Omaha Public Power District
Fort Calhoun Nuclear Station

2007
Radiological Operating Environmental Report

OMAHA PUBLIC POWER DISTRICT

FORT CALHOUN STATION

RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT

TECHNICAL SPECIFICATION 5.9.4.b

January 01, 2007 – December 31, 2007

Annual Radiological Environmental Operating Report

This report is submitted in accordance with Section 5.9.4.b of the Technical Specifications of Fort Calhoun Station Unit No. 1, Facility Operating License DPR-40 for the period January 01, 2007 through December 31, 2007.

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

In accordance with Technical Specification 5.9.4.b, herein is the Fort Calhoun Station (FCS) Annual Radiological Environmental Operating Report for year 2007. The data provided is consistent with the objectives as specified in Section 5.2.2 of the Offsite Dose Calculation Manual (ODCM), "Annual Radiological Environmental Operating Report." The report is presented as follows:

1) An introductory discussion of the implementation of the Radiological Environmental Monitoring Program (REMP), including program observations and environmental impact relevant to the operation of FCS.

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

3) A statistical evaluation of REMP data is summarized in Table 2.0, in accordance with Regulatory Guide 4.8, Table 1. For each type of sample media and analysis, Table 2.0 presents data separately for 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. Locations with the highest annual mean are specified by code, name, and by distance and direction from the center of plant reactor containment building.

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

5) Review of Environmental Inc. Quality Assurance Program

6) Appendix A describes the Interlaboratory Comparison Program

7) Appendix B describes the vendor Data Reporting Conventions utilized

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

9) Appendix D is the Sample Location Maps

INTRODUCTION

Radiological Environmental Monitoring Program (REMP) – 2007

This report gives the results of the Radiological Environmental Monitoring Program (REMP) for the year 2007. The REMP is a requirement of the Fort Calhoun Station (FCS) operating license. It was initiated prior to plant operation in 1973.

The main purpose of the REMP is to ensure public safety by monitoring plant discharges and assessing the effect, if any, of plant operations, on the environment. Samples are collected that would account for various exposure pathways such as ingestion, inhalation, adsorption and direct exposure. Samples collected on a regular basis include: air, water, milk, vegetation, fish, sediment, and food crops. Direct radiation is measured by thermoluminescent dosimeters (TLDs). These samples and TLDs are sent to an independent vendor laboratory for analysis. The vendor uses analytical methods that are sensitive enough to detect a level of activity far below that which would be considered harmful. Locations for sample collection are based on radiological and meteorological data from the Annual Effluent Release Report and information obtained from the Environmental Land Use Survey.

Most samples, particularly indicator samples, are collected in a circular area within a five-mile radius of plant containment. (However, control locations are usually outside of five miles.) This circle is divided into sixteen equal sectors, each assigned an identification letter "A" through "R" (note: letters "I" and "O" are not used, as they may be mistaken for the numbers "1" and "0"). Sector "A" is centered on North or zero degrees. Sectors are also given directional labels such as "West-Southwest" ("WSW"). Sample locations are listed by number along with their respective distances and direction from plant containment, in the Offsite Dose Calculation Manual (ODCM).

When assessing sample results, data from indicator locations (those most likely to be effected by plant operations) are compared to those from control locations (those least or not likely to be effected). Results from an indicator location which were significantly higher than those from a control location, could indicate a plant-attributable effect, and could require additional investigation.

The results of the sample 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." Sample collection was conducted by plant chemistry/environmental staff. A contract vendor (Environmental Inc., Northbrook, Illinois) performed sample analyses, preparation of monthly reports and the statistical evaluation of sample results. All vendor analysis techniques met the sensitivity requirements as stated in the ODCM.

Results for 2007, were within expected ranges and compared closely with historical results. The following is a review of specific sample results.

1) **Ambient Gamma Radiation**

Ambient gamma radiation is measured by thermoluminescent dosimeters (TLDs) provided by the vendor laboratory. These dosimeters contain calcium sulfate phosphors and are processed quarterly.

During the TLD collection on July 2, 2007, a TLD at location OTP-K-(I) which is 0.9 miles southeast of the Plant was found vandalized and the TLD missing. This was recorded as a missing sample and addressed in accordance with section 4.1.1.A-7 of the Offsite Dose Calculation Manual.

2) **Milk/Pasture**

Milk samples are collected every two weeks from the beginning of May through September. Indicator samples are collected from a herd of milk goats at a family farm located approximately 0.7 miles from the plant in Sector K (South-Southwest). The control samples are collected from a commercial dairy cow herd located approximately 9.9 miles from the plant in Sector J (South). These locations are unchanged from last year.

A milk sample collected on September 6, 2007, was damaged during shipping to the vendor laboratory for analysis. The vendor lab reported that the shipping box and plastic container had been significantly damaged and the milk sample was lost.

Because FCS environmental personnel were not notified within ±25% of the sample frequency time, a resample could not be substituted. This was recorded as a missing sample and addressed in accordance with section 4.1.1.A-7 of the Offsite Dose Calculation Manual.

All milk sample results for Iodine-131, Cesium-134, Cesium-137 and other gammas were at the LLD for both indicator and control locations. No plant-related effects were observed.

One pasture grass sample was collected on May 4, 2007, at Bansen Farm, in lieu of milk which was unavailable. All results were at the LLD.

3) **Fish**

Fish are collected on an annual basis. Control samples are collected at a location approximately twenty miles upstream of the plant (river miles 665-667). Indicator samples are collected in the immediate vicinity of the power plant (river miles 644-646). Several species of fish, important to commercial and recreational interest, representing all levels of the aquatic food chain are collected at both locations.

All sample results are within the range of historical data. Results from both control and indicator locations were less than LLD for all gamma emitters, indicating no plant-related effects.

4) **Food Crop**

Based on the results of the biennial Land Use Survey, the nearest high deposition pathway for food crops is the Ellis Acreage in Sector J (0.7 miles, 180°). Accordingly, vegetable samples were collected at Ellis Acreage for the purposes of the 2007 REMP.

Samples were comparable with historical results and within the range of results reported from the control location garden at Mohr Dairy.

All results were at the LLD for all non-naturally occurring radionuclides. No plant-related effects were observed.

5) **Sediment**

River sediment samples are collected twice a year at an upstream control location and a downstream indicator location. All results were at the LLD, and no plant-related effects were observed.

6) **Air Monitoring**

Air sample results for 2007 were well within historical limits for all locations. Additionally, all indicator locations showed results very similar to the control locations. No plant-related effects were observed.

Five equipment problems occurred during the year that affected air sample collection.

During sample collection on April 11, 2007, for location OAP-K-(I), the filter hold down ring was found to have vibrated loose allowing the filter paper to slide out of place. However, the charcoal canister was considered an adequate sample and sent to the vendor for radioactive iodine analysis. Iodine results on the charcoal canister were at the LLD. Air samples collected in adjacent sectors had normal results. The filter sample was considered lost and addressed in accordance with section 4.1.1.A-7 of the Offsite Dose Calculation Manual.

During sample collection at location OAP-B-(I) on April 25, 2007, a disparity was found between the elapsed time indicator on the unit which read 151 hours and the on/off times as recorded by the technician, 170 hours of run time. The time indicator on the unit was replaced by the technician at that time. The more conservative reading of 151 hours was used to calculate total sample volume, as allowed by procedure. Enough sample was collected to meet LLD requirements.

Also for the same week and location as above a quality control duplicate sample was independently collected. The duplicate unit's elapsed time indicator showed no elapsed time at all, though the unit was running when the technician arrived. The air sampler was returned to the shop for replacement of the faulty timer. The sample was processed using the logged on/off times as recorded by the technician.

During sample collection on June 20, 2007, and August 1, 2007, timer issues occurred for location OAP-I-(I). Adequate samples were collected and conservative values were used to calculate total sample volume.

Due to the number of timer problems in 2007, Maintenance has evaluated the age and lifespan of the existing inventory of sample pumps and timers. Three units were found to be more than ten years old. Due to age and run time, these sample pumps and timers are being deactivated. Six new pumps have been purchased to replace aging equipment.

7) **Surface Water**

Water samples are collected upstream of the plant (control location) as well as half-mile downstream, and at a municipal water treatment plant on the north edge of Omaha.

Results for Cs-134, Cs-137, and other gammas were all less than LLD. Tritium results were also less than LLD. No plant-related effects were detected.

8) **Ground Water**

Quarterly residential well water samples for tritium analysis were added to the Environmental program in the third quarter of 2007. Samples are collected at the following locations: Station No. 15, Smith Farm, Station No. 20, Mohr Dairy, Station No. 33, Bansen Farm and Station No. 40, Herber Acreage. All sample results to date, have been at the LLD except gross beta due to naturally occurring radionuclides. Gross beta results have ranged from a low of 3.2 pCi/liter to a high of 27.2 pCi/liter, with an average gross beta for the year of 11.9 pCi/liter.

Table 1.0 Sample collection program.

Sample Class	Collection Frequency	Number of Sample Locations	Number of Samples Collected This Period
Background Radiation (TLDs)	Quarterly	15	59
Air Particulates	Weekly	6	311
Airborne Iodine	Weekly	6	311
Milk	Semimonthly	2	20
Surface Water	Monthly	3	36
Ground Water	Quarterly	4	8
Fish	Annually	2	5
Sediment	Semiannually	2	4
Food Crops	Annually	2	5
		TOTAL	759

Table 2. Radiological Environmental Monitoring Program Summary — Reporting Period: January-December, 2007

Name of Facility: Fort Calhoun Nuclear Power Station - Unit 1 — Docket No. 50-285

Location of Facility: Washington, Nebraska
(County, State)

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 59	0.5	1.4 (55/55) (1.2-1.7)	OTD-J-(I), Ellis 0.7 mi. @ 180 °	1.6 (4 /4) (1.4-1.7)	1.3 (4/4) (1.2-1.3)	0
Airborne Particulates (pCi/m^3)	GB 311	0.005	0.028 (259/259) (0.012-0.078)	OAP-B-(I) 0.6 miles SW	0.032 (52 /52) (0.014-0.078)	0.029 (52/52) (0.012-0.063)	0
	GS 24						
	Cs-134	0.001	< LLD	-	-	< LLD	0
	Cs-137	0.001	< LLD	-	-	< LLD	0
	Other Gammas	0.001	< LLD	-	-	< LLD	0
Airborne Iodine (pCi/m^3)	I-131 311	0.07	< LLD	-	-	< LLD	0
Milk (pCi/L)	I-131 20	0.5	< LLD	-	-	< LLD	0
	GS 20						
	K-40	150	1732 (9/9) (1502-1895)	Bansen Farm 0.7 mi. @ 207 °	1732 (9/9) (1502-1895)	1455 (11/11) (1342-1549)	0
	Cs-134	15	< LLD	-	-	< LLD	0
	Cs-137	15	< LLD	-	-	< LLD	0
	Other Gammas	15	< LLD	-	-	< LLD	0
Pasture Grass (milk substitute) pCi/g wet	GS 1						
	Mn-54	0.010	< LLD	-	-	< LLD	0
	Co-58	0.014	< LLD	-	-	< LLD	0
	Co-60	0.008	< LLD	-	-	< LLD	0
	Fe-59	0.026	< LLD	-	-	< LLD	0
	Zn-65	0.016	< LLD	-	-	< LLD	0
	Zr-Nb-95	0.006	< LLD	-	-	< LLD	0
	I-131	0.014	< LLD	-	-	< LLD	0
	Cs-134	0.011	< LLD	-	-	< LLD	0
	Cs-137	0.012	< LLD	-	-	< LLD	0
	Ba-La-140	0.007	< LLD	-	-	< LLD	0
Surface Water (pCi/L)	GS 36						
	Cs-134	15	< LLD	-	-	< LLD	0
	Cs-137	15	< LLD	-	-	< LLD	0
	Other Gammas	15	< LLD	-	-	< LLD	0
	H-3 12	300	< LLD	-	-	< LLD	0

