Consumers Energy

A CMS Energy Company

Kurt M. Haas
General Manager

April 27, 2006

10 CFR 50, Appendix I, IV.B.2
10 CFR 50, Appendix I, IV.B.3
10 CFR 50, Appendix I, IV.C
10 CFR 50.36(b)

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555-0001

DOCKETS 50-155 AND 72-043 – LICENSE DPR-6 - BIG ROCK POINT PLANT – ANNUAL RADIOACTIVE ENVIRONMENTAL REPORT FOR THE PERIOD OF JANUARY 1, 2005 – DECEMBER 31, 2005

In accordance with the Big Rock Point Defueled Technical Specifications Section 6.6.2, attached (Attachment 1) is the Annual Radioactive Environmental Report for the period of January 1, 2005 to December 31, 2005. This report includes summaries, interpretations, and statistical evaluation of the results of the Radiological Environmental Monitoring Program for the reporting period. The material provided is consistent with the objectives outlined in the Offsite Dose Calculation Manual and Sections IV.B.2, IV.B.3, and IV.C Appendix I 10 CFR 50 and 10 CFR 50.36(b).

Kurt M. Haas
Site General Manager

cc: Administrator, Region III, USNRC
NRC Decommissioning Inspector, Big Rock Point
NRC NMSS Project Manager – James Shepherd
US Army Corp of Engineers – Detroit District

ATTACHMENT

IE25
NMSS01

ATTACHMENT 1

Big Rock Point
Dockets 50-155 and 72-043

April 27, 2006

BIG ROCK POINT RADIOACTIVE ENVIRONMENTAL REPORT

January 1, 2005 - December 31, 2005

66 pages

Big Rock Point Restoration Project
2005 Annual Radiological Environmental Operating Report

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Big Rock Point Nuclear Plant
Annual Radiological Environmental Operating Report
January through December 2005

Big Rock Point Annual Radiological Environmental Operating Report
January to December 2005

I. Introduction

The 2005 Big Rock Point Annual Radiological Environmental Operating Report provides a summary and data interpretation of the Big Rock Point Radiological Environmental Monitoring Program (REMP) as conducted during the 2005 reporting period. Reporting requirements are detailed in the Big Rock Point Defueled Technical Specifications 6.6.2, and Offsite Dose Calculation Manual (ODCM) Section III, Subsection 2.0.

The Big Rock Point site has been actively decommissioning since 1997; the site is expected to be restored to a Greenfield by the end of 2006. Decommisioning activities in 2005 involved completing final dismantlement activities to facilitate demolition and removal of remaining buildings and structures. At the end of 2005 the only structures remaining that supported power operations were a portion of the Containment Building and its foundation.

Big Rock Point's Defueled Technical Specifications contain administrative requirements for the REMP while specific technical requirements for this program are contained in the Big Rock Point ODCM Section III. The radiological environmental monitoring sampling requirements are greatly reduced when compared to the plant's operating period. A land use census is no longer required for Big Rock Point. Use of an assumed garden and milk animal at the site boundary in the downwind sector of highest D/Q, per ODCM Section II, Table 1.4, is conservative with respect to any actual garden and milk locations.

Tables 1, 2 and 3 provide a summary of 2005 BRP REMP sample requirements and results. Detailed sample station identification and location information can be found in Enclosure B. Well water, sediment, and fish samples were evaluated using data means comparisons against an appropriate control location (if available) and BRP ODCM limits. There are no remaining 2005 laboratory sample analyses pending completion for inclusion into this report.

The BRP ISFSI dry fuel storage facility environmental monitoring requirements pursuant to 10 CFR Part 72.44(d)(3) were submitted to the NRC in a letter dated February 16, 2006.

II. Discussion and Interpretation of Results

A. TLDs - Gamma Dose

The Big Rock Point gamma dose assessment program consists of 13 TLD locations: four on-site TLDs (locations 1-ST, 14-G, 15-H, and 17-K), six site boundary TLDs (locations 9-A, 10-B, 11-C, 12-D, 13-F, 16-J), and three control TLDs, 10.5 to 50 miles out, (locations 5-PT, 6-BC, 7-TR). Environmental gamma doses are measured quarterly and annually by placement of two TLD badges per designated location. Enclosure B provides a description and diagrams for TLD locations.

For 2005 the average quarterly gamma readings were:

23.6 millirem for the onsite TLDs;
11.7 millirem for the site boundary TLDs, and
13.2 millirem for the control TLD locations.

The average of the annual gamma readings in 2005 were:

90.5 millirem for the onsite TLDs,
42.7 millirem for the site boundary TLDs, and
42.7millirem for the control TLD locations[1].

The onsite quarterly TLD mean and the onsite annual TLD values measured in 2005 are consistent with 2004 TLD data. Site boundary and offsite control TLDs are also consistent with 2004 Annual Radiological Environmental Operating Report and historical data.

A statistical evaluation was completed comparing 2005 quarterly offsite control TLD data to site boundary TLD data. The site boundary TLD mean, although lower than the offsite control mean, is not statistically different than the offsite control TLD mean.

Each TLD badge contains a 4-zone $CaSO_4$ phosphor wafer (the wafer also includes an additional backup/reserve read-out zone). Sensitivity for the multi-zone TLDs are 1.0 millirem with a linear response to 1000 rem.

B. Air Samples

The Big Rock Point Radiological Environmental Monitoring Program no longer requires airborne surveillance be conducted.

[1] Control TLD BRP-07 (50 miles from the site) was lost in the field due to building remodeling.

C. Milk

The Big Rock Point Radiological Environmental Monitoring Program no longer requires milk samples be collected.

D. Lake Water

The site did not withdraw any lake water during 2005 and no liquid batch releases occurred in 2005; therefore, no lake water samples were required.

Groundwater and surface water from site dewatering activities is detained for sediment control during decommissioning activities. Sampling of this water prior to release for gamma isotopes and tritium is performed as a precautionary measure. All composite water sample analyses were less than established minimum detectable activity levels for gamma isotopes. Composite sample tritium value is 3291 pCi/L for the two retention pond releases in 2005. Precautionary sampling of the detained water during release is consistent with the ODCM requirement for semiannual lake water sample collection near the site (see Enclosure A)

A one-gallon quantity of sample is sent to Environmental Inc. Midwest Laboratory for analysis. No treatment of the water samples with a preservative is necessary.

E. Well Water

The BRP ODCM requires semiannual sampling of the site drinking water well with analysis for tritium and gamma isotopes. Well water samples were collected in June and December. None of the analyses detected any tritium or gamma isotopes in the well water samples.

No indicator well water samples had any detectable tritium. No BRP ODCM reporting limits were exceeded nor were any special/supplemental analyses required during 2005.

F. Groundwater Monitoring Wells

Big Rock Point ODCM requires semiannual sampling of six site groundwater monitoring wells, with analysis for tritium and gamma isotopes. Big Rock Point has up to 22 monitoring wells available for sampling. Nine groundwater monitoring wells were installed in 1994 while the remaining monitoring wells were installed in 2002 and 2003 for the purpose of additional groundwater characterization. Monitoring wells were sampled semiannually in April and October of 2005.

A total of 21 monitoring well samples were collected and analyzed in 2005. All gamma isotopic results were less than detectable. Tritium was detected above the required LLD in 13 of the samples at a mean of 3344 pCi/L. Historically MW-5 and MW-6 have shown the highest detectable tritium concentrations of the monitoring wells. The mean value for MW-5 and MW-6 was 4850 pCi/L, slightly higher than the 2004 mean value of 3176 pCi/L for the same well locations. Enclosure E contains a chart depicting the overall trend for MW-5 and MW-6 since plant shutdown in 1997. All monitoring well samples collected in 2005 were well below the reporting criteria of 20,000 pCi/L.

No BRP ODCM reporting limits were exceeded during 2005.

Each well water sample consists of a one-gallon grab sample. This sample is sent to Environmental Inc. Midwest Laboratory for analysis. No treatment of the water samples with a preservative is necessary.

G. Drinking Water

Collection of drinking water samples, other than the plant's drinking water supply well (see Section E), is no longer required by the BRP Radiological Environmental Monitoring Program.

H. Crops

The collection of food crops/vegetation samples is not required by the BRP Radiological Environmental Monitoring Program.

I. Sediment

A total of six individual sediment samples were collected from four locations during 2005. Sediment samples locations are the lakeshore adjacent to the former discharge channel (1-ST), 1/4 mile south of discharge (24-STS), 1/4 mile north of discharge (25-STN), and the Ludington control station (26-LP, 115 miles SSW). The BRP ODCM requirement for sampling where clarified water enters the lake is met by sample collected adjacent to the former discharge location due to the proximity of these two locations (approximately 100 yard distance).

Evaluation of the sediment analytical results was based on data mean comparisons between the BRP samples and the Ludington control samples and the BRP ODCM reporting limits. Gross beta was detected in three indicator samples with a mean value of 7.4 pCi/g. Cs-137 was detected in four indicator samples with a mean of 0.28 pCi/g. Co-60 was detected in all six indicator samples with a mean of 0.09 pCi/g. Detection of Cs-137 and

Co-60 were at levels slightly lower than the 2004 values for these sample locations. Neither Cs-137 nor Co-60 was detected in control samples.

No BRP ODCM reporting levels or action levels were exceeded during 2005.

Sediment samples are collected in one-liter quantities and obtained a few yards off-shore. No treatment of the samples with a preservative is necessary prior to shipment to Environmental Inc. Midwest Laboratory.

J. Fish

The BRP Radiological Environmental Monitoring Program requires that either one fish or invertebrate (crayfish) sample is collected semiannually at or near the Plant discharge area. Fish samples were collected from the shoreline adjacent to the former discharge area (1-ST) in July and October of 2005 (see Enclosure A). Control samples were taken from the Ludington location. Radionuclide analyses results are listed in Table 2 for these samples. The fall fish sample from the former discharge area indicated the presence of Cs-137 at less than one-half of the required LLD. Gross beta, which originates primarily from naturally-occurring background radionuclides, is not required by the Big Rock Point ODCM for fish samples.

No BRP ODCM reporting levels were exceeded nor were any special or supplemental analyses required during 2005.

One liter quantities of frozen fish are sent to Environmental Inc. Midwest Laboratory for analysis.

K. Crayfish

No crayfish samples were collected in 2005.

L. Aquatic Biota

The collection/analysis of aquatic biota (algae and periphyton) is no longer required for the Big Rock Point Radiological Environmental Monitoring Program.

M. Broad Leaf Vegetation

The collection/analysis of broad leaf vegetation is no longer required in the Big Rock Point Radiological Environmental Monitoring Program.

N. Gaseous and Liquid Radwaste Effluent Composite Samples

Although not a direct reporting component in the BRP Annual Radiological Environmental Monitoring Report, results of collected gaseous and liquid effluent composite samples are evaluated against overall environmental trending data. All isotopic analysis results were below BRP ODCM reporting levels.

Gaseous particulate composite samples from demolition areas that had the potential to become effluents were collected monthly and sent to Environmental Inc. Midwest Laboratory for analysis. The gaseous effluent monthly composite sample results are based on analyzing four or five weekly effluent filters. The liquid effluent composite sample is a representative sample quantity collected during each release activity. As noted in Enclosure C, two liquid effluent composite samples were collected for detained groundwater and surface water discharges in 2005 and sent to Environmental Inc. Midwest Laboratory for analyses. No special sample treatment with a preservative is required prior to laboratory analysis.

III. Assessment of Big Rock Point's Operational Environmental Impact

In reviewing the 2005 Big Rock Point radiological environmental monitoring data and comparing it to previous operational and pre-operational data, all trending parameters continue to indicate that operation and decommissioning activities of Big Rock Point have minimal environmental impact. Most radionuclide activity is at environmental "background" levels. Evidence of an overall environmental isotopic build-up attributable to site effluents remains negligible at all locations. In most instances, sample analytical results were below previously established environmental background levels. A comparison of analytical results showed that the shoreline adjacent to the former plant discharge canal (also the former location of licensed radioactive liquid release) remained the indicator location with the highest annual mean for the samples collected in 2005.

Table 1. Sampling and Analysis Summary

Medium	Description	Location(s)	Type of Analysis	Number of Samples Collected	Frequency of Analysis
TLD	Continuous	1-ST, 5-PT, 6-BC, 7-TR, 9A-17K	Gamma isotopic	51 12	Quarterly Annual [a]
Lake Water [b]	1 gallon composite	1-ST Near Discharge	Tritium [e], Gamma isotopic	0	Semiannual
Well Water	1 gallon grab/composite	1-ST Well	Tritium [e], Gamma isotopic	2	Semiannual
Monitoring Wells [c]	1 gallon grab	MW 1-9	Tritium [e], Gamma isotopic	21	Semiannual
Sediment	Grab	1-ST, 24-STS, 25-STN, 26-LP	Gamma Isotopic	7	Semiannual
Fish [d]	Grab	1-ST Near discharge, 26-LP	Gamma Isotopic	5	Semiannual
Crayfish [d]	Grab	1-ST Near discharge	Gamma Isotopic	0	Semiannual

Table Notes
[a] Only quarterly TLD's are required per Big Rock Point ODCM
[b] Composite samples from retention pond releases collected semiannually; see Enclosure A for additional information.
[c] Tritium and gamma isotopic analysis for a minimum of 6 monitoring wells, semi-annually
[d] BRP ODCM requires one fish or crayfish sample semiannually
[e] Tritium background sample analyses are not required since background is expected to be less than established LLDs

Table 2. Sample Data Summary [a]

Medium or Pathway Sampled (Units)	Analyses Evaluated Versus Total Number Analyses Performed		Lower Limit of Detection (LLD) [b]	All Indicator Locations Mean [c] (Range)		All Control Locations Mean [c] (Range)		Nonroutine Measure-ments
Direct Radiation:								
TLD - Onsite (mR)	TLD (quarterly) [d]	27/28	1.0	16/16	23.6 (11.8-87.3)	11/12	13.2 (10.3-20.3)	None
	TLD (annual)	6/7	1.0	4/4	90.5 (51.3-173.8)	2/3	42.7 (39.4-46.0)	None
TLD - Site Boundary (mR)	TLD (quarterly) [d]	35/36	1.0	24/24	11.7 (9.3-14.8)	11/12	13.2 (10.3-20.3)	None
	TLD (annual)	8/9	1.0	6/6	42.7 (37.0-51.7)	2/3	42.7 (39.4-46.0)	None
Waterborne:								
Lake [e] (pCi/L)	*Samples not collected*	--	--	--	--	--	--	--
Well Water (pCi/L)	Tritium	2/2	500.0	0/2	LLD	N/A	N/A	None
	Gamma Isotopic	2/2	15.0-30.0	0/2	LLD	N/A	N/A	None
Groundwater Monitoring Wells (pCi/L)	Tritium	21/21	1000.0	13/21	2450 (1405-5254)	N/A	N/A	None
	Gamma Isotopic	21/21	15.0-30.0	0/21	LLD	N/A	N/A	None
Biota:								
Crayfish [f] (pCi/g wet)	*Samples not collected*							
Fish [f] (pCi/g wet)	Gamma Isotopic (Cs-137)	5/5	0.15	1/2	0.05 N/A	1/3	0.035 N/A	None

Table 2. Sample Data Summary [a]

Medium or Pathway Sampled (Units)	Analyses Evaluated	Versus Total Number Analyses Performed	Lower Limit of Detection (LLD) [b]	All Indicator Locations Mean [c] (Range)		All Control Locations Mean [c] (Range)		Nonroutine Measure-ments
Lake Sediment:								
Shoreline sediment (pCi/g dry)	Gross Beta	3/3	1.0	3/6	7.4 (4.18-13.1)	0/0	N/A	None
	Co-60	7/7	0.05	4/6	0.09 (0.04-0.11)	0/1	LLD	None
	Cs-137	7/7	0.18	6/6	0.28 (0.10-0.61)	0/1	LLD	None

Table Notes:
[a] Values for sample locations with the greatest annual mean are provided in Table 3.
[b] Nominal LLD as defined in the Big Rock Point Offsite Dose Calculation Manual Section I, Table I.H-3 or vendor analytical capabilities.
[c] Mean and range data reported are based upon detectable measurements.
[d] Quarterly TLD results are normalized for 91 days net.
[e] Analyses of two composite samples collected during retention pond were 3835 pCi/L and 2747 pCi/L with an average of 3291 pCi/L.
[f] Sample requirements are either one fish or invertebrate sample semiannually

Table 3. Reporting Results Greatest Mean Sampling Location

Medium	Type of Analysis	Location	High	Low	Mean
TLD - Onsite (mR)	TLD (Quarterly) [a]	17-K	87.3	17.6	43.3
	TLD (Annual)	NE Restricted Area	---	---	173.8
TLD - Site Boundary (mR)	TLD (Quarterly) [a]	12-E	14.8	12.4	13.5
	TLD (Annual)	SE Boundary	---	---	51.7
Lake Water (pCi/L)	*No samples collected* [b]				
Well Water (pCi/L)	Tritium	Not applicable – all samples <LLD			
	Gamma Isotopic	Not applicable – all samples <LLD			
Groundwater Monitoring Wells (pCi/L)	Tritium	MW-6 North Restricted Area	4987	4918	4953
	Gamma Isotopic	Not applicable – all samples <LLD			
Sediment (pCi/g dry)	Gross Beta	1-ST, near former Plant Discharge	---	---	13.1
	Co-60	1-ST, near former Plant Discharge	0.11	0.11	0.11
	Cs-137	1-ST, near former Plant Discharge	0.61	0.30	0.46
Fish [c] (pCi/g wet)	Gamma Isotopic (Cs-137)	1-ST, near former Plant Discharge	---	---	0.05
Crayfish [c] (pCi/g wet)	*No samples collected*				

Table Notes
[a] Quarterly TLD results are normalized for 91 days net.
[b] See Enclosure A.
[d] Sample requirements are either one fish or invertebrate sample semiannually

Enclosures

A. Sample Collection Anomalies

B. Big Rock Point Environmental Sample Schedule (with sample locations and maps)

C. Radiological Environmental Monitoring Program Data as provided by Environmental, Inc. Midwest laboratory, Northbrook, IL.

