	2.73 E+00
		Fe-59	*-1.50 E+00	5.39 E+00
		Co-60	* 1.31 E+00	2.99 E+00
		Zn-65	*-5.84 E+00	6.19 E+00
		Zr-95	*-1.98 E+00	5.63 E+00
		Nb-95	* 7.66 E-01	2.77 E+00
		Cs-134	* 4.46 E+00	3.04 E+00
		Cs-137	* 4.91 E+00	3.20 E+00
		Ba-140	*-4.67 E-01	9.29 E+00
		La-140	*-1.30 E+00	4.74 E+00
		Ra-226	* 1.12 E+02	5.43 E+01
		Th-228	* 8.45 E+01	6.32 E+00
	880720to 880817	Be-7	*-3.39 E-01	1.62 E+01
		K-40	* 6.17 E+01	2.33 E+01
		Mn-54	* 9.61 E-01	1.84 E+00
		Co-58	*-1.09 E-01	1.68 E+00
		Fe-59	* 2.04 E+00	3.78 E+00
		Co-60	*-3.93 E-01	2.10 E+00
		Zn-65	*-4.05 E-01	4.16 E+00
		Zr-95	* 2.31 E+00	3.71 E+00
		Nb-95	*-6.18 E-01	1.74 E+00
		Cs-134	*-1.39 E+00	2.09 E+00
		Cs-137	* 2.56 E-01	1.95 E+00
		Ba-140	* 2.59 E+00	5.71 E+00
		La-140	* 1.09 E+00	2.62 E+00
		Ra-226	* 8.60 E+01	3.71 E+01
		Th-228	* 8.07 E+00	3.08 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	880817 to 880914	Be-7	*-1.43 E+01	2.53 E+01
		K-40	* 3.30 E+02	3.71 E+01
		Mn-54	* 4.16 E+00	2.48 E+00
		Co-58	* 7.22 E-01	2.54 E+00
		Fe-59	* 1.51 E+00	5.21 E+00
		Co-60	* 2.84 E+00	2.52 E+00
		Zn-65	*-2.10 E+00	5.25 E+00
		Zr-95	*-2.86 E+00	5.44 E+00
		Nb-95	* 1.13 E+00	2.64 E+00
		Cs-134	* 3.33 E+00	2.74 E+00
		Cs-137	* 2.28 E+00	2.85 E+00
		Ba-140	* 7.95 E+00	1.17 E+01
		La-140	*-1.23 E+00	4.63 E+00
		Ra-226	* 1.69 E+02	5.85 E+01
		Th-228	* 7.88 E+01	5.54 E+00
	880914 to 881012	Be-7	* 6.10 E+00	1.95 E+01
		K-40	* 6.41 E+01	2.75 E+01
		Mn-54	* 8.01 E-02	2.01 E+00
		Co-58	* 9.16 E-01	1.99 E+00
		Fe-59	*-1.01 E+00	4.11 E+00
		Co-60	* 3.61 E-01	2.08 E+00
		Zn-65	*-1.03 E+00	4.43 E+00
		Zr-95	* 1.99 E+00	4.24 E+00
		Nb-95	* 1.18 E+00	2.17 E+00
		Cs-134	* 9.48 E-01	2.14 E+00
		Cs-137	* 3.01 E+00	2.37 E+00
		Ba-140	* 1.87 E+00	8.00 E+00
		La-140	*-8.81 E-01	3.61 E+00
		Ra-226	* 9.95 E+01	4.83 E+01
		Th-228	* 1.44 E+01	3.98 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	881012 to 881116	Be-7	*-6.15 E+00	2.38 E+01
		K-40	* 3.17 E+02	3.54 E+01
		Mn-54	* 1.23 E+00	2.35 E+00
		Co-58	* 9.85 E-02	2.51 E+00
		Fe-59	*-2.01 E+00	5.06 E+00
		Co-60	* 4.24 E+00	2.66 E+00
		Zn-65	*-6.61 E+00	5.30 E+00
		Zr-95	*-3.36 E+00	5.17 E+00
		Nb-95	* 8.41 E-01	2.52 E+00
		Cs-134	* 9.68 E-01	2.65 E+00
		Cs-137	* 2.24 E+00	2.72 E+00
		Ba-140	* 1.35 E+01	1.01 E+01
		La-140	* 1.28 E+00	3.95 E+00
		Ra-226	* 1.66 E+02	5.76 E+01
		Th-228	* 7.57 E+01	5.36 E+00
	881116 to 881215	Be-7	*-4.92 E+00	2.92 E+01
		K-40	* 2.61 E+02	4.06 E+01
		Mn-54	* 1.58 E+00	2.79 E+00
		Co-58	* 2.94 E+00	2.84 E+00
		Fe-59	* 0.00 E+00	5.69 E+00
		Co-60	* 6.90 E+00	3.11 E+00
		Zn-65	*-3.51 E-01	6.14 E+00
		Zr-95	* 4.10 E+00	6.21 E+00
		Nb-95	* 8.17 E-01	2.96 E+00
		Cs-134	* 1.56 E+00	3.18 E+00
		Cs-137	* 2.16 E+00	3.23 E+00
		Ba-140	* 2.86 E+00	1.16 E+01
		La-140	* 4.08 E+00	4.76 E+00
		Ra-226	* 1.31 E+02	6.88 E+01
		Th-228	* 8.33 E+01	6.50 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	871216 to 880113	Be-7	*-6.57 E+00	1.46 E+01
		K-40	* 8.13 E+01	2.19 E+01
		Mn-54	*-9.71 E-01	1.65 E+00
		Co-58	*-3.89 E-01	1.64 E+00
		Fe-59	* 6.16 E-01	3.56 E+00
		Co-60	* 1.78 E+00	1.99 E+00
		Zn-65	*-1.17 E+00	3.78 E+00
		Zr-95	* 1.18 E-01	3.36 E+00
		Nb-95	* 1.34 E+00	1.62 E+00
		Cs-134	* 0.00 E+00	1.80 E+00
		Cs-137	* 1.84 E-01	1.72 E+00
		Ba-140	*-1.45 E-01	4.96 E+00
		La-140	*-5.61 E-01	2.25 E+00
		Ra-226	* 4.90 E+01	3.79 E+01
		Th-228	* 1.29 E+01	3.28 E+00
	880113 to 880216	Be-7	*-1.33 E+01	2.02 E+01
		K-40	* 1.04 E+03	5.28 E+01
		Mn-54	* 1.24 E+00	2.11 E+00
		Co-58	* 5.66 E-01	2.17 E+00
		Fe-59	* 1.32 E+00	4.54 E+00
		Co-60	* 4.72 E-01	2.29 E+00
		Zn-65	*-8.09 E-01	5.17 E+00
		Zr-95	* 2.31 E+00	4.48 E+00
		Nb-95	* 1.26 E+00	2.22 E+00
		Cs-134	*-5.20 E-01	2.35 E+00
		Cs-137	* 3.91 E+00	2.45 E+00
		Ba-140	*-4.90 E-01	7.17 E+00
		La-140	* 8.77 E-02	3.00 E+00
		Ra-226	* 8.47 E+01	4.60 E+01
		Th-228	* 1.42 E+01	3.99 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	880216 to 880316	Be-7	* 3.77 E+01	3.24 E+01
		K-40	* 1.59 E+03	8.35 E+01
		Mn-54	* 2.84 E+00	3.44 E+00
		Co-58	*-5.34 E-01	3.53 E+00
		Fe-59	* 4.85 E-01	7.62 E+00
		Co-60	*-2.92 E-01	3.58 E+00
		Zn-65	*-1.57 E+01	8.38 E+00
		Zr-95	* 2.33 E+00	7.15 E+00
		Nb-95	* 2.08 E+00	3.58 E+00
		Cs-134	* 6.27 E-01	3.85 E+00
		Cs-137	* 6.07 E-01	3.76 E+00
		Ba-140	* 1.98 E+00	1.27 E+01
		La-140	* 6.51 E+00	5.45 E+00
		Ra-226	* 8.75 E+01	6.71 E+01
		Th-228	* 1.95 E+01	5.79 E+00
	880316 to 880413	Be-7	*-7.39 E+00	1.68 E+01
		K-40	* 7.16 E+01	2.54 E+01
		Mn-54	*-7.32 E-02	1.85 E+00
		Co-58	*-1.51 E-01	1.81 E+00
		Fe-59	* 9.13 E-01	3.55 E+00
		Co-60	* 7.71 E-01	2.02 E+00
		Zn-65	*-2.45 E+00	4.43 E+00
		Zr-95	*-3.19 E+00	3.77 E+00
		Nb-95	*-6.44 E-01	1.85 E+00
		Cs-134	* 1.42 E+00	2.07 E+00
		Cs-137	*-6.90 E-02	2.07 E+00
		Ba-140	* 0.00 E+00	6.99 E+00
		La-140	* 0.00 E+00	3.13 E+00
		Ra-226	* 1.10 E+02	4.80 E+01
		Th-228	* 1.70 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		
29	880413 to 880518	Be-7	*-6.10 E+00	1.34 E+01
		K-40	* 1.32 E+02	2.34 E+01
		Mn-54	* 1.23 E+00	1.47 E+00
		Co-58	*-5.25 E-01	1.35 E+00
		Fe-59	* 3.04 E+00	2.82 E+00
		Co-60	*-1.06 E+00	1.65 E+00
		Zn-65	*-2.17 E+00	3.19 E+00
		Zr-95	*-1.84 E+00	2.97 E+00
		Nb-95	* 2.07 E+00	1.52 E+00
		Cs-134	*-5.11 E-02	1.56 E+00
		Cs-137	*-5.39 E-01	1.65 E+00
		Ba-140	*-4.98 E+00	4.61 E+00
		La-140	*-7.35 E-01	2.14 E+00
		Ra-226	* 1.61 E+02	3.76 E+01
		Th-228	* 1.85 E+01	3.13 E+00
	880518 to 880615	Be-7	*-5.11 E+00	1.94 E+01
		K-40	* 1.31 E+02	2.65 E+01
		Mn-54	* 1.18 E-01	1.66 E+00
		Co-58	*-3.96 E-01	1.84 E+00
		Fe-59	* 8.39 E-01	4.33 E+00
		Co-60	* 1.11 E+00	1.99 E+00
		Zn-65	*-4.07 E+00	3.94 E+00
		Zr-95	* 1.72 E+00	3.91 E+00
		Nb-95	* 2.53 E+00	2.08 E+00
		Cs-134	* 5.01 E-01	1.84 E+00
		Cs-137	* 1.75 E+00	1.87 E+00
		Ba-140	* 9.17 E+00	1.21 E+01
		La-140	* 2.68 E-01	5.17 E+00
		Ra-226	* 1.91 E+02	4.44 E+01
		Th-228	* 2.12 E+01	3.75 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	880615 to 880720	Be-7	* 2.92 E+00	4.03 E+01
		K-40	* 4.38 E+02	7.59 E-01
		Mn-54	* 4.09 E+00	4.26 E+00
		Co-58	*-1.10 E+00	4.22 E+00
		Fe-59	* 3.63 E+00	8.88 E+00
		Co-60	* 2.05 E+00	4.38 E+00
		Zn-65	*-1.49 E+01	9.85 E+00
		Zr-95	*-1.07 E+01	8.61 E+00
		Nb-95	*-3.48 E-01	4.26 E+00
		Cs-134	* 2.51 E+00	4.76 E+00
		Cs-137	* 3.09 E+00	4.66 E+00
		Ba-140	* 9.80 E-01	1.53 E+01
		La-140	* 7.53 E+00	5.94 E+00
		Ra-226	* 2.36 E+02	9.97 E+01
		Th-228	* 6.08 E+01	8.65 E+00
	880720 to 880817	Be-7	* 6.62 E+00	3.07 E+01
		K-40	* 1.71 E+03	8.44 E+01
		Mn-54	* 2.37 E+00	3.36 E+00
		Co-58	* 2.35 E+00	3.46 E+00
		Fe-59	* 1.56 E+00	7.71 E+00
		Co-60	*-8.00 E-01	3.62 E+00
		Zn-65	*-3.76 E+00	8.56 E+00
		Zr-95	* 0.00 E+00	6.89 E+00
		Nb-95	* 2.93 E+00	3.43 E+00
		Cs-134	* 2.93 E+00	3.70 E+00
		Cs-137	* 1.41 E+00	3.76 E+00
		Ba-140	*-2.69 E+00	1.15 E+01
		La-140	* 7.25 E+00	5.10 E+00
		Ra-226	* 1.07 E+02	6.66 E+01
		Th-228	* 1.64 E+01	5.67 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	880817 to 880914	Be-7	*-2.40 E+00	2.12 E+01
		K-40	* 4.66 E+02	3.72 E+01
		Mn-54	* 8.32 E-01	2.08 E+00
		Co-58	* 1.01 E+00	2.24 E+00
		Fe-59	* 0.00 E+00	4.63 E+00
		Co-60	*-2.91 E-01	2.21 E+00
		Zn-65	*-9.11 E+00	5.12 E+00
		Zr-95	* 1.25 E+00	4.41 E+00
		Nb-95	* 1.17 E+00	2.25 E+00
		Cs-134	*-3.41 E-01	2.27 E+00
		Cs-137	* 1.05 E+00	2.39 E+00
		Ba-140	*-5.96 E+00	9.97 E+00
		La-140	* 5.54 E+00	4.23 E+00
		Ra-226	* 1.51 E+02	5.09 E+01
		Th-228	* 2.16 E+01	4.11 E+00
	880914 to 881012	Be-7	*-6.87 E+00	1.87 E+01
		K-40	* 5.90 E+01	2.53 E+01
		Mn-54	*-1.76 E+00	2.06 E+00
		Co-58	* 6.13 E-01	2.16 E+00
		Fe-59	*-4.88 E-01	4.54 E+00
		Co-60	* 1.05 E+00	2.17 E+00
		Zn-65	*-4.80 E+00	4.95 E+00
		Zr-95	* 0.00 E+00	4.05 E+00
		Nb-95	* 1.16 E+00	2.11 E+00
		Cs-134	*-2.82 E-01	2.25 E+00
		Cs-137	* 8.71 E-01	2.12 E+00
		Ba-140	* 3.33 E+00	8.14 E+00
		La-140	*-3.14 E+00	3.64 E+00
		Ra-226	* 9.79 E+01	4.14 E+01
		Th-228	* 8.86 E+00	3.38 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	881012 to 881116	Be-7	* 1.26 E+00	1.99 E+01
		K-40	* 4.14 E+02	3.52 E+01
		Mn-54	*-1.12 E+00	1.91 E+00
		Co-58	*-4.03 E-02	2.12 E+00
		Fe-59	* 0.00 E+00	4.24 E+00
		Co-60	* 2.91 E+00	2.10 E+00
		Zn-65	* 1.97 E-01	4.59 E+00
		Zr-95	* 4.47 E+00	4.26 E+00
		Nb-95	* 1.95 E+00	2.13 E+00
		Cs-134	* 1.13 E+00	2.18 E+00
		Cs-137	* 2.09 E+00	2.26 E+00
		Ba-140	* 2.09 E+00	8.19 E+00
		La-140	*-2.53 E+00	3.21 E+00
		Ra-226	* 8.59 E+01	4.86 E+01
		Th-228	* 8.81 E+00	3.82 E+00
	881116 to 881215	Be-7	*-3.30 E+00	2.35 E+01
		K-40	* 4.40 E+02	4.27 E+01
		Mn-54	* 7.33 E-01	2.30 E+00
		Co-58	*-2.35 E+00	2.40 E+00
		Fe-59	* 7.05 E-01	4.92 E+00
		Co-60	* 5.83 E-01	2.40 E+00
		Zn-65	*-1.72 E+00	5.32 E+00
		Zr-95	* 5.20 E+00	5.09 E+00
		Nb-95	* 4.40 E+00	2.67 E+00
		Cs-134	* 1.95 E+00	2.56 E+00
		Cs-137	* 5.35 E-01	2.73 E+00
		Ba-140	*-3.35 E-01	9.95 E+00
		La-140	* 4.72 E+00	3.73 E+00
		Ra-226	* 1.07 E+02	5.79 E+01
		Th-228	* 1.10 E+01	4.60 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	871216 to 880113	Be-7	* 2.54 E+00	2.31 E+01
		K-40	* 9.72 E+02	6.22 E+01
		Mn-54	*-1.72 E+00	2.48 E+00
		Co-58	*-2.54 E+00	2.40 E+00
		Fe-59	* 2.32 E+00	5.04 E+00
		Co-60	* 2.20 E+00	2.80 E+00
		Zn-65	*-6.00 E-01	6.21 E+00
		Zr-95	* 5.75 E+00	5.23 E+00
		Nb-95	* 7.81 E-01	2.54 E+00
		Cs-134	* 9.03 E-01	2.75 E+00
		Cs-137	* 1.09 E+00	2.81 E+00
		Ba-140	* 3.89 E-01	7.24 E+00
		La-140	*-1.74 E+00	2.82 E+00
		Ra-226	* 1.09 E+02	5.54 E+01
		Th-228	* 1.62 E+01	4.80 E+00
	880113 to 880216	Be-7	* 1.15 E+00	1.59 E+01
		K-40	* 1.04 E+02	2.42 E+01
		Mn-54	* 2.11 E+00	1.68 E+00
		Co-58	*-5.70 E-01	1.66 E+00
		Fe-59	*-2.49 E+00	3.35 E+00
		Co-60	* 9.25 E-01	1.94 E+00
		Zn-65	* 4.83 E-01	3.85 E+00
		Zr-95	* 3.22 E+00	3.38 E+00
		Nb-95	* 1.61 E+00	1.62 E+00
		Cs-134	*-5.08 E-02	1.82 E+00
		Cs-137	* 1.24 E+00	1.86 E+00
		Ba-140	* 3.40 E-01	5.41 E+00
		La-140	*-1.61 E+00	2.46 E+00
		Ra-226	* 7.52 E+01	3.88 E+01
		Th-228	* 1.05 E+01	3.16 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	880216 to 880316 (a)	Be-7	* 1.31 E+01	1.78 E+01
		K-40	* 1.32 E+02	2.88 E+01
		Mn-54	*-2.59 E-01	1.68 E+00
		Co-58	*-2.68 E-01	1.74 E+00
		Fe-59	* 1.13 E+00	3.83 E+00
		Co-60	* 1.84 E+00	2.06 E+00
		Zn-65	*-1.66 E-01	4.15 E+00
		Zr-95	* 2.34 E+00	3.57 E+00
		Nb-95	* 2.47 E+00	1.98 E+00
		Cs-134	* 1.82 E+00	1.97 E+00
		Cs-137	* 1.41 E+00	1.96 E+00
		Ba-140	* 2.91 E+00	6.85 E+00
		La-140	*-8.53 E-01	3.25 E+00
		Ra-226	* 1.40 E+02	4.44 E+01
		Th-228	* 1.04 E+01	3.54 E+00
	880316 to 880413 (a)	Be-7	* 1.12 E+01	1.66 E+01
		K-40	* 6.57 E+01	2.66 E+01
		Mn-54	* 1.22 E+00	1.68 E+00
		Co-58	* 1.48 E+00	1.78 E+00
		Fe-59	*-1.80 E-01	3.63 E+00
		Co-60	* 1.96 E+00	2.22 E+00
		Zn-65	* 4.28 E+00	4.01 E+00
		Zr-95	* 8.14 E-01	3.88 E+00
		Nb-95	* 2.80 E-01	1.89 E+00
		Cs-134	* 0.00 E+00	1.92 E+00
		Cs-137	* 4.71 E-01	1.94 E+00
		Ba-140	*-3.96 E-01	6.55 E+00
		La-140	* 1.91 E-01	3.31 E+00
		Ra-226	* 6.53 E+01	4.02 E+01
		Th-228	* 8.45 E+00	3.43 E+00

