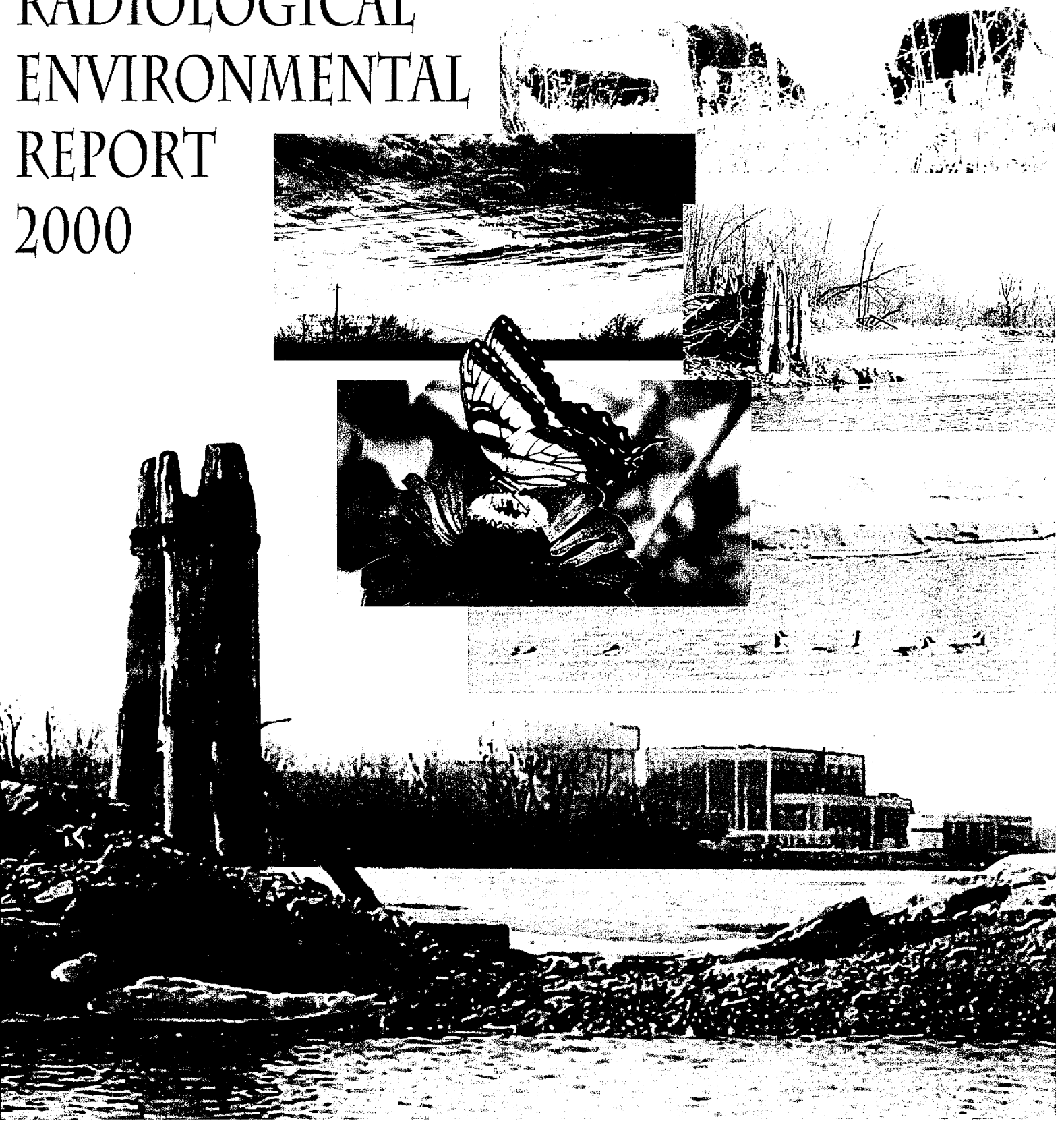
OMAHA PUBLIC POWER DISTRICT FORT CALHOUN RADIOLOGICAL ENVIRONMENTAL REPORT 2000



OMAHA PUBLIC POWER DISTRICT

FORT CALHOUN STATION

RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT

TECHNICAL SPECIFICATION 5.9.4.b

January 1, 2000 – December 31, 2000

Annual Radiological Environmental Operating Report

This report is submitted in accordance with Section 5.9.4b of the Technical Specifications of Fort Calhoun Station Unit No. 1, Facility Operating License DPR-40 for the period January 1, 2000 through December 31, 2000.

In addition, this report provides any observations and anomalies that occurred during the monitoring period.

Reviewed by:

Supervisor-System Chemistry

Approved by:

Manager-Chemistry

Annual Radiological Environmental Operating Report – 2000

In accordance with Technical Specification 5.9.4b, this is the Fort Calhoun Station (FCS) Annual Radiological Environmental Operating Report for year 2000. The data provided is consistent with the objectives as specified in Section 5 of the Offsite Dose Calculation Manual (ODCM), "Radiological Environmental Monitoring Requirements." The report is presented as follows:

1) An introduction discusses program observations and environmental impact relevant to the operation of FCS and the implementation of the Radiological Environmental Monitoring Program (REMP).

2) The sample class, sample collection frequency, number of sample locations, and the number of samples collected this reporting period for each class is delineated in Table 1.0.

3) A statistical evaluation of REMP findings is summarized in Table 2.0, in accordance with Regulatory Guide 4.8, Table 1. For each type of sample medium and analysis, Table 2.0 exhibits separately all **indicator** locations, all **control** (background) locations, and the location having the highest annual mean result. For each of these classes, Table 2.0 specifies the following:

   a. The total number of analyses.

   b. The fraction of analyses yielding detectable results (i.e., results above the highest Lower Limit of Detection (LLD) for this period).

   c. The maximum, minimum, and average results.

   d. The coordinates in distance in miles and the direction relative to the center of FCS Reactor Containment Building (radial degrees) are specified for the location with the highest mean.

4) Table 3.0 is a listing of missed samples and explanations.

5) Table 4.0 is the Environmental Land Use Survey.

6) Review of Environmental Inc. Quality Assurance Program

7) Appendix A describes the Interlaboratory Comparison Program.

8) Appendix B describes the vendor Data Reporting Conventions utilized.

9) Appendix C reports the information required when primary coolant specific activity has exceeded the limits of Technical Specification 2.1.3.

INTRODUCTION

Radiological Environmental Monitoring Program (REMP) - 2000

The Omaha Public Power District has a stringent environmental radiological monitoring program at Fort Calhoun Station Unit No. 01. This program was initiated prior to plant operation in 1973 and continues to date. Pre-operational and post-operational data have been recorded. This submittal presents the Fort Calhoun Station (FCS) Annual Radiological Environmental Operating Report – 2000, documenting the results of the Radiological Environmental Monitoring Program (REMP).

The main purpose for conducting the REMP is to ensure the safety of the public by monitoring radiological plant discharges, and to demonstrate responsible environmental stewardship by assessing the effect of plant operation on the environment. Program objectives are accomplished by monitoring potential exposure pathways, including air, water, milk, fish, sediment, and food crops. Monitoring consists of collecting samples from the area of the plant within a five-mile (radius) circle, centered on the plant containment building. This circle is divided into sixteen equal sectors. Sector "A" being centered on North. Samples are collected at both Control and Indicator locations. The program uses analysis techniques that are sufficiently sensitive to detect activity levels far below those that are considered hazardous to man. Sampling sites, or receptors, are selected based on radiological and meteorological factors that are obtained from the Annual Effluent Release Report and the Environmental Land Use Survey. The approximate distance and radial degrees for each sample site are recorded.

In interpreting the data, results due to plant operation are distinguished from those due to other sources by comparing Control results to Indicator location results. A station effect could be indicated if the sample results at an indicator location are significantly larger than those at the control location. The difference would have to be greater than could be accounted for by typical fluctuations in radiation from other sources. In year 2000, the activity present in some of the routinely sampled media was determined to be from natural and atmospheric fallout sources.

Results of completed analyses, as required by the FCS Offsite Dose Calculation Manual (ODCM), are presented in the attached statistical tables in accordance with Table 1 of Regulatory Guide 4.8, "Environmental Technical Specifications for Nuclear Power Plants." Collection of environmental samples performed by plant chemistry/environmental staff. Sample analysis and monthly reports were performed by a contract vendor (Environmental Inc., Northbrook, Illinois). Results for this reporting period were generally within expected ranges and compared favorably to historical trends. Evaluation of plant operating data indicated that media sampled did not contain radioactivity attributable to the operation of Fort Calhoun Station and any plant effects were negligible. The following observations were documented during the monitoring period:

1) AMBIENT GAMMA RADIATION-TLD

All dosimeters were found intact for all four quarters of 2000 and none were lost to vandalism or theft. A data comparison for 1999 and 2000 showed no increase in gamma radiation to the unrestricted area. There was no variance in the mean dose (in mr/week) for all indicator and control locations from year 1999 to year 2000. A

separate evaluation of year 2000 dosimetry data indicates that results were well within the expected range and no adverse trend is identified. Therefore, no observable environmental impact is indicated that would require changes or modifications to plant operation.

2) MILK

There were no milk animals located within the five mile monitoring radius of the plant during the pasture season (May to October) for year 2000. Therefore, this ingestion pathway was monitored by substituting vegetation samples collected from pastures at the location having the highest potential for exposure. Samples were also collected at one control location. A comparison of 1999 and 2000 data indicate that for both years all results are less than LLD. Therefore, no adverse environmental impact was observed.

3) FISH

Comparison of 1999 and 2000 data indicate no adverse effect. All indicator and control locations were less than LLD. No changes to plant operation are required.

4) FOOD CROPS

Comparison of 1999 and 2000 sample results for food crops do not indicate changes in the environment as a result of plant operations. All indicator and control locations were less than LLD and within the expected range. No changes to plant operation are required and there have been no observable adverse environmental impacts.

5) SEDIMENT

Results indicate a slight increase in the frequency of detectable Cesium-137 results from 1999 to 2000. Analysis of samples collected June 14, 2000, at both the upstream control location (OSD-B-C) and the downstream indicator location (OSD-A-I) revealed trace amounts greater than LLD (0.021 pCi/dry) were found for Cesium-137. The upstream results were 0.066 pCi/g dry and the downstream results were 0.036 pCi/g dry. Because the results at the indicator location were lower than the control, the most likely source of the cesium is from atmospheric fallout.

Samples collected December 7, 2000, at the downstream indicator location yielded results of 0.011 pCi/dry for Cesium-137. The upstream control location sample was <LLD. Condition reports were initiated to document the results and required plant staff to conduct an evaluation of plant operating data in order to determine the source of the activity. A review of Chemistry release data generated during this time frame demonstrates that FCS is likely not the source of these positive results. Additionally, the doses generated by LADTAP software for the year were cross-compared to one created using the conversions and usage factors from the ODCM and the environmental sample data.

River sediment was sampled twice during 2000. Sample results from June 14, 2000, were positive for Cesium-137 at both upstream and downstream locations. However the upstream results are approximately two times higher than the downstream and appear to be fallout related. The downstream sample performed on December 7, 2000, contained Cesium-137 at 0.011 pCi/g. On December 6, 2000, a monitor tank (MT) release was performed with a Cesium-137 concentration of 2.5E-4 pCi/ml at the site discharge tunnel. It is highly unlikely that a concentration at this level would result in a sediment sample of .011 pCi/g. The whole body dose estimate for this MT was 1.96E-4 mrem. An estimate was performed using the positive sediment result and equations in the ODCM. Using dose factors from ODCM Table 8 (External Dose Factors for Standing on Contaminated Ground) and highest usage factor (teen) from Table 6, the calculation produced a result of 3.1E-5 mrem. This number is consistent with the computer estimate for the tank's entire volume, the LADTAP number of 5.12E-4 mrem for the year for sediment, and is far lower than the total dose assigned per the fourth quarter report (0.111 mrem). An additional variable was in play during the December sample collection. A letdown piping weld leaked into containment resulting in airborne cesium being released to the environment at a concentration of 1.84E-13 μCi/cc Cs-137. Although highly unlikely that a release at this concentration would have produced a positive sediment result, it is possible that some did land on soil and was deposited in the sample. A positive result at this level, 0.011 versus 0.009 pCi/g (LLD), may in reality be a difference of only a few counting events.

In summation, changes to FCS release processes are not warranted due to these positive environmental results. The doses attributed to the positive results are minimal, lower than those estimated by LADTAP software, and consistent with normal background levels for environmental samples. Chemistry will continue to trend and evaluate these results to ensure the accuracy of our dose estimates and ensure our releases have minimal impact on the environment.

6) AIR MONITORING

Comparison of 1999 and 2000 data indicates that the results for all locations were within the expected range. It should be noted that there was no downtime or missed samples for the year. The following are noteworthy events relative to the performance of the air sampling program:

(1) One control location (OAP-E-(C) Location EOF, 17.5 miles SE of reactor) was terminated from the program December 22, 1999. Previous audits suggested that this location was not the most effective background site in accordance with Regulatory Guide 4.8, "Environmental Technical Specifications for Power Plants," and also the criteria of the NRC Branch Technical Position for a Radiological Environmental Monitoring Program. This location was replaced by Valley Substation #902, 19.5 miles SW of Reactor, OAP-F-(C). This site is 19.5 miles from the plant and opposite the prevailing wind direction. This is considered as an enhancement to the overall effectiveness of the REMP.

(2) An exposed glass fiber filter from Location OAP-F-(C), Valley Substation, was found slightly damaged by the technician collecting the sample. The filter had several small perforations in it. The filter appeared to have gotten wet because the filtrate had dissolved into the pad. Two days prior to collection, the weather had been extremely harsh, with strong gusting winds, which could have resulted in precipitation entering through the vents on the air pump enclosure. After consultation with the vendor supplying the air pumps it was determined that all filter holders would be upgraded with a retrofitted fine mesh screen that provides more support and is manufactured with edges not as sharp. I&C performed calibrations with the new mesh and found that this reconfiguration did not adversely affect unit performance. However, these calibrations were not documented. Since this modification, no further related incidents have occurred to date. The use of better filter support is considered an enhancement to the air sampling program and increases the overall effectiveness of the REMP.

(3) The air pump at location OAP-D- (I), City of Blair, was found out of tolerance high (2.35 CFM) when the technician performed a function check of the flowmeter while exchanging filter heads. Acceptable tolerance for airflow is 1.8-2.3 CFM. However, after filter head exchange, a follow-up function check indicated the unit was operating within tolerance. Monitoring in the following weeks indicated no further problems. No data corrections were necessary because sample collection volume was conservative. This finding did not result in a reduction in the overall effectiveness of the REMP.

(4) The air pump at location OAP-B-(I) was reading out of tolerance low (1.75 CFM) when the technician performed a function check of the flowmeter while exchanging filter heads. Acceptable tolerance for airflow is 1.8-2.3 CFM. The unit was taken out of service and was calibration checked at 1.90 CFM. Therefore, unit was ultimately verified to be within tolerance and no data corrections were necessary. This did not result in a reduction in the overall effectiveness of the REMP.

(5) While reviewing fourth quarter air sample data (gross beta results) provided by the vendor, Chemistry staff noted an unexpected upward trend in the results. A review of plant operational records revealed that there were no airborne plant releases during this time frame that could account for these results. Therefore, it was theorized that the skewed trend might possibly be due to vendor error, i.e., resulting from adjustments performed on instrumentation or from using an inappropriate counting efficiency. Upon inquiry, the vendor confirmed that indeed an alpha counting efficiency had been utilized to calculate results instead of a beta efficiency. As a result, data for all air sampling locations for September through December were recalculated by the vendor, and reported in the December 2000 Monthly Progress Report. A follow-up review of the corrected data found it to be within the expected range based on plant operations. Therefore, this condition did not result in a reduction in the overall effectiveness of the REMP.

7) WATER

Results of the fourth quarter tritium composite analysis at location OSW-B-I (0.5 mile downstream) indicated activity slightly greater than LLD (300 pCi/L). Initial analysis results were 651 ±113 pCi/L. Reanalysis showed 788 ±111 pCi/L. Though greater than LLD, these results are well below the drinking water standard of 20,000 pCi/L as specified in 40 CFR 141. However, condition reports were initiated to acknowledge these results and to require plant staff to conduct an evaluation of effluent release data for the period in order to determine the source of the activity. A Chemistry review of the release data generated during this time frame demonstrated that FCS most likely is not the source of these positive results. Additionally, the doses generated by LADTAP software for the year were compared to doses created using the conversion and usage factors from the ODCM and the environmental sample data. The calculated results are lower than the numbers generated by Chemistry software and represent minimal dose (7.0E-03 to 3.51E-05 mrem).

Fourth quarter tritium results for location OSW-B-I (0.5 mile downstream) was determined to be 651 pCi/L. The average monitor tank tritium concentration for the quarter was 0.108 μCi/ml. A calculation was performed using the December composite tritium value (0.111) and inserting it into a single monitor tank (MT) release performed on December 6, 2000, to determine dilution values, to obtain the tritium concentration at site discharge. The value calculated was 165 pCi/L at the site discharge for a MT released at 60 GPM with three circulation water pumps operating. This calculated value assumes no dilution by the river in the mixing zone between the discharge tunnel and the downstream sample site. Since actual dilution would decrease the downstream concentration, it is highly unlikely that FCS is the source. A dose estimate for releasing a single MT (6000 gal) with a tritium concentration of 0.111 μCi/ml was performed and resulted in a 0.00 mrem dose. A dose estimate was also performed using the equations listed in the ODCM and the positive sample result. For the determination an adult was assumed to drink water at 651 pCi/L for one quarter at the rate listed in Table 6. The dose from that calculation was 0.007 mrem. The highest drinking dose pathway determined by LADTAP was 0.0375 mrem for the year. This represents a small portion of the 0.111 mrem whole body dose assigned for the fourth quarter alone.

