Plum Brook Reactor Facility

Technical Basis Document

Adjusted Gross DCGLs for Structural Surfaces

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1.0 PURPOSE

Final status surveys, of structural surfaces that remain in place at the conclusion of the Plum Brook Rector Facility (PBRF) decommissioning, will include both scans and direct measurements. These techniques do not measure individual radionuclide surface activity concentrations directly, rather they measure gross activity. Evaluation of gross activity measurements against release criteria requires the use of either gross activity derived concentration guideline levels (DCGLs) or surrogate radionuclide DCGLs. Application of these methods requires knowledge of the radionuclides present and their activity ratios.

DCGLs for individual radionuclides were developed previously and are reported in the Final Status Survey Plan for the Plum Brook Reactor Facility (FSSP) [NASA 2006]. Included in that document was an evaluation of residual contamination radionuclide profiles on building structural surfaces. This document builds on the existing FSSP in two ways:

1. by decay-correcting, to February 1, 2007, data from the original FSSP which was gathered in early 2004 [MWH 2004] and
2. by including data obtained from more recent survey campaigns.

The final products of this document are as follows:

1. to refine the surrogate DCGLs,
2. based on the refined surrogates, to recalculate the adjusted gross activity DCGLs, and
3. to delineate where in the PBRF buildings these new DCGLs apply.

2.0 BACKGROUND

2.1 Montgomery Watson and Harza (MWH)

Under the previous decommissioning contractor, Montgomery Watson and Harza, Characterization Packages were developed to collect data (static measurements, smears, and spectroscopic analyses) around the PBRF. Some samples were sent to off-site laboratories for 10CFR61 analyses. A technical report was issued in the second half of 2004 detailing results of an investigation (C9000 101I1) [MWH 2004] of radionuclide activity ratios in concrete surfaces from samples collected in early 2004 (TBD-04-003) [NASA 2004]. This technical report was eventually incorporated into the FSSP [NASA 2006].

Coding to divine where samples were taken is provided in Appendix A of this document. Results from two additional concrete coring campaigns (E1000 101C4) [MWH 2005b], which should have been C9000 101I2, and C9000 101I3 [MWH 2005c]), attempted in May and June of 2005, were detailed in a report issued in early August of 2005 [MWH 2005d]. The August, 2005 report contains

results from both activation analyses from bio-shield samples and generic concrete coring throughout the remainder of the major plant buildings.

Dose assessments and DCGL calculations for building reuse and subsurface structures are described in detail in the FSSP and are repeated in the next few paragraphs. The results of those DCGL calculations are reprinted as Table 2-1. The $DCGL_{FSS}$ values are the surface activity levels in dpm/100 cm^2 that will be used during FSS to determine compliance with the 25 mrem/yr unrestricted use criterion.

Table 2-1
Building Re-use DCGLs, Sub-surface Structure Effective Surface DCGLs, and $DCGL_{FSS}$ Values

Radionuclide	Building Reuse DCGL (dpm/100 cm^2)	Sub-surface Structure Effective Surface $DCGL_{ES}$ (dpm/100 cm^2)	$DCGL_{FSS}$ (dpm/100 cm^2)
C-14	10,000,000	940,500	940,500
Fe-55	40,000,000	37,000,000	37,000,000
Co-60	11,000	182,500	11,000
Ni-59	99,000,000	80,000,000	80,000,000
Ni-63	36,000,000	43,000,000	36,000,000
Sr-90	136,200	33,100	33,100
Tc-99	14,000,000	1,300,000	1,300,000
Cs-137	40,500	121,700	40,500
Eu-152	24,300	520,000	24,300
Eu-154	4,500	475,800	4,500
H-3	320,000,000	9,100,000	9,100,000
Pu-241	228,000	26,000,000	228,000
Pu-238	4,900	719,200	4,900
Cm-243/244	6,100	265,500	6,100
Am-241	4,300	210,200	4,300
Eu-155	395,000	19,000,000	395,000
I-129	67,800	14,900	14,900
Nb-94	15,800	365,100	15,800
Pu-239	4,400	663,900	4,400
U-234	31,500	1,200,000	31,500
U-235	27,100	995,800	27,100
U-236	33,200	1,200,000	33,200
U-238	32,900	1,200,000	32,900

For each radionuclide, the $DCGL_{FSS}$ is the lesser of either the DCGL or $DCGL_{ES}$ values. NASA made a conscious decision to use the lesser value for each radionuclide to be more conservative irrespective of the surface condition.

The current decommissioning strategy for PBRF calls for the removal of activated portions of the concrete bio-shield and disposition of the activated concrete as radioactive waste. Any potentially activated concrete remaining in place will be evaluated for residual radioactive contamination volumetrically using the subsurface structure DCGL values provided in the FSSP. Therefore, as part of this technical basis document, no samples taken from the reactor bioshield were used in the calculation of any DCGLs.

Volumetric sampling of contaminated concrete, as opposed to surface measurements, may be necessary if gross activity measurements are insufficient or subsurface activity greater than the $DCGL_W$ is suspected. The results will be evaluated either by 1.) calculating the derived total gross beta dpm/100 cm^2 in the sample and comparing the gross beta results directly to the gross beta DCGL or 2.) comparing results to the volumetric DCGL values for subsurface structures coupled with application of the unity rule. By way of information only, the volumetric structure DCGLs are reprinted from the FSSP as Table 2-2 below.

Table 2-2
DCGL Values for Sub-surface Structures

Radionuclide	DCGL (pCi/g)
C-14	17
Fe-55	685
Co-60	3.3
Ni-59	2134
Ni-63	779
Sr-90	0.6
Tc-99	25
Cs-137	2.2
Eu-152	9.4
Eu-154	8.6
H-3	166
Pu-241	472
Pu-238	13
Cm-243/244	4.8
Am-241	3.8
Eu-155	354
I-129	0.27
Nb-94	6.6
Pu-239	12
U-234	22
U-235	18
U-236	23
U-238	22

2.2 MOTA Corporation (MOTA)

With the letting of a contract to MOTA, new personnel were hired. Under the direction of the NASA Project RSO, those personnel embarked on additional survey campaigns, using Survey Requests (SRs), to gain a better understand of the radionuclide distributions around the PBRF site. Codes used in the SR process are self-explanatory and, therefore, not included in this document. It must be noted that to understand how the codes were used and what data corresponds to what survey points usually requires interviewing a person involved with the actual survey.

As Phase I of a three-phase plan for taking concrete cores from the Reactor Building, SR4 documented 365 locations of elevated activity in the Reactor Building Quads and Canals. During Phase II (SR14), seven additional elevated activity locations were documented. Of the 372 locations, only 24 exhibited residual activity following removal of wall coverings. Of the 24, only one exhibited detectable activity following secondary scabbling. Phase III (SR15) consisted of concrete coring the walls and floors of the Reactor Building Quads and Canals based on data obtained during the previous two phases. After scabbling, a visual inspection of each of the elevated measurement points revealed no cracks or avenues for water penetration into the concrete.

As a follow on to data obtained from the Reactor Building, SRs were developed for concrete cores to be taken from walls and floors of other PBRF buildings as follows:

1. SR24 for the Primary Pump House, Hot Pipe Tunnel, and the Waste Handling Building Evaporator Pit,
2. SR28 for the Fan House, and
3. SR29 for the remainder of the Waste Handling Building

In addition, SR31 (ROLB) and SR32 (SEB) were modified to allow for the collection of wall scraping samples from building sumps.

2.3 General

A number of issues conspired to force the use of more conservative DCGLs than might otherwise be expected. Those issues are delineated below.

1. Prior to late 2004, the PBRF on-site laboratory lacked a quality assurance program. Therefore, any gamma spectroscopic analyses performed during that time frame can only be considered qualitative.
2. Prior to late 2004, the on-site laboratory didn’t have a NIST-traceable geometry for concrete pucks cut from the cores.

3. Because this was a research facility, there are areas on this site where various radionuclides exist exclusively without the presence of Cs-137 and/or Co-60 as would otherwise be expected (e.g., U-234 in the ROLB New Fuel Vault or Ni-63 in the Cold Pipe Tunnel)
4. For whatever reasons, not all data from MWH-produced characterization packages and from the United States Army Corps of Engineers (USACE) found its way to NASA's Document Control organization.
5. Generally, the buildings are relatively free of loose surface contamination. In addition, some percentage of PBRF structural surfaces has been decontaminated. That means that meaningful characterization data can no longer be collected.

Recognizing that radionuclide composition in both concrete cores and smears should vary considerably across the PBRF facility, the building structure DCGLs, once calculated, will be assigned to areas exhibiting similar radiological characteristics: the calculated DCGL, Cs-137-to-Co-60 ratio, and/or the presence or absence of other radionuclides. The expectation is that there will be many DCGLs due to the influences of gamma emitters, pure beta emitters (Sr-90, Ni-63), hard-to-detect species (H-3, C-14, Fe-59), and alpha emitters. In addition to the outright radionuclide differences, there are physical conditions around the site which lend themselves to different DCGLs: pipe leakage, new fuel storage, radiochemistry laboratories, and sumps.

Review of the facility design, operational history, and available survey and sample results (MWH 2004), indicate that radionuclide constituents in PBRF structures should vary widely. Based on previous data, the Cs-137-to-Co-60 ratio generally varies over five orders of magnitude. Bear in mind that the PBRF has been shut down for almost 35 years. This represents six half-lives for Co-60 and only one half-life for Cs-137. More often than not, the expectation will be for Cs-137 to dominate the mix in each sample, but that does not hold true over the entire site.

Section 5 describes how the PBRF structures have been divided into areas based on samples that are evaluated in this report. Radionuclide profiles are developed for each sample. Previously, the "10% Rule" was used to eliminate radionuclides which contributed less than 10% of the total dose. From application of the 10% Rule, the list of radionuclides was whittled down to eight. Lastly, an Adjusted Gross DCGL (with surrogate, as appropriate) is developed.

The Adjusted Gross DCGL values for building structural surfaces are listed in Table 5-3. These are surface activity concentrations which correspond to an annual dose of 25 mrem/yr to a future building occupant. These values are calculated for each mix of radionuclides in an area. For rooms in which there is embedded piping, the Table 5-3 values will be used in conjunction with information obtained from underground piping surveys to demonstrate compliance with the 25 mrem/yr standard.

To provide context for what follows, a description of what is meant by radionuclide profiles is provided here. The NRC Staff has stated that "A unique radionuclide profile must be developed for each of the major types of materials expected to remain onsite after remediation" [USNRC 2003].[1] To that end this Technical Basis Document, TBD 07-001, provides a summary of and the rationale for use of various Adjusted Gross DCGLs for building structural surfaces around the PBRF site.

The ultimate goal of the PBRF decommissioning project is to release the site for unrestricted use in compliance with the NRC's annual dose limit of 25 mrem/yr TEDE to an average member of the critical group. Additionally, the residual radioactivity should be reduced to levels that are as low as reasonably achievable (ALARA) [USNRC 1997b]. The NRC dose limits apply to residual radioactivity that is distinguishable from background. The Adjusted Gross DCGL values established within the FSSP will not be increased without prior NRC approval.

[1] NUREG-1757, Volume 2, Appendix O, Answer to Question 1.

3.0 REFERENCES

BNI 2004 Personal Conversations with Don Young and Dean Scheibley (both PBRF retirees about) about Roof Construction and Replacement of PBRF Buildings, multiple conversations in 2004.

MOTA 2006a Personal Conversations with Darin McEleney (former Bartlett Nuclear, Inc. Characterization Field Supervisor) about Concrete Coring Operations, multiple conversations in 2006.

MOTA 2006b Personal Conversations with Kenneth Latimer (formerly Parallax, Inc. Characterization Engineer) about Concrete Coring Operations, multiple conversations in 2006.

MOTA 2006c Personal Conversations with Bruce Mann (former Bartlett Nuclear, Inc. Characterization and Final Status Survey Manager) about Concrete Coring Operations, Cs-137:Co-60 Ratios, Various MWH Characterization Packages, multiple conversations in 2006.

MOTA 2006d Personal Conversations with David Wojtkowiak (Babcock Services, Inc. Director of Nuclear Operations) about DCGL Development and the original Final Status Survey Plan, multiple conversations in 2006.

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MWH 2004 Characterization Package C9000-101I1, *DCGL Development – Radionuclide Distribution,* Initiated February 23, 2004; closed September 20, 2005.

MWH 2005a MWH Constructors, Radionuclide Composition and Activity Ratios in Primary Coolant Piping, Transmittal No. PBRF-05-0285, March 24, 2005.

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MWH 2005c Characterization Package C9000-101I3, *DCGL Development - Concrete Core Boring in Various Plant Buildings*, Initiated June 3, 2005; closed September 15, 2005.

MWH 2005d MWH Constructors, Investigation of Radioactivity in PBRF Concrete, Transmittal No. PBRF-05-0745, August 5, 2005

NASA 2004 Plum Brook Reactor Facility Decommissioning Radiation Protection Department, Technical Basis Document, PBRF-TBD-04-003, *Radionuclide Distribution Basis for DCGL Determination and Final Status Survey of the Plum Brook Reactor Facility (PBRF)*, Rev 0, July 2004

NASA 2006 *Final Status Survey Plan for the Plum Brook Reactor Facility*, Rev 0, May 2006

USNRC 1997a US Nuclear Regulatory Commission *A Nonparametric Statistical Methodology for the Design and Analysis of Final Status Decommissioning Surveys*, NUREG-1505, July 1997.

USNRC 1997b US Nuclear Regulatory Commission *Radiological Criteria for License Termination*, 10CFR20, Subpart E (20.1402), July 21, 1997.

USNRC 2003 US Nuclear Regulatory Commission *Consolidated NMSS Decommissioning Guidance, Characterization Survey and Determination of Radiological Criteria*, NUREG-1757, September 2003.

4.0 MATERIAL DESCRIPTIONS

4.1 Description of Samples

The majority of samples analyzed were concrete cores, smears, and composite smears. Composite smears were used because so little activity could be detected on field-counted smears that they were put together (composited) and analyzed on site by gamma spectroscopy. In some cases, floor sweepings, concrete chips, paint chips, and sump scrapings were collected and analyzed.

Long concrete cores were taken with a three-inch inside diameter, water-cooled, core boring bit mounted to a drill. Once removed from its hole, the core was sliced into one-half inch thick “pucks”. Each puck was surveyed for beta/gamma activity and then analyzed by gamma spectroscopy in the on-site PBRF Counting Lab. Since the on-site lab has no way of homogenizing concrete samples, the pucks were counted both face up and face down on the high-purity germanium crystal and the activities were averaged for a quantitative analysis. Some of the pucks were sent off site for further analysis to include alpha-emitting radionuclides, hard to detects (H-3, C-14, Fe-55), and pure beta-emitters (Sr-90, Ni-63).

4.2 Analysis of Samples

The PBRF has an on-site counting lab capable of counting smears and performing gamma spectroscopy. To supplement the on-site lab, several approved off-site labs were used to perform 10CFR61 analyses. Among these were Severn Trent Laboratories, Inc., Earth City, Missouri and Eberline Services Lionville Laboratory, Inc., Oak Ridge, Tennessee. These labs were capable of pulverizing concrete to dust or dissolving smears and performing the requisite digestions, separations, wet chemistry, and neutralization in order to perform alpha spectroscopy, liquid scintillation, and gamma spectroscopy.

5.0 ASSESSMENT

5.1 Radionuclide Mixtures for FSS

The radionuclides listed in Tables 2-1 and 2-2 were selected after a detailed evaluation of characterization data, collected in 2004, which included concrete core samples, smears, and media samples collected for analyses. Current sample data are used to determine the final radionuclide mixtures for FSS.

The Nuclear Regulatory Commission (NRC) staff considers radionuclides and exposure pathways that contribute no greater than 10% of the 25 mrem/yr dose criteria to be insignificant contributors [USNRC 2003]. This 10% limit for insignificant contributors is an aggregate limitation only. That is, the sum of the dose contributions from all radionuclides and pathways considered insignificant will be no greater than 10% of the dose criteria of 25 mrem/yr per 10 CFR Part 20 [USNRC 1997b]. Table 5-1 shows the radionuclides remaining after removal of the insignificant radionuclides from Table 2-1.

Table 5-1
DCGL Values for Structures

Radionuclide	DCGL (dpm/100 cm^2)
H-3	9,100,000
Co-60	11,000
Sr-90	33,100
I-129	14,900
Cs-137	40,500
Eu-154	4,500
U-234	31,500
U-235	27,100
U-236	33,200

The dose from the insignificant radionuclides will be accounted for in demonstrating compliance, but may be eliminated from further detailed evaluations. The lowest total dose from the remaining radionuclides for PBRF structures was evaluated at 90% of the 25 mrem/yr criterion, which means that radionuclides potentially representing a dose of 2.5 mrem/yr were eliminated. To ensure the 25 mrem/yr criterion is met, any structural survey unit where the mean of FSS results indicates that the dose may be greater than 22.5 mrem/yr (including dose from embedded pipe in the given survey unit, if applicable) shall be reviewed for compliance with the unrestricted use limit [MWH 2005a].

5.2 Equations and Inclusion of the MDA

Hard-to-detect radionuclides (low energy beta emitters such as H-3 and I-129) are addressed by using a surrogate relationship to a radionuclide that is detectable. A common example would be to relate a specific radionuclide, such as Cs-137, to one or more radionuclides of similar characteristics such as H-3. This directly applies to the PBRF as both scans and fixed beta measurements will be used to assess surface contamination in comparison to the DCGLs for structural surfaces. In such cases, to demonstrate compliance with the release criteria for the survey unit the DCGL for the surrogate radionuclide, in this case Cs-137, must be scaled to account for the fact that it is being used as an indicator for an additional radionuclide, H-3. The result is referred to as the surrogate DCGL.

Non-beta emitting hard-to-detect radionuclides are addressed by using the equation in section 5.2.2, inserting the beta and alpha activity fractions for f_1 and f_2, and the calculated beta and alpha DCGLs for $DCGL_1$ and $DCGL_2$.

For structural surfaces, the final DCGL for FSS design and implementation will be a gross beta DCGL that represents the 25 mrem/yr unrestricted use criterion. There are two steps required to determine the gross beta DCGL:

1. perform a surrogate calculation to account for radionuclides that cannot readily be measured by a beta-sensitive detector (e.g., plastic scintillation, gas proportional) with typical efficiency and

2. perform a gross activity DCGL calculation on the surrogate DCGL values and other beta-emitting radionuclides determined to be present in significant fractions.

The equations to be used were derived from NUREG-1505 [USNRC 1997a] and are presented below.

5.2.1 Surrogate DCGL Equation

The surrogate DCGL is computed based on the distribution ratio between the hard-to-detect radionuclides and the easy-to-detect radionuclides. The surrogate DCGL is calculated using the following equation:

$$DCGL_{Sur} = \frac{1}{\left[\left(\frac{1}{DCGL_1}\right) + \left(\frac{R_2}{DCGL_2}\right) + \left(\frac{R_3}{DCGL_3}\right) + \ldots\ldots + \left(\frac{R_n}{DCGL_n}\right)\right]}$$

Where: $DCGL_{Sur}$ = Surrogate radionuclide DCGL

$DCGL_1$ = DCGL for the radionuclide to be used as the surrogate for the other radionuclides

$DCGL_2$, $DCGL_3$,… $DCGL_n$, = DCGL for each radionuclide to be represented by the surrogate

R_2, R_3, R_n = Ratio of concentration (or nuclide activity fraction) of each radionuclide to the surrogate radionuclide

5.2.2 Gross Beta Equation

Where multiple radionuclides are present, a gross beta DCGL can be developed. This approach enables field measurements of gross activity rather than a determination of individual radionuclide activities for comparison to the radionuclide-specific DCGLs. The gross beta DCGL is calculated using the following equation:

$$DCGL_{GB} = \frac{1}{\left[\left(\frac{f_1}{DCGL_1}\right)+\left(\frac{f_2}{DCGL_2}\right)+\left(\frac{f_3}{DCGL_3}\right)+.....+\left(\frac{f_n}{DCGL_n}\right)\right]}$$

Where: $DCGL_{GB}$ = gross beta DCGL

f_1, f_2, f_3, f_n = activity fraction of each radionuclide

$DCGL_n$ = DCGL of each radionuclide to be represented by the surrogate

Note 1: The gross beta equation may also be used to calculate a gross alpha DCGL for application in areas where DCGL values are established for alpha emitters.

Note 2: If a surrogate radionuclide is used, the "f_n" is equal to the surrogate radionuclide fraction.

Note 3: The value of 1 in the numerator is replaced by the actual fraction of beta (or alpha) emitters if less than 100% of the mixture.

5.2.3 Unity Rule Equation

When it has been determined that more than one radionuclide is present, the unity rule is typically used as the first test to evaluate compliance with radiological criteria for license termination. In lieu of a single gross beta (or alpha) DCGL, a unity rule calculation is used to demonstrate compliance with the structure surface unrestricted use limit. A surrogate DCGL, if applicable, would be used in the unity rule calculation. The unity rule equation is:

$$\frac{C_1}{DCGL_1}+\frac{C_2}{DCGL_2}+\frac{C_3}{DCGL_3}+.....+\frac{C_n}{DCGL_n} \le 1$$

Where: C_n = concentration of radionuclide "n"

$DCGL_n$ = DCGL of radionuclide n.

If two adjusted gross activity DCGL values (one for alpha and one for beta) are used, the unity rule must be applied to demonstrate compliance. In the event that the unity rule test fails, i.e., the calculated sum of fractions is > 1, then evaluation of the individual radionuclide concentrations against their respective DCGL values must be performed.

5.3 Compilation of Data Analyses from Building Interiors (Appendices D, F, G, H, and I)

5.3.1 Cs-137:Co-60 Ratio

Table 5-2 and Figure 5-1 reveal how the Cs-137:Co-60 ratio can affect the Gross Beta DCGL. The individual DCGLs for both Cs-137 and Co-60 are 40,500 dpm/100 cm^2 and 11,000 dpm/100 cm^2, respectively. Figure 5-1 depicts the data from Table 5-2 in graphical form. The equation used to generate the Gross Beta DCGLs is

$$DCGL_{GB} = \frac{1}{\left[\left(\frac{f_1}{40{,}500}\right) + \left(\frac{f_2}{11{,}000}\right)\right]}.$$

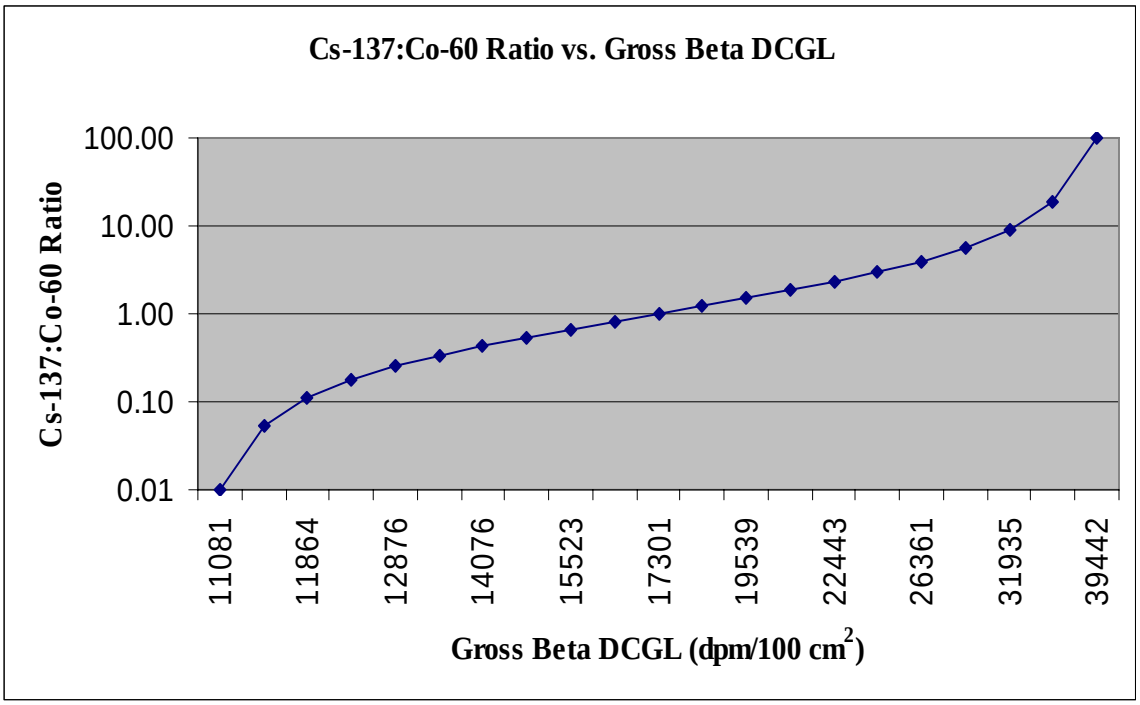
Where: f_1 and f_2 are the activity percentages (in decimal form) of Cs-137 and Co-60, respectively.

Without the equation above, you could just as easily interpolate linearly between values in the table with less than 1% error from the true value.

Table 5-2
Cs-137 and Co-60 Percentages and Calculated DCGL

Activity Percentages		Cs-37/Co-60	Gross Beta DCGL
Cs-137	Co-60	ratio	(dpm/100 cm^2)
1	99	0.01	11081
5	95	0.05	11416
10	90	0.11	11864
15	85	0.18	12349
20	80	0.25	12876
25	75	0.33	13449
30	70	0.43	14076
35	65	0.54	14764
40	60	0.67	15523
45	55	0.82	16364
50	50	1.00	17301
55	45	1.22	18352
60	40	1.50	19539
65	35	1.86	20891
70	30	2.33	22443
75	25	3.00	24245
80	20	4.00	26361
85	15	5.67	28882
90	10	9.00	31935
95	5	19.00	35711
99	1	99.00	39442

Figure 5-1
Cs-137:Co-60 Ratio vs. Gross Beta DCGL



The PBRF has been shut down for almost 35 years. This represents more than six half-lives for Co-60. It represents just a bit more than one half-life for Cs-137. Whereas the expectation would be that Co-60 would dominate the radionuclide mix after initial cessation of operations, Co-60 would not be expected to contribute much activity to the radionuclide mix after 35 years.

5.3.2 Evaluation of Core and Smear Data

This section describes the evaluation of all smear and core data obtained to date. This data includes activity profiles generated from gamma spectroscopy and both liquid scintillation and alpha spectroscopy following radiochemical separations. Sample results are evaluated to develop radionuclide profiles for the building structural surfaces. Radionuclide profiles are developed for each sample. Activity ratios are calculated from the individual sample activity ratios in each group. The10% Rule is used to eliminate radionuclides which contribute less than 10% of the total dose. Lastly, a Gross Beta DCGL (with surrogate, as appropriate) is developed. All calculations were performed in a manner identical to that of the FSSP. All data used in calculations from the FSSP was decay-corrected to 2/1/07 to more accurately reflect the true radionuclide activity mix. In particular, cores designated as C9000 101I1 were decayed from 4/24/04 because the off-site gamma spectroscopic analyses do not exist, but it is known that they were analyzed in February

and March of 2004. All cores designated as C9000 101I3 were decayed from July 6 and 8, 2005. All smears were decayed from 2/1/04.

Many sampling campaigns have taken place over the previous four years and under different contractors. The data gathered were not always consistent; meaning the same suite of radionuclides was not used from one campaign to the next. This may have helped or hindered the final DCGL determination. We will never know because, in the last year or so, the buildings have been cleaned up both physically and, to a limited extent, radiologically. The current expectation is that it will be unlikely that contamination at even 10% of any DCGL will be detected during performance of the FSS. This brings up another issue: smears not being the best to use for developing radionuclide profiles. It can be argued that loose surface contamination will be cleaned up prior to implementation of the final status survey. More accurate radionuclide profiles can be developed using concrete cores because, it is surmised, the data obtained will be indicative of what will be found during the final status survey. Without concrete core data smears, and to a lesser extent, paint chips, floor sweepings, and concrete chips are all that can be had for analysis.

It must be borne in mind that a grid of smears or samples was not taken on each floor throughout each building. Basic statistics were applied to series of data that appear to be similar based on good engineering judgment. All sampling was biased because of the lack of available sites with which to obtain a good sample (meaning there wasn't enough activity to render a fair presentation of radionuclides). In short, the facility is relatively clean from a radiological perspective.

The values in Table 5-3 present the Adjusted Gross DCGLs to be used in the FSS design packages. Section 5.2 discussed the equations used to generate the values in Table 5-3. Appendices D, F, and I present the actual laboratory analytical data used in the equations and the Adjusted Gross DCGL calculations. Each of the Adjusted Gross DCGLs calculated is discussed individually following each table starting with Table 5-4.