D. Environmental, Inc. Midwest laboratory EPA Interlaboratory Comparison Program Results

E. Data Graphs

1. Mean Quarterly TLDs, Big Rock Point 1997-2005
2. Groundwater Monitoring Well Mean Tritium Concentration, Big Rock Point 1997-2005
3. Sediment Mean Total Gamma Activity, Big Rock Point 1997-2005
4. Fish & Crayfish Mean Total Gamma Activity, Big Rock Point 1997-2005

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Enclosure A: Sample Collection Anomalies

Enclosure A

Sample Collection Anomalies

Sample Type Affected	Location	Date	Problem Description	Evaluation
TLD	BRP-07	10-06-05	Quarterly TLD lost in field	TLD lost during building exterior remodeling; remaining offsite TLD readings consistent with previous years data.
TLD	BRP-07	10-06-05	Annual TLD lost in field	Same as above
Biota	1-ST (near site)	07-12-05	Semi-annual fish sample collected in July	Sample was collected 12 days late due to emergent work.
Lake Water	1-ST (near site)	Semiannual	Samples not obtained	Table 1-1 of the ODCM states that semiannual lake water samples are to be collected near the site; however, these samples have been determined not to be required. The ODCM basis for environmental samples along the lakeshore discusses only biota and sediment sampling. The ODCM will be revised to resolve this inconsistency. Precautionary tritium and gamma isotopic analyses from composites of detained surface and groundwater released to the lake show that gamma activity was less than LLD. Tritium levels from these composite samples were 3835 pCi/L and 2747 pCi/L, for an average value of 3291 pCi/L.

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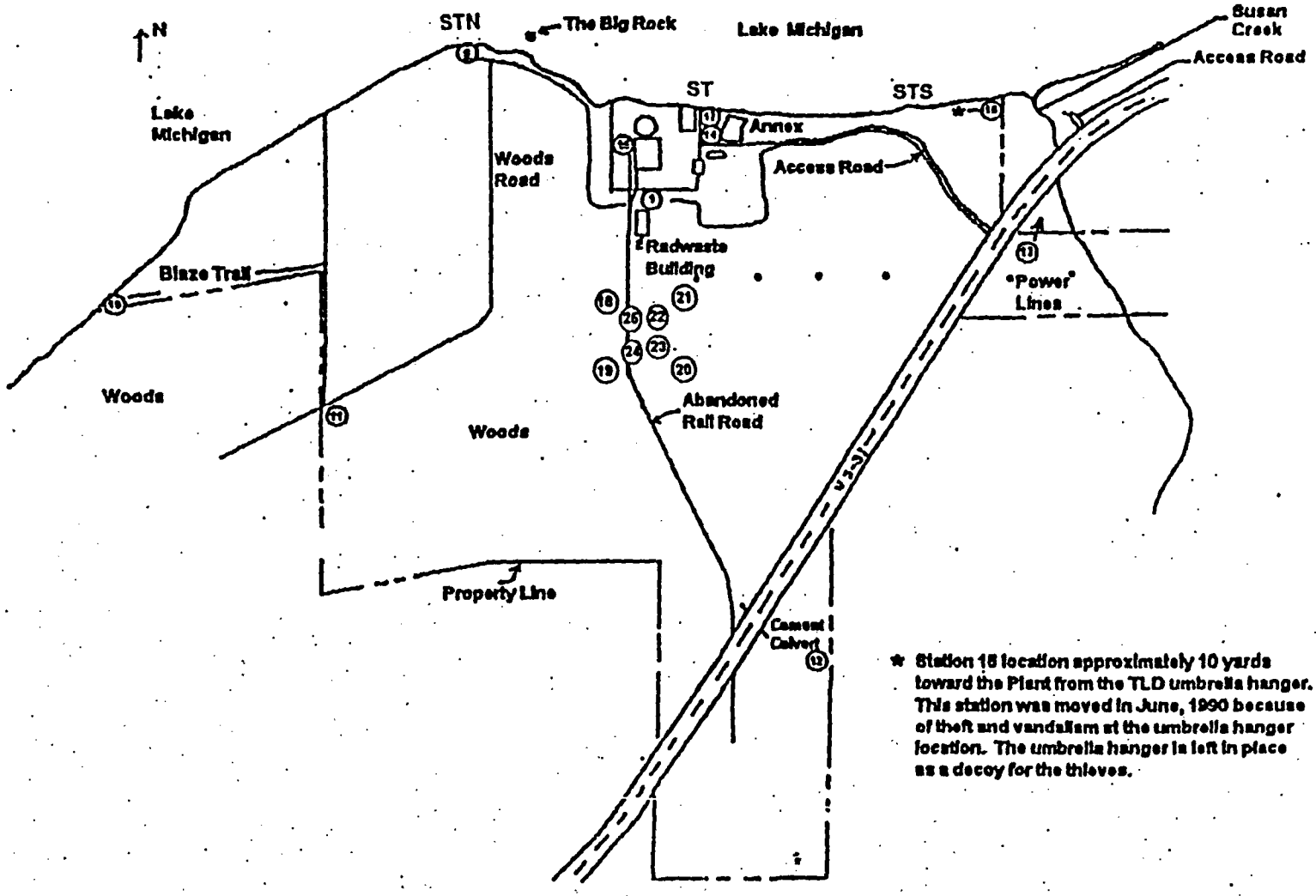
Enclosure B: Big Rock Point Environmental Sample Schedule
and Sample Location Maps

TABLE 1-1
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

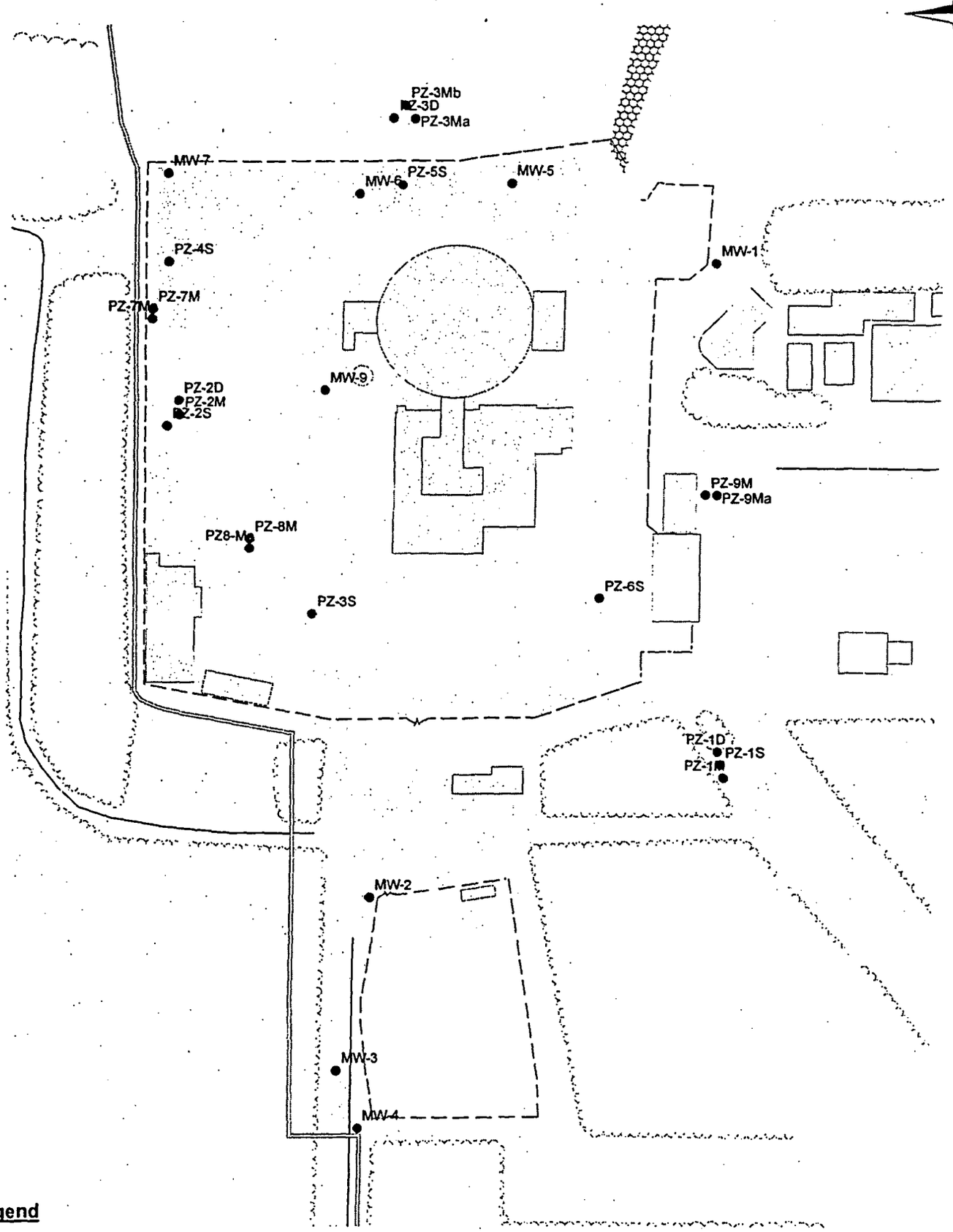
Exposure Pathway and/or Sample	Number of Representative Samples and Sample Locations [a]	Sampling and Collection Frequency	Type and frequency of Analysis
1. Direct Radiation [b]	21 monitoring stations either with two or more TLDs or one instrument for measuring and recording dose rate continuously, placed as follows [d]: a) Miscellaneous site locations (4) b) A ring of stations (6) at or near the Site boundary c) Balance of stations (3) placed to serve as control stations d) Outside perimeter of ISFSI (4) e) ISFSI protected area fence line (4)	Quarterly	Gamma dose quarterly
2. Waterborne			
a. Lake	1 sample near site	Semiannual (grab)	Tritium and gamma isotopic [d]
b. Well (drinking) and groundwater monitoring wells	1 sample from Site well, if in use, and 1 sample from minimum of 6 monitor wells	Semiannual (grab) Semiannual (grab)	Tritium and gamma isotopic semiannually
3. Biota			
a. Marine	1 fish or invertebrate sample where clarified, detained water enters lake	Semiannual (grab) Apr-Nov	Gamma Isotopic Semiannually
4. Lake Sediment			
a. Shoreline	1 sample where clarified, detained water enters lake	Semiannual (grab) Apr-Nov	Gamma Isotopic Semiannually
b. Shoreline	1 sample each side of 4.a (above), within ~½ mile	Semiannual (grab) Apr-Nov	Gamma Isotopic Semiannually

Big Rock Point
Environmental Sample Location Map



★ Station 18 location approximately 10 yards toward the Plant from the TLD umbrella hanger. This station was moved in June, 1990 because of theft and vandalism at the umbrella hanger location. The umbrella hanger is left in place as a decoy for the thieves.

Groundwater Sample Well Locations
Big Rock Point Restoration Project



Legend

- Monitoring Wells

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Enclosure C: BRP Radiological Environmental Monitoring Program Data

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FINAL REPORT
TO
CONSUMERS ENERGY COMPANY
JACKSON, MICHIGAN

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM (REMP)
FOR
BIG ROCK NUCLEAR GENERATING PLANT

PREPARED AND SUBMITTED
BY
ENVIRONMENTAL INCORPORATED MIDWEST LABORATORY

Project Number: 8022

Reporting Period: January - December, 2005

Reviewed and
Approved by _____ Date 02-14-2006

B. Grob, M.S.
Laboratory Manager

Distribution: R. J. Bearss (1 copy)

BIG ROCK

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LIST OF TABLES

1.0 INTRODUCTION

The following constitutes a final 2005 Progress Report for the Radiological Environmental Monitoring Program conducted at the Consumers Power Company, Big Rock Nuclear Generating Plant. Results of completed analyses are presented in the attached tables.

All concentrations, except gross alpha and gross beta, are decay corrected to the time of collection.

All samples were collected within the scheduled period unless noted otherwise in the Listing of Missed Samples.

BIG ROCK

2.0 LISTING OF MISSED SAMPLES

Sample Type	Location	Expected Collection Date	Reason
TLD	BRP-07	10-05-05	Lost in field.
TLD	BRP-07	01-05-06	Lost in field.