In summation, changes to FCS effluent processes based on this positive environmental result are unwarranted. The dose attributed to the positive result is minimal and lower than that estimated by LADTAP software. Chemistry will continue to trend and evaluate these results to verify the accuracy of our dose estimates and ensure our releases have minimal impact on the environment.

Table 1.0 Sample collection program.

Sample Class	Collection Frequency	Number of Sample Locations	Number of Samples Collected This Period
Background Radiation (TLDs)	Quarterly	12	48
Air Particulates	Weekly	5	265 [a]
Airborne Iodine	Weekly	5	265 [a]
Milk	Semimonthly	2	0
Pasture Grass (milk substitute)		2	24
Water	Monthly	3	36
Fish	Annually	2	6
Sediment	Semiannually	2	5
Food Crops	Annually	2	7
		TOTAL	656

[a] Five additional duplicate samples not included in total number of samples analyzed.

Table 2.0 Radiological Environmental Monitoring Program Summary

Name of Facility: Fort Calhoun Nuclear Power Station - Unit 1 — Docket No. 50-285
Location of Facility: Washington, Nebraska (County, State) — Reporting Period: January-December, 2000

Sample Type (Units)	Type and Number of Analyses[a]	LLD[b]	Indicator Locations Mean (F)[c] Range[c]	Location with Highest Annual Mean: Location[d]	Location with Highest Annual Mean: Mean (F)[c] Range[c]	Control Locations Mean (F)[c] Range[c]	Number Non-Routine Results[e]
Background Radiation (TLD) (mR/week)	Gamma 48	0.5	1.5 (40/40) (1.2-1.8)	OTD-J-(I), Onsite Stn. 0.7 mi. @ 250°	1.6 (4 /4) (1.5-1.8)	1.4 (8/8) (1.1-1.6)	0
Airborne Particulates (pCi/m³)	GB[f] 265	0.005	0.030 (212/212) (0.013-0.081)	OAP-F-(C), Valley Substation # 902 19.5 mi. @ 219°	0.031 (52/53) (0.013-0.075)	0.031 (52/53) (0.013-0.075)	0
	GS 20						
	Cs-134	0.001	< LLD	-	-	< LLD	0
	Cs-137	0.001	< LLD	-	-	< LLD	0
	Other Gammas	0.001	< LLD	-	-	< LLD	0
Airborne Iodine (pCi/m³)	I-131 265	0.07	< LLD	-	-	< LLD	0
Milk (pCi/L)	I-131 0	0.5	-	-	-	-	0
	GS 0						
	K-40	150	-	-	-	-	0
	Cs-134	15	-	-	-	-	0
	Cs-137	15	-	-	-	-	0
	Other Gammas	15	-	-	-	-	0
Pasture Grass (milk substitute) pCi/g wet	GS 24						
	Mn-54	0.031	< LLD	-	-	< LLD	0
	Co-58	0.035	< LLD	-	-	< LLD	0
	Co-60	0.030	< LLD	-	-	< LLD	0
	Fe-59	0.15	< LLD	-	-	< LLD	0
	Zn-65	0.067	< LLD	-	-	< LLD	0
	Zr-Nb-95	0.044	< LLD	-	-	< LLD	0
	I-131	0.049	< LLD	-	-	< LLD	0
	Cs-134	0.043	< LLD	-	-	< LLD	0
	Cs-137	0.041	< LLD	-	-	< LLD	0
	Ba-La-140	0.032	< LLD	-	-	< LLD	0

Table 2.0 Radiological Environmental Monitoring Program Summary

Name of Facility: Fort Calhoun Nuclear Power Station - Unit 1 — Docket No. 50-285
Location of Facility: Washington, Nebraska (County, State) — Reporting Period: January-December, 2000

Sample Type (Units)	Type and Number of Analyses[a]	LLD[b]	Indicator Locations Mean (F)[c] Range[c]	Location with Highest Annual Mean: Location[d]	Location with Highest Annual Mean: Mean (F)[c] Range[c]	Control Locations Mean (F)[c] Range[c]	Number Non-Routine Results[e]
Water (pCi/L)	GS 36						
	Cs-134	15	< LLD	-	-	< LLD	0
	Cs-137	15	< LLD	-	-	< LLD	0
	Other Gammas	15	< LLD	-	-	< LLD	0
	H3 12	300	651 (1/8)	OSW-B-(I), Down-stream, 0.5 mi. @ 106°	651 (1/4)	< LLD	0
Fish (pCi/g wet)	GS 6						
	Mn-54	0.019	< LLD	-	-	< LLD	0
	Co-58	0.022	< LLD	-	-	< LLD	0
	Co-60	0.013	< LLD	-	-	< LLD	0
	Fe-59	0.049	< LLD	-	-	< LLD	0
	Zn-65	0.044	< LLD	-	-	< LLD	0
	Cs-134	0.023	< LLD	-	-	< LLD	0
	Cs-137	0.016	< LLD	-	-	< LLD	0
Sediment pCi/g dry	GS 5						
	Cs-134	0.026	< LLD	-	-	< LLD	0
	Cs-137	0.021	0.036 (1/3)	OSD-B-(C), Upstream 0.024 mi. @ 345°	0.066 (1/2)	0.066 (1/2)	0
	Other Gammas	0.017	< LLD	-	-	< LLD	0
Food Crops (pCi/g wet)	GS 7						
	Mn-54	0.009	< LLD	-	-	< LLD	0
	Co-58	0.012	< LLD	-	-	< LLD	0
	Co-60	0.011	< LLD	-	-	< LLD	0
	Fe-59	0.022	< LLD	-	-	< LLD	0
	Zn-65	0.028	< LLD	-	-	< LLD	0
	Zr-Nb-95	0.010	< LLD	-	-	< LLD	0
	Cs-134	0.009	< LLD	-	-	< LLD	0
	Cs-137	0.009	< LLD	-	-	< LLD	0
	Ba-La-140	0.021	< LLD	-	-	< LLD	0

[a] GB = gross beta, GS = gamma scan.

[b] LLD = nominal lower limit of detection based on a 95% confidence level.

[c] Mean and range are based on detectable measurements only (i.e., > LLD) Fraction of detectable measurements at specified locations is indicated in parentheses (F).

[d] Locations are specified: (1) by code, (2) by name, and (3) by distance and direction relative to the Reactor Containment Building.

[e] Non-routine results are those which exceed ten times the control station value. If no control station value is available, the result is considered non-routine if it exceeds the typical pre-operational value for the medium or location.

[f] One result for gross beta (OAP-F-(C), collected 03-01-00), was not included in the calculation for mean and standard deviation due to filter damage, light particulate matter.

Table 3.0 Listing of Missed Samples

Sample Type	Date	Location	Reason

All required samples for the REMP were collected as scheduled for 2000.

Table 4.0 Environmental Land Use Survey

Sector	Type of Use	Owner's Name	Coordinates (miles/degrees)	Counting Technique	Males/Age[1]	Females/Age[1]	Remarks
A	Nearest Residence	F. Smith	4.57 / 349	Interview	1 Adult	1 Adult	None
	Milk Animal	None	None	None	None	None	None
	Meat Animal	None	None	None	None	None	None
	Vegetable Garden	None	None	None	None	None	None
B	Nearest Residence	J. Rand	1.93 / 12	Plat Map; City Register	1 Adult	1 Adult	None
	Milk Animal	None	None	None	None	None	None
	Meat Animal	None	None	None	None	None	None
	Vegetable Garden	J. Rand	1.93 / 12	Plat Map; City Register	1 Adult	1 Adult	None
C	Nearest Residence	J. Robbins	1.52 / 42	Plat Map; City Register	1 Adult	2 Adults	None
	Milk Animal	None	None	None	None	None	None
	Meat Animal	None	None	None	None	None	None
	Vegetable Garden	C. Salter	3.29 / 43	Plat Map; City Register	1 Adult	1 Adult	None
D	Nearest Residence	G. Meade	4.79 / 63	Plat Map; City Register	1 Adult	1 Adult	None
	Milk Animal	None	None	None	None	None	None
	Meat Animal	None	None	None	None	None	None
	Vegetable Garden	None	None	None	None	None	None

(1) Approximate age categories in receptor deck for evaluating dose commitment:

Infant	0-1 Yr.
Child	1-11 Yrs.
Teen	12-17 Yrs.
Adult	Over 17 Yrs.

Table 4.0 Environmental Land Use Survey (continued)

Sector	Type of Use	Owner's Name	Coordinates (miles/degrees)	Counting Technique	Males/Age[1]	Females/Age[1]	Remarks
E	Nearest Residence	D. Herman	4.67 / 89	Plat Map; City Register	1 Adult	1 Adult	None
	Milk Animal	None	None	None	None	None	None
	Meat Animal	None	None	None	None	None	None
	Vegetable Garden	None	None	None	None	None	None
F	Nearest Residence	C. Seitz	4.22 / 121	Interview	1 Adult	1 Adult	None
	Milk Animal	None	None	None	None	None	None
	Meat Animal	None	None	None	None	None	None
	Vegetable Garden	None	None	None	None	None	None
G	Nearest Residence	T. Carter	1.67 / 145	Plat Map; City Register	1 Adult	1 Adult	None
	Milk Animal	None	None	None	None	None	None
	Meat Animal	H. Barnes	4.73 / 136	Interview	1 Adult	1 Adult	None
	Vegetable Garden	W. Kalin	1.74 / 145	Interview	2 Adults	1 Adult	None
H	Nearest Residence	A. Pechnik	0.94 / 163	Interview	1 Adult	1 Adult	None
	Milk Animal	None	None	None	None	None	None
	Meat Animal	R. Hineline	1.82 / 148	Plat Map; City Register	2 Adults	1 Adult	None
	Vegetable Garden	A. Pechnik	0.94 / 163	Interview	1 Adult	1 Adult	None

(1) Approximate age categories in receptor deck for evaluating dose commitment:

Infant	0-1 Yr.
Child	1-11 Yrs.
Teen	12-17 Yrs.
Adult	Over 17 Yrs.

Table 4.0 Environmental Land Use Survey (continued)

Sector	Type of Use	Owner's Name	Coordinates (miles/degrees)	Counting Technique	Males/Age[1]	Females/Age[1]	Remarks
J	Nearest Residence	J. Ellis	0.74 / 182	Interview	1 Adult	1 Adult	None
	Milk Animal	W. Seltz	2.77 / 169	Interview	2 Adults	1 Adult	None
	Meat Animal	T. Dein	2.01 / 191	Plat Map; City Register	1 Adult	1 Adult	None
	Vegetable Garden	J. Ellis	0.74 / 182	Interview	1 Adult	1 Adult	None
K	Nearest Residence	T. Bansen	0.65 / 203	Interview	1 Adult; 2 Child	1 Adult; 1 Child	None
	Milk Animal	T. Bansen	0.65 / 203	Interview	1 Adult; 2 Child	1 Adult; 1 Child	None
	Meat Animal	J. Nixon	2.07 / 207	Plat Map; City Register	1 Adult	1 Adult	None
	Vegetable Garden	T. Bansen	0.65 / 203	Interview	1 Adult; 2 Child	1 Adult; 1 Child	None
L	Nearest Residence	S. Kyle	0.73 / 224	Interview; City Register	1 Adult	1 Adult	None
	Milk Animal	None	None	None	None	None	None
	Meat Animal	R. Ryder	0.85 / 226	Interview; City Register	1 Adult	1 Adult	None
	Vegetable Garden	D. Nixon	1.41 / 218	Plat Map; City Register	1 Adult; 1 Child	1 Adult	None
M	Nearest Residence	M. Bensen	1.06 / 257	Plat Map; City Register	1 Adult	1 Adult	None
	Milk Animal	None	None	None	None	None	None
	Meat Animal	B. Wrich	2.42 / 250	Interview	1 Adult	1 Adult; 1 Child	None
	Vegetable Garden	D. Russell	1.21 / 246	Plat Map; City Register	1 Adult	1 Adult	None

(1) Approximate age categories in receptor deck for evaluating dose commitment:

Infant	0-1 Yr.
Child	1-11 Yrs.
Teen	12-17 Yrs.
Adult	Over 17 Yrs.

Table 4.0 Environmental Land Use Survey (continued)

Sector	Type of Use	Owner's Name	Coordinates (miles/degrees)	Counting Technique	Males/Age[1]	Females/Age[1]	Remarks
N	Nearest Residence	D. Nielsen	1.20 / 263	Plat Map; City Register	1 Adult	1 Adult	None
	Milk Animal	None	None	None	None	None	None
	Meat Animal	J. Anderson	3.25 / 281	Interview	1 Adult	1 Adult	None
	Vegetable Garden	A. Frahm	1.23 / 265	Plat Map; City Register	1 Adult	1 Adult	None
P	Nearest Residence	G. Wachter	2.27 / 302	Plat Map; City Register	1 Adult	1 Adult	None
	Milk Animal	None	None	None	None	None	None
	Meat Animal	R. Wrich	2.74 / 283	Plat Map; City Register	1 Adult	1 Adult; 1 Child	None
	Vegetable Garden	B. Arp	2.64 / 284	Plat Map; City Register	None	1 Adult	None
Q	Nearest Residence	C. Edmonds	2.40 / 318	Plat Map; City Register	1 Adult	1 Adult	None
	Milk Animal	None	None	None	None	None	None
	Meat Animal	None	None	None	None	None	None
	Vegetable Garden	B. Bolton	2.63 / 310	Plat Map; City Register	1 Adult	1 Adult	None
R	Nearest Residence	P. Kelley	2.08 / 330	Plat Map; City Register	1 Adult	None	None
	Milk Animal	None	None	None	None	None	None
	Meat Animal	None	None	None	None	None	None
	Vegetable Garden	S. Sorensen	4.01 / 329	Plat Map; City Register	1 Adult	1 Adult; 1 Child	None

(1) Approximate age categories in receptor deck for evaluating dose commitment:

Infant	0-1 Yr.
Child	1-11 Yrs.
Teen	12-17 Yrs.
Adult	Over 17 Yrs.

Review of Environmental Inc., Quality Assurance Program

Fort Calhoun Station contracts with Environmental Inc. to perform radioanalysis of environmental samples. The following is an evaluation of this vendor's participation in an interlaboratory comparison program. This program is required in order to document the accuracy and consistency of the vendor's results. The program is composed of the following:

(1) Interlaboratory Comparison Crosscheck Program with Environmental Resource Associates (ERA).
(2) Crosscheck Program Results; Thermoluminescent Dosimeters (TLDs)
(3) In-house Spiked Sample Analysis
(4) In-house Blank Sample Analysis
(5) In-house Duplicate Sample Analysis
(6) Department of Energy's Mixed Analyte Performance Evaluation Program (MAPEP)
(7) Environmental Measurements Laboratory Quality Assessment Program (EML)
(8) REMP Duplicate Samples Provided by Fort Calhoun Station

(1) Interlaboratory Comparison Crosscheck Program/Environmental Resource Associates (ERA) –Table A-1

The vendor reported five initial sample results that did not meet the acceptance criteria (higher or lower than the known values) as stated by ERA. However, in all cases the vendor either conducted a reanalysis or a recalculation in order to ultimately verify or correct the results. One sample (STW-868) was thought by Environmental Inc. to have been invalid upon receipt from ERA. Environmental Inc. confirmed their results by gamma spectroscopy. Therefore, the position of Environmental Inc. is that the activity reported by ERA was inaccurate. Of the initial failed ERA sample results reported by Environmental Inc., none occurred during the months where radiological environmental monitoring sample analyses yielded positive results. Therefore, the overall impact of the Radiological Environmental Monitoring Program (REMP) was not reduced by poor lab practice in this area.

(2) Crosscheck Program Results; Thermoluminescent Dosimeters (TLDs) – Table A-2

Fort Calhoun Station's environmental samples are analyzed by Environmental Inc.'s Northbrook, Illinois facility. Environmental Inc.'s quality assurance program for dosimetry consists of processing TLDs irradiated by their Westwood, New Jersey facility. This serves as a blind spike program for the Northbrook facility. Results were reviewed and found to be satisfactory.

(3) In-house Spiked Sample Analysis – Table A-3

Review of the data indicates that overall the vendor's results were within acceptable limits. A water sample analyzed for Gross Alpha was exempted because during the test it was noted that insufficient Am-241 spike was available for accurate analysis. As a result it was determined that no adverse lab practices occurred that would affect REMP results.

(4) In-house Blank Sample Analysis – Table A-4

Plant staff noted that the vendor consistently met the Lower Limit of Detection (LLD) for In-house blank sample analyses. No anomalies were noted that would adversely affect the results of the REMP.

(5) In-house Duplicate Sample Analysis – Table A-5

Plant staff found the vendor's in-house duplicate program acceptable. The vendor analyzed a large number of duplicate samples with acceptable reproducibility of results. As a result the effectiveness of the REMP was not compromised.