Table 5-3
$DCGL_W$ Values and Activity Fractions for Various Areas of the PBRF

Building or Area	$DCGL_W$ (dpm/100 cm^2)*		H-3	Co-60	Sr-90	I-129	Cs-137	Eu-154	U-234	U-235
	smears	concrete cores	radionuclide activity fractions							
Reactor Building (1111)										
Containment outside of the Quads and Canals										
Area 2 and Lily Pad (0'0" Elevation)	11,563		.9757	.0210	.0013	0	.0020	0	0	0
Area 17 (-25'0" Elevation)		37,235	.8820	0	0	0	.0530	0	.0650	0
Containment Quads and Canals										
Quad A		13,450	0	.7499	0	0	.2501	0	0	0
Quads B, C, and D		21,566	0	.3305	0	0	.6695	0	0	0
Canals E,F, G, and H		31,711	.0116	.1169	0	0	.8699	0	.0016	0
Mezzanine (+12'0" Elevation) and Ground Floor (0'0" Elevation)	29,060		.5405	.0530	.1145	.0009	.2872	.0039	0	0
Area 20 (-15'0" Elevation)		35,296	0	0	0	0	.4840	0	.5160	0
Area 21 (Basement), Area 22 (Pump Room), and Pipe Trench (-25'0" Elevation)		14,600	.0729	.5389	.2222	0	.1205	.0171	.0242	.0042
Hot Laboratory (1112)										
All areas other than the Cells and Hot Pipe Tunnel		38,647	0	.0058	.1577	0	.8347	0	.0017	.0001
Hot Cells	34,404		.1045	.0255	.3302	.0003	.53787	.0012	.0004	.00003
Hot Pipe Tunnel		35,781	.0060	.0203	.3444	0	.6240	0	.0048	.0005
Services and Equipment Building (1131)										

Building or Area	DCGL$_W$ (dpm/100 cm^2)*		H-3	Co-60	Sr-90	I-129	Cs-137	Eu-154	U-234	U-235
Areas Outside the Cold Pipe Tunnel	**27,166**		**.2707**	**.0965**	**.0788**	**.0142**	**.4671**	**.0012**	**.0698**	**.0017**
Cold Pipe Tunnel (entire length)		**11,000**	**0**	**1.000**	**0**	**0**	**0**	**0**	**0**	**0**
Fan House (1132)										
All Areas		36,857	.7769	0	0	0	.0563	0	.1668	0
Waste Handling Building (1133)										
All Areas		40,051	.0052	.0016	.0260	0	.9634	0	.0036	.0002
Primary Pump House (1134)										
Room 4		11,186	.4291	.0956	.0256	.2255	.1892	0	.0334	.0016
All Other Rooms		26,348	.5422	.0866	.0939	0	.1881	0	.0805	.0087
Reactor Office and Laboratory Building (1141)										
New Fuel Vault	30,831		.3902	.0076	.0421	.0287	.1755	0	.3438	.0121
All Other Rooms	**27,166**		**.2707**	**.0965**	**.0788**	**.0142**	**.4671**	**.0012**	**.0698**	**.0017**
Hot Retention Area (1155)										
Hot Retention vault and pipe tunnel leading to Fan House exterior wall	34,213		.1362	.0522	.0601	0	.7346	0	.0148	.0021
WEMS (1192)										
All Areas	33,834		0	.0756	0	0	.9244	0	0	0
Average of 18 activity fractions (does not include 3 sets of values in boldface)			.2707	.0965	.0788	.0142	.4671	.0012	.0698	.0017
			Eight activity fractions were inserted into Table 5-4 to calculate the default DCGL (calculations similar to Appendices D, F, and I)							
Default DCGL	**27,166**									

* see Tables 5-5 through 5-25 for analyses of samples which became the DCGLs and rationale for choosing Table 5-3 values

Table 5-4
Computation of Default DCGL Value

	DCGL (dpm/100cm^2)		Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
ALPHA					
U-234	**3.15E+04**		6.98%	N/A	N/A
U-235	**2.71E+04**		0.17%	N/A	N/A
BETA					
Cs-137	**4.05E+04**		46.71%	1.0000	2.47E-05
H-3	**9.10E+06**		27.07%	0.5795	6.37E-08
I-129	**1.49E+04**		1.42%	0.0304	2.04E-06
Co-60	**1.10E+04**		9.65%	N/A	N/A
Sr-90	**3.31E+04**		7.88%	N/A	N/A
Eu-154	**4.50E+03**		0.12%	N/A	N/A
Cs-137 to Co-60 ratio =		4.84E+00	100.00%		

Adjusted Gross DCGL

ALPHA	DCGL (dpm/100cm^2)	Nuclide Fraction	Alpha Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
U-234	**3.15E+04**	0.06980	0.976	2.22E-06		30,632.80	9.72E-01
U-235	**2.71E+04**	0.00170	0.024	6.27E-08		746.07	2.75E-02
		0.07150	1.000	2.28E-06		31379	1.00
		Adjusted Gross DCGL		**31379**	**dpm/100cm^2**	**(alpha)**	

BETA	DCGL (dpm/100cm^2)	Nuclide Fraction	Beta Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
Cs-137	**3.73E+04**	0.4671	0.7258	1.25E-05		19,514.41	5.23E-01
Co-60	**1.10E+04**	0.0965	0.1499	8.77E-06		4,031.56	3.67E-01
Sr-90	**3.31E+04**	0.0788	0.1224	2.38E-06		3,292.09	9.95E-02
Eu-154	**4.50E+03**	0.0012	0.0019	2.67E-07		50.13	1.11E-02
		0.6436	1.0000	2.39E-05		26888	1.00
		Adjusted Gross DCGL		**26888**	**dpm/100cm^2**	**(beta)**	

Adjusted Gross DCGL (combined alpha plus beta)

	DCGL (dpm/100cm^2)		Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
DCGL	31379	(alpha)	0.0715	2.28E-06		1,942.38	6.19E-02
DCGL	26888	(beta)	0.9285	3.45E-05		25,223.79	9.38E-01
			1.0000	3.68E-05		27166	1.00
		Adjusted Gross DCGL		**27166**	**dpm/100cm^2**	**(alpha plus beta)**	

In Tables 5-5 through 5-25 the word "indeterminate" sometimes appears under the Cs-137:Co-60 Ratio column. This is due to the fact that either the Cs-137 value or the Co-60 value was less than MDA meaning the ratio cannot be determined. The same terminology appears throughout Appendices D, F, and I for the same reason.

Table 5-5
Reactor Building DCGL (smears)
Area 2 and Lily Pad (0'0" Elevation)

Containment Area 2 and Lilly Pad 2 samples		Cs-137:Co-60 Ratio	DCGL dpm/100 cm2
Reactor Building 0'0" El., Lilly Pad		0.0761	11537
Reactor Building 0'0" El., Area 2		0.14	11588
	MAX	0.14	11588
	MIN	0.08	11537
	MEDIAN	0.11	11563
	MEAN	0.11	11563
	STD. DEV.	0.05	36
	dev/mean	42.28%	0.31%

Notice that the two smears taken have Cs/Co ratios such that Co-60 is dominating the mix, hence the overall DCGL of 11,563 dpm/100 cm^2 very near the Co-60 DCGL of 11,000 dpm/100 cm^2.

Table 5-6
Reactor Building DCGL (core)
Area 17 (-25'0" Elevation)

Reactor Building, Area 17, -25'0" El. 1 sample		Cs-137:Co-60 Ratio	DCGL dpm/100 cm2
CTMT -25'0" El., Area 17		3.55	37235
	MAX	3.55	37235
	MIN	3.55	37235
	MEDIAN	3.55	37235
	MEAN	3.55	37235
	STD. DEV.	0	0
	dev/mean	0.00%	0.00%

This single sample showed only low levels of Cs-137 and U-234 with some H-3 at twice its MDA.

Table 5-7
Reactor Building DCGL (core)
Quad A (-25’0” Elevation)

Quad A 1 sample		Cs-137:Co-60 Ratio	DCGL dpm/100 cm2
Reactor Building -25'0" El.. Quad A (cold joint - floor)		0.404	13450
	MAX	0.40	13450
	MIN	0.40	13450
	MEDIAN	0.40	13450
	MEAN	0.40	13450
	STD. DEV.	0	0
	dev/mean	0.00%	0.00%

Quad A has a large Co-60 component, approximately 75% of the total activity in the slant core, which drives the DCGL down and is sufficiently different from the other Quads and Canals to warrant its own DCGL.

Table 5-8
Reactor Building DCGL (cores)
Quads B, C, and D (-25’0” Elevation)

Quads B, C, and D 2 samples		Cs-137:Co-60 Ratio	DCGL dpm/100 cm2
Reactor Building -25'0" El., Quad C (wall)		indeterminate	20120
Reactor Building -25'0" El., Quad C (cold joint - floor)		8.27	23011
	MAX	8.27	23011
	MIN	8.27	20120
	MEDIAN	8.27	21566
	MEAN	8.27	21566
	STD. DEV.	0	2044
	dev/mean	0.00%	9.48%

Quads B, C, and D had similar data and were sufficiently different from Quad A to merit a separate DCGL. SR-15 (see Appendix G) showed only Cs-137 in both Canal E and Quad C. This DCGL is conservative.

Table 5-9
Reactor Building DCGL (cores)
Canals E, F, G, and H (-25'0" Elevation)

Canals E, F, G, and H 4 samples		Cs-137:Co-60 Ratio	DCGL dpm/100 cm2
CTMT -25'0" El., Canal E, Area 18		71.5	38988
Reactor Building -25'0" El., Canal G (wall)		10.9	34230
Reactor Building -25'0" El., Canal G (cold joint - floor)		indeterminate	24958
Reactor Building -25'0" El., Canal H (wall)		indeterminate	28668
	MAX	71.50	38988
	MIN	10.90	24958
	MEDIAN	41.20	31449
	MEAN	41.20	31711
	STD. DEV.	42.85	6169
	dev/mean	104.01%	19.45%

Canals E, G, and H are similar enough to be grouped together. Canal F, being located between Canals E and G, would not be expected to show a radionuclide profile radically different from the other two in this grouping. SR-15 (see Appendix G) showed only Cs-137 in both Canal E and Quad C so we are assured that this DCGL is appropriately conservative.

Table 5-10
Reactor Building DCGL (smears)
Mezzanine (+12'0" Elevation) and Ground Floor (0'0" Elevation)

Reactor Building Mezzanine +12'0" El. and Ground Floor 0'0" El. 2 samples		Cs-137:Co-60 Ratio	DCGL dpm/100 cm2
Reactor Building 0'0" El., Smear		27	33385
Reactor Building 0'0" El., Smear Duplicate		3.08	24735
	MAX	27.00	33385
	MIN	3.08	24735
	MEDIAN	15.04	29060
	MEAN	15.04	29060
	STD. DEV.	16.91	6116
	dev/mean	112.46%	21.05%

Both of these samples were collected outside of the reactor containment structure in areas generally accessible to personnel.

Table 5-11
Reactor Building DCGL (core)
Area 20 (-15'0" Elevation)

Area 20 1 sample		Cs-137:Co-60 Ratio	DCGL dpm/100 cm2
Reactor Building -15'0" El., Area 20		indeterminate	35296
	MAX	0.00	35296
	MIN	0.00	35296
	MEDIAN	0.00	35296
	MEAN	0.00	35296
	STD. DEV.	0	0
	dev/mean	0.00%	0.00%

This core was taken near the entrance to the Cold Pipe Tunnel because a leak in a primary water pipe in the overhead was known to have existed during operation. This sample contained an approximate 50%-50% mix of Cs-137 and U-234.

Table 5-12
Reactor Building DCGL (cores)
Areas 21, 22, and the Pipe Trench (-25'0" Elevation)

Area 21 and Area 22 2 samples		Cs-137:Co-60 Ratio	DCGL dpm/100 cm2
Reactor Building -25'0" El., Area 22		0.342	15325
Reactor Building -25'0" El., Pump Room Trench, Area 21		0.0785	13874
	MAX	0.34	15325
	MIN	0.08	13874
	MEDIAN	0.21	14600
	MEAN	0.21	14600
	STD. DEV.	0.19	1026
	dev/mean	88.62%	7.03%

These samples were taken on the floor of the -25'0" elevation of the reactor building and in the pipe trench. Since the floor of the pipe trench is sloped and flows toward the pump room (Area 22), Area 22 is also included in this grouping. The pipe trench contained Quad and Canal Cleanup piping and associated valves and pumps for the same systems were located in Area 22. Notice that, because of Cs-137:Co-60 ratios are less than unity, the overall DCGL tend to be closer to the Co-60 DCGL.

Table 5-13
Hot Laboratory DCGL (cores)
All Areas Other than the Hot Cells and Hot Pipe Tunnel

Hot Laboratory - all areas except hot cells and hot pipe tunnel 4 samples	Cs-137:Co-60 Ratio	DCGL dpm/100 cm2
Hot Laboratory 0'0" El., Core #11 (101I1-11)	705	40231
Hot Laboratory 0'0" El., Core #12 (101I1-12)	26.4	34949
Hot Laboratory 0'0" El., Core #13 (101I1-13)	8990	39587
Hot Laboratory 0'0" El., Core #14 (101I1-14)	335	39820
MAX	8990.00	40231
MIN	26.40	34949
MEDIAN	520.00	39704
MEAN	2514.10	38647
STD. DEV.	4326.17	2480
dev/mean	172.08%	6.42%

The area behind the hot cells is known as the Hot Work Area (Room 16). An adjacent room (Room 23) was designated as a decontamination facility. Room 23 was a concrete block-walled, stainless steel-lined room with work tables and sinks. This room was decontaminated, stainless steel was removed, and the block wall was taken down. No residues were left on the concrete floor under the footprint of the room. Dry wastes would have been processed in the Hot Work Area and, though Canal K is immediately adjacent to Room 16, contaminated liquids would either not have been expected or would have been cleaned up immediately. Since the east side of the room has a roll-up door for bringing in and removing materials, the expectation is for the area to be relatively clean. The room also has a well-maintained epoxy resin-painted floor. Three samples showed very large percentages of Cs-137 with minor amounts of Co-60, Sr-90, U-134, and U-235. One sample was essentially a 50%-50% mix of Cs-137 and Sr-90. With that information in mind, it is not unexpected that Table 5-13 shows the overall DCGL tends to be closer to the Cs-137 DCGL.

Table 5-14
Hot Laboratory DCGL (smears)
Hot Cells

Hot Laboratory - Hot Cells 14 samples		Cs-137:Co-60 Ratio	DCGL dpm/100 cm2
Hot Cell 1 Equipment		4.08	28960
Hot Cell 2 Equipment		43.56	36482
Hot Cell 3 Equipment		23.40	34313
Hot Cell 4 Equipment		3.50	26887
Hot Cell 5 Equipment		1257.00	39342
Hot Cell 6 Equipment		32.63	35006
Hot Cell 7 Equipment		24.77	34556
Hot Cell 1 Surface		21.60	34167
Hot Cell 2 Surface		7.51	31571
Hot Cell 3 Surface		12.77	32636
Hot Cell 4 Surface		30.12	34928
Hot Cell 5 Surface		157.62	37590
Hot Cell 6 Surface		78.85	36950
Hot Cell 7 Surface		103.74	38263
	MAX	1257.00	39342
	MIN	3.50	26887
	MEDIAN	27.45	34742
	MEAN	128.65	34404
	STD. DEV.	327.68	3489
	dev/mean	254.70%	10.14%

Liquids and solids were both used in the hot cells. Experiments were taken from the reactor rabbit tubes and thermal column to the cells for destructive examination. All samples were dominated by the presence of both Cs-137 and Sr-90. Very minor amounts of H-3, Co-60, I-129, Eu-154, U-234, and U-235 were also present, but having virtually no effect on the DCGL calculation. As 35 years has passed since the facility was shut down, the DCGL will more and more approach that of Cs-137 due to radioactive decay. As an aside, 35 years ago there would have been at least 64 times more Co-60 and twice as much Cs-137 than there are today.

Table 5-15
Hot Laboratory DCGL (cores)
Hot Pipe Tunnel

Hot Laboratory - hot pipe tunnel 5 samples		Cs-137:Co-60 Ratio	DCGL dpm/100 cm2
Hot Laboratory -12'0" El., Core #15 (101I1-15)		222	38529
Hot Laboratory -12'0" El., Core #16 (101I1-16)		39.1	34156
Hot Laboratory -12'0" El., Core #20 (101I3-20)		54	34707
Hot Laboratory -12'0" El., HPT-SP4-SL3 (SR 24-8)		16.5	35016
Hot Laboratory -12'0" El., HPT-SP9-SL2 (SR 24-18)		27.1	36495
	MAX	222.00	38529
	MIN	16.50	34156
	MEDIAN	39.10	35016
	MEAN	71.74	35781
	STD. DEV.	85.15	1764
	dev/mean	118.69%	4.93%

Numerous on-site analyses were performed under SR-24. Under SR-24, the Cs-137:Co-60 ratios generally started at 8 and increased to as high as 834 (see Appendix G). It should be noted that for surface contamination, the DCGL of 35,781 dpm/100 cm^2 is appropriate; however, sample SR24-5, SR24-7, SR-24-8, and SR24-20 all indicate low Cs-137:Co-60 ratios at various depths in the concrete. This is most likely due to the fact that the Hot Cell drains, which collected in a piping header in the overhead, had a chronic leakage problem which deposited much activity on the floor below. This leakage point is in the vicinity of where rooms 25A and 25B meet right under Hot Cell 7. It is recommended that volumetric sampling be performed in this area of the Hot Pipe Tunnel to demonstrate compliance. Table 2-2, DCGL Values for Subsurface Structures, lists 23 radionuclides and their corresponding DCGLs that should be used to compare volumetric samples in order to determine compliance with the 25mrem/yr, criterion.

At this time, the plan is to remove one inch of floor in the entire tunnel and three inches of concrete floor at both the intersection of rooms 25A and 25B and at a location about the midpoint of room 25B.

Table 5-16
Services and Equipment Building DCGL (pipe analyses)
Areas Outside the Cold Pipe Tunnel

Services and Equipment Building – Drains Outside of CPT 6 pipe analyses (reproduced from App. H)		Cs-137:Co-60 Ratio	DCGL dpm/100 cm^2
CPT-4		2.52	22987
CPT-6		2.70	23481
CPT-7		2.17	21939
CPT-7A		2.16	21908
CPT-8		2.43	22729
CPT-9		2.09	21682
	MAX	2.70	23481
	MIN	2.09	21682
	MEDIAN	2.30	22334
	MEAN	2.35	22454
	STD. DEV.	0.24	717
	dev/mean	10.34%	3.20%

The Cs-137:Co-60 mix is, more or less, 70%-30%. It is based solely on samples from inside drain piping. A smear taken in the Cold Pipe Tunnel trench (Appendix G, SR-32, sample SR32-1) indicates nothing but Cs-137. No other SEB drain lines were surveyed for both Co-60 and Cs-137 so ratios cannot be calculated.

Historically, smears collected as part of D1131 402C1 (SEB Basement) were <MDA alpha and ranged from <MDA to 54 dpm/100 cm^2 beta. D1131 403C1 (SEB First Floor) smears were <MDA alpha and ranged from <MDA to 18 dpm/100 cm^2 beta. There was a suspect area at the west side of the north wall of the SEB addition, first floor. Subsequent surveys indicated no detectable contamination. A sample from the sand filters on the first floor indicated no detectable activity. Previously, a particle was found on the 13'0" elevation mezzanine which qualitatively indicated 17,507 pCi/sample of pure Cs-137 (D1131 404C1 FL1 3-1, sample PB04-00900, CS050504-002, dated 5/6/04). No other contamination is found in the building.

With no other data available and due to not being able to collect any more samples, it was decided that a default DCGL would be appropriate and conservative for this building. The default value from Table 5-3, and calculated in Table 5-4 is 27,166 dpm/100 cm^2 for all rooms and areas outside of the Cold Pipe Tunnel.

Table 5-17
Services and Equipment Building DCGL (cores)
Cold Pipe Tunnel

Services and Equipment Building 1 sample		Cs-137:Co-60 Ratio	DCGL dpm/100 cm2
Cold Pipe Tunnel -15'0" El., West of N-S Trench (101I3-18)		indeterminate	32914
	MAX	0.00	32914
	MIN	0.00	32914
	MEDIAN	0.00	32914
	MEAN	0.00	32914
	STD. DEV.	0	0
	dev/mean	0.00%	0.00%

This sample produced no measurable gamma-emitting radionuclides when analyzed by the on-site counting laboratory, hence the indeterminate Cs-137:Co-60 ratio. The sample was sent to an off-site lab for analysis due to the presence of a 36,894 dpm/100cm^2 beta reading on the top of the core puck and a 3,136 dpm/100cm^2 beta reading on the bottom. The off-site lab analysis revealed 59.6% Ni-63, 35.9% Sr-90, and 4.5% U-234. Ni-63 was de-selected, due to its negligible contribution to dose (it is a very low energy beta-emitter). After the Ni-63 was removed from the mix, the rebalanced mix became 88.9% Sr-90 and 11.1% U-234.

This information conflicts with the drain data provided in Appendix H. Drain data shows only Cs-137 and Co-60 values as analyses for other radionuclides are not performed. The Cs-137:Co-60 ratio for drains in the Cold Pipe Tunnel was 1.62. This would roughly equate to a DCGL 20,000 dpm/100cm^2. In addition, a sediment sample taken from debris on the floor near the trench (D1131 406C1 FL1R1 L0401-1, sample PB04-00902, CS050404-003, dated 5/6/04) indicated virtually all Co-60 and a sample of sediment collected from the trench (D1131 406C1 FL1R1 L0401-2, sample PB04-00903, CS050404-004, dated 5/6/04) indicated a Cs-137:Co-60 ratio of 0.014. Both of the 2004 analyses are qualitative.

In the face of this conflicting data and Appendix G sample SR32-2 indicating nothing but Co-60 in the trench sludge, prudence dictates use of the more restrictive DCGL for Co-60 of 11,000 dpm/100cm^2. By using Co-60, the Project will insure that if remediation needs to be performed based on Co-60, then we will be under the DCGLs for any other radionuclides that could possibly be expected to be found. In like fashion, when the survey unit passes FSS based on the Co-60 DCGL, the Project is assured that it will have passed even if other radionuclides are present.

Table 5-18
Fan House DCGL (core)
All Areas

Fan House 1 sample		Cs-137:Co-60 Ratio	DCGL dpm/100 cm2
Fan House -12'0" El., Core #17 (101I1-17)		indeterminate	36857
	MAX	0.00	36857
	MIN	0.00	36857
	MEDIAN	0.00	36857
	MEAN	0.00	36857
	STD. DEV.	0	0
	dev/mean	0.00%	0.00%

With only one sample, indeterminate Cs-137:Co-60 ratio, and no Co-60 detected, the question arises as to how a DCGL of less than 40,500 dpm/100 cm^2 was determined. The answer lies in the surrogate method for accounting for H-3 (see Appendix D, Addendum 3).

On the 0’0” elevation of the Fan House, samples SR28-3 and SR28-4 indicate all Cs-137 and a Cs-137:Co-60 ratio of 8:1, respectively (see Appendix G, SR28). The 8:1 ratio equates to a DCGL of 31,000 dpm/100 cm^2. On the -12’0” elevation, samples SR28-1 and SR28-2 show nothing but Cs-137 and would indicate a DCGL of 40,500 dpm/100 cm^2. Using the DCGL of 36,857 dpm/100 cm^2 taken from the -12’0” elevation core #17 (101I1-17) is appropriately conservative.

Table 5-19
Waste Handling Building DCGL (cores)
All Areas

Waste Handling Building 3 samples		Cs-137:Co-60 Ratio	DCGL dpm/100 cm2
Waste Handling Building -13'0" El., Core #10 (101I1-10)		indeterminate	40490
Waste Handling Building -14'6" El., Evaporator Pit (101I3-16)		401	39646
Waste Handling Building -14'6" El., WHB-SP2-SL3 (SR24-2)		indeterminate	40017
	MAX	401.00	40490
	MIN	401.00	39646
	MEDIAN	401.00	40017
	MEAN	401.00	40051
	STD. DEV.	0	423
	dev/mean	0.00%	1.06%

Appendix G, SR24 and SR29, corroborates the three core samples shown above. Sample SR24-1 on the -14'6" elevation displays a Cs-137:Co-60 ratio of greater than 800:1. Samples SR29-1 and SR29-2, on the -13'0" elevation, are virtually all Cs-137 with no Co-60 detected. The Cs-137:Co-60 ratios, from samples SR29-3 and SR29-4 on the 0'0" elevation, range from roughly 250:1 to 500:1 or, essentially, all Cs-137. The 40,051 dpm/100 cm^2 DCGL is appropriate under the circumstances.

Table 5-20
Primary Pump House DCGL (cores)
Room 4

Primary Pump House - Room 4 2 samples		Cs-137:Co-60 Ratio	DCGL dpm/100 cm2
PPH 0'0" El., Room 4, PPH-R4-SP2-SL1 (SR24-16)		0.815	6341
PPH 0'0" El., Room 4, PPH-R4-SP1-SL1 (SR24-15)		3.12	16031
	MAX	3.12	16031
	MIN	0.82	6341
	MEDIAN	1.97	11186
	MEAN	1.97	11186
	STD. DEV.	1.63	6852
	dev/mean	82.84%	61.25%

SR24 in Appendix G lists locations in the Primary Pump House where core samples were taken. Samples SR24-15 and SR24-16 (above) were sent off site for analysis. The DCGLs obtained from these two samples are driven by H-3 and I-129; both low energy beta-emitters and therefore hard-to-detect radionuclides. These nuclides must be surrogated to Cs-137. The actual Cs-137 and Co-60 activities average 29% and 9.6%, respectively for the two core samples. Cs-137:Co-60 ratios were 0.815 and 3.12. Using 11,186 dpm/100 cm^2 appropriately accounts for the radionuclides expected to be found in Room 4.

Table 5-21
Primary Pump House DCGL (cores)
All Other Rooms

Primary Pump House - All Other Rooms 5 samples		Cs-137:Co-60 Ratio	DCGL dpm/100 cm2
PPH 0'0" El., Room 6, PPH-R6-SP1-SL10 (SR24-12)		indeterminate	25410
PPH 0'0" El., Room 8, PPH-R8-SP1-SL4 (SR24-11)		indeterminate	27312
PPH 0'0" El., Room 6, PPH-R6-SP1-SL1 (SR24-12)		10.9	32805
PPH 0'0" El., Room 5, PPH-R5-SP1-SL1 (SR24-13)		1.48	19743
PPH 0'0" El., Room 3, PPH-R3-SP1-SL1 (SR24-14)		3.11	26470
	MAX	10.90	32805
	MIN	1.48	19743
	MEDIAN	3.11	26470
	MEAN	5.16	26348
	STD. DEV.	5.03	4668
	dev/mean	97.50%	17.71%

SR24 in Appendix G lists six locations in the Primary Pump House where core samples were taken. Data from two sample points in Room 4 are shown in Table 5-20. Five samples were taken from the four remaining locations in the PPH. Originally, SR24-12 and SR24-16 were sent for off-site analyses. Results indicated the presence of I-129. The unexpected presence of I-129 was cause for sending the remaining five samples off site to be analyzed. It was later decided to cordon off Room 4 for its own DCGL since I-129 only appeared in that room. All other rooms were lumped into the same DCGL of 26,348 dpm/100 cm^2.

Table 5-22
Reactor Office and Laboratory Building DCGL (chips)
Areas Outside the New Fuel Vault

Reactor Office and Laboratory Building 2 samples		Cs-137:Co-60 Ratio	DCGL dpm/100 cm^2
ROLB-RM-210-IM-1 (SR31-2)		indeterminate	40500
ROLB-RM-210-IM-4 (SR31-3)		6	29282
	MAX	6	40,500
	MIN	6	29282
	MEDIAN	6	34891
	MEAN	6	34891
	STD. DEV.	0	7932
	dev/mean	0.00%	22.73%

Table 5-22 data is reproduced from Appendix G, SR-31 and the DCGL values were calculated from only Cs-137 and Co-60 using the equation in section 5.3.1. Concrete pieces were chipped from the floor, placed in a Marinelli beaker, and analyzed by gamma spectroscopy. These samples were collected prior to scabbling (a decontamination technique) the affected floor area. Since only Cs-137 was detected in the first sample, the Cs-137:Co-60 ratio is indeterminate and the DCGL for Cs-137 is applied.

Sample analyses from two of three sumps, on the -15'0" elevation, indicated only Cs-137 and at levels close to the MDA (see Appendix G, SR-31). Analysis of a composite of first floor smears indicates only Cs-137. The building is relatively clean from a radiological perspective. The only place where detectable contamination was found was in the New Fuel Vault. From both talking to former PBRF personnel and by knowledge gleaned from records reviews, it is known that during reactor operations, the second floor laboratories analyzed samples taken from the reactor, including primary system water samples. It is also known that, prior to their removal, some walls in the second floor laboratories were contaminated but that both the levels and radionuclide composition of contamination were not characterized. Due to not being able to collect any more samples and based on all the aforementioned, it was decided that a default DCGL would be appropriate and conservative for this building. The default value from Table 5-3, and calculated in Table 5-4 is 27,166 dpm/100 cm^2 for all rooms and areas outside of the New Fuel Vault.