Table 1. Gamma radiation, as measured by TLDs, quarterly exposure.
Units: mR/91 days[a]

	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.
Date Placed	01-06-05	04-04-05	07-07-05	10-05-05
Date Removed	04-04-05	07-07-05	10-05-05	01-05-06
Intransit (mR)	3.1 ± 0.3	2.0 ± 0.3	2.7 ± 0.4	1.2 ± 0.3
BRP-01 (ST) (Onsite)	17.3 ± 1.2	14.8 ± 1.1	14.1 ± 1.0	12.6 ± 1.0
BRP-05 (PT) (Control)	11.0 ± 0.6	11.3 ± 0.4	12.5 ± 1.1	11.5 ± 0.4
BRP-06 (BC) (Control)	14.1 ± 0.4	13.0 ± 0.9	14.7 ± 0.6	14.1 ± 1.0
BRP-07 (TR) (Control)	12.3 ± 0.5	10.3 ± 0.6	ND[b]	20.3 ± 0.7
BRP-09 (Site Boundary)	11.1 ± 0.5	11.2 ± 0.8	12.2 ± 1.0	11.1 ± 0.4
BRP-10 (Site Boundary)	10.5 ± 0.6	10.1 ± 0.4	10.9 ± 0.6	10.5 ± 0.4
BRP-11 (Site Boundary)	12.4 ± 0.5	12.1 ± 0.8	13.5 ± 0.5	12.2 ± 0.5
BRP-12 (Site Boundary)	12.4 ± 0.4	13.3 ± 0.5	14.8 ± 0.6	13.6 ± 0.4
BRP-13 (Site Boundary)	11.3 ± 0.4	12.0 ± 0.5	13.6 ± 0.4	12.3 ± 0.4
BRP-14 (G) (Onsite)	15.7 ± 0.8	13.2 ± 0.8	13.0 ± 0.7	12.1 ± 0.5
BRP-15 (H) (Onsite)	43.4 ± 1.4	17.7 ± 0.6	18.1 ± 0.8	11.8 ± 0.5
BRP-16 (J) (Site Boundary)	9.3 ± 0.5	9.8 ± 0.5	9.6 ± 0.6	9.9 ± 0.4
BRP-17 (K) (Onsite)	17.6 ± 0.5	48.2 ± 0.8	87.3 ± 2.2	20.0 ± 0.8
BRP-18 (ISFSI-NW)	10.7 ± 0.5	10.1 ± 0.6	10.0 ± 0.5	10.8 ± 0.6
BRP-19 (ISFSI-SW)	11.9 ± 0.6	13.1 ± 0.6	13.5 ± 0.6	13.6 ± 0.6
BRP-20 (ISFSI-SE)	12.3 ± 0.6	12.4 ± 0.5	15.0 ± 0.8	13.0 ± 0.5
BRP-21 (ISFSI-NE)	10.7 ± 0.6	10.2 ± 0.4	10.6 ± 0.7	10.9 ± 0.4
BRP-22 (ISFSI-FNE)	17.3 ± 0.6	16.8 ± 0.6	17.0 ± 0.7	17.8 ± 0.4
BRP-23 (ISFSI-FSE)	34.2 ± 0.7	34.7 ± 1.6	34.9 ± 1.2	34.1 ± 1.0
BRP-24 (ISFSI-FSW)	19.3 ± 0.9	19.1 ± 0.3	19.1 ± 0.7	19.5 ± 0.4
BRP-25 (ISFSI-FNW)	16.1 ± 0.5	15.9 ± 0.4	16.7 ± 0.6	16.4 ± 0.4

[a] Intransit exposure has been subtracted.
[b] "ND" = No data; TLD missing.

Table 2. Gamma radiation, as measured by TLDs, annual exposure.
Units: mR/365 days[a]

	2005
Date Placed	01-06-05
Date Removed	01-05-06
Intransit (mR)	2.6 ± 0.7
BRP-01 (ST) (Onsite)	52.5 ± 3.8
BRP-05 (PT) (Control)	39.4 ± 0.8
BRP-06 (BC) (Control)	46.0 ± 1.1
BRP-07 (TR) (Control)	ND[b]
BRP-09 (Site Boundary)	37.0 ± 1.3
BRP-10 (Site Boundary)	38.1 ± 1.2
BRP-11 (Site Boundary)	44.9 ± 2.1
BRP-12 (Site Boundary)	51.7 ± 1.1
BRP-13 (Site Boundary)	47.2 ± 1.0
BRP-14 (G) (Onsite)	51.3 ± 1.0
BRP-15 (H) (Onsite)	84.3 ± 1.4
BRP-16 (J) (Site Boundary)	37.3 ± 0.8
BRP-17 (K) (Onsite)	173.8 ± 1.4
BRP-18 (ISFSI-NW)	37.7 ± 1.1
BRP-19 (ISFSI-SW)	44.5 ± 1.6
BRP-20 (ISFSI-SE)	45.9 ± 0.9
BRP-21 (ISFSI-NE)	34.3 ± 1.1
BRP-22 (ISFSI-FNE)	63.3 ± 3.9
BRP-23 (ISFSI-FSE)	137.6 ± 2.2
BRP-24 (ISFSI-FSW)	69.8 ± 1.0
BRP-25 (ISFSI-FNW)	57.8 ± 1.9
Control 1 (Shield)	21.4 ± 1.2
Control 2 (Shield)	22.1 ± 1.0

[a] *Intransit exposure has been subtracted.*

[b] "ND" = No data; TLD missing.

Table 5.1 Well water, analyses for tritium and gamma emitting isotopes.
Collection: Semiannual
Units: pCi/L

Location	Site Well		
Lab Code	BRWW-3205	BRWW-6948	
Date Collected	6/3/2005	11/30/2005	Req. LLD
H-3	< 169	< 166	
Mn-54	< 4.6	< 4.3	15
Fe-59	< 12.4	< 6.9	30
Co-58	< 4.2	< 4.1	15
Co-60	< 3.1	< 3.1	15
Zn-65	< 5.3	< 6.9	30
Zr-Nb-95	< 4.1	< 6.7	15
Cs-134	< 3.3	< 4.7	15
Cs-137	< 3.3	< 7.1	18
Ba-La-140	< 12.2	< 4.8	15

Table 6. Fish, analyses for gross beta and gamma-emitting isotopes.
Collection: Semiannually
Units: pCi/g wet

Location	Discharge		
Lab Code	BRF-4088	BRF-5864	
Date Collected	7/12/2005	10/12/2005	Req. LLD
Sample Type	Carp	Salmon	
Gross Beta		3.63 ± 0.09	
Mn-54	< 0.020	< 0.007	0.13
Fe-59	< 0.032	< 0.052	0.26
Co-58	< 0.015	< 0.018	0.13
Co-60	< 0.013	< 0.014	0.13
Zn-65	< 0.014	< 0.021	0.26
Zr-Nb-95	< 0.026	< 0.022	0.10
Cs-134	< 0.016	< 0.010	0.13
Cs-137	< 0.015	0.050 ± 0.017	0.15

Location	Ludington Pumped Storage Plant (Control)			
Lab Code	PAF-7122	PAF-7124	PAF-7125	
Date Collected	10/13/2005	12/8/2005	12/8/2005	Req. LLD
Sample Type	Chinook Salmon	Whitefish	Trout	
Gross Beta				
Mn-54	< 0.028	< 0.017	< 0.013	0.13
Fe-59	< 0.174	< 0.028	< 0.059	0.26
Co-58	< 0.037	< 0.015	< 0.014	0.13
Co-60	< 0.030	< 0.013	< 0.011	0.13
Zn-65	< 0.046	< 0.031	< 0.025	0.26
Zr-Nb-95	< 0.097	< 0.043	< 0.023	0.10
Cs-134	< 0.020	< 0.020	< 0.016	0.13
Cs-137	< 0.023	< 0.017	0.035 ± 0.020	0.15

Table 8. Bottom sediment, analyses for gross beta and gamma-emitting isotopes.
Collection: Semiannually
Units: pCi/g dry

Location	1/4 Mile East		1/4 Mile West		
Lab Code	BRBS-4091	BRBS-5866	BRBS-4092	BRBS-5867	
Date Collected	6/3/2005	10/11/2005	6/3/2005	10/11/2005	Req. LLD
Gross Beta		4.18 ± 1.74		5.00 ± 1.64	
Mn-54	< 0.023	< 0.021	< 0.026	< 0.022	0.08
Fe-59	< 0.108	< 0.091	< 0.124	< 0.052	0.10
Co-58	< 0.038	< 0.028	< 0.038	< 0.029	0.08
Co-60	0.09 ± 0.021	0.04 ± 0.026	< 0.022	< 0.021	0.05
Zn-65	< 0.070	< 0.045	< 0.056	< 0.048	0.10
Zr-Nb-95	< 0.064	< 0.062	< 0.152	< 0.038	0.10
Cs-134	< 0.028	< 0.026	< 0.035	< 0.024	0.15
Cs-137	0.28 ± 0.035	0.28 ± 0.039	0.11 ± 0.046	0.10 ± 0.027	0.18

Location	Discharge		Ludington (Control)	
Lab Code	BRBS-4089,90	BRBS-5865	PABS-7127	
Date Collected	6/3/2005	10/11/2005	12/8/2005	Rec. LLD
Gross Beta		13.13 ± 1.77		
Mn-54	< 0.020	< 0.025	< 0.025	0.08
Fe-59	< 0.130	< 0.077	< 0.091	0.10
Co-58	< 0.036	< 0.015	< 0.027	0.08
Co-60	0.11 ± 0.016	0.11 ± 0.028	< 0.026	0.05
Zn-65	< 0.055	< 0.050	< 0.087	0.10
Zr-Nb-95	< 0.078	< 0.045	< 0.025	0.10
Cs-134	< 0.020	< 0.024	< 0.037	0.15
Cs-137	0.61 ± 0.035	0.30 ± 0.035	< 0.024	0.18

Table 9.1. Liquid Radwaste, analyses for gross alpha, tritium, strontium-89, strontium-90, plutonium-239 and gamma emitting isotopes.
Collection: Monthly
Units: uCi/ml

Lab Code	Required LLD	NS[a]	NS[a]	NS[a]
Date Collected	-	01-31-05	02-28-05	03-31-05
Gross Alpha	1.0 E-07	-	-	-
H-3	1.0 E-05	-	-	-
Sr-89	5.0 E-08	-	-	-
Sr-90	5.0 E-08	-	-	-
Pu-239	5.0 E-08	-	-	-
Cr-51	5.0 E-07	-	-	-
Mn-54	5.0 E-07	-	-	-
Fe-59	5.0 E-07	-	-	-
Co-58	5.0 E-07	-	-	-
Co-60	5.0 E-07	-	-	-
Zn-65	5.0 E-07	-	-	-
Zr-95	5.0 E-07	-	-	-
Nb-95	5.0 E-07	-	-	-
Ag-110m	5.0 E-07	-	-	-
Sb-124	5.0 E-07	-	-	-
Cs-134	5.0 E-07	-	-	-
Cs-137	5.0 E-07	-	-	-
Ba-140	5.0 E-07	-	-	-
La-140	5.0 E-07	-	-	-
Ce-141	5.0 E-07	-	-	-
Ce-144	5.0 E-07	-	-	-

[a] Sample not collected.

Table 9.1. Liquid Radwaste, analyses for gross alpha, tritium, strontium-89, strontium-90, plutonium-239 and gamma emitting isotopes.
Collection: Monthly
Units: uCi/ml

Lab Code	Required LLD	NS[a]	NS[a]	NS[a]
Date Collected	-	04-30-05	05-31-05	06-30-05
Gross Alpha	1.0 E-07	-	-	-
H-3	1.0 E-05	-	-	-
Sr-89	5.0 E-08	-	-	-
Sr-90	5.0 E-08	-	-	-
Pu-239	5.0 E-08	-	-	-
Cr-51	5.0 E-07	-	-	-
Mn-54	5.0 E-07	-	-	-
Fe-59	5.0 E-07	-	-	-
Co-58	5.0 E-07	-	-	-
Co-60	5.0 E-07	-	-	-
Zn-65	5.0 E-07	-	-	-
Zr-95	5.0 E-07	-	-	-
Nb-95	5.0 E-07	-	-	-
Ag-110m	5.0 E-07	-	-	-
Sb-124	5.0 E-07	-	-	-
Cs-134	5.0 E-07	-	-	-
Cs-137	5.0 E-07	-	-	-
Ba-140	5.0 E-07	-	-	-
La-140	5.0 E-07	-	-	-
Ce-141	5.0 E-07	-	-	-
Ce-144	5.0 E-07	-	-	-

[a] Sample not collected.

Table 9.1. Liquid Radwaste, analyses for gross alpha, tritium, strontium-89, strontium-90, plutonium-239 and gamma emitting isotopes.
Collection: Monthly
Units: uCi/ml

Lab Code	Required LLD	NS[a]	NS[a]	NS[a]
Date Collected	-	07-31-05	08-31-05	09-30-05
Gross Alpha	1.0 E-07			
H-3	1.0 E-05			
Sr-89	5.0 E-08			
Sr-90	5.0 E-08			
Pu-239	5.0 E-08			
Cr-51	5.0 E-07			
Mn-54	5.0 E-07			
Fe-59	5.0 E-07			
Co-58	5.0 E-07			
Co-60	5.0 E-07			
Zn-65	5.0 E-07			
Zr-95	5.0 E-07			
Nb-95	5.0 E-07			
Ag-110m	5.0 E-07			
Sb-124	5.0 E-07			
Cs-134	5.0 E-07			
Cs-137	5.0 E-07			
Ba-140	5.0 E-07			
La-140	5.0 E-07			
Ce-141	5.0 E-07			
Ce-144	5.0 E-07			

[a] Sample not collected.

Table 9.1. Liquid Radwaste, analyses for gross alpha, tritium, strontium-89, strontium-90, plutonium-239 and gamma emitting isotopes.
Collection: Monthly
Units: uCi/ml

Lab Code	Required LLD	NS[a]	NS[a]	NS[a]
Date Collected	-	10-31-05	11-30-05	12-31-05
Gross Alpha	1.0 E-07			
H-3	1.0 E-05			
Sr-89	5.0 E-08			
Sr-90	5.0 E-08			
Pu-239	5.0 E-08			
Cr-51	5.0 E-07			
Mn-54	5.0 E-07			
Fe-59	5.0 E-07			
Co-58	5.0 E-07			
Co-60	5.0 E-07			
Zn-65	5.0 E-07			
Zr-95	5.0 E-07			
Nb-95	5.0 E-07			
Ag-110m	5.0 E-07			
Sb-124	5.0 E-07			
Cs-134	5.0 E-07			
Cs-137	5.0 E-07			
Ba-140	5.0 E-07			
La-140	5.0 E-07			
Ce-141	5.0 E-07			
Ce-144	5.0 E-07			

[a] Sample not collected.

Table 9.2. Stack Filters, analyses for gross alpha, plutonium-239, strontium-89 and strontium-90.
Collection: Continuous, monthly exchange.
Units: pCi/filter

Location		Big Rock			
Date Collecte	Lab Code	Gross Alpha	Sr-89	Sr-90	Pu-239
Required LLD		10	10	10	10
01-31-05	BRSP -543	16.3 ± 1.6	< 3.2	4.9 ± 2.0	0.6 ± 0.2
02-28-05	-1042	19.2 ± 1.8	< 2.1	7.7 ± 1.4	< 0.3
03-31-05	-1615	17.2 ± 0.7	< 3.6	18.7 ± 3.0	1.1 ± 0.5
04-30-05	-2354	17.1 ± 1.8	< 5.2	134.1 ± 7.0	0.5 ± 0.4
05-28-05	-3120	12.8 ± 1.6	< 4.5	28.3 ± 3.6	3.0 ± 0.6
06-30-05	-3915	12.9 ± 1.5	< 2.6	66.5 ± 4.7	2.7 ± 1.0
07-31-05	-4525	6.6 ± 1.2	< 4.6	32.2 ± 3.5	1.4 ± 0.6
08-31-05	-5024	4.8 ± 1.3	< 5.3	12.7 ± 2.5	1.0 ± 0.4
09-30-05	-5544	5.3 ± 1.4	< 6.6	10.4 ± 2.7	< 0.1
10-31-05	-6326	1.9 ± 0.7	< 4.6	< 3.3	< 0.1
11-30-05	-6947	3.5 ± 1.1	< 4.3	< 2.6	< 0.2
12-31-05	-7377	0.7 ± 0.4	< 5.6	< 3.3	< 0.1

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an Allegheny Technologies Co.

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Mr. Randy Bearss
Big Rock Point
10269 US-31 North
Charlevoix MI 49720

LABORATORY REPORT NO. 8022-100-179
DATE: 05-18-2005
SAMPLES RECEIVED: 05-11-2005
PURCHASE ORDER NO:

Below are the results of the analyses for tritium on two samples.

Sample Description	Collection Date	Lab Code	Concentration (pCi/L) H-3
PZ-3MA	04-19-05	BRW-2470	2,141 ± 145
PZ-5S	04-20-05	BRW-2471	4,842 ± 200

The error g ven is the probable counting error at 95% confidence level.