(6) Department of Energy's Mixed Analyte Performance Evaluation Program (MAPEP) – Table A-6

Review of these results showed two minor discrepancies. Sample STSO-882 had a non-standard geometry. The sample size was reduced and reanalysis results were satisfactory. Sample STSO-882 was possibility incompletely dissolved the first time it was analyzed. Reanalysis results were satisfactory. There were no soil samples collected for the REMP during 2000. Therefore, these inconsistencies did not adversely affect the results of the REMP.

(7) Environmental Measurements Laboratory Quality Assessment Program (EML) – Table A-7

Review of EML results showed acceptable performance by the vendor. There was one deviation noted for a vegetation sample analyzed in September. A follow-up investigation by the vendor failed to find a reason for the failure. However, a reanalysis met the acceptance criteria. There were six additional QA vegetation samples analyzed during this time period, which met the acceptance criteria. Vegetation samples for the REMP were collected during the month of September and were all less than LLD. As a result it was determined that REMP sample analyses were not compromised.

(8) REMP Duplicate Samples provided by Fort Calhoun Station

Duplicate samples were collected and sent to Environmental Inc. throughout the year as a check on consistency of vendor results. Results of the duplicate analyses were reviewed and considered satisfactory.

Environmental, Inc.
Midwest Laboratory
an Allegheny Technologies Co.

700 Landwehr Road • Northbrook, IL 60062-2310
(847) 564-0700 fax (847) 564-4517

APPENDIX A

INTERLABORATORY COMPARISON PROGRAM RESULTS

NOTE: Environmental, Inc., Midwest Laboratory participates in intercomparison studies administered by Environmental Resources Associates, and serves as a replacement for studies conducted previously by the U.S. EPA Environmental Monitoring Systems Laboratory, Las Vegas, Nevada. Results are reported in Appendix A. TLD Intercomparison results, in-house spikes, blanks, duplicates and mixed analyte performance evaluation program results are also reported. Appendix A is updated four times a year; the complete Appendix is included in March, June, September and December monthly progress reports only.

January, 2000 through December, 2000

Appendix A

Interlaboratory Comparison Program Results

Environmental, Inc., Midwest Laboratory, formerly Teledyne Brown Engineering Environmental Services Midwest Laboratory has participated in interlaboratory comparison (crosscheck) programs since the formulation of it's quality control program in December 1971. These programs are operated by agencies which supply environmental type samples (e.g., milk or water) containing concentrations of radionuclides known to the issuing agency but not to participant laboratories. The purpose of such a program is to provide an independent check on a laboratory's analytical procedures and to alert it of any possible problems.

Participant laboratories measure the concentration of specified radionuclides and report them to the issuing agency. Several months later, the agency reports the known values to the participant laboratories and specifies control limits. Results consistently higher or lower than the known values or outside the control limits indicate a need to check the instruments or procedures used.

The results in Table A-1 were obtained through participation in the environmental sample crosscheck program for milk, water and air filters during the past twelve months. Data for previous years is available upon request.

This program was conducted by the U.S. Environmental Protection Agency Office of Research and Development National Exposure Research Laboratory Characterization Research Division-Las Vegas, Nevada.

The results in Table A-2 were obtained for Thermoluminescent Dosimeters (TLDs), via various International Intercomparisons of Environmental Dosimeters under the sponsorships listed in Table A-2. Results of crosscheck testing with Teledyne Brown Engineering are also listed.

Table A-3 lists results of the analyses on in-house "spiked" samples for the past twelve months. All samples are prepared using NIST traceable sources. Data for previous years available upon request.

Table A-4 lists results of the analyses on in-house "blank" samples for the past twelve months. Data for previous years available upon request.

Table A-5 list results of the in-house "duplicate" program for the past twelve months. Acceptance is based on the difference of the results being less than the sum of the errors. Data for previous years available upon request.

The results in Table A-6 were obtained through participation in the Mixed Analyte Performance Evaluation Program.

The results in Table A-7 were obtained through participation in the Environmental Measurement Laboratory Quality Assessment Program.

Attachment A lists acceptance criteria for "spiked" samples.

Out-of-limit results are explained directly below the result.

12-31-00

ATTACHMENT A

ACCEPTANCE CRITERIA FOR "SPIKED" SAMPLES

LABORATORY PRECISION: ONE STANDARD DEVIATION VALUES FOR VARIOUS ANALYSES[a]

Analysis	Level	One Standard Deviation for single determinations
Gamma Emitters	5 to 100 pCi/liter or kg >100 pCi/liter or kg	5.0 pCi/liter 5% of known value
Strontium-89[b]	5 to 50 pCi/liter or kg >50 pCi/liter or kg	5.0 pCi/liter 10% of known value
Strontium-90[b]	2 to 30 pCi/liter or kg >30 pCi/liter or kg	5.0 pCi/liter 10% of known value
Potassium-40	>0.1 g/liter or kg	5% of known value
Gross alpha	≤20 pCi/liter >20 pCi/liter	5.0 pCi/liter 25% of known value
Gross beta	≤100 pCi/liter >100 pCi/liter	5.0 pCi/liter 5% of known value
Tritium	≤4,000 pCi/liter >4,000 pCi/liter	1s = (pCi/liter) = $169.85 \times (\text{known})^{0.0933}$ 10% of known value
Radium-226,-228	<0.1 pCi/liter	15% of known value
Plutonium	0.1 pCi/liter, gram, or sample	10% of known value
Iodine-131, Iodine-129[b]	≤55 pCi/liter >55 pCi/liter	6.0 pCi/liter 10% of known value
Uranium-238, Nickel-63[b] Technetium-99[b]	≤35 pCi/liter >35 pCi/liter	6.0 pCi/liter 15% of known value
Iron-55[b]	50 to 100 pCi/liter >100 pCi/liter	10 pCi/liter 10% of known value
Others[b]	–	20% of known value

[a] From EPA publication, "Environmental Radioactivity Laboratory Intercomparison Studies Program, Fiscal Year, 1981-1982, EPA-600/4-81-004.

[b] Laboratory limit.

Table A-1. Interlaboratory Comparison Crosscheck program, Environmental Resource Associates (ERA)[a].

Lab Code	Sample Type	Date Collected	Analysis	Concentration in pCi/L[b] Laboratory results ±2 Sigma[c]	ERA Result[d] 1s, N=1	Control Limits
STW-863	WATER	Jan, 2000	Gr. Alpha	39.3 ± 5.2	25.4 ± 6.4	14.5 - 36.3
The analysis was repeated and recalculated with Am-241 efficiency; result of reanalysis 29.32 ± 5.79 pCi/L. Internal spike program results do not indicate a problem.						
STW-863	WATER	Jan, 2000	Gr. Beta	40.7 ± 1.2	42.1 ± 4.2	33.4 - 50.8
STW-866	WATER	Jan, 2000	Sr-89	17.1 ± 2.2	22.5 ± 5.0	13.8 - 31.2
STW-866	WATER	Jan, 2000	Sr-90	8.1 ± 0.6	9.6 ± 5.0	0.9 - 18.3
STW-868	WATER	Feb, 2000	Ra-226	7.6 ± 0.5	8.3 ± 1.2	6.1 - 10.4
STW-868	WATER	Feb, 2000	Ra-228	5.6 ± 1.0	2.3 ± 0.6	1.3 - 3.2
Result of reanalysis: 6.34 ± 0.94. Activity confirmed by gamma spectroscopy (6.00 ± 1.42 pCi/L).						
STW-868	WATER	Feb, 2000	Uranium	5.4 ± 0.2	6.1 ± 3.0	0.9 - 11.3
STW-869	WATER	Mar, 2000	H-3	23,500.0 ± 306.0	23,800.0 ± 2,380.0	19,800.0 - 27,800.0
STW-867	WATER	Mar, 2000	Gr. Alpha	83.6 ± 5.8	58.4 ± 5.8	33.3 - 83.5
Results were recalculated with Am-241 efficiency; 57.80 ± 5.73 pCi/L. Refer to STW-863.						
STW-867	WATER	Mar, 2000	Gr. Beta	15.4 ± 0.9	16.8 ± 1.7	8.1 - 25.5
STW-876	WATER	Mar, 2000	I-131	18.7 ± 0.6	19.9 ± 2.0	18.1 - 28.5
STW-877	WATER	Apr, 2000	Gr. Alpha	52.3 ± 2.3	54.0 ± 13.5	30.8 - 77.2
STW-877	WATER	Apr, 2000	Ra-226	17.5 ± 1.1	18.6 ± 2.8	13.8 - 23.4
STW-877	WATER	Apr, 2000	Ra-228	3.7 ± 0.4	3.6 ± 0.9	2.0 - 5.1
STW-878	WATER	Apr, 2000	Co-60	19.2 ± 0.6	16.9 ± 5.0	8.2 - 25.6
STW-878	WATER	Apr, 2000	Cs-134	81.0 ± 1.3	86.4 ± 5.0	77.7 - 95.1
STW-878	WATER	Apr, 2000	Cs-137	119.0 ± 2.6	123.0 ± 6.2	112.0 - 134.0
STW-878	WATER	Apr, 2000	Gr. Beta	276.0 ± 9.6	289.0 ± 43.4	214.0 - 364.0
STW-878	WATER	Apr, 2000	Sr-89	32.3 ± 3.3	50.7 ± 5.0	42.0 - 59.4
STW-878	WATER	Apr, 2000	Sr-90	11.3 ± 1.0	32.8 ± 5.0	24.1 - 41.5
An error was found in calculation. Result of recalculation: Sr-89, 55.5± 7.2 pCi/L / Sr-90, 30.7 ± 3.0 pCi/L. Results of reanalysis: Sr-89, 47.4 ± 14.5 pCi/L / Sr-90, 33.0 ± 1.35 pCi/L. Both results are within limits.						
STW-879	WATER	Jun, 2000	Ba-133	22.4 ± 2.1	25.5 ± 5.0	16.8 - 34.2
STW-879	WATER	Jun, 2000	Co-60	69.9 ± 3.7	65.6 ± 5.0	56.9 - 74.3
STW-879	WATER	Jun, 2000	Cs-134	13.5 ± 0.8	13.8 ± 5.0	5.1 - 22.5
STW-879	WATER	Jun, 2000	Cs-137	232.0 ± 7.8	238.0 ± 11.9	217.0 - 259.0
STW-879	WATER	Jun, 2000	Zn-65	50.9 ± 3.8	54.6 ± 5.5	45.3 - 63.9
STW-880	WATER	Jun, 2000	Ra-226	2.8 ± 0.2	3.0 ± 0.5	2.2 - 3.8
STW-880	WATER	Jun, 2000	Ra-228	10.0 ± 0.9	13.0 ± 3.3	7.4 - 18.6
STW-880	WATER	Jun, 2000	Uranium	57.0 ± 4.4	63.4 ± 6.3	52.6 - 74.2
STW-883	WATER	Jul, 2000	Gr. Alpha	6.9 ± 1.1	7.2 ± 5.0	0.0 - 15.9
STW-883	WATER	Jul, 2000	Gr. Beta	88.8 ± 9.8	87.5 ± 10.0	70.2 - 105.0
STW-884	WATER	Aug, 2000	H-3	8,740.0 ± 174.0	8,320.0 ± 832.0	6,910.0 - 9,730.0
STW-891	WATER	Sep, 2000	Ra-226	17.9 ± 1.3	18.9 ± 2.8	14.0 - 23.8
STW-891	WATER	Sep, 2000	Ra-228	5.7 ± 0.5	6.2 ± 1.6	3.5 - 8.8

Table A-1. Interlaboratory Comparison Crosscheck program, Environmental Resource Associates (ERA)[a].

Lab Code	Sample Type	Date Collected	Analysis	Concentration in pCi/L[b] Laboratory results ±2 Sigma[c]	ERA Result[d] 1s, N=1	Control Limits
STW-891	WATER	Sep, 2000	Uranium	10.3 ± 0.1	11.9 ± 3.0	6.7 - 17.1
STW-892	WATER	Oct, 2000	I-131	16.9 ± 0.3	15.9 ± 1.6	10.7 - 21.1
STW-892	WATER	Oct, 2000	I-131(g)	17.1 ± 5.4	15.9 ± 1.6	10.7 - 21.1
STW-893	WATER	Oct, 2000	Gr. Alpha	66.3 ± 5.3	74.4 ± 18.6	42.2 - 107.0
STW-893	WATER	Oct, 2000	Ra-226	10.1 ± 1.0	10.5 ± 1.6	7.8 - 13.2
STW-893	WATER	Oct, 2000	Ra-228	21.2 ± 0.5	19.4 ± 4.9	11.0 - 27.8
STW-893	WATER	Oct, 2000	Uranium	41.4 ± 1.9	44.5 ± 4.5	36.8 - 52.2
STW-894	WATER	Oct, 2000	Co-60	93.4 ± 1.6	91.1 ± 5.0	82.4 - 99.8
STW-894	WATER	Oct, 2000	Cs-134	54.8 ± 0.3	59.8 ± 5.0	51.1 - 68.5
STW-894	WATER	Oct, 2000	Cs-137	45.5 ± 2.3	45.0 ± 5.0	36.3 - 53.7
STW-894	WATER	Oct, 2000	Cs-137	45.5 ± 2.3	45.0 ± 5.0	36.3 - 53.7
STW-894	WATER	Oct, 2000	Gr. Beta	209.0 ± 7.9	256.0 ± 38.4	189.0 - 323.0
STW-894	WATER	Oct, 2000	Sr-89	32.8 ± 3.0	41.3 ± 5.0	32.6 - 50.0
STW-894	WATER	Oct, 2000	Sr-90	16.0 ± 2.4	18.0 ± 5.0	9.3 - 26.7
STW-895	WATER	Nov, 2000	Gr. Alpha	50.3 ± 2.6	60.3 ± 15.1	34.4 - 86.2
STW-895	WATER	Nov, 2000	Gr. Beta	28.6 ± 1.3	25.5 ± 5.0	16.8 - 34.2
STW-896	WATER	Nov, 2000	Ba-133	78.0 ± 2.0	82.2 ± 8.2	68.0 - 96.4
STW-896	WATER	Nov, 2000	Co-60	30.8 ± 1.7	27.8 ± 5.0	19.1 - 36.5
STW-896	WATER	Nov, 2000	Cs-134	67.2 ± 3.3	76.0 ± 5.0	67.3 - 84.7
	The mean value for Cs-134 of all participating laboratories was 70.7 pCi/L. Other gamma emitters are within limits, the counting efficiency is not suspect. Library values were reviewed and found to be correct.					
STW-896	WATER	Nov, 2000	Cs-137	109.0 ± 1.0	106.0 ± 5.3	96.8 - 115.0
STW-896	WATER	Nov, 2000	Zn-65	81.5 ± 7.4	79.0 ± 7.9	65.3 - 92.7

[a] Results obtained by Environmental, Inc., Midwest Laboratory as a participant in the environmental samples crosscheck program operated by Environmental Resources Associates (ERA).

[b] All results are in pCi/L, except for elemental potassium (K) data in milk, which are in mg/L; air filter samples, which are in pCi/Filter.

[c] Unless otherwise indicated, the laboratory results are given as the mean ± 2 standard deviations for three determinations.

[d] Results are presented as the known values, expected laboratory precision (1 sigma, 1 determination) and control limits as provided by ERA.

Table A-2. Crosscheck program results; Thermoluminescent Dosimeters. (TLDs).

Lab Code	TLD Type	Date	Measurement	mR: Laboratory results ± 2 Sigma	mR: Known Value	mR: Average ± 2 Sigma (All Participants)
Environmental, Inc.						
1999-1	LiF-100 Chips	Mar, 1999	Reader 1, #1	14.5 ± 0.5	15.4	-
1999-1	LiF-100 Chips	Mar, 1999	Reader 1, #2	29.3 ± 1.0	31.8	-
1999-1	LiF-100 Chips	Mar, 1999	Reader 1, #3	60.0 ± 0.2	59.1	-
Environmental, Inc.						
1999-2	$CaSO_4$: Dy Cards	Mar, 1999	Reader 1, #1	18.3 ± 0.5	15.4	-
1999-2	$CaSO_4$: Dy Cards	Mar, 1999	Reader 1, #2	35.9 ± 1.3	31.8	-
1999-2	$CaSO_4$: Dy Cards	Mar, 1999	Reader 1, #3	66.5 ± 4.4	59.1	-

Chips and Cards were irradiated by Teledyne Brown Engineering, Westwood, New Jersey, in March, 1999.

Environmental, Inc.						
2000-1	LiF-100 Chips	Mar, 2000	Reader 1, #1	14.4 ± 0.2	17.8	-
2000-1	LiF-100 Chips	Mar, 2000	Reader 1, #2	32.4 ± 0.1	35.5	-
2000-1	LiF-100 Chips	Mar, 2000	Reader 1, #3	61.8 ± 0.9	62.2	-
Environmental, Inc.						
2000-2	$CaSO_4$: Dy Cards	Mar, 2000	Reader 1, #1	21.3 ± 0.3	17.8	-
2000-2	$CaSO_4$: Dy Cards	Mar, 2000	Reader 1, #2	40.1 ± 1.9	35.5	-
2000-2	$CaSO_4$: Dy Cards	Mar, 2000	Reader 1, #3	69.9 ± 3.5	62.2	-

Chips and Cards were irradiated by Teledyne Brown Engineering, Westwood, New Jersey, in March, 2000.

Table A-3. In-house "spike" samples.