(a) Sampler nonfunctional during a portion of this time.
* 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	880413 to 880518 (a)	Be-7	* 7.09 E+00	1.41 E+01
		K-40	* 1.36 E+02	2.51 E+01
		Mn-54	* 1.52 E-01	1.49 E+00
		Co-58	* 1.02 E-01	1.41 E+00
		Fe-59	*-2.15 E+00	2.93 E+00
		Co-60	* 1.37 E+00	1.68 E+00
		Zn-65	*-2.20 E+00	3.30 E+00
		Zr-95	* 1.95 E+00	2.99 E+00
		Nb-95	* 1.34 E+00	1.49 E+00
		Cs-134	* 1.21 E+00	1.70 E+00
		Cs-137	* 3.28 E+00	1.78 E+00
		Ba-140	*-2.31 E-01	4.62 E+00
		La-140	*-1.93 E+00	2.04 E+00
		Ra-226	* 1.86 E+02	3.98 E+01
		Th-228	* 1.58 E+01	3.20 E+00
	880518 to 880615 (a)	Be-7	* 1.84 E+01	1.88 E+01
		K-40	* 7.19 E+01	2.40 E+01
		Mn-54	* 1.54 E+00	1.78 E+00
		Co-58	*-1.38 E-01	1.88 E+00
		Fe-59	* 1.24 E+00	4.61 E+00
		Co-60	* 0.00 E+00	1.90 E+00
		Zn-65	* 1.75 E+00	4.30 E+00
		Zr-95	*-1.28 E+00	4.03 E+00
		Nb-95	* 5.95 E-01	2.04 E+00
		Cs-134	* 1.64 E+00	1.91 E+00
		Cs-137	*-9.64 E-01	1.92 E+00
		Ba-140	*-9.15 E-01	1.16 E+01
		La-140	*-1.72 E+00	5.51 E+00
		Ra-226	* 9.08 E+01	4.24 E+01
		Th-228	* 1.46 E+01	3.46 E+00

(a) Sampler nonfunctional during a portion of this time.
* 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	880615 to 880720	Be-7	* 3.46 E+00	3.50 E+01
		K-40	* 1.85 E+03	9.45 E+01
		Mn-54	*-4.90 E-01	3.75 E+00
		Co-58	* 1.81 E+00	3.89 E+00
		Fe-59	*-2.82 E+00	8.07 E+00
		Co-60	* 7.18 E+00	4.07 E+00
		Zn-65	* 0.00 E+00	9.62 E+00
		Zr-95	* 1.45 E+00	7.56 E+00
		Nb-95	* 3.75 E+00	3.87 E+00
		Cs-134	* 5.35 E+00	4.19 E+00
		Cs-137	* 7.85 E+00	4.42 E+00
		Ba-140	*-5.95 E+00	1.40 E+01
		La-140	* 4.72 E+00	6.00 E+00
		Ra-226	* 9.14 E+01	7.08 E+01
		Th-228	* 1.55 E+01	6.18 E+00
	880720 to 880817	(a)		
	880817 to 880914 (a)	Be-7	* 7.21 E-01	1.89 E+01
		K-40	* 1.31 E+02	2.66 E+01
		Mn-54	* 1.07 E+00	1.89 E+00
		Co-58	* 1.14 E-01	1.94 E+00
		Fe-59	*-1.25 E+00	4.16 E+00
		Co-60	*-2.34 E-01	1.97 E+00
		Zn-65	* 1.36 E+00	3.90 E+00
		Zr-95	* 2.32 E+00	4.12 E+00
		Nb-95	* 1.41 E+00	1.86 E+00
		Cs-134	*-8.61 E-01	1.95 E+00
		Cs-137	* 1.36 E+00	2.07 E+00
		Ba-140	* 4.49 E+00	8.72 E+00
		La-140	* 2.18 E+00	3.59 E+00
		Ra-226	* 1.02 E+02	4.36 E+01
		Th-228	* 1.24 E+01	3.71 E+00

(a) Sampler nonfunctional; grab samples taken and/or attempted during a portion of this time.

* 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	880914 to 881012 (a)	Be-7	* 7.75 E+00	1.99 E+01
		K-40	* 1.17 E+02	3.03 E+01
		Mn-54	*-8.54 E-01	1.89 E+00
		Co-58	*-1.11 E+00	2.04 E+00
		Fe-59	* 7.17 E-01	4.41 E+00
		Co-60	* 8.51 E-01	2.21 E+00
		Zn-65	* 7.31 E-01	4.45 E+00
		Zr-95	* 2.45 E+00	4.24 E+00
		Nb-95	* 1.33 E+00	2.17 E+00
		Cs-134	* 7.67 E-02	2.14 E+00
		Cs-137	* 8.05 E-01	2.21 E+00
		Ba-140	*-5.44 E+00	8.27 E+00
		La-140	*-3.91 E-01	3.54 E+00
		Ra-226	* 1.30 E+02	5.01 E+01
		Th-228	* 1.25 E+01	3.95 E+00
	881012 to 881116 (a)	Be-7	* 1.16 E+00	1.58 E+01
		K-40	* 1.07 E+02	2.44 E+01
		Mn-54	*-6.91 E-01	1.60 E+00
		Co-58	* 1.92 E-01	1.66 E+00
		Fe-59	* 3.28 E+00	3.49 E+00
		Co-60	* 6.97 E-01	1.76 E+00
		Zn-65	* 4.89 E+00	3.64 E+00
		Zr-95	* 3.52 E-01	3.41 E+00
		Nb-95	* 2.32 E+00	1.72 E+00
		Cs-134	*-1.09 E+00	1.73 E+00
		Cs-137	* 9.50 E-01	1.78 E+00
		Ba-140	*-2.56 E+00	6.26 E+00
		La-140	* 0.00 E+00	2.66 E+00
		Ra-226	* 7.80 E+01	3.60 E+01
		Th-228	* 8.39 E+00	2.97 E+00

(a) Sampler malfunctional; grab samples taken and/or attempted during a portion of this time.

* 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	881116 to 881212 (a)			
	881212 to 881216	Be-7	*-9.93 E-01	2.15 E+01
		K-40	* 1.35 E+02	3.16 E+01
		Mn-54	*-1.52 E-01	2.12 E+00
		Co-58	*-2.14 E+00	2.24 E+00
		Fe-59	* 1.89 E-01	4.45 E+00
		Co-60	* 6.69 E-01	2.29 E+00
		Zn-65	* 1.35 E+00	4.54 E+00
		Zr-95	* 1.90 E+00	4.65 E+00
		Nb-95	*-3.76 E-01	2.27 E+00
		Cs-134	* 0.00 E+00	2.34 E+00
		Cs-137	* 3.97 E+00	2.62 E+00
		Ba-140	*-2.95 E+00	8.39 E+00
		La-140	* 2.04 E-01	3.66 E+00
		Ra-226	* 1.18 E+02	5.13 E+01
		Th-228	* 1.09 E+01	4.27 E+00

(a) Sample from 11/16/88 to 12/12/88 not collected due to sampler malfunction. Grab samples taken 12/09/88 to 12/12/88.

* Denotes a result less than the detection limit.

TABLE A-7.1 (Cont.)

GAMMA SPECTROMETRY OF WATER

Results in pCi/liter

LOCATION	COLLECTION DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
		Ground		
31 (Well 1)	880316	Be-7	* 1.64 E+01	2.72 E+01
		K-40	* 3.30 E+02	4.16 E+01
		Mn-54	* 2.67 E+00	2.74 E+00
		Co-58	* 3.95 E-01	2.80 E+00
		Fe-59	* 4.09 E+00	5.65 E+00
		Co-60	* 6.21 E+00	3.19 E+00
		Zn-65	*-8.26 E+00	6.38 E+00
		Zr-95	* 1.94 E+00	5.99 E+00
		Nb-95	* 2.87 E+00	2.96 E+00
		Cs-134	* 2.20 E+00	3.10 E+00
		Cs-137	* 1.69 E+00	3.17 E+00
		Ba-140	*-5.60 E+00	1.06 E+01
		La-140	* 2.46 E+00	4.28 E+00
		Ra-226	* 1.55 E+02	6.30 E+01
		Th-228	* 7.36 E+01	6.16 E+00
	880615	Be-7	* 4.16 E+00	2.05 E+01
		K-40	* 1.14 E+02	2.52 E+01
		Mn-54	*-1.08 E-01	1.82 E+00
		Co-58	*-1.81 E-01	2.16 E+00
		Fe-59	* 3.74 E+00	4.76 E+00
		Co-60	*-1.60 E-01	1.97 E+00
		Zn-65	*-2.80 E-01	4.09 E+00
		Zr-95	* 1.01 E+00	4.20 E+00
		Nb-95	* 2.07 E+00	2.20 E+00
		Cs-134	*-7.99 E-01	2.00 E+00
		Cs-137	* 1.68 E+00	2.15 E+00
		Ba-140	*-7.40 E+00	1.21 E+01
		La-140	*-2.29 E+00	5.77 E+00
		Ra-226	* 9.93 E+01	4.12 E+01
		Th-228	* 1.43 E+01	3.49 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 DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
		Ground		
31 (Well 1)	880915	Be-7	*-1.38 E+01	1.58 E+01
		K-40	* 8.32 E+01	2.26 E+01
		Mn-54	* 9.18 E-01	1.45 E+00
		Co-58	*-5.71 E-02	1.67 E+00
		Fe-59	* 1.40 E+00	3.48 E+00
		Co-60	* 7.25 E-01	1.74 E+00
		Zn-65	*-3.20 E+00	3.79 E+00
		Zr-95	*-2.53 E+00	3.32 E+00
		Nb-95	* 1.74 E+00	1.73 E+00
		Cs-134	* 8.13 E-01	1.77 E+00
		Cs-137	* 2.58 E+00	1.78 E+00
		Ba-140	* 1.95 E+00	7.13 E+00
		La-140	*-2.16 E+00	3.14 E+00
		Ra-226	* 8.97 E+01	4.02 E+01
		Th-228	* 1.48 E+01	3.29 E+00
	881215	Be-7	* 7.88 E+00	1.81 E+01
		K-40	* 9.08 E+01	2.72 E+01
		Mn-54	* 1.08 E+00	1.88 E+00
		Co-58	* 8.02 E-02	1.97 E+00
		Fe-59	* 1.56 E+00	4.22 E+00
		Co-60	* 4.61 E-01	1.95 E+00
		Zn-65	* 4.36 E+00	4.37 E+00
		Zr-95	* 1.92 E+00	3.79 E+00
		Nb-95	* 3.80 E-01	1.94 E+00
		Cs-134	* 5.81 E-01	1.97 E+00
		Cs-137	* 1.45 E+00	2.12 E+00
		Ba-140	* 5.22 E+00	7.70 E+00
		La-140	*-1.07 E+00	3.35 E+00
		Ra-226	* 1.02 E+02	4.88 E+01
		Th-228	* 9.29 E+00	3.70 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 DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
		Ground		
32 (Well 2)	880316	Be-7	* 6.79 E+00	2.83 E+01
		K-40	* 7.51 E+02	5.39 E+01
		Mn-54	* 1.11 E+00	2.81 E+00
		Co-58	* 5.46 E-01	2.91 E+00
		Fe-59	* 3.78 E+00	6.09 E+00
		Co-60	* 6.47 E+00	3.10 E+00
		Zn-65	*-4.68 E+01	7.89 E+00
		Zr-95	* 4.33 E+00	5.87 E+00
		Nb-95	* 6.47 E+00	3.09 E+00
		Cs-134	* 0.00 E+00	3.15 E+00
		Cs-137	* 3.11 E+00	3.15 E+00
		Ba-140	*-3.15 E+00	1.11 E+01
		La-140	* 2.58 E+00	4.37 E+00
		Ra-226	* 1.07 E+02	6.84 E+01
		Th-228	* 3.19 E+01	5.67 E+00
	880615	Be-7	*-1.77 E+00	2.23 E+01
		K-40	* 1.52 E+02	2.85 E+01
		Mn-54	* 2.43 E-01	2.00 E+00
		Co-58	*-2.73 E-01	2.23 E+00
		Fe-59	* 5.70 E+00	5.07 E+00
		Co-60	* 3.32 E+00	2.10 E+00
		Zn-65	* 2.79 E+00	4.55 E+00
		Zr-95	* 2.04 E+00	4.75 E+00
		Nb-95	* 7.85 E-01	2.25 E+00
		Cs-134	* 1.88 E+00	2.15 E+00
		Cs-137	*-5.65 E-02	2.26 E+00
		Ba-140	*-6.75 E+00	1.34 E+01
		La-140	* 8.26 E-01	5.85 E+00
		Ra-226	* 1.06 E+02	4.67 E+01
		Th-228	* 1.25 E+01	3.95 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 DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
		Ground		
32 (Well 2)	880915	Be-7	*-6.37 E+00	1.90 E+01
		K-40	* 1.07 E+02	2.61 E+01
		Mn-54	* 4.85 E-01	1.91 E+00
		Co-58	*-4.56 E-01	1.95 E+00
		Fe-59	*-9.76 E-01	4.05 E+00
		Co-60	* 1.20 E+00	1.95 E+00
		Zn-65	*-5.67 E+00	4.39 E+00
		Zr-95	*-4.41 E+00	3.91 E+00
		Nb-95	* 4.87 E-01	2.01 E+00
		Cs-134	* 1.10 E+00	2.05 E+00
		Cs-137	* 1.16 E+00	2.08 E+00
		Ba-140	*-3.55 E-01	8.47 E+00
		La-140	* 0.00 E+00	3.85 E+00
		Ra-226	* 9.76 E+01	4.15 E+01
		Th-228	* 1.50 E+01	3.62 E+00
	881215	Be-7	*-3.45 E+00	2.06 E+01
		K-40	* 1.22 E+02	3.09 E+01
		Mn-54	* 9.22 E-01	2.18 E+00
		Co-58	* 3.20 E-01	2.19 E+00
		Fe-59	*-7.73 E-01	4.67 E+00
		Co-60	* 1.95 E+00	2.34 E+00
		Zn-65	*-5.72 E+00	5.21 E+00
		Zr-95	* 5.89 E-01	4.46 E+00
		Nb-95	* 5.31 E-01	2.24 E+00
		Cs-134	* 7.45 E-01	2.35 E+00
		Cs-137	* 2.17 E+00	2.39 E+00
		Ba-140	*-4.53 E+00	8.64 E+00
		La-140	* 1.69 E+00	4.09 E+00
		Ra-226	* 1.16 E+02	4.87 E+01
		Th-228	* 1.31 E+01	4.34 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 DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
		Ground		
52 (Well 3)	880316	Be-7	*-8.80 E+01	1.61 E+01
		K-40	* 6.77 E+01	2.50 E+01
		Mn-54	* 3.53 E-01	1.61 E+00
		Co-58	*-1.46 E-01	1.75 E+00
		Fe-59	* 1.77 E+00	3.65 E+00
		Co-60	* 1.29 E+00	1.91 E+00
		Zn-65	*-7.31 E-01	3.80 E+00
		Zr-95	* 1.87 E+00	3.54 E+00
		Nb-95	* 1.38 E-01	1.84 E+00
		Cs-134	* 8.36 E-01	1.85 E+00
		Cs-137	* 1.32 E-01	1.80 E+00
		Ba-140	* 3.72 E+00	6.46 E+00
		La-140	* 3.78 E-01	3.10 E+00
		Ra-226	* 6.23 E+01	3.92 E+01
		Th-228	* 7.22 E+00	3.31 E+00
	880615	Be-7	* 2.76 E+01	3.01 E+01
		K-40	* 3.29 E+02	3.90 E+01
		Mn-54	* 1.54 E+00	2.57 E+00
		Co-58	*-6.19 E-01	2.93 E+00
		Fe-59	*-1.57 E+00	6.37 E+00
		Co-60	* 3.10 E+00	2.94 E+00
		Zn-65	*-3.52 E+00	5.83 E+00
		Zr-95	*-9.22 E-01	6.09 E+00
		Nb-95	* 0.00 E+00	3.03 E+00
		Cs-134	* 2.52 E+00	3.02 E+00
		Cs-137	* 2.04 E+00	2.98 E+00
		Ba-140	* 5.56 E-01	1.82 E+01
		La-140	*-5.03 E-01	7.56 E+00
		Ra-226	* 1.76 E+02	6.32 E+01
		Th-228	* 7.63 E+01	5.90 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 DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
		Ground		
52 (Well 3)	880915	Be-7	*-2.06 E+00	1.56 E+01
		K-40	* 1.30 E+02	2.53 E+01
		Mn-54	* 2.58 E-01	1.54 E+00
		Co-58	*-5.46 E-02	1.60 E+00
		Fe-59	*-2.39 E+00	3.23 E+00
		Co-60	* 9.09 E-01	1.71 E+00
		Zn-65	*-3.29 E+00	3.84 E+00
		Zr-95	* 1.82 E+00	3.36 E+00
		Nb-95	* 5.19 E-01	1.75 E+00
		Cs-134	* 8.88 E-01	1.77 E+00
		Cs-137	* 2.34 E+00	1.74 E+00
		Ba-140	*-8.58 E-01	7.13 E+00
		La-140	*-2.49 E+00	3.30 E+00
		Ra-226	* 1.85 E+02	4.11 E+01
		Th-228	* 1.79 E+01	3.42 E+00
	881215	Be-7	* 3.40 E+00	1.78 E+01
		K-40	* 1.21 E+02	2.90 E+01
		Mn-54	* 1.92 E+00	1.90 E+00
		Co-58	*-1.44 E-01	1.85 E+00
		Fe-59	* 1.80 E+00	4.36 E+00
		Co-60	* 6.40 E-01	2.08 E+00
		Zn-65	* 1.63 E+00	4.53 E+00
		Zr-95	*-2.63 E-01	3.81 E+00
		Nb-95	* 2.38 E+00	2.11 E+00
		Cs-134	* 1.25 E+00	2.15 E+00
		Cs-137	*-2.54 E-01	2.01 E+00
		Ba-140	*-8.25 E-01	7.60 E+00
		La-140	* 2.32 E+00	3.82 E+00
		Ra-226	* 1.43 E+02	4.82 E+01
		Th-228	* 1.05 E+01	3.59 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)	1.49E+00	-1.06E+00	6.90E+00	24	0
Co-60	(C)	9.40E-01	-9.51E-01	3.68E+00	12	0
Co-58	(I)	-3.37E-03	-2.35E+00	2.94E+00	24	0
Co-58	(C)	5.66E-02	-1.54E+00	1.26E+00	12	0
Cs-134	(I)	9.85E-01	-1.39E+00	4.46E+00	24	0
Cs-134	(C)	2.66E-01	-1.28E+00	2.15E+00	12	0
Cs-137	(I)	1.56E+00	-5.39E-01	4.91E+00	24	0
Cs-137	(C)	1.87E+00	-1.24E-01	3.90E+00	12	0
Nb-95	(I)	1.39E+00	-6.18E-01	4.40E+00	24	0
Nb-95	(C)	9.22E-01	-4.34E-02	3.10E+00	12	0
Zr-95	(I)	4.87E-01	-1.07E+01	5.20E+00	24	0
Zr-95	(C)	7.56E-01	-1.72E+00	5.38E+00	12	0
Zn-65	(I)	-3.21E+00	-1.57E+01	3.57E+00	24	0
Zn-65	(C)	-1.26E+00	-5.12E+00	6.13E+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)	1.82E-01	-4.08E+00	3.63E+00	24	0
Fe-59	(C)	6.33E-01	-1.59E+00	2.87E+00	12	0
Ba-140	(I)	1.56E+00	-5.96E+00	1.35E+01	24	0
Ba-140	(C)	7.86E-01	-3.93E+00	5.66E+00	12	0
La-140	(I)	9.00E-01	-3.14E+00	7.53E+00	24	0
La-140	(C)	-4.56E-01	-5.34E+00	1.03E+01	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			
Co-60	(I)	1.59E+00	-2.34E-01	7.18E+00	11	0
Co-58	(I)	-2.79E-01	-2.54E+00	1.81E+00	11	0
Cs-134	(I)	8.18E-01	-1.09E+00	5.35E+00	11	0
Cs-137	(I)	1.95E+00	-9.64E-01	7.85E+00	11	0
Nb-95	(I)	1.41E+00	-3.76E-01	3.75E+00	11	0
Zr-95	(I)	1.93E+00	-1.28E+00	5.75E+00	11	0
Zn-65	(I)	1.08E+00	-2.20E+00	4.89E+00	11	0
Fe-59	(I)	-1.27E-03	-2.82E+00	3.28E+00	11	0
Ba-140	(I)	-9.38E-01	-5.95E+00	4.49E+00	11	0
La-140	(I)	-8.63E-02	-1.93E+00	4.72E+00	11	0