Sincerely,

Bronia Grob,
Laboratory Manager

APPROVED BY

Tony Coorlim,
Quality Assurance

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LABORATORY REPORT NO. 8022-100-181
DATE: 05-23-2005
SAMPLES RECEIVED: 05-12-2005
PURCHASE ORDER NO:

Below are the results of the analyses for tritium on eight samples.

Sample Description	Collection Date	Lab Code	Concentration (pCi/L) H-3
PZ-2D	04-20-05	BRW-2516	< 1000
PZ-3D	04-20-05	BRW-2517	1,405 ± 407
PZ-2M	04-20-05	BRW-2518	< 1000
PZ-8M	04-28-05	BRW-2519	< 1000
PZ-9M	04-19-05	BRW-2520	< 1000
PZ-8MA	04-28-05	BRW-2521	< 1000
PZ-9MA	04-19-05	BRW-2522	< 1000
PZ-3MB	04-19-05	BRW-2523	1,745 ± 422

The error given is the probable counting error at 95% confidence level.

Sincerely,

Bronia Grob,
Laboratory Manager

APPROVED BY

Tony Coorlim,
Quality Assurance

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LABORATORY REPORT NO. 8022-100-178
DATE: 05-18-2005
SAMPLES RECEIVED: 05-11-2005
PURCHASE ORDER NO:

Below are the results of the analyses for tritium on two samples.

Sample Description	Collection Date	Lab Code	Concentration (pCi/L) H-3
MW-5	05-03-05	BRW-2468	4,436 ± 193
MW-6	04-28-05	BRW-2469	4,918 ± 204

The error given is the probable counting error at 95% confidence level.

Sincerely,

Bronia Grob,
Laboratory Manager

APPROVED BY

Tony Coorlim,
Quality Assurance

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Mr. Randy Bearss
Big Rock Point
10269 US-31 North
Charlevoix, MI 49720

LABORATORY REPORT NO. 8022-100-199
DATE: 10-25-2005
SAMPLES RECEIVED: 10-18-2005
PURCHASE ORDER NO:

Below are the results of the analyses for tritium on two samples.

Sample Description	Collection Date	Lab Code	Concentration (pCi/L) H-3
MW-5	10-05-05	BRW-5942	4,825 ± 533
MW-5	10-05-05	BRW-5943*	5,254 ± 544
MW-6	10-05-05	BRW-5944	4,987 ± 537

* Denotes a duplicate.
The error given is the probable counting error at 95% confidence level.

Sincerely,

Bronia Grob,
Laboratory Manager

APPROVED BY Tony Coorlim /bmo

Tony Coorlim,
Quality Assurance

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Charlevoix, MI 49720

LABORATORY REPORT NO. 8022-100-200
DATE: 10-25-2005
SAMPLES RECEIVED: 10-18-2005
PURCHASE ORDER NO:

CORRECTED REPORT

Below are the results of the analyses for tritium on seven samples.

Sample Description	Collection Date	Lab Code	Concentration (pCi/L) H-3
PZ-3D	10-05-05	BRW-5945	2,813 ± 477
PZ-3MA	10-05-05	BRW-5946	2,961 ± 481
PZ-3MB	10-05-05	BRW-5947	4,248 ± 517
PZ-8M	10-06-05	BRW-5948	< 1000
PZ-9M	10-04-05	BRW-5949	1,477 ± 436
PZ-9MA	10-04-05	BRW-5950	< 1000
PZ-5S*	10-05-05	BRW-5951	2,222 ± 459

*Corrected Sample Description.
The error given is the probable counting error at 95% confidence level.

Sincerely,

Bronia Grob,
Laboratory Manager

APPROVED BY

Tony Coorlim,
Quality Assurance

Big Rock Point
Annual Radiological Environmental Operation Report
January through December 2005

Enclosure D: Interlaboratory Comparison Program Results

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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, 2005 through December, 2005

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 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.

Attachment A lists acceptance criteria for "spiked" samples.

Out-of-l mit 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	$\pm 1\sigma$ = (pCi/liter) = 169.85 x (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	Concentration (pCi/L)				
		Analysis	Laboratory Result[b]	ERA Result[c]	Control Limits	Acceptance
STW-1051	02/15/05	Sr-89	28.0 ± 1.2	29.4	20.7 - 38.1	Pass
STW-1051	02/15/05	Sr-90	25.1 ± 0.7	24.4	15.7 - 33.1	Pass
STW-1052	02/15/05	Ba-133	52.9 ± 2.8	53.4	44.2 - 62.6	Pass
STW-1052	02/15/05	Co-60	54.4 ± 0.4	56.6	47.9 - 65.3	Pass
STW-1052	02/15/05	Cs-134	67.7 ± 1.8	64.9	56.2 - 73.6	Pass
STW-1052	02/15/05	Cs-137	39.6 ± 1.8	40.2	31.5 - 48.9	Pass
STW-1052	02/15/05	Zn-65	159.7 ± 3.0	161.0	133.0 - 189.0	Pass
STW-1053	02/15/05	Gr. Alpha	55.1 ± 1.8	67.9	38.5 - 97.3	Pass
STW-1053	02/15/05	Gr. Beta	46.8 ± 1.3	51.1	38.5 - 97.3	Pass
STW-1054	02/15/05	Ra-226	13.7 ± 1.5	14.1	10.4 - 17.8	Pass
STW-1054	02/15/05	Ra-228	13.3 ± 0.6	13.7	7.8 - 19.6	Pass
STW-1054	02/15/05	Uranium	5.1 ± 0.2	5.0	0.0 - 10.2	Pass
STW-1055	05/17/05	Sr-89	45.1 ± 4.1	41.3	32.6 - 50.0	Pass
STW-1055	05/17/05	Sr-90	7.5 ± 0.9	5.9	0.0 - 14.6	Pass
STW-1056	05/17/05	Ba-133	87.1 ± 2.0	88.4	73.1 - 104.0	Pass
STW-1056	05/17/05	Co-60	38.4 ± 0.8	37.0	28.3 - 45.7	Pass
STW-1056	05/17/05	Cs-134	75.3 ± 0.7	78.6	69.9 - 87.3	Pass
STW-1056	05/17/05	Cs-137	201.0 ± 8.4	194.0	184.0 - 218.0	Pass
STW-1056	05/17/05	Zn-65	130.0 ± 6.7	118.0	97.6 - 138.0	Pass
STW-1057	05/17/05	Gr. Alpha	42.7 ± 2.9	37.0	21.0 - 53.0	Pass
STW-1057	05/17/05	Gr. Beta	34.0 ± 0.4	34.2	25.5 - 42.9	Pass
STW-1058	05/17/05	I-131	14.7 ± 0.5	15.5	10.3 - 20.7	Pass
STW-1059	05/17/05	Ra-226	6.6 ± 0.1	7.6	5.6 - 9.5	Pass
STW-1059	05/17/05	Ra-228	19.3 ± 0.7	18.9	10.7 - 27.1	Pass
STW-1059	05/17/05	Uranium	9.6 ± 0.1	10.1	4.9 - 15.3	Pass
STW-1060	05/17/05	H-3	24100.0 ± 109.0	24400.0	20200.0 - 28600.0	Pass
STW-1067	08/16/05	Sr-89	29.1 ± 3.0	28.0	19.3 - 36.7	Pass
STW-1067	08/16/05	Sr-90	36.0 ± 0.6	33.8	25.1 - 42.5	Pass
STW-1068	08/16/05	Ba-133	107.0 ± 1.7	106.0	87.7 - 124.0	Pass
STW-1068	08/16/05	Co-60	15.2 ± 0.2	13.5	4.8 - 22.2	Pass
STW-1068	08/16/05	Cs-134	89.1 ± 0.3	92.1	83.4 - 101.0	Pass
STW-1068	08/16/05	Cs-137	72.1 ± 1.0	72.7	64.0 - 81.4	Pass
STW-1068	08/16/05	Zn-65	67.4 ± 1.4	65.7	54.3 - 77.1	Pass
STW-1069	08/16/05	Gr. Alpha	44.3 ± 1.5	55.7	31.6 - 79.8	Pass
STW-1069	08/16/05	Gr. Beta	58.4 ± 2.1	61.3	44.0 - 78.6	Pass
STW-1070	08/16/05	Ra-226	16.6 ± 1.5	16.6	12.3 - 20.9	Pass
STW-1070	08/16/05	Ra-228	6.2 ± 0.3	6.2	3.5 - 8.9	Pass
STW-1070	08/16/05	Uranium	4.5 ± 0.1	4.5	0.0 - 9.7	Pass

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-1072	11/15/05	Sr-89	20.6 ± 0.4	19.0	10.3 - 27.7	Pass
STW-1072	11/15/05	Sr-90	15.0 ± 0.3	16.0	7.3 - 24.7	Pass
STW-1073	11/15/05	Ba-133	31.8 ± 1.8	31.2	22.5 - 39.9	Pass
STW-1073	11/15/05	Co-60	85.0 ± 1.4	84.1	75.4 - 92.8	Pass
STW-1073	11/15/05	Cs-134	37.2 ± 2.1	33.9	25.2 - 42.6	Pass
STW-1073	11/15/05	Cs-137	27.8 ± 0.7	28.3	19.6 - 37.0	Pass
STW-1073	11/15/05	Zn-65	109.0 ± 1.0	105.0	86.8 - 123.0	Pass
STW-1074 [d]	11/15/05	Gr. Alpha	41.1 ± 1.2	23.3	13.2 - 33.4	Fail
STW-1074	11/15/05	Gr. Beta	42.7 ± 0.5	39.1	30.4 - 47.8	Pass
STW-1075	11/15/05	I-131	20.5 ± 0.6	17.4	12.2 - 22.6	Pass
STW-1076	11/15/05	Ra-226	7.8 ± 0.6	8.3	6.2 - 10.5	Pass
STW-1076 [e]	11/15/05	Ra-228	5.5 ± 0.6	3.5	2.0 - 5.0	Fail
STW-1076	11/15/05	Uranium	15.5 ± 0.3	16.1	10.9 - 21.3	Pass
STW-1077	11/15/05	H-3	12500.0 ± 238.0	12200.0	10100.0 - 14300.0	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.

[d] The original samples were calculated using an Am-241 efficiency. The samples were spiked with Th-232. Samples were recounted and calculated using the Th-232 efficiency. Results of the recount: 27.01 ± 2.35 pCi/L.

[e] Decay of short-lived radium daughters contributed to a higher counting rate. Delay of counting for 100 minutes provided better results. The reported result was the average of the first cycle of 100 minutes, the average of the second cycle counts was 4.01 pCi/L

TABLE A-2. Crosscheck program results; Thermoluminescent Dosimetry, (TLD, CaSO4: Dy Cards).

Lab Code	Date	Description	mR Known Value	mR Lab Result ± 2 sigma	Control Limits	Acceptance
Environmental, Inc.						
2005-1	4/4/2005	30 cm	55.01	64.02 ± 2.86	38.51 - 71.51	Pass
2005-1	4/4/2005	60 cm	13.75	15.43 ± 1.02	9.63 - 17.88	Pass
2005-1	4/4/2005	60 cm	13.75	14.98 ± 0.80	9.63 - 17.88	Pass
2005-1	4/4/2005	90 cm	6.11	6.24 ± 0.16	4.28 - 7.94	Pass
2005-1	4/4/2005	90 cm	6.11	5.45 ± 0.48	4.28 - 7.94	Pass
2005-1	4/4/2005	120 cm	3.44	3.50 ± 0.35	2.41 - 4.47	Pass
2005-1	4/4/2005	120 cm	3.44	3.15 ± 0.18	2.41 - 4.47	Pass
2005-1	4/4/2005	150 cm	2.2	2.31 ± 0.25	1.54 - 2.86	Pass
2005-1	4/4/2005	180 cm	1.53	1.65 ± 0.41	1.07 - 1.99	Pass
Environmental, Inc.						
2005-2	9/12/2005	30 cm	54.84	59.30 ± 2.66	38.39 - 71.29	Pass
2005-2	9/12/2005	60 cm	13.71	17.55 ± 1.30	9.60 - 17.82	Pass
2005-2	9/12/2005	75 cm	8.77	8.24 ± 0.38	6.14 - 11.40	Pass
2005-2	9/12/2005	90 cm	6.09	5.94 ± 0.49	4.26 - 7.92	Pass
2005-2	9/12/2005	90 cm	6.09	5.93 ± 0.37	4.26 - 7.92	Pass
2005-2	9/12/2005	120 cm	3.43	3.42 ± 0.18	2.40 - 4.46	Pass
2005-2	9/12/2005	150 cm	2.19	1.71 ± 0.14	1.53 - 2.85	Pass
2005-2	9/12/2005	150 cm	2.19	1.87 ± 0.27	1.53 - 2.85	Pass
2005-2	9/12/2005	180 cm	1.52	1.58 ± 0.99	1.06 - 1.98	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-11105	1/11/2005	Gr. Alpha	24.05 ± 1.01	20.08	10.04 - 30.12	Pass
W-11105	1/11/2005	Gr. Beta	61.59 ± 1.11	65.70	55.70 - 75.70	Pass
SPW-754	2/18/2005	H-3	77595.00 ± 764.00	80543.00	64434.40 - 96651.60	Pass
SPAP-766	2/18/2005	Gr. Beta	416.08 ± 5.52	463.00	370.40 - 509.30	Pass
STW-2887	2/28/2005	Tc-99	32.91 ± 1.23	32.98	20.98 - 44.98	Pass
W-30105	3/1/2005	Gr. Alpha	25.22 ± 0.45	20.08	10.04 - 30.12	Pass
W-30105	3/1/2005	Gr. Beta	62.27 ± 0.48	65.73	55.73 - 75.73	Pass
SPW-1836	4/15/2005	I-131	109.79 ± 0.94	106.30	85.04 - 127.56	Pass
SPW-1836	4/15/2005	I-131(G)	110.25 ± 9.68	106.30	95.67 - 116.93	Pass
SPMI-1838	4/15/2005	Cs-134	25.94 ± 1.28	26.60	16.60 - 36.60	Pass
SPMI-1838	4/15/2005	Cs-137	59.31 ± 3.66	60.90	50.90 - 70.90	Pass
SPMI-1838	4/15/2005	I-131	97.71 ± 0.81	106.30	85.04 - 127.56	Pass
SPMI-1838	4/15/2005	I-131(G)	109.45 ± 3.06	106.30	95.67 - 116.93	Pass
SPMI-1838	4/15/2005	Sr-89	104.44 ± 2.89	108.20	86.56 - 129.84	Pass
SPMI-1838	4/15/2005	Sr-90	8.97 ± 0.79	7.53	0.00 - 17.53	Pass
SPVE-1932	4/18/2005	I-131(G)	1.00 ± 0.04	0.73	0.44 - 1.02	Pass
SPCH-1935	4/18/2005	I-131	382.40 ± 14.95	328.64	262.91 - 394.37	Pass
SPAP-1966	4/18/2005	Cs-134	52.10 ± 7.27	53.35	43.35 - 63.35	Pass
SPAP-1966	4/18/2005	Cs-134	57.28 ± 13.47	53.35	43.35 - 63.35	Pass
SPAP-1966	4/18/2005	Cs-137	124.68 ± 18.41	121.77	109.59 - 133.95	Pass
SPAP-1968	4/18/2005	Cs-134	52.10 ± 7.27	53.35	43.35 - 63.35	Pass
SPAP-1968	4/18/2005	Cs-137	116.79 ± 14.00	121.77	109.59 - 133.95	Pass
SPW-2098	4/26/2005	Fe-55	2565.20 ± 63.66	3017.60	2414.08 - 3621.12	Pass
SPW-2922	5/31/2005	Cs-134	27.01 ± 1.09	25.54	15.54 - 35.54	Pass
SPW-2922	5/31/2005	Cs-134	65.38 ± 2.92	60.71	50.71 - 70.71	Pass
SPW-2922	5/31/2005	Sr-89	107.90 ± 3.60	113.90	91.12 - 136.68	Pass
SPW-2922	5/31/2005	Sr-90	11.11 ± 1.13	6.90	0.00 - 16.90	Pass
SPAP-2892	6/1/2005	Gr. Beta	420.32 ± 5.55	448.00	358.40 - 492.80	Pass
SPW-2895	6/1/2005	H-3	75271.00 ± 724.00	78676.00	62940.80 - 94411.20	Pass
w-60105	6/1/2005	Gr. Alpha	23.69 ± 0.52	20.08	10.04 - 30.12	Pass
w-60105	6/1/2005	Gr. Beta	60.08 ± 0.57	65.73	55.73 - 75.73	Pass
SPF-3089	6/7/2005	Cs-134	1.08 ± 0.05	1.02	0.61 - 1.43	Pass
SPF-3089	6/7/2005	Cs-137	2.54 ± 0.10	2.43	1.46 - 3.40	Pass
SPW-	7/1/2005	Ni-63	20.57 ± 1.10	16.75	10.05 - 23.45	Pass
SPW-47731	8/24/2005	C-14	2112.30 ± 9.13	2370.80	1422.48 - 3319.12	Pass
SPW-47732	8/24/2005	C-14	2294.10 ± 10.37	2370.80	1422.48 - 3319.12	Pass
SPW-4775	8/24/2005	Fe-55	2633.50 ± 62.40	2777.50	2222.00 - 3333.00	Pass
SPMI-4834	8/30/2005	Cs-134	49.27 ± 4.68	47.02	37.02 - 57.02	Pass
SPMI-4834	8/30/2005	Cs-137	58.17 ± 8.18	60.37	50.37 - 70.37	Pass
SPMI-4834	8/30/2005	Sr-89	66.39 ± 3.13	65.90	52.72 - 79.08	Pass
SPMI-4834	8/30/2005	Sr-90	11.15 ± 1.13	9.60	0.00 - 19.60	Pass