Table 5-23
Reactor Office and Laboratory Building DCGL (smears)
New Fuel Vault

Reactor Operations and Laboratory Building 4 samples		Cs-137:Co-60 Ratio	DCGL(beta) dpm/100 cm2
ROLB Smear		16.10	33963
ROLB Smear Duplicate		16.10	33985
ROLB Smear 2		46.20	27715
ROLB Smear 2 Duplicate		41.90	27660
	MAX	46.20	33985
	MIN	16.10	27660
	MEDIAN	29.00	30839
	MEAN	30.08	30831
	STD. DEV.	16.23	3630
	dev/mean	53.97%	11.77%

Other than a core taken in the New Fuel Vault, the only quantitative data extant are from the four smears shown in Table 5-23. The core indicated only U-234. Conversations with retirees indicated that experiments and other non-fuel materials were also stored in the vault so further analysis, by taking smears for loose surface contamination, was ordered. Since the DCGLs calculated from all four smears are so close, it is assumed that they are right on and the DCGL of 30,831 dpm/100 cm^2 is defensible.

Table 5-24
Hot Retention Area DCGL (concrete pieces and pipe debris)
Hot Retention Vault and Tunnel to Fan House Exterior

Hot Retention Area -6'0" Elevation 2 samples concrete chips and pipe debris)		Cs-137:Co-60 Ratio	DCGL dpm/100 cm2
Hot Retention Area -6'0" Elevation (concrete chips)		14.2	34207
Hot Retention Area -6'0" Elevation (pipe debris)		14.00	34218
	MAX	14.20	34218
	MIN	14.00	34207
	MEDIAN	14.10	34213
	MEAN	14.10	34213
	STD. DEV.	0.14	8
dev/mean	1.00%		0.02%

The data show that for locations inside the Hot Retention Area (HRA), on average, the Cs-137:Co-60 ratio is about 14.1:1. Results from the HRA give credibility to the use of an Adjusted Gross DCGL based on a mixture of Cs-137 and Co-60. The datum from SR28 (sample 28-5) shows only Cs-137 with no Co-60 (see Appendix G) and Table I-2 shows a Cs-137:Co-60 ratio of 14.6 for nine Hot Retention Area samples analyzed on site. Using the mean value of 34,213 dpm/100cm^2 from Table 5-24 is appropriate.

Table 5-25
WEMS DCGL (sludge samples)
WEMS North Vault Interior

WEMS -12'0" Elevation 3 sludge samples from north vault		Cs-137:Co-60 Ratio	DCGL dpm/100 cm2
Sludge sample #1 (south)		8.96	31908
Sludge sample #2 (west)		indeterminate	37180
Sludge sample #1 (north)		9.75	32415
	MAX	9.75	37180
	MIN	8.96	31908
	MEDIAN	9.36	32415
	MEAN	9.36	33834
	STD. DEV.	0.56	2909
	dev/mean	5.97%	8.60%

The WEMS is the PBRF liquid release point and, as such, is known to have controlled the release of radioactive effluents during plant operations. In addition, soil samples taken both upstream and downstream of the WEMS have revealed the presence of plant-related radioactivity dominated by the isotopes Cs-137, Co-60, and Sr-90.

Table 5-25 data is taken from sludge samples taken on 10/4/06 and decay-corrected 2/1/07. DCGL values were calculated from only Cs-137 and Co-60 using the equation in section 5.3.1. Sludge was taken from three locations in the north vault: at the south wall just before going through the trash racks, at the west wall just beneath the 24" pipe inlet, and at the north wall beneath the 36" pipe inlet. The samples were dried and analyzed by gamma spectroscopy on 10/10/06. These samples were collected to ascertain the radiological characteristics prior to the WEMS being cleaned out. The 33,834 dpm/100cm^2 DCGL from Table 5-25 is appropriate.

5.4 Compilation of Data from Building Exteriors

5.4.1 Historical Perspective

Up to this point, building roofs and exterior walls have not been discussed. From an historical perspective, between 1973 and 1985, roofs of the Reactor Building (1111), Reactor Office and Laboratory Building (1141), Fan House (1132), and Waste Handling Building (1133) were recoated with spray-on polyurethane foam insulation covered with Dow Corning 3-5000 elastomeric silicone. The roofs of these buildings were surveyed just prior to recoating to verify contamination as not present. As part of the 1985 Initial Characterization Survey, radiological monitoring performed at three grid points on the Hot Lab Roof (1112), Service Equipment Building (1131), and Primary Pump House (1134) found no detectable contamination.

Subsequent discussion with NASA retirees on 8/12/04 determined that some stone removed from the roof surfaces between 1973 and 1985 was reported to have elevated activity that was equal to or greater than twice background. This stone was retained on site and was in three piles just west of the Hot Retention Tank area [BNI 2004]. In late 2006 and early 2007, telephone calls to various former employees and interviews with current employees indicated that the stone was most likely either 1) pushed into a pile at the south end of the Hot Retention Area when all the stone/dirt was removed from around the Hot Retention Area or 2) used as void space filler in B-25 radioactive waste shipment boxes back when MWH was still the site contractor [MOTA 2006a, MOTA 2006b, MOTA 2007]. Current Radiological Field Operations personnel, who have been here since the MWH days, indicated they have no surveys showing this material leaving site which corroborates the previous sentence.

NASA used to launder protective clothing on the first floor of the Waste Handling Building. Interviews with current decommissioning personnel indicate that the washers and dryers used to launder protective clothing as well as a sewing machine used to repair the same were "loaded with hot particles" so they were packaged and shipped off site as radioactive waste in 2002. Reviews of building drawings revealed that exhausts for dryers were vented directly to the roof of the Waste Handling Building without being filtered. This may be the origin of the three piles of stone mentioned above.

Based on all the previous information, MWH implemented one characterization survey package in 2003 and six in 2004 to ascertain the radiological status of the exteriors of some PBRF buildings.

C1111 301C1 Reactor Building Roof and Exterior Walls
C1112 301C1 Hot Laboratory Roof and Exterior Walls
C1132 301C1 Fan House Roof and Exterior Walls
C1133 301C1 Waste Handling Building Exterior Walls
C1134 301C1 Primary Pump House Exterior Walls and Roof
C1134 301C2 Primary Pump House Exterior Walls
C1141 215C1 ROLB Roof and Exterior Walls

Each of the six survey packages from 2004 required the following:

1. Perform a beta scan survey of accessible exterior surfaces of the building (i.e., roof and walls to two meters only) paying particular attention to areas of highest activity (e.g., pits and cracks in the roofing material, roof/wall interfaces). Scans shall be performed by moving at a maximum rate of one detector width per second while listening to the audible output of the instrument.
2. Perform a gamma scan survey of accessible exterior surfaces of the building roof only, paying particular attention to areas of highest activity (e.g., pits and cracks in the roofing material). Scan 100% of the accessible surfaces of the roof.
3. Perform direct beta measurements at any location of elevated activity identified during either beta or gamma scan. If no areas of elevated activity are identified, then randomly select a minimum of eight direct beta measurements. If many areas are discovered, then take sample measurements at the highest eight locations identified during either the beta or gamma scans. Note the location of each measurement on the appropriate survey map contained in Appendix A (of the survey package).
4. Collect a direct alpha measurement at each direct beta measurement location where the beta result was greater than 1,000 dpm/100 cm^2.
5. Take a contact gamma measurement at each direct beta measurement location where the result was greater than 5,000 dpm/100 cm^2 or where elevated readings were observed during the gamma scan.
6. Collect a gamma exposure rate measurement at one meter distance from the contact gamma measurement location.
7. Collect a smear for removable alpha and beta contamination at each direct beta measurement location. Field count smears. If the activity of any smear is greater than 50,000 dpm/100 cm^2, then do no submit it to the count room. Note the activity and record in the field notes section that the activity is form a field count.
8. Combine and analyze, by gamma spectroscopy, alpha/beta smear samples collected at locations where either the removable alpha

was greater than 100 dpm/100 cm^2 or the removable beta was greater than 1,000 dpm/100 cm^2.

9. For QA/QC purposes, a minimum of 5% of the direct measurement points (minimum of one) and surface area scans are selected for replicate survey.

   In addition, each survey package required the removal of four 18-inch square pieces of roofing material right down to the metal or concrete roof. The roofs are covered with a layer of felt/tar paper and mastic covered by approximately 6 inches of yellow/orange foam insulation, then sealed with a kind of elastic polymer material painted gray. The same series of measurements as described above were repeated on the base metal or concrete material. After completing this phase, the sections of roofing material were replaced and either silicone caulked around the crack and/or patched with roof patch.

All surveys were conducted using the following instrumentation:

Ludlum Model 2350 data logger
Ludlum Model 44-116 beta plastic scintillator
Ludlum Model 43-90 alpha scintillator
Ludlum Model 44-10 2”x2” NaI(Tl) gamma scintillator
Tennelec LB5100 alpha/beta counting system

5.4.2 Analysis

Appendix J consists of the Characterization Survey Unit Summary Reports for the seven characterization packages. Below are the highlights of each package.

<u>C1111 301C1</u> Reactor Building Roof and Exterior Walls
One positive of four samples taken was 0.466 pCi/g Cs-137 or approximately eight times the MDA on the tar paper/roof felt.

<u>C1112 301C1</u> Hot Laboratory Roof and Exterior Walls
Two positive of four samples taken were 0.248 and 0.293 pCi/g Cs-137 and 1.5 and 1.9 times the respective MDAs on tar paper/felt.

<u>C1132 301C1</u> Fan House Roof and Exterior Walls
Two positive of four samples taken were 0.656 and 0.237 pCi/g Cs-137 and 4.9 and 4.8 times the respective MDAs on tar paper/felt.

<u>C1133 301C1</u> Waste Handling Building Exterior Walls
Two positive of four samples were 0.527 and 0.761 pCi/g Cs-137 and 1.4 and 4.1 times the respective MDAs on tar paper/felt. Additionally, one of

the samples showed 0.198 pCi/g Ag-108m or approximately 1.2 times the MDA.

C1134 301C1 Primary Pump House Exterior Walls and Roof
C1134 301C2 Primary Pump House Exterior Walls
On the Primary Pump House roof no positive samples, of four taken, were detected. Two samples of roofing debris measured 1.53 and 457 pCi/g Cs-137. A hot particle collected was less than MDA on the gamma spec and, therefore, assumed to be a beta-emitter. Results are not available as to what exactly the particle was. Both the roof debris and the hot particle were removed.

C1141 215C1 ROLB Roof and Exterior Walls
Four positive of four samples taken were 0.186, 0.160, 0.171, and 0.190 pCi/g Cs-137 and 2.3, 2.2, 1.2, and 1.6 times the respective MDAs on tar paper/felt.

Unless otherwise delineated, all other smears, scans, and direct readings were very low; ranging from less than MDA to just above. With the exception of the Primary Pump House, all the other positive sample results are most likely due to atmospheric fallout from nuclear bomb tests.

Operations ceased more than 30 years ago and there is virtually no expectation that activity due to plant operations will be found in any of these buildings. Nevertheless, NASA Project Management has decided that a default DCGL would be both conservative and appropriate for all the building exterior surfaces and roofs. The default value from Table 5-3, and calculated in Table 5-4 is 27,166 dpm/100 cm^2.

5.5 Compilation of Data from Out Buildings

The list of Out Buildings is as follows:

1135 – Reactor Gas Services Building
1136 – Reactor Compressor Building
1151 – Reactor Water Tower
1152 – Reactor Cooling Tower
1153 – Reactor Sludge Basins
1154 – Cold Retention Basins
1157 – Reactor Precipitator
1161 – Reactor Substation
1191 – Reactor Security Building
1193 – Reactor Radar and Weather Tower House
1195/9837 – Reactor Cryogenic and Gas Supply System
1196 – Reactor Gas Storage Structure

Of the 12 structures listed above, only the Cold Retention Basins (1154) are known to have plant-related activity present. The other 11 buildings would not be expected to show any signs of contamination, either because of where they are physically located on site or because of their intended use or both.

Because of the presence of plant-related activity, the current plan for the Cold Retention Basins (CRB) is to tear them out of the ground and perform soil sample analyses to show compliance with the regulations. Presently, the CRBs are filled with water due to in-leakage.

NASA Project Management has decided to use the default DCGL calculated in Table 5-4 of this document. Therefore, 27,166 dpm/100 cm^2 should be used during the FSS of the remaining 11 structures. Since the results of the six survey packages revealed no detectable contamination greater than release criteria and there was no loose contamination found on what remains of the structures, they should be surveyed to the least stringent criteria. In addition, the remaining 11 structures were built at the same time, built of the same materials, and there is no reason to believe that plant-related contaminants migrated to any of the buildings not surveyed.

The Cooling Tower was "found free of radioactive contamination" as stated in section 1.9 of the NASA Specifications for Demolition of Structure 1152. The final radiological survey of the cooling tower, to support that statement, was prepared August 22, 1983. The cooling tower basin and clear well are currently buried. The plan for these structures is to excavate them and survey to the default DCGL of 27,166 dpm/100 cm^2. If contamination in excess of the DCGL is discovered, then actions up to, and including, remediation and reclassification will take place.

6.0 CONCLUSIONS

From section one, the final products of this document are as follows:

1. to refine the surrogate DCGLs,
2. based on the refined surrogates, to recalculate the adjusted gross activity DCGLs, and
3. to delineate where in the PBRF buildings these new DCGLs apply.

Appendices D, F, and I refine the surrogate DCGLs and recalculate the adjusted gross activity DCGLs. Appendices J and K provide the rationale for DCGLs to be used on the building exterior walls and roofs. Table 5-3 delineates where the new DCGLs apply for the specific area where the concrete cores and smears were taken. Appendix L shows, room-by-room and building-by-building, where the new DCGLs will be applied throughout the PBRF.

Note that as time goes on, the Cs-137-to-Co-60 ratio increases since the Cs-137 half life is more than five times as long as the Co-60 half life. Also, since in general Cs-137 represents the majority of the activity in most samples, the adjusted gross DCGL increases over time.

There are 19 DCGLs needed to adequately describe the radionuclide ratios found on the interior building surfaces at the PBRF. There is one default DCGL to be used in areas where data is limited or non-existent: including both interior and exterior building surfaces. Bear in mind that non-existent doesn't mean there is no rationale for choosing to use the default. In general, the default is used for building exterior walls and roofs, out buildings that housed liquid and gas supplies used in the buildings, and interiors of buildings where little or no plant-related activity was detected. The DCGLs range from 11,000 to 40,051 dpm/100 cm^2 depending on the area of the PBRF that is being surveyed for FSS.

Cs-137 and Co-60 constitute the most prevalent radioactive species throughout the site. Their activity ratio is very useful for evaluating survey measurements. The use of MDA values in the calculations for the various DCGLs (see Appendices D, F and I) inserts conservatism into each DCGL value.

Other conclusions are:

1. DCGLs in rooms and buildings which housed Primary Cooling Water system piping (Quad and Canal Clean-up pipe trench, Area 22, and the Cold Pipe Tunnel due to a pipe leak in the overhead) generally were dominated by Co-60. In addition, both Ni-63 and Sr-90 were represented in contamination deposits. Transuranics are present at very low activity fractions. The Cs-137:Co-60 activity ratio is relatively low. The Primary Pump House is a special case where, in Room 4, I-129 and H-3 are dominating the mix in the absence of both Cs-137 and Co-60.

2. The numbers of radionuclides detected and average activity levels generally show decreasing trends with distance from the Primary Coolant Water and Quad and Canal piping. As such, considerable changes in the radionuclide composition occur.

3. Beta-gamma emitters comprise a significant activity fraction in most areas of the site. Thus, beta measurements are useful for FSS in most areas. In the Hot Pipe Tunnel, where rooms 25A and 25B intersect, it was noted in the core analyses that very low Cs-137:Co-60 ratios occur at depth and that, therefore, volumetric sampling will have to be performed in order to demonstrate compliance with the decommissioning regulations.

4. The radionuclides identified as HTD constitute a significant fraction of the total activity in area with comprehensive sample analyses. This report assigns H-3 and I-129 to the HTD class. H-3 and I-129 emit betas of very low average energy (6 keV for H-3 and 50 keV for I-129) and are barely detectable by most plastic scintillation detectors designed for field use. They all have very low detection

efficiencies (<<<1%, 1 or 2 %, and 4%, respectively). The pure beta emitters, mostly Sr-90, constitute a relatively small fraction of the activity in all areas. Fortunately, other easier-to-detect beta-gamma emitters present in the same samples provide sufficient detectable betas to enable FSS using direct surface beta measurements. While none of these radionuclides contribute significantly to the dose to future building occupants from structural surface residual contamination, their presence should be accounted for. Their activity fractions are required for calibration of beta detectors and interpretation of direct surface beta measurements on surfaces with significant activity fractions of I-129.

5. The presence of alpha-emitting radionuclides that were not de-selected comprises < 5% of the activity in most samples. Under the PBRF Final Status Survey Plan future building occupancy scenario and conceptual dose model for structures, alpha emitters make an extremely small contribution to the dose; however, they are accounted for in all DCGL calculations where they appear in the radionuclide mix.

7.0 APPENDICES

Appendix A – Code Definitions Used in Characterization Packages
Appendix B – Concrete Core Location Maps
Appendix C – List of Concrete Core Locations and Corresponding Gamma Spectroscopy Log Numbers
Appendix D – Concrete Core 10CFR61 Data and DCGL Calculations
Appendix E – Smear Location Maps
Appendix F – Smear 10CFR61 Data and DCGL Calculations
Appendix G – Survey Request (SR) Concrete Core and Smear Data
Appendix H – Cold Pipe Tunnel (CPT) Drain Piping Data
Appendix I – Hot Retention Area (HRA) Data
Appendix J – Building Exterior Surfaces
Appendix K – Out Buildings
Appendix L – Building Structural Surface DCGLs

APPENDIX A

Code Definitions Used in Characterization Survey Packages

(4 pages)

CODING FROM OLD PROCEDURE PBRF-CS-015, REVISION 1

Each code was referred to as a Location Code (LC). The codes came in groups of five because the Ludlum Model 2360 Data Logger, used when the old survey packages were developed, had memory which could support a 30 character alphanumeric identifier. The groupings and LCs are listed below.

PBRF Survey Measurement Location Code Example Sheet

LC1 Survey Group and Survey Area ID	LC2 Survey Unit Class/ Survey Unit ID and Survey Reason	LC3 Survey Category and Material Code	LC4 Detector Type/ Survey Count Type Background Mode	LC5 Survey Grid ID or Room Number	LC6 Survey Point or Measurement Location
Positions (P) 1-5	Positions (P) 1-5	Positions (P) 1-5	Positions (P) 1-5	Positions (P) 1-5	Positions (P) 1-5
C 1 1 1 1	1 0 1 C 1	F L 1 C 1	B 0 2 F A	D A C 3 5	0 0 0 0 1
P1 – a one character code to identify the survey group **A** – impacted environs **B** – non-impacted environs **C** – impacted structures **D** – non-impacted structures **E** – impacted systems **F** – non-impacted systems **G** – background structures **H** – background environs	P1 – a one character code to identify the survey unit Classification **1** – Class 1 **2** – Class 2 **3** – Class 3 **4** – Non-Impacted	P1, P2, and P3 - a three character code to identify the survey surface **FLx** – floor **LAx** – open land area **SAx** – surface soil (0”-6”) **ESx** – system exterior **x** will be a numeric sequence starting with 1 See next page for entire listing of structure, soil, and system surface codes	P1, P2, and P3 - a three character code to identify the survey detector **A01** – 43-68A (alpha) **B01** – 44-40B **G01** – 44-10 (15 cm.) **ZZZ** – not used See next page for entire listing of detector codes	P1, P2, P3, P4, and P5 – can be a five character code to identify the survey grid ID, room number, or system number	A five character counter to track measurement or sample numbers, as required
P2, P3, P4, and P5 – a four character code to identify the survey area **1110** - Containment **1111** – Reactor Building **1112** – Hot Laboratory **1131** – Serv. & Equip. Bldg. **1132** – Fan House **1133** – Waste Handling Bldg. **1134** – Primary Pump House **1135** – Gas Services Building **1136** – Compressor Building **1141** – Rx. Ops. & Lab. Bldg. **1151** – Water Tower **1155** – Hot Retention Area **1191** – Reactor Security **1192** – Effluent Monitor Sys. **1195** – Cryo. & Gas Supply	P2 and P3 – a two character code to identify the survey unit **01** – Quad A **12** – Quad E **21** – Mock-up Reactor	P4 and P5 – a two character code to identify the material Type **A1** – asphalt **B1** – brick **B2** – cay tile pipe **C1** – concrete (bare) **C2** – concrete (painted) **C3** – concrete (epoxy) **D1** – cinder block (bare) **D2** – cinder block (painted) **D3** – cinder block (epoxy) **G1** – miscellaneous material **M1** – metal **P1** – porcelain **R1** – sediment **S1** – soil **V1** – vegetation **W1** – water **Y1** – ceramic tile	P4 – a one character code to identify the type of count Source Check (SC) Types **A** – pre-use SC background **B** – pre-use SC count **C** – post SC background **D** – post SC count **F** – field count **G** - field background **S** – field scan		
The LC1 code is also used to designate the source number during source checks **PB017** – PBRF assigned	P4 and P5 – a two character code to identify the reason for the survey **Bx** – background survey **Cx** – characterization **Ix** – investigation **Fx** – final status survey **Px** – post-remediation **Qx** – QA/QC **Sx** – scoping survey **Vx** – verification survey **x** will be a numeric sequence starting with 1		P5 – a one character code to identify background subtract method for direct measurements **A** – average background **N** – not required **S** – single background per reading		
	The LC2 code is also used to designate **DRT01** or **DRT02** during source checks				

LC3 Survey Category and Material Code	LC3 Survey Category and Material Code	LC3 Survey Category and Material Code
Positions (P) 1-3 **Structures**	Positions (P) 1-3 **Soils**	Positions (P) 1-3 **Systems**
BEx – building exterior surfaces **BIx** – building interior surfaces **CLx** – ceiling **EQx** – plant equipment **FDx** – floor drains **FLx** – floor surfaces **MAx** – misc. equip. **MIx** – interior of equip. & matl. **PAx** – paved areas **RDx** – roof surface drain **RFx** – roof surfaces **RWx** – roadways **STx** – stairway **SWx** – sidewalks **WAx** – wall surfaces **WLx** – lower wall surfaces **WUx** – upper wall surfaces	**EPx** – effluent pathway **LAx** – open land areas **MDx** – sediment samples **MMx** – misc. materials **SAx** – 0-15 cm surface soil **SBx** – 15-30 cm subsurface soil **SCx** – 30-60 cm subsurface soil **SDx** – 60-90 cm subsurface soil **SEx** – 90-120 cm subsurface soil **SFx** – 0-1 m subsurface soil **SGx** – 1-2 m subsurface soil **SHx** – 2-3 m subsurface soil **SIx** – 3-4 m subsurface soil **SJx** – 4-5 m subsurface soil **SZx** – subsurface soil **WSx** – water samples	**DFx** – floor drain **DMx** – storm drain **DSx** – sewer drain **ESx** – system exterior **ISx** – system interior **MEx** – misc. equipment **SPx** – system piping

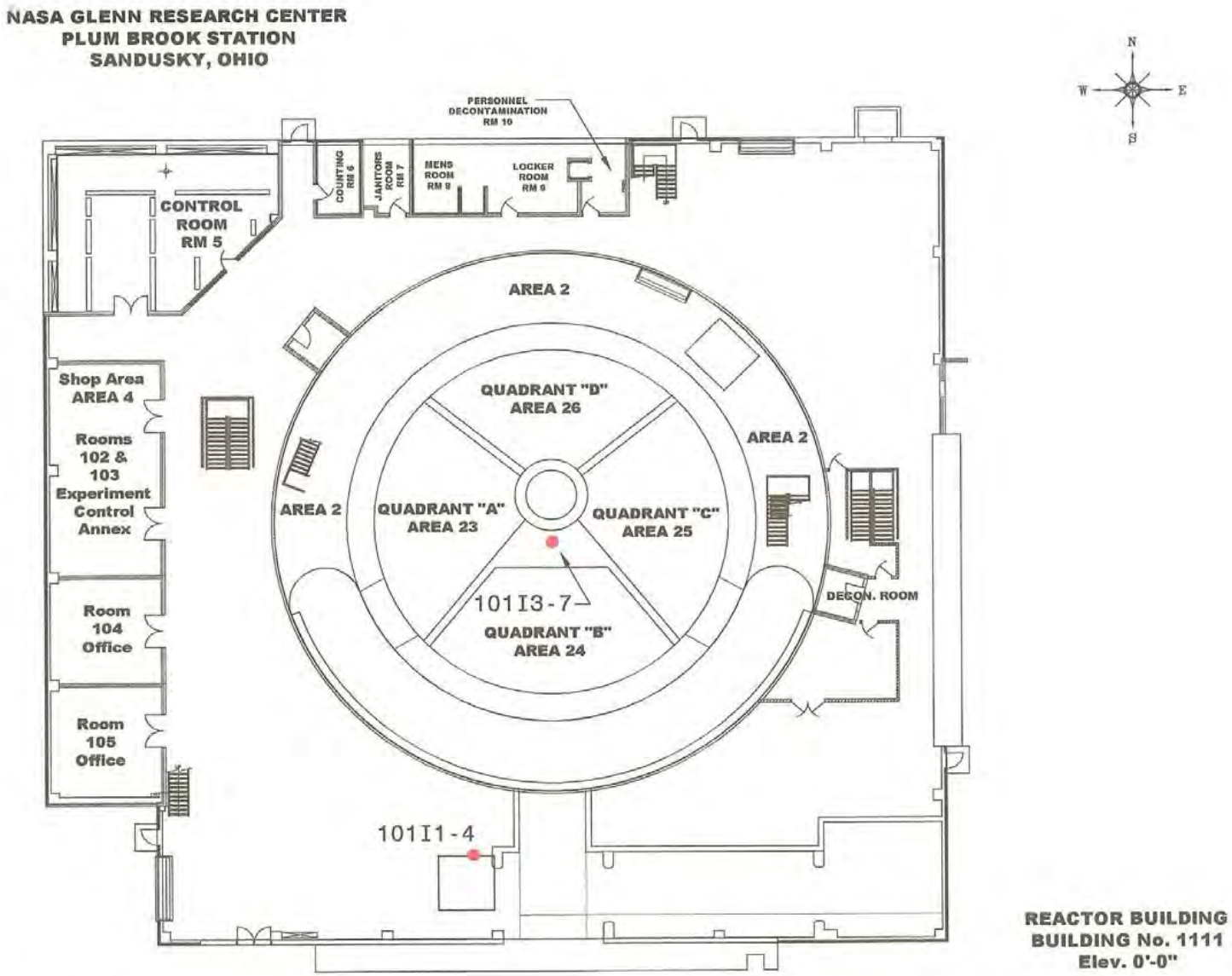
LC4 Detector Type/ Survey Count Type	LC4 Detector Type/ Survey Count Type
Positions (P) 1-3	Positions (P) 1-3
A01 – 43-68A (alpha) **A02** – 43-5 (alpha) **A03** – 43-90 (alpha) **A04** – 43-37A **B01** – 44-40B **B02** – 44-116 **B03** – 44-9 **B04** – 43-68B **B05** – 43-106B **B06** – 44-40B (25 ft. cable) **B08** – 43-37B **B09** – 44-116A (interior 8” dia. pipe) **B10** – 44-116B (interior 10” dia. pipe) **B11** – 44-116C (interior 12” dia. pipe) **B12** – 44-116D (int. 14”-18” dia. pipe) **B13** – 44-116E (int. 20”-26” dia. pipe) **B14** – 44-116F (10’ probe cable) **G01** – 44-10 (15 cm.) **G02** – 44-10 (1 meter) **G03** – 44-10 (50 cm.) **G06** – 44-2 (1 meter)	**L01** – alpha/beta smear analysis **L02** – gamma spec smears **L03** – H3 water sample **L04** – gamma spec soil sample **L05** – gamma spec core bore **L06** – gamma spec water **L07** – gamma spec smear analysis **L08** – lead analysis **L09** – PCB sample analysis **L10** – asbestos sample analysis **L11** – gamma spec. misc. material **L12** – gamma spec sediment sample **L13** – beryllium sample analysis **Q01** – gamma spec soil QA **Q02** – gamma spec smear QA **Q03** – alpha/beta smear QA **Q04** – H-3 smear QA **Q05** – gamma spec core bore QA **Q06** – gamma spec water QA **Q07** – H-3 water QA **Q08** – lead analysis QA **Q09** – PCB sample QA **Q10** – asbestos sample QA **Q11** – gamma spec. misc. material QA **Q12** – gamma spec sediment sample QA **ZZZ** – not used

APPENDIX B

Concrete Core Location Maps

(14 pages)

Concrete core location maps are provided to show the reader from where all concrete cores were taken. Most areas of the PBRF are represented; however, one will note that both the Hot Laboratory and the Reactor Building are represented more than any of the other buildings. This is because, based upon the preponderance of the evidence, both those buildings showed plentiful signs of residual contamination with which to obtain concrete samples. The other buildings not only displayed limited contamination, but also appeared to be free of residual contamination altogether.