(I) Indicator Station only.

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)	2.18E+00	-1.60E-01	6.47E+00	12	0
Co-58	(I)	-4.91E-02	-6.19E-01	5.46E-01	12	0
Cs-134	(I)	1.00E+00	-7.99E-01	2.52E-00	12	0
Cs-137	(I)	1.50E+00	-2.54E-01	3.11E+00	12	0
Nb-95	(I)	1.46E+00	0.00E+00	6.47E+00	12	0
Zr-95	(I)	6.01E-01	-2.53E+00	4.43E+00	12	0
Zn-65	(I)	-5.72E+00	-4.68E+01	4.36E+00	12	0
Fe-59	(I)	1.51E+00	-2.39E+00	5.70E+00	12	0
Ba-140	(I)	-1.50E+00	-7.40E+00	5.22E+00	12	0
La-140	(I)	1.45E-01	-2.49E+00	2.58E+00	12	0

(I) Indicator Stations only

TABLE A-8.1

GAMMA SPECTROMETRY OF SOIL

Results in pCi/kilogram

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
1	880517	K-40	1.23 E+04	4.55 E+02
		Cs-134	* 1.41 E+01	1.40 E+01
		Cs-137	4.34 E+02	2.87 E+01
		Ra-226	1.05 E+03	3.01 E+02
		Th-228	5.27 E+02	2.33 E+01
7	880517	K-40	1.28 E+04	4.49 E+02
		Cs-134	* 1.93 E+01	1.32 E+01
		Cs-137	4.68 E+02	2.77 E+01
		Ra-226	6.69 E+02	3.15 E+02
		Th-228	5.12 E+02	2.44 E+01
9	880517	K-40	1.13 E+04	5.52 E+02
		Cs-134	* 3.27 E+01	1.86 E+01
		Cs-137	7.20 E+01	2.90 E+01
		Ra-226	1.44 E+03	3.69 E+02
		Th-228	7.12 E+02	3.14 E+01
21	880517	K-40	1.48 E+04	4.80 E+02
		Cs-134	* 1.36 E+01	1.40 E+01
		Cs-137	* 2.93 E+01	1.36 E+01
		Ra-226	6.15 E+02	3.07 E+02
		Th-228	4.52 E+02	2.23 E+01
23	880517	K-40	1.29 E+04	4.08 E+02
		Cs-134	* 1.56 E+01	1.29 E+01
		Cs-137	3.63 E+02	2.44 E+01
		Ra-226	7.36 E+02	3.04 E+02
		Th-228	6.89 E+02	3.83 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)	1.32E+04	1.23E+04	1.48E+04	4	4
K-40 (C)	1.13E+04	1.13E+04	1.13E+04	1	1
Cs-134 (I)	1.57E+01	1.36E+01	1.93E+01	4	0
Cs-134 (C)	3.27E+01	3.27E+01	3.27E+01	1	0
Cs-137 (I)	3.24E+02	2.93E+01	4.68E+02	4	3
Cs-137 (C)	7.20E+01	7.20E+01	7.20E+01	1	1
Ra-226 (I)	7.68E+02	6.15E+02	1.05E+03	4	4
Ra-226 (C)	1.44E+03	1.44E+03	1.44E+03	1	1
Th-228 (I)	5.45E+02	4.52E+02	6.89E+02	4	4
Th-228 (C)	7.12E+02	7.12E+02	7.12E+02	1	1

(I) Indicator Stations
(C) Control Station

TABLE A-9.1

GAMMA SPECTROMETRY OF SEDIMENT

Results in pCi/kilogram

LOCATION	COLLECTION DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
33 Upstream	880421	K-40	1.34 E+04	5.32 E+02
		Co-60	* 2.98 E+01	1.86 E+01
		Cs-134	* 1.78 E+01	1.74 E+01
		Cs-137	2.02 E+02	2.74 E+01
		Ra-226	8.52 E+02	3.60 E+02
		Eu-152	* 8.60 E+01	8.48 E+01
		Th-228	6.55 E+02	2.82 E+01
	881026	K-40	1.49 E+04	3.33 E+02
		Co-60	* 2.84 E+01	9.58 E+00
		Cs-134	* 4.40 E+01	9.95 E+00
		Cs-137	1.93 E+02	1.71 E+01
		Ra-226	1.13 E+03	2.24 E+02
		Eu-152	* 8.87 E+01	4.25 E+01
		Th-228	8.49 E+02	2.03 E+01
34 Downstream	880421 (a)	K-40	1.41 E+04	4.18 E+02
		Co-60	5.51 E+01	2.07 E+01
		Cs-134	7.16 E+01	1.56 E+01
		Cs-137	2.88 E+02	2.19 E+01
		Ra-226	8.13 E+02	2.70 E+02
		Eu-152	* 1.23 E+02	5.59 E+01
		Th-228	6.67 E+02	2.27 E+01
	881026	K-40	1.35 E+04	2.80 E+02
		Co-60	2.71 E+01	1.15 E+01
		Cs-134	* 5.79 E+01	9.35 E+00
		Cs-137	1.53 E+02	9.89 E+00
		Ra-226	1.63 E+03	2.07 E+02
		Eu-152	* 1.32 E+02	4.20 E+01
		Th-228	1.49 E+03	2.24 E+01

(a) Taken twenty feet further from shore due to low water level.
* 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)	1.38E+04	1.35E+04	1.41E+04	2	2
K-40 (C)	1.42E+04	1.34E+04	1.49E+04	2	2
Co-60 (I)	4.11E+01	2.71E+01	5.51E+01	2	2
Co-60 (C)	2.91E+01	2.84E+01	2.98E+01	2	0
Cs-134 (I)	6.48E+01	5.79E+01	7.16E+01	2	1
Cs-134 (C)	3.09E+01	1.78E+01	4.40E+01	2	0
Cs-137 (I)	2.21E+02	1.53E+02	2.88E+02	2	2
Cs-137 (C)	1.98E+02	1.93E+02	2.02E+02	2	2
Ra-226 (I)	1.22E+03	8.13E+02	1.63E+03	2	2
Ra-226 (C)	9.91E+02	8.52E+02	1.13E+03	2	2
Eu-152 (I)	1.28E+02	1.23E+02	1.32E+02	2	0
Eu-152 (C)	8.74E+01	8.60E+01	8.87E+01	2	0
Th-228 (I)	1.08E+03	6.67E+02	1.49E+03	2	2
Th-228 (C)	7.52E+02	6.55E+02	8.49E+02	2	2

(I) Indicator Station

(C) Control Station

TABLE A-10.1
GAMMA SPECTROMETRY OF FISH

Results in pCi/kilogram (wet)

LOCATION	COLLECTION DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
30	880427	K-40	2.78 E+03	1.20 E+02
Carp		Mn-54	* 1.75 E+00	2.76 E+00
		Co-58	*-2.58 E-01	2.84 E+00
		Fe-59	*-4.25 E-01	7.93 E+00
		Co-60	* 3.37 E+00	3.26 E+00
		Zn-65	*-6.71 E+00	7.38 E+00
		Cs-134	* 2.13 E+00	2.99 E+00
		Cs-137	1.26 E+01	4.13 E+00
		Ra-226	* 1.65 E+02	6.24 E+01
		Th-228	* 1.37 E+01	4.94 E+00
Sucker	880427	K-40	3.44 E+03	1.26 E+02
		Mn-54	* 2.19 E-01	2.59 E+00
		Co-58	*-3.16 E-01	2.69 E+00
		Fe-59	* 2.55 E+00	7.23 E+00
		Co-60	* 5.40 E-01	3.12 E+00
		Zn-65	*-4.14 E+00	7.62 E+00
		Cs-134	* 4.62 E+00	3.04 E+00
		Cs-137	3.20 E+01	4.87 E+00
		Ra-226	* 2.21 E+02	5.37 E+01
		Th-228	* 1.80 E+01	4.49 E+00
Chinook	880427	K-40	3.22 E+03	1.18 E+02
		Mn-54	* 1.02 E+00	2.50 E+00
		Co-58	*-1.61 E+00	2.67 E+00
		Fe-59	*-2.55 E+00	7.36 E+00
		Co-60	*-2.01 E-01	2.94 E+00
		Zn-65	*-6.98 E+00	6.68 E+00
		Cs-134	* 1.59 E+00	2.61 E+00
		Cs-137	9.80 E+00	4.40 E+00
		Ra-226	* 1.40 E+02	5.00 E+01
		Th-228	* 1.32 E+01	4.16 E+00
Whitefish	880427	K-40	3.45 E+03	1.77 E+02
		Mn-54	* 2.99 E+00	5.14 E+00
		Co-58	* 1.57 E+00	5.46 E+00
		Fe-59	* 4.62 E+00	1.33 E+01
		Co-60	* 4.21 E-01	5.64 E+00
		Zn-65	*-1.87 E+01	1.32 E+01
		Cs-134	*-4.14 E-01	5.66 E+00
		Cs-137	1.63 E+01	7.45 E+00
		Ra-226	* 1.41 E+02	1.08 E+02
		Th-228	* 5.08 E+01	9.36 E+00

* Denotes a result less than the detection limit.

TABLE A-10.1 (Cont.)

GAMMA SPECTROMETRY OF FISH

Results in pCi/kilogram (wet)

LOCATION	COLLECTION DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
30	880927	K-40	2.98 E+03	1.25 E+02
Carp		Mn-54	* 1.00 E+00	2.78 E+00
		Co-58	*-3.87 E-01	3.09 E+00
		Fe-59	*-4.78 E+00	8.76 E+00
		Co-60	* 6.01 E-01	3.21 E+00
		Zn-65	*-2.58 E+00	7.89 E+00
		Cs-134	* 9.75 E-01	3.18 E+00
		Cs-137	1.31 E+01	5.39 E+00
		Ra-226	* 2.36 E+02	5.83 E+01
		Th-228	* 1.78 E+01	4.96 E+00
Sucker	880927	K-40	4.15 E+03	1.60 E+02
		Mn-54	* 5.62 E-01	4.39 E+00
		Co-58	* 3.25 E-01	5.29 E+00
		Fe-59	* 8.44 E+00	1.38 E+01
		Co-60	* 2.82 E+00	4.79 E+00
		Zn-65	*-7.94 E+00	1.22 E+01
		Cs-134	* 3.08 E+00	5.14 E+00
		Cs-137	3.68 E+01	7.37 E+00
		Ra-226	* 1.54 E+02	8.01 E+01
		Th-228	* 2.39 E+01	7.05 E+00
Chinook	880927	K-40	3.88 E+03	1.47 E+02
		Mn-54	* 1.72 E-01	3.03 E+00
		Co-58	*-2.08 E+00	3.62 E+00
		Fe-59	*-3.45 E+00	9.90 E+00
		Co-60	* 1.56 E+00	3.72 E+00
		Zn-65	*-2.73 E+00	9.30 E+00
		Cs-134	* 2.44 E+00	3.46 E+00
		Cs-137	2.06 E+01	5.48 E+00
		Ra-226	* 1.31 E+02	6.33 E+01
		Th-228	* 1.64 E+01	4.95 E+00
Whitefish	880927	K-40	3.24 E+03	1.70 E+02
		Mn-54	* 2.55 E+00	4.88 E+00
		Co-58	* 1.28 E-01	5.49 E+00
		Fe-59	* 5.75 E+00	1.50 E+01
		Co-60	* 6.54 E+00	5.59 E+00
		Zn-65	*-1.77 E+01	1.34 E+01
		Cs-134	*-1.17 E+00	5.26 E+00
		Cs-137	2.11 E+01	7.67 E+00
		Ra-226	* 1.05 E+02	9.06 E+01
		Th-228	* 2.19 E+01	7.99 E+00

* Denotes a result less than the detection limit.