Lab Code	Sample Type	Date Collected	Analysis	Concentration in pCi/L[a] Laboratory results 2s, n=1[b]	Known Activity	Control[c] Limits
SPW-271	WATER	Jan, 2000	Ra-226	14.81 ± 0.44	13.76	9.63 - 17.89
SPW-271	WATER	Jan, 2000	Ra-228	16.97 ± 2.12	14.68	10.28 - 19.08
SPW-272	WATER	Jan, 2000	Gr. Alpha	44.35 ± 1.95	41.14	20.57 - 61.71
SPW-272	WATER	Jan, 2000	Gr. Beta	31.19 ± 5.02	29.50	19.50 - 39.50
SPW-756	WATER	Jan, 2000	H-3	56339.00 ± 666.00	57667.00	46133.60 - 69200.40
SPW-480	WATER	Jan, 2000	Co-60	32.33 ± 2.87	28.36	18.36 - 38.36
SPW-480	WATER	Jan, 2000	Cs-137	35.58 ± 4.20	36.83	26.83 - 46.83
SPMI-482	MILK	Jan, 2000	Sr-90	16.93 ± 1.07	14.10	4.10 - 24.10
SPAP-484	AIR FILTER	Jan, 2000	Cs-137	1.84 ± 0.01	1.72	1.03 - 2.41
SPW-917	WATER	Feb, 2000	Gr. Alpha	16.59 ± 1.90	41.10	20.55 - 61.65
An insufficient amount of Am-241 spike was available for an accurate test.						
SPW-917	WATER	Feb, 2000	Gr. Beta	32.61 ± 2.06	29.43	19.43 - 39.43
SPW-918	WATER	Feb, 2000	Ra-226	21.15 ± 0.49	20.68	14.48 - 26.88
SPW-918	WATER	Feb, 2000	Ra-228	14.24 ± 1.64	14.51	10.16 - 18.86
SPVE-1262	VEGETATION	Mar, 2000	I-131(g)	1.17 ± 0.07	1.12	0.67 - 1.57
SPCH-1264	CHARCOAL CANISTER	Mar, 2000	I-131(g)	0.56 ± 0.02	0.53	0.32 - 0.74
SPMI-1274	MILK	Mar, 2000	I-131	47.02 ± 3.36	48.00	36.00 - 60.00
SPW-1301	WATER	Mar, 2000	I-131	66.03 ± 1.06	76.84	61.47 - 92.21
SPW-1301	WATER	Mar, 2000	I-131(g)	80.31 ± 6.28	76.84	66.84 - 86.84
SPW-1477	WATER	Mar, 2000	Gr. Alpha	32.09 ± 1.82	41.13	20.57 - 61.70
SPW-1477	WATER	Mar, 2000	Gr. Beta	29.20 ± 1.56	29.38	19.38 - 39.38
SPW-1478	WATER	Mar, 2000	Ra-226	21.78 ± 0.47	20.69	14.48 - 26.90
SPW-1478	WATER	Mar, 2000	Ra-228	14.41 ± 1.70	14.39	10.07 - 18.71
SPMI-2275	MILK	Apr, 2000	Cs-134	33.53 ± 2.82	32.12	22.12 - 42.12
SPMI-2275	MILK	Apr, 2000	Cs-137	36.38 ± 4.94	36.66	26.66 - 46.66
SPMI-2275	MILK	Apr, 2000	I-131	46.06 ± 0.82	55.50	44.40 - 66.60
SPW-2277	WATER	Apr, 2000	Ra-226	20.51 ± 0.44	20.68	14.48 - 26.88
SPW-2278	WATER	Apr, 2000	Gr. Alpha	40.22 ± 2.50	38.44	19.22 - 57.66
SPW-2278	WATER	Apr, 2000	Gr. Beta	32.63 ± 1.81	29.30	19.30 - 39.30
SPW-2278	WATER	Apr, 2000	Ra-228	14.91 ± 1.70	14.25	9.98 - 18.53
SPW-2279	WATER	Apr, 2000	Co-60	37.12 ± 3.86	34.54	24.54 - 44.54
SPW-2279	WATER	Apr, 2000	Cs-134	34.70 ± 3.32	32.12	22.12 - 42.12
SPW-2279	WATER	Apr, 2000	Cs-137	39.60 ± 5.12	36.66	26.66 - 46.66
SPW-2279	WATER	Apr, 2000	I-131	49.92 ± 0.67	55.50	44.40 - 66.60
SPW-2279	WATER	Apr, 2000	I-131(g)	60.63 ± 6.58	55.50	45.50 - 65.50
SPW-2281	WATER	Apr, 2000	H-3	58829.00 ± 682.00	56996.00	45596.80 - 68395.20
SPAP-3097	AIR FILTER	Apr, 2000	Cs-137	1.81 ± 0.02	1.71	1.03 - 2.39
SPW-3093	WATER	May, 2000	I-131	83.39 ± 1.06	85.38	68.30 - 102.46
SPW-3094	WATER	May, 2000	Ra-226	20.86 ± 0.42	20.68	14.48 - 26.88
SPW-3094	WATER	May, 2000	Ra-228	14.17 ± 1.59	14.12	9.88 - 18.36
SPW-3095	WATER	May, 2000	Gr. Alpha	38.99 ± 2.09	38.44	19.22 - 57.66

Table A-3. In-house "spike" samples.

Lab Code	Sample Type	Date Collected	Analysis	Concentration in pCi/L[a] Laboratory results 2s, n=1[b]	Known Activity	Control[c] Limits
SPW-3095	WATER	May, 2000	Gr. Beta	30.65 ± 1.53	29.30	19.30 - 39.30
SPAP-274	AIR FILTER	May, 2000	Gr. Beta	5.08 ± 0.03	5.97	-4.03 - 15.97
SPMI-3138	MILK	May, 2000	I-131	85.08 ± 1.05	85.38	68.30 - 102.46
SPF-3180	FISH	May, 2000	Cs-134	0.52 ± 0.02	0.50	0.30 - 0.70
SPF-3180	FISH	May, 2000	Cs-137	0.65 ± 0.04	0.59	0.35 - 0.82
SPAP-3902	AIR FILTER	Jun, 2000	Gr. Beta	5.81 ± 0.03	5.35	-4.65 - 15.35
SPF-5182	FISH	Jun, 2000	Cs-134	0.60 ± 0.04	0.59	0.35 - 0.83
SPF-5182	FISH	Jun, 2000	Cs-137	0.60 ± 0.05	0.58	0.35 - 0.81
SPW-3911	WATER	Jun, 2000	Ra-226	23.73 ± 0.85	20.68	14.48 - 26.88
SPW-3911	WATER	Jun, 2000	Ra-228	20.43 ± 1.77	20.75	14.53 - 26.98
SPW-3910	WATER	Jun, 2000	Gr. Alpha	38.28 ± 2.12	38.44	19.22 - 57.66
SPW-3910	WATER	Jun, 2000	Gr. Beta	35.14 ± 1.74	29.22	19.22 - 39.22
SPW-4342	WATER	Jun, 2000	Sr-89	73.70 ± 4.77	81.00	64.80 - 97.20
SPW-4342	WATER	Jun, 2000	Sr-90	58.13 ± 2.17	55.90	44.72 - 67.08
SPW-4687	WATER	Jul, 2000	Ra-226	21.07 ± 0.56	20.68	14.48 - 26.88
SPW-4687	WATER	Jul, 2000	Ra-228	16.35 ± 1.70	20.75	14.53 - 26.98
SPW-4688	WATER	Jul, 2000	H-3	56205.00 ± 663.00	56228.00	44982.40 - 67473.60
SPAP-4807	AIR FILTER	Jul, 2000	Gr. Beta	6.07 ± 0.02	5.96	-4.04 - 15.96
SPAP-4809	AIR FILTER	Jul, 2000	Cs-137	1.82 ± 0.02	1.71	1.03 - 2.39
SPMI-4856	MILK	Jul, 2000	Cs-134	33.24 ± 3.74	29.56	19.56 - 39.56
SPMI-4856	MILK	Jul, 2000	Cs-137	39.80 ± 6.77	36.45	26.45 - 46.45
SPMI-4856	MILK	Jul, 2000	Sr-89	46.35 ± 5.10	56.34	45.07 - 67.61
SPMI-4856	MILK	Jul, 2000	Sr-90	70.47 ± 2.06	69.73	55.78 - 83.68
SPW-5372	WATER	Jul, 2000	Co-60	33.31 ± 4.61	33.24	23.24 - 43.24
SPW-5372	WATER	Jul, 2000	Cs-134	59.70 ± 4.57	58.26	48.26 - 68.26
SPW-5372	WATER	Jul, 2000	Cs-137	40.00 ± 5.58	36.42	26.42 - 46.42
SPW-4686	WATER	Aug, 2000	Gr. Alpha	34.12 ± 1.71	38.43	19.22 - 57.65
SPW-4686	WATER	Aug, 2000	Gr. Beta	35.42 ± 1.51	29.21	19.21 - 39.21
SPW-5564	WATER	Aug, 2000	Sr-89	62.97 ± 4.73	67.61	54.09 - 81.13
SPW-5564	WATER	Aug, 2000	Sr-90	65.40 ± 2.47	55.70	44.56 - 66.84
SPW-5792	WATER	Aug, 2000	Ra-226	12.82 ± 0.30	13.79	9.65 - 17.93
SPW-5792	WATER	Aug, 2000	Ra-228	15.00 ± 1.21	13.69	9.58 - 17.80
SPW-6631	WATER	Sep, 2000	Ra-228	22.20 ± 2.20	20.32	14.22 - 26.42
SPW-6632	WATER	Sep, 2000	Ra-226	13.58 ± 0.29	13.79	9.65 - 17.93
SPW-6632	WATER	Sep, 2000	Ra-228	18.84 ± 2.59	20.32	14.22 - 26.42
SPW-6633	WATER	Sep, 2000	Fe-55	1757.00 ± 674.00	1852.00	1481.60 - 2222.40
SPW-5791	WATER	Sep, 2000	Gr. Alpha	52.28 ± 9.41	69.00	34.50 - 103.50
SPW-5791	WATER	Sep, 2000	Gr. Beta	34.60 ± 4.71	29.10	19.10 - 39.10
SPW-6630	WATER	Sep, 2000	Gr. Alpha	71.54 ± 7.15	69.14	34.57 - 103.71
SPW-6630	WATER	Sep, 2000	Gr. Beta	37.78 ± 1.62	29.04	19.04 - 39.04
SPW-7744	WATER	Oct, 2000	Ra-226	12.36 ± 0.25	13.79	9.65 - 17.93

Table A-3. In-house "spike" samples.

Lab Code	Sample Type	Date Collected	Analysis	Concentration in pCi/L[a] Laboratory results 2s, n=1[b]	Known Activity	Control[c] Limits
SPW-7744	WATER	Oct, 2000	Ra-228	10.37 ± 1.15	13.40	9.38 - 17.42
SPW-7745	WATER	Oct, 2000	H-3	54650.00 ± 643.00	55391.00	44312.80 - 66469.20
SPAP-7764	AIR FILTER	Oct, 2000	Gr. Beta	6.14 ± 0.03	5.91	-4.09 - 15.91
SPAP-7766	AIR FILTER	Oct, 2000	Cs-137	1.84 ± 0.01	1.69	1.01 - 2.37
SPMI-8347	MILK	Oct, 2000	Cs-134	29.18 ± 6.51	26.83	16.83 - 36.83
SPMI-8347	MILK	Oct, 2000	Cs-134	29.37 ± 3.63	26.83	16.83 - 36.83
SPMI-8347	MILK	Oct, 2000	Cs-137	39.04 ± 8.76	36.20	26.20 - 46.20
SPMI-8347	MILK	Oct, 2000	Cs-137	34.89 ± 5.71	36.20	26.20 - 46.20
SPF-8349	FISH	Oct, 2000	Cs-134	0.56 ± 0.02	0.54	0.32 - 0.75
SPF-8349	FISH	Oct, 2000	Cs-137	0.92 ± 0.04	0.87	0.52 - 1.22
SPW-8369	WATER	Oct, 2000	Co-60	32.49 ± 1.86	32.19	22.19 - 42.19
SPW-8369	WATER	Oct, 2000	Cs-134	55.87 ± 1.71	53.66	43.66 - 63.66
SPW-8369	WATER	Oct, 2000	Cs-137	36.46 ± 2.73	36.21	26.21 - 46.21
SPW-7743	WATER	Oct, 2000	Gr. Alpha	51.28 ± 2.28	69.10	34.55 - 103.65
SPW-7743	WATER	Oct, 2000	Gr. Beta	36.86 ± 1.66	29.00	19.00 - 39.00
SPW-9101	WATER	Nov, 2000	Ra-226	14.35 ± 0.24	13.79	9.65 - 17.93
SPW-9101	WATER	Nov, 2000	Ra-228	22.14 ± 1.56	20.09	14.06 - 26.12
SPW-9102	WATER	Dec, 2000	Gr. Alpha	77.76 ± 3.02	69.14	34.57 - 103.71
SPW-9102	WATER	Dec, 2000	Gr. Beta	36.71 ± 1.65	28.99	18.99 - 38.99
SPW-9726	WATER	Dec, 2000	Gr. Alpha	43.03 ± 2.18	69.14	34.57 - 103.71
SPW-9726	WATER	Dec, 2000	Gr. Beta	32.17 ± 1.55	28.89	18.89 - 38.89
SPW-9727	WATER	Dec, 2000	Ra-226	13.35 ± 0.29	13.79	9.65 - 17.93
SPW-9727	WATER	Dec, 2000	Ra-228	15.44 ± 1.23	19.75	13.83 - 25.68
SPCH-10228	CHARCOAL CANISTER	Dec, 2000	Ba-133	1.80 ± 0.05	2.11	1.26 - 2.95

[a] All results are in pCi/L, except for elemental potassium (K) in milk, which are in mg/L.; air filter samples, which are in pCi/Filter; and food products, which are in mg/kg.

[b] All samples are the results of single determinations.

[c] Control limits are based on Attachment A, page A2 of this report.

NOTE: For fish, Jello is used for the spike matrix. For vegetation, Sawdust is used for the spike matrix.

Table A-4. In-house "blank" samples.

Lab Code	Sample Type	Sample Date	Analysis	Concentration pCi/L[a]. Laboratory results (4.66 Sigma) LLD	Activity[b]	Acceptance Criteria (4.66 Sigma)
SPW-270	WATER	Jan 2000	Gr. Alpha	< 0.50	0.52 ± 0.41	< 1.0
SPW-270	WATER	Jan 2000	Gr. Beta	< 1.50	-0.34 ± 1.11	< 3.2
SPW-270	WATER	Jan 2000	Ra-226		0.06 ± 0.01	< 1.0
SPW-270	WATER	Jan 2000	Ra-228	< 0.94	0.14 ± 0.45	< 2.0
SPW-447	WATER	Jan 2000	H-3	< 184.00	-54.70 ± 88.60	< 200.0
SPW-481	WATER	Jan 2000	Co-60	< 2.42		< 10.0
SPW-481	WATER	Jan 2000	Cs-134	< 3.99		< 10.0
SPW-481	WATER	Jan 2000	Cs-137	< 2.90		< 10.0
SPMI-483	MILK	Jan 2000	Cs-137	< 2.73		< 10.0
SPMI-483	MILK	Jan 2000	Sr-90		1.03 ± 0.40	< 1.0
Low level of Sr-90 concentration in milk (1-5 pCi/L) is not unusual.						
SPAP-485	AIR FILTER	Jan 2000	Cs-137	< 1.64		< 100.0
SPW-919	WATER	Feb 2000	Gr. Alpha	< 0.80	0.56 ± 0.61	< 1.0
SPW-919	WATER	Feb 2000	Gr. Beta	< 1.65	0.11 ± 1.16	< 3.2
SPW-919	WATER	Feb 2000	Ra-226	< 0.02	0.02 ± 0.01	< 1.0
SPW-919	WATER	Feb 2000	Ra-228	< 0.60	0.02 ± 0.01	< 2.0
SPVE-1263	VEGETATION	Mar 2000	Cs-134	< 11.48		< 100.0
SPVE-1263	VEGETATION	Mar 2000	Cs-137	< 24.82		< 100.0
SPCH-1265	CHARCOAL CANISTER	Mar 2000	I-131(g)	< 7.00		< 9.6
SPMI-1292	MILK	Mar 2000	I-131	< 0.32	0.05 ± 0.18	< 0.5
SPMI-1292	MILK	Mar 2000	I-131(g)	< 4.60		< 20.0
SPW-1302	WATER	Mar 2000	I-131	< 0.30	0.01 ± 0.14	< 0.5
SPW-1479	WATER	Mar 2000	Gr. Alpha	< 0.84	-0.32 ± 0.53	< 1.0
SPW-1479	WATER	Mar 2000	Gr. Beta	< 1.86	-1.39 ± 1.19	< 3.2
SPW-1479	WATER	Mar 2000	Ra-226	< 0.01	0.06 ± 0.01	< 1.0
SPW-1479	WATER	Mar 2000	Ra-228	< 1.00	1.17 ± 0.60	< 2.0
SPMI-2276	MILK	Apr 2000	Cs-134	< 4.20		< 10.0
SPMI-2276	MILK	Apr 2000	Cs-137	< 3.33		< 10.0
SPMI-2276	MILK	Apr 2000	I-131	< 0.50	0.32 ± 0.30	< 0.5
SPW-2280	WATER	Apr 2000	Co-60	< 2.78		< 10.0
SPW-2280	WATER	Apr 2000	Cs-134	< 3.56		< 10.0

Table A-4. In-house "blank" samples.