Table 2. Radiological Environmental Monitoring Program Summary | Reporting Period | January-December, 2007

Name of Facility: Fort Calhoun Nuclear Power Station - Unit 1 | Docket No. 50-285

Location of Facility: Washington, Nebraska

(County, State)

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]
Ground Water	GB 8	2.0	9.3 (8/8) (3.2-27.2)	Smith Farm OGW-A-(I) 1.99 mi. @ 134° SE	22.1 (2/2) (17.0 - 27.2)	Mohr Dairy OGW-D-(C) 9.86 mi. @ 186° S	0
	H-3 8	300	< LLD	-	-	< LLD	0
	Sr-90 8	0.7	< LLD	-	-	< LLD	0
	GS 8						
(pCi/L)	Cs-134	15	< LLD	-	-	< LLD	0
	Cs-137	15	< LLD	-	-	< LLD	0
	Other Gammas	15	< LLD	-	-	< LLD	0
Fish	GS 5						
(pCi/g wet)	Mn-54	0.023	< LLD	-	-	< LLD	0
	Co-58	0.028	< LLD	-	-	< LLD	0
	Co-60	0.023	< LLD	-	-	< LLD	0
	Fe-59	0.053	< LLD	-	-	< LLD	0
	Zn-65	0.045	< LLD	-	-	< LLD	0
	Ru-103	0.033	< LLD	-	-	< LLD	0
	Cs-134	0.014	< LLD	-	-	< LLD	0
	Cs-137	0.022	< LLD	-	-	< LLD	0
Sediment	GS 4						
pCi/g dry	Mn-54	0.029	< LLD	-	-	< LLD	0
	Co-58	0.035	< LLD	-	-	< LLD	0
	Co-60	0.035	< LLD	-	-	< LLD	0
	Fe-59	0.087	< LLD	-	-	< LLD	0
	Zn-65	0.083	< LLD	-	-	< LLD	0
	Cs-134	0.049	< LLD	-	-	< LLD	0
	Cs-137	0.037	< LLD	-	-	< LLD	0
Food Crops	GS 5						
(pCi/g wet)	Mn-54	0.009	< LLD	-	-	< LLD	0
	Co-58	0.012	< LLD	-	-	< LLD	0
	Co-60	0.010	< LLD	-	-	< LLD	0
	Fe-59	0.014	< LLD	-	-	< LLD	0
	Zn-65	0.019	< LLD	-	-	< LLD	0
	Zr-Nb-95	0.012	< LLD	-	-	< LLD	0
	Cs-134	0.008	< LLD	-	-	< LLD	0
	Cs-137	0.008	< LLD	-	-	< LLD	0
	Ba-La-140	0.011	< 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.

Table 3.0 Listing of Missed Samples (samples scheduled but not collected)

Sample Type	Date	Location	Reason
AP	04-11-07	OAP-K	Missing
TLD	07-02-07	OTD-K	TLD stolen in field
MI	09-06-07	Bansen Farm	Sample damaged in transit

Review of Environmental Inc., Quality Assurance Program

Fort Calhoun Station contracts with Environmental Inc., Midwest Laboratory (vendor lab) to perform radioanalysis of environmental samples. Environmental Inc. participates in interlaboratory comparison (cross-check) programs as part of its quality control program. These programs are operated by such agencies as the Department of Energy, which supply blind-spike samples such as milk or water containing concentrations of radionuclides unknown to the testing laboratory. This type of program provides an independent check of the analytical laboratory's procedures and processes, and provides indication of possible weaknesses. In addition, Environmental Inc. has its own in-house QA program of blind-spike and duplicate analyses.

Of the vendor's In-house spiked samples, only one failure was recorded for 2007. Sample SPW-2909, Fe-55, was originally analyzed as 11137.00 pCi/L, slightly lower than the acceptance criteria of 11417.20-17125.80 pCi/L. A recount of the sample was within limits.

Two samples from the Department of Energy's Mixed Analyte Performance Evaluation Program were initially analyzed slightly higher than the control limits allowed. An Am-241 sample was counted as 2.80 pCi/L as opposed to an upper limit of 2.22 pCi/L. A recount of 2.08 pCi/L was within limits. The second sample, also Am-241, was first counted at 46.40Bq/kg, with an upper control limit of 45.20 Bq/kg. The sample was recounted on a lower background detector, resulting in a count of 41.40 Bq/kg, which was within limits.

The final QA sample was part of the Environmental Resource Associates Interlaboratory Comparison Cross-check Program. An air filter sample of Cs-137 was counted as less than 345.30 pCi/L, with an upper control limit of 336 pCi/L. A bias of >20% was observed in the gamma results for air filter. A composite filter geometry was used in the calculations versus a single filter geometry. A recalculation yielded a result of 305.80 pCi/filter, and was within control limits.

These results indicate the vendor's ability to self-identify and correct any deviations from acceptable or expected results. These test results had no impact on Fort Calhoun samples and were documented by the vendor.

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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 through December, 2007

Appendix A

Interlaboratory Comparison Program Results

Environmental, Inc., 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 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.

Results in Table A-1 were obtained through participation in the environmental sample crosscheck program administered by Environmental Resources Associates, serving as a replacement for studies conducted previously by the U.S. EPA Environmental Monitoring Systems Laboratory, Las Vegas, Nevada.

The results in Table A-2 list results for thermoluminescent dosimeters (TLDs), via International Intercomparison of Environmental Dosimeters, when available, and internal laboratory testing.

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 lists REMP specific analytical results from 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.
Complete analytical data for duplicate analyses is available upon request.

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

Results in Table A-7 were obtained through participation in the environmental sample crosscheck program administered by Environmental Resources Associates, serving as a replacement for studies conducted previously by the Environmental Measurement Laboratory Quality Assessment Program (EML).

Attachment A lists acceptance criteria for "spiked" samples.

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

Attachment A

ACCEPTANCE CRITERIA FOR "SPIKED" SAMPLES

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

Analysis	Level	One standard deviation for single determination
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	$\pm 1\sigma = 169.85 \times (\text{known})^{0.0933}$ 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	Date	Analysis	Concentration (pCi/L) Laboratory Result[b]	ERA Result[c]	Control Limits	Acceptance
STW-1121	04/09/07	Sr-89	30.7 ± 4.3	35.4	26.7 - 44.1	Pass
STW-1121	04/09/07	Sr-90	39.3 ± 1.8	42.1	33.4 - 50.8	Pass
STW-1122	04/09/07	Ba-133	30.0 ± 2.4	29.3	20.6 - 38.0	Pass
STW-1122	04/09/07	Co-60	118.5 ± 3.9	119.0	109.0 - 129.0	Pass
STW-1122	04/09/07	Cs-134	52.6 ± 2.3	54.3	45.6 - 63.0	Pass
STW-1122	04/09/07	Cs-137	49.5 ± 3.8	50.3	41.6 - 59.0	Pass
STW-1122	04/09/07	Zn-65	91.7 ± 6.3	88.6	73.3 - 104.0	Pass
STW-1123	04/09/07	Gr. Alpha	33.8 ± 3.5	56.5	32.0 - 81.0	Pass
STW-1123	04/09/07	Gr. Beta	24.2 ± 2.3	25.3	16.6 - 34.0	Pass
STW-1124	04/09/07	I-131	19.2 ± 1.2	18.9	13.7 - 24.1	Pass
STW-1125	04/09/07	H-3	7540.0 ± 255.0	8060.0	6660.0 - 9450.0	Pass
STW-1125	04/09/07	Ra-226	13.0 ± 0.6	13.4	9.9 - 16.9	Pass
STW-1125	04/09/07	Ra-228	19.9 ± 2.7	18.2	10.3 - 26.1	Pass
STW-1125	04/09/07	Uranium	4.5 ± 0.2	4.6	0.0 - 9.8	Pass
STW-1127	07/09/07	Sr-89	51.7 ± 5.0	58.2	49.5 - 66.9	Pass
STW-1127	07/09/07	Sr-90	21.4 ± 2.3	19.0	10.3 - 27.7	Pass
STW-1128	07/09/07	Ba-133	19.4 ± 2.2	19.4	10.7 - 28.1	Pass
STW-1128	07/09/07	Co-60	32.8 ± 2.0	33.5	24.8 - 42.2	Pass
STW-1128	07/09/07	Cs-134	67.0 ± 2.9	68.9	60.2 - 77.6	Pass
STW-1128	07/09/07	Cs-137	61.6 ± 3.8	61.3	52.6 - 70.0	Pass
STW-1128	07/09/07	Zn-65	55.6 ± 7.5	54.6	45.2 - 64.0	Pass
STW-1129	07/09/07	Gr. Alpha	19.2 ± 1.6	27.1	15.4 - 38.8	Pass
STW-1129	07/09/07	Gr. Beta	9.1 ± 0.9	11.5	2.8 - 20.2	Pass
STW-1130	07/09/07	Ra-226	7.0 ± 0.5	7.7	5.7 - 9.7	Pass
STW-1130	07/09/07	Ra-228	9.2 ± 2.3	9.1	5.2 - 13.1	Pass
STW-1130	07/09/07	Uranium	23.9 ± 1.1	25.1	19.9 - 30.3	Pass
STW-1131	10/05/07	Sr-89	27.3 ± 3.3	27.4	19.3 - 33.9	Pass
STW-1131	10/05/07	Sr-90	17.7 ± 1.2	18.2	12.9 - 21.6	Pass
STW-1132	10/05/07	Ba-133	12.2 ± 3.3	12.6	8.6 - 15.5	Pass
STW-1132	10/05/07	Co-60	23.8 ± 1.4	23.2	19.9 - 28.3	Pass
STW-1132	10/05/07	Cs-134	70.5 ± 4.2	71.1	58.0 - 78.2	Pass
STW-1132	10/05/07	Cs-137	178.2 ± 3.3	180.0	162.0 - 200.0	Pass
STW-1132	10/05/07	Zn-65	263.9 ± 6.9	251.0	226.0 - 294.0	Pass
STW-1133	10/05/07	Gr. Alpha	54.7 ± 2.1	58.6	30.6 - 72.9	Pass
STW-1133	10/05/07	Gr. Beta	11.9 ± 0.9	9.7	4.3 - 18.2	Pass
STW-1134	10/05/07	I-131	33.0 ± 1.5	28.9	24.0 - 33.8	Pass
STW-1135	10/05/07	H-3	9965.0 ± 250.0	9700.0	8430.0 - 10700.0	Pass
STW-1135	10/05/07	Ra-226	12.7 ± 0.2	12.9	9.6 - 14.9	Pass
STW-1135	10/05/07	Ra-228	19.6 ± 2.4	17.9	12.0 - 21.5	Pass
STW-1135	10/05/07	Uranium	27.3 ± 1.1	27.5	22.1 - 30.8	Pass

[a] Results obtained by Environmental, Inc., Midwest Laboratory as a participant in the crosscheck program for proficiency testing in drinking water conducted by Environmental Resources Associates (ERA).