TABLE A-10.1 (Cont.)
GAMMA SPECTROMETRY OF FISH

Results in pCi/kilogram (wet)

LOCATION	COLLECTION DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
38 Carp	880429	K-40	2.86 E+03	1.19 E+02
		Mn-54	*-1.11 E+00	3.57 E+00
		Co-58	*-7.94 E-01	3.73 E+00
		Fe-59	*-7.41 E-00	8.95 E+00
		Co-60	* 7.37 E+00	4.08 E+00
		Zn-65	* 2.27 E+00	9.18 E+00
		Cs-134	* 6.75 E+00	4.16 E+00
		Cs-137	1.15 E+01	4.94 E+00
		Ra-226	* 1.91 E+02	7.46 E+01
		Th-228	* 8.33 E+01	7.17 E+00
Sucker	880429	K-40	3.72 E+03	1.30 E+02
		Mn-54	* 2.12 E+00	2.78 E+00
		Co-58	* 5.50 E-01	2.97 E+00
		Fe-59	*-1.94 E-01	8.01 E+00
		Co-60	* 2.16 E+00	3.32 E+00
		Zn-65	*-7.89 E+00	7.50 E+00
		Cs-134	* 4.71 E-01	3.07 E+00
		Cs-137	2.34 E+01	4.93 E+00
		Ra-226	* 5.57 E+01	5.38 E+01
		Th-228	* 1.35 E+01	4.62 E+00
Channel Catfish	880429	K-40	2.52 E+03	2.51 E+02
		Mn-54	* 8.79 E+00	9.44 E+00
		Co-58	* 2.28 E+00	9.83 E+00
		Fe-59	* 8.07 E+00	2.32 E+01
		Co-60	* 3.61 E+00	1.05 E+01
		Zn-65	*-3.13 E+00	2.09 E+01
		Cs-134	* 3.25 E+00	1.00 E+01
		Cs-137	* 1.33 E+01	1.10 E+01
		Ra-226	* 4.24 E+02	2.02 E+02
		Th-228	* 8.31 E+01	1.77 E+01
Chinook Salmon	880429	K-40	3.47 E+03	1.18 E+02
		Mn-54	* 4.39 E-01	3.09 E+00
		Co-58	* 3.36 E-01	3.28 E+00
		Fe-59	* 1.65 E+00	8.02 E+00
		Co-60	* 3.67 E+00	3.44 E+00
		Zn-65	*-1.15 E+01	8.24 E+00
		Cs-134	* 1.01 E+00	3.49 E+00
		Cs-137	* 8.78 E+00	3.53 E+00
		Ra-226	* 1.37 E+02	6.74 E+01
		Th-228	* 1.24 E+01	5.56 E+00

* Denotes a result less than the detection limit.

TABLE A-10.1 (Cont.)
GAMMA SPECTROMETRY OF FISH

Results in pCi/kilogram (wet)

LOCATION	COLLECTION DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
38 Carp	880928	K-40	3.08 E+03	1.30 E+02
		Mn-54	* 3.08 E+00	3.04 E+00
		Co-58	* 2.44 E+00	3.61 E+00
		Fe-59	* 0.00 E-01	9.94 E+00
		Co-60	* 6.29 E-01	3.41 E+00
		Zn-65	*-4.50 E-01	8.66 E+00
		Cs-134	* 1.49 E+00	3.31 E+00
		Cs-137	* 3.89 E+00	3.26 E+00
		Ra-226	* 8.21 E+01	6.16 E+01
		Th-228	* 1.45 E+01	5.39 E+00
Sucker	880928	K-40	3.98 E+03	1.41 E+02
		Mn-54	* 1.37 E+00	3.60 E+00
		Co-58	* 6.18 E-01	4.31 E+00
		Fe-59	*-2.06 E+00	1.08 E+01
		Co-60	* 1.21 E+00	3.94 E+00
		Zn-65	*-9.61 E+00	9.58 E+00
		Cs-134	* 1.37 E+00	4.04 E+00
		Cs-137	2.66 E+01	6.23 E+00
		Ra-226	* 1.37 E+02	7.85 E+01
		Th-228	* 1.70 E+01	6.42 E+00
Crappie	881007 (a)	K-40	5.78 E+03	8.73 E+02
		Mn-54	* 1.07 E+01	4.68 E+01
		Co-58	*-3.04 E+01	4.82 E+01
		Fe-59	* 5.85 E+00	1.06 E+02
		Co-60	* 6.97 E+01	5.11 E+01
		Zn-65	*-4.70 E+01	1.04 E+02
		Cs-134	* 6.90 E+00	5.09 E+01
		Cs-137	* 2.50 E+01	5.05 E+01
		Ra-226	* 1.80 E+03	9.62 E+02
		Th-228	* 1.15 E+03	9.50 E+01

(a) Low sample weight due to lack of species available as a result of low water level.
* Denotes a result less than the detection limit.

TABLE A-10.1 (Cont.)

GAMMA SPECTROMETRY OF FISH

Results in pCi/kilogram (wet)

LOCATION	COLLECTION DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
38 Steelhead	881006	K-40	4.03 E+03	1.34 E+02
		Mn-54	* 1.25 E+00	3.46 E+00
		Co-58	* 0.00 E-01	3.72 E+00
		Fe-59	* 4.96 E+00	9.46 E+00
		Co-60	* 1.32 E+00	3.64 E+00
		Zn-65	*-7.31 E+00	8.85 E+00
		Cs-134	* 3.13 E+00	3.52 E+00
		Cs-137	* 1.09 E+01	3.89 E+00
		Ra-226	* 1.20 E+02	7.30 E+01
		Th-228	* 1.48 E+01	5.98 E+00
Bass	881007 (a)	K-40	3.53 E+03	2.84 E+02
		Mn-54	* 1.46 E+00	8.87 E+00
		Co-58	*-9.55 E-01	9.39 E+00
		Fe-59	* 2.38 E+00	2.33 E+01
		Co-60	* 9.46 E+00	1.00 E+01
		Zn-65	* 1.58 E+01	2.25 E+01
		Cs-134	*-2.81 E+00	9.46 E+00
		Cs-137	* 4.63 E+00	1.00 E+01
		Ra-226	* 3.77 E+02	1.96 E+02
		Th-228	* 3.16 E+01	1.63 E+01

(a) Low sample weight due to lack of species available as a result of low water level.

* Denotes a result less than the detection limit.

TABLE A-10.2

GAMMA SPECTROMETRY OF FISH - SUMMARY

Results in pCi/kilogram (wet)

NUCLIDE		AVERAGE	LOW	HIGH	NUMBER SAMPLES	NUMBER POSITIVE
K-40	(I)	3.39E+03	2.78E+03	4.15E+03	8	8
K-40	(C)	3.66E+03	2.52E+03	5.78E+03	9	9
Co-60	(I)	1.96E+00	-2.01E-01	6.54E+00	8	0
Co-60	(C)	1.11E+01	6.29E-01	6.97E+01	9	0
Fe-59	(I)	1.27E+00	-4.78E+00	8.44E+00	8	0
Fe-59	(C)	1.47E+00	-7.41E+00	8.07E+00	9	0
Zn-65	(I)	-8.44E+00	-1.87E+01	-2.58E+00	8	0
Zn-65	(C)	-7.65E+00	-4.70E+01	1.58E+01	9	0
Co-58	(I)	-3.29E-01	-2.08E+00	1.57E+00	8	0
Co-58	(C)	-2.88E+00	-3.04E+01	2.44E+00	9	0
Cs-134	(I)	1.66E+00	-1.17E+00	4.62E+00	8	0
Cs-134	(C)	2.40E+00	-2.81E+00	6.90E+00	9	3
Cs-137	(I)	2.03E+01	9.80E+00	3.68E+01	8	8
Cs-137	(C)	1.31E+01	1.10E+00	2.66E+01	9	3
Mn-54	(I)	1.28E+00	1.72E-01	2.99E+00	8	0
Mn-54	(C)	3.12E+00	-1.11E+00	1.07E+01	9	0

(I) Indicator Stations; does not include the duplicate sample, Station 37.
(C) Control Station

TABLE A-11.1

I-131 IN MILK

Results in pCi/liter

LOCATION	COLLECTION DATE	RESULT	OVERALL UNCERTAINTY
9	880105	*-4.9 E-02	2.06 E-01
	880209	* 1.0 E-02	1.53 E-01
	880308	* 2.7 E-02	1.31 E-01
	880405	* 1.2 E-01	1.07 E-01
	880419	* 8.7 E-03	1.61 E-01
	880510	* 8.4 E-02	1.60 E-01
	880524	* 1.0 E-01	1.71 E-01
	880607	*-9.7 E-02	1.70 E-01
	880621	* 1.1 E-01	2.18 E-01
	880712	* 1.5 E-01	2.26 E-01
	880726	* 9.5 E-03	2.98 E-01
	880809	* 7.0 E-02	2.20 E-01
	880823	*-1.5 E-01	1.42 E-01
	880907	* 1.8 E-01	1.78 E-01
	880920	*-2.3 E-02	1.67 E-01
	881018	* 2.9 E-02	1.72 E-01
	881115	* 6.7 E-02	1.62 E-01
	881213	* 2.1 E-02	1.08 E-01
36	880105	*-1.6 E-01	2.06 E-01
	880209	*-7.9 E-02	1.38 E-01
	880308	*-1.8 E-02	1.21 E-01
	880405	*-9.8 E-02	1.79 E-01
	880419	*-6.2 E-02	1.38 E-01
	880510	* 1.1 E-01	1.38 E-01
	880524	* 1.4 E-01	1.57 E-01
	880607	*-7.1 E-02	1.88 E-01
	880621	* 3.7 E-02	2.16 E-01
	880712	* 0.0 E+00	1.80 E-01
	880726	*-2.8 E-01	1.79 E-01
	880809	* 9.7 E-02	1.64 E-01
	880823	*-2.7 E-01	1.29 E-01
	880907	* 1.1 E-01	1.80 E-01
	880920	* 6.5 E-02	1.28 E-01
	881018	* 3.6 E-02	1.55 E-01
	881115	* 0.0 E+00	1.47 E-01
	881213	* 6.9 E-02	1.21 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
37	880105	* 9.3 E-02	2.47 E-01
	880308	*-8.0 E-03	1.23 E-01
	880920	* 9.1 E-02	1.44 E-01
	(a)		
40	880105	*-1.7 E-02	2.29 E-01
	880209	*-8.7 E-02	1.34 E-01
	880308	*-5.7 E-02	1.36 E-01
	880405	* 3.3 E-02	1.38 E-01
	880419	* 1.2 E-01	1.35 E-01
	880510	* 6.8 E-02	1.79 E-01
	880524	*-1.9 E-01	2.18 E-01
	880607	*-2.5 E-02	1.61 E-01
	880621	* 0.0 E+00	1.79 E-01
	880712	*-3.5 E-02	1.72 E-01
	880726	* 8.7 E-02	1.57 E-01
	880809	* 1.9 E-02	1.49 E-01
	880823	*-1.0 E-01	1.14 E-01
	880907	*-2.1 E-02	1.66 E-01
	880920	*-1.0 E-02	1.47 E-01
	881018	* 2.1 E-02	1.59 E-01
	881115	*-8.1 E-03	1.16 E-01
	881213	*-3.5 E-02	2.44 E-01
59	880105	*-5.2 E-02	1.83 E-01
	880209	*-2.0 E-01	1.58 E-01
	880308	* 1.5 E-02	1.43 E-01
	880405	*-5.9 E-03	1.41 E-01
	880419	* 2.0 E-01	1.73 E-01
	880510	* 7.5 E-02	1.54 E-01
	880524	* 2.7 E-02	1.78 E-01
	880607	* 6.4 E-02	1.83 E-01
	880621	* 5.6 E-02	1.78 E-01
	880712	*-1.5 E-01	1.51 E-01
	880726	*-1.5 E-01	1.55 E-01
	880809	* 1.6 E-02	1.20 E-01
	880823	* 1.7 E-01	1.72 E-01
	880907	* 5.9 E-02	1.53 E-01
	880920	* 8.6 E-02	1.40 E-01
	881018	*-5.6 E-02	1.55 E-01
	881115	*-5.0 E-02	1.51 E-01
	881213	* 2.7 E-02	1.45 E-01

(a) Station no longer required.

* 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
96	880105	*-1.2 E-01	1.98 E-01
	880209	*-1.4 E-01	1.44 E-01
	880308	* 4.4 E-02	1.25 E-01
	880405	*-4.4 E-03	1.86 E-01
	880419	* 9.3 E-02	1.40 E-01
	880510	*-7.0 E-02	1.34 E-01
	880524	* 2.9 E-02	2.02 E-01
	880607	*-7.0 E-02	1.52 E-01
	880621	* 5.2 E-02	1.59 E-01
	880712	*-1.2 E-01	1.99 E-01
	880726	*-1.5 E-01	1.43 E-01
	880809 (a)		
	880823	* 4.5 E-02	1.29 E-01
	880907	*-1.3 E-01	1.68 E-01
	880920	*-6.6 E-02	1.29 E-01
	881018	*-9.6 E-02	1.46 E-01
	881115	*-2.0 E-01	2.05 E-01
	881213	* 1.2 E-01	1.05 E-01

(a) Sample not available.

* Denotes a result less than the detection limit.

TABLE A-11.2

I-131 in Milk - Summary

Results in pCi/liter

NUCLIDE	AVERAGE	LOW	HIGH	NUMBER SAMPLES	NUMBER POSITIVE
I-131 (I)	2.9E-03	-2.8E-01	2.0E-01	75	0
I-131 (C)	-4.6E-02	-2.0E-01	1.2E-01	17	0