Lab Code	Sample Type	Sample Date	Analysis	Concentration pCi/L[a]. Laboratory results (4.66 Sigma) LLD	Laboratory results (4.66 Sigma) Activity[b]	Acceptance Criteria (4.66 Sigma)
SPW-2280	WATER	Apr 2000	Cs-137	< 2.81		< 10.0
SPW-2280	WATER	Apr 2000	Gr. Alpha	< 0.60	0.55 ± 0.45	< 1.0
SPW-2280	WATER	Apr 2000	Gr. Beta	< 1.66	0.62 ± 1.11	< 3.2
SPW-2280	WATER	Apr 2000	I-131	< 0.29	-0.16 ± 0.19	< 0.5
SPW-2280	WATER	Apr 2000	I-131(g)	< 3.42		< 20.0
SPW-2280	WATER	Apr 2000	Ra-226		0.03 ± 0.01	< 1.0
SPW-2280	WATER	Apr 2000	Ra-228	< 0.87	0.65 ± 0.47	< 2.0
SPW-2282	WATER	Apr 2000	H-3	< 151.60	-5.40 ± 74.90	< 200.0
SPAP-3098	AIR FILTER	Apr 2000	Cs-137	< 1.37		< 100.0
SPW-3096	WATER	May 2000	Gr. Alpha	< 0.68		< 1.0
SPW-3096	WATER	May 2000	Gr. Beta	< 1.62		< 3.2
SPW-3096	WATER	May 2000	Ra-226		0.05 ± 0.01	< 1.0
SPW-3096	WATER	May 2000	Ra-228	< 0.90	0.05 ± 0.01	< 2.0
SPAP-273	AIR FILTER	May 2000	Gr. Beta	< 0.54	0.90 ± 0.32	< 3.2
SPMI-3139	MILK	May 2000	I-131	< 0.33		< 0.5
SPF-3181	FISH	May 2000	Cs-134	< 3.02		< 100.0
SPF-3181	FISH	May 2000	Cs-137	< 4.99		< 100.0
SPAP-3903	AIR FILTER	Jun 2000	Gr. Beta	< 0.48		< 3.2
SPW-3912	WATER	Jun 2000	Gr. Alpha	< 0.35	0.28 ± 0.28	< 1.0
SPW-3912	WATER	Jun 2000	Gr. Beta	< 1.22	0.54 ± 0.86	< 3.2
SPW-3912	WATER	Jun 2000	Ra-226		0.04 ± 0.02	< 1.0
SPW-3912	WATER	Jun 2000	Ra-228	< 0.65		< 2.0
SPMI-4343	MILK	Jun 2000	Sr-89	< 0.73		< 5.0
SPMI-4343	MILK	Jun 2000	Sr-90	< 0.56		< 1.0
SPW-4689	WATER	Jul 2000	Ra-226		0.03 ± 0.01	< 1.0
SPW-4689	WATER	Jul 2000	Ra-228	< 0.93	1.11 ± 0.55	< 2.0
SPW-4690	WATER	Jul 2000	H-3	< 178.00	18.57 ± 89.13	< 200.0
SPW-4808	WATER	Jul 2000	Gr. Alpha	< 0.45		< 1.0
SPAP-4810	AIR FILTER	Jul 2000	Cs-137	< 2.18		< 100.0
SPMI-4857	MILK	Jul 2000	Cs-137	< 6.13		< 10.0
SPMI-4857	MILK	Jul 2000	I-131(g)	< 7.19		< 20.0

Table A-4. In-house "blank" samples.

Lab Code	Sample Type	Sample Date	Analysis	Concentration pCi/L[a]. Laboratory results (4.66 Sigma) LLD	Activity[b]	Acceptance Criteria (4.66 Sigma)
SPMI-4857	MILK	Jul 2000	Sr-89	< 0.66		< 5.0
SPMI-4857	MILK	Jul 2000	Sr-90		1.15 ± 0.32	< 1.0
Low level of Sr-90 concentration in milk (1-5 pCi/L) is not unusual.						
SPF-5183	FISH	Jul 2000	Cs-134	< 17.71		< 100.0
SPF-5183	FISH	Jul 2000	Cs-137	< 12.81		< 100.0
SPW-4689	WATER	Jul 2000	Gr. Alpha	< 0.50		< 1.0
SPW-4689	WATER	Jul 2000	Gr. Beta	< 1.20		< 3.2
SPW-5373	WATER	Jul 2000	Co-60	< 5.20		< 10.0
SPW-5373	WATER	Jul 2000	Cs-134	< 4.80		< 10.0
SPW-5373	WATER	Jul 2000	Cs-137	< 4.00		< 10.0
SPW-5565	WATER	Aug 2000	Sr-89	< 1.56	-0.64 ± 1.11	< 5.0
SPW-5565	WATER	Aug 2000	Sr-90	< 0.59	0.17 ± 0.30	< 1.0
SPW-5793	WATER	Aug 2000	Gr. Alpha	< 0.51	0.02 ± 0.36	< 1.0
SPW-5793	WATER	Aug 2000	Ra-226		0.05 ± 0.02	< 1.0
SPW-5793	WATER	Aug 2000	Ra-228	< 0.95	0.26 ± 0.47	< 2.0
SPW-5793	WATER	Aug 2000	Gr. Beta	< 1.40	-0.13 ± 1.01	< 3.2
SPW-6634	WATER	Sep 2000	Fe-55	< 617.00	-105.90 ± 453.40	< 1000.0
SPW-6634	WATER	Sep 2000	Ra-226	< 0.01	0.03 ± 0.01	< 1.0
SPW-6634	WATER	Sep 2000	Ra-228	< 0.99	0.36 ± 0.51	< 2.0
SPW-6634	WATER	Sep 2000	Gr. Alpha	< 0.67	-0.22 ± 0.45	< 1.0
SPW-6634	WATER	Sep 2000	Gr. Beta	< 1.60	-0.20 ± 1.12	< 3.2
SPSO-10595	SOIL	Oct 2000	Cs-134	< 16.87		< 100.0
SPSO-10595	SOIL	Oct 2000	Cs-137	< 9.40		< 100.0
SPW-7746	WATER	Oct 2000	Ra-226	< 0.03	0.04 ± 0.02	< 1.0
SPW-7746	WATER	Oct 2000	Ra-228	< 1.08	0.00 ± 0.87	< 2.0
SPW-7747	WATER	Oct 2000	H-3	< 158.00	-38.00 ± 77.00	< 200.0
SPAP-7765	AIR FILTER	Oct 2000	Gr. Beta	< 0.64	0.00 ± 0.00	< 3.2
SPAP-7767	AIR FILTER	Oct 2000	Co-60	< 0.19		< 100.0
SPAP-7767	AIR FILTER	Oct 2000	Cs-134	< 0.32		< 100.0
SPAP-7767	AIR FILTER	Oct 2000	Cs-137	< 2.32		< 100.0
SPMI-8348	MILK	Oct 2000	Cs-134	< 3.35		< 10.0
SPMI-8348	MILK	Oct 2000	Cs-137	< 3.07		< 10.0

Table A-4. In-house "blank" samples.

Lab Code	Sample Type	Sample Date	Analysis	Concentration pCi/L[a]. Laboratory results (4.66 Sigma) LLD	Activity[b]	Acceptance Criteria (4.66 Sigma)
SPF-8350	FISH	Oct 2000	Cs-134	< 10.26		< 100.0
SPF-8350	FISH	Oct 2000	Cs-137	< 10.51		< 100.0
SPW-8370	WATER	Oct 2000	Co-60	< 4.67		< 10.0
SPW-8370	WATER	Oct 2000	Cs-134	< 5.28		< 10.0
SPW-8370	WATER	Oct 2000	Cs-137	< 4.93		< 10.0
SPW-7746	WATER	Oct 2000	Gr. Alpha	< 0.46	0.06 ± 0.33	< 1.0
SPW-7746	WATER	Oct 2000	Gr. Beta	< 1.24	0.00 ± 0.87	< 3.2
SPW-9103	WATER	Nov 2000	Ra-226	< 0.01	0.02 ± 0.01	< 1.0
SPW-9103	WATER	Nov 2000	Ra-228	< 1.00	0.14 ± 0.48	< 2.0
SPW-9729	WATER	Dec 2000	Gr. Alpha	< 0.46	0.23 ± 0.36	< 1.0
SPW-9729	WATER	Dec 2000	Gr. Beta	< 1.33	-0.46 ± 0.98	< 3.2
SPW-9729	WATER	Dec 2000	Ra-226	< 0.02	0.05 ± 0.01	< 1.0
SPW-9729	WATER	Dec 2000	Ra-228	< 0.70	0.22 ± 0.35	< 2.0
SPW-9103	WATER	Dec 2000	Gr. Alpha	< 0.51	-0.11 ± 0.37	< 1.0
SPW-9103	WATER	Dec 2000	Gr. Beta	< 1.21	0.55 ± 0.91	< 3.2
SPCH-10583	CHARCOAL CANISTER	Dec 2000	I-131(g)	< 1.49		< 9.6

[a] Liquid sample results are reported in pCi/Liter, air filter sample results are in pCi/filter, charcoal sample results are in pCi/charcoal, and solid sample results are in pCi/kilogram.
[b] The activity reported is the net activity result.

Table A-5. In-house "duplicate" samples.

Lab Codes	Sample Date	Analysis	Concentration in pCi/L[a] First Result	Second Result	Averaged Result
CF-23, 24	Jan, 2000	Gr. Beta	13.05 ± 0.39	12.46 ± 0.36	12.75 ± 0.26
CF-23, 24	Jan, 2000	K-40	13.00 ± 0.90	11.73 ± 0.79	12.36 ± 0.60
CF-23, 24	Jan, 2000	Sr-90	0.01 ± 0.00	0.01 ± 0.00	0.01 ± 0.00
WW-65, 66	Jan, 2000	Co-60	-0.53 ± 1.62	0.44 ± 2.11	-0.04 ± 1.33
WW-65, 66	Jan, 2000	Cs-137	-2.13 ± 1.70	0.41 ± 2.35	-0.86 ± 1.45
WW-65, 66	Jan, 2000	H-3	131.62 ± 84.13	182.81 ± 86.33	157.22 ± 60.27
WW-686, 687	Jan, 2000	Gr. Beta	4.76 ± 1.22	4.59 ± 1.27	4.67 ± 0.88
AP-1204, 1205	Jan, 2000	Be-7	0.19 ± 0.09	0.10 ± 0.07	0.14 ± 0.06
SW-68, 69	Jan, 2000	K-40 (FP)	1.30 ± 0.13	1.30 ± 0.13	1.30 ± 0.09
MI-277, 278	Jan, 2000	I-131	-0.08 ± 0.27	-0.00 ± 0.26	-0.04 ± 0.19
MI-277, 278	Jan, 2000	K-40	1,664.70 ± 113.20	1,431.30 ± 90.30	1,548.00 ± 72.40
MI-277, 278	Jan, 2000	Sr-90	0.63 ± 0.42	0.51 ± 0.40	0.57 ± 0.29
SW-728, 729	Jan, 2000	Co-60	0.39 ± 1.79	1.04 ± 1.53	0.72 ± 1.18
SW-728, 729	Jan, 2000	Cs-137	-0.67 ± 1.86	1.22 ± 1.38	0.27 ± 1.16
SW-403, 404	Jan, 2000	H-3	795.21 ± 109.04	857.22 ± 111.09	826.22 ± 77.83
SWT-437, 438	Jan, 2000	Gr. Beta	1.73 ± 0.57	2.60 ± 0.58	2.16 ± 0.41
PW-637, 638	Jan, 2000	Co-60	4.90 ± 2.92	-2.56 ± 2.80	1.17 ± 2.02
PW-637, 638	Jan, 2000	Cs-137	2.73 ± 2.51	-1.68 ± 2.71	0.53 ± 1.85
PW-637, 638	Jan, 2000	Gr. Beta	1.67 ± 1.31	4.00 ± 1.59	2.83 ± 1.03
SW-587, 588	Jan, 2000	Co-60	-1.24 ± 1.86	-0.27 ± 1.79	-0.76 ± 1.29
SW-587, 588	Jan, 2000	Cs-137	1.35 ± 1.94	0.23 ± 1.80	0.79 ± 1.32
SW-587, 588	Jan, 2000	Gr. Beta	3.80 ± 1.56	6.76 ± 1.75	5.28 ± 1.17
SW-611, 612	Jan, 2000	H-3	2,229.26 ± 158.61	2,115.19 ± 155.80	2,172.23 ± 111.16
SW-459, 460	Feb, 2000	Gr. Beta	2.15 ± 0.94	2.79 ± 0.94	2.47 ± 0.66
WW-774, 775	Feb, 2000	Co-60	4.26 ± 3.48	1.61 ± 4.46	2.93 ± 2.83
WW-774, 775	Feb, 2000	Cs-137	-1.19 ± 3.78	2.37 ± 4.65	0.59 ± 2.99
WW-774, 775	Feb, 2000	H-3	2,841.35 ± 174.48	2,566.76 ± 168.19	2,704.05 ± 121.17
SW-707, 708	Feb, 2000	Gr. Alpha	2.20 ± 1.73	0.16 ± 1.29	1.18 ± 1.08
SW-707, 708	Feb, 2000	Gr. Beta	7.90 ± 1.70	7.70 ± 1.70	7.80 ± 1.20
SW-707, 708	Feb, 2000	H-3	117.00 ± 92.00	69.00 ± 90.00	93.00 ± 64.35
CW-854, 855	Feb, 2000	Gr. Beta	2.13 ± 1.36	1.34 ± 1.25	1.74 ± 0.93
SW-881, 882	Feb, 2000	H-3	1,794.91 ± 145.81	1,762.31 ± 144.95	1,778.61 ± 102.80
SW-959, 960	Feb, 2000	Gr. Alpha	1.04 ± 1.00	0.92 ± 0.67	0.98 ± 0.60
SW-959, 960	Feb, 2000	Gr. Beta	1.24 ± 0.89	1.79 ± 0.90	1.51 ± 0.63
PW-1055, 1056	Feb, 2000	Co-60	-0.72 ± 3.18	1.73 ± 1.89	0.51 ± 1.85
PW-1055, 1056	Feb, 2000	Cs-137	0.55 ± 2.81	0.90 ± 1.86	0.72 ± 1.69
PW-1055, 1056	Feb, 2000	Gr. Beta	2.40 ± 1.52	2.20 ± 1.50	2.30 ± 1.07

Table A-5. In-house "duplicate" samples.

Lab Codes	Sample Date	Analysis	Concentration in pCi/L[a] First Result	Second Result	Averaged Result
MI-1079, 1080	Mar, 2000	Calcium	0.79 ± 0.08	0.78 ± 0.08	0.79 ± 0.06
MI-1079, 1080	Mar, 2000	K-40	1,229.00 ± 138.00	1,387.00 ± 162.00	1,308.00 ± 106.40
MI-1079, 1080	Mar, 2000	Sr-90	0.90 ± 0.40	1.70 ± 0.50	1.30 ± 0.32
CW-1156, 1157	Mar, 2000	H-3	1,994.51 ± 143.09	2,012.54 ± 143.55	2,003.53 ± 101.34
SW-1967, 1968	Mar, 2000	Gr. Beta	11.96 ± 1.31	12.57 ± 1.31	12.27 ± 0.93
SW-2468, 2469	Mar, 2000	Sr-90	0.93 ± 0.45	0.50 ± 0.29	0.72 ± 0.27
WW-1402, 1403	Mar, 2000	H-3	93.34 ± 97.05	60.63 ± 95.75	76.98 ± 68.17
LW-1269, 1270	Mar, 2000	Gr. Beta	1.97 ± 0.57	3.22 ± 0.69	2.60 ± 0.45
AP-,	Mar, 2000	Be-7	0.06 ± 0.01	0.07 ± 0.01	0.07 ± 0.01
MI-1541, 1542	Mar, 2000	K-40	1,380.00 ± 122.00	1,476.00 ± 158.00	1,428.00 ± 99.81
CW-1571, 1572	Mar, 2000	Gr. Beta	2.29 ± 1.48	1.35 ± 1.27	1.82 ± 0.98
CW-1693, 1694	Mar, 2000	Gr. Beta	0.56 ± 1.18	1.91 ± 1.49	1.24 ± 0.95
SWT-,	Mar, 2000	Gr. Beta	2.36 ± 0.65	2.01 ± 0.57	2.19 ± 0.43
WW-1916, 1917	Mar, 2000	H-3	25.37 ± 90.21	3.90 ± 89.27	14.63 ± 63.46
AP-2155, 2156	Mar, 2000	Be-7	0.07 ± 0.01	0.07 ± 0.01	0.07 ± 0.01
SWU-2547, 2548	Mar, 2000	Sr-90	0.57 ± 0.24	0.55 ± 0.24	0.56 ± 0.17
CW-1798, 1799	Mar, 2000	Gr. Beta	2.73 ± 1.85	0.76 ± 1.71	1.75 ± 1.26
AP-2176, 2177	Mar, 2000	Be-7	0.06 ± 0.01	0.08 ± 0.02	0.07 ± 0.01
WW-2046, 2047	Mar, 2000	H-3	221.85 ± 101.64	185.19 ± 100.24	203.52 ± 71.38
SW-1967, 1968	Apr, 2000	K-40	9.20 ± 0.90	9.10 ± 0.90	9.15 ± 0.64
SW-2241, 2242	Apr, 2000	Gr. Alpha	2.49 ± 1.44	3.15 ± 1.53	2.82 ± 1.05
SW-2241, 2242	Apr, 2000	Gr. Beta	8.37 ± 1.36	7.20 ± 1.29	7.79 ± 0.94
WW-,	Apr, 2000	Gr. Beta	4.20 ± 0.64	4.68 ± 0.73	4.44 ± 0.49
WW-2711, 2712	Apr, 2000	Cs-137	-0.76 ± 2.19	1.43 ± 3.63	0.34 ± 2.12
WW-2711, 2712	Apr, 2000	H-3	3,877.05 ± 192.54	3,951.88 ± 193.99	3,914.46 ± 136.66
WW-2511, 2512	Apr, 2000	H-3	108.10 ± 79.80	127.80 ± 80.70	117.95 ± 56.75
SO-2435, 2436	Apr, 2000	K-40	4.73 ± 0.38	4.83 ± 0.53	4.78 ± 0.33
SS-2669, 2670	Apr, 2000	K-40	8.60 ± 0.55	9.18 ± 0.45	8.89 ± 0.36
SWU-2732, 2733	Apr, 2000	Gr. Beta	3.33 ± 0.68	3.19 ± 0.69	3.26 ± 0.48
PW-2605, 2606	Apr, 2000	Co-60	0.36 ± 1.10	1.05 ± 2.03	0.71 ± 1.16
PW-2605, 2606	Apr, 2000	Cs-137	-0.07 ± 0.93	-0.98 ± 2.37	-0.53 ± 1.27
PW-2605, 2606	Apr, 2000	Gr. Beta	1.51 ± 1.31	2.91 ± 1.39	2.21 ± 0.96
WW-2711, 2712	Apr, 2000	H-3	3,877.00 ± 192.50	3,951.90 ± 194.00	3,914.45 ± 136.65
WW-2711, 2712	Apr, 2000	Co-60	0.97 ± 1.93	0.82 ± 3.64	0.90 ± 2.06
BS-3212, 3213	Apr, 2000	Gr. Beta	7.90 ± 1.97	7.57 ± 1.88	7.74 ± 1.36
SW-,	May, 2000	K-40	1.30 ± 0.13	1.20 ± 0.12	1.25 ± 0.09
MI-2810, 2811	May, 2000	K-40	1,285.00 ± 111.00	1,338.00 ± 127.00	1,311.50 ± 84.34

Table A-5. In-house "duplicate" samples.