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

Lab Code	Date	Analysis	Concentration (pCi/L) Laboratory results 2s, n=1[b]	Known Activity	Control Limits[c]	Acceptance
SPW-4836	8/30/2005	Cs-134	47.35 ± 5.19	47.02	37.02 - 57.02	Pass
SPW-4836	8/30/2005	Cs-137	62.91 ± 9.08	60.37	50.37 - 70.37	Pass
SPW-4836	8/30/2005	Sr-89	11.04 ± 0.98	9.60	0.00 - 19.60	Pass
SPW-4836	8/30/2005	Sr-90	65.89 ± 2.79	65.90	52.72 - 79.08	Pass
SPW-5014	8/30/2005	H-3	77518.20 ± 753.80	77602.52	62082.02 - 93123.02	Pass
W-90705	9/7/2005	Gr. Alpha	24.61 ± 0.48	20.08	10.04 - 30.12	Pass
W-90705	9/7/2005	Gr. Beta	58.35 ± 0.49	65.73	55.73 - 75.73	Pass
SPW-5237	9/22/2005	C-14	2387.40 ± 11.00	2370.80	1422.48 - 3319.12	Pass
SPW-5508	9/26/2005	Ni-63	20.64 ± 1.23	16.70	10.02 - 23.38	Pass
SPW-6019	10/24/2005	Tc-99	547.99 ± 6.69	539.22	377.45 - 700.99	Pass
SPF-6293	11/4/2005	Cs-134	941.30 ± 44.10	886.00	797.40 - 974.60	Pass
SPF-6293	11/4/2005	Cs-137	2570.40 ± 105.30	2400.00	2160.00 - 2640.00	Pass
SPAP-6309	11/7/2005	Cs-134	41.24 ± 1.91	44.03	34.03 - 54.03	Pass
SPAP-6309	11/7/2005	Cs-137	114.03 ± 5.01	120.24	108.22 - 132.26	Pass
SPAP-6311	11/7/2005	Gr. Beta	1.58 ± 0.02	1.42	1.14 - 11.42	Pass
SPW-6451	11/10/2005	H-3	77126.00 ± 747.00	76749.00	61399.20 - 92098.80	Pass
W-120105	12/1/2005	Gr. Alpha	25.16 ± 0.45	20.08	10.04 - 30.12	Pass
W-120105	12/1/2005	Gr. Beta	74.58 ± 0.81	65.73	55.73 - 75.73	Pass
SPW-7440	12/30/2005	Cs-134	42.67 ± 4.22	42.03	32.03 - 52.03	Pass
SPW-7440	12/30/2005	Cs-137	61.19 ± 7.20	59.91	49.91 - 69.91	Pass
SPMI-7442	12/31/2005	Cs-134	40.41 ± 5.66	42.03	32.03 - 52.03	Pass
SPMI-7442	12/31/2005	Cs-137	60.05 ± 7.80	59.91	49.91 - 69.91	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.

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	Concentration (pCi/L)[a] Laboratory results (4.66σ) LLD	Laboratory results (4.66σ) Activity[b]	Acceptance Criteria (4.66 σ)
W-11105	water	1/11/2005	Gr. Alpha	0.055	0.00 ± 0.038	1
W-11105	water	1/11/2005	Gr. Beta	0.15	-0.016 ± 0.10	3.2
SPW-765	water	2/18/2005	H-3	165.8	7.4 ± 82.5	200
SPAP-766	Air Filter	2/18/2005	Gr. Beta	0.72	0.29 ± 0.48	3.2
STW-2388	water	2/28/2005	Tc-99	1.32	0.45 ± 0.81	10
W-30105	water	3/1/2005	Gr. Alpha	0.067	-0.007 ± 0.043	1
W-30105	water	3/1/2005	Gr. Beta	0.18	-0.04 ± 0.11	3.2
SPW-1837	water	4/15/2005	Cs-134	4.66		10
SPW-1837	water	4/15/2005	Cs-137	5.38		10
SPW-1837	water	4/15/2005	I-131	0.30	-0.13 ± 0.16	0.5
SPW-1837	water	4/15/2005	I-131(G)	6.56		20
SPMI-1839	Milk	4/15/2005	I-131	0.26	-0.083 ± 0.14	0.5
SPMI-1839	Milk	4/15/2005	Sr-89	0.54	-0.069 ± 0.56	5
SPMI-1839	Milk	4/15/2005	Sr-90	0.53	0.88 ± 0.34	1
SPCH-1934	Charcoal	4/18/2005	I-131(G)	2.34		9.6
SPW-2097	water	4/26/2005	Fe-55	859.0	96.1 ± 528.4	1000
SPW-2923	water	5/31/2005	Cs-134	3.29		10
SPW-2923	water	5/31/2005	Cs-137	3.87		10
SPW-2896	water	6/1/2005	H-3	138.30	48.1 ± 85.9	200
w-60105	water	6/1/2005	Gr. Alpha	0.061	0.002 ± 0.043	1
w-60105	water	6/1/2005	Gr. Beta	0.16	0.056 ± 0.11	3.2
SPF-3090	Fish	6/7/2005	Cs-134	15.69		100
SPF-3090	Fish	6/7/2005	Cs-137	11.71		100
SPW-	water	7/1/2005	Ni-63	1.60	0.79 ± 0.99	20
SPW-4774	water	8/24/2005	C-14	12.18	2.84 ± 6.45	200
SPW-4776	water	8/24/2005	Fe-55	833	275 ± 525	1000
SPMI-4835	Milk	8/30/2005	Co-60	4.42		10
SPMI-4835	Milk	8/30/2005	Cs-134	4.18		10
SPMI-4835	Milk	8/30/2005	Cs-137	6.25		10
SPMI-4835	Milk	8/30/2005	I-131(G)	5.37		20
SPMI-4835	Milk	8/30/2005	Sr-89	0.66	-0.23 ± 0.65	5
SPMI-4835 [d]	Milk	8/30/2005	Sr-90	0.66	1.02 ± 0.41	1
SPW-4837	water	8/30/2005	Co-60	2.48		10
SPW-4837	water	8/30/2005	Cs-134	3.85		10
SPW-4837	water	8/30/2005	Cs-137	3.00		10
SPW-4837	water	8/30/2005	Sr-89	0.63	0.25 ± 0.53	5
SPW-4837	water	8/30/2005	Sr-90	0.63	-0.035 ± 0.29	1
SPW-5015	water	8/30/2005	H-3	142.8	168 ± 93	200
SPW-5238	water	9/22/2005	C-14	17.10	3.02 ± 9.04	200

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

Lab Code	Sample Type	Date	Analysis	Concentration (pCi/L)[a] Laboratory results (4.66σ) LLD	Activity[b]	Acceptance Criteria (4.66 σ)
W-90705	water	9/7/2005	Gr. Alpha	0.056	0.034 ± 0.04	1
W-90705	water	9/7/2005	Gr. Beta	0.16	0.082 ± 0.11	3.2
SPW-5238	water	9/22/2005	C-14	17.10	3.02 ± 9.04	200
SPW-5509	water	9/26/2005	Ni-63	1.25	1.23 ± 0.79	20
SPW-6020	water	10/24/2005	Tc-99	4.81	-1.75 ± 2.90	10
SPF-6294	Fish	11/4/2005	Cs-134	18.60		100
SPF-6294	Fish	11/4/2005	Cs-137	12.99		100
SPAP-6310	Air Filter	11/7/2005	Cs-134	3.23		100
SPAP-6310	Air Filter	11/7/2005	Cs-137	3.86		100
SPAP-6312	Air Filter	11/7/2005	Gr. Beta	1.22	-0.64 ± 0.64	3.2
W-120105	water	12/1/2005	Gr. Alpha	0.05	0.033 ± 0.04	1
W-120105	water	12/1/2005	Gr. Beta	0.15	-0.043 ± 0.11	3.2
SPMI-7419	Milk	12/22/2005	Co-60	7.24		10
SPMI-7419	Milk	12/22/2005	Cs-137	5.61		10
SPMI-7419	Milk	12/22/2005	I-131(G)	10.96		20
SPW-7421	water	12/22/2005	Co-60	2.43		10
SPW-7421	water	12/22/2005	Cs-137	3.12		10
SPW-7441	water	12/30/2005	Cs-134	4.25		10
SPW-7441	water	12/30/2005	Cs-137	1.63		10
SPMI-7443	Milk	12/30/2005	Cs-134	4.74		10
SPMI-7443	Milk	12/30/2005	Cs-137	8.53		10

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

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

[c] I-131(G); Iodine-131 as analyzed by gamma spectroscopy.

[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
SW-62, 63	1/3/2005	Gr. Beta	3.01 ± 0.57	2.39 ± 0.58	2.70 ± 0.41	Pass
SW-62, 63	1/3/2005	K-40	2.00 ± 0.20	2.10 ± 0.20	2.05 ± 0.14	Pass
CF-95, 96	1/3/2005	Gr. Beta	6.26 ± 0.23	6.28 ± 0.23	6.27 ± 0.16	Pass
CF-95, 96	1/3/2005	K-40	5.68 ± 0.59	5.37 ± 0.48	5.53 ± 0.38	Pass
AP-791, 792	1/14/2005	Be-7	0.057 ± 0.017	0.07 ± 0.04	0.06 ± 0.02	Pass
WW-353, 354	1/19/2005	Gr. Beta	8.37 ± 1.21	10.28 ± 1.34	9.32 ± 0.90	Pass
SO-383, 384	1/19/2005	H-3	453.50 ± 107.20	417.90 ± 106.00	435.70 ± 75.38	Pass
LW-431, 432	1/27/2005	Gr. Beta	2.45 ± 0.54	2.20 ± 0.54	2.33 ± 0.38	Pass
MI-486, 487	2/1/2005	K-40	1319.40 ± 163.60	1177.20 ± 179.70	1248.30 ± 121.51	Pass
SW-511, 512	2/1/2005	I-131	0.37 ± 0.22	0.44 ± 0.23	0.40 ± 0.16	Pass
TD-628, 629	2/1/2005	H-3	489663 ± 1918	491225 ± 1915	490444 ± 1355	Pass
DW-538, 539	2/3/2005	Gr. Beta	3.93 ± 1.18	3.62 ± 1.10	3.78 ± 0.81	Pass
MI-564, 565	2/8/2005	K-40	1316.20 ± 171.10	1292.60 ± 154.40	1304.40 ± 115.23	Pass
DW-50134, 5	2/11/2005	Gr. Beta	18.41 ± 0.98	16.76 ± 0.98	17.59 ± 0.69	Pass
SWU-893, 894	2/22/2005	Gr. Beta	4.00 ± 0.96	4.20 ± 0.72	4.10 ± 0.60	Pass
SW-925, 926	2/25/2005	Gr. Beta	5.97 ± 1.51	6.14 ± 1.55	6.06 ± 1.08	Pass
SW-950, 951	3/1/2005	Gr. Beta	0.92 ± 0.27	1.21 ± 0.27	1.07 ± 0.19	Pass
SW-950, 951	3/1/2005	Gr. Beta	2.06 ± 0.40	2.29 ± 0.44	2.18 ± 0.30	Pass
SW-973, 974	3/1/2005	I-131	1.08 ± 0.19	0.92 ± 0.18	1.00 ± 0.13	Pass
DW-50248, 9	3/16/2005	Gr. Alpha	5.27 ± 1.06	4.17 ± 0.90	4.72 ± 0.70	Pass
DW-1264, 1265	3/19/2005	I-131	0.54 ± 0.21	0.73 ± 0.20	0.63 ± 0.15	Pass
AP-1955, 1956	3/28/2005	Be-7	0.071 ± 0.009	0.071 ± 0.009	0.071 ± 0.006	Pass
AP-1890, 1891	3/29/2005	Be-7	0.060 ± 0.013	0.069 ± 0.013	0.065 ± 0.009	Pass
AP-2025, 2026	3/29/2005	Be-7	0.063 ± 0.012	0.071 ± 0.011	0.067 ± 0.008	Pass
MI-1346, 1347	3/30/2005	K-40	1252.80 ± 120.50	1334.10 ± 106.60	1293.45 ± 80.44	Pass
AP-2048, 2049	3/30/2005	Be-7	0.075 ± 0.018	0.071 ± 0.015	0.073 ± 0.012	Pass
AP-2081, 2082	3/30/2005	Be-7	0.073 ± 0.016	0.061 ± 0.018	0.067 ± 0.012	Pass
SWU-1521, 1522	3/31/2005	Gr. Beta	2.83 ± 1.16	3.46 ± 1.23	3.14 ± 0.85	Pass
WW-1738, 1739	4/5/2005	Gr. Beta	11.44 ± 1.17	11.14 ± 1.62	11.29 ± 1.00	Pass
SW-1857, 1858	4/13/2005	Gr. Beta	7.04 ± 1.71	9.96 ± 1.65	8.50 ± 1.19	Pass
LW-1911, 1912	4/14/2005	Gr. Beta	2.50 ± 0.63	3.23 ± 0.67	2.86 ± 0.46	Pass
F-1976, 1977	4/18/2005	K-40	3.09 ± 0.60	3.33 ± 0.40	3.21 ± 0.36	Pass
MI-2111, 2112	4/26/2005	K-40	1291.50 ± 177.90	1323.70 ± 108.80	1307.60 ± 104.27	Pass
SWU-2158, 2159	4/26/2005	Gr. Beta	3.69 ± 0.74	3.54 ± 0.66	3.62 ± 0.50	Pass
DW-2349, 2350	4/29/2005	I-131	0.58 ± 0.27	0.49 ± 0.27	0.53 ± 0.19	Pass
SO-2305, 2306	5/2/2005	Cs-137	0.11 ± 0.05	0.11 ± 0.04	0.11 ± 0.03	Pass
SO-2305, 2306	5/2/2005	Gr. Alpha	7.55 ± 2.88	12.41 ± 3.38	9.98 ± 2.22	Pass
SO-2305, 2306	5/2/2005	Gr. Beta	28.74 ± 2.57	28.17 ± 2.52	28.46 ± 1.80	Pass
SO-2305, 2306	5/2/2005	K-40	21.51 ± 1.22	21.42 ± 1.24	21.47 ± 0.87	Pass
SO-2305, 2306	5/2/2005	Sr-90	32.90 ± 9.90	29.60 ± 13.90	31.25 ± 8.53	Pass
MI-2260, 2261	5/3/2005	K-40	1028.10 ± 99.36	1206.70 ± 118.50	1117.40 ± 77.32	Pass
F-2630, 2631	5/5/2005	K-40	3.08 ± 0.46	3.04 ± 0.51	3.06 ± 0.34	Pass
VE-2502, 2503	5/10/2005	Gr. Alpha	0.06 ± 0.03	0.07 ± 0.04	0.07 ± 0.03	Pass