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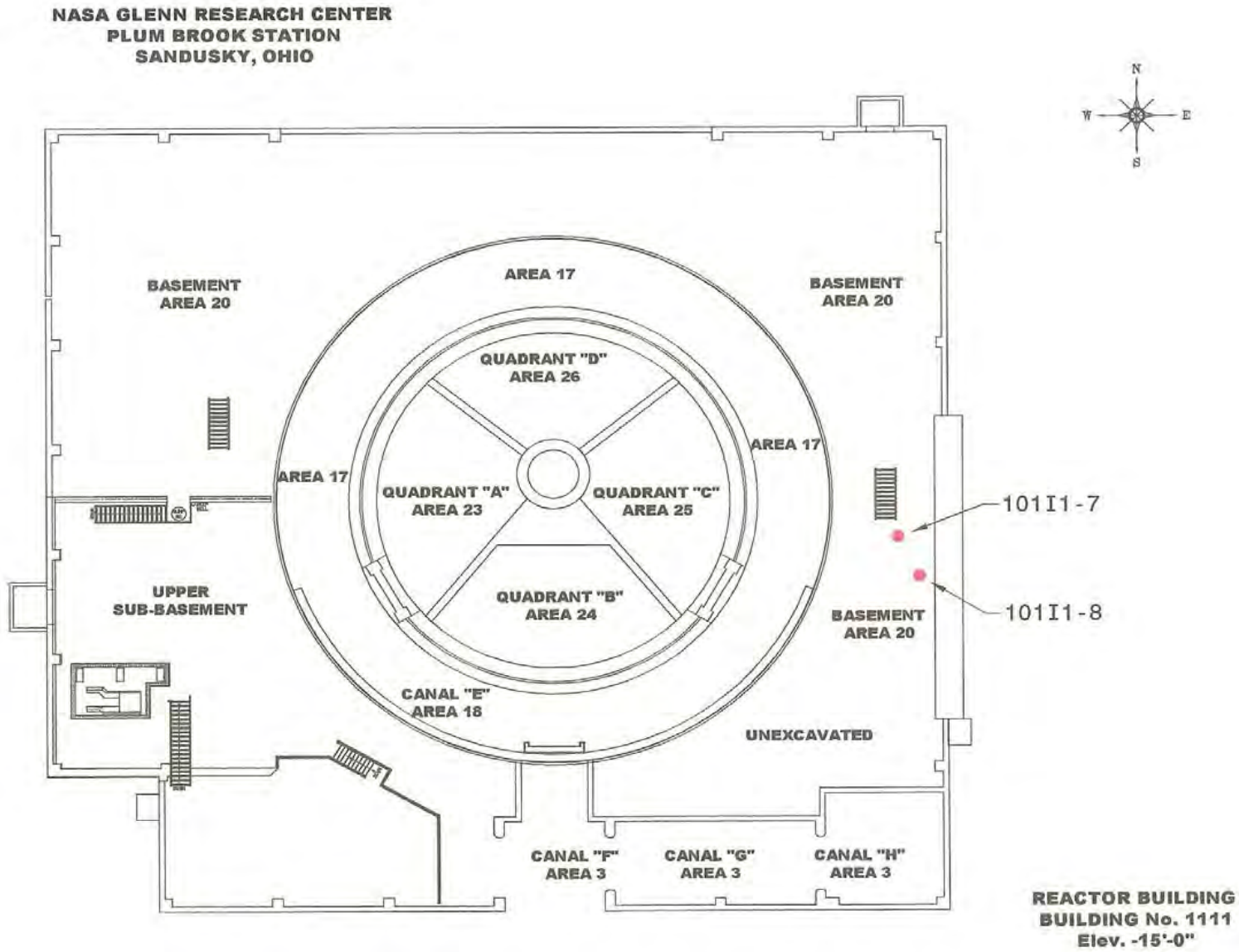

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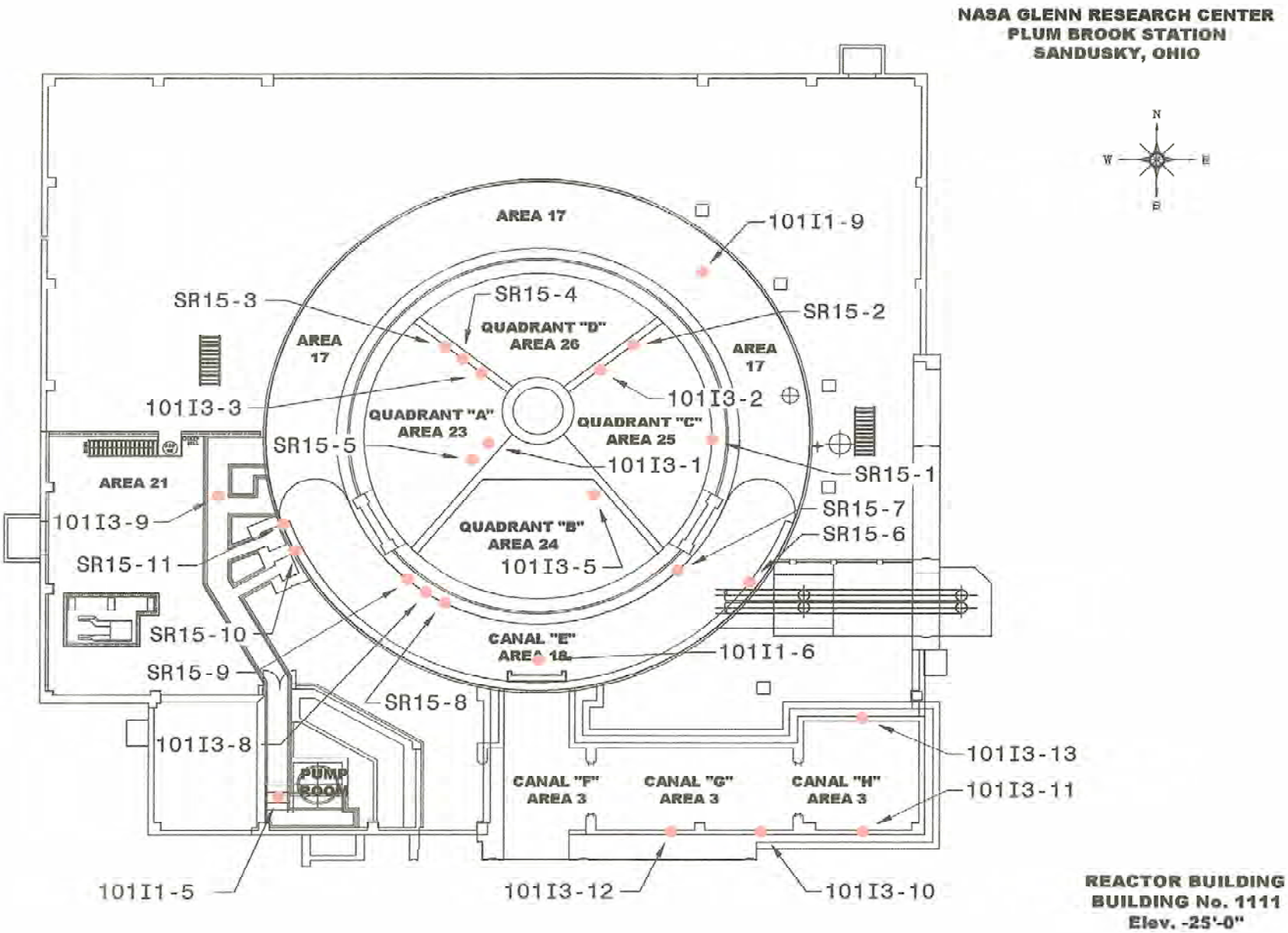
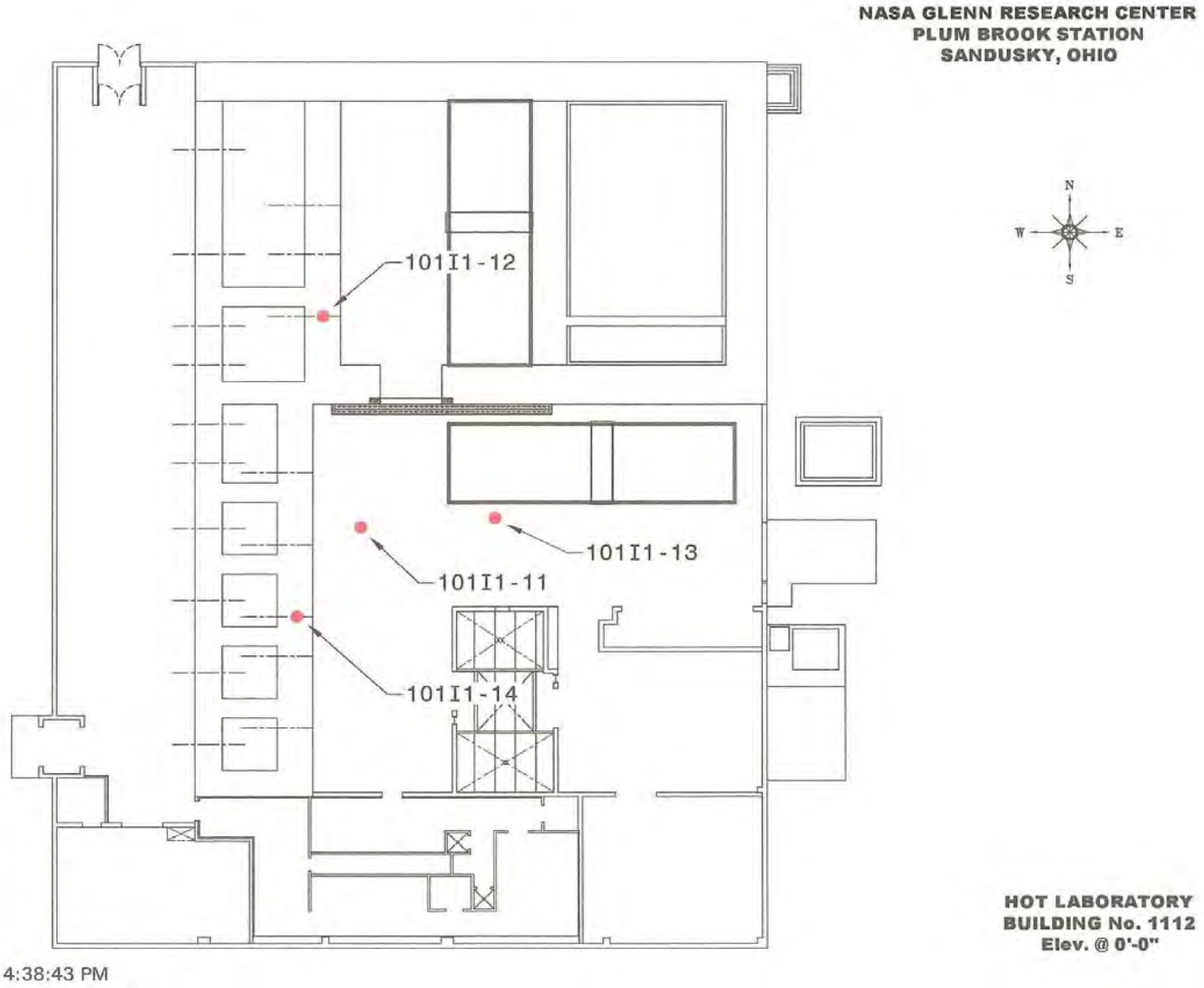

NASA GLENN RESEARCH CENTER
PLUM BROOK STATION
SANDUSKY, OHIO
N
W
E
S
AREA 17
101I1-9
SR15-3
SR15-4
SR15-2
QUADRANT "D"
AREA 26
AREA
17
AREA
17
101I3-3
101I3-2
QUADRANT "A"
AREA 23
QUADRANT "C"
AREA 25
SR15-5
101I3-1
SR15-1
AREA 21
SR15-7
101I3-9
QUADRANT "B"
AREA 24
SR15-6
SR15-11
101I3-5
SR15-10
CANAL "E"
AREA 18
101I1-6
SR15-9
SR15-8
101I3-8
101I3-13
PUMP
ROOM
CANAL "F"
AREA 3
CANAL "G"
AREA 3
CANAL "H"
AREA 3
101I3-11
101I1-5
101I3-12
101I3-10
REACTOR BUILDING
BUILDING No. 1111
Elev. -25'-0"


NASA GLENN RESEARCH CENTER
PLUM BROOK STATION
SANDUSKY, OHIO
N
W
E
S
101I1-12
101I1-13
101I1-11
101I1-14
HOT LABORATORY
BUILDING No. 1112
Elev. @ 0'-0"
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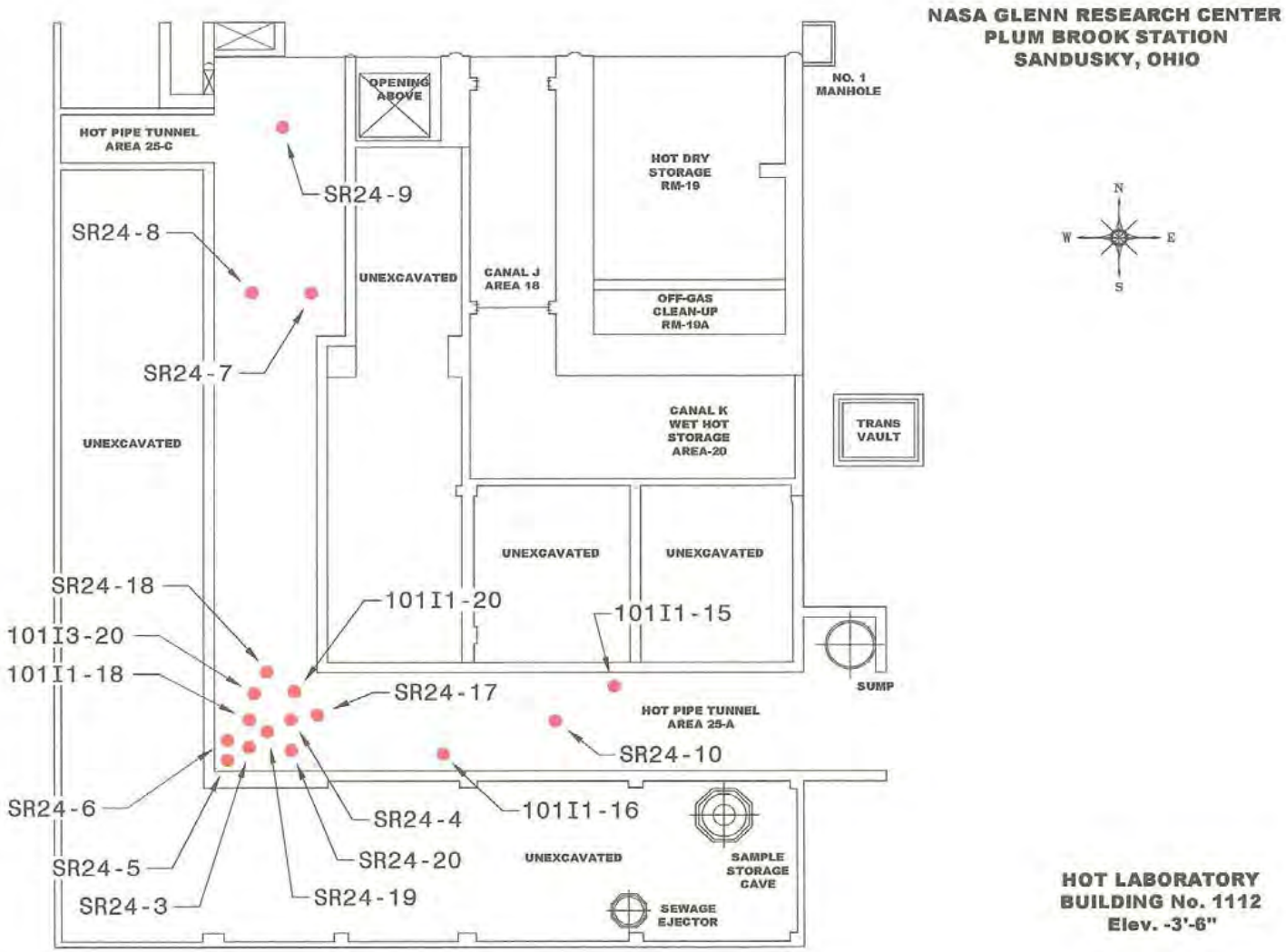
NASA GLENN RESEARCH CENTER
PLUM BROOK STATION
SANDUSKY, OHIO
OPENING ABOVE
NO. 1 MANHOLE
HOT PIPE TUNNEL AREA 25-C
HOT DRY STORAGE RM-19
SR24-9
SR24-8
UNEXCAVATED
CANAL J AREA 18
OFF-GAS CLEAN-UP RM-19A
SR24-7
CANAL K WET HOT STORAGE AREA-20
TRANS VAULT
UNEXCAVATED
UNEXCAVATED
UNEXCAVATED
SR24-18
101I1-20
101I1-15
101I3-20
101I1-18
SR24-17
SUMP
HOT PIPE TUNNEL AREA 25-A
SR24-10
SR24-6
SR24-4
101I1-16
SR24-5
SR24-20
UNEXCAVATED
SAMPLE STORAGE CAVE
SR24-3
SR24-19
SEWAGE EJECTOR
N
W
E
S
HOT LABORATORY BUILDING No. 1112
Elev. -3'-6"
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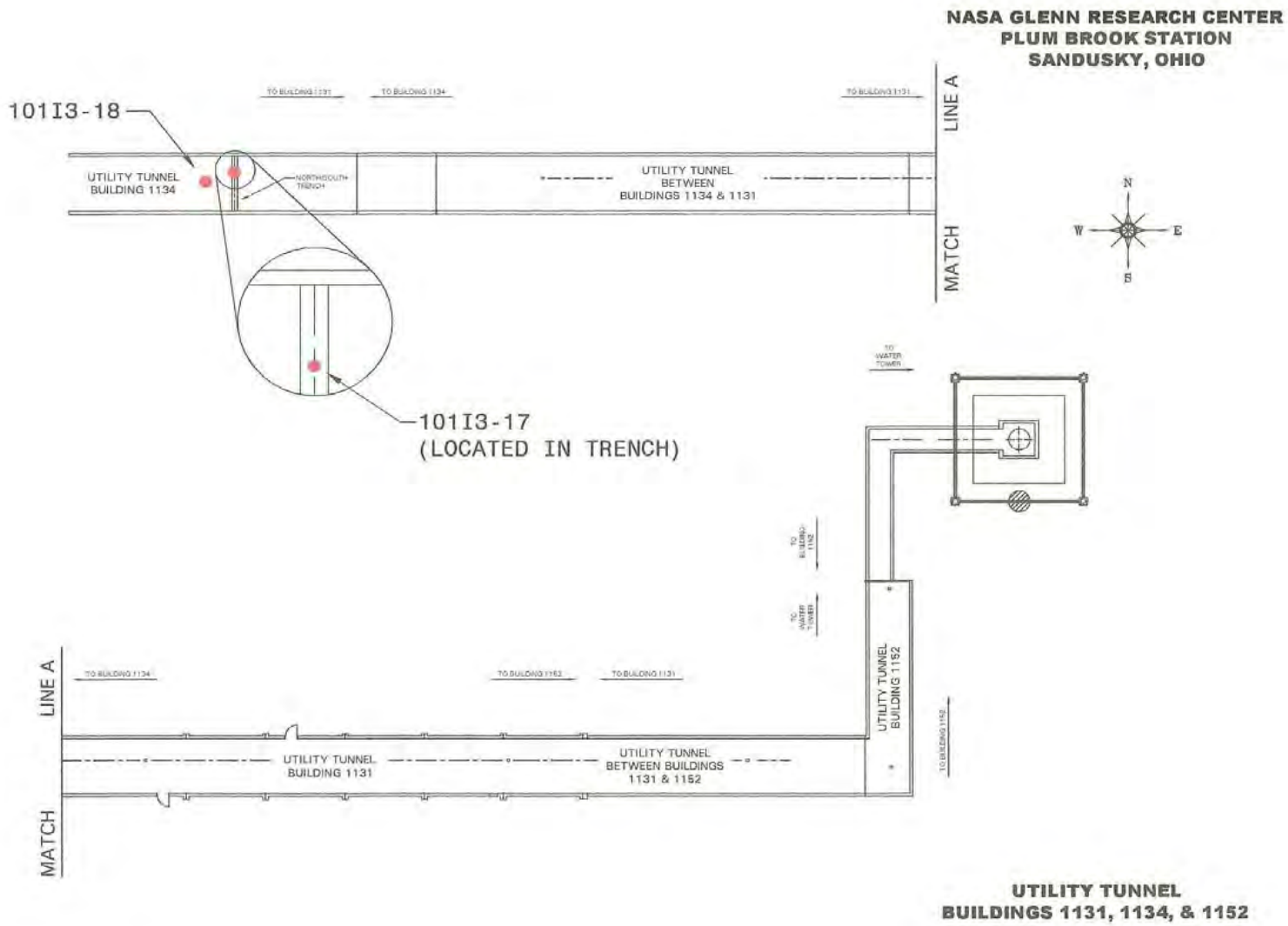

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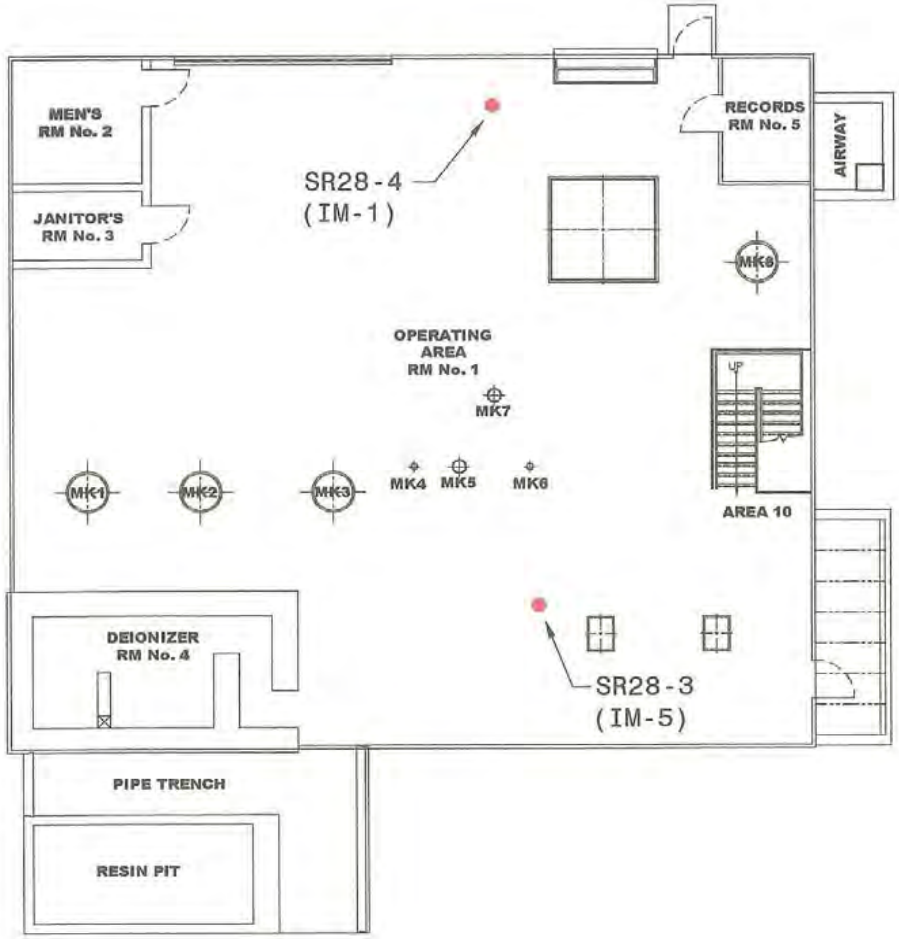
SANDUSKY, OHIO



FAN HOUSE
BUILDING No. 1132
Elev. 0'-0"