Lab Codes	Sample Date	Analysis	Concentration in pCi/L[a] First Result	Second Result	Averaged Result
SW-3003, 3004	May, 2000	Gr. Beta	5.06 ± 0.73	5.27 ± 0.73	5.17 ± 0.52
F-2831, 2832	May, 2000	Co-60	0.01 ± 0.01	0.00 ± 0.01	0.01 ± 0.01
F-2831, 2832	May, 2000	Cs-137	-0.00 ± 0.01	0.00 ± 0.01	0.00 ± 0.01
WW-3128, 3129	May, 2000	Gr. Beta	5.41 ± 1.35	4.43 ± 1.22	4.92 ± 0.91
BS-3411, 3412	May, 2000	Co-60	-0.00 ± 0.01	0.01 ± 0.01	0.00 ± 0.01
BS-3411, 3412	May, 2000	Cs-137	0.01 ± 0.01	0.00 ± 0.01	0.00 ± 0.00
F-3436, 3437	May, 2000	Co-60	0.01 ± 0.01	0.00 ± 0.01	0.01 ± 0.00
F-3436, 3437	May, 2000	Cs-137	0.00 ± 0.01	-0.00 ± 0.00	-0.00 ± 0.00
F-2978, 2979	May, 2000	K-40	2.72 ± 0.26	2.14 ± 0.30	2.43 ± 0.20
SS-3482, 3483	May, 2000	Cs-137	0.11 ± 0.03	0.12 ± 0.03	0.12 ± 0.02
SS-3482, 3483	May, 2000	K-40	11.26 ± 0.57	11.37 ± 0.54	11.32 ± 0.39
BS-3458, 3459	May, 2000	Co-60	0.01 ± 0.01	0.02 ± 0.01	0.01 ± 0.01
BS-3458, 3459	May, 2000	Cs-137	0.04 ± 0.01	0.03 ± 0.02	0.03 ± 0.01
MI-3510, 3511	May, 2000	Co-60	0.48 ± 3.05	-0.80 ± 2.74	-0.16 ± 2.05
MI-3510, 3511	May, 2000	Cs-137	1.17 ± 2.96	0.38 ± 2.60	0.77 ± 1.97
MI-3510, 3511	May, 2000	I-131	-0.06 ± 0.25	-0.04 ± 0.24	-0.05 ± 0.17
SO-3629, 3630	May, 2000	Cs-137	0.23 ± 0.03	0.20 ± 0.03	0.22 ± 0.02
SO-3629, 3630	May, 2000	Gr. Beta	20.49 ± 2.82	19.14 ± 2.73	19.82 ± 1.96
SO-3629, 3630	May, 2000	K-40	13.03 ± 0.61	12.25 ± 0.57	12.64 ± 0.42
SW-3904, 3905	May, 2000	Gr. Beta	6.27 ± 1.83	7.02 ± 1.90	6.65 ± 1.32
SW-3904, 3905	May, 2000	Co-60	-0.65 ± 1.54	1.32 ± 1.77	0.33 ± 1.17
SW-3904, 3905	May, 2000	Cs-137	0.19 ± 1.22	-0.16 ± 1.15	0.01 ± 0.84
SW-3904, 3905	May, 2000	Gr. Beta	6.27 ± 1.83	7.02 ± 1.90	6.64 ± 1.32
SP-3833, 3834	May, 2000	Gr. Alpha	4.19 ± 1.34	3.22 ± 1.20	3.71 ± 0.90
MI-3105, 3106	May, 2000	K-40	1,460.00 ± 173.00	1,452.00 ± 110.00	1,456.00 ± 102.50
VE-3191, 3192	May, 2000	Be-7	0.42 ± 0.23	0.39 ± 0.16	0.40 ± 0.14
VE-3191, 3192	May, 2000	Gr. Alpha	0.15 ± 0.06	0.28 ± 0.07	0.22 ± 0.05
VE-3191, 3192	May, 2000	Gr. Beta	3.76 ± 0.13	3.88 ± 0.14	3.82 ± 0.10
VE-3191, 3192	May, 2000	K-40	3.58 ± 0.43	3.47 ± 0.72	3.53 ± 0.42
MI-3718, 3719	May, 2000	K-40	1,447.00 ± 165.00	1,444.00 ± 177.00	1,445.50 ± 120.99
DW-3770, 3771	May, 2000	Gr. Beta	5.92 ± 1.32	4.54 ± 1.10	5.23 ± 0.86
MI-3653, 3654	Jun, 2000	K-40	1,407.00 ± 170.00	1,388.00 ± 102.00	1,397.50 ± 99.13
SW-4614, 4615	Jun, 2000	Sr-90	0.50 ± 0.27	0.55 ± 0.27	0.53 ± 0.19
WW-3883, 3884	Jun, 2000	H-3	4,401.80 ± 204.60	4,298.00 ± 202.70	4,349.90 ± 144.00
WW-3883, 3884	Jun, 2000	Co-60	0.91 ± 3.01	-0.28 ± 1.52	0.32 ± 1.69
WW-3883, 3884	Jun, 2000	Cs-137	0.49 ± 2.16	0.66 ± 1.82	0.57 ± 1.41
WW-3883, 3884	Jun, 2000	H-3	4,401.78 ± 204.63	4,297.96 ± 202.67	4,349.87 ± 144.00

Table A-5. In-house "duplicate" samples.

Lab Codes	Sample Date	Analysis	Concentration in pCi/L[a] First Result	Second Result	Averaged Result
BS-3980, 3981	Jun, 2000	Cs-137	0.07 ± 0.02	0.08 ± 0.02	0.08 ± 0.01
BS-3980, 3981	Jun, 2000	Cs-137	0.06 ± 0.02	0.07 ± 0.02	0.07 ± 0.01
BS-3980, 3981	Jun, 2000	K-40	1,458.60 ± 69.40	1,421.90 ± 52.20	1,440.25 ± 43.42
VE-4065, 4066	Jun, 2000	K-40	6.37 ± 0.54	6.34 ± 0.51	6.36 ± 0.37
WW-4252, 4253	Jun, 2000	H-3	705.40 ± 114.10	718.90 ± 114.60	712.15 ± 80.86
TSWU-4283, 4284	Jun, 2000	Gr. Beta	3.24 ± 0.63	3.11 ± 0.62	3.18 ± 0.44
F-4438, 4439	Jun, 2000	Gr. Beta	2.25 ± 0.06	2.13 ± 0.06	2.19 ± 0.04
SW-4459, 4460	Jun, 2000	H-3	532.20 ± 108.10	670.50 ± 112.90	601.35 ± 78.15
WW-4480, 4481	Jun, 2000	H-3	601.50 ± 99.50	573.10 ± 108.50	587.30 ± 73.61
SW-4375, 4376	Jun, 2000	Gr. Beta	4.53 ± 1.59	4.43 ± 1.54	4.48 ± 1.11
SW-4375, 4376	Jun, 2000	Cs-137	-0.09 ± 1.61	-0.43 ± 1.39	-0.26 ± 1.06
AP-,	Jun, 2000	Be-7	0.06 ± 0.02	0.07 ± 0.01	0.07 ± 0.01
AP-4712, 4713	Jun, 2000	Be-7	0.07 ± 0.02	0.09 ± 0.02	0.08 ± 0.01
SW-4537, 4538	Jun, 2000	H-3	584.10 ± 108.80	599.20 ± 109.30	591.65 ± 77.11
SL-4636, 4637	Jul, 2000	Be-7	0.93 ± 0.18	0.56 ± 0.12	0.75 ± 0.11
SL-4636, 4637	Jul, 2000	Gr. Beta	2.41 ± 0.32	2.69 ± 0.32	2.55 ± 0.23
SL-4636, 4637	Jul, 2000	K-40	1.25 ± 0.24	1.13 ± 0.30	1.19 ± 0.19
SL-4636, 4637	Jul, 2000	Sr-90	0.04 ± 0.02	0.05 ± 0.03	0.05 ± 0.02
G-4667, 4668	Jul, 2000	Be-7	0.93 ± 0.20	0.98 ± 0.31	0.96 ± 0.18
G-4667, 4668	Jul, 2000	Gr. Beta	6.16 ± 0.13	6.68 ± 0.14	6.42 ± 0.10
G-4667, 4668	Jul, 2000	K-40	7.72 ± 0.51	8.43 ± 0.83	8.08 ± 0.49
WW-4818, 4819	Jul, 2000	H-3	13.30 ± 77.10	29.70 ± 77.90	21.50 ± 54.80
MI-4839, 4840	Jul, 2000	K-40	1,313.00 ± 173.00	1,398.00 ± 161.00	1,355.50 ± 118.16
MI-4949, 4950	Jul, 2000	K-40	1,307.00 ± 56.00	1,346.00 ± 58.00	1,326.50 ± 40.31
LW-4991, 4992	Jul, 2000	Gr. Beta	2.78 ± 0.66	2.22 ± 0.55	2.50 ± 0.43
MI-4903, 4904	Jul, 2000	K-40	1,383.10 ± 193.20	1,328.00 ± 153.10	1,355.55 ± 123.25
MI-4881, 4882	Jul, 2000	K-40	1,538.40 ± 103.00	1,438.00 ± 125.30	1,488.20 ± 81.10
MI-4881, 4882	Jul, 2000	Sr-90	1.01 ± 0.37	1.38 ± 0.42	1.19 ± 0.28
G-5388, 5389	Jul, 2000	Be-7	1.64 ± 0.16	1.52 ± 0.21	1.58 ± 0.13
G-5388, 5389	Jul, 2000	K-40	5.51 ± 0.33	5.86 ± 0.49	5.69 ± 0.30
G-5388, 5389	Jul, 2000	Gr. Beta	5.64 ± 0.15	5.81 ± 0.15	5.73 ± 0.11
SWU-5473, 5474	Jul, 2000	Gr. Beta	3.50 ± 0.67	3.17 ± 0.61	3.34 ± 0.45
SW-5410, 5411	Jul, 2000	Gr. Beta	1.95 ± 0.81	1.89 ± 1.04	1.92 ± 0.66
PW-5550, 5551	Jul, 2000	Gr. Beta	0.71 ± 1.15	2.50 ± 1.49	1.61 ± 0.94
WW-5623, 5624	Jul, 2000	H-3	22,713.90 ± 429.00	22,265.50 ± 424.90	22,489.70 ± 301.90
MI-5529, 5530	Aug, 2000	K-40	1,396.80 ± 103.80	1,278.20 ± 117.50	1,337.50 ± 78.39
VE-,	Aug, 2000	K-40	1.66 ± 0.32	1.93 ± 0.33	1.80 ± 0.23

Table A-5. In-house "duplicate" samples.

Lab Codes	Sample Date	Analysis	Concentration in pCi/L[a] First Result	Second Result	Averaged Result
MI-5808, 5809	Aug, 2000	K-40	1,261.90 ± 124.40	1,234.40 ± 152.80	1,248.15 ± 98.52
CW-6514, 6515	Aug, 2000	Gr. Beta	1.42 ± 0.37	1.44 ± 0.41	1.43 ± 0.28
MI-5933, 5934	Aug, 2000	Calcium	0.88 ± 0.09	0.89 ± 0.09	0.89 ± 0.06
MI-5933, 5934	Aug, 2000	Sr-90	3.29 ± 0.51	1.72 ± 0.47	2.51 ± 0.35
VE-6002, 6003	Aug, 2000	Sr-90	0.00 ± 0.00	0.00 ± 0.00	0.00 ± 0.00
VE-6002, 6003	Aug, 2000	K-40	1.44 ± 0.23	1.78 ± 0.18	1.61 ± 0.14
PW-6209, 6210	Aug, 2000	H-3	528.20 ± 112.70	578.50 ± 114.50	553.35 ± 80.33
SW-6291, 6292	Aug, 2000	Gr. Beta	4.14 ± 1.58	1.95 ± 1.32	3.05 ± 1.03
WW-6312, 6313	Aug, 2000	H-3	7,804.20 ± 262.70	7,221.70 ± 253.80	7,512.95 ± 182.64
WW-5981, 5982	Aug, 2000	Gr. Beta	4.85 ± 0.78	5.87 ± 0.79	5.36 ± 0.56
PW-6341, 6342	Aug, 2000	Gr. Beta	2.45 ± 1.42	2.63 ± 1.37	2.54 ± 0.99
CW-6514, 6515	Aug, 2000	H-3	5,600.10 ± 226.80	5,434.30 ± 223.90	5,517.20 ± 159.35
MI-6409, 6410	Sep, 2000	I-131	-0.04 ± 0.23	0.19 ± 0.24	0.08 ± 0.17
MI-6409, 6410	Sep, 2000	K-40	1,367.80 ± 111.40	1,368.60 ± 107.50	1,368.20 ± 77.41
MI-6409, 6410	Sep, 2000	Sr-90	1.19 ± 0.35	0.80 ± 0.30	1.00 ± 0.23
MI-6542, 6543	Sep, 2000	K-40	1,298.00 ± 140.10	1,470.60 ± 139.70	1,384.30 ± 98.92
MI-6450, 6451	Sep, 2000	K-40	1,237.20 ± 102.10	1,328.10 ± 108.30	1,282.65 ± 74.42
MI-7102, 7103	Sep, 2000	I-131	-0.11 ± 0.23	-0.02 ± 0.25	-0.07 ± 0.17
MI-7102, 7103	Sep, 2000	K-40	1,473.10 ± 101.40	1,400.70 ± 168.60	1,436.90 ± 98.37
SWT-7262, 7263	Sep, 2000	Gr. Beta	3.45 ± 0.66	2.32 ± 0.57	2.89 ± 0.44
SWU-7283, 7284	Sep, 2000	Gr. Beta	2.75 ± 0.55	2.87 ± 0.56	2.81 ± 0.39
SWU-7283, 7284	Sep, 2000	H-3	197.76 ± 94.07	172.31 ± 93.00	185.04 ± 66.14
SW-7081, 7082	Sep, 2000	H-3	89.32 ± 92.99	42.38 ± 90.37	65.85 ± 64.83
AP-7685, 7686	Sep, 2000	Be-7	0.07 ± 0.01	0.07 ± 0.01	0.07 ± 0.01
AP-7706, 7707	Sep, 2000	Be-7	0.06 ± 0.01	0.05 ± 0.01	0.05 ± 0.01
SW-7482, 7483	Sep, 2000	Gr. Beta	5.31 ± 1.75	6.70 ± 1.85	6.01 ± 1.27
SP-7347, 7348	Sep, 2000	Gr. Alpha	6.12 ± 1.54	5.68 ± 1.49	5.90 ± 1.07
SW-7436, 7437	Sep, 2000	H-3	40.60 ± 79.90	72.00 ± 81.40	56.30 ± 57.03
CW-7748, 7749	Sep, 2000	Gr. Alpha	0.47 ± 0.28	0.65 ± 0.36	0.56 ± 0.23
CW-7748, 7749	Sep, 2000	Gr. Beta	2.35 ± 0.39	2.02 ± 0.38	2.19 ± 0.27
SL-7304, 7305	Oct, 2000	Gr. Beta	2.94 ± 0.23	2.90 ± 0.23	2.92 ± 0.17
SL-7304, 7305	Oct, 2000	K-40	1.14 ± 0.36	1.73 ± 0.58	1.44 ± 0.34
BS-7369, 7370	Oct, 2000	Cs-137	10.79 ± 4.96	20.04 ± 9.40	15.41 ± 5.31
SO-7950, 7951	Oct, 2000	Ac-228	0.66 ± 0.10	0.77 ± 0.10	0.72 ± 0.07
SO-7950, 7951	Oct, 2000	Bi-214	0.42 ± 0.06	0.57 ± 0.07	0.49 ± 0.05
SO-7950, 7951	Oct, 2000	Cs-137	0.20 ± 0.31	0.21 ± 0.04	0.20 ± 0.16
SO-7950, 7951	Oct, 2000	Gr. Beta	29.22 ± 1.98	28.02 ± 1.98	28.62 ± 1.40

Table A-5. In-house "duplicate" samples.