(I) Indicator Stations
(C) Control Station

TABLE A-12.1

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
9	880105	Cs-134	* 1.72 E+00	2.38 E+00
		Cs-137	* 1.24 E+00	2.36 E+00
		Ba-140	*-3.83 E+00	7.69 E+00
		La-140	*-3.64 E-01	3.22 E+00
	880209	Cs-134	* 5.32 E-01	2.33 E+00
		Cs-137	* 8.09 E-01	2.36 E+00
		Ba-140	* 3.02 E+00	8.51 E+00
		La-140	* 1.27 E+00	3.72 E+00
	880308	Cs-134	* 1.94 E+00	2.32 E+00
		Cs-137	* 1.32 E+00	2.39 E+00
		Ba-140	*-1.49 E+00	7.68 E+00
		La-140	* 0.00 E-01	2.81 E+00
	880405	Cs-134	* 3.21 E-01	2.19 E+00
		Cs-137	* 4.42 E+00	2.21 E+00
		Ba-140	*-3.34 E+00	7.26 E+00
		La-140	* 1.58 E+00	3.11 E+00
	880419	Cs-134	* 2.61 E+00	2.32 E+00
		Cs-137	* 1.70 E+00	2.30 E+00
		Ba-140	*-2.66 E+00	7.26 E+00
		La-140	* 6.40 E-01	3.26 E+00
	880510	Cs-134	* 1.18 E+00	2.14 E+00
		Cs-137	* 1.94 E+00	2.31 E+00
		Ba-140	*-3.11 E-01	7.32 E+00
		La-140	* 1.77 E+00	3.12 E+00
	880524	Cs-134	* 6.57 E-02	2.35 E+00
		Cs-137	* 4.97 E+00	2.46 E+00
		Ba-140	*-6.52 E+00	7.92 E+00
		La-140	* 1.61 E+00	3.57 E+00
	880607	Cs-134	* 9.87 E-01	2.47 E+00
		Cs-137	* 2.27 E+00	2.47 E+00
		Ba-140	*-1.80 E+00	8.05 E+00
		La-140	*-8.64 E-01	3.61 E+00
	880621	Cs-134	* 4.45 E-01	2.49 E+00
		Cs-137	* 1.55 E+00	2.58 E+00
		Ba-140	*-1.80 E+00	8.56 E+00
		La-140	*-3.26 E+00	3.97 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 DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
9	880712	Cs-134	*-1.76 E+00	3.53 E+00
		Cs-137	* 5.01 E+00	3.42 E+00
		Ba-140	* 0.00 E-01	1.27 E+01
		La-140	*-2.15 E+00	5.32 E+00
	880726	Cs-134	*-3.84 E-01	3.30 E+00
		Cs-137	* 2.02 E+00	3.56 E+00
		Ba-140	*-5.47 E+00	1.04 E+01
		La-140	*-1.84 E+00	5.00 E+00
	880809	Cs-134	*-7.60 E-01	2.33 E+00
		Cs-137	* 1.73 E+00	2.48 E+00
		Ba-140	* 0.00 E-01	8.55 E+00
		La-140	*-9.65 E-01	3.68 E+00
	880823	Cs-134	* 2.06 E+00	3.64 E+00
		Cs-137	* 6.75 E-01	3.56 E+00
		Ba-140	* 3.22 E+00	9.60 E+00
		La-140	*-5.84 E-01	3.74 E+00
	880907	Cs-134	*-7.29 E-01	2.40 E+00
		Cs-137	* 2.71 E+00	2.53 E+00
		Ba-140	*-6.40 E+00	7.26 E+00
		La-140	*-1.09 E+00	2.77 E+00
	880920	Cs-134	* 0.00 E-01	2.51 E+00
		Cs-137	* 2.50 E+00	2.53 E+00
		Ba-140	*-2.63 E+00	8.03 E+00
		La-140	*-1.63 E+00	3.48 E+00
	881018	Cs-134	* 1.21 E+00	2.84 E+00
		Cs-137	* 6.07 E-01	2.88 E+00
		Ba-140	* 3.54 E+00	9.62 E+00
		La-140	* 2.20 E-01	4.13 E+00
	881115	Cs-134	* 3.07 E+00	3.47 E+00
		Cs-137	* 3.17 E+00	3.44 E+00
		Ba-140	* 2.74 E+00	1.17 E+01
		La-140	*-2.66 E+00	4.48 E+00
	881213	Cs-134	*-1.44 E+00	2.39 E+00
		Cs-137	* 4.08 E+00	2.63 E+00
		Ba-140	*-2.65 E+00	8.39 E+00
		La-140	*-7.82 E-01	3.71 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 DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
36	880105	Cs-134	*-7.15 E-02	2.39 E+00
		Cs-137	*-4.40 E-01	2.27 E+00
		Ba-140	*-1.86 E+00	7.72 E+00
		La-140	*-1.35 E+00	3.11 E+00
	880209	Cs-134	* 1.54 E+00	2.35 E+00
		Cs-137	* 6.41 E-01	2.35 E+00
		Ba-140	*-5.06 E+00	8.79 E+00
		La-140	* 1.36 E+00	3.45 E+00
	880308	Cs-134	*-1.10 E+00	2.25 E+00
		Cs-137	* 8.97 E-01	2.23 E+00
		Ba-140	*-1.13 E+00	7.13 E+00
		La-140	*-7.01 E-01	3.06 E+00
	880405	Cs-134	* 0.00 E-01	2.39 E+00
		Cs-137	* 1.80 E+00	2.41 E+00
		Ba-140	* 3.11 E+00	7.73 E+00
		La-140	*-1.01 E+00	3.25 E+00
	880419	Cs-134	* 1.44 E+00	2.28 E+00
		Cs-137	* 1.51 E+00	2.31 E+00
		Ba-140	*-5.02 E+00	7.67 E+00
		La-140	*-8.59 E-01	3.07 E+00
	880510	Cs-134	* 1.51 E+00	2.38 E+00
		Cs-137	* 4.43 E+00	2.49 E+00
		Ba-140	* 2.05 E+00	7.87 E+00
		La-140	*-1.03 E+00	2.89 E+00
	880524	Cs-134	* 0.00 E-01	2.32 E+00
		Cs-137	* 2.60 E+00	2.37 E+00
		Ba-140	*-4.16 E-01	8.73 E+00
		La-140	* 2.31 E+00	3.84 E+00
	880607	Cs-134	* 2.24 E+00	2.62 E+00
		Cs-137	* 2.39 E+00	2.61 E+00
		Ba-140	* 1.07 E+01	9.10 E+00
		La-140	* 0.00 E-01	3.22 E+00
	880621	Cs-134	*-1.68 E+00	2.57 E+00
		Cs-137	* 2.07 E+00	2.78 E+00
		Ba-140	*-3.48 E+00	9.22 E+00
		La-140	*-2.08 E+00	3.68 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 DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
36	880712	Cs-134	* 1.09 E+00	2.60 E+00
		Cs-137	* 3.17 E+00	2.72 E+00
		Ba-140	*-1.71 E+00	1.05 E+01
		La-140	*-2.62 E+00	3.51 E+00
	880726	Cs-134	* 2.05 E+00	4.40 E+00
		Cs-137	* 4.02 E+00	4.29 E+00
		Ba-140	* 7.68 E-01	1.43 E+01
		La-140	* 7.56 E+00	5.80 E+00
	880809	Cs-134	* 8.55 E-01	2.33 E+00
		Cs-137	* 1.57 E+00	2.29 E+00
		Ba-140	*-4.62 E-01	8.70 E+00
		La-140	*-2.63 E+00	3.52 E+00
	880823	Cs-134	*-6.26 E-02	2.86 E+00
		Cs-137	* 2.54 E+00	2.97 E+00
		Ba-140	* 3.30 E+00	7.86 E+00
		La-140	*-2.63 E+00	2.90 E+00
	880907	Cs-134	* 6.35 E-01	3.33 E+00
		Cs-137	* 1.74 E+00	3.48 E+00
		Ba-140	*-2.44 E+00	1.03 E+01
		La-140	*-7.90 E-01	4.51 E+00
	880920	Cs-134	*-1.08 E+00	2.65 E+00
		Cs-137	* 1.47 E-01	2.73 E+00
		Ba-140	*-5.46 E+00	8.74 E+00
		La-140	*-3.33 E+00	3.75 E+00
	881018	Cs-134	* 1.08 E+00	2.56 E+00
		Cs-137	* 1.65 E+00	2.48 E+00
		Ba-140	* 2.22 E+00	8.37 E+00
		La-140	* 1.65 E+00	3.90 E+00
	881115	Cs-134	* 2.59 E+00	2.89 E+00
		Cs-137	* 4.25 E+00	2.72 E+00
		Ba-140	* 3.02 E+00	9.14 E+00
		La-140	*-2.01 E+00	3.47 E+00
	881213	Cs-134	*-1.71 E+00	2.63 E+00
		Cs-137	* 1.58 E+00	2.68 E+00
		Ba-140	* 4.02 E+00	9.57 E+00
		La-140	*-8.48 E-01	3.81 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 DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
37	880105	Cs-134	*-6.91 E-01	2.19 E+00
		Cs-137	* 1.74 E+00	2.28 E+00
		Ba-140	*-1.97 E-01	7.34 E+00
		La-140	*-2.42 E+00	2.96 E+00
	880215	(a)		
	880308	Cs-134	* 1.28 E-01	3.12 E+00
		Cs-137	* 2.25 E+00	3.10 E+00
		Ba-140	*-1.34 E+00	1.06 E+01
		La-140	*-3.44 E+00	4.16 E+00
	880920	Cs-134	* 0.00 E-01	2.69 E+00
		Cs-137	* 2.51 E+00	2.73 E+00
		Ba-140	* 2.17 E-01	8.79 E+00
		La-140	*-2.63 E+00	3.65 E+00

(a) Sample not received; sample frequency for this duplicate changed.
* Denotes a result less than the detection limit.

TABLE A-12.1 (Cont.)

GAMMA SPECTROMETRY OF MILK

Results in pCi/liter

LOCATION	COLLECTION DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
40	880105	Cs-134	* 1.46 E-01	2.28 E+00
		Cs-137	* 8.30 E-01	2.13 E+00
		Ba-140	*-7.53 E-01	7.19 E+00
		La-140	*-6.99 E-01	2.81 E+00
	880209	Cs-134	* 1.39 E-01	3.11 E+00
		Cs-137	* 3.59 E+00	3.23 E+00
		Ba-140	*-3.01 E+00	1.20 E+01
		La-140	*-1.64 E+00	4.51 E+00
	880308	Cs-134	* 1.67 E-01	3.87 E+00
		Cs-137	* 3.56 E+00	3.81 E+00
		Ba-140	*-6.14 E+00	1.28 E+01
		La-140	*-2.49 E+00	5.40 E+00
	880405	Cs-134	* 1.00 E+00	3.10 E+00
		Cs-137	* 1.82 E+00	3.18 E+00
		Ba-140	*-1.74 E+00	1.07 E+01
		La-140	*-3.16 E-01	4.15 E+00
	880419	Cs-134	* 2.04 E+00	3.26 E+00
		Cs-137	* 3.53 E+00	3.31 E+00
		Ba-140	*-1.77 E+00	1.10 E+01
		La-140	* 2.25 E+00	4.04 E+00
	880510	Cs-134	*-3.35 E-01	2.26 E+00
		Cs-137	* 2.39 E+00	2.27 E+00
		Ba-140	* 2.34 E+00	7.89 E+00
		La-140	*-3.47 E+00	3.47 E+00
	880524	Cs-134	* 3.90 E+00	3.19 E+00
		Cs-137	* 3.67 E+00	3.18 E+00
		Ba-140	* 1.39 E+00	1.23 E+01
		La-140	*-1.80 E+00	4.47 E+00
	880607	Cs-134	* 4.13 E+00	3.51 E+00
		Cs-137	* 2.74 E+00	3.51 E+00
		Ba-140	* 5.66 E-01	1.18 E+01
		La-140	*-3.07 E+00	4.51 E+00
	880621	Cs-134	* 4.34 E+00	3.53 E+00
		Cs-137	* 1.67 E+00	3.64 E+00
		Ba-140	* 2.30 E+00	1.27 E+01
		La-140	*-3.22 E+00	4.70 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 DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
40	880712	Cs-134	* 1.82 E+00	3.64 E+00
		Cs-137	* 1.07 E+00	3.46 E+00
		Ba-140	* 6.82 E+00	1.32 E+01
		La-140	*-2.99 E+00	4.64 E+00
	880726	Cs-134	* 1.02 E+00	2.44 E+00
		Cs-137	* 3.04 E+00	2.43 E+00
		Ba-140	* 2.76 E+00	8.15 E+00
		La-140	* 1.75 E+00	3.69 E+00
	880809	Cs-134	* 4.20 E-01	2.53 E+00
		Cs-137	* 1.23 E+00	2.45 E+00
		Ba-140	* 3.29 E+00	8.31 E+00
		La-140	* 1.21 E+00	3.88 E+00
	880823	Cs-134	*-5.87 E-01	2.93 E+00
		Cs-137	* 3.11 E+00	2.85 E+00
		Ba-140	* 1.26 E+00	8.57 E+00
		La-140	* 2.96 E+00	3.62 E+00
	880907	Cs-134	* 2.04 E+00	2.42 E+00
		Cs-137	* 4.17 E+00	2.46 E+00
		Ba-140	* 2.69 E+00	7.44 E+00
		La-140	* 1.38 E+00	3.22 E+00
	880920	Cs-134	* 8.31 E-01	2.47 E+00
		Cs-137	* 2.12 E+00	2.52 E+00
		Ba-140	*-1.75 E+00	7.96 E+00
		La-140	*-3.64 E-01	3.41 E+00
	881018	Cs-134	* 8.28 E-01	2.33 E+00
		Cs-137	* 2.18 E+00	2.26 E+00
		Ba-140	*-2.28 E-01	8.32 E+00
		La-140	*-4.34 E+00	3.74 E+00
	881115	Cs-134	* 5.20 E-01	2.31 E+00
		Cs-137	* 9.60 E-01	2.29 E+00
		Ba-140	*-1.85 E+00	7.66 E+00
		La-140	*-2.08 E+00	3.41 E+00
	881213	Cs-134	* 4.34 E+00	3.53 E+00
		Cs-137	* 4.16 E+00	3.61 E+00
		Ba-140	*-2.99 E+00	1.24 E+01
		La-140	* 0.00 E-01	4.97 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 DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
59	880105	Cs-134	* 7.00 E-01	3.12 E+00
		Cs-137	* 3.37 E+00	3.09 E+00
		Ba-140	*-2.83 E+00	1.03 E+01
		La-140	*-1.49 E+00	3.87 E+00
	880209	Cs-134	*-4.32 E-01	2.15 E+00
		Cs-137	* 3.79 E-01	2.34 E-01
		Ba-140	*-6.37 E+00	8.47 E+00
		La-140	* 7.89 E-01	3.52 E+00
	880308	Cs-134	*-9.02 E-02	3.25 E+00
		Cs-137	* 7.72 E+00	3.26 E+00
		Ba-140	* 1.16 E+00	1.00 E+01
		La-140	* 3.95 E+00	4.43 E+00
	880405	Cs-134	*-6.70 E-02	2.20 E+00
		Cs-137	* 1.98 E+00	2.31 E+00
		Ba-140	*-3.97 E+00	7.53 E+00
		La-140	*-1.91 E+00	3.05 E+00
	880419	Cs-134	* 1.20 E+00	2.26 E+00
		Cs-137	* 2.49 E+00	2.14 E+00
		Ba-140	*-1.72 E+00	7.01 E+00
		La-140	* 1.11 E+00	3.12 E+00
	880510	Cs-134	*-2.26 E+00	2.69 E+00
		Cs-137	* 2.44 E+00	2.79 E+00
		Ba-140	* 1.33 E+00	9.44 E+00
		La-140	* 1.34 E-01	3.50 E+00
	880524	Cs-134	* 9.65 E-01	2.72 E+00
		Cs-137	* 1.45 E+00	2.80 E+00
		Ba-140	* 3.29 E-01	1.05 E+01
		La-140	*-1.49 E+00	4.03 E+00
	880607	Cs-134	* 0.00 E+00	2.75 E+00
		Cs-137	* 1.78 E+00	2.77 E+00
		Ba-140	*-9.48 E+00	9.31 E+00
		La-140	* 6.46 E-01	4.00 E+00
	880621	Cs-134	* 8.11 E-01	3.02 E+00
		Cs-137	* 5.54 E+00	3.03 E+00
		Ba-140	*-9.93 E+00	1.07 E+01
		La-140	* 0.00 E-01	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 DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
59	880712	Cs-134	* 6.22 E-02	2.90 E+00
		Cs-137	* 3.82 E+00	2.96 E+00
		Ba-140	* 6.84 E+00	1.10 E+01
		La-140	*-1.96 E+00	3.76 E+00
	880726	Cs-134	*-5.57 E-01	2.47 E+00
		Cs-137	* 6.14 E-01	2.33 E+00
		Ba-140	*-1.54 E+00	7.88 E+00
		La-140	* 0.00 E-01	3.65 E+00
	880809	Cs-134	*-2.26 E+00	4.14 E+00
		Cs-137	* 7.97 E+00	4.33 E+00
		Ba-140	* 2.41 E+00	1.45 E+01
		La-140	* 9.71 E+00	6.30 E+00
	880823	Cs-134	* 2.56 E-01	2.84 E+00
		Cs-137	* 1.65 E+00	2.85 E+00
		Ba-140	*-1.78 E+00	7.31 E+00
		La-140	* 2.15 E+00	3.16 E+00
	880907	Cs-134	*-2.44 E+00	2.55 E+00
		Cs-137	* 1.85 E-01	2.28 E+00
		Ba-140	*-1.21 E+00	7.20 E+00
		La-140	*-2.78 E+00	3.21 E+00
	880920	Cs-134	* 0.00 E+00	2.40 E+00
		Cs-137	* 2.89 E+00	2.40 E+00
		Ba-140	* 6.53 E-01	7.79 E+00
		La-140	* 0.00 E-01	3.65 E+00
	881018	Cs-134	* 1.16 E+00	2.43 E+00
		Cs-137	* 6.79 E-02	2.44 E+00
		Ba-140	* 1.48 E+00	8.52 E+00
		La-140	*-9.86 E-01	3.52 E+00
	881115	Cs-134	*-3.56 E+00	3.47 E+00
		Cs-137	* 2.52 E+00	3.29 E+00
		Ba-140	* 3.64 E-01	1.06 E+01
		La-140	*-8.25 E-01	4.52 E+00
	881213	Cs-134	* 2.41 E+00	2.84 E+00
		Cs-137	* 2.12 E+00	2.96 E+00
		Ba-140	* 2.44 E+00	1.04 E+01
		La-140	*-9.51 E-01	3.42 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 DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
96	880105	Cs-134	*-1.18 E+00	2.13 E+00
		Cs-137	* 9.10 E-01	2.17 E+00
		Ba-140	* 7.15 E-01	7.41 E+00
		La-140	*-8.37 E-01	2.94 E+00
	880209	Cs-134	*-1.38 E+00	2.27 E+00
		Cs-137	* 1.07 E+00	2.19 E+00
		Ba-140	* 5.21 E+00	7.98 E+00
		La-140	*-4.20 E-01	3.03 E+00
	880308	Cs-134	* 2.47 E+00	4.53 E+00
		Cs-137	* 3.42 E+00	4.51 E+00
		Ba-140	*-1.52 E+01	1.51 E+01
		La-140	* 8.26 E+00	6.50 E+00
	880405	Cs-134	* 5.18 E-01	2.15 E+00
		Cs-137	* 8.37 E-01	2.18 E+00
		Ba-140	*-3.77 E-01	6.89 E+00
		La-140	* 5.46 E-01	2.79 E+00
	880419	Cs-134	* 2.31 E+00	2.46 E+00
		Cs-137	* 3.78 E+00	2.60 E+00
		Ba-140	*-3.25 E+00	8.05 E+00
		La-140	*-2.18 E+00	3.22 E+00
	880510	Cs-134	* 1.99 E+00	2.49 E+00
		Cs-137	7.47 E+00	4.08 E+00
		Ba-140	* 4.83 E+00	8.56 E+00
		La-140	* 0.00 E+00	3.50 E+00
	880524	Cs-134	* 6.81 E-01	2.32 E+00
		Cs-137	* 3.88 E+00	2.34 E+00
		Ba-140	*-1.29 E+00	7.63 E+00
		La-140	*-8.29 E-01	3.05 E+00
	880607	Cs-134	*-2.18 E+00	2.29 E+00
		Cs-137	* 1.77 E+00	2.44 E+00
		Ba-140	* 1.46 E+00	7.50 E+00
		La-140	*-7.18 E-01	3.55 E+00
	880621	Cs-134	* 1.36 E+00	2.55 E+00
		Cs-137	* 1.49 E-01	2.41 E+00
		Ba-140	* 7.62 E+00	8.67 E+00
		La-140	* 1.30 E+00	3.23 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 DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
96	880712	Cs-134	*-1.20 E+00	4.23 E+00
		Cs-137	* 1.16 E+01	4.46 E+00
		Ba-140	* 2.23 E+00	1.67 E+01
		La-140	* 3.29 E+00	6.92 E+00
	880726	Cs-134	* 2.93 E+00	4.32 E+00
		Cs-137	* 4.49 E+00	4.16 E+00
		Ba-140	*-5.21 E+00	1.47 E+01
		La-140	* 7.49 E+00	6.40 E+00
	880809 (a)			
	880823	Cs-134	* 6.74 E-01	2.01 E+00
		Cs-137	5.55 E+00	3.16 E+00
		Ba-140	* 8.64 E-01	6.08 E+00
		La-140	*-5.22 E-01	2.48 E+00
	880907	Cs-134	*-1.28 E+00	4.33 E+00
		Cs-137	* 4.24 E+00	4.38 E+00
		Ba-140	* 2.70 E+00	1.34 E+01
		La-140	*-1.78 E-01	5.52 E+00
	880920	Cs-134	* 5.91 E-01	2.31 E+00
		Cs-137	* 1.85 E+00	2.47 E+00
		Ba-140	* 4.35 E-01	7.97 E+00
		La-140	* 6.12 E-01	3.61 E+00
	881018	Cs-134	* 9.60 E-01	2.52 E+00
		Cs-137	* 3.40 E-01	2.41 E+00
		Ba-140	*-1.89 E+00	8.53 E+00
		La-140	*-4.48 E-01	3.43 E+00
	881115	Cs-134	*-2.14 E+00	2.37 E+00
		Cs-137	* 2.44 E+00	2.39 E+00
		Ba-140	* 3.98 E+00	7.91 E+00
		La-140	* 3.38 E+00	3.38 E+00
	881213	Cs-134	* 2.25 E+00	2.44 E+00
		Cs-137	* 1.74 E+00	2.47 E+00
		Ba-140	*-3.29 E+00	8.24 E+00
		La-140	*-6.62 E-01	3.84 E+00