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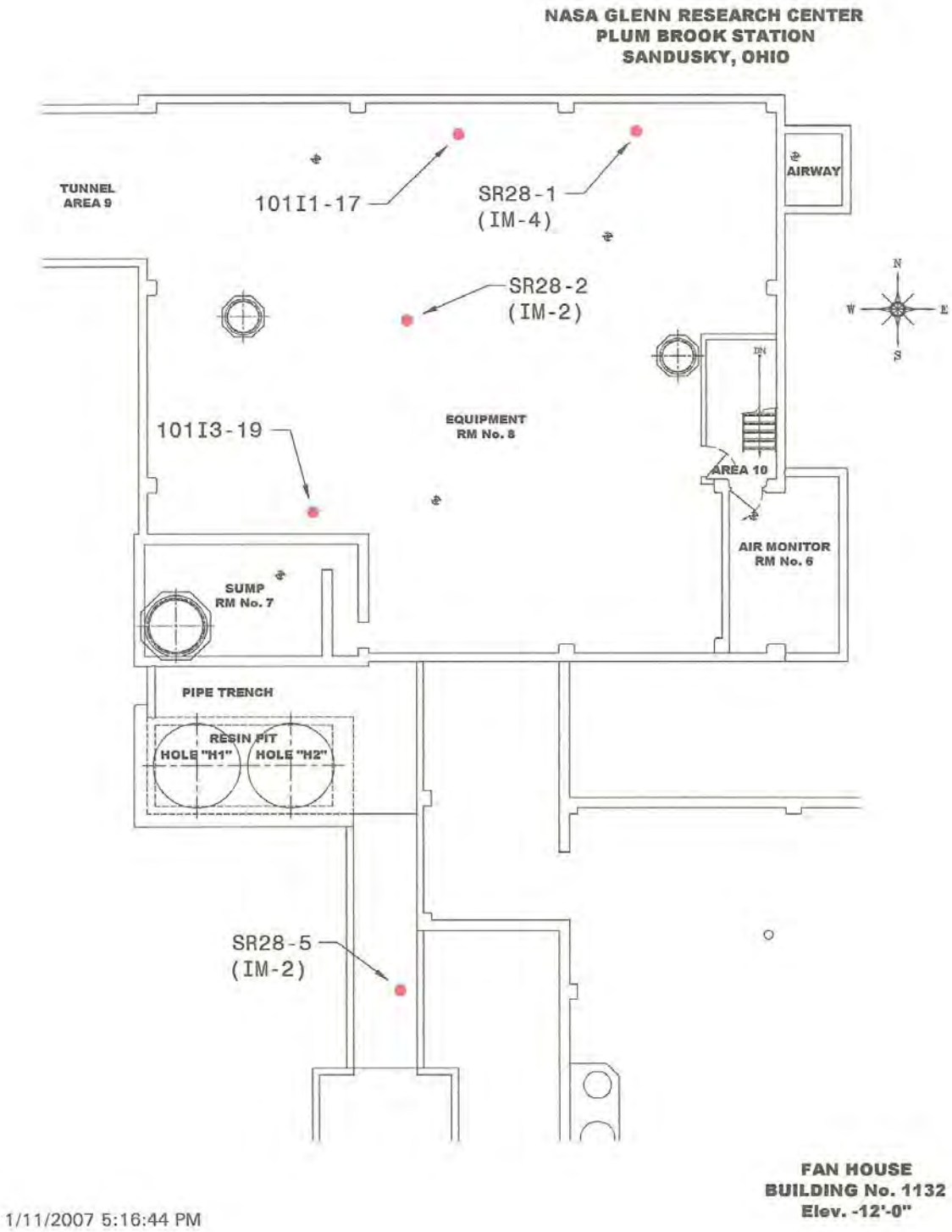
NASA GLENN RESEARCH CENTER
PLUM BROOK STATION
SANDUSKY, OHIO
TUNNEL
AREA 9
101I1-17
SR28-1
(IM-4)
AIRWAY
SR28-2
(IM-2)
N
W
E
S
101I3-19
EQUIPMENT
RM No. 8
AREA 10
AIR MONITOR
RM No. 6
SUMP
RM No. 7
PIPE TRENCH
RESIN PIT
HOLE "H1"
HOLE "H2"
SR28-5
(IM-2)
FAN HOUSE
BUILDING No. 1132
Elev. -12'-0"
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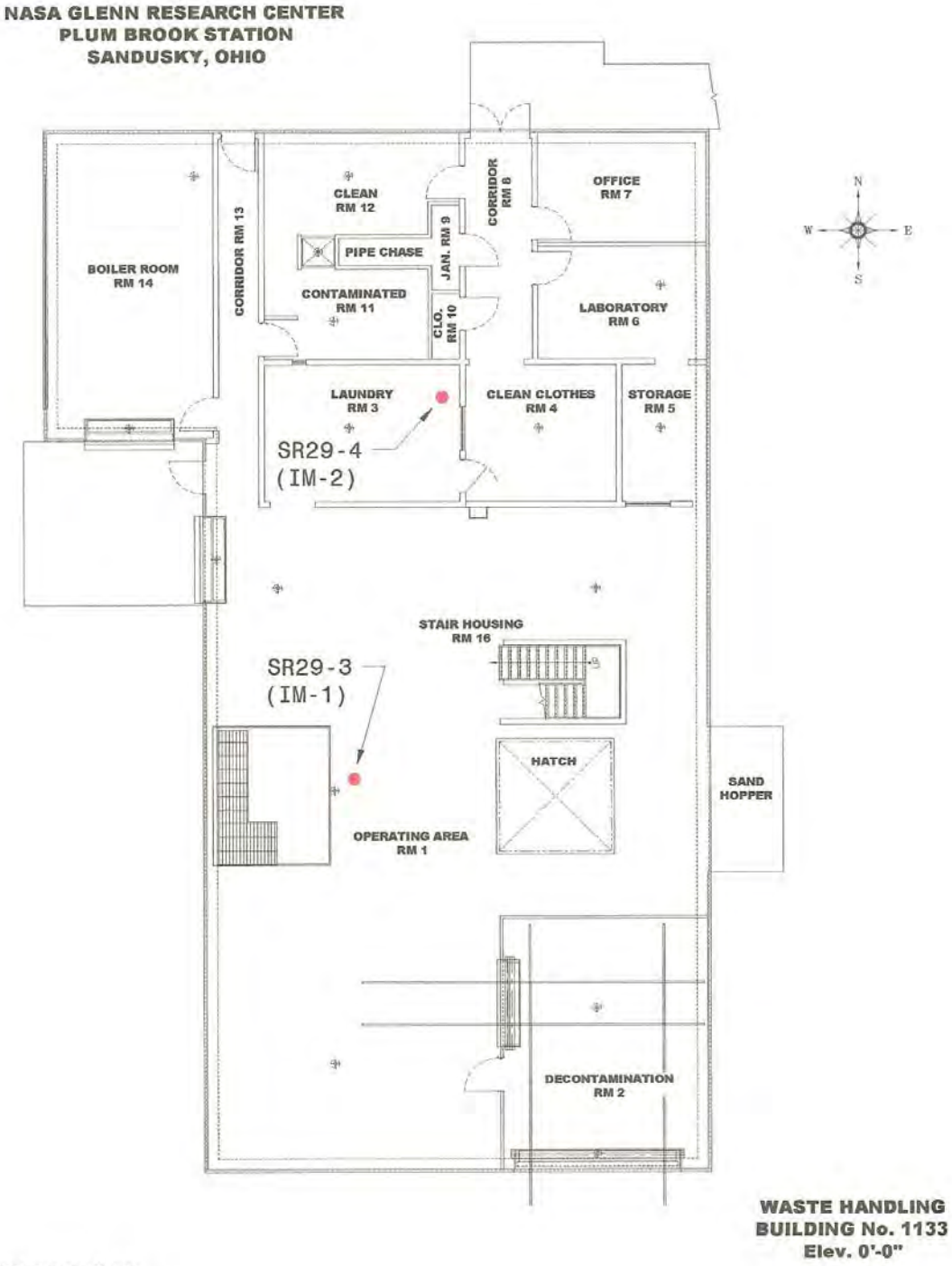
NASA GLENN RESEARCH CENTER
PLUM BROOK STATION
SANDUSKY, OHIO
BOILER ROOM
RM 14
CORRIDOR RM 13
CLEAN
RM 12
PIPE CHASE
CONTAMINATED
RM 11
JAN. RM 9
CLO.
RM 10
CORRIDOR
RM 8
OFFICE
RM 7
LABORATORY
RM 6
LAUNDRY
RM 3
CLEAN CLOTHES
RM 4
STORAGE
RM 5
SR29-4
(IM-2)
STAIR HOUSING
RM 16
SR29-3
(IM-1)
HATCH
SAND
HOPPER
OPERATING AREA
RM 1
DECONTAMINATION
RM 2
N
W
E
S
WASTE HANDLING
BUILDING No. 1133
Elev. 0'-0"
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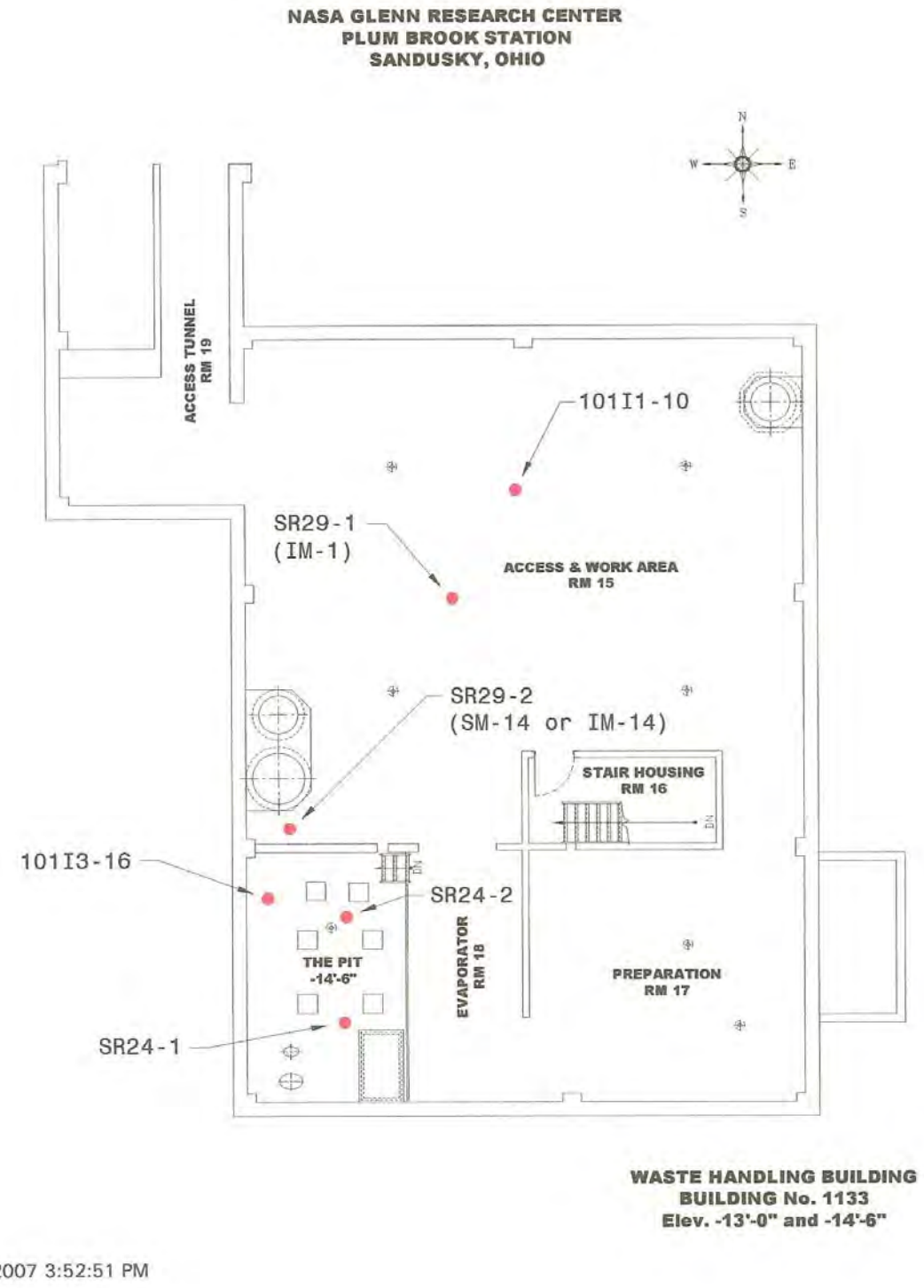

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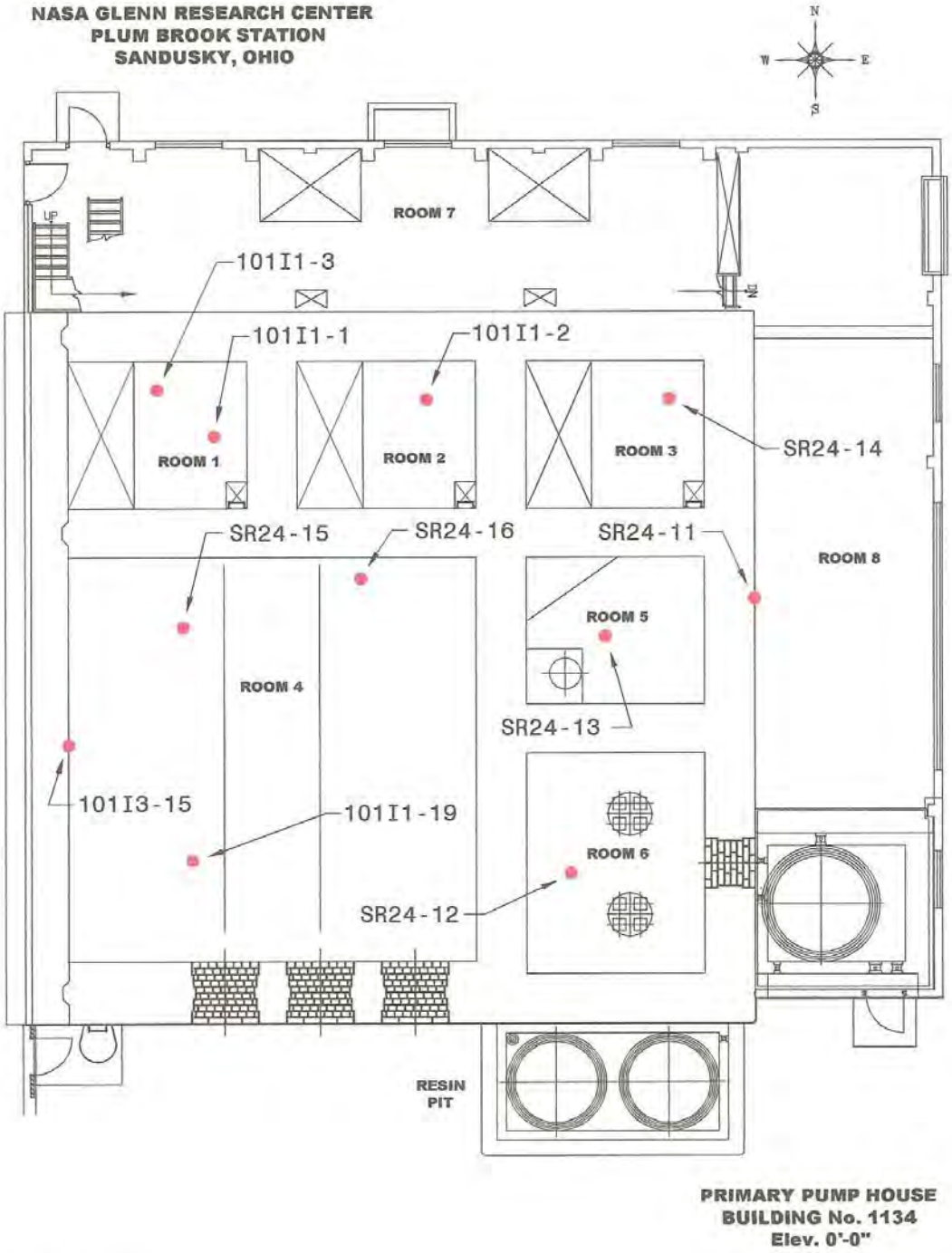

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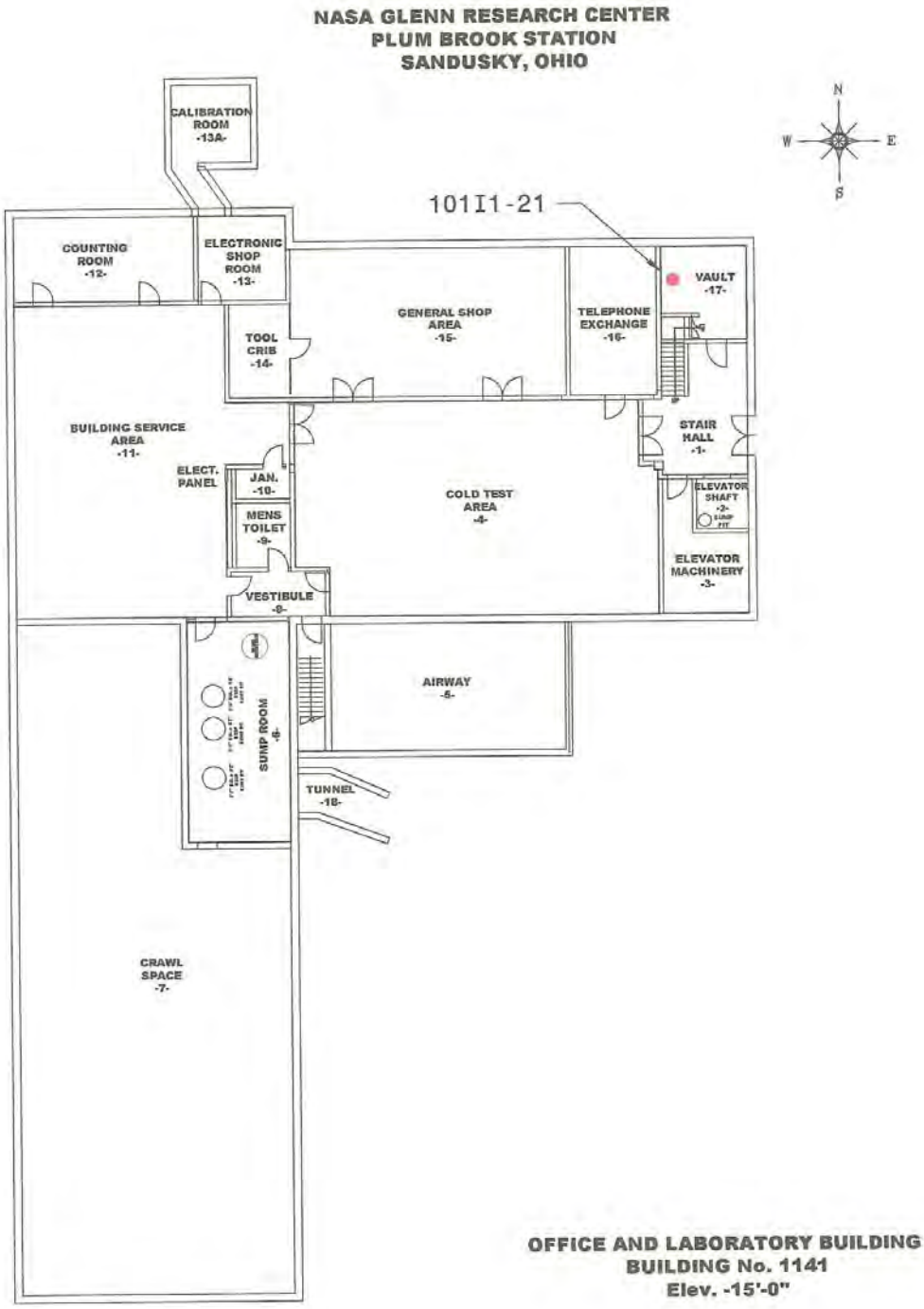

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APPENDIX C

List of Concrete Core Locations with Corresponding Gamma Spectroscopy Log Numbers and Summaries of Gamma Spectroscopic Data for Site Structures

(53 pages)

List of Concrete Core Locations with Corresponding Gamma Spectroscopy Log Numbers and Summaries of Gamma Spectroscopic Data for Site Structures

There have been seven campaigns (C9000 101I1, E1000 101C4, C9000 101I3, SR-15, SR-24, SR-28, and SR-29) conducted since 2004 to gather concrete cores. Cores are three inches inside diameter and are subsequently cut into one-half inch-thick pucks. Most of the pucks were analyzed on site and some were sent for off-site analyses. Addendum 1 provides a listing of all PBRF locations where concrete cores were taken. Each location has an associated Plum Brook gamma spectroscopy log number and a description of the approximate location where the core was taken. Site maps have been produced which document the sample locations (see Appendix B, Concrete Core Location Maps). Boldface type indicates that, in addition to on-site analysis, cores were sent for off-site analysis as well.

Addendum 2 shows the boldface-typed Off-Site Laboratory gamma spec numbers from Appendix 1 with their corresponding analytical results.

APPENDIX C
Addendum 1

List of Concrete Core Locations with Corresponding Gamma Spectroscopy Log Numbers

(26 pages)

Survey Package or Survey Request	Sample Point	Approximate Location Description	Plum Brook Gamma Spectroscopy Sample Log Number	Survey Package or Survey Request Sample Identifier	Off-site Lab. Gamma Spec. Number
C1134-201C2 C9000-101I1	1	Primary Pump House, El. 0’0”, Rm.1 (floor)	Unknown	C1134 201C2 FL1C1 L0501-1 Package and all data lost	Unknown
	2	Primary Pump House, El. 0’0”, Rm.2 (floor)	Unknown	C1134 201C2 FL1C1 L0503-1 Package and all data lost	Unknown
	3	Primary Pump House, El. 0’0”, Rm.1 (floor)	Unknown	C1134 201C2 FL1C1 L0507-1 Package and all data lost	Unknown
C9000 101I1	4	Reactor Building, El. 0’0”, Area 1 (floor)	PB04-00398, PB04-00515 PB04-00399, PB04-00516 PB04-00434 (puck crushed)	C9000 101I1 FL1C1 L0504-02 C9000 101I1 FL1C1 L0504-02A C9000 101I1 FL1C3 L0504-01	CS022004-002 CS022004-003 CS022304-028
	5	Reactor Building, El. -25’0”, Pump Room, Area 22 (trench floor)	PB04-00400, PB04-00509 PB04-00401, PB04-00510 PB04-00402, PB04-00511 PB04-00403, PB04-00512	**C9000 101I1 FL1C1 L0505-01** C9000 101I1 FL1C1 L0505-01A **C9000 101I1 FL1C1 L0505-02** C9000 101I1 FL1C1 L0505-02A	**CS022004-004** CS022004-005 **CS022004-006** CS022004-007
	6	Reactor Building, El. -25’0”, Canal E (floor)	PB04-00439 PB04-00440 PB04-00441 PB04-00442	**C9000 101I1 FL1C3 L0506-01** C9000 101I1 FL1C3 L0506-01A **C9000 101I1 FL1C1 L0506-02** C9000 101I1 FL1C1 L0506-02A	**CS022304-001** CS022304-002 **CS022304-003** CS022304-004
	7	Reactor Building, El. -15’0”, Area 20 (floor)	PB04-00443, PB04-00513 PB04-00444, PB04-00514 PB04-00445 PB04-00446	**C9000 101I1 FL1C1 L0507-01** C9000 101I1 FL1C1 L0507-01A **C9000 101I1 FL1C1 L0507-02** C9000 101I1 FL1C1 L0507-02A	**CS022304-005** CS022304-006 **CS022304-007** CS022304-008
	8	Reactor Building, El. -15’0”, Area 20 (floor)	Not sliced		N/A
	9	Reactor Building, El. -25’0”, Area 17 (floor)	PB04-00448 PB04-00449 PB04-00450 PB04-00451	**C9000 101I1 FL1C3 L0509-01** C9000 101I1 FL1C1 L0509-01A **C9000 101I1 FL1C1 L0509-02** C9000 101I1 FL1C1 L0509-02A	**CS022304-009** CS022304-010 **CS022304-011** CS022304-012
	10	Waste Handling Building, El. -13’6”,	PB04-00452 PB04-00453	**C9000 101I1 FL1C3 L0510-01** C9000 101I1 FL1C3 L0510-01A	**CS022304-013** CS022304-014

		Room 15 (floor)	PB04-00459 PB04-00460	**C9000 101I1 FL1C1 L0510-02** C9000 101I1 FL1C1 L0510-02A	**CS022304-015** CS022304-016
	11	Hot Laboratory, El. 0’0”, Room16 (floor)	PB04-00412 *PB04-00413* PB04-00414 PB04-00415 PB04-00538 PB04-00539 PB04-00540 PB04-00541	**C9000 101I1 FL1C1 L0511-01** C9000 101I1 FL1C1 L0511-01A **C9000 101I1 FL1C1 L0511-02** C9000 101I1 FL1C1 L0511-02A C9000 101I1 FL1C1 L0511-03 C9000 101I1 FL1C1 L0511-03A C9000 101I1 FL1C1 L0511-04 C9000 101I1 FL1C1 L0511-04A	**CS022004-008** CS022004-009 **CS022004-010** CS022004-011 CS030504-001 CS030504-002 CS030504-003 CS030504-004
	12	Hot Laboratory, El. 0’0”, Room17 (floor)	PB04-00419 PB04-00421 PB04-00422 PB04-00423	**C9000 101I1 FL1C3 L0512-01** C9000 101I1 FL1C1 L0512-01A **C9000 101I1 FL1C1 L0512-02** C9000 101I1 FL1C1 L0512-02A	**CS022004-016** CS022004-017 **CS022004-018** CS022004-019
	13	Hot Laboratory, El. 0’0”, Room16 (floor)	PB04-00424 PB04-00425 PB04-00427 PB04-00428 PB04-00542 PB04-00543 PB04-00544 PB04-00545	**C9000 101I1 FL1C3 L0513-01** C9000 101I1 FL1C1 L0513-01A **C9000 101I1 FL1C1 L0513-02** C9000 101I1 FL1C1 L0513-02A C9000 101I1 FL1C1 L0513-03 C9000 101I1 FL1C1 L0513-03A C9000 101I1 FL1C1 L0513-04 C9000 101I1 FL1C1 L0513-04A	**CS022004-020** CS022004-021 **CS022004-022** CS022004-023 CS030504-005 CS030504-006 CS030504-007 CS030504-008
	14	Hot Laboratory, El. 0’0”, Room16 (floor)	PB04-00416 PB04-00417 PB04-00418 PB04-00419	**C9000 101I1 FL1C1 L0514-01** C9000 101I1 FL1C1 L0514-01A **C9000 101I1 FL1C1 L0514-02** C9000 101I1 FL1C1 L0514-02A	**CS022004-012** CS022004-013 **CS022004-014** CS022004-015
	15	Hot Pipe Tunnel, El. -12’0”, Room 25A (floor)	PB04-00461 PB04-00462 PB04-00463 PB04-00464 PB04-00546 PB04-00547 PB04-00548 PB04-00549	**C9000 101I1 FL1C1 L0515-01** C9000 101I1 FL1C1 L0515-01A **C9000 101I1 FL1C1 L0515-02** C9000 101I1 FL1C1 L0515-02A C9000 101I1 FL1C1 L0515-03 C9000 101I1 FL1C1 L0515-03A C9000 101I1 FL1C1 L0515-04 C9000 101I1 FL1C1 L0515-04A	**CS022304-017** CS022304-018 **CS022304-019** CS022304-020 CS030504-009 CS030504-010 CS030504-011 CS030504-012

	16	Hot Pipe Tunnel, El. -12’0”, Room 25A (floor)	PB04-00465 PB04-00466 PB04-00467 PB04-00468	**C9000 101I1 FL1C1 L0516-01** C9000 101I1 FL1C1 L0516-01A **C9000 101I1 FL1C1 L0516-02** C9000 101I1 FL1C1 L0516-02A	**CS022304-021** CS022304-022 **CS022304-023** CS022304-024
	17	Fan House, El. -12’0”, Room 8 (floor)	PB04-00487 PB04-00488 PB04-00489 PB04-00490	**C9000 101I1 FL1C1 L0517-01** C9000 101I1 FL1C1 L0517-01A **C9000 101I1 FL1C1 L0517-02** C9000 101I1 FL1C1 L0517-02A	**CS022704-001** CS022704-002 **CS022704-003** CS022704-004
	18	Hot Pipe Tunnel, El. -12’0”, Room 25B (floor)	Not sliced		N/A
	19	Primary Pump House, El. 0’0”, Room 4 (floor)	Not sliced		N/A
	20	Hot Pipe Tunnel, El. -12’0”, Room 25B (floor)	Not sent off site	PDI-006 collected in 2000	N/A
	21	ROLB, El. -15’0”, New Fuel Vault (floor)	PB04-00525 PB04-00526 PB04-00527 PB04-00528	**C9000 101I1 FL1C1 L0521-01** C9000 101I1 FL1C1 L0521-01A **C9000 101I1 FL1C1 L0521-02** C9000 101I1 FL1C1 L0521-02A	**CS030404-002** CS030404-003 **CS030404-004** CS030404-005
C9000-101I3	1	Reactor Building, El. -25’0”, Quad A (south wall slant core)	PB05-01924T, PB05-01924B N/A N/A N/A	C9000 101I3 WL1C1 L05 1-1P1 **C9000 101I3 WL1C1 L05 1-2P4** **C9000 101I3 WL1C1 L05 1-2P5** **C9000 101I3 WL1C1 L11 1-3**	N/A **CS050630-058** **CS050630-059** **CS050630-057**
	2	Reactor Building, El. -25’0”, Quad C (north wall slant core)	PB05-01938T, PB05-1938B N/A N/A N/A N/A	**C9000 101I3 WL1C1 L05 2-1P1** **C9000 101I3 WL1C1 L05 2-1P2** **C9000 101I3 WL1C1 L11 2-3** **C9000 101I3 WL1C1 L05 2-4P1** C9000 101I3 WL1C1 L05 2-4P2	**CS050630-061** **CS050630-062** **CS050630-060** **CS050630-063** CS050630-064
	3	Reactor Building, El. -25’0”, Quad A (north wall)	PB05-01927T, PB05-1927B N/A N/A	C9000 101I3 WL1C1 L05 3-1P1 C9000 101I3 WL1C1 L05 3-1P2 C9000 101I3 WL1C1 L05 3-1P3	CS050630-001 CS050630-002 CS050630-003
	4	Reactor Building,	Sample not taken	N/A	N/A

		El. -25’0”, Quad C (wall)			
	5	Reactor Building, El. -25’0”, Quad B (east wall)	PB05-02625T, PB05-02625B	C9000 101I3 WL1C1 L05 5-2P1	N/A
	6	Reactor Building, El. -25’0”, Quad D (wall)	Sample not taken	N/A	N/A
	7	Reactor Building, El. 0’0”, Lily Pad	PB05-01911T, PB05-01911B N/A N/A N/A N/A N/A N/A	C9000 101I3 FL1C1 L05 7-1P1 C9000 101I3 FL1C1 L05 7-1P2 C9000 101I3 FL1C1 L05 7-1P3 C9000 101I3 FL1C1 L05 7-1P4 C9000 101I3 FL1C1 L05 7-1P5 C9000 101I3 FL1C1 L05 7-1P6 C9000 101I3 FL1C1 L05 7-1P7	CS050630-004 CS050630-005 CS050630-006 CS050630-007 CS050630-008 CS050630-009 CS050630-010
	8	Reactor Building, El. -25’0”, Canal E, (north wall west)	PB05-01941T, PB05-1941B N/A	C9000 101I3 WL1C1 L05 8-1P1 C9000 101I3 WL1C1 L05 8-1P2	CS050630-011 CS050630-012
	9	Reactor Building, El. -25’0”, Area 21 (floor of trench)	PB05-01945T, PB05-01945B N/A N/A N/A	**C9000 101I3 FL1C1 L05 9-1P1** C9000 101I3 FL1C1 L05 9-1P2 C9000 101I3 FL1C1 L05 9-1P3 C9000 101I3 FL1C1 L05 9-1P4	**CS050630-013** CS050630-014 CS050630-015 CS050630-016
	10	Reactor Building, El. -25’0”, Canal G (south wall slant core)	PB05-01923T, PB05-01923B N/A N/A N/A N/A N/A	**C9000 101I3 WL1C1 L05 10-1P1** **C9000 101I3 WL1C1 L05 10-1P3** **C9000 101I3 WL1C1 L05 10-1P4** C9000 101I3 WL1C1 L11 10-2 **C9000 101I3 WL1C1 L05 10-3P1** **C9000 101I3 WL1C1 L05 10-3P2**	**N/A** **CS050630-066** **CS050630-067** CS050630-065 **CS050630-068** **CS050630-069**
	11	Reactor Building, El. -25’0”, Canal H (south wall slant core)	PB05-01921T, PB05-01921B N/A N/A N/A N/A	C9000 101I3 WL1C1 L05 11-1P1 C9000 101I3 WL1C1 L05 11-1P5 **C9000 101I3 WL1C1 L05 11-1P6** C9000 101I3 WL1C1 L05 11-2P1 C9000 101I3 WL1C1 L05 11-2P2	N/A CS050630-070 **CS050630-071** CS050630-072 CS050630-073
	12	Reactor Building,	PB05-01922T, PB05-01922B	C9000 101I3 WL1C1 L05 12-1P1	CS050630-017