[b] Unless otherwise indicated, the laboratory result is given as the mean ± standard deviation for three determinations.

[c] 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 Dosimetry, (TLD, $CaSO_4$: Dy Cards).

Lab Code	Date	Description	Known Value (mR)	Lab Result ± 2 sigma (mR)	Control Limits (mR)	Acceptance
Environmental, Inc.						
2007-1	7/13/2007	30 cm.	54.25	60.56 ± 5.54	37.98 - 70.53	Pass
2007-1	7/13/2007	40 cm.	30.51	34.23 ± 0.96	21.36 - 39.66	Pass
2007-1	7/13/2007	50 cm.	19.53	17.95 ± 1.86	13.67 - 25.39	Pass
2007-1	7/13/2007	60 cm.	13.56	16.61 ± 0.60	9.49 - 17.63	Pass
2007-1	7/13/2007	70 cm.	9.96	9.72 ± 0.90	6.97 - 12.95	Pass
2007-1	7/13/2007	80 cm.	7.63	7.79 ± 0.33	5.34 - 9.92	Pass
2007-1	7/13/2007	90 cm.	6.03	5.53 ± 0.72	4.22 - 7.84	Pass
2007-1	7/13/2007	100 cm.	4.88	5.32 ± 0.17	3.42 - 6.34	Pass
2007-1	7/13/2007	110 cm.	4.03	3.49 ± 0.14	2.82 - 5.24	Pass
2007-1	7/13/2007	120 cm.	3.39	2.64 ± 0.14	2.37 - 4.41	Pass
2007-1	7/13/2007	150 cm.	2.17	2.13 ± 0.87	1.52 - 2.82	Pass
Environmental, Inc.						
2007-2	11/12/2007	30 cm.	54.37	65.47 ± 5.25	38.06 - 70.68	Pass
2007-2	11/12/2007	40 cm.	30.59	37.43 ± 2.18	21.41 - 39.77	Pass
2007-2	11/12/2007	60 cm.	13.59	15.18 ± 0.50	9.51 - 17.67	Pass
2007-2	11/12/2007	70 cm.	9.99	12.18 ± 0.46	6.99 - 12.99	Pass
2007-2	11/12/2007	80 cm.	7.65	8.74 ± 0.39	5.36 - 9.95	Pass
2007-2	11/12/2007	90 cm.	6.04	5.89 ± 0.25	4.23 - 7.85	Pass
2007-2	11/12/2007	110 cm.	4.04	4.13 ± 0.41	2.83 - 5.25	Pass
2007-2	11/12/2007	120 cm.	3.4	2.92 ± 0.13	2.38 - 4.42	Pass
2007-2	11/12/2007	120 cm.	3.4	2.91 ± 0.31	2.38 - 4.42	Pass
2007-2	11/12/2007	150 cm.	2.17	1.95 ± 0.72	1.52 - 2.82	Pass
2007-2	11/12/2007	180 cm.	1.51	1.38 ± 0.05	1.06 - 1.96	Pass

TABLE A-3. In-House "Spike" Samples

Lab Code [b]	Date	Analysis	Concentration (pCi/L)[a] Laboratory results 2s, n=1 [c]	Known Activity	Control Limits [d]	Acceptance
W-30707	3/7/2007	Gr. Alpha	19.51 ± 0.40	20.08	10.04 - 30.12	Pass
W-30707	3/7/2007	Gr. Beta	67.45 ± 0.49	65.73	55.73 - 75.73	Pass
SPAP-1566	3/23/2007	Cs-134	25.35 ± 1.31	27.82	17.82 - 37.82	Pass
SPAP-1566	3/23/2007	Cs-137	107.52 ± 3.02	116.48	104.83 - 128.13	Pass
SPW-1568	3/23/2007	H-3	65595.00 ± 672.00	71118.00	56894.40 - 85341.60	Pass
SPW-1678	3/28/2007	Tc-99	28.44 ± 1.12	32.35	20.35 - 44.35	Pass
SPW-1595	4/5/2007	Cs-134	54.48 ± 2.12	54.99	44.99 - 64.99	Pass
SPW-1595	4/5/2007	Cs-137	59.03 ± 2.94	58.19	48.19 - 68.19	Pass
SPW-1595	4/5/2007	I-131(G)	83.11 ± 3.51	82.07	72.07 - 92.07	Pass
SPW-1595A	4/5/2007	I-131	78.40 ± 1.10	82.07	65.66 - 98.48	Pass
SPW-1595B	4/5/2007	I-131	78.97 ± 1.10	82.07	65.66 - 98.48	Pass
SPMI-1597	4/5/2007	Cs-134	54.03 ± 2.15	54.99	44.99 - 64.99	Pass
SPMI-1597	4/5/2007	Cs-137	59.81 ± 4.75	58.19	48.19 - 68.19	Pass
SPMI-1597	4/5/2007	I-131(G)	83.97 ± 4.07	82.07	72.07 - 92.07	Pass
SPMI-1597A	4/5/2007	I-131	79.53 ± 1.03	82.07	65.66 - 98.48	Pass
SPMI-1597B	4/5/2007	I-131	83.51 ± 1.05	82.07	65.66 - 98.48	Pass
SPCH-2839	5/17/2007	I-131(G)	78.70 ± 7.36	70.40	60.40 - 80.40	Pass
SPW-2847	5/17/2007	Cs-134	55.43 ± 1.68	52.85	42.85 - 62.85	Pass
SPW-2847	5/17/2007	Cs-137	59.86 ± 2.71	58.03	48.03 - 68.03	Pass
SPW-2847	5/17/2007	I-131(G)	63.95 ± 2.69	70.87	60.87 - 80.87	Pass
SPMI-2849	5/17/2007	Cs-134	51.37 ± 1.65	52.85	42.85 - 62.85	Pass
SPMI-2849	5/17/2007	Cs-137	60.42 ± 4.31	58.03	48.03 - 68.03	Pass
SPMI-2849	5/17/2007	I-131(G)	62.44 ± 3.14	70.87	60.87 - 80.87	Pass
SPCH-2922	5/17/2007	I-131(G)	80.00 ± 6.40	70.40	41.60 - 99.20	Pass
SPW-2847	5/18/2007	I-131	60.14 ± 0.89	70.87	56.70 - 85.04	Pass
SPW-2847	5/18/2007	Sr-89	104.93 ± 6.64	121.90	97.52 - 146.28	Pass
SPW-2847	5/18/2007	Sr-89	46.72 ± 1.97	46.08	36.08 - 56.08	Pass
SPMI-2849	5/18/2007	I-131	67.97 ± 0.88	70.87	56.70 - 85.04	Pass
SPW-2909 [e]	5/22/2007	Fe-55	11137.00 ± 316.00	14271.50	11417.20 - 17125.80	Fail
SPW-2911	5/22/2007	H-3	65023.00 ± 679.00	70485.00	56388.00 - 84582.00	Pass
SPAP-2913	5/22/2007	Gr. Beta	55.27 ± 8.51	52.65	42.12 - 73.71	Pass
SPAP-2915	5/22/2007	Cs-134	22.53 ± 1.12	26.42	16.42 - 36.42	Pass
SPAP-2915	5/22/2007	Cs-137	111.14 ± 3.57	116.06	104.45 - 127.67	Pass
SPF-2922	5/22/2007	Cs-134	0.52 ± 0.03	0.53	0.32 - 0.74	Pass
SPF-2922	5/22/2007	Cs-137	2.58 ± 0.07	2.32	1.39 - 3.25	Pass
SPW-3223	5/24/2007	Ni-63	2233.10 ± 10.32	2135.90	1281.54 - 2990.26	Pass
W-60507	6/5/2007	Gr. Alpha	20.93 ± 0.42	20.08	10.04 - 30.12	Pass
W-60507	6/5/2007	Gr. Beta	60.50 ± 0.46	65.73	55.73 - 75.73	Pass
SPW-4327	7/18/2007	Tc-99	25.58 ± 1.11	32.35	20.35 - 44.35	Pass
SPW-5476	8/17/2007	Ni-63	1925.18 ± 9.62	2135.90	1281.54 - 2990.26	Pass
W-92107	9/21/2007	Gr. Alpha	23.02 ± 0.44	20.08	10.04 - 30.12	Pass
W-92107	9/21/2007	Gr. Beta	61.48 ± 0.47	65.73	55.73 - 75.73	Pass

TABLE A-3. In-House "Spike" Samples

Lab Code	Date	Analysis	Concentration (pCi/L)[a] Laboratory results 2s, n=1[b]	Known Activity	Control Limits[c]	Acceptance
SPW-6880	10/10/2007	Tc-99	30.97 ± 1.21	32.35	20.35 - 44.35	Pass
w-111007	11/10/2007	Gr. Alpha	22.43 ± 0.42	20.08	10.04 - 30.12	Pass
w-111007	11/10/2007	Gr. Beta	64.49 ± 0.48	65.73	55.73 - 75.73	Pass
SPAP-7742	11/13/2007	Cs-134	21.18 ± 1.29	22.41	12.41 - 32.41	Pass
SPAP-7742	11/13/2007	Cs-137	113.61 ± 3.16	114.76	103.28 - 126.24	Pass
SPAP-7744	11/13/2007	Gr. Beta	53.41 ± 0.13	52.03	41.62 - 72.84	Pass
SPMI-7746	11/13/2007	Cs-134	42.20 ± 1.48	44.83	34.83 - 54.83	Pass
SPMI-7746	11/13/2007	Cs-137	56.05 ± 2.83	57.40	47.40 - 67.40	Pass
SPMI-7746	11/13/2007	Sr-90	41.02 ± 1.61	45.54	36.43 - 54.65	Pass
SPW-7748	11/13/2007	Cs-134	43.11 ± 1.52	44.80	34.80 - 54.80	Pass
SPW-7748	11/13/2007	Cs-137	59.28 ± 3.50	57.40	47.40 - 67.40	Pass
SPW-7748	11/13/2007	Sr-90	37.23 ± 1.51	45.54	36.43 - 54.65	Pass
SPW-7752	11/13/2007	Fe-55	12935.10 ± 357.00	12640.50	10112.40 - 15168.60	Pass
SPW-7758	11/13/2007	H-3	65405.00 ± 712.50	68618.00	54894.40 - 82341.60	Pass
SPF-7760	11/13/2007	Cs-134	0.45 ± 0.02	0.45	0.27 - 0.63	Pass
SPF-7760	11/13/2007	Cs-137	2.45 ± 0.07	2.29	1.37 - 3.21	Pass
SPW-8034	11/13/2007	Ni-63	2194.06 ± 10.77	2129.03	1277.42 - 2980.64	Pass

[a] Liquid sample results are reported in pCi/Liter, air filters(pCi/filter), charcoal (pCi/m^3), and solid samples (pCi/g).

[b] Laboratory codes as follows: W (water), MI (milk), AP (air filter), SO (soil), VE (vegetation), CH (charcoal canister), F (fish).