(a) Milk sample not available.
* 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
Cs-134 (I)	5.67E-01	-3.56E+00	4.34E+00	75	0
Cs-134 (C)	4.34E-01	-2.18E+00	2.93E+00	17	0
Cs-137 (I)	2.41E+00	-4.40E-01	7.97E+00	75	0
Cs-137 (C)	3.27E+00	1.49E-01	1.16E+01	17	2
Ba-140 (I)	-5.89E-01	-9.93E+00	1.07E+01	75	0
Ba-140 (C)	-2.72E-02	-1.52E+01	7.62E+00	17	0
La-140 (I)	-2.99E-01	-4.34E+00	9.71E+00	75	0
La-140 (C)	1.06E+00	-2.18E+00	8.26E+00	17	0

(I) Indicator Stations; does not include the duplicate sample, Station 37.
(C) Control Station

TABLE A-13.1

GAMMA SPECTROMETRY OF ROOT

Results in pCi/kilogram (wet)

LOCATION	COLLECTION DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
	(a)			
9 Beets	880621	Cs-134	*-4.62 E-01	4.84 E+00
		Cs-137	* 5.38 E+00	4.97 E+00
		I-131	* 1.71 E+00	1.01 E+01
Potatoes	880726	Cs-134	* 1.52 E+00	6.12 E+00
		Cs-137	*-1.67 E+00	5.97 E+00
		I-131	*-2.30 E+00	1.24 E+01
Potatoes	880823	Cs-134	* 7.39 E-01	4.48 E+00
		Cs-137	* 5.84 E+00	4.30 E+00
		I-131	* 1.17 E+00	5.58 E+00
Onions	880907	Cs-134	*-1.88 E+00	4.13 E+00
		Cs-137	* 7.11 E-01	4.22 E+00
		I-131	*-8.56 E-01	7.59 E+00

(a) Samples not available until June.
* Denotes a result less than the detection limit.

TABLE A-13.1 (Cont.)

GAMMA SPECTROMETRY OF ROOT

Results in pCi/kilogram (wet)

LOCATION	COLLECTION DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
	(a)			
37 Onions	880621	Cs-134	*-3.30 E+00	5.81 E+00
		Cs-137	* 5.38 E+00	5.49 E+00
		I-131	*-2.63 E+00	9.50 E+00
Onions	880726	Cs-134	* 4.65 E+00	5.58 E+00
		Cs-137	* 4.20 E+00	5.91 E+00
		I-131	*-5.29 E+00	1.15 E+01
Carrots	880823	Cs-134	* 8.39 E+00	6.34 E+00
		Cs-137	* 8.16 E+00	6.36 E+00
		I-131	* 2.13 E+00	8.31 E+00
Onions	880907	Cs-134	* 0.00 E-01	5.45 E+00
		Cs-137	* 3.67 E+00	5.41 E+00
		I-131	*-1.49 E+00	9.04 E+00

(a) Samples not available until June.
* 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)	2.44E+00	-3.30E+00	8.39E+00	4	0
Cs-134	(C)	-2.08E-02	-1.88E+00	1.52E+00	4	0
Cs-137	(I)	5.35E+00	3.67E+00	8.16E+00	4	0
Cs-137	(C)	2.57E+00	-1.67E+00	5.84E+00	4	0
I-131	(I)	-1.82E+00	-5.29E+00	2.13E+00	4	0
I-131	(C)	-6.90E-02	-2.30E+00	1.71E+00	4	0

(I) Indicator Station

(C) Control Station

TABLE A-14.1

GAMMA SPECTROMETRY OF FRUIT

Results in pCi/kilogram (wet)

LOCATION	COLLECTION DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
	(a)			
9 Cherry	880621	Cs-134	* 1.07 E+00	5.68 E+00
		Cs-137	* 2.72 E+00	5.56 E+00
		I-131	*-6.10 E+00	1.06 E+01
Peach	880726	Cs-134	*-4.04 E-01	3.31 E+00
		Cs-137	*-2.65 E-01	3.21 E+00
		I-131	*-4.38 E+00	6.40 E+00
Nectarine	880823	Cs-134	* 6.30 E-01	2.50 E+00
		Cs-137	* 3.07 E+00	2.51 E+00
		I-131	* 8.77 E-01	3.16 E+00
Peach	880907	Cs-134	*-1.99 E+00	3.95 E+00
		Cs-137	* 2.45 E+00	4.01 E+00
		I-131	* 1.83 E+00	7.54 E+00

(a) Samples not available until June.
* Denotes a result less than the detection limit.

TABLE A-14.1 (Cont.)

GAMMA SPECTROMETRY OF FRUIT

Results in pCi/kilogram (wet)

LOCATION	COLLECTION DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
	(a)			
37 Strawberry	880621	Cs-134	* 7.63 E-02	2.34 E+00
		Cs-137	* 2.55 E+00	2.39 E+00
		I-131	*-4.88 E+00	4.43 E+00
Apricots	880726	Cs-134	* 1.04 E+00	5.24 E+00
		Cs-137	* 4.15 E+00	5.47 E+00
		I-131	* 3.69 E+00	1.11 E+01
Nectarine	880823	Cs-134	*-7.88 E-02	3.08 E+00
		Cs-137	* 2.16 E+00	3.08 E+00
		I-131	* 1.69 E+00	4.24 E+00
Peaches	880907	Cs-134	* 9.55 E-02	3.55 E+00
		Cs-137	* 5.90 E-01	3.37 E+00
		I-131	*-3.73 E-01	5.35 E+00
Apples	880830	Cs-134	* 2.43 E+00	5.05 E+00
		Cs-137	* 2.14 E+00	4.78 E+00
		I-131	*-1.40 E+00	5.69 E+00

(a) Samples not available until June.
* 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)	6.90E-01	-7.88E-02	2.40E+00	5	0
Cs-134	(C)	-1.74E-01	-1.99E+00	1.07E+00	4	0
Cs-137	(I)	2.34E+00	5.90E-01	4.15E+00	5	0
Cs-137	(C)	1.99E+00	-2.65E-01	3.07E+00	4	0
I-131	(I)	-2.56E-01	-4.88E+00	3.69E+00	5	0
I-131	(C)	-1.94E+00	-6.10E+00	1.83E+00	4	0

(I) Indicator Station

(C) Control Station

TABLE A-15.1

GAMMA SPECTROMETRY OF VEGETABLES

Results in pCi/kilogram (wet)

LOCATION	COLLECTION DATE	NUCLIDE	RESULT	OVERALL UNCERTAINTY
	(a)			
9 Asparagus	880524	Cs-134	* 8.84 E-01	5.29 E+00
		Cs-137	* 2.47 E+00	5.58 E+00
		I-131	* 2.00 E+00	1.01 E+01
Lettuce	880621	Cs-134	* 2.90 E-01	4.04 E+00
		Cs-137	* 8.91 E-01	3.93 E+00
		I-131	*-1.65 E-01	8.13 E+00
Cabbage	880726	Cs-134	* 5.27 E+00	5.24 E+00
		Cs-137	* 3.92 E+00	5.35 E+00
		I-131	*-3.67 E+00	1.06 E+01
Bean	880823	Cs-134	* 1.00 E+00	5.67 E+00
		Cs-137	* 7.86 E+00	5.81 E+00
		I-131	* 2.12 E+00	7.79 E+00
Bean	880907	Cs-134	* 3.39 E+00	9.36 E+00
		Cs-137	*-5.26 E-01	8.97 E+00
		I-131	* 6.06 E+00	1.59 E+01

(a) Samples not available until May.
* 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 Asparagus	880419	Cs-134	* 4.47 E+00	5.86 E+00
		Cs-137	* 8.68 E+00	6.26 E+00
		I-131	* 3.35 E+00	7.14 E+00
Asparagus	880524	Cs-134	* 0.00 E-01	4.84 E+00
		Cs-137	* 4.96 E+00	5.33 E+00
		I-131	*-7.26 E+00	9.72 E+00
Lettuce	880621	Cs-134	* 6.50 E+00	8.81 E+00
		Cs-137	* 8.09 E+00	8.78 E+00
		I-131	* 9.31 E+00	1.60 E+01
Cabbage	880726	Cs-134	*-5.14 E+00	6.94 E+00
		Cs-137	* 8.22 E+00	7.46 E+00
		I-131	*-2.15 E+00	1.49 E+01
Cabbage	880823	Cs-134	* 3.33 E+00	4.89 E+00
		Cs-137	* 5.92 E+00	5.01 E+00
		I-131	* 5.39 E-01	6.63 E+00
Cabbage	880907	Cs-134	* 0.00 E-01	5.21 E+00
		Cs-137	* 5.30 E+00	5.56 E+00
		I-131	* 2.07 E+00	9.12 E+00

* 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	HIGH	NUMBER SAMPLES	NUMBER POSITIVE
Cs-134	(I)	1.53E+00	-5.14E+00	6.50E+00	6	0
Cs-134	(C)	2.17E+00	2.90E-01	5.27E+00	5	0
Cs-137	(I)	6.86E+00	4.96E+00	8.68E+00	6	0
Cs-137	(C)	2.92E+00	-5.26E-01	7.86E+00	5	0
I-131	(I)	9.77E-01	-7.26E+00	9.31E+00	6	0
I-131	(C)	1.27E+00	-3.67E+00	6.06E+00	5	0

(I) Indicator Station

(C) Control Station

APPENDIX B: TELEDYNE ISOTOPES 1988 EPA INTERCOMPARISON RESULTS

TABLE B-1

1988 EPA INTERCOMPARISON PROGRAM RESULTS

ISOTOPE	COLLECTION DATE	TI RESULTS (a)	EPA RESULTS (b)	OTHER LABS (c)
		MEDIUM - AIR FILTERS (pCi/cubic meter)		
Gr-Alpha	880325	24.00 ± 0.00	20.00 ± 5.00	22.62 ± 4.72
Gr-Beta	"	46.33 ± 1.15	50.00 ± 5.00	53.29 ± 6.05
Sr-90	"	17.00 ± 0.00	17.00 ± 1.50	17.09 ± 2.43
Cs-137	"	16.33 ± 0.58	16.00 ± 5.00	17.72 ± 3.05
Gr-Alpha	880826	9.33 ± 0.58	8.00 ± 5.00	8.89 ± 1.77
Gr-Beta	"	25.67 ± 1.53	29.00 ± 5.00	28.71 ± 3.51
Sr-90	"	7.67 ± 0.58	8.00 ± 1.50	7.79 ± 1.64
Cs-137	"	11.00 ± 1.00	12.00 ± 5.00	12.64 ± 2.69
		MEDIUM - FOOD (pCi/kilogram)(d)		
Sr-89	880129	40.67 ± 2.52	46.00 ± 5.00	41.54 ±12.89
Sr-90	"	54.33 ± 3.79	55.00 ± 2.75	52.59 ± 5.66
I-131	"	85.67 ± 5.13	102.00 ± 10.20	98.75 ± 8.09 (e)
Cs-137	"	98.67 ± 7.64	91.00 ± 5.00	91.05 ± 6.52 (f)
K-40	"	1210.00 ± 151.00	1230.00 ± 61.50	1217.57 ± 121.68
I-131	880729	103.33 ± 11.55	107.00 ± 11.00	107.54 ± 7.79
Cs-137	"	51.33 ± 2.52	49.00 ± 5.00	48.11 ± 2.82
K-40	"	1220.00 ± 34.64	1240.00 ± 62.00	1224.74 ± 50.30
		MEDIUM - MILK (pCi/liter)		
I-131	880226	4.33 ± 0.58	4.00 ± 0.40	4.17 ± 0.91
Sr-89	880624	36.33 ± 2.52	40.00 ± 5.00	33.88 ±11.92
Sr-90	"	61.00 ± 2.00	60.00 ± 3.00	56.16 ±10.10
I-131	"	101.67 ± 7.64	94.00 ± 9.00	96.02 ± 8.92
Cs-137	"	53.67 ± 3.06	51.00 ± 5.00	51.91 ± 3.60
K	"	1656.67 ± 55.07	1600.00 ± 80.00	1588.86 ±137.93
Sr-89	881028	28.33 ± 0.58	40.00 ± 5.00	31.73 ± 12.18 (g)
Sr-90	"	52.00 ± 3.46	60.00 ± 3.00	55.84 ± 5.74 (g)
I-131	"	87.67 ± 1.15	91.00 ± 9.00	89.95 ± 7.99
Cs-137	"	51.33 ± 1.53	50.00 ± 5.00	49.88 ± 3.76
K-40	"	1578.33 ± 23.63	1600.00 ± 80.00	1622.27 ± 98.53

* Footnotes are located at end of table.