		El. -25’0”, Canal G (south wall)	N/A N/A N/A N/A N/A N/A	C9000 101I3 WL1C1 L05 12-1P2 C9000 101I3 WL1C1 L05 12-1P3 C9000 101I3 WL1C1 L05 12-1P4 C9000 101I3 WL1C1 L05 12-1P5 C9000 101I3 WL1C1 L05 12-1P6 C9000 101I3 WL1C1 L05 12-1P7	CS050630-018 CS050630-019 CS050630-020 CS050630-021 CS050630-022 CS050630-023
	13	Reactor Building, El. -25’0”, Canal H (north wall)	PB05-01925T, PB05-01925B N/A N/A N/A	C9000 101I3 WL1C1 L05 13-1P1 C9000 101I3 WL1C1 L05 13-1P2 C9000 101I3 WL1C1 L05 13-1P3 C9000 101I3 WL1C1 L05 13-1P4	CS050630-024 CS050630-025 CS050630-026 CS050630-027
	14	Primary Pump House, El. 0’0”, sample #1 (wall)	Sample not taken	N/A	N/A
	15	Primary Pump House, El. 0’0”, Room 4, sample #2 (west wall)	PB05-01913T, PB05-01913B N/A N/A N/A N/A N/A N/A N/A	C9000 101I3 WL1C1 L05 15-1P1 C9000 101I3 WL1C1 L05 15-1P2 C9000 101I3 WL1C1 L05 15-1P3 C9000 101I3 WL1C1 L05 15-1P4 C9000 101I3 WL1C1 L05 15-1P5 C9000 101I3 WL1C1 L05 15-1P6 C9000 101I3 WL1C1 L05 15-1P7 C9000 101I3 WL1C1 L05 15-1P8	CS050630-028 CS050630-029 CS050630-030 CS050630-031 CS050630-032 CS050630-033 CS050630-034 CS050630-035
	16	Waste Handling Building, El. -14’6”, Evaporator Pit	PB05-01912T, PB05-01912B N/A N/A N/A N/A N/A	**C9000 101I3 FL1C1 L05 16a1P1** C9000 101I3 FL1C1 L05 16a1P2 C9000 101I3 FL1C1 L05 16a1P3 C9000 101I3 FL1C1 L05 16a1P4 C9000 101I3 FL1C1 L05 16a1P5 C9000 101I3 FL1C1 L05 16a1P6	**CS050630-036** CS050630-037 CS050630-038 CS050630-039 CS050630-040 CS050630-041
	17	Cold Pipe Tunnel, El. -16’0”, Trench	PB05-01926T, PB05-01926B	C9000 101I3 FL1C1 L05 17-1P1	N/A
	18	Cold Pipe Tunnel, El. -15’0”, west of trench	PB05-01928T, PB05-01928B	**C9000 101I3 FL1C1 L05 18-1P1**	**CS050617-017**
	19	Fan House, El. -12’0”, Room 8	PB05-01937T, PB05-01937B N/A	C9000 101I3 FL1C1 L05 19-1P1 C9000 101I3 FL1C1 L05 19-2P1	N/A CS050630-042

		(southwest)	N/A N/A N/A N/A	C9000 101I3 FL1C1 L05 19-2P2 C9000 101I3 FL1C1 L05 19-2P3 C9000 101I3 FL1C1 L05 19-2P4 C9000 101I3 FL1C1 L05 19-2P5	CS050630-043 CS050630-044 CS050630-045 CS050630-046
	20	Hot Pipe Tunnel, El. -12’0”, at confluence of Area 25A and 25B	PB05-01936T, PB05-01936B N/A N/A N/A N/A N/A N/A N/A N/A N/A	**C9000 101I3 FL1C1 L05 20-1P1** C9000 101I3 FL1C1 L05 20-1P2 C9000 101I3 FL1C1 L05 20-1P3 C9000 101I3 FL1C1 L05 20-1P4 C9000 101I3 FL1C1 L05 20-1P5 C9000 101I3 FL1C1 L05 20-1P6 C9000 101I3 FL1C1 L05 20-2P1 C9000 101I3 FL1C1 L05 20-2P2 C9000 101I3 FL1C1 L05 20-2P3 C9000 101I3 FL1C1 L05 20-2P4	**CS050630-047** CS050630-048 CS050630-049 CS050630-050 CS050630-051 CS050630-052 CS050630-053 CS050630-054 CS050630-055 CS050630-056
SR-15	15-1 (QC-03)	Reactor Building, El. -25’0”, Quad C (lower east wall)	PB06-01623-T PB06-01623-B PB06-01624-T PB06-01624-B PB06-01628-T PB06-01628-B PB06-01629-T PB06-01629-B PB06-01634-T PB06-01634-B PB06-01635-T PB06-01635-B PB06-01636-T PB06-01636-B PB06-01637-T PB06-01637-B PB06-01638-T PB06-01638-B PB06-01639-T PB06-01639-B	EMP-QC-03-SL1-T EMP-QC-03-SL1-B EMP-QC-03-SL2-T EMP-QC-03-SL2-B EMP-QC-03-SL3-T EMP-QC-03-SL3-B EMP-QC-03-SL4-T EMP-QC-03-SL4-B EMP-QC-03-SL5-T EMP-QC-03-SL5-B EMP-QC-03-SL6-T EMP-QC-03-SL6-B EMP-QC-03-SL7-T EMP-QC-03-SL7-B EMP-QC-03-SL8-T EMP-QC-03-SL8-B EMP-QC-03-SL9-T EMP-QC-03-SL9-B EMP-QC-03-SL10-T EMP-QC-03-SL10-B	N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A

			PB06-01649-T	EMP-QC-03-SL11-T	N/A
			PB06-01649-B	EMP-QC-03-SL11-B	N/A
			PB06-01650-T	EMP-QC-03-SL12-T	N/A
			PB06-01650-B	EMP-QC-03-SL12-B	N/A
			PB06-01651-T	EMP-QC-03-SL13-T	N/A
			PB06-01651-B	EMP-QC-03-SL13-B	N/A
			PB06-01657-T	EMP-QC-03-SL14-T	N/A
			PB06-01657-B	EMP-QC-03-SL14-B	N/A
	15-2 (QC-11)	Reactor Building, El. -25’0”, Quad C (north wall)	PB06-01726-T	EMP-QC-11-SL1-T	N/A
			PB06-01726-B	EMP-QC-11-SL1-B	N/A
			PB06-01727-T	**EMP-QC-11- SL2-T**	**EMPQ11 SL2**
			PB06-01727-B	**EMP-QC-11- SL2-B**	**EMPQ11 SL2**
			PB06-01728-T	EMP-QC-11-SL3-T	N/A
			PB06-01728-B	EMP-QC-11-SL3-B	N/A
			PB06-01729-T	EMP-QC-11-SL4-T	N/A
			PB06-01729-B	EMP-QC-11-SL4-B	N/A
			PB06-01730-T	EMP-QC-11-SL5-T	N/A
			PB06-01730-B	EMP-QC-11-SL5-B	N/A
			PB06-01731-T	EMP-QC-11-SL6-T	N/A
			PB06-01731-B	EMP-QC-11-SL6-B	N/A
			PB06-01740-T	EMP-QC-11-SL7-T	N/A
			PB06-01740-B	EMP-QC-11-SL7-B	N/A
			PB06-01742-T	EMP-QC-11-SL8-T	N/A
			PB06-01742-B	EMP-QC-11-SL8-B	N/A
			PB06-01743-T	EMP-QC-11-SL9-T	N/A
			PB06-01743-B	EMP-QC-11-SL9-B	N/A
			PB06-01744-T	EMP-QC-11-SL10-T	N/A
			PB06-01744-B	EMP-QC-11-SL10-B	N/A
	15-3 (QA-6)	Reactor Building, El. -25’0”, Quad A (north wall slant core)	PB06-01748-T	EMP-QA-6-SL1-T	N/A
			PB06-01748-B	EMP-QA-6-SL1-B	N/A
			PB06-01749-T	**EMP-QA-6-SL2-T**	**EMPQA6 SL2**
			PB06-01749-B	**EMP-QA-6-SL2-B**	**EMPQA6 SL2**
			PB06-01754-T	EMP-QA-6-SL3-T	N/A
			PB06-01754-B	EMP-QA-6-SL3-B	N/A

			PB06-01755-T PB06-01755-B PB06-01760-T PB06-01760-B	EMP-QA-6-SL4-T EMP-QA-6-SL4-B EMP-QA-6-SL5-T EMP-QA-6-SL5-B	N/A N/A N/A N/A
	15-4 (QA-QC)	Reactor Building, El. -25’0”, Quad A (north wall slant core)	PB06-01763-T PB06-01763-B PB06-01764-T PB06-01764-B PB06-01765-T PB06-01765-B PB06-01770-T PB06-01770-B PB06-01771-T PB06-01771-B PB06-01775-T PB06-01775-B PB06-01776-T PB06-01776-B	EMP-QA-6-Q-SL1-T EMP-QA-6-Q-SL1-B EMP-QA-6-Q-SL2-T EMP-QA-6-Q-SL2-B EMP-QA-6-Q-SL3-T EMP-QA-6-Q-SL3-B EMP-QA-6-Q-SL4-T EMP-QA-6-Q-SL4-B EMP-QA-6-Q-SL5-T EMP-QA-6-Q-SL5-B EMP-QA-6-Q-SL6-T EMP-QA-6-Q-SL6-B EMP-QA-6-Q-SL7-T EMP-QA-6-Q-SL7-B	N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A
	15-5 (QA-5)	Reactor Building, El. -25’0”, Quad A (south wall slant core)	PB06-01780-T PB06-01780-B PB06-01782-T PB06-01782-B PB06-01784-T PB06-01784-B PB06-01785-T PB06-01785-B PB06-01786-T PB06-01786-B	EMP-QA-5-SL1-T EMP-QA-5-SL1-B EMP-QA-5-SL2-T EMP-QA-5-SL2-B EMP-QA-5-SL3-T EMP-QA-5-SL3-B EMP-QA-5-SL4-T EMP-QA-5-SL4-B EMP-QA-5-SL5-T EMP-QA-5-SL5-B	N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A
	15-6 (CE-7)	Reactor Building, El. -25’0”, Canal E (south wall 4 feet above floor)	PB06-01956-T PB06-01956-B PB06-01958-T PB06-01958-B PB06-01959-T PB06-01959-B	EMP-CE-7-SL1-T EMP-CE-7-SL1-B EMP-CE-7-SL2-T EMP-CE-7-SL2-B EMP-CE-7-SL3-T EMP-CE-7-SL3-B	N/A N/A N/A N/A N/A N/A

			PB06-01968-T	EMP-CE-7-SL4-T	N/A
			PB06-01968-B	EMP-CE-7-SL4-B	N/A
			PB06-01974-T	EMP-CE-7-SL5-T	N/A
			PB06-01974-B	EMP-CE-7-SL5-B	N/A
			PB06-01988-T	EMP-CE-7-SL6-T	N/A
			PB06-01988-B	EMP-CE-7-SL6-B	N/A
			PB06-01989-T	EMP-CE-7-SL7-T	N/A
			PB06-01989-B	EMP-CE-7-SL7-B	N/A
			PB06-01990-T	EMP-CE-7-SL8-T	N/A
			PB06-01990-B	EMP-CE-7-SL8-B	N/A
			PB06-01991-T	EMP-CE-7-SL9-T	N/A
			PB06-01991-B	EMP-CE-7-SL9-B	N/A
			PB06-01992-T	EMP-CE-7-SL10-T	N/A
			PB06-01992-B	EMP-CE-7-SL10-B	N/A
			PB06-01993-T	EMP-CE-7-SL11-T	N/A
			PB06-01993-B	EMP-CE-7-SL11-B	N/A
			PB06-01994-T	EMP-CE-7-SL12-T	N/A
			PB06-01994-B	EMP-CE-7-SL12-B	N/A
			PB06-01995-T	EMP-CE-7-SL13-T	N/A
			PB06-01995-B	EMP-CE-7-SL13-B	N/A
	15-7 (CE-14)	Reactor Building, El. -25’0”, Canal E (north wall slant core)	PB06-01909-T	EMP-CE-14-SL1-T	N/A
			PB06-01909-B	EMP-CE-14-SL1-B	N/A
			PB06-01910-T	EMP-CE-14-SL2-T	N/A
			PB06-01910-B	EMP-CE-14-SL2-B	N/A
			PB06-01915-T	EMP-CE-14-SL3-T	N/A
			PB06-01915-B	EMP-CE-14-SL3-B	N/A
			PB06-01916-T	EMP-CE-14-SL4-T	N/A
			PB06-01916-B	EMP-CE-14-SL4-B	N/A
			PB06-01921-T	EMP-CE-14-SL5-T	N/A
			PB06-01921-B	EMP-CE-14-SL5-B	N/A
			PB06-01923-T	EMP-CE-14-SL6-T	N/A
			PB06-01923-B	EMP-CE-14-SL6-B	N/A
			PB06-01925-T	EMP-CE-14-SL7-T	N/A
			PB06-01925-B	EMP-CE-14-SL7-B	N/A

			PB06-01926-T	EMP-CE-14-SL8-T	N/A
			PB06-01926-B	EMP-CE-14-SL8-B	N/A
			PB06-01927-T	EMP-CE-14-SL9-T	N/A
			PB06-01927-B	EMP-CE-14-SL9-B	N/A
			PB06-01935-T	EMP-CE-14-SL10-T	N/A
			PB06-01935-B	EMP-CE-14-SL10-B	N/A
			PB06-01942-T	EMP-CE-14-SL11-T	N/A
			PB06-01942-B	EMP-CE-14-SL11-B	N/A
			PB06-01943-T	EMP-CE-14-SL12-T	N/A
			PB06-01943-B	EMP-CE-14-SL12-B	N/A
			PB06-01947-T	EMP-CE-14-SL13-T	N/A
			PB06-01947-B	EMP-CE-14-SL13-B	N/A
			PB06-01948-T	EMP-CE-14-SL14-T	N/A
			PB06-01948-B	EMP-CE-14-SL14-B	N/A
			PB06-01951-T	**EMP-CE-14-SL15-T**	**EMPCE14SL15**
			PB06-01951-B	**EMP-CE-14-SL15-B**	**EMPCE14SL15**
	15-8 (CE-16B)	Reactor Building, El. -25’0”, Canal E (north wall slant core)	PB06-01996-T	EMP-CE-16B-SL1-T	N/A
			PB06-01996-B	EMP-CE-16B-SL1-B	N/A
			PB06-01998-T	EMP-CE-16B-SL2-T	N/A
			PB06-01998-B	EMP-CE-16B-SL2-B	N/A
			Crumbled while slicing	EMP-CE-16B-SL3-T	N/A
			Crumbled while slicing	EMP-CE-16B-SL3-B	N/A
			PB06-01999-T	EMP-CE-16B-SL4-T	N/A
			PB06-01999-B	EMP-CE-16B-SL4-B	N/A
			PB06-02000-T	EMP-CE-16B-SL5-T	N/A
			PB06-02000-B	EMP-CE-16B-SL5-B	N/A
			PB06-02001-T	EMP-CE-16B-SL6-T	N/A
			PB06-02001-B	EMP-CE-16B-SL6-B	N/A
			PB06-02002-T	EMP-CE-16B-SL7-T	N/A
			PB06-02002-B	EMP-CE-16B-SL7-B	N/A
			PB06-02003-T	EMP-CE-16B-SL8-T	N/A
			PB06-02003-B	EMP-CE-16B-SL8-B	N/A
			PB06-02011-T	EMP-CE-16B-SL9-T	N/A
			PB06-02011-B	EMP-CE-16B-SL9-B	N/A

			PB06-02012-T	EMP-CE-16B-SL10-T	N/A
			PB06-02012-B	EMP-CE-16B-SL10-B	N/A
			PB06-02013-T	EMP-CE-16B-SL11-T	N/A
			PB06-02013-B	EMP-CE-16B-SL11-B	N/A
	15-9 (CE-16A)	Reactor Building, El. -25’0”, Canal E (north wall slant core)	PB06-02016-T	EMP-CE-16A-SL1-T	N/A
			PB06-02016-B	EMP-CE-16A-SL1-B	N/A
			PB06-02017-T	EMP-CE-16A-SL2-T	N/A
			PB06-02017-B	EMP-CE-16A-SL2-B	N/A
			PB06-02018-T	EMP-CE-16A-SL3-T	N/A
			PB06-02018-B	EMP-CE-16A-SL3-B	N/A
			PB06-02019-T	EMP-CE-16A-SL4-T	N/A
			PB06-02019-B	EMP-CE-16A-SL4-B	N/A
			PB06-02020-T	EMP-CE-16A-SL5-T	N/A
			PB06-02020-B	EMP-CE-16A-SL5-B	N/A
			PB06-02022-T	EMP-CE-16A-SL6-T	N/A
			PB06-02022-B	EMP-CE-16A-SL6-B	N/A
			PB06-02023-T	EMP-CE-16A-SL7-T	N/A
			PB06-02023-B	EMP-CE-16A-SL7-B	N/A
			PB06-02024-T	EMP-CE-16A-SL8-T	N/A
			PB06-02024-B	EMP-CE-16A-SL8-B	N/A
	15-10 (CE-4)	Reactor Building, El. -25’0”, Canal E (south wall, 3.5 feet above floor)	PB06-02025-T	EMP-CE-4-SL1-T	N/A
			PB06-02025-B	EMP-CE-4-SL1-B	N/A
			PB06-02026-T	EMP-CE-4-SL2-T	N/A
			PB06-02026-B	EMP-CE-4-SL2-B	N/A
			PB06-02027-T	EMP-CE-4-SL3-T	N/A
			PB06-02027-B	EMP-CE-4-SL3-B	N/A
			PB06-02028-T	EMP-CE-4-SL4-T	N/A
			PB06-02028-B	EMP-CE-4-SL4-B	N/A
			PB06-02029-T	EMP-CE-4-SL5-T	N/A
			PB06-02029-B	EMP-CE-4-SL5-B	N/A
			PB06-02030-T	EMP-CE-4-SL6-T	N/A
			PB06-02030-B	EMP-CE-4-SL6-B	N/A
			PB06-02031-T	EMP-CE-4-SL7-T	N/A
			PB06-02031-B	EMP-CE-4-SL7-B	N/A

			PB06-02032-T	EMP-CE-4-SL8-T	N/A
			PB06-02032-B	EMP-CE-4-SL8-B	N/A
			PB06-02033-T	EMP-CE-4-SL9-T	N/A
			PB06-02033-B	EMP-CE-4-SL9-B	N/A
			PB06-02034-T	EMP-CE-4-SL10-T	N/A
			PB06-02034-B	EMP-CE-4-SL10-B	N/A
			PB06-02035-T	EMP-CE-4-SL11-T	N/A
			PB06-02035-B	EMP-CE-4-SL11-B	N/A
	15-11 (CE-2)	Reactor Building, El. -25’0”, Canal E (south wall slant core)	PB06-02036-T	EMP-CE-2-SL1-T	N/A
			PB06-02036-B	EMP-CE-2-SL1-B	N/A
			PB06-02040-T	EMP-CE-2-SL2-T	N/A
			PB06-02040-B	EMP-CE-2-SL2-B	N/A
			PB06-02046-T	EMP-CE-2-SL3-T	N/A
			PB06-02046-B	EMP-CE-2-SL3-B	N/A
			PB06-02047-T	EMP-CE-2-SL4-T	N/A
			PB06-02047-B	EMP-CE-2-SL4-B	N/A
			PB06-02048-T	EMP-CE-2-SL5-T	N/A
			PB06-02048-B	EMP-CE-2-SL5-B	N/A
			PB06-02049-T	EMP-CE-2-SL6-T	N/A
			PB06-02049-B	EMP-CE-2-SL6-B	N/A
			PB06-02050-T	EMP-CE-2-SL7-T	N/A
			PB06-02050-B	EMP-CE-2-SL7-B	N/A
			PB06-02051-T	EMP-CE-2-SL8-T	N/A
			PB06-02051-B	EMP-CE-2-SL8-B	N/A
			PB06-02052-T	EMP-CE-2-SL9-T	N/A
			PB06-02052-B	EMP-CE-2-SL9-B	N/A
			PB06-02053-T	EMP-CE-2-SL10-T	N/A
			PB06-02053-B	EMP-CE-2-SL10-B	N/A
			PB06-02054-T	EMP-CE-2-SL11-T	N/A
			PB06-02054-B	EMP-CE-2-SL11-B	N/A
			PB06-02055-T	EMP-CE-2-SL12-T	N/A
			PB06-02055-B	EMP-CE-2-SL12-B	N/A
			PB06-02056-T	EMP-CE-2-SL13-T	N/A
			PB06-02056-B	EMP-CE-2-SL13-B	N/A

			PB06-02057-T PB06-02057-B	EMP-CE-2-SL14-T EMP-CE-2-SL14-B	N/A N/A
SR-24	24-1	Waste Handling Building, El. -14’6”, Evaporator Pit (floor)	PB06-02227-T PB06-02227-B PB06-02228-T PB06-02228-B PB06-02231-T PB06-02231-B PB06-02232-T PB06-02232-B PB06-02233-T PB06-02233-B	WHB-SP-1-SL1-T WHB-SP-1-SL1-B WHB-SP-1-SL2-T WHB-SP-1-SL2-B WHB-SP-1-SL3-T WHB-SP-1-SL3-B WHB-SP-1-SL4-T WHB-SP-1-SL4-B WHB-SP-1-SL5-T WHB-SP-1-SL5-B	N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A
	24-2	Waste Handling Building, El. -14’6”, Evaporator Pit (floor)	PB06-02242-T PB06-02242-B PB06-02243-T PB06-02243-B **PB06-02244-T** **PB06-02244-B** PB06-02245-T PB06-02245-B PB06-02246-T PB06-02246-B PB06-02247-T PB06-02247-B	WHB-SP-2-SL1-T WHB-SP-2-SL1-B WHB-SP-2-SL2-T WHB-SP-2-SL2-B **WHB-SP-2-SL3-T** **WHB-SP-2-SL3-B** WHB-SP-2-SL4-T WHB-SP-2-SL4-B WHB-SP-2-SL5-T WHB-SP-2-SL5-B WHB-SP-2-SL6-T WHB-SP-2-SL6-B	N/A N/A N/A N/A **WHB-SP2-SL3** **WHB-SP2-SL3** N/A N/A N/A N/A N/A N/A
	24-3	Hot Pipe Tunnel, El. -12’0”, confluence of Areas 25A and 25B (floor)	PB06-02260-T PB06-02260-B PB06-02262-T PB06-02262-B PB06-02263-T PB06-02263-B PB06-02264-T PB06-02264-B PB06-02265-T PB06-02265-B	HPT-SP2-SL1-T HPT-SP2-SL1-B HPT-SP2-SL2-T HPT-SP2-SL2-B HPT-SP2-SL3-T HPT-SP2-SL3-B HPT-SP2-SL4-T HPT-SP2-SL4-B HPT-SP2-SL5-T HPT-SP2-SL5-B	N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A

	24-4	Hot Pipe Tunnel, El. -12’0”, confluence of Areas 25A and 25B (floor)	PB06-02266-T PB06-02266-B PB06-02267-T PB06-02267-B PB06-02268-T PB06-02268-B PB06-02269-T PB06-02269-B PB06-02270-T PB06-02270-B PB06-02271-T PB06-02271-B	HPT-SP1-SL1-T HPT-SP1-SL1-B HPT-SP1-SL2-T HPT-SP1-SL2-B HPT-SP1-SL3-T HPT-SP1-SL3-B HPT-SP1-SL4-T HPT-SP1-SL4-B HPT-SP1-SL5-T HPT-SP1-SL5-B HPT-SP1-SL6-T HPT-SP1-SL6-B	N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A
	24-5	Hot Pipe Tunnel, El. -12’0”, confluence of Areas 25A and 25B (floor)	PB06-02272-T PB06-02272-B PB06-02273-T PB06-02273-B PB06-02274-T PB06-02274-B PB06-02275-T PB06-02275-B PB06-02276-T PB06-02276-B PB06-02277-T PB06-02277-B PB06-02278-T PB06-02278-B	HPT-SP6-SL1-T HPT-SP6-SL1-B HPT-SP6-SL2-T HPT-SP6-SL2-B HPT-SP6-SL3-T HPT-SP6-SL3-B HPT-SP6-SL4-T HPT-SP6-SL4-B HPT-SP6-SL5-T HPT-SP6-SL5-B HPT-SP6-SL6-T HPT-SP6-SL6-B HPT-SP6-SL7-T HPT-SP6-SL7-B	N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A
	24-6	Hot Pipe Tunnel, El. -12’0”, confluence of Areas 25A and 25B (floor)	PB06-02279-T PB06-02279-B PB06-02280-T PB06-02280-B PB06-02282-T PB06-02282-B PB06-02283-T PB06-02283-B	HPT-SP6QC-SL1-T HPT-SP6QC-SL1-B HPT-SP6QC-SL2-T HPT-SP6QC-SL2-B HPT-SP6QC-SL3-T HPT-SP6QC-SL3-B HPT-SP6QC-SL4-T HPT-SP6QC-SL4-B	N/A N/A N/A N/A N/A N/A N/A N/A

			PB06-02284-T	HPT-SP6QC-SL5-T	N/A
			PB06-02284-B	HPT-SP6QC-SL5-B	N/A
			PB06-02285-T	HPT-SP6QC-SL6-T	N/A
			PB06-02285-B	HPT-SP6QC-SL6-B	N/A
			PB06-02286-T	HPT-SP6QC-SL7-T	N/A
			PB06-02286-B	HPT-SP6QC-SL7-B	N/A
	24-7	Hot Pipe Tunnel, El. -12’0”, Area 25B (floor)	PB06-02289-T	HPT-SP3-SL1-T	N/A
			PB06-02289-B	HPT-SP3-SL1-B	N/A
			PB06-02290-T	HPT-SP3-SL2-T	N/A
			PB06-02290-B	HPT-SP3-SL2-B	N/A
			PB06-02291-T	HPT-SP3-SL3-T	N/A
			PB06-02291-B	HPT-SP3-SL3-B	N/A
			PB06-02292-T	HPT-SP3-SL4-T	N/A
			PB06-02292-B	HPT-SP3-SL4-B	N/A
			PB06-02293-T	HPT-SP3-SL5-T	N/A
			PB06-02293-B	HPT-SP3-SL5-B	N/A
			PB06-02294-T	HPT-SP3-SL6-T	N/A
			PB06-02294-B	HPT-SP3-SL6-B	N/A
			PB06-02295-T	HPT-SP3-SL7-T	N/A
			PB06-02295-B	HPT-SP3-SL7-B	N/A
			PB06-02296-T	HPT-SP3-SL8-T	N/A
			PB06-02296-B	HPT-SP3-SL8-B	N/A
	24-8	Hot Pipe Tunnel, El. -12’0”, Area 25B (floor)	PB06-02317-T	HPT-SP4-SL1-T	N/A
			PB06-02317-B	HPT-SP4-SL1-B	N/A
			PB06-02318-T	HPT-SP4-SL2-T	N/A
			PB06-02318-B	HPT-SP4-SL2-B	N/A
			PB06-02319-T	**HPT-SP4-SL3-T**	**HPT-SP4-SL3**
			PB06-02319-B	**HPT-SP4-SL3-B**	**HPT-SP4-SL3**
			PB06-02320-T	HPT-SP4-SL4-T	N/A
			PB06-02320-B	HPT-SP4-SL4-B	N/A
			PB06-02322-T	HPT-SP4-SL5-T	N/A
			PB06-02322-B	HPT-SP4-SL5-B	N/A
			PB06-02323-T	HPT-SP4-SL6-T	N/A
			PB06-02323-B	HPT-SP4-SL6-B	N/A

			PB06-02324-T PB06-02324-B	HPT-SP4-SL7-T HPT-SP4-SL7-B	N/A N/A
	24-9	Hot Pipe Tunnel, El. -12’0”, Area 25B (floor)	PB06-02325-T PB06-02325-B PB06-02326-T PB06-02326-B PB06-02327-T PB06-02327-B PB06-02328-T PB06-02328-B PB06-02332-T PB06-02332-B PB06-02333-T PB06-02333-B PB06-02334-T PB06-02334-B PB06-02335-T PB06-02335-B	HPT-SP5-SL1-T HPT-SP5-SL1-B HPT-SP5-SL2-T HPT-SP5-SL2-B HPT-SP5-SL3-T HPT-SP5-SL3-B HPT-SP5-SL4-T HPT-SP5-SL4-B HPT-SP5-SL5-T HPT-SP5-SL5-B HPT-SP5-SL6-T HPT-SP5-SL6-B HPT-SP5-SL7-T HPT-SP5-SL7-B HPT-SP5-SL8-T HPT-SP5-SL8-B	N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A
	24-10	Hot Pipe Tunnel, El. -12’0”, Area 25A (floor)	PB06-02336-T PB06-02336-B PB06-02337-T PB06-02337-B PB06-02339-T PB06-02339-B PB06-02340-T PB06-02340-B PB06-02342-T PB06-02342-B PB06-02343-T PB06-02343-B PB06-02344-T PB06-02344-B	HPT-SP7-SL1-T HPT-SP7-SL1-B HPT-SP7-SL2-T HPT-SP7-SL2-B HPT-SP7-SL3-T HPT-SP7-SL3-B HPT-SP7-SL4-T HPT-SP7-SL4-B HPT-SP7-SL5-T HPT-SP7-SL5-B HPT-SP7-SL6-T HPT-SP7-SL6-B HPT-SP7-SL7-T HPT-SP7-SL7-B	N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A
	24-11	Primary Pump House, El. 0’0”, Room 8,	PB06-02345-T PB06-02345-B	PPH-R8-SP1-SL1-T PPH-R8-SP1-SL1-B	N/A N/A