[c] Results are based on single determinations.

[d] Control limits are based on Attachment A, Page A2 of this report.

[e] Sample recount: 12557 ± 335.

NOTE: For fish, Jello is used for the Spike matrix. For Vegetation, cabbage is used for the Spike matrix.

TABLE A-4. In-House "Blank" Samples

Lab Code	Sample Type	Date	Analysis[b]	Concentration (pCi/L)[a] Laboratory results (4.66σ) LLD	Activity[c]	Acceptance Criteria (4.66 σ)
W-30707	water	3/7/2007	Gr. Alpha	0.40	0.01 ± 0.28	2
W-30707	water	3/7/2007	Gr. Beta	0.75	0.06 ± 0.53	4
SPAP-1567	Air Filter	3/23/2007	Cs-134	0.79		100
SPW-1567	Air Filter	3/23/2007	Cs-137	1.01		100
SPW-1568	water	3/23/2007	H-3	176.10	-26.16 ± 91.62	200
SPW-1596	water	4/5/2007	Cs-134	3.28		10
SPW-1596	water	4/5/2007	Cs-137	3.45		10
SPW-1596	water	4/5/2007	I-131	0.27	0.02 ± 0.18	0.5
SPW-1596	water	4/5/2007	I-131(G)	2.91		20
SPMI-1598	Milk	4/5/2007	Cs-134	3.30		10
SPMI-1598	Milk	4/5/2007	Cs-137	5.08		10
SPMI-1598	Milk	4/5/2007	I-131	0.26	-0.10 ± 0.17	0.5
SPMI-1598	Milk	4/5/2007	I-131(G)	4.10		20
SPCH-2839	Charcoal Canister	5/17/2007	I-131(G)	2.24		9.6
SPW-2848	water	5/17/2007	Cs-134	3.14		10
SPW-2848	water	5/17/2007	Cs-137	1.37		10
SPW-2848	water	5/17/2007	I-131(G)	5.34		20
SPMI-2850	Milk	5/17/2007	Cs-134	3.32		10
SPMI-2850	Milk	5/17/2007	Cs-137	2.60		10
SPMI-2850	Milk	5/17/2007	I-131(G)	4.77		20
SPW-2848	water	5/18/2007	I-131	0.34	-0.06 ± 0.19	0.5
SPW-2848	water	5/18/2007	Sr-89	0.81	-0.02 ± 0.65	5
SPW-2848	water	5/18/2007	Sr-90	0.53	0.01 ± 0.25	1
SPMI-2850	Milk	5/18/2007	I-131	0.45	0.20 ± 0.26	0.5
SPMI-2850	Milk	5/18/2007	Sr-89	0.96	-0.73 ± 1.02	5
SPMI-2850 [d]	Milk	5/18/2007	Sr-90	0.58	0.96 ± 0.38	1
SPAP-2914	Air Filter	5/22/2007	Gr. Beta	0.004	-0.002 ± 0.002	0.01
SPAP-2916	Air Filter	5/22/2007	Cs-134	2.84		100
SPAP-2916	Air Filter	5/22/2007	Cs-137	2.24		100
SPF-2923	Fish	5/22/2007	Cs-134	8.71		100
SPF-2923	Fish	5/22/2007	Cs-137	8.35		100
SPW-3224	water	5/24/2007	Ni-63	1.61	-0.30 ± 0.84	20
W-60507	water	6/5/2007	Gr. Alpha	0.43	-0.01 ± 0.30	2
W-60507	water	6/5/2007	Gr. Beta	0.77	0.01 ± 0.54	4
SPW-4328	water	7/18/2007	Tc-99	6.41	-3.12 ± 3.84	10
SPW-5477	water	8/17/2007	Ni-63	1.48	4.38 ± 1.01	20
W-92107	water	9/21/2007	Gr. Alpha	0.41	0.09 ± 0.29	2
W-92107	water	9/21/2007	Gr. Beta	0.75	-0.26 ± 0.51	4

TABLE A-4. In-House "Blank" Samples

Lab Code	Sample Type	Date	Analysis[b]	Concentration (pCi/L)[a] Laboratory results (4.66σ) LLD	Activity[c]	Acceptance Criteria (4.66 σ)
SPW-6881	water	10/10/2007	Tc-99	6.82	-6.58 ± 4.04	10
SPAP-7743	Air Filter	11/13/2007	Gr. Beta	0.003	-0.002 ± 0.002	0.01
SPMI-7745	Milk	11/13/2007	Cs-134	2.16		10
SPMI-7745	Milk	11/13/2007	Cs-137	3.46		10
SPMI-7745	Milk	11/13/2007	I-131(G)	5.89		20
SPMI-7745	Milk	11/13/2007	Sr-90	0.59	0.73 ± 0.35	1
SPW-7747	water	11/13/2007	Cs-134	2.39		10
SPW-7747	water	11/13/2007	Cs-137	3.53		10
SPW-7747	water	11/13/2007	I-131(G)	12.51		20
SPW-7747	water	11/13/2007	Sr-90	0.71	-0.04 ± 0.32	1
SPW-7751	water	11/13/2007	Fe-55	15.50	-4.18 ± 9.20	1000
SPW-7757	water	11/13/2007	H-3	151.35	-14.98 ± 78.85	200
SPF-7759	Fish	11/13/2007	Cs-134	5.50		100
SPF-7759	Fish	11/13/2007	Cs-137	5.10		100
SPW-8033	water	11/13/2007	Ni-63	1.45	-0.19 ± 0.87	20
W-120607	water	12/6/2007	Gr. Alpha	0.40	0.02 ± 0.28	2
W-120607	water	12/6/2007	Gr. Beta	0.77	-0.70 ± 0.51	4

[a] Liquid sample results are reported in pCi/Liter, air filters(pCi/filter), charcoal (pCi/charcoal canister), and solid samples (pCi/kg).

[b] I-131(G); iodine-131 as analyzed by gamma spectroscopy.

[c] Activity reported is a net activity result. For gamma spectroscopic analysis, activity detected below the LLD value is not reported.

[d] Low levels of Sr-90 are still detected in the environment. A concentration of (1-5 pCi/L) in milk is not unusual.

TABLE A-5. In-House "Duplicate" Samples

Lab Code	Date	Analysis	Concentration (pCi/L)[a] First Result	Second Result	Averaged Result	Acceptance
E-20, 21	1/2/2007	Gr. Beta	1.76 ± 0.07	1.70 ± 0.06	1.73 ± 0.05	Pass
E-20, 21	1/2/2007	K-40	1.49 ± 0.24	1.57 ± 0.27	1.53 ± 0.18	Pass
CF-41, 42	1/2/2007	Gr. Beta	18.02 ± 0.41	18.81 ± 0.42	18.42 ± 0.29	Pass
CF-41, 42	1/2/2007	K-40	11.68 ± 1.12	12.67 ± 0.97	12.18 ± 0.74	Pass
CF-41, 42	1/2/2007	Sr-90	0.039 ± 0.011	0.026 ± 0.010	0.033 ± 0.007	Pass
P-9516, 9517	1/3/2007	H-3	270.78 ± 91.74	301.18 ± 92.99	285.98 ± 65.31	Pass
LW-9579, 9580	1/4/2007	Gr. Beta	0.91 ± 0.31	0.93 ± 0.30	0.92 ± 0.22	Pass
DW-70085, 70086	1/9/2007	Gr. Alpha	7.95 ± 1.20	7.92 ± 1.42	7.94 ± 0.93	Pass
DW-70037, 70038	1/11/2007	Gr. Alpha	55.47 ± 3.99	52.87 ± 4.02	54.17 ± 2.83	Pass
DW-70054, 70055	1/18/2007	Gr. Alpha	2.68 ± 0.88	1.88 ± 0.78	2.28 ± 0.59	Pass
DW-70122, 70123	1/18/2007	Gr. Alpha	4.30 ± 1.14	6.25 ± 1.16	5.28 ± 0.81	Pass
DW-70122, 70123	1/18/2007	Gr. Beta	4.22 ± 0.70	5.33 ± 0.75	4.78 ± 0.51	Pass
DW-70098, 70099	1/25/2007	Gr. Alpha	3.27 ± 0.90	1.97 ± 0.92	2.62 ± 0.64	Pass
DW-70110, 70111	1/25/2007	Gr. Alpha	2.19 ± 0.92	1.69 ± 0.79	1.94 ± 0.61	Pass
SWU-676, 677	1/30/2007	Gr. Beta	1.77 ± 0.39	2.11 ± 0.39	1.94 ± 0.28	Pass
DW-70148, 70149	1/30/2007	Gr. Alpha	4.65 ± 1.37	5.20 ± 1.81	4.93 ± 1.14	Pass
SW-600, 601	2/1/2007	K-40	1.24 ± 0.12	1.20 ± 0.12	1.22 ± 0.08	Pass
SW-601, 602	2/1/2007	Gr. Beta	0.89 ± 0.37	1.02 ± 0.25	0.96 ± 0.22	Pass
DW-1138, 1139	2/9/2007	H-3	2707.00 ± 161.00	2700.00 ± 161.00	2703.50 ± 113.84	Pass
MI-721, 722	2/13/2007	K-40	1330.40 ± 117.60	1316.40 ± 116.50	1323.40 ± 82.77	Pass
SW-847, 848	2/13/2007	Gr. Alpha	3.82 ± 1.67	2.61 ± 1.24	3.22 ± 1.04	Pass
SW-847, 848	2/13/2007	Gr. Beta	7.33 ± 1.37	5.89 ± 0.90	6.61 ± 0.82	Pass
DW-70175, 70176	2/14/2007	Gr. Alpha	11.72 ± 1.68	8.84 ± 1.32	10.28 ± 1.07	Pass
DW-70187, 70188	2/14/2007	Gr. Alpha	6.79 ± 1.18	6.47 ± 1.08	6.63 ± 0.80	Pass
SWU-1162, 1163	2/27/2007	Gr. Beta	3.63 ± 0.69	2.61 ± 0.44	3.12 ± 0.41	Pass
DW-70205, 70206	2/28/2007	Gr. Alpha	0.88 ± 0.80	1.31 ± 0.79	1.10 ± 0.56	Pass
PW-1117, 1118	3/1/2007	Gr. Alpha	3.79 ± 1.91	3.62 ± 2.09	3.71 ± 1.42	Pass
PW-1117, 1118	3/1/2007	Gr. Beta	7.12 ± 1.40	7.20 ± 1.39	7.16 ± 0.99	Pass
W-2122, 2123	3/5/2007	Gr. Alpha	6.10 ± 4.16	3.80 ± 4.30	4.95 ± 2.99	Pass
W-2122, 2123	3/5/2007	Gr. Beta	10.65 ± 2.15	13.11 ± 2.42	11.88 ± 1.62	Pass
W-2085, 2086	3/6/2007	Gr. Alpha	2.51 ± 2.29	1.10 ± 2.78	1.81 ± 1.80	Pass
W-2085, 2086	3/6/2007	Gr. Beta	11.02 ± 1.85	9.50 ± 2.01	10.26 ± 1.37	Pass
DW-70232, 70233	3/8/2007	Gr. Alpha	4.75 ± 1.28	5.98 ± 1.31	5.37 ± 0.92	Pass
WW-1477, 1478	3/12/2007	Gr. Beta	6.41 ± 1.48	4.10 ± 1.25	5.26 ± 0.97	Pass
WW-1498, 1499	3/15/2007	Gr. Beta	0.83 ± 0.31	0.97 ± 0.33	0.90 ± 0.22	Pass
W-2140, 2141	3/19/2007	Gr. Alpha	2.31 ± 1.57	1.33 ± 1.64	1.82 ± 1.14	Pass
W-2140, 2141	3/19/2007	Gr. Beta	4.26 ± 1.00	5.58 ± 1.02	4.92 ± 0.71	Pass
DW-1626, 1627	3/21/2007	H-3	4973.00 ± 209.00	5190.00 ± 213.00	5081.50 ± 149.21	Pass
MI-1647, 1648	3/21/2007	K-40	1448.80 ± 120.20	1439.30 ± 126.00	1444.05 ± 87.07	Pass
DW-70248, 70249	3/21/2007	Gr. Alpha	11.10 ± 1.18	9.90 ± 1.16	10.50 ± 0.83	Pass
W-2150, 2151	3/26/2007	Gr. Alpha	3.56 ± 2.20	3.30 ± 1.81	3.43 ± 1.42	Pass
W-2150, 2151	3/26/2007	Gr. Beta	9.26 ± 1.00	10.17 ± 1.90	9.72 ± 1.07	Pass
LW-1941, 1942	3/31/2007	Gr. Beta	1.35 ± 0.43	1.36 ± 0.41	1.36 ± 0.30	Pass