TABLE B-1 (Continued)

1988 EPA INTERCOMPARISON PROGRAM RESULTS

ISOTOPE	COLLECTION DATE	TI RESULTS (a)	EPA RESULTS (b)	OTHER LABS (c)
		MEDIUM - WATER (pCi/liter)		
Gr-Alpha	880122	3.67 ± 0.58	4.00 ± 5.00	3.87 ± 1.62
Gr-Alpha	880318	4.00 ± 0.00	6.00 ± 5.00	5.58 ± 1.73
Gr-Alpha	880424	70.67 ± 0.58	46.00 ± 11.00	44.83 ± 12.26 (h)
Gr-Alpha	880520	4.67 ± 0.58	11.00 ± 5.00	9.40 ± 2.60 (i)
Gr-Alpha	880722	8.33 ± 0.58	15.00 ± 5.00	12.23 ± 2.87 (j)
Gr-Alpha	880923	9.00 ± 0.00	8.00 ± 5.00	7.58 ± 2.00
Gr-Alpha	881018	38.67 ± 1.15	41.00 ± 10.00	38.96 ± 9.31
Gr-Alpha	881125	10.00 ± 0.00	9.00 ± 5.00	8.83 ± 2.37
Gr-Beta	880122	8.33 ± 0.58	8.00 ± 5.00	8.30 ± 2.11
Gr-Beta	880318	15.67 ± 0.58	13.00 ± 5.00	12.90 ± 2.23
Gr-Beta	880424	67.67 ± 2.08	57.00 ± 5.00	57.80 ± 6.29 (k)
Gr-Beta	880520	13.67 ± 0.58	11.00 ± 5.00	11.88 ± 2.19
Gr-Beta	880722	6.00 ± 0.00	4.00 ± 5.00	5.73 ± 1.94
Gr-Beta	880923	11.33 ± 0.58	10.00 ± 5.00	10.45 ± 2.18
Gr-Beta	881018	53.33 ± 2.52	54.00 ± 5.00	50.42 ± 5.91
Gr-Beta	881125	11.00 ± 1.00	9.00 ± 5.00	9.66 ± 2.26
Sr-89	880108	27.33 ± 0.58	30.00 ± 5.00	27.76 ± 5.63
Sr-90	"	16.00 ± 1.00	15.00 ± 1.50	14.33 ± 1.56
Co-60	880205	65.00 ± 2.65	69.00 ± 5.00	69.28 ± 5.11
Zn-65	"	91.00 ± 4.36	94.00 ± 9.40	96.07 ± 7.31
Ru-106	"	89.00 ± 7.94	105.00 ± 10.50	99.59 ± 12.74 (l)
Cs-134	"	55.00 ± 5.29	64.00 ± 5.00	60.66 ± 5.00 (m)
Cs-137	"	91.00 ± 3.61	94.00 ± 5.00	94.16 ± 6.35
H-3	880212	3266.67 ±57.73	3327.00 ± 362.00	3358.36 ± 337.80
Ra-226	880331	7.30 ± 0.17	7.60 ± 1.14	7.18 ± 1.12
Ra-228	"	12.00 ± 0.00	7.70 ± 1.16	7.58 ± 1.70 (n)

TABLE B-1 (Continued)

1988 EPA INTERCOMPARISON PROGRAM RESULTS

ISOTOPE	COLLECTION DATE	TI RESULTS (a)	EPA RESULTS (b)	OTHER LABS (c)
		MEDIUM - WATER (pCi/liter)		
I-131	880408	8.67 ± 0.58	7.50 ± 0.75	7.52 ± 1.25 (o)
Ra-226	880424	6.63 ± 0.12	6.40 ± 0.96	6.04 ± 0.87
Ra-228	"	6.10 ± 0.20	5.60 ± 0.84	5.69 ± 1.20
Sr-89	"	4.67 ± 0.58	5.00 ± 5.00	5.56 ± 1.86
Sr-90	"	5.00 ± 0.00	5.00 ± 1.50	5.13 ± 1.04
Co-60	"	53.00 ± 2.00	50.00 ± 5.00	50.78 ± 4.04
Cs-134	"	8.33 ± 1.15	7.00 ± 5.00	7.20 ± 1.63
Cs-137	"	9.00 ± 1.00	7.00 ± 5.00	8.04 ± 1.57
Sr-89	880506	16.67 ± 2.08	20.00 ± 5.00	18.84 ± 5.84
Sr-90	"	19.67 ± 1.15	20.00 ± 1.50	18.36 ± 3.50
Cr-51	880603	313.67 ± 20.31	302.00 ± 30.00	304.64 ± 31.60
Co-60	"	18.00 ± 2.00	15.00 ± 5.00	15.95 ± 2.15
Zn-65	"	109.33 ± 10.50	101.00 ± 10.00	103.14 ± 7.38
Ru-106	"	184.67 ± 20.03	195.00 ± 20.00	190.83 ± 16.03
Cs-134	"	19.33 ± 2.08	20.00 ± 5.00	19.30 ± 2.03
Cs-137	"	30.33 ± 7.55	25.00 ± 5.00	25.91 ± 3.05
H-3	880610	5900.00 ± 199.99	5565.00 ± 557.00	5393.85 ± 504.93
Ra-226	880617	10.60 ± 0.40	10.00 ± 1.51	9.80 ± 1.49
Ra-228	"	9.97 ± 0.06	12.40 ± 1.86	11.60 ± 2.32 (p)
I-131	880805	86.00 ± 2.65	76.00 ± 8.00	77.29 ± 7.59 (q)
Ra-226	880916	8.70 ± 0.26	8.40 ± 1.30	7.75 ± 1.39
Ra-228	"	5.83 ± 0.32	5.40 ± 0.80	5.58 ± 1.18
Cr-51	881007	236.00 ± 29.21	251.00 ± 25.00	248.74 ± 24.02
Co-60	"	28.00 ± 0.00	25.00 ± 5.00	25.51 ± 2.35
Zn-65	"	165.67 ± 5.51	151.00 ± 15.00	151.82 ± 9.20
Ru-106	"	159.67 ± 12.22	152.00 ± 15.00	144.17 ± 17.50
Cs-134	"	27.67 ± 1.53	25.00 ± 5.00	24.05 ± 2.16
Cs-137	"	17.33 ± 3.06	15.00 ± 5.00	15.77 ± 2.32
H-3	881014	2300.00 ± 100.00	2316.00 ± 350.00	2317.56 ± 238.51
Ra-226	881018	5.67 ± 0.15	5.00 ± 0.80	4.86 ± 0.50

1988 EPA INTERCOMPARISON PROGRAM RESULTS

ISOTOPE	COLLECTION DATE	TI RESULTS (a)	EPA RESULTS (b)	OTHER LABS (c)
		MEDIUM - WATER (pCi/liter)		
Ra-228	881018	5.27 ± 0.06	5.20 ± 0.80	5.32 ± 0.87
Sr-89	"	8.67 ± 0.58	11.00 ± 5.00	9.91 ± 2.76
Sr-90	"	9.00 ± 0.00	10.00 ± 1.50	9.46 ± 1.34
Cs-134	"	15.67 ± 1.15	15.00 ± 5.00	14.34 ± 1.74
Cs-137	"	16.33 ± 3.21	15.00 ± 5.00	15.72 ± 1.69
I-131	881209	106.67 ± 5.77	115.00 ± 12.00	115.54 ± 14.48

TABLE B-1 (Continued)

1988 EPA INTERCOMPARISON PROGRAM RESULTS

COLLECTION DATE	MEDIA	NUCLIDE	EPA-RESULTS(a)	TELEDYNE ISOTOPES RESULTS(b)

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.

(d) Units for food analysis are pCi/kilogram except K-40 is mg/kilogram.

(e) The average result of 86 pCi/kg was lowered by one analysis of 80 pCi/kg, in which I-131 may have been lost in processing. If this analysis is discarded and the higher results of the other 2 aliquots are taken, the average becomes 94 pCi/kg which is more favorable (-1.1 sigma for 2 determinations). Our investigation revealed no systematic reason for the low I-131 (-2.77) sigma for 3 determinations). Moreover, our previous performance for this analysis shows no systematic bias.

(f) There is no apparent reason for the deviation. Although there is a bias high, the bias does not appear to be changing significantly. Starting with the 860113 data, the ratio of the average TI results to the EPA result is 1.27, 1.10, 1.08 and 1.15.

(g) Possible loss of radiostrontium in the initial TCA separation step. Another possibility, the presence of calcium on the final strontium mount has been ruled out by an experiment in which the strontium mounts were repurified and recounted, giving the same results as originally found. An experiment with direct ashing (EML method) as alternatives to the TCA separation step is being explored. This study includes an experiment in which spiked milk samples are stored for several weeks before analysis in order to determine whether radiostrontium becomes bound to the protein or fat components of the milk

(h) Dr. Frank Novielli of the EPA states that the EPA takes energy correction into account. He mailed us a document which indicates how this is achieved. Teledyne Isotopes has implemented the EPA method for energy correction.

(i) Low alpha caused by presence of chlorides in the sample residue which increases self-absorption. In the future we will evaporate the sample with more nitric acid to convert chlorides to nitrates. These reported results fall within the EPA 3 sigma control limits.

TABLE B-1 (Continued)

1988 EPA INTERCOMPARISON PROGRAM RESULTS

COLLECTION DATE	MEDIA	NUCLIDE	EPA-RESULTS(a)	TELEDYNE ISOTOPES RESULTS(b)

Footnotes: (Cont.)

(j) The deviation noted is due to unusually high self-absorption characteristics of EPA water spikes. Our results and the Midwest laboratory, each independently calibrated with Am-241, obtained low results by the same margin. Corrective action involves applying the self-absorption curve derived by our analysis of EPA water in 1976 collaborative study (solid line) instead of the usual curve (dashed line) when calculating EPA cross-check samples. (See figure below)

(k) High concentration of Co-60 in the sample (50 pci/l) resulted in false beta counts on the Tennelec counters from Co-60 gamma. Dr. Frank Norelli of the EPA stated that the EPA will discontinue using Co-60 in Performance Evaluation samples (effective October 1988) because of this problem.

(l) The ruthenium-106 results (as well as other isotopes in the EPA sample) for February 5, 1988 EPA sample were based on a new standard (Amersham) used in the December 1987 annual calibrations. A calculation using the previous NBS standard efficiencies gave an average of 98.0 pCi/liter having a normalized deviation of -1.15. A second Amersham standard in a Marinelli will be prepared to check on the original preparation.

(m) The cesium-134 results (as well as the other isotopes in the EPA sample) for February 5, 1988 EPA sample were based on a new standard (Amersham) used in the December 1987 annual calibrations. A calculation using the previous NBS standard efficiencies gave an average of 60.2 pCi/liter having a normalized deviation of -1.80. A second Amersham standard in a Marinelli will be prepared to check on the original preparation.

(n) The samples were analyzed for Ra-228 by PRO-032-67. A new procedure (PRO-032-97) has been formalized and will be in use in the near future for all samples. The results using the new procedure gave 6.2 ± 1.4 pCi/liter.

(o) An investigation was conducted and there is no apparent reason for the deviation. The samples contained an unusually high concentration of stable iodide (3.6 mg/liter) as determined by electrode readings which were verified at that time. The chemical yields were properly calculated, taking these readings into account. No corrective action is necessary, since these results fall within the EPA 3 sigma control limits and no trends on previous I-131 intercomparison results are evident.

(p) The investigation revealed no apparent reason for the reported low value. The result is within the EPA 3 sigma acceptance region. The new rapid extraction method for Ra-228 has provided acceptable results for all of the last 7 EPA tests.

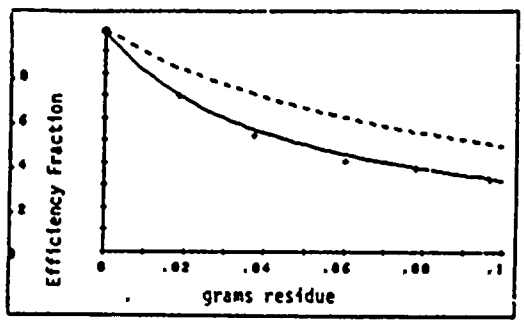
TABLE B-1 (Continued)

1988 EPA INTERCOMPARISON PROGRAM RESULTS

COLLECTION DATE	MEDIA	NUCLIDE	EPA-RESULTS(a)	TELEDYNE ISOTOPES RESULTS(b)

Footnotes:

(q) Faulty stable iodide yield correction, probably caused by a chemical in the sample which interferes with the iodide electrode. The high electrode reading was verified by repeating several times. Without yield correction our average result would have been 77 pCi/l. In the future we should confirm stable iodide readings on EPA waters with chemical analysis, or confirm I-131 result with gamma spectral analysis. This result is in the EPA 3 sigma acceptance region.



APPENDIX C: SPECIAL SAMPLE RESULTS

Special Sample Results

During 1988, investigations into anomalous results or the inability to use routine sampling methods to fulfill the monitoring program requirements necessitated the collection of special environmental samples. Since these samples were collected using nonroutine sampling or analytical methods and/or sampling locations, the results were not grouped with the routine results in Appendix A.

Table C-1 contains the results of special intake water samples taken from the January, March and April 1988 composite samples. These samples were concentrated by factors of 8-10 through evaporation and then submitted for analysis. The purpose of these concentrated samples was to improve the gamma detection ability and define the radioactivity present in the water coming from upstream of the plant. Despite the concentration, however, all the gamma results were still below detection levels.

The results of grab samples taken from the intake line (Station 26) and the discharge line (Station 27) during 1988 are presented in Table C-2. Such grab sampling was necessitated during periods when the composite samplers were inoperable.

The gamma results for the third quarter composite of Station 21 air particulate filters indicated detectable Cs-137. So additional sampling was performed at that station to gather more information about radionuclide concentrations there. Table C-3 contains the results of a soil sample and a composite of the air particulate filters for the month of October. Tables C-4 and C-5 present the results of air particulate filters and charcoal cartridges collected over a period of a month at the chalet approximately 800 feet NE of the plant. Except for naturally-occurring radionuclides and, in the case of the soil sample, Cs-137, all results were less than the lower limits of detection. The cesium level in the soil was typical of concentrations found in the soil in the area, including soil from the control location near Grandview.

TABLE C-1

RESULTS OF CONCENTRATED INTAKE (STATION 26) WATER SAMPLES

Results in pCi/liter

COLLECTION PERIOD	NUCLIDE		RESULT	OVERALL UNCERTAINTY
871216 to 880113[1]	Gross Beta		1.2E+01	4.0E+00
	Be-7	*	-1.6E+01	3.1E+01
	K-40	*	1.3E+02	5.0E+01
	Mn-54	*	0.0E+00	3.2E+00
	Co-58	*	-1.0E+00	3.2E+00
	Fe-59	*	2.5E+00	7.2E+00
	Co-60	*	3.7E+00	3.8E+00
	Zn-65	*	-2.9E+00	7.4E+00
	Zr-95	*	6.9E+00	7.2E+00
	Nb-95	*	6.9E-01	3.4E+00
	Cs-134	*	-4.6E-01	3.7E+00
	Cs-137	*	9.2E+00	4.0E+00
	Ba-140	*	1.5E+00	1.2E+01
	La-140	*	-3.6E+00	5.4E+00
	Ra-226	*	1.8E+02	8.0E+01
	Th-228	*	1.7E+01	7.0E+00
880217 to 880316[2]	Be-7	*	2.7E+00	2.6E+01
	K-40	*	4.1E+02	2.0E+01
	Mn-54	*	7.1E-01	1.2E+00
	Co-58	*	4.4E-01	2.2E+00
	Fe-59	*	2.6E+00	7.8E+00
	Co-60	*	-3.3E-02	1.0E-01
	Zn-65	*	-5.1E+00	2.9E+00
	Zr-95	*	3.4E+00	5.0E+00
	Nb-95	*	-5.0E-01	2.3E+00
	Cs-134	*	6.9E-01	1.1E+00
	Cs-137	*	9.2E-01	1.0E+00
	Ba-140	*	-3.3E+02	3.2E+02
	La-140	*	4.5E+01	1.4E+02
	Ra-226	*	3.1E+01	1.8E+01
	Th-228	*	6.4E+00	1.7E+00

TABLE C-1 (Continued)

RESULTS OF CONCENTRATED INTAKE (STATION 26) WATER SAMPLES

Results in pCi/liter

COLLECTION PERIOD	NUCLIDE		RESULT	OVERALL UNCERTAINTY
880316 to 880413(2)	Be-7	*	-3.5E+00	1.4E+01
	K-40	*	1.9E+01	9.0E+00
	Mn-54	*	5.3E-01	7.3E-01
	Co-58	*	3.1E-01	1.2E+00
	Fe-59	*	8.6E-01	3.3E+00
	Co-60	*	-3.1E-01	7.4E-01
	Zn-65	*	7.5E-02	1.8E+00
	Zr-95	*	-7.6E-01	2.3E+00
	Nb-95	*	-4.3E-02	1.2E+00
	Cs-134	*	-5.6E-02	7.8E-01
	Cs-137	*	4.9E-01	7.3E-01
	Ba-140	*	-4.0E+01	5.1E+01
	La-140	*	1.0E+01	2.2E+01
	Ra-226	*	1.1E+01	1.4E+01
	Th-228	*	2.4E+00	1.3E+00

(1) Concentrated by a factor of 8 through evaporation.
(2) Concentrated by a factor of 10.3 through evaporation.
* Denotes a result less than the detection limit.

TABLE C-2

RESULTS OF WATER GRAB SAMPLES AND GRAB SAMPLE COMPOSITES

Results in pCi/liter

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
		River/Drinking Water		
26	880621 to 880701 (Composite of Grab Samples)	Gross Beta	2.1E+00	9.0E-01
		Be-7	* -7.1E+00	3.7E+01
		K-40	* 3.1E+02	4.0E+01
		Mn-54	* 1.7E+00	3.1E+00
		Co-58	* 7.1E-01	3.5E+00
		Fe-59	* -2.4E+00	7.4E+00
		Co-60	* 4.5E+00	3.1E+00
		Zn-65	* -1.9E+00	6.7E+00
		Zr-95	* 5.7E+00	7.9E+00
		Nb-95	* 4.7E+00	3.8E+00
		Cs-134	* 3.9E-01	3.4E+00
		Cs-137	* 9.4E-01	3.3E+00
		Ba-140	* -2.6E+01	3.4E+01
		La-140	* 1.4E+01	1.3E+01
		Ra-226	* 1.5E+02	7.0E+01
		Th-228	* 8.3E+01	7.0E+00
26	880621 to 880701 (Composite of Grab Samples)	H-3	3.3E+02	6.0E+01
		Discharge		
27	880531 (Time: 1550)	Gross Beta	3.9E+01	4.0E+00
		Be-7	* -1.2E+01	2.3E+01
		K-40	* 1.6E+02	2.0E+01
		Mn-54	* 1.1E+00	1.9E+00
		Co-58	* 8.8E-01	2.3E+00
		Fe-59	* -1.9E+00	5.0E+00
		Co-60	1.3E+01	3.2E+00
		Zn-65	3.3E+01	7.0E+00
		Zr-95	* 5.2E+00	4.6E+00
		Nb-95	* 7.1E+01	2.4E+00
		Cs-134	* 7.2E-00	3.0E+00
		Cs-137	* 1.2E-01	2.2E+00
		Ba-140	* -6.2E+00	1.8E+01
		La-140	* -3.2E+00	6.7E+00
		Ra-226	* 1.3E+02	4.0E+01
		Th-228	* 1.4E+01	4.0E+00
		Ag-110m	2.8E+01	2.8E+00

* Denotes a result less than the detection limit.