		(west wall)	PB06-02346-T PB06-02346-B PB06-02347-T PB06-02347-B **PB06-02348-T** **PB06-02348-B** PB06-02349-T PB06-02349-B PB06-02350-T PB06-02350-B PB06-02351-T PB06-02351-B PB06-02352-T PB06-02352-B PB06-02353-T PB06-02353-B	PPH-R8-SP1-SL2-T PPH-R8-SP1-SL2-B PPH-R8-SP1-SL3-T PPH-R8-SP1-SL3-B **PPH-R8-SP1-SL4-T** **PPH-R8-SP1-SL4-B** PPH-R8-SP1-SL5-T PPH-R8-SP1-SL5-B PPH-R8-SP1-SL6-T PPH-R8-SP1-SL6-B PPH-R8-SP1-SL7-T PPH-R8-SP1-SL7-B PPH-R8-SP1-SL8-T PPH-R8-SP1-SL8-B PPH-R8-SP1-SL9-T PPH-R8-SP1-SL9-B	N/A N/A N/A N/A **PPH-R8-SP1-SL4** N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A
	24-12	Primary Pump House, El. 0’0”, Room 6, (floor)	**PB06-02354-T** **PB06-02354-B** PB06-02355-T PB06-02355-B PB06-02356-T PB06-02356-B PB06-02357-T PB06-02357-B PB06-02358-T PB06-02358-B PB06-02359-T PB06-02359-B PB06-02360-T PB06-02360-B PB06-02362-T PB06-02362-B PB06-02363-T PB06-02363-B	**PPH-R6-SP1-SL1-T** **PPH-R6-SP1-SL1-B** PPH-R6-SP1-SL2-T PPH-R6-SP1-SL2-B PPH-R6-SP1-SL3-T PPH-R6-SP1-SL3-B PPH-R6-SP1-SL4-T PPH-R6-SP1-SL4-B PPH-R6-SP1-SL5-T PPH-R6-SP1-SL5-B PPH-R6-SP1-SL6-T PPH-R6-SP1-SL6-B PPH-R6-SP1-SL7-T PPH-R6-SP1-SL7-B PPH-R6-SP1-SL8-T PPH-R6-SP1-SL8-B PPH-R6-SP1-SL9-T PPH-R6-SP1-SL9-B	**PPH-R6-SP1-SL1** N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A

			PB06-02364-T **PB06-02364-B**	**PPH-R6-SP1-SL10-T** **PPH-R6-SP1-SL10-B**	**PPH-R6-SP1-SL10**
	24-13	Primary Pump House, El. 0’0”, Room 5, (floor)	**PB06-02369-T** **PB06-02369-B** PB06-02370-T PB06-02370-B PB06-02371-T PB06-02371-B PB06-02372-T PB06-02372-B PB06-02373-T PB06-02373-B PB06-02374-T PB06-02374-B PB06-02375-T PB06-02375-B PB06-02376-T PB06-02376-B PB06-02377-T PB06-02377-B PB06-02378-T PB06-02378-B	**PPH-R5-SP1-SL1-T** **PPH-R5-SP1-SL1-B** PPH-R5-SP1-SL2-T PPH-R5-SP1-SL2-B PPH-R5-SP1-SL3-T PPH-R5-SP1-SL3-B PPH-R5-SP1-SL4-T PPH-R5-SP1-SL4-B PPH-R5-SP1-SL5-T PPH-R5-SP1-SL5-B PPH-R5-SP1-SL6-T PPH-R5-SP1-SL6-B PPH-R5-SP1-SL7-T PPH-R5-SP1-SL7-B PPH-R5-SP1-SL8-T PPH-R5-SP1-SL8-B PPH-R5-SP1-SL9-T PPH-R5-SP1-SL9-B PPH-R5-SP1-SL10-T PPH-R5-SP1-SL10-B	**PPH-R5-SP1-SL1** N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A
	24-14	Primary Pump House, El. 0’0”, Room 3, (floor)	**PB06-02379-T** **PB06-02379-B** PB06-02380-T PB06-02380-B PB06-02382-T PB06-02382-B PB06-02383-T PB06-02383-B PB06-02384-T PB06-02384-B PB06-02385-T PB06-02385-B	**PPH-R3-SP1-SL1-T** **PPH-R3-SP1-SL1-B** PPH-R3-SP1-SL2-T PPH-R3-SP1-SL2-B PPH-R3-SP1-SL3-T PPH-R3-SP1-SL3-B PPH-R3-SP1-SL4-T PPH-R3-SP1-SL4-B PPH-R3-SP1-SL5-T PPH-R3-SP1-SL5-B PPH-R3-SP1-SL6-T PPH-R3-SP1-SL6-B	**PPH-R3-SP1-SL1** N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A

			PB06-02386-T PB06-02386-B PB06-02387-T PB06-02387-B	PPH-R3-SP1-SL7-T PPH-R3-SP1-SL7-B PPH-R3-SP1-SL8-T PPH-R3-SP1-SL8-B	N/A N/A N/A N/A
	24-15	Primary Pump House, El. 0’0”, Room 4 (floor)	**PB06-02388-T** **PB06-02388-B** PB06-02389-T PB06-02389-B PB06-02390-T PB06-02390-B PB06-02391-T PB06-02391-B PB06-02392-T PB06-02392-B PB06-02393-T PB06-02393-B PB06-02394-T PB06-02394-B PB06-02395-T PB06-02395-B PB06-02396-T PB06-02396-B PB06-02397-T PB06-02397-B	**PPH-R4-SP1-SL1-T** **PPH-R4-SP1-SL1-B** PPH-R4-SP1-SL2-T PPH-R4-SP1-SL2-B PPH-R4-SP1-SL3-T PPH-R4-SP1-SL3-B PPH-R4-SP1-SL4-T PPH-R4-SP1-SL4-B PPH-R4-SP1-SL5-T PPH-R4-SP1-SL5-B PPH-R4-SP1-SL6-T PPH-R4-SP1-SL6-B PPH-R4-SP1-SL7-T PPH-R4-SP1-SL7-B PPH-R4-SP1-SL8-T PPH-R4-SP1-SL8-B PPH-R4-SP1-SL9-T PPH-R4-SP1-SL9-B PPH-R4-SP1-SL10-T PPH-R4-SP1-SL10-B	**PPH-R4-SP1-SL1** N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A
	24-16	Primary Pump House, El. 0’0”, Room 4 (floor)	**PB06-02229-T** **PB06-02229-B** PB06-02230-T PB06-02230-B PB06-02234-T PB06-02234-B PB06-02235-T PB06-02235-B PB06-02236-T PB06-02236-B	**PPH-R4-SP2-SL1-T** **PPH-R4-SP2-SL1-B** PPH-R4-SP2-SL2-T PPH-R4-SP2-SL2-B PPH-R4-SP2-SL3-T PPH-R4-SP2-SL3-B PPH-R4-SP2-SL4-T PPH-R4-SP2-SL4-B PPH-R4-SP2-SL5-T PPH-R4-SP2-SL5-B	**PPH-R4-SP2-SL1** N/A N/A N/A N/A N/A N/A N/A N/A N/A

			PB06-02237-T PB06-02237-B	PPH-R4-SP2-SL6-T PPH-R4-SP2-SL6-B	N/A N/A
	24-17	Hot Pipe Tunnel, El. -12’0”, confluence of Areas 25A and 25B (floor)	PB06-02456-T PB06-02456-B PB06-02457-T PB06-02457-B PB06-02458-T PB06-02458-B PB06-02459-T PB06-02459-B PB06-02460-T PB06-02460-B PB06-02462-T PB06-02462-B PB06-02463-T PB06-02463-B PB06-02464-T PB06-02464-B PB06-02465-T PB06-02465-B PB06-02466-T PB06-02466-B PB06-02467-T PB06-02467-B PB06-02468-T PB06-02468-B PB06-02475-T PB06-02475-B PB06-02476-T PB06-02476-B	HPT-SP8-SL1-T HPT-SP8-SL1-B HPT-SP8-SL2-T HPT-SP8-SL2-B HPT-SP8-SL3-T HPT-SP8-SL3-B HPT-SP8-SL4-T HPT-SP8-SL4-B HPT-SP8-SL5-T HPT-SP8-SL5-B HPT-SP8-SL6-T HPT-SP8-SL6-B HPT-SP8-SL7-T HPT-SP8-SL7-B HPT-SP8-SL8-T HPT-SP8-SL8-B HPT-SP8-SL9-T HPT-SP8-SL9-B HPT-SP8-SL10-T HPT-SP8-SL10-B HPT-SP8-SL11-T HPT-SP8-SL11-B HPT-SP8-SL12-T HPT-SP8-SL12-B HPT-SP8-SL13-T HPT-SP8-SL13-B HPT-SP8-SL14-T HPT-SP8-SL14-B	N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A
	24-18	Hot Pipe Tunnel, El. -12’0”, confluence of Areas 25A and 25B (floor)	PB06-02477-T PB06-02477-B **PB06-02478-T** **PB06-02478-B**	HPT-SP9-SL1-T HPT-SP9-SL1-B **HPT-SP9-SL2-T** **HPT-SP9-SL2-B**	N/A N/A **HPT-SP9-SL2** **HPT-SP9-SL2**

			PB06-02479-T	HPT-SP9-SL3-T	N/A
			PB06-02479-B	HPT-SP9-SL3-B	N/A
			PB06-02480-T	HPT-SP9-SL4-T	N/A
			PB06-02480-B	HPT-SP9-SL4-B	N/A
			PB06-02482-T	HPT-SP9-SL5-T	N/A
			PB06-02482-B	HPT-SP9-SL5-B	N/A
			PB06-02483-T	HPT-SP9-SL6-T	N/A
			PB06-02483-B	HPT-SP9-SL6-B	N/A
			PB06-02484-T	HPT-SP9-SL7-T	N/A
			PB06-02484-B	HPT-SP9-SL7-B	N/A
			PB06-02485-T	HPT-SP9-SL8-T	N/A
			PB06-02485-B	HPT-SP9-SL8-B	N/A
			PB06-02486-T	HPT-SP9-SL9-T	N/A
			PB06-02486-B	HPT-SP9-SL9-B	N/A
			PB06-02493-T	HPT-SP9-SL10-T	N/A
			PB06-02493-B	HPT-SP9-SL10-B	N/A
			PB06-02494-T	HPT-SP9-SL11-T	N/A
			PB06-02494-B	HPT-SP9-SL11-B	N/A
			PB06-02495-T	HPT-SP9-SL12-T	N/A
			PB06-02495-B	HPT-SP9-SL12-B	N/A
			PB06-02496-T	HPT-SP9-SL13-T	N/A
			PB06-02496-B	HPT-SP9-SL13-B	N/A
			PB06-02497-T	HPT-SP9-SL14-T	N/A
			PB06-02497-B	HPT-SP9-SL14-B	N/A
			PB06-02498-T	HPT-SP9-SL15-T	N/A
			PB06-02498-B	HPT-SP9-SL15-B	N/A
			PB06-02499-T	HPT-SP9-SL16-T	N/A
			PB06-02499-B	HPT-SP9-SL16-B	N/A
	24-19	Hot Pipe Tunnel, El. -12’0”, confluence of Areas 25A and 25B (floor)	PB06-02500-T	HPT-SP10-SL1-T	N/A
			PB06-02500-B	HPT-SP10-SL1-B	N/A
			PB06-02502-T	HPT-SP10-SL2-T	N/A
			PB06-02502-B	HPT-SP10-SL2-B	N/A
			PB06-02503-T	HPT-SP10-SL3-T	N/A
			PB06-02503-B	HPT-SP10-SL3-B	N/A

			PB06-02504-T	HPT-SP10-SL4-T	N/A
			PB06-02504-B	HPT-SP10-SL4-B	N/A
			PB06-02505-T	HPT-SP10-SL5-T	N/A
			PB06-02505-B	HPT-SP10-SL5-B	N/A
			PB06-02506-T	HPT-SP10-SL6-T	N/A
			PB06-02506-B	HPT-SP10-SL6-B	N/A
			PB06-02507-T	HPT-SP10-SL7-T	N/A
			PB06-02507-B	HPT-SP10-SL7-B	N/A
			PB06-02508-T	HPT-SP10-SL8-T	N/A
			PB06-02508-B	HPT-SP10-SL8-B	N/A
			PB06-02509-T	HPT-SP10-SL9-T	N/A
			PB06-02509-B	HPT-SP10-SL9-B	N/A
			PB06-02510-T	HPT-SP10-SL10-T	N/A
			PB06-02510-B	HPT-SP10-SL10-B	N/A
			PB06-02511-T	HPT-SP10-SL11-T	N/A
			PB06-02511-B	HPT-SP10-SL11-B	N/A
			PB06-02512-T	HPT-SP10-SL12-T	N/A
			PB06-02512-B	HPT-SP10-SL12-B	N/A
			PB06-02513-T	HPT-SP10-SL13-T	N/A
			PB06-02513-B	HPT-SP10-SL13-B	N/A
			PB06-02514-T	HPT-SP10-SL14-T	N/A
			PB06-02514-B	HPT-SP10-SL14-B	N/A
	24-20	Hot Pipe Tunnel, El. -12’0”, confluence of Areas 25A and 25B (floor)	PB06-02515-T	HPT-SP11-SL1-T	N/A
			PB06-02515-B	HPT-SP11-SL1-B	N/A
			PB06-02516-T	HPT-SP11-SL2-T	N/A
			PB06-02516-B	HPT-SP11-SL2-B	N/A
			PB06-02517-T	HPT-SP11-SL3-T	N/A
			PB06-02517-B	HPT-SP11-SL3-B	N/A
			PB06-02518-T	HPT-SP11-SL4-T	N/A
			PB06-02518-B	HPT-SP11-SL4-B	N/A
			PB06-02519-T	HPT-SP11-SL5-T	N/A
			PB06-02519-B	HPT-SP11-SL5-B	N/A
			PB06-02520-T	HPT-SP11-SL6-T	N/A
			PB06-02520-B	HPT-SP11-SL6-B	N/A

			PB06-02522-T PB06-02522-B PB06-02524-T PB06-02524-B PB06-02525-T PB06-02525-B PB06-02526-T PB06-02526-B PB06-02527-T PB06-02527-B PB06-02528-T PB06-02528-B PB06-02529-T PB06-02529-B PB06-02530-T PB06-02530-B PB06-02531-T PB06-02531-B PB06-02532-T PB06-02532-B PB06-02533-T PB06-02533-B	HPT-SP11-SL7-T HPT-SP11-SL7-B HPT-SP11-SL8-T HPT-SP11-SL8-B HPT-SP11-SL9-T HPT-SP11-SL9-B HPT-SP11-SL10-T HPT-SP11-SL10-B HPT-SP11-SL11-T HPT-SP11-SL11-B HPT-SP11-SL12-T HPT-SP11-SL12-B HPT-SP11-SL13-T HPT-SP11-SL13-B HPT-SP11-SL14-T HPT-SP11-SL14-B HPT-SP11-SL15-T HPT-SP11-SL15-B HPT-SP11-SL16-T HPT-SP11-SL16-B HPT-SP11-SL17-T HPT-SP11-SL17-B	N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A
SR-28	28-1 (IM-1)	Fan House, El. -12’0”, Equipment Room 8 (floor)	PB06-02747-T PB06-02747-B PB06-02748-T PB06-02748-B PB06-02749-T PB06-02749-B	IM-1 SL1-T IM-1 SL1-B IM-1 SL2-T IM-1 SL2-B IM-1 SL3-T IM-1 SL3-B	N/A N/A N/A N/A N/A N/A
	28-2 (IM-2)	Fan House, El. -12’0”, Equipment Room 8 (floor)	PB06-02752-T PB06-02752-B PB06-02753-T PB06-02753-B	IM-2 SL1-T IM-2 SL1-B IM-2 SL2-T IM-2 SL2-B	N/A N/A N/A N/A
	28-3 (IM-5)	Fan House, El. 0’0”, Operating Area Rm. 1	PB06-02754-T PB06-02754-B	IM-5 SL1-T IM-5 SL1-B	N/A N/A

		(floor)	PB06-02755-T PB06-02755-B	IM-5 SL2-T IM-5 SL2-B	N/A N/A
	28-4 (IM-1)	Fan House, El. 0’0”, Operating Area Rm. 1 (floor)	PB06-02756-T PB06-02756-B PB06-02757-T PB06-02757-B	IM-1-4 SL1-T IM-1-4 SL1-B IM-1-4 SL2-T IM-1-4 SL2-B	N/A N/A N/A N/A
	28-5 (IM-2)	Fan House, El. -12’0”, Tunnel to HRA (floor)	PB06-02758-T PB06-02758-B PB06-02759-T PB06-02759-B	IM-2-5 SL1-T IM-2-5 SL1-B IM-2-5 SL2-T IM-2-5 SL2-B	N/A N/A N/A N/A
SR-29	29-1 (IM-1)	Waste Handling Bldg., El. -13’0”, Access and Work Area Room 15 (floor)	PB06-02700-T PB06-02700-B PB06-02702-T PB06-02702-B	WB-15 IM1 SL1-T WB-15 IM1 SL1-B WB-15 IM1 SL2-T WB-15 IM1 SL2-B	N/A N/A N/A N/A
	29-2 (SM-14 or IM-14)	Waste Handling Bldg., El. -13’0”, Access and Work Area Room 15 (floor)	PB06-02704-T PB06-02704-B PB06-02705-T PB06-02705-B	WB-15 IM14 SL1-T WB-15 IM14 SL1-B WB-15 IM14 SL2-T WB-15 IM14 SL2-B	N/A N/A N/A N/A
	29-3 (IM-1)	Waste Handling Bldg., El. 0’0”, Operating Area Rm. 1 (floor)	PB06-02706-T PB06-02706-B PB06-02707-T PB06-02707-B PB06-02744-T PB06-02744-B PB06-02743-T PB06-02743-B PB06-02745-T PB06-02745-B PB06-02746-T PB06-02746-B	WB 0 IM1 SL1-T WB 0 IM1 SL1-B WB 0 IM1 SL2-T WB 0 IM1 SL2-B WB 0 IM1 SL3-T WB 0 IM1 SL3-B WB 0 IM1 SL4-T WB 0 IM1 SL4-B WB 0 IM1 SL5-T WB 0 IM1 SL5-B WB 0 IM1 SL6-T WB 0 IM1 SL6-B	N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A
	29-4 (IM-2)	Waste Handling Bldg., El. 0’0”, Laundry Room 3 (floor)	PB06-02708-T PB06-02708-B PB06-02709-T PB06-02709-B	WB 0 IM2 SL1-T WB 0 IM2 SL1-B WB 0 IM2 SL2-T WB 0 IM2 SL2-B	N/A N/A N/A N/A

			PB06-02740-T PB06-02740-B PB06-02742-T PB06-02742-B	WB 0 IM2 SL3-T WB 0 IM2 SL3-B WB 0 IM2 SL4-T WB 0 IM2 SL4-B	N/A N/A N/A N/A

* PB04-00413 This gamma spec analysis was lost

On pages 4 through 7, Sample ID is in the following format: The first number indicates the core bore number/location; the second number indicates the sequential piece of the core bore (many were collected in pieces rather than one long core bore); the third number indicates the sequential slice of a given piece (ex: 10-2-P1 is first slice or puck from the second piece of the core bore collected at location 10).

Package E1000 101C4 was specifically written for activation analysis of the reactor cavity concrete and is not germane to this document.

APPENDIX C
Addendum 2

Summaries of Gamma Spectroscopy Data for Site Structures

(25 pages)

Reactor Building - Containment outside Quads and Canals - Area 2 / Lily Pad (0'0")

Sample Log #	Qualitative Only	Sample #	Location	Cs-137 pCi/g	Co-60 pCi/g	Cs:Co	H-3 pCi/g	Sr-90 pCi/g	I-129 pCi/g	Eu-154 pCi/g	U-233/234 pCi/g	U-235/236 pCi/g
Qualitative Only	0		**Average Concentration**									
			Average Cs-137 MDA									
			Average Co-60 MDA									
			Average Cs:Co Ratio									

Reactor Building - Area 17 (-25 ft.)

Sample Log #	Qualitative Only	Sample #	Location	Cs-137 pCi/g	Co-60 pCi/g	Cs:Co	H-3 pCi/g	Sr-90 pCi/g	I-129 pCi/g	Eu-154 pCi/g	U-233/234 pCi/g	U-235/236 pCi/g
CS022304-009		L0509-1	Loc. #9	5.72E-01	< 2.10E-01		9.51E+00	<4.50E-01			7.00E-01	<4.70E-02
CS050630-013		L05 9-1P1	Loc. #9	2.32E+00	2.96E+01	0.08	8.90E+00	1.82E+01		1.06E+01		
Qualitative Only			Average Concentration	1.45E+00	2.96E+01		9.21E+00	1.82E+01		1.06E+01	7.00E-01	
			Average Cs-137 MDA	2.33E-01								
			Average Co-60 MDA		3.05E-01							
			Average Cs:Co Ratio			0.08						

Reactor Building - Quad A

Sample Log #	Qualitative Only	Sample #	Location	Cs-137 pCi/g	Co-60 pCi/g	Cs:Co	H-3 pCi/g	Sr-90 pCi/g	I-129 pCi/g	Eu-154 pCi/g	U-233/234 pCi/g	U-235/236 pCi/g
			Quadrant "A"									
Avg. of CS050630--057, 058, 059		**L05 1-3, 1-2P5, 1-2P4**	**Loc #1 - Slant Core**	**2.67E+00**	**6.60E+00**	**0.40**						
PB06-01748-T	1	SR15-3	EMP-QA-6-SL1-T	<MDA	<MDA	N/A				< 5.65E-02		< 6.02E-02
PB06-01748-B	1	SR15-3	EMP-QA-6-SL1-B	<MDA	<MDA	N/A				< 6.84E-02		< 4.99E-02
PB06-01749-T	1	SR15-3	EMP-QA-6-SL2-T	<MDA	<MDA	N/A				< 1.58E-01		< 5.02E-01
PB06-01749-B	1	SR15-3	EMP-QA-6-SL2-B	<MDA	<MDA	N/A				< 1.85E-01		< 4.53E-01
PB06-01754-T		SR15-3	EMP-QA-6-SL3-T	<MDA	<MDA	N/A				< 1.56E-01		<1.46E-01
PB06-01754-B		**SR15-3**	**EMP-QA-6-SL3-B**	**8.23E-02**	<MDA	N/A				< 1.65E-01		< 1.66E-01
PB06-01755-T		SR15-3	EMP-QA-6-SL4-T	<MDA	<MDA	N/A				< 1.55E-01		< 7.57E-01
PB06-01755-B		SR15-3	EMP-QA-6-SL4-B	<MDA	<MDA	N/A				< 1.38E-01		< 6.94E-01
PB06-01760-T		SR15-3	EMP-QA-6-SL5-T	<MDA	<MDA	N/A				< 1.54E-01		< 1.26E-01
PB06-01760-B		SR15-3	EMP-QA-6-SL5-B	<MDA	<MDA	N/A				< 9.05E-02		< 1.78E-01
PB06-01763-T	1	SR15-4	EMP-QA-6--Q-SL1-T	<MDA	<MDA	N/A				< 9.85E-02		< 3.28E-01
PB06-01763-B	1	SR15-4	EMP-QA-6--Q-SL1-B	<MDA	<MDA	N/A				< 8.06E-02		< 3.28E-01
PB06-01764-T		SR15-4	EMP-QA-6--Q-SL2-T	<MDA	<MDA	N/A				< 1.08E-01		< 1.64E-01
PB06-01764-B		SR15-4	EMP-QA-6--Q-SL2-B	<MDA	<MDA	N/A				< 1.73E-01		< 1.90E-01
PB06-01765-T		SR15-4	EMP-QA-6--Q-SL3-T	<MDA	<MDA	N/A				< 1.77E-01		< 4.06E-01
PB06-01765-B		SR15-4	EMP-QA-6--Q-SL3-B	<MDA	<MDA	N/A				< 1.55E-01		< 6.27E-01
PB06-01770-T		SR15-4	EMP-QA-6--Q-SL4-T	<MDA	<MDA	N/A				< 1.09E-01		< 1.40E-01
PB06-01770-B		SR15-4	EMP-QA-6--Q-SL4-B	<MDA	<MDA	N/A				< 1.65E-01		< 1.38E-01
PB06-01771-T	1	SR15-4	EMP-QA-6--Q-SL5-T	<MDA	<MDA	N/A				< 1.64E-01		< 6.24E-01
PB06-01771-B	1	SR15-4	EMP-QA-6--Q-SL5-B	<MDA	<MDA	N/A				< 1.23E-01		< 7.74E-01
PB06-01775-T		SR15-4	EMP-QA-6--Q-SL6-T	<MDA	<MDA	N/A				< 1.40E-01		< 1.91E-01
PB06-01775-B		SR15-4	EMP-QA-6--Q-SL6-B	<MDA	<MDA	N/A				< 1.35E-01		<1.84E-01
PB06-01776-T	1	SR15-4	EMP-QA-6--Q-SL7-T	<MDA	<MDA	N/A				< 1.75E-01		< 5.95E-01
PB06-01776-B	1	SR15-4	EMP-QA-6--Q-SL7-B	<MDA	<MDA	N/A				< 1.13E-01		< 5.76E-01
PB06-01780-T	1	SR15-5	EMP-QA-5--SL1-T	<MDA	<MDA	N/A				< 6.59E-02		< 5.77E-02
PB06-01780-B	**1**	**SR15-5**	**EMP-QA-5--SL1-B**	**7.82E-02**	<MDA	N/A				< 5.59E-02		< 7.49E-02
PB06-01782-T		SR15-5	EMP-QA-5--SL2-T	<MDA	<MDA	N/A				< 9.65E-02		< 5.34E-01
PB06-01782-B		SR15-5	EMP-QA-5--SL2-B	<MDA	<MDA	N/A				< 1.59E-01		< 6.45e-01
PB06-01784-T	1	SR15-5	EMP-QA-5--SL3-T	<MDA	<MDA	N/A				< 1.19E-01		< 1.61E-01
PB06-01784-B	1	SR15-5	EMP-QA-5--SL3-B	<MDA	<MDA	N/A				< 9.18E-02		< 1.10E-01
PB06-01785-T		SR15-5	EMP-QA-5--SL4-T	<MDA	<MDA	N/A				< 1.48E-01		< 6.28E-01
PB06-01785-B		SR15-5	EMP-QA-5--SL4-B	<MDA	<MDA	N/A				< 1.50E-01		< 5.36E-01
PB06-01786-T	**1**	**SR15-5**	**EMP-QA-5--SL5-T**	**1.47E-01**	<MDA	N/A				< 1.46E-01		< 1.18E-01
PB06-01786-B	1	SR15-5	EMP-QA-5--SL5-B	<MDA	<MDA	N/A				< 1.35E-01		< 9.92E-02
Qualitative Only	16		**Average Concentration**	**7.44E-01**	**6.60E+00**							
			Average Cs-137 MDA	**7.69E-02**								
			Average Co-60 MDA		**9.64E-02**							
			Average Cs:Co Ratio			**0.40**						