TABLE A-5. In-House "Duplicate" Samples

Lab Code	Date	Analysis	Concentration (pCi/L)[a] First Result	Second Result	Averaged Result	Acceptance
MI-1824, 1825	4/2/2007	K-40	1316.10 ± 110.60	1229.80 ± 110.50	1272.95 ± 78.17	Pass
MI-1824, 1825	4/2/2007	Sr-90	1.20 ± 0.50	1.10 ± 0.36	1.15 ± 0.31	Pass
AP-2170, 2171	4/2/2007	Be-7	0.08 ± 0.01	0.08 ± 0.01	0.08 ± 0.01	Pass
WW-1850, 1851	4/3/2007	H-3	-5.83 ± 102.29	150.05 ± 80.14	72.11 ± 64.97	Pass
AP-2198, 2199	4/3/2007	Be-7	0.08 ± 0.01	0.08 ± 0.01	0.08 ± 0.01	Pass
AP-2370, 2371	4/3/2007	Be-7	0.07 ± 0.01	0.07 ± 0.01	0.07 ± 0.01	Pass
DW-70300, 70301	4/4/2007	Gr. Alpha	3.78 ± 0.89	3.66 ± 0.96	3.72 ± 0.65	Pass
DW-70300, 70301	4/4/2007	Gr. Beta	2.93 ± 0.61	2.91 ± 0.64	2.92 ± 0.44	Pass
DW-70335, 70336	4/5/2007	Gr. Alpha	24.37 ± 2.89	22.72 ± 2.91	23.55 ± 2.05	Pass
DW-70335, 70336	4/5/2007	Gr. Beta	20.26 ± 1.37	18.33 ± 1.34	19.30 ± 0.96	Pass
SW-1898, 1899	4/10/2007	Gr. Alpha	3.86 ± 1.40	4.78 ± 1.51	4.32 ± 1.03	Pass
SW-1898, 1899	4/10/2007	Gr. Beta	6.31 ± 1.36	7.03 ± 1.42	6.67 ± 0.98	Pass
SW-1898, 1899	4/10/2007	H-3	241.99 ± 93.35	318.10 ± 96.48	280.04 ± 67.12	Pass
DW-70346, 70347	4/11/2007	Gr. Alpha	1.83 ± 1.08	2.54 ± 1.04	2.19 ± 0.75	Pass
DW-70346, 70347	4/11/2007	Gr. Beta	4.62 ± 0.72	4.01 ± 0.71	4.32 ± 0.51	Pass
DW-70376, 70377	4/11/2007	Gr. Alpha	1.81 ± 0.80	1.66 ± 0.86	1.74 ± 0.59	Pass
DW-70376, 70377	4/11/2007	Gr. Beta	1.84 ± 0.62	2.24 ± 0.61	2.04 ± 0.44	Pass
DW-70311, 70312	4/12/2007	Gr. Alpha	10.82 ± 1.50	13.20 ± 1.56	12.01 ± 1.08	Pass
WW-2349, 2350	4/17/2007	Gr. Alpha	0.71 ± 0.56	0.62 ± 0.52	0.66 ± 0.38	Pass
WW-2461, 2462	4/25/2007	H-3	190.30 ± 100.31	115.95 ± 97.65	153.13 ± 70.00	Pass
LW-2437, 2438	4/26/2007	Gr. Beta	2.71 ± 0.50	2.15 ± 0.45	2.43 ± 0.34	Pass
LW-2917, 2918	4/30/2007	Gr. Beta	1.97 ± 0.79	2.78 ± 0.81	2.38 ± 0.57	Pass
SO-2583, 2584	5/1/2007	Be-7	544.99 ± 247.70	601.13 ± 192.20	573.06 ± 156.76	Pass
SO-2583, 2584	5/1/2007	Cs-137	119.22 ± 36.61	87.46 ± 23.97	103.34 ± 21.88	Pass
SO-2583, 2584	5/1/2007	K-40	17825.00 ± 749.90	17672.00 ± 724.30	17748.50 ± 521.29	Pass
SO-2583, 2584	5/1/2007	Gr. Alpha	11.49 ± 3.96	8.04 ± 3.88	9.77 ± 2.77	Pass
SO-2583, 2584	5/1/2007	Gr. Beta	31.02 ± 3.74	26.10 ± 3.40	28.56 ± 2.53	Pass
SO-2583, 2584	5/1/2007	Sr-90	0.086 ± 0.024	0.068 ± 0.025	0.077 ± 0.017	Pass
S-2620, 2621	5/2/2007	H-3	277.90 ± 126.70	304.40 ± 101.00	291.15 ± 81.02	Pass
MI-2610, 2611	5/3/2007	K-40	1549.20 ± 184.20	1388.80 ± 128.20	1469.00 ± 112.21	Pass
W-4469, 4470	5/7/2007	Gr. Beta	10.60 ± 1.90	11.10 ± 1.80	10.85 ± 1.31	Pass
SS-2697, 2698	5/8/2007	Cs-137	0.06 ± 0.02	0.05 ± 0.03	0.05 ± 0.02	Pass
SS-2697, 2698	5/8/2007	K-40	8.03 ± 0.57	7.36 ± 0.68	7.70 ± 0.44	Pass
MI-2790, 2791	5/14/2007	K-40	1694.30 ± 126.20	1627.60 ± 128.80	1660.95 ± 90.16	Pass
W-4505, 4506	5/14/2007	Gr. Beta	3.30 ± 1.70	3.90 ± 1.50	3.60 ± 1.13	Pass
DW-3219, 3220	5/26/2007	I-131	0.62 ± 0.32	0.69 ± 0.31	0.66 ± 0.22	Pass
SO-3416, 3417	5/31/2007	Cs-137	0.15 ± 0.03	0.15 ± 0.03	0.15 ± 0.02	Pass
SO-3416, 3417	5/31/2007	Gr. Beta	22.88 ± 2.33	22.46 ± 2.37	22.67 ± 1.66	Pass
SO-3416, 3417	5/31/2007	K-40	12.26 ± 0.80	12.36 ± 0.65	12.31 ± 0.52	Pass
F-3561, 3562	5/31/2007	K-40	3.06 ± 0.39	3.37 ± 0.45	3.21 ± 0.30	Pass
SL-3311, 3312	6/4/2007	Be-7	0.61 ± 0.29	0.55 ± 0.25	0.58 ± 0.19	Pass
SL-3311, 3312	6/4/2007	K-40	5.78 ± 0.67	4.87 ± 0.25	5.33 ± 0.36	Pass

TABLE A-5. In-House "Duplicate" Samples

Lab Code	Date	Analysis	Concentration (pCi/L)[a] First Result	Second Result	Averaged Result	Acceptance
SL-3992, 3993	6/4/2007	Be-7	0.75 ± 0.19	0.74 ± 0.32	0.75 ± 0.19	Pass
SL-3992, 3993	6/4/2007	Gr. Beta	13.61 ± 1.12	14.06 ± 1.08	13.84 ± 0.78	Pass
SL-3992, 3993	6/4/2007	K-40	2.43 ± 0.36	2.29 ± 0.40	2.36 ± 0.27	Pass
W-5087, 5088	6/11/2007	Gr. Beta	8.70 ± 1.90	7.70 ± 1.90	8.20 ± 1.34	Pass
SW-3710, 3711	6/14/2007	H-3	9571.51 ± 287.22	9879.21 ± 291.42	9725.36 ± 204.59	Pass
W-4062, 4063	6/28/2007	Gr. Alpha	0.76 ± 0.63	0.32 ± 0.66	0.54 ± 0.45	Pass
W-4062, 4063	6/28/2007	Gr. Beta	0.97 ± 0.53	0.58 ± 0.57	0.78 ± 0.39	Pass
AP-4448, 4449	6/28/2007	Be-7	0.10 ± 0.02	0.09 ± 0.02	0.10 ± 0.01	Pass
SG-3735, 3736	6/30/2007	Be-7	0.84 ± 0.12	0.82 ± 0.18	0.83 ± 0.11	Pass
SG-3735, 3736	6/30/2007	Cs-137	0.07 ± 0.01	0.07 ± 0.01	0.07 ± 0.01	Pass
SG-3735, 3736	6/30/2007	Gr. Beta	29.51 ± 2.22	30.81 ± 2.22	30.16 ± 1.57	Pass
SG-3735, 3736	6/30/2007	K-40	9.41 ± 0.31	8.90 ± 0.48	9.16 ± 0.29	Pass
LW-4175, 4176	6/30/2007	Gr. Beta	2.18 ± 0.60	1.93 ± 0.68	2.06 ± 0.45	Pass
SG-5422, 5423	7/2/2007	Gr. Alpha	10.31 ± 1.98	10.57 ± 1.99	10.44 ± 1.40	Pass
SG-5422, 5423	7/2/2007	Gr. Beta	18.59 ± 1.46	20.97 ± 1.49	19.78 ± 1.04	Pass
AP-4656, 4657	7/3/2007	Be-7	0.09 ± 0.02	0.10 ± 0.02	0.10 ± 0.01	Pass
AP-4763, 4764	7/3/2007	Be-7	0.11 ± 0.02	0.10 ± 0.02	0.11 ± 0.01	Pass
SG-5430, 5431	7/11/2007	Be-7	10.17 ± 0.48	10.06 ± 0.51	10.12 ± 0.35	Pass
SG-5430, 5431	7/11/2007	Cs-137	0.050 ± 0.010	0.059 ± 0.011	0.055 ± 0.007	Pass
SG-5430, 5431	7/11/2007	Gr. Alpha	17.86 ± 2.78	15.74 ± 2.70	16.80 ± 1.94	Pass
SG-5430, 5431	7/11/2007	Gr. Beta	26.19 ± 1.74	25.04 ± 1.86	25.62 ± 1.27	Pass
SG-5430, 5431	7/11/2007	K-40	7.69 ± 0.30	7.65 ± 0.28	7.67 ± 0.21	Pass
WW-4298, 4299	7/12/2007	Gr. Beta	1.74 ± 0.74	2.22 ± 0.80	1.98 ± 0.55	Pass
DW-70612, 70613	7/23/2007	Gr. Alpha	4.54 ± 1.11	4.19 ± 0.97	4.37 ± 0.74	Pass
WW-4918, 4919	7/25/2007	H-3	240.43 ± 111.12	216.68 ± 110.27	228.56 ± 78.27	Pass
MI-4742, 4743	7/26/2007	K-40	1820.30 ± 134.10	1802.90 ± 199.50	1811.60 ± 120.19	Pass
VE-4939, 4940	8/1/2007	Be-7	0.39 ± 0.21	0.45 ± 0.20	0.42 ± 0.15	Pass
VE-4939, 4940	8/1/2007	Gr. Beta	5.50 ± 0.14	5.76 ± 0.13	5.63 ± 0.10	Pass
VE-4939, 4940	8/1/2007	K-40	3.36 ± 0.45	3.36 ± 0.21	3.36 ± 0.25	Pass
SG-6274, 6275	8/6/2007	Gr. Alpha	16.68 ± 3.29	19.26 ± 3.39	17.97 ± 2.36	Pass
SG-6274, 6275	8/6/2007	Gr. Beta	40.93 ± 2.74	42.42 ± 2.66	41.68 ± 1.91	Pass
SW-5218, 5219	8/7/2007	I-131	1.31 ± 0.24	1.42 ± 0.24	1.37 ± 0.17	Pass
SG-6284, 6285	8/8/2007	Cs-137	0.043 ± 0.006	0.051 ± 0.007	0.047 ± 0.005	Pass
SG-6284, 6285	8/8/2007	Gr. Alpha	9.38 ± 2.93	13.61 ± 3.38	11.50 ± 2.24	Pass
SG-6284, 6285	8/8/2007	Gr. Beta	33.46 ± 2.84	32.87 ± 2.93	33.17 ± 2.04	Pass
SG-6284, 6285	8/8/2007	K-40	16.15 ± 0.24	16.23 ± 0.25	16.19 ± 0.17	Pass
WW-5310, 5311	8/9/2007	H-3	644.00 ± 106.00	831.00 ± 113.00	737.50 ± 77.47	Pass
SW-5393, 5394	8/14/2007	Gr. Beta	2.32 ± 1.31	1.71 ± 1.27	2.02 ± 0.92	Pass
SW-5393, 5394	8/14/2007	H-3	190.06 ± 86.80	69.05 ± 80.88	129.55 ± 59.32	Pass
W-5468, 5469	8/15/2007	H-3	262.58 ± 108.43	346.53 ± 111.42	304.55 ± 77.74	Pass