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

Lab Code	Date	Analysis	Concentration (pCi/L)[a] First Result	Second Result	Averaged Result	Acceptance
VE-2502, 2503	5/10/2005	Gr. Beta	3.81 ± 0.10	3.86 ± 0.10	3.83 ± 0.07	Pass
VE-2502, 2503	5/10/2005	K-40	3.79 ± 0.40	4.30 ± 0.59	4.04 ± 0.36	Pass
G-2546, 2547	5/11/2005	Be-7	0.81 ± 0.39	1.25 ± 0.38	1.03 ± 0.27	Pass
G-2546, 2547	5/11/2005	K-40	9.43 ± 1.00	7.96 ± 0.85	8.70 ± 0.66	Pass
SS-2787, 2788	5/18/2005	Cs-137	0.13 ± 0.04	0.14 ± 0.05	0.13 ± 0.03	Pass
SS-2787, 2788	5/18/2005	K-40	12.44 ± 0.76	13.33 ± 0.83	12.88 ± 0.56	Pass
SO-3056, 3057	5/19/2005	Cs-137	0.18 ± 0.04	0.17 ± 0.01	0.18 ± 0.02	Pass
SO-3056, 3057 [b]	5/19/2005	K-40	20.06 ± 1.10	21.73 ± 0.36	20.90 ± 0.58	Fail
SS-3175, 3176	5/23/2005	K-40	6.06 ± 0.44	5.96 ± 0.61	6.01 ± 0.38	Pass
SO-2865, 2866	5/25/2005	Cs-137	0.18 ± 0.04	0.18 ± 0.03	0.18 ± 0.02	Pass
SO-2865, 2866	5/25/2005	Gr. Beta	32.95 ± 2.48	33.88 ± 2.36	33.41 ± 1.71	Pass
SO-2865, 2866	5/25/2005	K-40	21.93 ± 0.97	22.32 ± 0.98	22.13 ± 0.69	Pass
DW-2935, 2936	5/27/2005	I-131	0.51 ± 0.34	0.56 ± 0.30	0.53 ± 0.23	Pass
SWU-3103, 3104	6/1/2005	Gr. Beta	3.29 ± 0.49	3.75 ± 0.66	3.52 ± 0.41	Pass
G-2958, 2959	6/1/2005	Be-7	1.06 ± 0.40	1.21 ± 0.28	1.14 ± 0.24	Pass
G-2958, 2959 [b]	6/1/2005	Gr. Beta	8.06 ± 0.07	7.79 ± 0.07	7.93 ± 0.05	Fail
G-2958, 2959	6/1/2005	K-40	5.93 ± 0.73	6.05 ± 0.28	5.99 ± 0.39	Pass
BS-4089, 4090	6/3/2005	Co-60	0.11 ± 0.02	0.10 ± 0.02	0.11 ± 0.02	Pass
BS-4089, 4090	6/3/2005	Cs-137	0.60 ± 0.05	0.62 ± 0.05	0.61 ± 0.04	Pass
DW-50527, 3	6/8/2005	Gr. Alpha	11.58 ± 1.31	13.52 ± 1.43	12.55 ± 0.97	Pass
VE-3278, 3279	6/13/2005	K-40	6.34 ± 0.59	7.29 ± 0.68	6.81 ± 0.45	Pass
MI-3299, 3300	6/15/2005	K-40	1215.40 ± 110.20	1250.70 ± 106.70	1233.05 ± 76.70	Pass
BS-3348, 3349	6/17/2005	Co-60	0.20 ± 0.04	0.22 ± 0.04	0.21 ± 0.03	Pass
BS-3348, 3349	6/17/2005	Cs-137	2.59 ± 0.10	2.51 ± 0.07	2.55 ± 0.06	Pass
BS-3348, 3349	6/17/2005	K-40	11.57 ± 0.81	11.82 ± 0.76	11.69 ± 0.56	Pass
DW-3486, 3487	6/28/2005	Gr. Beta	0.97 ± 0.54	1.67 ± 0.58	1.32 ± 0.40	Pass
SWT-3631, 3632	6/28/2005	Gr. Beta	2.12 ± 0.53	1.62 ± 0.56	1.87 ± 0.39	Pass
W-3507, 3508	6/29/2005	H-3	38717 ± 382	38017 ± 535	38367 ± 329	Pass
VE-3555, 3556	6/29/2005	Gr. Beta	7.53 ± 0.18	7.56 ± 0.18	7.55 ± 0.13	Pass
VE-3555, 3556	6/29/2005	K-40	5.70 ± 0.52	5.64 ± 0.53	5.67 ± 0.37	Pass
AP-3781, 3782	6/29/2005	Be-7	0.09 ± 0.02	0.08 ± 0.02	0.09 ± 0.01	Pass
LW-3610, 3611	6/30/2005	Gr. Beta	1.37 ± 0.35	1.40 ± 0.36	1.39 ± 0.25	Pass
SW-3760, 3761	6/30/2005	Gr. Beta	9.70 ± 1.63	9.77 ± 1.61	9.73 ± 1.15	Pass
E-3654, 3655	7/5/2005	Gr. Beta	1.76 ± 0.07	1.69 ± 0.07	1.72 ± 0.05	Pass
E-3654, 3655	7/5/2005	K-40	1.49 ± 0.25	1.05 ± 0.21	1.27 ± 0.16	Pass
MI-3676, 3677	7/5/2005	K-40	1383.90 ± 116.20	1428.20 ± 125.40	1406.05 ± 85.48	Pass
DW-3739, 3740	7/5/2005	I-131	1.93 ± 0.24	2.18 ± 0.23	2.05 ± 0.17	Pass
W-3808, 3809	7/6/2005	H-3	4189.61 ± 196.68	4438.33 ± 201.39	4313.97 ± 140.75	Pass
DW-3938, 3939	7/8/2005	I-131	1.11 ± 0.30	1.26 ± 0.31	1.18 ± 0.22	Pass
VE-3896, 3897	7/12/2005	K-40	3.44 ± 0.62	3.60 ± 0.36	3.52 ± 0.36	Pass
MI-3963, 3964	7/13/2005	K-40	1438.70 ± 102.80	1351.80 ± 100.80	1395.25 ± 71.99	Pass
DW-4068, 4069	7/15/2005	I-131	0.64 ± 0.27	0.91 ± 0.28	0.78 ± 0.20	Pass

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

			Concentration (pCi/L)[a]			
Lab Code	Date	Analysis	First Result	Second Result	Averaged Result	Acceptance
VE-4290, 4291	7/26/2005	Gr. Alpha	0.11 ± 0.04	0.05 ± 0.03	0.08 ± 0.03	Pass
VE-4290, 4291	7/26/2005	Gr. Beta	4.55 ± 0.13	4.69 ± 0.14	4.62 ± 0.09	Pass
SWU-4311, 4312	7/26/2005	Gr. Beta	2.62 ± 0.64	1.67 ± 0.37	2.15 ± 0.37	Pass
SWU-4311, 4312	7/26/2005	H-3	192.30 ± 92.90	304.60 ± 97.40	248.45 ± 67.30	Pass
G-4383, 4384	8/1/2005	Be-7	2.06 ± 0.49	1.76 ± 0.29	1.91 ± 0.28	Pass
G-4383, 4384	8/1/2005	Gr. Beta	8.76 ± 0.22	8.40 ± 0.20	8.58 ± 0.15	Pass
G-4383, 4384	8/1/2005	K-40	6.74 ± 0.64	6.88 ± 0.92	6.81 ± 0.56	Pass
MI-4425, 4426	8/1/2005	K-40	1358.10 ± 169.20	1267.90 ± 164.40	1313.00 ± 117.96	Pass
TD-4446, 4447	8/1/2005	H-3	563.00 ± 252.00	529.00 ± 251.00	546.00 ± 177.84	Pass
SL-4473, 4474	8/4/2005	Gr. Beta	5.44 ± 0.48	4.57 ± 0.42	5.00 ± 0.32	Pass
SL-4473, 4474	8/4/2005	K-40	2.91 ± 0.83	2.74 ± 0.54	2.82 ± 0.49	Pass
VE-4532, 4533	8/5/2005	Gr. Beta	31.20 ± 1.20	31.70 ± 1.20	31.45 ± 0.85	Pass
VE-4618, 4619	8/9/2005	Gr. Alpha	0.09 ± 0.05	0.09 ± 0.04	0.09 ± 0.03	Pass
VE-4618, 4619	8/9/2005	Gr. Beta	4.60 ± 0.13	4.54 ± 0.12	4.57 ± 0.09	Pass
VE-4618, 4619	8/9/2005	K-40	4.19 ± 0.46	4.34 ± 0.47	4.27 ± 0.33	Pass
F-4639, 4640	8/11/2005	Cs-137	0.05 ± 0.02	0.05 ± 0.02	0.05 ± 0.02	Pass
F-4639, 4640	8/11/2005	Gr. Beta	3.33 ± 0.11	3.37 ± 0.10	3.35 ± 0.07	Pass
F-4639, 4640	8/11/2005	K-40	2.62 ± 0.57	2.58 ± 0.59	2.60 ± 0.41	Pass
DW-4730, 4731	8/12/2005	I-131	0.82 ± 0.23	0.83 ± 0.25	0.83 ± 0.17	Pass
MI-4855, 4856	8/28/2005	K-40	1341.50 ± 107.70	1340.00 ± 114.70	1340.75 ± 78.67	Pass
MI-4855, 4856	8/28/2005	Sr-90	0.77 ± 0.37	0.87 ± 0.37	0.82 ± 0.26	Pass
MI-4945, 4946	8/31/2005	K-40	1388.90 ± 158.90	1307.50 ± 165.20	1348.20 ± 114.61	Pass
MI-4945, 4946	8/31/2005	Sr-90	0.67 ± 0.34	0.82 ± 0.36	0.75 ± 0.25	Pass
TD-4921, 4922	9/1/2005	H-3	5737.00 ± 266.00	5860.00 ± 269.00	5798.50 ± 189.15	Pass
VE-4900, 4901	9/2/2005	Gr. Beta	3.40 ± 0.06	3.51 ± 0.06	3.45 ± 0.04	Pass
VE-4900, 4901	9/2/2005	K-40	2.15 ± 0.27	2.27 ± 0.24	2.21 ± 0.18	Pass
DW-50769, 50770	9/2/2005	Gr. Alpha	6.17 ± 1.42	6.08 ± 1.46	6.13 ± 1.02	Pass
VE-4990, 4991	9/6/2005	K-40	18.81 ± 1.12	19.52 ± 0.86	19.17 ± 0.71	Pass
MI-5011, 5012	9/8/2005	K-40	1584.00 ± 194.00	1707.60 ± 173.00	1645.80 ± 129.97	Pass
VE-5119, 5120	9/12/2005	Gr. Alpha	0.10 ± 0.06	0.09 ± 0.05	0.10 ± 0.04	Pass
VE-5119, 5120	9/12/2005	Gr. Beta	6.05 ± 0.18	5.92 ± 0.17	5.98 ± 0.12	Pass
VE-5119, 5120	9/12/2005	K-40	4.61 ± 0.46	4.74 ± 0.69	4.68 ± 0.41	Pass
LW-5361, 5362	9/12/2005	Gr. Beta	1.09 ± 0.33	1.18 ± 0.34	1.13 ± 0.24	Pass
SW-5098, 5099	9/13/2005	I-131	0.44 ± 0.22	0.31 ± 0.20	0.38 ± 0.15	Pass
LW-5178, 5179	9/14/2005	Gr. Beta	2.92 ± 0.56	2.95 ± 0.59	2.93 ± 0.41	Pass
DW-5239, 5240	9/16/2005	I-131	0.45 ± 0.27	0.55 ± 0.29	0.50 ± 0.20	Pass
CF-5432, 5433	9/19/2005	Be-7	0.91 ± 0.40	0.64 ± 0.30	0.78 ± 0.25	Pass
CF-5432, 5433	9/19/2005	K-40	1.43 ± 0.34	1.38 ± 0.43	1.41 ± 0.27	Pass
MI-5292, 5293	9/21/2005	K-40	1228.80 ± 78.13	1297.00 ± 81.03	1262.90 ± 56.28	Pass
BS-5340, 5341	9/23/2005	Be-7	1286.10 ± 550.80	1222.90 ± 394.40	1254.50 ± 338.72	Pass
BS-5340, 5341	9/23/2005	Cs-137	726.97 ± 76.24	677.49 ± 70.03	702.23 ± 51.76	Pass

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

Lab Code	Date	Analysis	Concentration (pCi/L)[a] First Result	Second Result	Averaged Result	Acceptance
BS-5340, 5341	9/23/2005	K-40	12404 ± 1154	13033 ± 983	12719 ± 758	Pass
DW-5382, 5383	9/23/2005	I-131	0.79 ± 0.31	0.53 ± 0.31	0.66 ± 0.22	Pass
MI-5405, 5406	9/27/2005	K-40	1324.80 ± 112.20	1366.80 ± 99.44	1345.80 ± 74.96	Pass
AP-5769, 5770	9/27/2005	Be-7	0.08 ± 0.01	0.09 ± 0.02	0.08 ± 0.01	Pass
AP-5983, 5984	9/27/2005	Be-7	0.08 ± 0.01	0.08 ± 0.01	0.08 ± 0.01	Pass
AP-5878, 5879	9/29/2005	Be-7	0.06 ± 0.01	0.07 ± 0.01	0.07 ± 0.01	Pass
G-5526, 5527	10/3/2005	Be-7	4.03 ± 0.62	4.07 ± 0.80	4.05 ± 0.51	Pass
G-5526, 5527	10/3/2005	Gr. Beta	8.10 ± 0.30	8.80 ± 0.40	8.41 ± 0.24	Pass
G-5526, 5527	10/3/2005	K-40	4.93 ± 0.67	6.00 ± 0.72	5.47 ± 0.49	Pass
VE-5721, 5722	10/10/2005	Gr. Alpha	0.07 ± 0.05	0.08 ± 0.06	0.08 ± 0.04	Pass
VE-5721, 5722	10/10/2005	Gr. Beta	5.09 ± 0.15	5.00 ± 0.16	5.05 ± 0.11	Pass
VE-5721, 5722	10/10/2005	K-40	4.27 ± 0.43	4.20 ± 0.34	4.23 ± 0.27	Pass
CF-5695, 5696	10/11/2005	Be-7	2.70 ± 0.37	2.80 ± 0.34	2.75 ± 0.25	Pass
CF-5695, 5696	10/11/2005	K-40	11.79 ± 0.86	13.11 ± 0.68	12.45 ± 0.55	Pass
LW-6129, 6130	10/11/2005	Gr. Beta	1.34 ± 0.25	1.85 ± 0.29	1.59 ± 0.19	Pass
LW-6129, 6130	10/11/2005	H-3	304.35 ± 95.31	369.23 ± 97.88	336.79 ± 68.31	Pass
DW-50844, 5	10/11/2005	Gr. Beta	5.30 ± 1.50	4.20 ± 1.40	4.75 ± 1.03	Pass
LW-5748, 5749 [c]	10/12/2005	Gr. Beta	1.09 ± 0.25	1.89 ± 0.28	1.49 ± 0.19	Fail
AP-6485, 6486	10/20/2005	Be-7	0.10 ± 0.03	0.09 ± 0.03	0.09 ± 0.02	Pass
SWU-6156, 6157	10/25/2005	Gr. Beta	4.69 ± 1.34	4.18 ± 1.34	4.44 ± 0.95	Pass
VE-6186, 6187	10/26/2005	K-40	2.90 ± 0.49	2.83 ± 0.51	2.87 ± 0.35	Pass
LW-6203, 6204	10/27/2005	Gr. Beta	2.92 ± 0.62	3.09 ± 0.66	3.01 ± 0.45	Pass
SO-6270, 6271	10/28/2005	Cs-137	0.33 ± 0.03	0.34 ± 0.04	0.33 ± 0.03	Pass
SO-6270, 6271	10/28/2005	Gr. Beta	26.85 ± 2.78	22.25 ± 2.41	24.55 ± 1.84	Pass
SO-6270, 6271	10/28/2005	K-40	13.67 ± 0.74	14.02 ± 0.76	13.85 ± 0.53	Pass
TD-6320, 6321	11/1/2005	H-3	444202 ± 1770	446633 ± 1775	445418 ± 1253	Pass
SO-6605, 6606	11/11/2005	Gr. Beta	18.22 ± 2.23	18.47 ± 2.22	18.35 ± 1.57	Pass
CF-6509, 6510	11/14/2005	K-40	0.85 ± 0.14	0.99 ± 0.22	0.92 ± 0.13	Pass
SW-6638, 6639	11/22/2005	I-131	0.95 ± 0.35	0.67 ± 0.31	0.81 ± 0.23	Pass
SO-6887, 6888	11/22/2005	Gr. Alpha	6.80 ± 2.92	10.27 ± 3.26	8.53 ± 2.19	Pass
SO-6887, 6888	11/22/2005	Gr. Beta	19.27 ± 2.16	18.43 ± 2.21	18.85 ± 1.54	Pass
SO-6887, 6888	11/22/2005	K-40	14.29 ± 1.11	13.78 ± 0.78	14.03 ± 0.68	Pass
SWT-6721, 6722	11/29/2005	Gr. Beta	0.98 ± 0.31	0.87 ± 0.31	0.93 ± 0.22	Pass
VE-6775, 6776	11/29/2005	Gr. Beta	12.75 ± 0.28	13.16 ± 0.21	12.96 ± 0.18	Pass
LW-6743, 6744	11/30/2005	Gr. Beta	3.19 ± 0.47	2.50 ± 0.44	2.85 ± 0.32	Pass
DW-51023, 4	12/2/2005	Gr. Alpha	0.55 ± 1.40	2.21 ± 1.31	1.38 ± 0.96	Pass
SWT-7282, 7283	12/27/2005	Gr. Beta	1.62 ± 0.37	1.85 ± 0.38	1.74 ± 0.27	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).