TABLE C-2 (Continued)

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
27	880531 (Time: 2300)	Gross Beta	1.3E+01	3.0E+00
		Be-7	* 7.2E+00	2.9E+01
		K-40	* 4.1E+02	3.0E+01
		Mn-54	* 2.4E+00	2.4E+00
		Co-58	* -1.3E-01	2.7E+00
		Fe-59	* 8.8E+01	6.0E+00
		Co-60	6.1E+00	2.5E+00
		Zn-65	1.4E+00	5.1E+00
		Zr-95	* 8.8E+00	6.1E+00
		Nb-95	* 2.6E+00	2.9E+00
		Cs-134	* 6.2E+00	2.7E+00
		Cs-137	* 8.5E+00	2.9E+00
		Ba-140	* -1.2E+01	2.2E+01
		La-140	* -8.2E+00	8.8E+00
		Ra-226	* 2.2E+02	6.0E+01
		Th-228	* 9.3E+01	5.0E+00
27	880601 (Time: 0610)	Gross Beta	9.6E+00	2.8E+00
		Be-7	* 9.4E+00	4.4E+01
		K-40	* 1.4E+03	8.0E+01
		Mn-54	* 8.1E-02	3.6E+00
		Co-58	* -2.2E+00	4.4E+00
		Fe-59	* 1.6E+00	1.1E+01
		Co-60	* 5.5E+00	4.0E+00
		Zn-65	* -7.9E+00	9.2E+00
		Zr-95	* 1.1E+01	9.0E+00
		Nb-95	* 3.8E+00	4.7E+00
		Cs-134	* 2.6E+00	3.9E+00
		Cs-137	* 4.3E+00	4.1E+00
		Ba-140	* -1.8E+01	4.5E+01
		La-140	* -1.2E+01	2.0E+01
		Ra-226	* 1.4E+02	7.0E+01
		Th-228	* 2.0E+01	6.0E+00
27	880531 to 880601 (Composite of grab samples)	H-3	1.6E+04	1.0E+03

* Denotes a result less than the detection limit.

TABLE C-2 (Continued)

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
27	881209 (Time: 1430)	Gross Beta	2.9E+01	3.0E+01
		Be-7	* -9.6E+01	2.0E+01
		K-40	* 1.3E+02	3.0E+01
		Mn-54	* 7.4E-02	2.0E+00
		Co-58	* 7.2E-01	2.2E+00
		Fe-59	* 5.3E+00	4.6E+00
		Co-60	* 1.0E+00	2.5E+00
		Zn-65	* -2.4E+00	4.4E+00
		Zr-95	* -1.5E+00	4.3E+00
		Nb-95	* 3.0E+00	2.3E+00
		Cs-134	* 1.0E+00	2.1E+00
		Cs-137	* 2.7E+00	2.2E+00
		Ba-140	* 7.3E+00	1.0E+01
		La-140	* 2.8E+00	4.7E+00
		Ra-226	* 1.3E+02	5.0E+01
		Th-228	* 1.1E+01	1.0E+00
27	881210 (Time: 0800)	Gross Beta	2.2E+01	3.0E+00
		Be-7	* 1.0E+01	2.8E+01
		K-40	* 1.0E+03	7.0E+01
		Mn-54	* 1.9E+00	2.7E+00
		Co-58	* 3.7E-01	3.0E+00
		Fe-59	* 3.8E+00	6.8E+00
		Co-60	* -2.0E-01	3.1E+00
		Zn-65	* -6.6E+00	6.6E+00
		Zr-95	* 1.4E-01	6.3E+00
		Nb-95	* -4.3E-01	3.1E+00
		Cs-134	* 1.0E+00	3.1E+00
		Cs-137	* 3.5E+00	3.2E+00
		Ba-140	* 1.0E+01	1.4E+01
		La-140	* -2.8E+00	5.5E+00
		Ra-226	* 1.1E+02	6.0E+01
		Th-228	* 1.9E+01	5.0E+00

* Denotes a result less than the detection limit.

TABLE C-2 (Continued)

LOCATION	COLLECTION PERIOD	NUCLIDE		RESULT	OVERALL UNCERTAINTY
27	881210 (Time: 1800)	Gross Beta		2.0E+01	3.0E+00
		Be-7	*	5.5E+00	2.0E+01
		K-40	*	1.3E+02	3.0E+01
		Mn-54	*	-1.2E+00	2.0E+00
		Co-58	*	6.4E-01	2.1E+00
		Fe-59	*	5.9E-01	4.5E+00
		Co-60	*	-6.6E-01	2.1E+00
		Zn-65	*	7.7E-01	4.6E+00
		Zr-95	*	7.4E-01	4.5E+00
		Nb-95	*	3.0E+00	2.2E+00
		Cs-134	*	-9.6E-01	2.1E+00
		Cs-137	*	7.7E-01	2.3E+00
		Ba-140	*	-1.9E+00	9.7E+00
		La-140	*	-7.4E-01	3.9E+00
		Ra-226	*	1.1E+02	5.0E+01
		Th-228	*	1.1E+01	4.0E+00
27	881211 (Time: 0800)	Gross Beta		2.4E+01	3.0E+00
		Be-7	*	0.0E+01	2.0E+01
		K-40	*	9.6E+01	3.0E+01
		Mn-54	*	9.2E-01	2.0E+00
		Co-58	*	-8.9E-02	2.0E+00
		Fe-59	*	-8.8E-01	4.8E+00
		Co-60	*	8.8E-01	2.2E+00
		Zn-65	*	2.6E+00	5.0E+00
		Zr-95	*	2.3E+00	4.4E+00
		Nb-95	*	1.4E+00	2.1E+00
		Cs-134	*	-9.0E-02	2.1E+00
		Cs-137	*	1.9E+00	2.2E+00
		Ba-140	*	0.0E+00	9.1E+00
		La-140	*	-4.9E+00	4.2E+00
		Ra-226	*	1.0E+02	5.0E+01
		Th-226	*	9.5E+00	4.0E+00

* Denotes a result less than the detection limit.

TABLE C-2 (Continued)

LOCATION	COLLECTION PERIOD	NUCLIDE	RESULT	OVERALL UNCERTAINTY
27	881211 (Time: 1600)	Gross Beta	2.2E+01	3.0E+00
		Be-7	* 1.1E+01	2.1E+01
		K-40	* 5.1E+01	2.7E+01
		Mn-54	* 1.5E+00	2.1E+00
		Co-58	* 2.2E-01	2.1E+00
		Fe-59	* 1.8E-01	4.5E+00
		Co-60	* 1.4E+00	2.4E+00
		Zn-65	* 3.5E-01	5.2E+00
		Zr-95	* 5.4E-01	4.3E+00
		Nb-95	* 6.9E-02	2.1E+00
		Cs-134	* -6.6E-01	2.4E+00
		Cs-137	* 2.6E-01	2.2E+00
		Ba-140	* 7.1E-01	9.2E+00
		La-140	* -4.4E+00	4.5E+00
		Ra-226	* 1.1E+02	4.0E+01
		Th-226	* 1.3E+01	4.0E+00
27	881209 to 881211 (Composite of grab samples)	H-3	* 4.4E+01	1.1E+02

* Denotes a result less than the detection limit.

TABLE C-3

RESULTS OF SPECIAL SAMPLES COLLECTED AT STATION 21

MEDIA	COLLECTION PERIOD	NUCLIDE	RESULTS	OVERALL UNCERTAINTY
Soil	881118			
(pCi/kilogram)		K-40	1.4E+04	0.1E+04
		Cs-134	* 1.8E+01	1.3E+01
		Cs-137	6.1E+01	1.7E+01
		Ra-226	3.4E+02	0.4E+02
		Th-228	4.6E+02	0.5E+02
October Air Particulate Composite	880926 to 881031			
(pCi/cubic meter)		Be-7	8.3E-02	0.8E-02
		K-40	* 1.6E-01	0.2E-01
		Ru-103	* -2.2E-02	3.3E-02
		Ru-106	* -9.3E-04	2.6E-03
		Cs-134	* 4.6E-04	3.5E-04
		Cs-137	* 1.4E-04	3.1E-04
		Ra-226	7.1E-03	4.6E-03
		Th-228	3.2E-03	0.4E-03

* Denotes a result less than the detection limit.

TABLE C-4

RESULTS OF SPECIAL AIR PARTICULATE FILTERS FROM NEAR-PLANT LOCATION

Results in pCi/cubic meter

NUCLIDE	881205 TO 881212		881212 TO 881219		881219 TO 881227		881227 TO 890103	
	Result	Uncertainty	Result	Uncertainty	Result	Uncertainty	Result	Uncertainty
Be-7	* 1.3E-02	0.8E-02	5.8E-02	1.9E-02	2.73E-02	1.04E-02	* 9.8E+00	5.6E+00
K-40	* 2.7E-02	1.3E-02	* 8.9E-01	0.4E-01	* 8.0E-02	1.6E-02	* 2.6E+02	0.2E+02
Ru-103	* 4.1E-04	9.6E-04	*-1.4E-03	1.7E-03	* 3.8E-04	9.0E-04	* 2.8E-02	0.6E-02
Ru-106	*-2.3E-03	8.3E-03	*-4.7E-03	13.8E-03	*-4.3E-03	8.2E-03	* 4.7E+00	5.9E+00
Cs-134	*-1.8E-04	9.5E-04	* 8.9E-04	17.1E-04	* 1.2E-03	1.0E-03	* 7.3E-01	7.3E-01
Cs-137	* 2.5E-05	95.8E-05	* 3.7E-04	15.8E-04	* 2.1E-03	1.1E-03	* 6.7E-02	72.0E-02
Ra-226	* 1.8E-02	1.5E-02	* 4.4E-02	2.3E-02	* 3.9E-02	1.4E-02	* 5.6E+00	12.7E+00
Th-228	* 1.9E-03	1.3E-03	* 1.2E-02	0.2E-02	* 1.6E-02	0.1E-02	* 5.4E+00	1.0E+00

TABLE C-5

IODINE-131 RESULTS FOR SPECIAL CHARCOAL CARTRIDGES FROM NEAR PLANT LOCATION

Results in pCi/cubic meter

DATE	I-131 RESULTS	OVERALL UNCERTAINTY
881205 to 881212	*-3.3E-03	9.4E-03
881212 to 881219	*-2.9E-03	7.5E-03
881219 to 881227	*-3.7E-03	5.3E-03
881227 to 890103	*-2.6E-03	3.9E-03

* Denotes a result less than the detection limit.

APPENDIX D: SAMPLE DEVIATIONS

Sample Deviations

Deviations from the 1988 sampling schedule or from analytical procedures are listed in Table D-1. In each case, the causes of the deviations were corrected, so no long-term impact on the program resulted.

The majority of the sampling problems encountered during 1988 involved the malfunction of air samplers and the composite water sampler on the plant discharge line (Station 27). Most of the air sampling problems involved power outages at the air sampling stations. Short power outages were particularily frequent at Station 21, the Security Firing Range, where the electrical breakers were frequently shut off. The breaker to the air sampler there is now labeled to prevent it from being inadvertently shut off.

Power outages at the pumphouse, periods of plant outage, and sampling system malfunction were the major reasons for the water sampling problems at Station 27. When possible during power outages and periods of sampler inoperability, grab samples of the discharge water were taken. The times, dates and results of these grab samples and grab sample composites are presented in Appendix C. A non-conformance report (NCR) was written in August 1988 to document the composite water sampling problems. Repairs were made to components of the discharge water sampling system, making the system more reliable. The flow proportional sampling system for the discharge line was installed during 1988, but difficulties with the signal from a low range flowmeter prevented full use of the system during 1988.

TABLE D-1

1988 SAMPLE DEVIATIONS

SAMPLE MEDIA	COLLECTION PERIOD/DATE	SAMPLE LOCATION	CAUSE OF DEVIATION
Air Particulate/ Air Iodine			
	880104 to 880111	7	Pump out; shortened sampling period.
	880118 to 880125	23	Power outage; low sampling time (26 hours short).
	880125 to 880201	23	Timer malfunction; used elapsed time instead of the indicated time.
	880201 to 880208	21	Small power outage; slightly shortened sampling time.
	880201 to 880208	5	Blown fuse; low sampling time (49.5 hours).
	880208 to 880216	21	Small power outage; slightly shortened sampling time.
	880222 to 880229	21	Power outage; low sampling time (118.4 hours).
	880307 to 880314	9	Indicated cfm out of range; actual cfm was within requirements.
	880321 to 880328	40	Blown fuse; very low sampling time (34.0 hours).
	880411 to 880418	48	Filter lost for one week; retrieved 4/25/88 and submitted for analysis.
	880425 to 880502	23	Power outage; shortened sampling time.
	880509 to 880516	48	Pump out; low sampling time (22.8 hours); usual LLD (0.003 pCi/m^3) not met.
	880516 to 880523	1	Power outage; shortened sampling time (150.8 hours).
	880531 to 880606	48	Blown fuse; short sampling time (44.6 hours).

TABLE D-1 (Continued)

1988 SAMPLE DEVIATIONS

SAMPLE MEDIA	COLLECTION PERIOD/DATE	SAMPLE LOCATION	CAUSE OF DEVIATION
Air Particulate/ Air Iodine (Cont.)			
	880531 to 880606	21	Power outage; short sampling time (133.4 hours).
	880726 to 880729	8	Blown fuse; very low sampling time (32.8 hours).
	880729 to 880801	8	Blown fuse; low sampling time (73.5 hours).
	880801 to 880808	21	Pump malfunction short sampling time (52.7 hours).
	880816	6	During calibration, the air flow regulation (cfm) for sampler #14671-79 was found to be out of acceptance limits. Last use was from 12/14/87 to 06/06/88 at Station 6. No correction was made to this station's results since the actual cfm was higher than the 1.5 cfm assumed in air volume calculations.
	880822 to 880829	23	Small power outage; slightly shortened sampling time.
	881010 to 881017	8	Blown fuse; low sample time (23.0 hours).
	881024 to 881031	5	Power outage due to sub-station work; slightly shortened sampling time.
	881128 to 881205	23	Small power outage; slightly shortened sampling time.
Water	880304	27	Sampler non-operational; flow switch adjusted.
	880406	27	Sampler found non-operational; flow switch adjusted.

TABLE D-1 (Continued)

1988 SAMPLE DEVIATIONS

SAMPLE MEDIA	COLLECTION PERIOD/DATE	SAMPLE LOCATION	CAUSE OF DEVIATION
Water (Cont.)	880418 to 880429	27	Sampler non-operational; repair not possible until the 29th. Grab samples were attempted but the sampling line was plugged.
	880509 to 880512	26	Sampler non-operational; repair delayed due to pumphouse floor flooding.
	880514 to 880603	27	Power outage at pumphouse prevented sampling of discharge line; grab samples taken 5/31/88 to 6/01/88.
	880620 to 880702	26	Pump supplying intake water not operational; grab samples taken daily from 6/21/88 to 7/01/88.
	880810 to 880817	26	Pump supplying intake water not operational; grab samples taken from 8/11/88 to 8/17/88. No monthly sample 7/20/88 to 8/17/88.
	880810 to 880822	27	Sampler non-operational because the pump supplying intake water for line flush not operational and because the flow switch malfunctioned; grab samples taken from 8/17/88 to 8/22/88. An NCR was written documenting operational problems.
	880901	27	Sampler non-operational while being repaired. Sampler calibration delayed until repair completed and operational problems resolved.

TABLE D-1 (Continued)

1988 SAMPLE DEVIATIONS

SAMPLE MEDIA	COLLECTION PERIOD/DATE	SAMPLE LOCATION	CAUSE OF DEVIATION
	881019 to 881020	27	Pump supplying water to sampler damaged due to operating dry; relay also burned out. New relay installed and replacement parts for pump ordered.
	881101 to 881102	27	Relay burned out; new relay installed.
	881129 to 881130	27	Relay burned out; heavy duty relay ordered.
	881209 to 881212	27	Solenoid burned out; grab samples collected from 12/09/88 to 12/11/88.
Sediment	880421	34	River level low so sampled about twenty feet further from shore then usual.
Fish	880929 to 881007	38	Water level low on Snake River so requirement for two pounds of each species was not fulfilled; only 0.8 pound of bass and 0.2 pound of crappie were obtained.
Milk	880809	96	Milk sample unavailable due to early milk truck pick-up.
Produce	880419	9, 37	Fruit and root samples were not yet available at either location; a vegetable sample was not available at Station 9.
	880524	9, 37	Fruit and root samples were not available at either location.
TLD	871230 to 881229	25 Building Controls	Forward area results lost on TLDs 624, 692 and 693; used backup readings to determine results.

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