TABLE A-5. In-House "Duplicate" Samples

Lab Code	Date	Analysis	Concentration (pCi/L)[a] First Result	Second Result	Averaged Result	Acceptance
VE-5553, 5554	8/22/2007	K-40	1.89 ± 0.33	1.89 ± 0.22	1.89 ± 0.20	Pass
WW-5643, 5644	8/22/2007	H-3	259.00 ± 110.00	266.00 ± 110.00	262.50 ± 77.78	Pass
SWU-5799, 5800	8/28/2007	Gr. Beta	2.64 ± 1.18	3.62 ± 1.06	3.13 ± 0.79	Pass
DW-70752, 70753	8/31/2007	Gr. Alpha	14.41 ± 1.48	12.90 ± 1.50	13.66 ± 1.05	Pass
VE-5917, 5918	9/4/2007	Be-7	0.94 ± 0.17	0.83 ± 0.20	0.89 ± 0.13	Pass
VE-5917, 5918	9/4/2007	K-40	3.73 ± 0.37	3.58 ± 0.36	3.66 ± 0.26	Pass
VE-5917, 5918	9/4/2007	Gr. Beta	2.71 ± 0.10	2.69 ± 0.10	2.70 ± 0.07	Pass
MI-6009, 6010	9/11/2007	K-40	1348.90 ± 113.40	1388.10 ± 116.40	1368.50 ± 81.25	Pass
MI-6030, 6031	9/12/2007	K-40	1242.70 ± 118.00	1475.60 ± 119.60	1359.15 ± 84.01	Pass
MI-6030, 6031	9/12/2007	Sr-90	1.00 ± 0.38	0.90 ± 0.34	0.95 ± 0.26	Pass
DW-70718, 70719	9/12/2007	Gr. Alpha	23.04 ± 3.71	23.22 ± 3.61	23.13 ± 2.59	Pass
DW-70718, 70719	9/12/2007	Gr. Beta	16.13 ± 1.59	17.36 ± 1.69	16.75 ± 1.16	Pass
SO-6156, 6157	9/14/2007	H-3	181.99 ± 90.67	232.19 ± 92.95	207.09 ± 64.92	Pass
SO-6484, 6485	9/17/2007	Cs-137	0.01 ± 0.00	0.01 ± 0.00	0.01 ± 0.00	Pass
SO-6484, 6485	9/17/2007	Gr. Beta	24.20 ± 2.60	23.30 ± 2.30	23.75 ± 1.74	Pass
SO-6484, 6485	9/17/2007	K-40	11.52 ± 1.16	10.89 ± 1.10	11.20 ± 0.80	Pass
WW-6469, 6470	9/21/2007	Gr. Beta	27.19 ± 2.51	24.23 ± 2.29	25.71 ± 1.70	Pass
E-6647, 6648	10/1/2007	Gr. Beta	1.82 ± 0.10	1.93 ± 0.11	1.88 ± 0.07	Pass
E-6647, 6648	10/1/2007	K-40	1.48 ± 0.24	1.31 ± 0.23	1.40 ± 0.17	Pass
WW-6656, 6657	10/1/2007	Gr. Beta	2.80 ± 0.97	1.95 ± 0.87	2.38 ± 0.65	Pass
TD-7080, 7081	10/2/2007	H-3	332.00 ± 229.00	383.00 ± 191.00	357.50 ± 149.10	Pass
SG-6891, 6892	10/3/2007	Gr. Alpha	12.93 ± 2.12	13.52 ± 2.07	13.23 ± 1.48	Pass
SG-6891, 6892	10/3/2007	Gr. Beta	18.08 ± 1.41	18.27 ± 1.36	18.18 ± 0.98	Pass
AP-7191, 7192	10/3/2007	Be-7	0.09 ± 0.01	0.09 ± 0.01	0.09 ± 0.01	Pass
WW-6786, 6787	10/8/2007	H-3	13333 ± 322	13532 ± 324	13433 ± 228	Pass
WW-6786, 6787	10/8/2007	H-3	13188 ± 322	13556 ± 326	13372 ± 229	Pass
VE-6828, 6829	10/8/2007	Gr. Alpha	0.06 ± 0.04	0.06 ± 0.05	0.06 ± 0.03	Pass
VE-6828, 6829	10/8/2007	Gr. Beta	5.55 ± 0.21	5.20 ± 0.22	5.38 ± 0.10	Pass
VE-6828, 6829	10/8/2007	K-40	5.45 ± 0.43	5.20 ± 0.49	5.32 ± 0.33	Pass
SS-6870, 6871	10/9/2007	Gr. Beta	18.10 ± 2.08	21.71 ± 2.19	19.90 ± 1.51	Pass
SS-6870, 6871	10/9/2007	K-40	10.19 ± 0.66	9.72 ± 0.68	9.95 ± 0.47	Pass
LW-7507, 7508	10/11/2007	Gr. Beta	1.40 ± 0.56	1.44 ± 0.54	1.42 ± 0.39	Pass
MI-6933, 6934	10/16/2007	K-40	1386.60 ± 104.70	1331.20 ± 106.70	1358.90 ± 74.74	Pass
MI-6933, 6934	10/16/2007	Sr-90	1.73 ± 0.52	2.17 ± 0.57	1.95 ± 0.39	Pass
MI-7059, 7060	10/17/2007	K-40	1424.80 ± 106.60	1448.60 ± 115.30	1436.70 ± 78.51	Pass
F-7213, 7214	10/24/2007	H-3	6.83 ± 0.22	7.24 ± 0.22	7.03 ± 0.16	Pass
F-7213, 7214	10/24/2007	K-40	3.13 ± 0.51	3.16 ± 0.48	3.15 ± 0.35	Pass
WW-7408, 7409	10/24/2007	H-3	340.71 ± 90.45	346.22 ± 90.67	343.46 ± 64.03	Pass
DW-70856, 70857	10/24/2007	Gr. Alpha	11.03 ± 1.66	10.71 ± 1.34	10.87 ± 1.07	Pass
SO-7508, 7509	10/26/2007	Cs-137	0.30 ± 0.04	0.29 ± 0.05	0.29 ± 0.03	Pass
SO-7508, 7509	10/26/2007	Gr. Beta	34.43 ± 2.72	37.25 ± 3.07	35.84 ± 2.05	Pass
SO-7508, 7509	10/26/2007	K-40	16.84 ± 0.84	17.43 ± 1.05	17.14 ± 0.67	Pass

TABLE A-5. In-House "Duplicate" Samples

Lab Code	Date	Analysis	Concentration (pCi/L)[a] First Result	Second Result	Averaged Result	Acceptance
SS-7529, 7530	10/29/2007	Cs-137	0.12 ± 0.03	0.12 ± 0.02	0.12 ± 0.02	Pass
SS-7529, 7530	10/29/2007	K-40	11.85 ± 0.68	11.75 ± 0.58	11.80 ± 0.45	Pass
SW-7589, 7590	10/30/2007	Gr. Beta	1.75 ± 0.29	1.24 ± 0.26	1.50 ± 0.19	Pass
SWU-7733, 7734	10/30/2007	Gr. Beta	1.66 ± 1.01	2.43 ± 1.13	2.05 ± 0.76	Pass
MI-7618, 7619	10/31/2007	K-40	1376.80 ± 114.30	1426.70 ± 128.80	1401.75 ± 86.10	Pass
VE-7666, 7667	11/5/2007	Gr. Alpha	0.07 ± 0.04	0.16 ± 0.05	0.11 ± 0.03	Pass
VE-7666, 7667	11/5/2007	Gr. Beta	6.03 ± 0.15	6.13 ± 0.15	6.08 ± 0.10	Pass
VE-7666, 7667	11/5/2007	K-40	5.82 ± 0.36	5.74 ± 0.36	5.78 ± 0.25	Pass
DW-7853, 7854	11/9/2007	I-131	1.61 ± 0.40	1.08 ± 0.39	1.35 ± 0.28	Pass
MI-7874, 7875	11/14/2007	K-40	1407.70 ± 101.30	1362.60 ± 114.50	1385.15 ± 76.44	Pass
WW-8142, 8143	11/28/2007	Gr. Beta	9.51 ± 2.21	7.86 ± 2.01	8.68 ± 1.49	Pass
DW-8094, 8095	11/29/2007	Gr. Beta	1.60 ± 0.58	1.25 ± 0.54	1.43 ± 0.40	Pass
F-8328, 8329	12/11/2007	Gr. Beta	3.97 ± 0.08	4.00 ± 0.08	3.99 ± 0.05	Pass
WW-8378, 8379	12/11/2007	H-3	296.00 ± 103.00	407.00 ± 107.00	351.50 ± 74.26	Pass

Note: Duplicate analyses are performed on every twentieth sample received in-house. Results are not listed for those analyses with activities that measure below the LLD.