[b] 600 minute count time or longer, resulting in lower error.

[c] Recount of W-5748, 2.38 ± 0.85 pCi/L Averaged result; 2.14 ± 0.45 pCi/L

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
STW-1045	01/01/05	Gr. Alpha	0.45 ± 0.10	0.53	0.00 - 1.05	Pass
STW-1045	01/01/05	Gr. Beta	1.90 ± 0.10	1.67	0.84 - 2.51	Pass
STW-1046	01/01/05	Am-241	1.62 ± 0.12	1.72	1.20 - 2.24	Pass
STW-1046	01/01/05	Co-57	239.40 ± 1.20	227.00	158.90 - 295.10	Pass
STW-1046	01/01/05	Co-60	248.70 ± 1.00	251.00	175.70 - 326.30	Pass
STW-1046	01/01/05	Cs-134	115.50 ± 1.80	127.00	88.90 - 165.10	Pass
STW-1046	01/01/05	Cs-137	328.50 ± 1.70	332.00	232.40 - 431.60	Pass
STW-1046	01/01/05	Fe-55	64.90 ± 7.00	75.90	53.13 - 98.67	Pass
STW-1046	01/01/05	H-3	304.00 ± 9.70	280.00	196.00 - 364.00	Pass
STW-1046	01/01/05	Mn-54	334.80 ± 1.90	331.00	231.70 - 430.30	Pass
STW-1046	01/01/05	Ni-63	7.10 ± 1.60	9.00	0.00 - 20.00	Pass
STW-1046	01/01/05	Pu-238	0.01 ± 0.02	0.02	0.00 - 1.00	Pass
STW-1046	01/01/05	Pu-239/40	2.50 ± 0.14	2.40	1.68 - 3.12	Pass
STW-1046	01/01/05	Sr-90	0.70 ± 0.80	0.00	0.00 - 5.00	Pass
STW-1046	01/01/05	Tc-99	43.20 ± 1.40	42.90	30.03 - 55.77	Pass
STW-1046	01/01/05	U-233/4	3.31 ± 0.20	3.24	2.27 - 4.21	Pass
STW-1046	01/01/05	U-238	3.38 ± 0.20	3.33	2.33 - 4.33	Pass
STW-1046	01/01/05	Zn-65	538.40 ± 3.80	496.00	347.20 - 644.80	Pass
STVE-1047	01/01/05	Co-57	10.60 ± 0.20	9.88	6.92 - 12.84	Pass
STVE-1047	01/01/05	Co-60	3.00 ± 0.20	3.15	2.21 - 4.10	Pass
STVE-1047	01/01/05	Cs-134	4.80 ± 0.40	5.00	3.50 - 6.50	Pass
STVE-1047	01/01/05	Cs-137	4.10 ± 0.30	4.11	2.88 - 5.34	Pass
STVE-1047	01/01/05	Mn-54	5.10 ± 0.30	5.18	3.63 - 6.73	Pass
STVE-1047	01/01/05	Zn-65	6.20 ± 0.50	6.29	4.40 - 8.18	Pass
STSO-1048	01/01/05	Am-241	96.60 ± 10.00	109.00	76.30 - 141.70	Pass
STSO-1048	01/01/05	Co-57	264.00 ± 2.00	242.00	169.40 - 314.60	Pass
STSO-1048	01/01/05	Co-60	226.50 ± 2.20	212.00	148.40 - 275.60	Pass
STSO-1048	01/01/05	Cs-134	760.60 ± 3.70	759.00	531.30 - 986.70	Pass
STSO-1048	01/01/05	Cs-137	336.20 ± 3.60	315.00	220.50 - 409.50	Pass
STSO-1048	01/01/05	K-40	663.70 ± 18.00	604.00	422.80 - 785.20	Pass
STSO-1048	01/01/05	Mn-54	541.30 ± 3.90	485.00	339.50 - 630.50	Pass
STSO-1048	01/01/05	Ni-63	924.30 ± 17.20	1220.00	854.00 - 1586.00	Pass
STSO-1048	01/01/05	Pu-238	0.60 ± 0.80	0.48	0.00 - 1.00	Pass
STSO-1048	01/01/05	Pu-239/40	78.00 ± 4.80	89.50	62.65 - 116.35	Pass
STSO-1048	01/01/05	Sr-90	514.60 ± 18.70	640.00	448.00 - 832.00	Pass
STSO-1048	01/01/05	U-233/4	47.90 ± 4.00	62.50	43.75 - 81.25	Pass
STSO-1048	01/01/05	U-238	226.30 ± 8.60	249.00	174.30 - 323.70	Pass
STSO-1048	01/01/05	Zn-65	851.30 ± 7.30	810.00	567.00 - 1053.00	Pass
STAP-1050	01/01/05	Gr. Alpha	0.11 ± 0.03	0.23	0.00 - 0.46	Pass
STAP-1050	01/01/05	Gr. Beta	0.38 ± 0.05	0.30	0.15 - 0.45	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
STAP-1049	01/01/05	Am-241	0.10 ± 0.04	0.10	0.07 - 0.13	Pass
STAP-1049	01/01/05	Co-57	4.76 ± 0.64	4.92	3.44 - 6.40	Pass
STAP-1049	01/01/05	Co-60	2.84 ± 0.22	3.03	2.12 - 3.94	Pass
STAP-1049	01/01/05	Cs-134	3.54 ± 0.37	3.51	2.46 - 4.56	Pass
STAP-1049	01/01/05	Cs-137	2.20 ± 0.27	2.26	1.58 - 2.94	Pass
STAP-1049	01/01/05	Mn-54	3.15 ± 0.21	3.33	2.33 - 4.33	Pass
STAP-1049	01/01/05	Pu-238	0.16 ± 0.04	0.20	0.14 - 0.25	Pass
STAP-1049	01/01/05	Pu-239/40	0.17 ± 0.02	0.17	0.14 - 0.25	Pass
STAP-1049[e]	01/01/05	Sr-90	2.24 ± 0.34	1.35	0.95 - 1.76	Fail
STAP-1049	01/01/05	U-233/4	0.34 ± 0.02	0.34	0.24 - 0.44	Pass
STAP-1049	01/01/05	U-238	0.35 ± 0.02	0.35	0.25 - 0.46	Pass
STAP-1049	01/01/05	Zn-65	3.12 ± 0.15	3.14	2.20 - 4.08	Pass
STW-1061	07/01/05	Am-241	2.21 ± 0.13	2.23	1.56 - 2.90	Pass
STW-1061	07/01/05	Co-57	293.20 ± 7.30	272.00	190.40 - 353.60	Pass
STW-1061	07/01/05	Co-60	275.70 ± 1.30	261.00	182.70 - 339.30	Pass
STW-1061	07/01/05	Cs-134	171.80 ± 4.00	167.00	116.90 - 217.10	Pass
STW-1061	07/01/05	Cs-137	342.10 ± 2.20	333.00	233.10 - 432.90	Pass
STW-1061	07/01/05	Fe-55	167.80 ± 9.30	196.00	137.20 - 254.80	Pass
STW-1061	07/01/05	H-3	514.20 ± 12.60	527.00	368.90 - 685.10	Pass
STW-1061	07/01/05	Mn-54	437.00 ± 2.50	418.00	292.60 - 543.40	Pass
STW-1061	07/01/05	Ni-63	105.10 ± 3.60	100.00	70.00 - 130.00	Pass
STW-1061	07/01/05	Pu-238	1.64 ± 0.12	1.91	1.34 - 2.48	Pass
STW-1061	07/01/05	Pu-239/40	2.32 ± 0.13	2.75	1.93 - 3.58	Pass
STW-1061	07/01/05	Sr-90	9.20 ± 1.30	8.98	6.29 - 11.67	Pass
STW-1061	07/01/05	Tc-99	72.30 ± 2.30	66.50	46.55 - 86.45	Pass
STW-1061	07/01/05	U-233/4	4.11 ± 0.18	4.10	2.87 - 5.33	Pass
STW-1061	07/01/05	U-238	4.14 ± 0.18	4.26	2.98 - 5.54	Pass
STW-1061	07/01/05	Zn-65	364.60 ± 4.90	330.00	231.00 - 429.00	Pass
STW-1062	07/01/05	Gr. Alpha	0.57 ± 0.05	0.79	0.21 - 1.38	Pass
STW-1062	07/01/05	Gr. Beta	1.36 ± 0.05	1.35	0.85 - 1.92	Pass
STSO-1063[f]	07/01/05	Am-241	48.40 ± 3.90	81.10	56.77 - 105.43	Fail
STSO-1063	07/01/05	Co-57	608.30 ± 2.80	524.00	366.80 - 681.20	Pass
STSO-1063	07/01/05	Co-60	322.70 ± 2.40	287.00	200.90 - 373.10	Pass
STSO-1063	07/01/05	Cs-134	632.10 ± 5.20	568.00	397.60 - 738.40	Pass
STSO-1063	07/01/05	Cs-137	512.40 ± 4.20	439.00	307.30 - 570.70	Pass
STSO-1063	07/01/05	K-40	720.50 ± 19.00	604.00	422.80 - 785.20	Pass
STSO-1063	07/01/05	Mn-54	516.80 ± 5.10	439.00	307.30 - 570.70	Pass
STSO-1063	07/01/05	Ni-63	366.50 ± 13.30	445.00	311.50 - 578.50	Pass
STSO-1063	07/01/05	Pu-238	68.80 ± 15.00	60.80	42.56 - 79.04	Pass
STSO-1063	07/01/05	Pu-239/40	0.00 ± 0.00	0.00	0.00 - 0.00	
STSO-1063	07/01/05	Sr-90	602.90 ± 17.20	757.00	529.90 - 984.10	Pass
STSO-1063	07/01/05	U-233/4	61.50 ± 1.00	52.50	36.75 - 68.25	Pass
STSO-1063	07/01/05	U-238	164.50 ± 16.70	168.00	117.60 - 218.40	Pass
STSO-1063	07/01/05	Zn-65	874.70 ± 8.40	823.00	576.10 - 1070.00	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-1064	07/01/05	Am-241	0.18 ± 0.03	0.23	0.16 - 0.30	Pass
STVE-1064	07/01/05	Co-57	15.90 ± 0.20	13.30	9.31 - 17.29	Pass
STVE-1064	07/01/05	Co-60	4.80 ± 0.10	4.43	3.10 - 5.76	Pass
STVE-1064	07/01/05	Cs-134	4.60 ± 0.20	4.09	2.86 - 5.32	Pass
STVE-1064	07/01/05	Cs-137	5.90 ± 0.30	5.43	3.80 - 7.06	Pass
STVE-1064	07/01/05	Mn-54	7.20 ± 0.20	6.57	4.60 - 8.54	Pass
STVE-1064	07/01/05	Pu-238	0.04 ± 0.02	0.00	0.00 - 1.00	Pass
STVE-1064	07/01/05	Pu-239/40	0.13 ± 0.02	0.16	0.11 - 0.21	Pass
STVE-1064	07/01/05	Sr-90	2.80 ± 0.30	2.42	1.69 - 3.15	Pass
STVE-1064	07/01/05	U-233/4	0.28 ± 0.03	0.33	0.23 - 0.43	Pass
STVE-1064	07/01/05	U-238	0.33 ± 0.04	0.35	0.24 - 0.45	Pass
STVE-1064	07/01/05	Zn-65	11.00 ± 0.50	10.20	7.14 - 13.26	Pass
STAP-1065	07/01/05	Gr. Alpha	0.30 ± 0.04	0.48	0.00 - 0.80	Pass
STAP-1065	07/01/05	Gr. Beta	0.97 ± 0.06	0.83	0.55 - 1.22	Pass
STAP-1066	07/01/05	Am-241	0.14 ± 0.03	0.16	0.11 - 0.21	Pass
STAP-1066	07/01/05	Co-57	5.81 ± 0.17	6.20	4.34 - 8.06	Pass
STAP-1066	07/01/05	Co-60	2.79 ± 0.14	2.85	2.00 - 3.71	Pass
STAP-1066	07/01/05	Cs-134	3.67 ± 0.12	3.85	2.70 - 5.01	Pass
STAP-1066	07/01/05	Cs-137	2.93 ± 0.23	3.23	2.26 - 4.20	Pass
STAP-1066	07/01/05	Mn-54	4.11 ± 0.26	4.37	3.06 - 5.68	Pass
STAP-1066	07/01/05	Pu-238	0.11 ± 0.02	0.10	0.07 - 0.13	Pass
STAP-1066	07/01/05	Pu-239/40	0.10 ± 0.01	0.09	0.06 - 0.12	Pass
STAP-1066	07/01/05	Sr-90	2.25 ± 0.29	2.25	1.58 - 2.93	Pass
STAP-1066	07/01/05	U-233/4	0.28 ± 0.02	0.27	0.19 - 0.35	Pass
STAP-1066	07/01/05	U-238	0.28 ± 0.02	0.28	0.20 - 0.37	Pass
STAP-1066	07/01/05	Zn-65	4.11 ± 0.26	4.33	3.06 - 5.68	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) as requested by the Department of Energy.

[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] The strontium carbonate precipitates were redissolved and processed. The average of the three analyses was 1.34 although the recovery was only 30%. The result of a new analysis was 1.56 pCi/L.