Lab Codes	Sample Date	Analysis	Concentration in pCi/L[a] First Result	Second Result	Averaged Result
SO-7950, 7951	Oct, 2000	K-40	21.36 ± 0.93	21.77 ± 0.89	21.56 ± 0.64
SO-7950, 7951	Oct, 2000	Pb-212	0.72 ± 0.12	0.92 ± 0.12	0.82 ± 0.09
SO-7950, 7951	Oct, 2000	Ra-226	1.21 ± 0.33	1.30 ± 0.31	1.26 ± 0.22
SO-7950, 7951	Oct, 2000	Tl-208	0.21 ± 0.04	0.25 ± 0.03	0.23 ± 0.02
VE-7554, 7555	Oct, 2000	Gr. Beta	0.73 ± 0.02	0.74 ± 0.02	0.74 ± 0.01
MI-7622, 7623	Oct, 2000	K-40	1,505.90 ± 142.70	1,453.60 ± 172.00	1,479.75 ± 111.74
F-8219, 8220	Oct, 2000	K-40	2.94 ± 0.22	3.39 ± 0.38	3.16 ± 0.22
WW-7844, 7845	Oct, 2000	H-3	-68.13 ± 74.09	84.23 ± 81.38	8.05 ± 55.03
WW-8240, 8241	Oct, 2000	Gr. Beta	0.35 ± 1.89	1.61 ± 2.28	0.98 ± 1.48
WW-8240, 8241	Oct, 2000	H-3	72.46 ± 92.95	38.87 ± 91.51	55.66 ± 65.22
BS-8170, 8171	Oct, 2000	Gr. Beta	11.96 ± 2.55	11.30 ± 2.39	11.63 ± 1.75
BS-8170, 8171	Oct, 2000	K-40	8.36 ± 0.46	8.76 ± 0.47	8.56 ± 0.33
MI-8085, 8086	Oct, 2000	Calcium	0.94	0.94	0.94
MI-8085, 8086	Oct, 2000	Sr-90	1.04 ± 0.35	0.75 ± 0.31	0.90 ± 0.24
MI-8149, 8150	Oct, 2000	K-40	1,358.10 ± 95.81	1,341.80 ± 178.00	1,349.95 ± 101.07
SO-8967, 8968	Oct, 2000	Be-7	1.25 ± 0.37	1.27 ± 0.35	1.26 ± 0.26
SO-8967, 8968	Oct, 2000	Cs-137	0.05 ± 0.02	0.05 ± 0.02	0.05 ± 0.02
SO-8967, 8968	Oct, 2000	K-40	4.53 ± 0.66	4.46 ± 0.58	4.50 ± 0.44
MI-8522, 8523	Oct, 2000	I-131	-0.05 ± 0.23	0.18 ± 0.25	0.07 ± 0.17
SWU-8894, 8895	Oct, 2000	Gr. Beta	3.63 ± 0.62	2.45 ± 0.61	3.04 ± 0.43
MI-8802, 8803	Nov, 2000	I-131	-0.22 ± 0.24	-0.25 ± 0.26	-0.24 ± 0.18
MI-8802, 8803	Nov, 2000	K-40	1,340.50 ± 113.80	1,453.50 ± 100.50	1,397.00 ± 75.91
MI-8802, 8803	Nov, 2000	Sr-89	0.19 ± 1.31	0.61 ± 1.34	0.40 ± 0.94
MI-8802, 8803	Nov, 2000	Sr-90	1.10 ± 0.39	0.90 ± 0.38	1.00 ± 0.27
LW-8823, 8824	Nov, 2000	Gr. Beta	2.13 ± 0.55	1.59 ± 0.52	1.86 ± 0.38
VE-9014, 9015	Nov, 2000	Gr. Alpha	0.10 ± 0.06	0.15 ± 0.07	0.12 ± 0.05
VE-9014, 9015	Nov, 2000	Gr. Beta	5.59 ± 0.17	5.90 ± 0.19	5.74 ± 0.13
PW-9991, 9992	Nov, 2000	Gr. Beta	2.50 ± 0.01	3.49 ± 1.18	3.00 ± 0.59
SW-9991, 9992	Nov, 2000	Co-60	1.16 ± 1.70	-2.94 ± 3.39	-0.89 ± 1.89
SW-9991, 9992	Nov, 2000	Cs-134	-0.07 ± 1.85	2.27 ± 3.73	1.10 ± 2.08
SW-9991, 9992	Nov, 2000	Cs-137	-0.88 ± 1.67	3.84 ± 3.45	1.48 ± 1.92
DW-9682, 9683	Dec, 2000	Gr. Beta	1.61 ± 1.02	2.10 ± 0.94	1.86 ± 0.69
MI-9749, 9750	Dec, 2000	K-40	1,562.40 ± 118.70	1,495.90 ± 168.30	1,529.15 ± 102.97
AP-10782, 10783	Dec, 2000	Be-7	0.21 ± 0.10	0.31 ± 0.14	0.26 ± 0.09
AP-10824, 10825	Dec, 2000	Be-7	0.06 ± 0.02	0.07 ± 0.01	0.06 ± 0.01
WW-10424, 10425	Dec, 2000	H-3	1,690.87 ± 137.81	1,551.48 ± 1,339.42	1,621.18 ± 673.25

[a] Liquid sample results are reported in pCi/Liter, air filter sample results are in pCi/filter, charcoal sample results are in pCi/charcoal, and solid sample results are in pCi/kilogram.

Table A-6. Department of Energy's Mixed Analyte Performance Evaluation Program (MAPEP)[a].

Lab Code	Sample Type	Date Collected	Analysis	Concentration[b] Laboratory result[c]	MAPEP Result[d] 1s, N=1	Control Limits
STSO-882	SOIL	Jan, 2000	Am-241	64.90 ± 6.49	61.10	42.77 - 79.43
STSO-882	SOIL	Jan, 2000	Co-57	721.10 ± 83.80	949.00	664.30 - 1,233.70
The MAPEP soil sample (STSO-882), as received, did not closely match a standard gamma geometry. The results for gamma-emitting isotopes are reanalyses, with a reduced sample size.						
STSO-882	SOIL	Jan, 2000	Co-60	1,264.40 ± 78.60	1,180.00	826.00 - 1,534.00
STSO-882	SOIL	Jan, 2000	Cs-134	969.30 ± 76.90	1,047.00	732.90 - 1,361.10
STSO-882	SOIL	Jan, 2000	Cs-137	944.00 ± 92.00	930.00	651.00 - 1,209.00
STSO-882	SOIL	Jan, 2000	K-40	811.70 ± 79.90	652.00	456.40 - 847.60
STSO-882	SOIL	Jan, 2000	Mn-54	1,103.30 ± 64.20	1,023.00	716.10 - 1,329.90
STSO-882	SOIL	Jan, 2000	Ni-63	711.00 ± 71.10	960.00	672.00 - 1,248.00
STSO-882	SOIL	Jan, 2000	Pu-239/40	67.90 ± 6.79	74.40	52.08 - 96.72
STSO-882	SOIL	Jan, 2000	Sr-90	345.00 ± 34.50	304.00	212.80 - 395.20
STSO-882	SOIL	Jan, 2000	U-233/4	62.90 ± 6.29	90.00	63.00 - 117.00
Incomplete dissolution of the sample is suspected. Results of reanalysis: U-233/234 67.3 ± 3.3 pCi/g, U-238 68.1 ± 8.9 pCi/g.						
STSO-882	SOIL	Jan, 2000	U-238	63.20 ± 6.32	93.00	65.10 - 120.90
STSO-882	SOIL	Jan, 2000	Zn-65	1,544.30 ± 61.50	1,540.00	1,078.00 - 2,002.00

[a] Results obtained by Environmental Inc., Midwest Laboratory as a participant in the Department of Energy's Mixed Analyte Performance Evaluation Program, Idaho Operations office, Idaho Falls, Idaho.

[b] All results are in Bq/kg or Bq/L as requested by the Department of Energy.

[c] Unless otherwise indicated, laboratory results are given as the mean ± 1 standard deviations for three determinations.

[d] Results are presented as the known values, expected laboratory precision (1 sigma, 1 determination), and control limits as defined by the MAPEP.

Table A-7. Environmental Measurements Laboratory Quality Assessment Program (EML)[a].

Lab Code	Sample Type	Date Collected	Analysis	Concentration[b] Laboratory result[c]	EML Result[d]	Control Limits[e]
STSO-870	SOIL	Mar, 2000	Ac-228	98.30 ± 7.10	97.60	0.80 - 1.40
STSO-870	SOIL	Mar, 2000	Bi-212	98.50 ± 15.10	106.00	0.80 - 1.40
STSO-870	SOIL	Mar, 2000	Bi-214	88.00 ± 3.80	86.70	0.80 - 1.40
STSO-870	SOIL	Mar, 2000	Cs-137	324.00 ± 5.00	339.00	0.74 - 1.40
STSO-870	SOIL	Mar, 2000	K-40	872.00 ± 34.00	811.00	0.70 - 1.59
STSO-870	SOIL	Mar, 2000	Pb-212	93.70 ± 2.70	97.30	0.80 - 1.30
STSO-870	SOIL	Mar, 2000	Pb-214	100.10 ± 3.70	86.50	0.80 - 1.30
STSO-870	SOIL	Mar, 2000	Pu-238	19.80 ± 3.00	18.60	0.22 - 1.99
STSO-870	SOIL	Mar, 2000	Pu-239/40	8.10 ± 1.70	7.00	0.62 - 1.99
STSO-870	SOIL	Mar, 2000	Sr-90	13.60 ± 3.10	20.20	0.58 - 2.96
STVE-871	VEGETATION	Mar, 2000	Am-241	9.80 ± 0.90	10.40	0.58 - 2.86
STVE-871	VEGETATION	Mar, 2000	Co-60	46.50 ± 2.10	52.80	0.64 - 1.49
STVE-871	VEGETATION	Mar, 2000	Cs-137	1,872.00 ± 46.00	1,380.00	0.75 - 1.48
STVE-871	VEGETATION	Mar, 2000	K-40	506.40 ± 28.00	521.00	0.45 - 1.51
STVE-871	VEGETATION	Mar, 2000	Pu-239/40	14.30 ± 1.50	15.50	0.60 - 1.98
STVE-871	VEGETATION	Mar, 2000	Sr-90	1,198.00 ± 85.00	1,780.00	0.50 - 1.37
STAP-872	AIR FILTER	Mar, 2000	Co-57	5.90 ± 0.10	5.31	0.63 - 1.29
STAP-872	AIR FILTER	Mar, 2000	Co-60	5.90 ± 0.10	5.32	0.74 - 1.25
STAP-872	AIR FILTER	Mar, 2000	Cs-137	7.50 ± 0.10	6.10	0.72 - 1.32
STAP-872	AIR FILTER	Mar, 2000	Gr. Alpha	3.30 ± 0.10	3.02	0.82 - 1.58
STAP-872	AIR FILTER	Mar, 2000	Gr. Beta	2.70 ± 0.10	2.42	0.75 - 1.94
STAP-872	AIR FILTER	Mar, 2000	Mn-54	31.80 ± 0.30	27.20	0.76 - 1.33
STAP-872	AIR FILTER	Mar, 2000	Pu-238	0.06 ± 0.03	0.08	0.61 - 1.55
STAP-872	AIR FILTER	Mar, 2000	Pu-239/40	0.09 ± 0.01	0.09	0.67 - 1.58
STAP-872	AIR FILTER	Mar, 2000	Ru-106	3.50 ± 1.00	2.01	0.54 - 1.59
Result within activity ± error margin.						
STAP-872	AIR FILTER	Mar, 2000	Sr-90	0.31 ± 0.16	0.24	0.62 - 2.26
STAP-872	AIR FILTER	Mar, 2000	Uranium	0.12 ± 0.01	0.13	0.79 - 2.88
STW-874	WATER	Mar, 2000	Am-241	1.70 ± 0.22	1.95	0.66 - 1.56
STW-874	WATER	Mar, 2000	Co-60	51.00 ± 1.20	48.90	0.87 - 1.17

Table A-7. Environmental Measurements Laboratory Quality Assessment Program (EML)[a].

Lab Code	Sample Type	Date Collected	Analysis	Concentration[b] Laboratory result[c]	EML Result[d]	Control Limits[e]
STW-874	WATER	Mar, 2000	Cs-137	108.60 ± 1.80	103.00	0.87 - 1.17
STW-874	WATER	Mar, 2000	Fe-55	33.00 ± 1.20	33.10	0.27 - 1.62
STW-874	WATER	Mar, 2000	Gr. Alpha	1,217.00 ± 35.00	1,700.00	0.55 - 1.31
STW-874	WATER	Mar, 2000	Gr. Beta	792.00 ± 25.00	690.00	0.75 - 1.65
STW-874	WATER	Mar, 2000	H-3	147.00 ± 26.00	79.40	0.69 - 1.91
STW-874	WATER	Mar, 2000	Ni-63	101.00 ± 6.00	112.00	0.80 - 1.30
STW-874	WATER	Mar, 2000	Pu-238	0.75 ± 0.17	0.94	0.68 - 1.33
STW-874	WATER	Mar, 2000	Pu-239/40	0.99 ± 0.09	0.92	0.62 - 1.38
STW-874	WATER	Mar, 2000	Sr-90	4.46 ± 0.99	3.39	0.73 - 1.35
STW-874	WATER	Mar, 2000	Uranium	0.27 ± 0.02	1.00	0.40 - 1.45
Result reported was for U-234. Result for U (total); 0.58 ± 0.02 pCi/L.						
STSO-885	SOIL	Sep, 2000	Ac-228	78.00 ± 1.50	80.20	0.80 - 1.40
STSO-885	SOIL	Sep, 2000	Bi-212	73.00 ± 3.30	80.50	0.80 - 1.40
STSO-885	SOIL	Sep, 2000	Bi-214	91.00 ± 4.00	83.30	0.80 - 1.40
STSO-885	SOIL	Sep, 2000	Cs-137	925.70 ± 14.20	1,020.00	0.74 - 1.40
STSO-885	SOIL	Sep, 2000	K-40	713.60 ± 7.10	713.00	0.70 - 1.59
STSO-885	SOIL	Sep, 2000	Pb-212	66.10 ± 4.30	79.30	0.80 - 1.40
STSO-885	SOIL	Sep, 2000	Pb-214	100.10 ± 3.70	86.30	0.80 - 1.40
STSO-885	SOIL	Sep, 2000	Pu-239/40	18.40 ± 0.40	16.80	0.62 - 1.99
STSO-885	SOIL	Sep, 2000	Sr-90	39.90 ± 5.30	50.40	0.58 - 2.96
STSO-885	SOIL	Sep, 2000	Th-234	154.70 ± 9.30	148.00	0.80 - 1.40
STSO-885	SOIL	Sep, 2000	Uranium	254.30 ± 13.00	327.00	0.27 - 1.48
STW-886	WATER	Sep, 2000	Am-241	1.30 ± 0.20	1.19	0.66 - 1.56
STW-886	WATER	Sep, 2000	Co-60	71.90 ± 7.20	73.70	0.87 - 1.17
STW-886	WATER	Sep, 2000	Cs-137	62.70 ± 6.30	67.00	0.90 - 1.25
STW-886	WATER	Sep, 2000	H-3	92.30 ± 8.90	91.30	0.69 - 1.91
STW-886	WATER	Sep, 2000	Pu-238	0.70 ± 0.10	0.79	0.68 - 1.33
STW-886	WATER	Sep, 2000	Pu-239/40	0.60 ± 0.10	0.59	0.62 - 1.38
STW-886	WATER	Sep, 2000	Sr-90	4.60 ± 0.40	4.53	0.73 - 1.65
STW-886	WATER	Sep, 2000	Uranium	0.80 ± 0.10	0.92	0.40 - 1.45

Table A-7. Environmental Measurements Laboratory Quality Assessment Program (EML)[a].