[a] Results are reported in units of pCi/L, except for air filters (pCi/Filter), food products, vegetation, soil, sediment (pCi/g).

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

Lab Code[c]	Date	Analysis	Concentration[b] Laboratory result	Known Activity	Control Limits[d]	Acceptance
STW-1110	01/01/07	Gr. Alpha	0.45 ± 0.08	0.33	0.00 - 0.65	Pass
STW-1110	01/01/07	Gr. Beta	0.90 ± 0.14	0.85	0.43 - 1.28	Pass
STW-1111[e]	01/01/07	Am-241	2.80 ± 0.21	1.71	1.20 - 2.22	Fail
STW-1111	01/01/07	Co-57	151.60 ± 10.00	143.70	100.60 - 186.80	Pass
STW-1111	01/01/07	Cs-134	79.20 ± 8.00	83.50	58.50 - 108.60	Pass
STW-1111	01/01/07	Cs-137	168.70 ± 12.10	163.00	114.10 - 211.90	Pass
STW-1111	01/01/07	Fe-55	130.30 ± 19.90	129.30	90.50 - 168.10	Pass
STW-1111	01/01/07	H-3	262.20 ± 9.10	283.00	198.10 - 367.90	Pass
STW-1111	01/01/07	Mn-54	130.60 ± 11.50	123.80	86.70 - 160.90	Pass
STW-1111	01/01/07	Ni-63	127.80 ± 3.60	130.40	91.30 - 169.50	Pass
STW-1111	01/01/07	Ni-63	127.80 ± 3.60	130.40	91.30 - 169.50	Pass
STW-1111	01/01/07	Pu-238	2.03 ± 0.17	2.25	1.58 - 2.93	Pass
STW-1111	01/01/07	Pu-239/40	2.27 ± 0.17	2.22	1.55 - 2.89	Pass
STW-1111	01/01/07	Sr-90	9.60 ± 1.40	8.87	6.21 - 11.53	Pass
STW-1111	01/01/07	Tc-99	8.80 ± 1.50	88.00	7.40 - 13.70	Pass
STW-1111	01/01/07	U-233/4	2.44 ± 0.21	2.49	1.74 - 3.24	Pass
STW-1111	01/01/07	U-238	2.44 ± 0.21	2.48	1.74 - 3.22	Pass
STW-1111	01/01/07	Zn-65	123.70 ± 17.00	114.80	80.40 - 149.20	Pass
STSO-1112[f]	01/01/07	Am-241	46.40 ± 9.00	34.80	24.40 - 45.20	Fail
STSO-1112	01/01/07	Co-57	501.20 ± 2.90	471.20	329.80 - 612.60	Pass
STSO-1112	01/01/07	Co-60	285.90 ± 2.10	274.70	192.30 - 357.10	Pass
STSO-1112	01/01/07	Cs-134	325.90 ± 7.40	327.40	229.20 - 425.60	Pass
STSO-1112	01/01/07	Cs-137	855.70 ± 4.60	799.70	559.80 - 1039.60	Pass
STSO-1112	01/01/07	Mn-54	750.90 ± 4.70	685.20	479.60 - 890.80	Pass
STAP-1113	01/01/07	Gr. Alpha	0.27 ± 0.04	0.60	0.00 - 1.20	Pass
STAP-1113	01/01/07	Gr. Beta	0.57 ± 0.05	0.44	0.22 - 0.66	Pass
STAP-1114	01/01/07	Am-241	0.10 ± 0.03	0.10	0.07 - 0.13	Pass
STAP-1114	01/01/07	Co-57	3.51 ± 0.07	2.89	2.02 - 3.75	Pass
STAP-1114	01/01/07	Co-60	2.98 ± 0.10	2.91	2.03 - 3.78	Pass
STAP-1114	01/01/07	Cs-134	4.02 ± 0.16	4.20	2.94 - 5.45	Pass
STAP-1114	01/01/07	Cs-137	2.75 ± 0.12	2.57	1.80 - 3.34	Pass
STAP-1114	01/01/07	Mn-54	3.94 ± 0.12	3.52	2.46 - 4.57	Pass
STAP-1114	01/01/07	Pu-238	0.07 ± 0.01	0.07	0.05 - 0.09	Pass
STAP-1114	01/01/07	Pu-239/40	0.08 ± 0.01	0.08	0.06 - 0.11	Pass
STAP-1114	01/01/07	Sr-90	0.58 ± 0.18	0.61	0.43 - 0.79	Pass
STAP-1114	01/01/07	U-233/4	0.09 ± 0.01	0.10	0.07 - 0.13	Pass
STAP-1114	01/01/07	U-238	0.09 ± 0.01	0.10	0.07 - 0.13	Pass
STAP-1114	01/01/07	Zn-65	2.70 ± 0.10	2.68	1.88 - 3.49	Pass

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

			Concentration [b]			
Lab Code[c]	Date	Analysis	Laboratory result	Known Activity	Control Limits [d]	Acceptance
STVE-1115	01/01/07	Co-57	8.90 ± 0.20	8.19	5.73 - 10.64	Pass
STVE-1115	01/01/07	Co-60	6.50 ± 0.20	5.82	4.08 - 7.57	Pass
STVE-1115	01/01/07	Cs-134	6.90 ± 0.30	6.21	4.35 - 8.07	Pass
STVE-1115	01/01/07	Cs-137	8.20 ± 0.30	6.99	4.90 - 9.09	Pass
STVE-1115	01/01/07	Mn-54	10.10 ± 0.30	8.46	5.91 - 10.98	Pass

[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] Results are reported in units of Bq/kg (soil), Bq/L (water) or Bq/total sample (filters, vegetation).

[c] Laboratory codes as follows: STW (water), STAP (air filter), STSO (soil), STVE (vegetation).

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

[e] Result of reanalysis, 2.08 ± 0.13 pCi/L.

[f] The test samples were recounted on lower background detectors. Result of the recounts: 41.4 ± 6.3 Bq/kg.

TABLE A-7. Interlaboratory Comparison Crosscheck program, Environmental Resource Associates (ERA)[a].

Lab Code [b]	Date	Analysis	Concentration (pCi/L) Laboratory Result [c]	ERA Result [d]	Control Limits	Acceptance
STAP-1116	03/19/07	Gr. Alpha	34.64 ± 2.56	25.8	12.4 - 39	Pass
STAP-1116	03/19/07	Gr. Beta	93.41 ± 3.20	79.5	48.8 - 116	Pass
STAP-1117	03/19/07	Am-241	56.04 ± 3.90	57.5	33.1 - 80	Pass
STAP-1117	03/19/07	Co-60	1610.00 ± 8.40	1300.0	1010.0 - 1620	Pass
STAP-1117	03/19/07	Cs-134	1340.40 ± 48.84	1120.0	732.0 - 1380	Pass
STAP-1117 [e]	03/19/07	Cs-137	345.30 ± 8.20	255.0	192.0 - 336	Fail
STAP-1117 [f]	03/19/07	Fe-55	< 134.0	0.0		Pass
STAP-1117 [f]	03/19/07	Mn-54	< 5.0	0.0		Pass
STAP-1117	03/19/07	Pu-238	43.32 ± 2.28	37.4	25.7 - 49	Pass
STAP-1117	03/19/07	Pu-239/40	35.23 ± 2.24	31.6	22.9 - 41	Pass
STAP-1117	03/19/07	Sr-90	156.10 ± 6.60	156.0	66.6 - 246	Pass
STAP-1117	03/19/07	U-233/4	42.22 ± 1.84	47.8	30.1 - 71	Pass
STAP-1117	03/19/07	U-238	42.00 ± 1.84	47.4	30.2 - 68	Pass
STAP-1117	03/19/07	Uranium	85.79 ± 3.60	97.3	49.5 - 155	Pass
STAP-1117	03/19/07	Zn-65	363.80 ± 11.90	245.0	208.0 - 412	Pass
STSO-1118	03/19/07	Ac-228	3097.77 ± 94.96	2790.0	1790.0 - 3930	Pass
STSO-1118	03/19/07	Am-241	1000.70 ± 156.10	927.0	548.0 - 1200	Pass
STSO-1118	03/19/07	Bi-212	2467.87 ± 114.33	2500.0	658.0 - 3730	Pass
STSO-1118	03/19/07	Co-60	7847.40 ± 86.60	7330.0	5340.0 - 9820	Pass
STSO-1118	03/19/07	Cs-134	7910.60 ± 356.88	7560.0	4850.0 - 9070	Pass
STSO-1118	03/19/07	Cs-137	4635.00 ± 99.10	4300.0	3290.0 - 5580	Pass
STSO-1118	03/19/07	K-40	12201.60 ± 423.20	11100.0	8050.0 - 15000	Pass
STSO-1118 [f]	03/19/07	Mn-54	< 34.0	0.0		Pass
STSO-1118	03/19/07	Pb-212	2046.80 ± 127.20	1730.0	1120.0 - 2430	Pass
STSO-1118	03/19/07	Pb-214	4142.80 ± 110.40	3330.0	1980.0 - 4980	Pass
STSO-1118	03/19/07	Pu-238	1099.20 ± 73.10	857.0	490.0 - 1200	Pass
STSO-1118	03/19/07	Pu-239/40	1586.10 ± 82.00	1360.0	928.0 - 1810	Pass
STSO-1118	03/19/07	Sr-90	6163.30 ± 791.60	7500.0	2610.0 - 12400	Pass
STSO-1118	03/19/07	Th-234	4329.40 ± 569.10	3590.0	2190.0 - 4560	Pass
STSO-1118	03/19/07	U-233/4	3236.70 ± 106.00	3620.0	2280.0 - 4520	Pass
STSO-1118	03/19/07	U-238	3425.20 ± 134.00	3590.0	2190.0 - 4560	Pass
STSO-1118	03/19/07	Uranium	6787.80 ± 240.00	7380.0	4210.0 - 9930	Pass
STSO-1118	03/19/07	Uranium	6787.80 ± 240.00	7380.0	4210.0 - 9930	Pass
STSO-1118 [f]	03/19/07	Zn-65	0.00 ± 0.00	0.0	0.0 - 0	Pass

TABLE A-7. Interlaboratory Comparison Crosscheck program, Environmental Resource Associates (ERA)[a].