[f] Incorrect sample weight used in calculation. Result of recalculation: 97.0 ± 7.8 Bq/kg.

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:

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

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

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

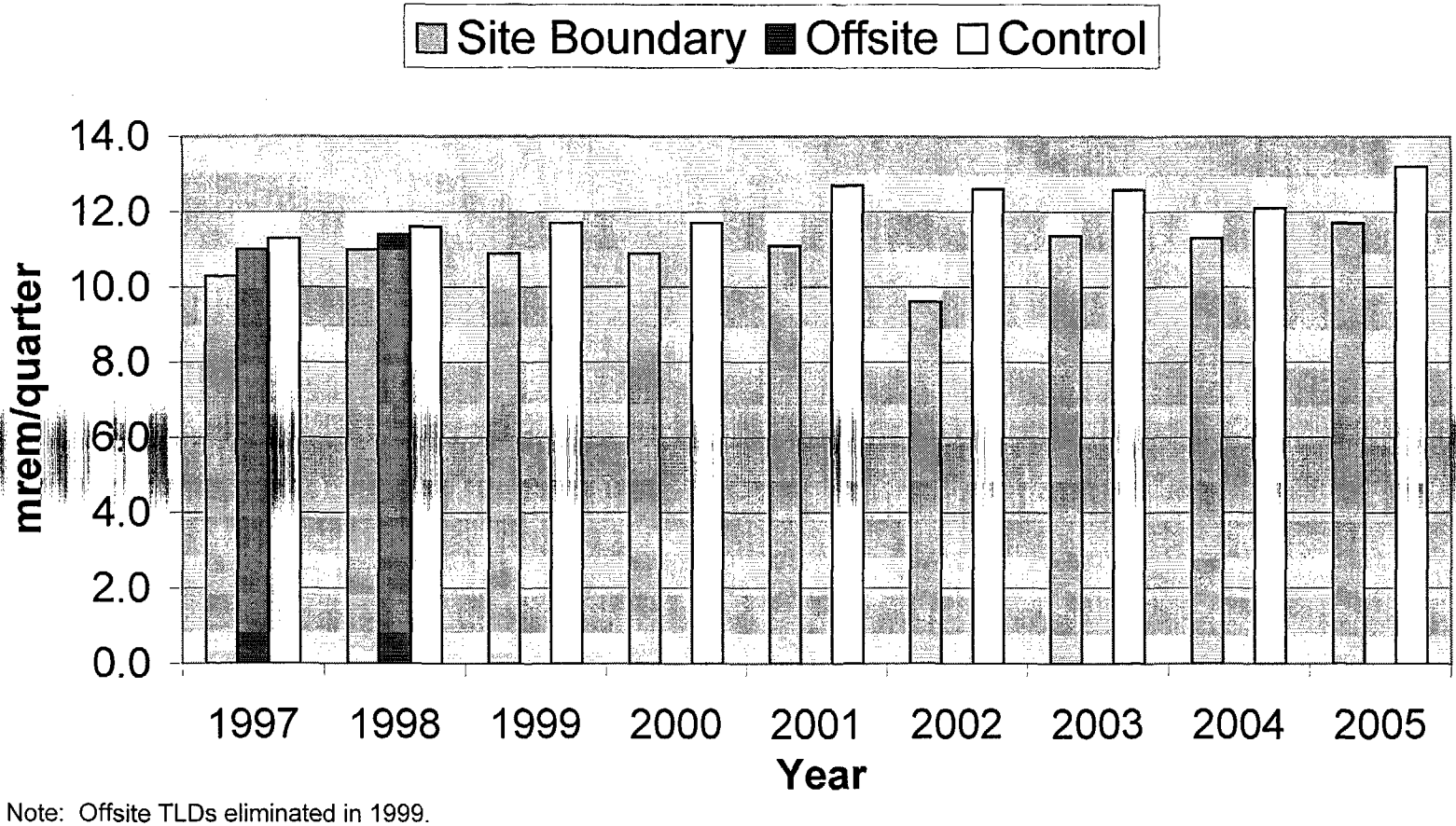
APPENDIX C

SPECIAL ANALYSES

Big Rock Point
Annual Radiological Environmental Operation Report
January through December 2005

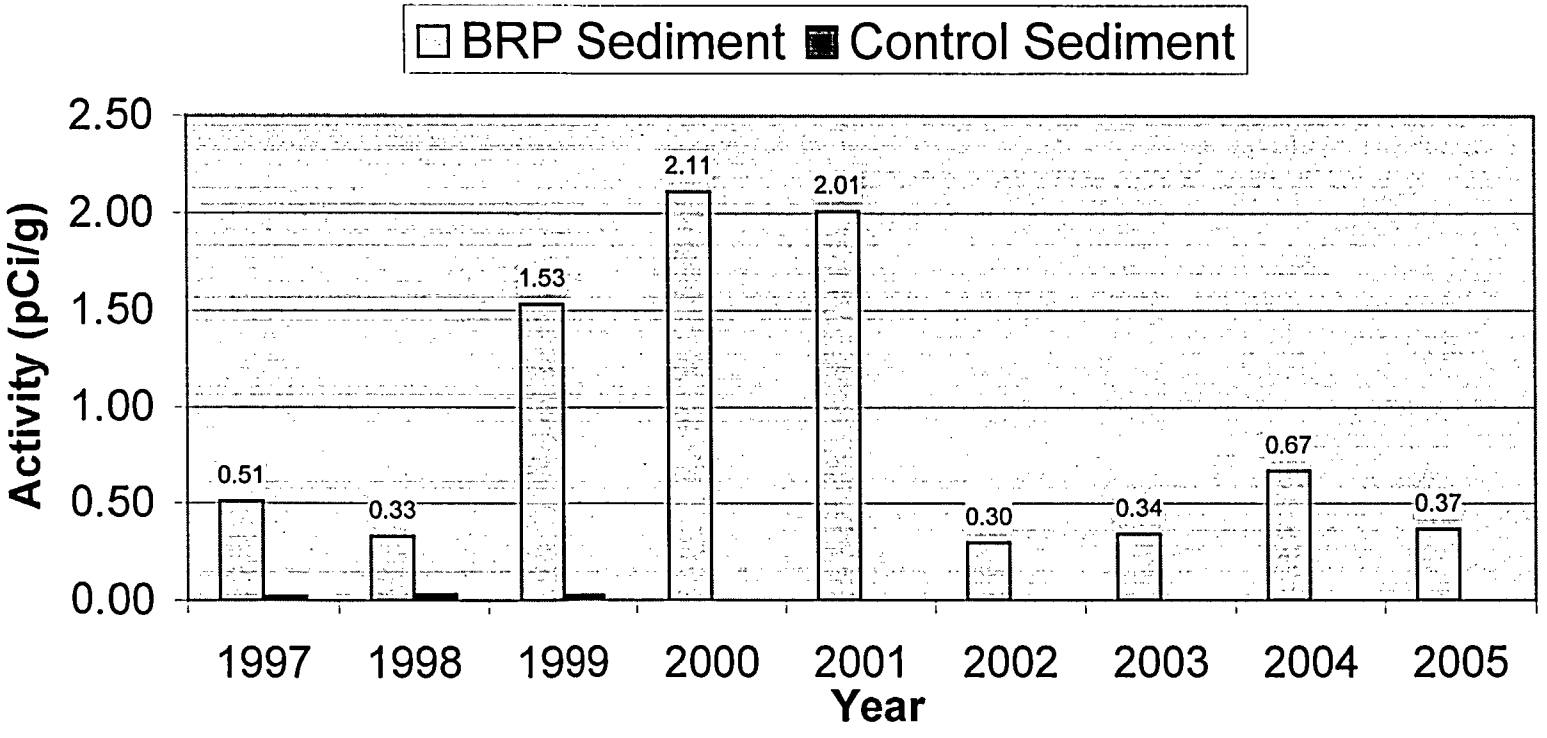
Enclosure E: Data Graphs

Mean Quarterly TLDs
Big Rock Point 1997 - 2005



Note: Offsite TLDs eliminated in 1999.

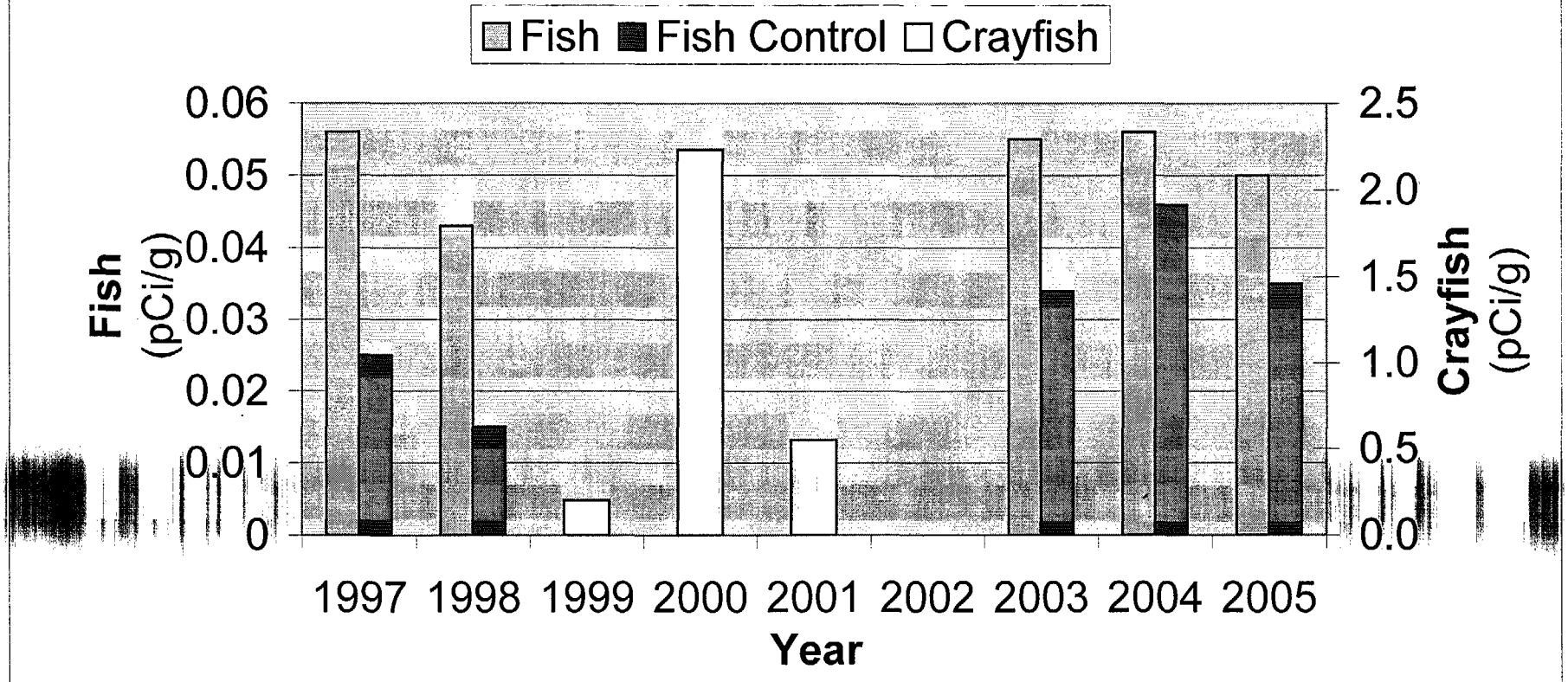
Sediment Mean Total Gamma Activity
Big Rock Point 1997-2005



Notes:
1. Zero values for control location were below detectable concentration.
2. Total gamma activity is sum of Cs-137, Mn-54 and Co-60 means.

Fish & Crayfish Mean Total Gamma Activity

Big Rock Point 1997 - 2005

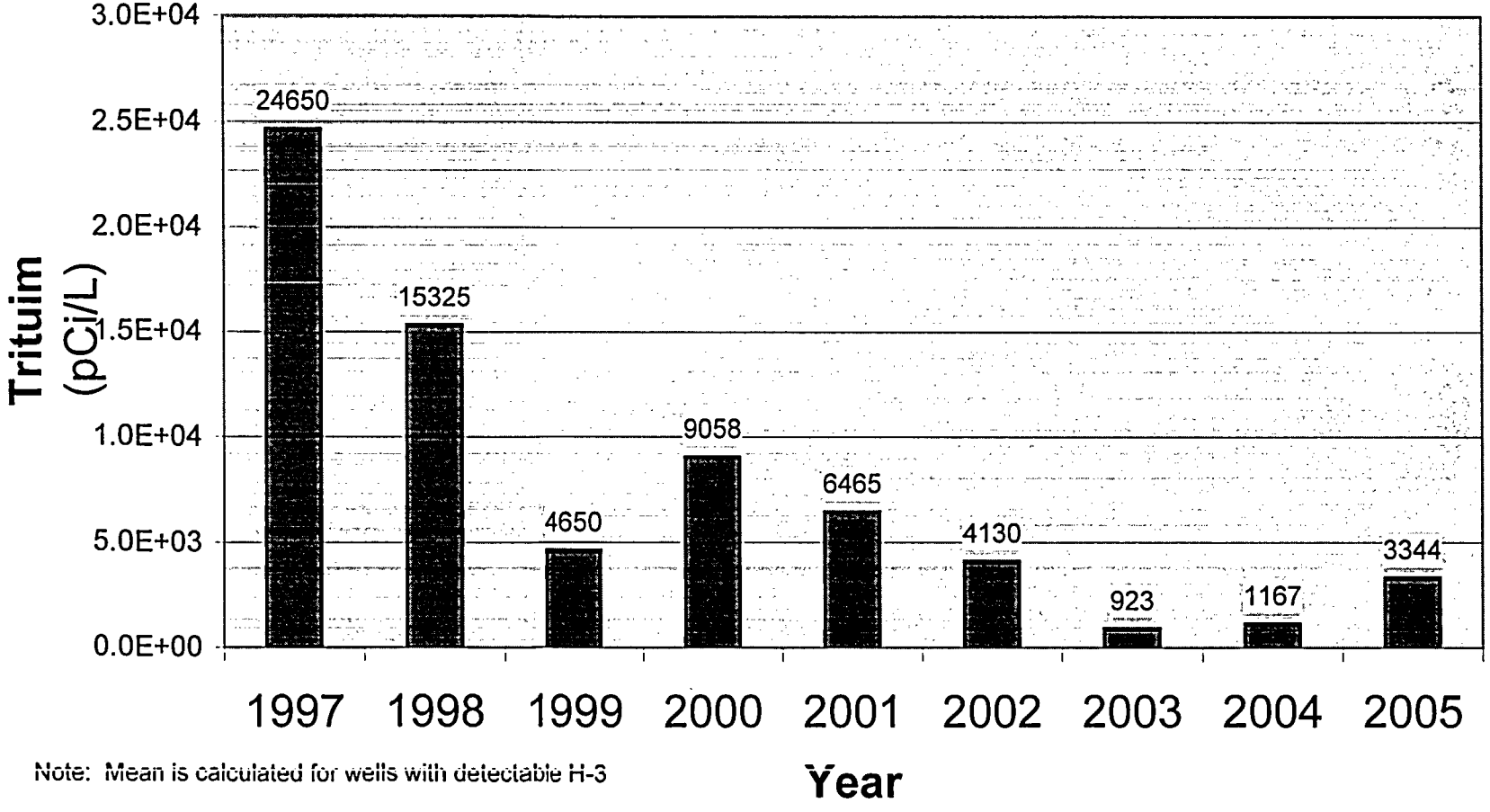


Notes:

1. Total gamma activity is sum of Cs-137, Mn-54 and Co-60 means
2. Fish indicator and control samples int 2002 showed no detectable gamma isotopes.
3. Crayfish samples not collected in 2002 to 2004; fish samples not collected in 1999 to 2001

Groundwater Monitoring Well Mean Trituim Concentration

Big Rock Point 1997 - 2005



Note: Mean is calculated for wells with detectable H-3