Lab Code	Sample Type	Date Collected	Analysis	Concentration [b] Laboratory result[c]	EML Result[d]	Control Limits[e]
STW-887	WATER	Sep, 2000	Gr. Alpha	1,113.70 ± 17.90	1,070.00	0.55 - 1.31
STW-887	WATER	Sep, 2000	Gr. Beta	1,129.40 ± 16.70	950.00	0.75 - 1.65
STAP-888	AIR FILTER	Sep, 2000	Am-241	0.06 ± 0.01	0.03	0.62 - 1.93
STAP-888	AIR FILTER	Sep, 2000	Co-57	16.50 ± 0.60	14.50	0.63 - 1.29
STAP-888	AIR FILTER	Sep, 2000	Co-60	9.20 ± 0.40	8.43	0.74 - 1.25
STAP-888	AIR FILTER	Sep, 2000	Cs-137	8.80 ± 0.50	7.41	0.72 - 1.32
STAP-888	AIR FILTER	Sep, 2000	Mn-54	50.20 ± 2.30	43.20	0.76 - 1.42
STAP-888	AIR FILTER	Sep, 2000	Pu-238	0.03 ± 0.01	0.05	0.61 - 1.55
STAP-888	AIR FILTER	Sep, 2000	Pu-239/40	0.08 ± 0.01	0.07	0.67 - 1.58
STAP-888	AIR FILTER	Sep, 2000	Sr-90	3.30 ± 0.10	1.64	0.62 - 2.26
STAP-888	AIR FILTER	Sep, 2000	U-233/4	0.03 ± 0.00	0.04	0.79 - 2.88
STAP-888	AIR FILTER	Sep, 2000	U-238	0.03 ± 0.01	0.04	0.80 - 2.63
Result within activity ± error margin.						
STAP-888	AIR FILTER	Sep, 2000	Uranium	0.07 ± 0.01	0.08	0.79 - 2.88
STAP-889	AIR FILTER	Sep, 2000	Gr. Alpha	2.84 ± 0.01	2.35	0.82 - 1.58
STAP-889	AIR FILTER	Sep, 2000	Gr. Beta	2.08 ± 0.02	1.52	0.75 - 1.94
STVE-890	VEGETATION	Sep, 2000	Am-241	5.90 ± 1.20	5.60	0.58 - 2.86
STVE-890	VEGETATION	Sep, 2000	Cm-244	3.20 ± 0.10	3.60	0.40 - 1.87
STVE-890	VEGETATION	Sep, 2000	Co-60	29.40 ± 0.40	32.80	0.64 - 1.49
STVE-890	VEGETATION	Sep, 2000	Cs-137	739.30 ± 23.00	867.00	0.75 - 1.48
STVE-890	VEGETATION	Sep, 2000	K-40	597.50 ± 49.30	639.00	0.45 - 1.51
STVE-890	VEGETATION	Sep, 2000	Pu-239/40	4.50 ± 0.20	9.60	0.60 - 1.98
No reason for deviation was found with original result. The result of reanalysis; 12.1 ±1.1 pCi/g.						
STVE-890	VEGETATION	Sep, 2000	Sr-90	1,201.50 ± 117.30	1,150.00	0.50 - 1.37

[a] The Environmental Measurements Laboratory provides the following nuclear species : Air Filters, Soil, Vegetation and Water.

[b] Results are reported in Bq/L with the following exceptions: Air Filter results are reported in Bq/Filter, Soil results are reported in Bq/Kg, Vegetation results are reported in Bq/Kg.

[c] Laboratory results are reported as the mean of three determinations ± standard deviation.

[d] The EML result listed is the mean of replicate determinations for each nuclide±the standard error of the mean.

[e] The control limits are reported by EML as the ratio of Reported Value / EML value.

APPENDIX B

DATA REPORTING CONVENTIONS

Data Reporting Conventions

1.0. All activities, except gross alpha and gross beta, are decay corrected to collection time or the end of the collection period.

2.0. Single Measurements

Each single measurement is reported as follows: $x \pm s$

where: x = value of the measurement;

s = 2s counting uncertainty (corresponding to the 95% confidence level).

In cases where the activity is less than the lower limit of detection L, it is reported as: <L,

where L = the lower limit of detection based on 4.66s uncertainty for a background sample.

3.0. Duplicate analyses

3.1 Individual results: For two analysis results; $x_1 \pm s_1$ and $x_2 \pm s_2$

Reported result: $x \pm s$; where $x = (1/2)(x_1 + x_2)$ and $s = (1/2)\sqrt{s_1^2 + s_2^2}$

3.2. Individual results: $<L_1$, $<L_2$ Reported result: <L, where L = lower of L_1 and L_2

3.3. Individual results: $x \pm s$, <L Reported result: $x \pm s$ if $x \geq L$; <L otherwise.

4.0. Computation of Averages and Standard Deviations

4.1 Averages and standard deviations listed in the tables are computed from all of the individual measurements over the period averaged; for example, an annual standard deviation would not be the average of quarterly standard deviations. The average $\bar{x}$ and standard deviation s of a set of n numbers $x_1, x_2 \ldots x_n$ are defined as follows:

$$\bar{x} = \frac{1}{n} \sum x \qquad s = \sqrt{\frac{\sum (x - \bar{x})^2}{n-1}}$$

4.2 Values below the highest lower limit of detection are not included in the average.

4.3 If all values in the averaging group are less than the highest LLD, the highest LLD is reported.

4.4 If all but one of the values are less than the highest LLD, the single value x and associated two sigma error is reported.

4.5 In rounding off, the following rules are followed:

4.5.1. If the figure following those to be retained is less than 5, the figure is dropped, and the retained figures are kept unchanged. As an example, 11.443 is rounded off to 11.44.

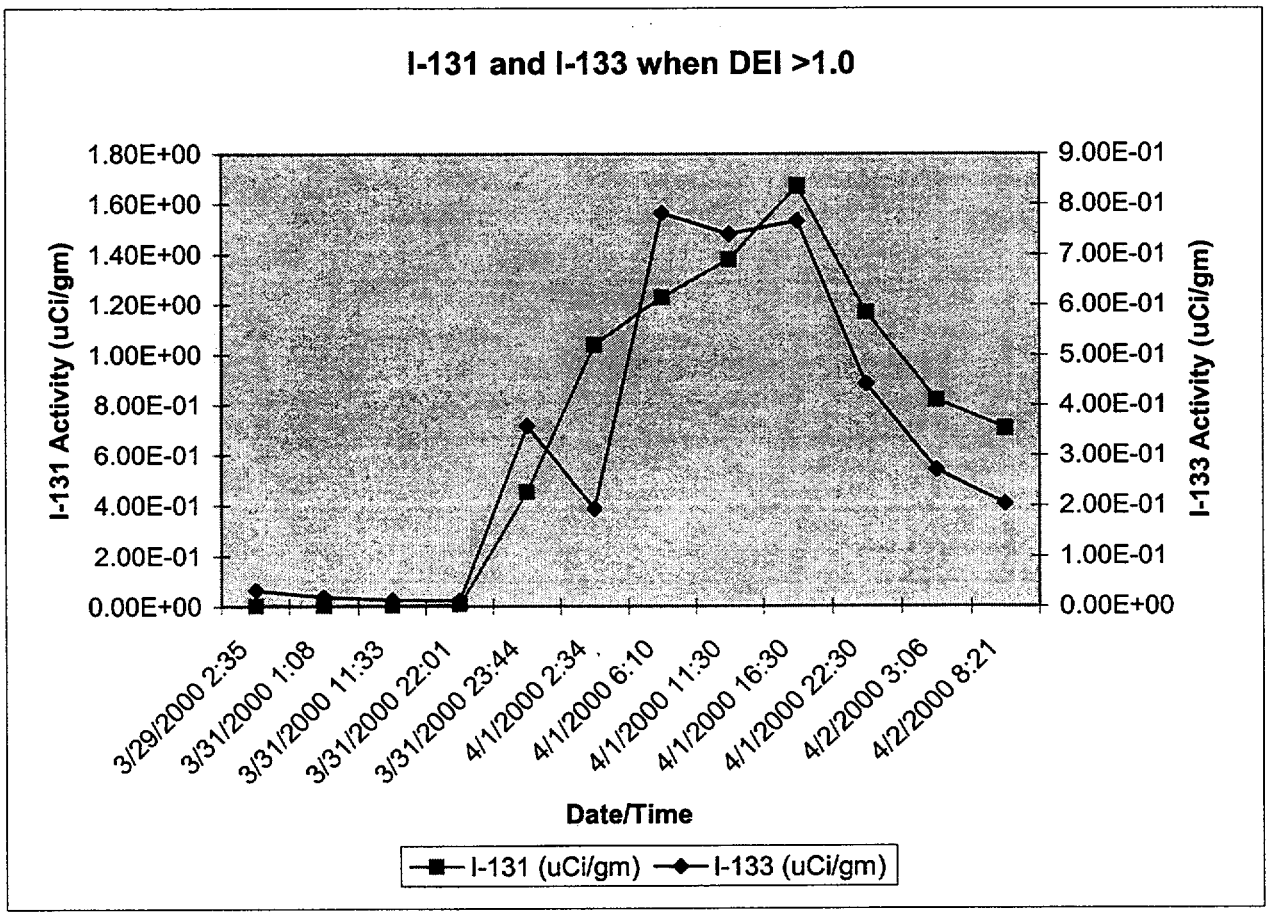
4.5.2. If the figure following those to be retained is equal to or greater than 5, the figure is dropped and the last retained figure is raised by 1. As an example, 11.445 is rounded off to 11.45.

APPENDIX C

TECHNICAL SPECIFICATION 2.1.3

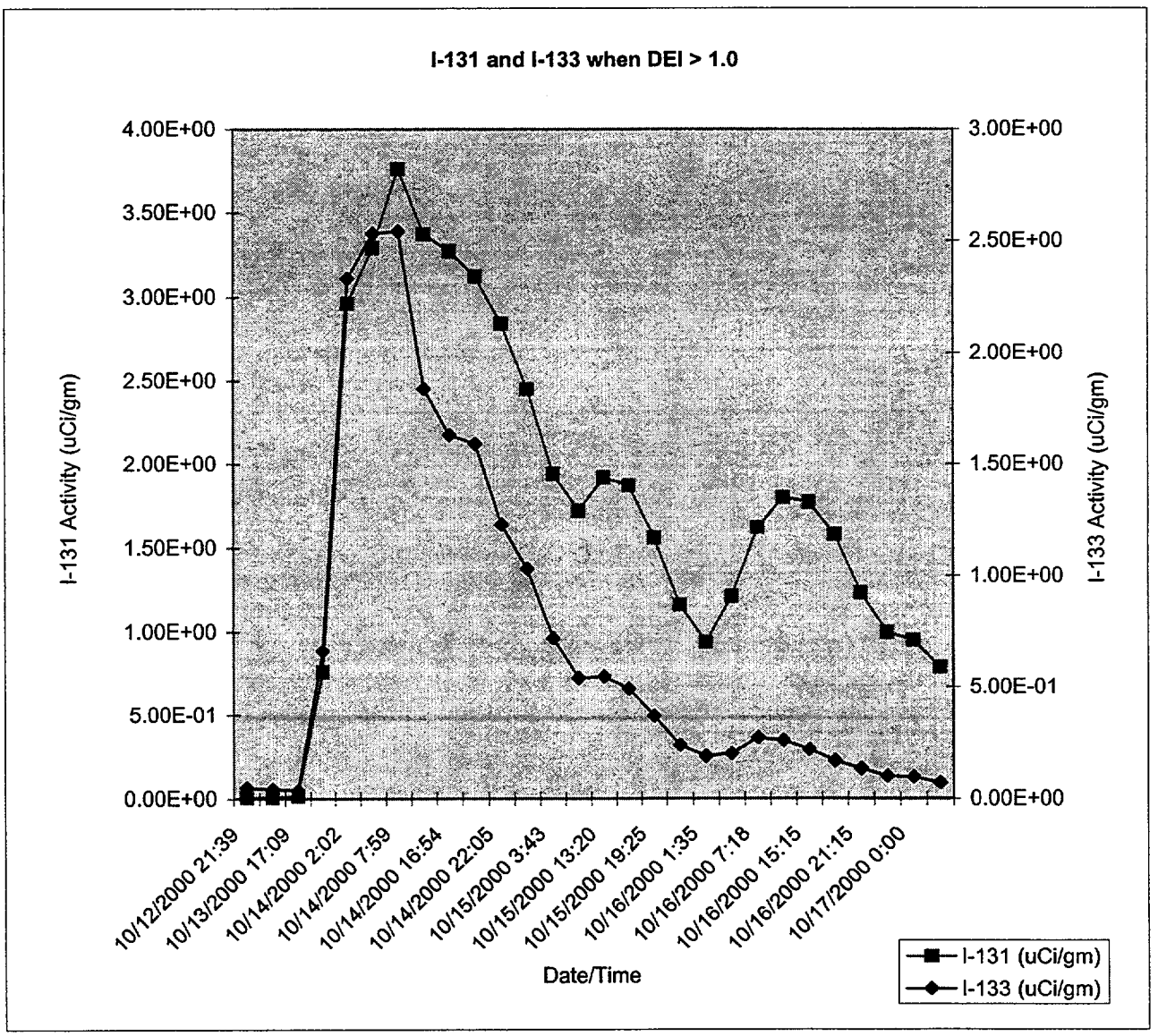
REACTOR COOLANT DOSE EQUIVALENT IODINE
ABOVE TECHNICAL SPECIFICATION LIMIT

The following information is provided per Technical Specification 2.1.3(4):
On 4/1/2000 RCS Dose Equivalent Iodine (DEI) exceeded the Technical Specification limit of 1.0 uCi/g for approximately 25 hours.



Day/time	DEI (uCi/gm)	Purification System Letdown Flow	Reactor Power	I-131 (uCi/gm)	I-133 (uCi/gm)
3/29/2000 2:35	2.10E-02	33.3	100	4.05E-03	3.30E-02
3/31/2000 1:08	1.34E-02	74.6	69	2.63E-03	1.97E-02
3/31/2000 11:33	1.10E-02	73.7	40	3.08E-03	1.31E-02
3/31/2000 22:01	1.53E-02	73.0	10	8.97E-03	1.25E-02
3/31/2000 23:44	5.74E-01	73.0	0	4.55E-01	3.58E-01
4/1/2000 2:34	1.27E+00	71.2	0	1.04E+00	1.94E-01
4/1/2000 6:10	1.48E+00	75.0	0	1.23E+00	7.82E-01
4/1/2000 11:30	1.61E+00	0.0	0	1.38E+00	7.40E-01
4/1/2000 16:30	1.90E+00	0.0	0	1.67E+00	7.66E-01
4/1/2000 22:30	1.31E+00	71.2	0	1.17E+00	4.43E-01
4/2/2000 3:06	9.05E-01	74.0	0	8.22E-01	2.71E-01
4/2/2000 8:21	7.70E-01	72.4	0	7.07E-01	2.04E-01

The following information is provided per Technical Specification 2.1.3(4):
On 10/14/2000 RCS Dose Equivalent Iodine (DEI) exceeded the Technical Specification limit of 1.0 uCi/g for approximately 60 hours.



Day/time	DEI (uCi/gm)	Purification System Letdown Flow	Reactor Power	I-131 (uCi/gm)	I-133 (uCi/gm)
10/12/2000 21:39	3.38E-02	71.3	90	9.25E-03	4.80E-02
10/13/2000 4:05	3.07E-02	72.1	74	9.36E-03	4.20E-02
10/13/2000 17:09	3.42E-02	70.3	36	1.70E-02	3.70E-02
10/14/2000 0:40	9.79E-01	70.1	8	7.60E-01	6.63E-01
10/14/2000 2:02	3.71E+00	70.4	0	2.96E+00	2.33E+00
10/14/2000 3:45	4.10E+00	72.5	0	3.29E+00	2.53E+00
10/14/2000 7:59	4.54E+00	72.0	0	3.76E+00	2.54E+00
10/14/2000 14:24	3.93E+00	73.3	0	3.37E+00	1.84E+00
10/14/2000 16:54	3.75E+00	72.0	0	3.27E+00	1.63E+00
10/14/2000 17:42	3.58E+00	72.3	0	3.12E+00	1.59E+00
10/14/2000 22:05	3.19E+00	72.0	0	2.84E+00	1.23E+00
10/15/2000 0:31	2.74E+00	77.1	0	2.45E+00	1.03E+00
10/15/2000 3:43	2.14E+00	74.0	0	1.94E+00	7.21E-01
10/15/2000 8:40	1.87E+00	0.0	0	1.72E+00	5.41E-01
10/15/2000 13:20	2.08E+00	0.0	0	1.92E+00	5.49E-01
10/15/2000 15:20	2.01E+00	35.0	0	1.87E+00	4.94E-01
10/15/2000 19:25	1.66E+00	36.5	0	1.56E+00	3.70E-01
10/15/2000 23:25	1.23E+00	36.5	0	1.16E+00	2.39E-01
10/16/2000 1:35	9.89E-01	34.8	0	9.36E-01	1.90E-01
10/16/2000 5:15	1.27E+00	0.0	0	1.21E+00	2.02E-01
10/16/2000 7:18	1.71E+00	0.0	0	1.62E+00	2.73E-01
10/16/2000 11:15	1.88E+00	0.0	0	1.80E+00	2.61E-01
10/16/2000 15:15	1.83E+00	25.0	0	1.77E+00	2.20E-01
10/16/2000 19:25	1.63E+00	50.0	0	1.58E+00	1.70E-01
10/16/2000 21:15	1.27E+00	50.0	0	1.23E+00	1.35E-01
10/16/2000 22:59	1.02E+00	50.0	0	9.94E-01	1.02E-01
10/17/2000 0:00	9.48E-01	50.0	0	9.48E-01	9.76E-02
10/17/2000 2:05	8.04E-01	50.0	0	7.84E-01	7.18E-02