Lab Code [b]	Date	Analysis	Concentration (pCi/L) Laboratory Result [c]	ERA Result [d]	Control Limits	Acceptance
STVE-1119	03/19/07	Am-241	3249.60 ± 150.30	3550.0	2020.0 - 4890	Pass
STVE-1119	03/19/07	Cm-244	1860.70 ± 91.50	1840.0	905.0 - 2870	Pass
STVE-1119	03/19/07	Co-60	2827.90 ± 62.40	2600.0	1760.0 - 3720	Pass
STVE-1119	03/19/07	Cs-134	654.80 ± 48.40	579.0	308.0 - 822	Pass
STVE-1119	03/19/07	Cs-137	3307.30 ± 58.80	2920.0	2150.0 - 4060	Pass
STVE-1119	03/19/07	K-40	40814.20 ± 618.80	37900.0	27200.0 - 53600	Pass
STVE-1119 [f]	03/19/07	Mn-54	< 27.6	0.0		Pass
STVE-1119	03/19/07	Pu-238	2762.00 ± 251.10	2430.0	1250.0 - 3600	Pass
STVE-1119	03/19/07	Pu-239/40	2156.60 ± 83.40	1900.0	1180.0 - 2600	Pass
STVE-1119	03/19/07	Sr-90	8999.70 ± 580.90	8890.0	4900.0 - 11800	Pass
STVE-1119	03/19/07	U-233/4	2821.90 ± 73.50	2940.0	1930.0 - 3920	Pass
STVE-1119	03/19/07	U-238	2896.10 ± 50.70	2910.0	2090.0 - 3610	Pass
STVE-1119	03/19/07	Uranium	5718.00 ± 124.15	5980.0	4110.0 - 7770	Pass
STVE-1119	03/19/07	Zn-65	474.30 ± 45.70	366.0	267.0 - 500	Pass
STW-1120	03/19/07	Am-241	133.50 ± 10.60	179.0	123.0 - 243	Pass
STW-1120	03/19/07	Co-60	541.40 ± 9.00	536.0	467.0 - 631	Pass
STW-1120	03/19/07	Cs-134	1623.80 ± 66.10	1750.0	1290.0 - 2020	Pass
STW-1120	03/19/07	Cs-137	1839.10 ± 17.90	1850.0	1570.0 - 2220	Pass
STW-1120	03/19/07	Fe-55	829.50 ± 226.80	671.0	392.0 - 896	Pass
STW-1120 [f]	03/19/07	Mn-54	< 8.1	0.0		Pass
STW-1120	03/19/07	Pu-238	123.30 ± 4.30	116.0	87.6 - 144	Pass
STW-1120	03/19/07	Pu-239/40	95.10 ± 3.80	90.9	70.3 - 113	Pass
STW-1120	03/19/07	Sr-90	949.40 ± 16.70	989.0	630.0 - 1320	Pass
STW-1120	03/19/07	U-233/4	164.20 ± 6.58	192.0	145.0 - 247	Pass
STW-1120	03/19/07	U-238	169.20 ± 8.22	190.0	145.0 - 236	Pass
STW-1120	03/19/07	Uranium	339.60 ± 10.66	391.0	282.0 - 521	Pass
STW-1120	03/19/07	Zn-65	2009.00 ± 36.40	1910.0	1600.0 - 2410	Pass

[a] Results obtained by Environmental, Inc., Midwest Laboratory as a participant in the crosscheck program for proficiency testing administered by Environmental Resources Associates, serving as a replacement for studies conducted previously by the Environmental Measurements Laboratory Quality Assessment Program (EML).

[b] Laboratory codes as follows: STW (water), STAP (air filter), STSO (soil), STVE (vegetation).

[c] Unless otherwise indicated, the laboratory result is given as the mean ± standard deviation 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.

[e] A high bias (~ 20%) was observed in gamma results for air filters. A composite filter geometry was used in the calculations vs. a single filter geometry. Result of recalculation. Cs-137, 305.8 ± 6.0 pCi/filter.

[f] Included in the testing series as a "false positive". No activity expected.

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.

4.6 Composite samples which overlap the next month or year are reported for the month or year in which most of the sample is collected.

APPENDIX C

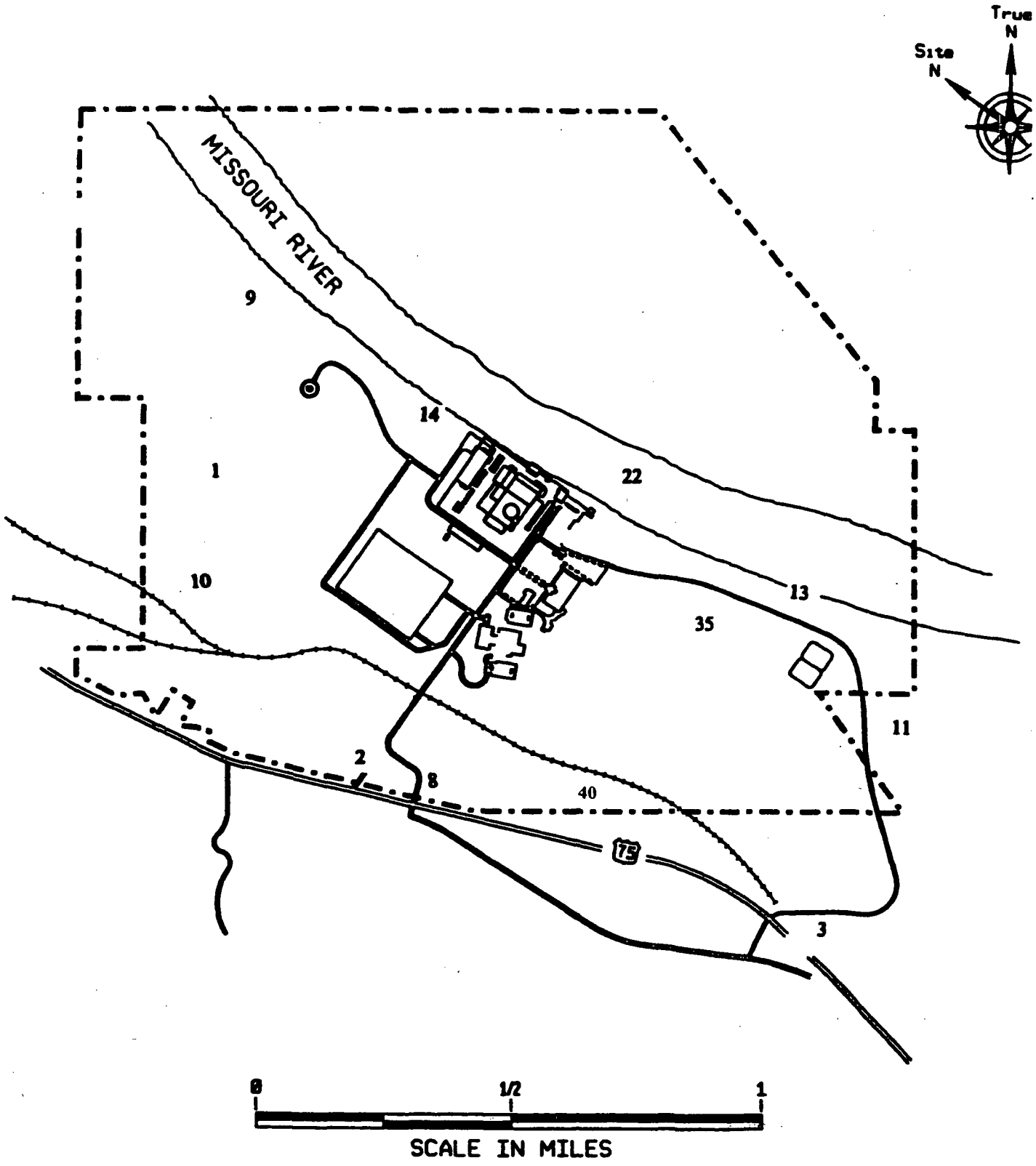
TECHNICAL SPECIFICATION 2.1.3

REACTOR COOLANT DOSE EQUIVALENT IODINE ABOVE TECHNICAL SPECIFICATION LIMIT

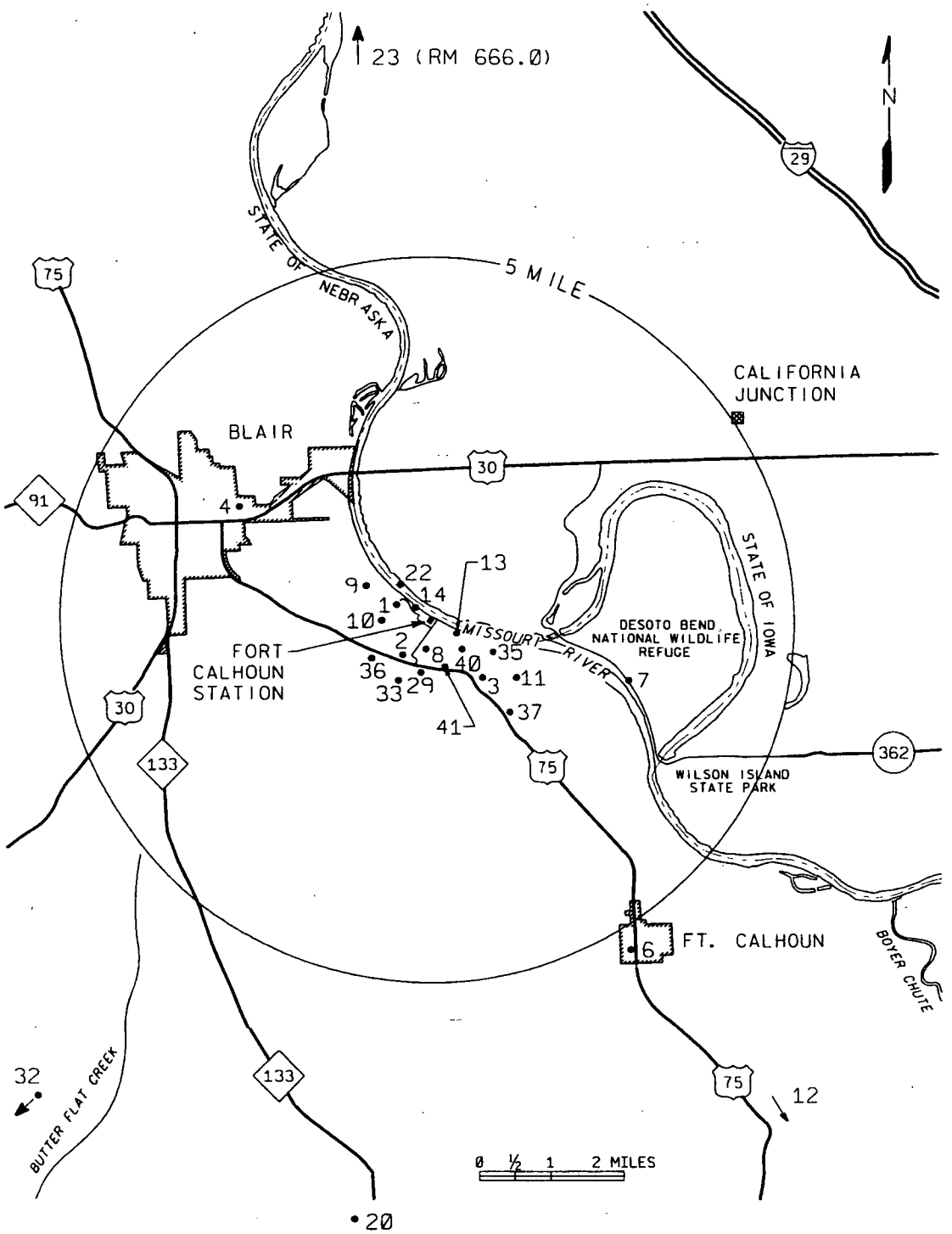
During the 2007 reporting period, radioactivity of primary coolant did not exceed the limits of Technical Specification 2.1.3.

APPENDIX D

SAMPLE LOCATION MAPS



Sample locations within Site Boundary/Owner Controlled Area



Sample locations within 5-mile Area