Sample Log #	Qualitative Only	Sample #	Location	Cs-137 pCi/g	Co-60 pCi/g	Cs:Co	H-3 pCi/g	Sr-90 pCi/g	I-129 pCi/g	Eu-154 pCi/g	U-233/234 pCi/g	U-235/236 pCi/g
			Quadrant "C"									
CS050630-060		**L05 2-3**	**Loc #2**	**2.93E+00**	**3.54E-01**	**8.28**				< 2.30E-01		
CS050630-063		**L05 2-4P1**	**Loc #2**	**1.91E-01**	< 1.62E-01					< 6.22E-01		
PB06-01623-T	1	SR15-1	EMP-QC-03-SL1-T	<MDA	<MDA	N/A				< 7.36E-02		<5.66E-02
PB06-01623-B	1	SR15-1	EMP-QC-03-SL1-B	<MDA	<MDA	N/A				< 4.53E-02		< 6.76E-02
PB06-01624-T		SR15-1	EMP-QC-03-SL2-T	<MDA	<MDA	N/A				< 2.08E-01		< 4.95E-01
PB06-01624-B		SR15-1	EMP-QC-03-SL2-B	<MDA	<MDA	N/A				< 2.02E-01		< 6.73E-01
PB06-01628-T		SR15-1	EMP-QC-03-SL3-T	<MDA	<MDA	N/A				< 1.43E-01		< 7.66E-01
PB06-01628-B		SR15-1	EMP-QC-03-SL3-B	<MDA	<MDA	N/A				< 1.16E-01		< 7.02E-01
PB06-01629-T		SR15-1	EMP-QC-03-SL4-T	<MDA	<MDA	N/A				< 1.74E-01		< 2.06E-01
PB06-01629-B		SR15-1	EMP-QC-03-SL4-B	<MDA	<MDA	N/A				< 8.83E-02		< 1.49E-01
PB06-01634-T		**SR15-1**	**EMP-QC-03-SL5-T**	**1.68E-01**	**<MDA**	N/A				< 1.20E-01		< 1.43E-01
PB06-01634-B		SR15-1	EMP-QC-03-SL5-B	<MDA	<MDA	N/A				< 1.28E-01		< 1.11e-01
PB06-01635-T		SR15-1	EMP-QC-03-SL6-T	<MDA	<MDA	N/A				< 1.65e-01		< 7.43E-01
PB06-01635-B		SR15-1	EMP-QC-03-SL6-B	<MDA	<MDA	N/A				< 1.97E-01		< 7.45E-01
PB06-01636-T		SR15-1	EMP-QC-03-SL7-T	<MDA	<MDA	N/A				< 1.54E-01		< 1.45E-01
PB06-01636-B		SR15-1	EMP-QC-03-SL7-B	<MDA	<MDA	N/A				< 9.21E-02		<1.44E-01
PB06-01637-T		SR15-1	EMP-QC-03-SL8-T	<MDA	<MDA	N/A				< 1.89E-01		< 7.33E-01
PB06-01637-B		SR15-1	EMP-QC-03-SL8-B	<MDA	<MDA	N/A				< 1.72E-01		< 3.90E-01
PB06-01638-T	1	SR15-1	EMP-QC-03-SL9-T	<MDA	<MDA	N/A				< 1.82E-01		< 5.46E-01
PB06-01638-B	1	SR15-1	EMP-QC-03-SL9-B	<MDA	<MDA	N/A				< 1.77E-01		< 5.72E-01
PB06-01639-T		SR15-1	EMP-QC-03-SL10-T	<MDA	<MDA	N/A				< 3.62E-01		< 1.62E-01
PB06-01639-B		**SR15-1**	**EMP-QC-03-SL10-B**	**1.56E-01**	**<MDA**	N/A				< 1.50E-01		< 1.84E-01
PB06-01649-T		SR15-1	EMP-QC-03-SL11-T	<MDA	<MDA	N/A				< 2.32E-01		< 6.87E-01
PB06-01649-B		SR15-1	EMP-QC-03-SL11-B	<MDA	<MDA	N/A				< 2.09E-01		< 6.45E-01
PB06-01650-T		SR15-1	EMP-QC-03-SL12-T	<MDA	<MDA	N/A				< 1.55E-01		<1.80E-01
PB06-01650-B		SR15-1	EMP-QC-03-SL12-B	<MDA	<MDA	N/A				< 9.81E-02		< 1.77E-01
PB06-01651-T		SR15-1	EMP-QC-03-SL13-T	<MDA	<MDA	N/A				< 2.03E-01		< 8.36E-01
PB06-01651-B		SR15-1	EMP-QC-03-SL13-B	<MDA	<MDA	N/A				< 2.0E-01		< 2.89E-01
PB06-01657-T	1	SR15-1	EMP-QC-03-SL14-T	<MDA	<MDA	N/A				< 1.32E-01		< 4.50E-01
PB06-01657-B	1	SR15-1	EMP-QC-03-SL14-B	<MDA	<MDA	N/A				< 1.36E-01		< 5.21E-01
PB06-01726-T	1	SR15-2	EMP-QC-11-SL1-T	<MDA	<MDA	N/A				< 1.16E-01		< 1.05E-01
PB06-01726-B	1	SR15-2	EMP-QC-11-SL1-B	<MDA	<MDA	N/A				< 8.69E-02		< 1.28E-01
PB06-01727-T		**SR15-2**	**EMP-QC-11-SL2-T**	**1.57E-01**	**<MDA**	N/A				< 1.92E-01		< 7.22E-01
PB06-01727-B		**SR15-2**	**EMP-QC-11-SL2-B**	**2.45E-01**	**<MDA**	N/A				< 1.52E-01		< 5.62E-01
PB06-01728-T		SR15-2	EMP-QC-11-SL3-T	<MDA	<MDA	N/A				< 1.39E-01		<1.87E-01
PB06-01728-B		SR15-2	EMP-QC-11-SL3-B	<MDA	<MDA	N/A				< 1.58E-01		< 1.50E-01
PB06-01729-T		SR15-2	EMP-QC-11-SL4-T	<MDA	<MDA	N/A				< 1.29E-01		< 8.45E-01
PB06-01729-B		SR15-2	EMP-QC-11-SL4-B	<MDA	<MDA	N/A				< 1.74E-01		< 7.26E-01
PB06-01730-T		SR15-2	EMP-QC-11-SL5-T	<MDA	<MDA	N/A				< 1.46E-01		< 1.38E-01
PB06-01730-B		SR15-2	EMP-QC-11-SL5-B	<MDA	<MDA	N/A				< 1.34E-01		< 1.88E-01
PB06-01731-T		SR15-2	EMP-QC-11-SL6-T	<MDA	<MDA	N/A				< 1.345E-01		< 7.17E-01
PB06-01731-B		SR15-2	EMP-QC-11-SL6-B	<MDA	<MDA	N/A				< 1.59E-01		< 6.31E-01
PB06-01740-T		SR15-2	EMP-QC-11-SL7-T	<MDA	<MDA	N/A				< 2.43E-01		< 5.17E-01
PB06-01740-B		SR15-2	EMP-QC-11-SL7-B	<MDA	<MDA	N/A				< 7.40E-01		< 5.92E-01

Sample Log #	Qualitative Only	Sample #	Location	Cs-137 pCi/g	Co-60 pCi/g	Cs:Co	H-3 pCi/g	Sr-90 pCi/g	I-129 pCi/g	Eu-154 pCi/g	U-233/234 pCi/g	U-235/236 pCi/g
PB06-01742-T		SR15-2	EMP-QC-11-SL8-T	<MDA	<MDA	N/A				< 1.09E-01		< 1.60E-01
PB06-01742-B		SR15-2	EMP-QC-11-SL8-B	<MDA	<MDA	N/A				< 1.57E-01		< 1.48E-01
PB06-01743-T		SR15-2	EMP-QC-11-SL9-T	<MDA	<MDA	N/A				< 1.11E-01		< 5.44E-01
PB06-01743-B		SR15-2	EMP-QC-11-SL9-B	<MDA	<MDA	N/A				< 1.08E-01		< 8.10E-01
PB06-01744-T	1	SR15-2	EMP-QC-11-SL10-T	<MDA	<MDA	N/A				< 5.57E-02		<1.25E-01
PB06-01744-B	1	SR15-2	EMP-QC-11-SL10-B	<MDA	<MDA	N/A				< 1.48E-01		< 1.68E-01
Qualitative Only	10		**Average Concentration**	**6.41E-01**	**3.54E-01**	**8.28E+00**						
			Average Cs-137 MDA	**8.28E-02**								
			Average Co-60 MDA		**1.07E-01**							
			Average Cs:Co Ratio			**8.28**						

Sample Log #	Qualitative Only	Sample #	Location	Cs-137 pCi/g	Co-60 pCi/g	Cs:Co	H-3 pCi/g	Sr-90 pCi/g	I-129 pCi/g	Eu-154 pCi/g	U-233/234 pCi/g	U-235/236 pCi/g
			Canal "H"									
CS050630-071		**L05 11-1P6**	**Loc#11**	**1.06E+00**	< 1.93E-01					< 4.71E-01		
			Canal "G"									
CS050630-065		**L05 10-1P1**	**Loc #10**	**2.71E+00**	**2.48E-01**	**10.93**				< 3.46E-01		
			Canal "E"									
CS022304-001		**L0506-1**	**Loc #6**	**1.10E+02**	**1.53E+00**	**71.90**	**5.45E+00**		**4.31E-01**		**7.50E-01**	< 3.40e-02
PB06-01956-T		SR15-6	EMP-CE-7-SL1-T	<MDA	<MDA					< 1.61E-01		< 5.23E-01
PB06-01956-B		SR15-6	EMP-CE-7-SL1-B	<MDA	<MDA					< 1.68E-01		< 5.82E-01
PB06-01958-T		SR15-6	EMP-CE-7-SL2-T	<MDA	<MDA					< 1.77E-01		< 1.06E+00
PB06-01958-B		SR15-6	EMP-CE-7-SL2-B	<MDA	<MDA					< 1.98E-01		< 7.51E-01
PB06-01959-T		**SR15-6**	**EMP-CE-7-SL3-T**	**3.04E-01**	<MDA					< 1.48E-01		< 4.55E-01
PB06-01959-B		SR15-6	EMP-CE-7-SL3-B	<MDA	<MDA					< 1.86E-01		< 5.93E-01
PB06-01968-T	1	SR15-6	EMP-CE-7-SL4-T	<MDA	<MDA					< 1.71E-01		< 8.64E-01
PB06-01968-B	1	SR15-6	EMP-CE-7-SL4-B	<MDA	<MDA					< 7.69E-02		< 4.56E-01
PB06-01974-T	1	SR15-6	EMP-CE-7-SL5-T	<MDA	<MDA					< 1.92E-01		< 6.98E-01
PB06-01974-B	1	SR15-6	EMP-CE-7-SL5-B	<MDA	<MDA					< 1.53E-01		< 3.96E-01
PB06-01988-T	1	SR15-6	EMP-CE-7-SL6-T	<MDA	<MDA					< 1.71e-01		< 8.38E-01
PB06-01988-B	1	SR15-6	EMP-CE-7-SL6-B	<MDA	<MDA					< 1.77E-01		< 4.69E-01
PB06-01989-T	1	SR15-6	EMP-CE-7-SL7-T	<MDA	<MDA					< 1.93e-01		< 6.37E-01
PB06-01989-B	1	SR15-6	EMP-CE-7-SL7-B	<MDA	<MDA					< 1.85E-01		<6.85E-01
PB06-01990-T	1	SR15-6	EMP-CE-7-SL8-T	<MDA	<MDA					< 2.07E-01		< 5.25E-01
PB06-01990-B	1	SR15-6	EMP-CE-7-SL8-B	<MDA	<MDA					< 1.67E-01		< 7.74E-01
PB06-01991-T	1	SR15-6	EMP-CE-7-SL9-T	<MDA	<MDA					< 9.63E-02		< 3.06E-01
PB06-01991-B	1	SR15-6	EMP-CE-7-SL9-B	<MDA	<MDA					< 5.42E-02		< 1.59E-01
PB06-01992-T		SR15-6	EMP-CE-7-SL10-T	<MDA	<MDA					< 9.09E-02		< 7.08E-01
PB06-01992-B		SR15-6	EMP-CE-7-SL10-B	<MDA	<MDA					< 1.58E-01		< 5.76E-01
PB06-01993-T	**1**	**SR15-6**	**EMP-CE-7-SL11-T**	**2.19E-01**	<MDA					< 2.16E-01		< 6.05E-01
PB06-01993-B	1	SR15-6	EMP-CE-7-SL11-B	<MDA	<MDA					< 1.95E-01		< 6.29E-01
PB06-01994-T	1	SR15-6	EMP-CE-7-SL12-T	<MDA	<MDA					< 9.55E-02		< 5.61E-01
PB06-01994-B	1	SR15-6	EMP-CE-7-SL12-B	<MDA	<MDA					< 7.91E-02		< 5.68E-01
PB06-01995-T	1	SR15-6	EMP-CE-7-SL13-T	<MDA	<MDA					< 1.35E-01		< 5.23E-01
PB06-01995-B	1	SR15-6	EMP-CE-7-SL13-B	<MDA	<MDA					< 1.49E-01		< 3.01E-01
PB06-01909-T	1	SR15-7	EMP-CE-14-SL1-T	<MDA	<MDA					< 6.38E-02		< 1.03E-01
PB06-01909-B	**1**	**SR15-7**	**EMP-CE-14-SL1-B**	**9.49E-02**	<MDA					< 7.56E-02		< 8.01E-02
PB06-01910-T		SR15-7	EMP-CE-14-SL2-T	<MDA	<MDA					< 1.31E-01		< 5.22E-01
PB06-01910-B		SR15-7	EMP-CE-14-SL2-B	<MDA	<MDA					< 1.72E-01		< 5.70e-01
PB06-01915-T		SR15-7	EMP-CE-14-SL3-T	<MDA	<MDA					< 1.44E-01		< 1.05E-01
PB06-01915-B		SR15-7	EMP-CE-14-SL3-B	<MDA	<MDA					< 1.75E-01		< 1.70E-01
PB06-01916-T		SR15-7	EMP-CE-14-SL4-T	<MDA	<MDA					< 1.11E-01		< 5.80E-01
PB06-01916-B		SR15-7	EMP-CE-14-SL4-B	<MDA	<MDA					< 1.97E-01		< 5.21E-01
PB06-01921-T		SR15-7	EMP-CE-14-SL5-T	<MDA	<MDA					< 1.31E-01		< 1.60E-01
PB06-01921-B		SR15-7	EMP-CE-14-SL5-B	<MDA	<MDA					< 8.31E-02		< 1.73E-01
PB06-01923-T		**SR15-7**	**EMP-CE-14-SL6-T**	**1.48E-01**	<MDA					< 1.82E-01		< 6.30E-01
PB06-01923-B		SR15-7	EMP-CE-14-SL6-B	<MDA	<MDA					< 1.85E-01		< 6.06E-01
PB06-01925-T	1	SR15-7	EMP-CE-14-SL7-T	<MDA	<MDA					< 1.56E-01		< 6.88E-01

Sample Log #	Qualitative Only	Sample #	Location	Cs-137 pCi/g	Co-60 pCi/g	Cs:Co	H-3 pCi/g	Sr-90 pCi/g	I-129 pCi/g	Eu-154 pCi/g	U-233/234 pCi/g	U-235/236 pCi/g
PB06-01925-B	1	SR15-7	EMP-CE-14-SL7-B	<MDA	<MDA					< 1.61E-01		< 5.94E-01
PB06-01926-T	1	SR15-7	EMP-CE-14-SL8-T	<MDA	<MDA					< 1.62E-01		< 6.55E-01
PB06-01926-B	1	SR15-7	EMP-CE-14-SL8-B	<MDA	<MDA					< 1.75E-01		< 3.30E-01
PB06-01927-T		SR15-7	EMP-CE-14-SL9-T	<MDA	<MDA					< 1.34E-01		< 7.26E-01
PB06-01927-B		SR15-7	EMP-CE-14-SL9-B	<MDA	<MDA					< 1.88E-01		< 7.16E-01
PB06-01935-T		SR15-7	EMP-CE-14-SL10-T	<MDA	<MDA					< 2.20E-01		< 6.26E-01
PB06-01935-B		SR15-7	EMP-CE-14-SL10-B	<MDA	<MDA					< 2.37E-01		< 5.52E-01
PB06-01942-T		SR15-7	EMP-CE-14-SL11-T	<MDA	<MDA					< 1.35E-01		< 9.12E-01
PB06-01942-B		SR15-7	EMP-CE-14-SL11-B	<MDA	<MDA					< 1.83E-01		< 7.14E-01
PB06-01943-T		SR15-7	EMP-CE-14-SL12-T	<MDA	<MDA					< 2.11E-01		< 4.55E-01
PB06-01943-B		SR15-7	EMP-CE-14-SL12-B	<MDA	<MDA					< 2.24E-01		< 3.91E-01
PB06-01947-T		SR15-7	EMP-CE-14-SL13-T	<MDA	<MDA					< 1.55E-01		< 7.25E-01
PB06-01947-B		SR15-7	EMP-CE-14-SL13-B	<MDA	<MDA					< 1.37E-01		< 5.27E-01
PB06-01948-T		SR15-7	EMP-CE-14-SL14-T	<MDA	<MDA					< 1.01E-01		< 5.92E-01
PB06-01948-B		SR15-7	EMP-CE-14-SL14-B	<MDA	<MDA					< 1.20E-01		< 7.21E-01
PB06-01951-T		**SR15-7**	**EMP-CE-14-SL15-T**	**4.55E-01**	<MDA					< 1.98E-01		< 4.99E-01
PB06-01951-B		**SR15-7**	**EMP-CE-14-SL15-B**	**5.62E-01**	<MDA					< 1.69E-01		< 5.46E-01
PB06-01996-T	1	SR15-8	EMP-CE-16B-SL1-T	<MDA	<MDA					< 1.77E-01		< 3.55E-01
PB06-01996-B	1	SR15-8	EMP-CE-16B-SL1-B	<MDA	<MDA					< 1.54E-01		< 3.56E-01
PB06-01998-T	1	SR15-8	EMP-CE-16B-SL2-T	<MDA	<MDA					< 1.32E-01		< 2.50E-01
PB06-01998-B	**1**	**SR15-8**	**EMP-CE-16B-SL2-B**	**1.65E-01**	**1.85E-01**	**0.9**				< 1.16E-01		< 3.43E-01
PB06-01999-T	1	SR15-8	EMP-CE-16B-SL4-T	<MDA	<MDA					< 1.73E-01		< 5.55E-01
PB06-01999-B	1	SR15-8	EMP-CE-16B-SL4-B	<MDA	<MDA					< 1.70E-01		< 4.54E-01
PB06-02000-T	1	SR15-8	EMP-CE-16B-SL5-T	<MDA	<MDA					< 2.44E-01		< 1.08E+00
PB06-02000-B	1	SR15-8	EMP-CE-16B-SL5-B	<MDA	<MDA					< 1.69E-01		< 1.08E+00
PB06-02001-T		**SR15-8**	**EMP-CE-16B-SL6-T**	**2.13E-01**	<MDA					< 1.28E-01		< 9.34E-01
PB06-02001-B		SR15-8	EMP-CE-16B-SL6-B	<MDA	<MDA					< 1.30E-01		< 8.93E-01
PB06-02002-T-R		SR15-8	EMP-CE-16B-SL7-T	<MDA	<MDA					< 3.31E-01		< 1.13E+00
PB06-02002-B		SR15-8	EMP-CE-16B-SL7-B	<MDA	<MDA					< 2.26E-01		< 8.31E-01
PB06-02003-T		SR15-8	EMP-CE-16B-SL8-T	<MDA	<MDA					< 9.90E-02		< 6.43E-01
PB06-02003-B		SR15-8	EMP-CE-16B-SL8-B	<MDA	<MDA					< 1.67E-01		< 6.49E-01
PB06-02011-T		SR15-8	EMP-CE-16B-SL9-T	<MDA	<MDA					< 2.01E-01		< 8.84E-01
PB06-02011-B		**SR15-8**	**EMP-CE-16B-SL9-B**	**3.35E-01**	<MDA					< 2.55E-01		< 9.67E-01
PB06-02012-T		SR15-8	EMP-CE-16B-SL10-T	<MDA	<MDA					< 1.86E-01		< 8.92E-01
PB06-02012-B		SR15-8	EMP-CE-16B-SL10-B	<MDA	<MDA					< 9.03E-02		< 5.17E-01
PB06-02013-T		SR15-8	EMP-CE-16B-SL11-T	<MDA	<MDA					< 2.94E-01		< 6.5E-01
PB06-02013-B		**SR15-8**	**EMP-CE-16B-SL11-B**	**2.26E-01**	<MDA					< 1.69E-01		< 7.94E-01
PB06-02016-T	1	SR15-9	EMP-CE-16A-SL1-T	<MDA	<MDA					< 2.21E-01		< 6.08E-01
PB06-02016-B	1	SR15-9	EMP-CE-16A-SL1-B	<MDA	<MDA					< 1.76E-01		< 7.90E-01
PB06-02017-T	1	SR15-9	EMP-CE-16A-SL2-T	<MDA	<MDA					< 1.70E-01		< 4.76E-01
PB06-02017-B	1	SR15-9	EMP-CE-16A-SL2-B	<MDA	<MDA					< 1.85E-01		< 4.15E-01
PB06-02018-T		SR15-9	EMP-CE-16A-SL3-T	<MDA	<MDA					< 1.93E-01		< 5.04E-01
PB06-02018-B		SR15-9	EMP-CE-16A-SL3-B	<MDA	<MDA					< 1.66E-01		< 6.83E-01
PB06-02019-T		SR15-9	EMP-CE-16A-SL4-T	<MDA	<MDA					< 1.92E-01		< 7.05E-01
PB06-02019-B		SR15-9	EMP-CE-16A-SL4-B	<MDA	<MDA					< 1.08E-01		< 5.49E-01
PB06-02020-T		SR15-9	EMP-CE-16A-SL5-T	<MDA	<MDA					< 1.73E-01		< 4.97E-01

Sample Log #	Qualitative Only	Sample #	Location	Cs-137 pCi/g	Co-60 pCi/g	Cs:Co	H-3 pCi/g	Sr-90 pCi/g	I-129 pCi/g	Eu-154 pCi/g	U-233/234 pCi/g	U-235/236 pCi/g
PB06-02020-B		**SR15-9**	**EMP-CE-16A-SL5-B**	**2.64E-01**	<MDA					< 1.57E-01		< 4.74E-01
PB06-02022-T	1	SR15-9	EMP-CE-16A-SL6-T	<MDA	<MDA					< 7.42E-02		< 4.25E-01
PB06-02022-B	1	SR15-9	EMP-CE-16A-SL6-B	<MDA	<MDA					< 6.30E-02		< 4.75E-01
PB06-02023-T	**1**	**SR15-9**	**EMP-CE-16A-SL7-T**	**9.05E-02**	<MDA					< 1.04E-01		< 4.09E-01
PB06-02023-B	**1**	**SR15-9**	**EMP-CE-16A-SL7-B**	**1.07E-01**	<MDA					< 7.23E-02		< 3.92E-01
PB06-02024-T	1	SR15-9	EMP-CE-16A-SL8-T	<MDA	<MDA					< 1.23E-01		< 3.89E-01
PB06-02024-B	1	SR15-9	EMP-CE-16A-SL8-B	<MDA	<MDA					< 1.34E-01		< 4.25E-01
PB06-02025-T	1	SR15-10	EMP-CE-4-SL1-T	<MDA	<MDA					< 1.53E-01		< 5.23E-01
PB06-02025-B	1	SR15-10	EMP-CE-4-SL1-B	<MDA	<MDA					< 1.45E-01		< 4.60E-01
PB06-02026-T		SR15-10	EMP-CE-4-SL2-T	<MDA	<MDA					< 1.53E-01		< 6.08E-01
PB06-02026-B		SR15-10	EMP-CE-4-SL2-B	<MDA	<MDA					< 1.96e-01		< 9.06E-01
PB06-02027-T		**SR15-10**	**EMP-CE-4-SL3-T**	**1.90E-01**	<MDA					< 1.59E-01		< 7.11E-01
PB06-02027-B		SR15-10	EMP-CE-4-SL3-B	<MDA	<MDA					< 2.15E-01		< 5.15E-01
PB06-02028-T		SR15-10	EMP-CE-4-SL4-T	<MDA	<MDA					< 2.30E-01		< 6.05e-01
PB06-02028-B		**SR15-10**	**EMP-CE-4-SL4-B**	**2.97E-01**	<MDA					< 2.02E-01		< 7.44E-01
PB06-02029-T		**SR15-10**	**EMP-CE-4-SL5-T**	**2.00E-01**	<MDA					< 1.90E-01		< 6.04E-01
PB06-02029-B		SR15-10	EMP-CE-4-SL5-B	<MDA	<MDA					< 1.64E-01		< 6.21E-01
PB06-02030-T		SR15-10	EMP-CE-4-SL6-T	<MDA	<MDA					< 2.35E-01		< 8.70E-01
PB06-02030-B		SR15-10	EMP-CE-4-SL6-B	<MDA	<MDA					< 1.54E-01		< 1.00E+00
PB06-02031-T		SR15-10	EMP-CE-4-SL7-T	<MDA	<MDA					< 1.84E-01		< 8.00E-01
PB06-02031-B		**SR15-10**	**EMP-CE-4-SL7-B**	**2.30E-01**	<MDA					< 2.34E-01		< 6.78E-01
PB06-02032-T		SR15-10	EMP-CE-4-SL8-T	<MDA	<MDA					< 1.94E-01		< 5.18E-01
PB06-02032-B		SR15-10	EMP-CE-4-SL8-B	<MDA	<MDA					< 1.97E-01		< 6.74E-01
PB06-02033-T		SR15-10	EMP-CE-4-SL9-T	<MDA	<MDA					< 1.66E-01		< 4.59E-01
PB06-02033-B		SR15-10	EMP-CE-4-SL9-B	<MDA	<MDA					< 1.55E-01		< 5.71E-01
PB06-02034-T	1	SR15-10	EMP-CE-4-SL10-T	<MDA	<MDA					< 1.40E-01		< 6.70E-01
PB06-02034-B	1	SR15-10	EMP-CE-4-SL10-B	<MDA	<MDA					< 1.89E-01		< 6.21E-01
PB06-02035-T		SR15-10	EMP-CE-4-SL11-T	<MDA	<MDA					< 2.03E-01		< 6.74E-01
PB06-02035-B		**SR15-10**	**EMP-CE-4-SL11-B**	**1.69E-01**	<MDA					< 1.54E-01		< 5.52E-01
PB06-02036-T		SR15-11	EMP-CE-2-SL1-T	<MDA	<MDA					< 2.42E-01		< 7.27E-01
PB06-02036-B		SR15-11	EMP-CE-2-SL1-B	<MDA	<MDA					< 8.32E-02		< 7.36E-01
PB06-02040-T		SR15-11	EMP-CE-2-SL2-T	<MDA	<MDA					< 1.46E-01		< 5.66E-01
PB06-02040-B		SR15-11	EMP-CE-2-SL2-B	<MDA	<MDA					< 1.79E-01		< 5.64E-01
PB06-02046-T		SR15-11	EMP-CE-2-SL3-T	<MDA	<MDA					< 2.01E-01		< 8.64E-01
PB06-02046-B		SR15-11	EMP-CE-2-SL3-B	<MDA	<MDA					< 2.01E-01		< 9.09E-01
PB06-02047-T		**SR15-11**	**EMP-CE-2-SL4-T**	**1.40E-01**	<MDA					< 1.38E-01		< 5.39E-01
PB06-02047-B		**SR15-11**	**EMP-CE-2-SL4-B**	<MDA	<MDA					< 2.49E-01		< 5.39E-01
PB06-02048-T		SR15-11	EMP-CE-2-SL5-T	<MDA	<MDA					< 1.18E-01		< 6.41E-01
PB06-02048-B		SR15-11	EMP-CE-2-SL5-B	<MDA	<MDA					< 1.60E-01		< 9.25E-01
PB06-02049-T		SR15-11	EMP-CE-2-SL6-T	<MDA	<MDA					< 1.42E-01		< 3.52E-01
PB06-02049-B		SR15-11	EMP-CE-2-SL6-B	<MDA	<MDA					< 1.91E-01		< 6.32E-01
PB06-02050-T		SR15-11	EMP-CE-2-SL7-T	<MDA	<MDA					< 2.18E-01		< 6.56E-01
PB06-02050-B		SR15-11	EMP-CE-2-SL7-B	<MDA	<MDA					< 9.36E-02		< 6.88E-01
PB06-02051-T		SR15-11	EMP-CE-2-SL8-T	<MDA	<MDA					< 8.78E-02		< 6.00E-01
PB06-02051-B		**SR15-11**	**EMP-CE-2-SL8-B**	**1.47E-01**	<MDA					< 1.39E-01		< 5.83E-01
PB06-02052-T		SR15-11	EMP-CE-2-SL9-T	<MDA	<MDA					< 1.29E-01		< 5.89E-01

Sample Log #	Qualitative Only	Sample #	Location	Cs-137 pCi/g	Co-60 pCi/g	Cs:Co	H-3 pCi/g	Sr-90 pCi/g	I-129 pCi/g	Eu-154 pCi/g	U-233/234 pCi/g	U-235/236 pCi/g
PB06-02052-B		SR15-11	EMP-CE-2-SL9-B	<MDA	<MDA					< 1.63E-01		< 3.63E-01
PB06-02053-T		SR15-11	EMP-CE-2-SL10-T	<MDA	<MDA					< 2.63E-01		< 3.29E-01
PB06-02053-B		**SR15-11**	**EMP-CE-2-SL10-B**	**1.79E-01**	<MDA					< 1.54E-01		< 4.97E-01
PB06-02054-T		SR15-11	EMP-CE-2-SL11-T	<MDA	<MDA					< 1.48E-01		< 9.57E-01
PB06-02054-B		SR15-11	EMP-CE-2-SL11-B	<MDA	<MDA					< 1.57E-01		< 8.03E-01
PB06-02055-T		**SR15-11**	**EMP-CE-2-SL12-T**	**1.18E-01**	<MDA					< 1.20E-01		< 6.18E-01
PB06-02055-B		SR15-11	EMP-CE-2-SL12-B	<MDA	<MDA					< 1.90E-01		< 6.10E-01
PB06-02056-T		SR15-11	EMP-CE-2-SL13-T	<MDA	<MDA					< 1.73E-01		< 5.45E-01
PB06-02056-B		**SR15-11**	**EMP-CE-2-SL13-B**	**2.49E-01**	<MDA					< 8.64E-02		< 7.24E-01
PB06-02057-T		**SR15-11**	**EMP-CE-2-SL14-T**	**1.43E-01**	<MDA					< 1.76E-01		< 4.46E-01
PB06-02057-B		SR15-11	EMP-CE-2-SL14-B	<MDA	<MDA					< 1.33E-01		< 6.27E-01
Qualitative Only	46		**Average Concentration**	**4.41E+00**	**6.54E-01**	**2.79E+01**	**5.45E+00**		**4.31E-01**		**7.50E-01**	
			Average Cs-137 MDA	**9.40E-02**								
			Average Co-60 MDA		**1.10E-01**							
			Average Cs:Co Ratio			**27.9**						

Hot Lab - Hot Cells

Sample Log #	Qualitative Only	Sample #	Location	Cs-137 pCi/g	Co-60 pCi/g	Cs:Co	H-3 pCi/g	Sr-90 pCi/g	I-129 pCi/g	Eu-154 pCi/g	U-233/234 pCi/g	U-235/236 pCi/g
Qualitative Only	0		**Average Concentration**									
			Average Cs-137 MDA									
			Average Co-60 MDA									
			Average Cs:Co Ratio									

Sample Log #	Qualitative Only	Sample #	Location	Cs-137 pCi/g	Co-60 pCi/g	Cs:Co	H-3 pCi/g	Sr-90 pCi/g	I-129 pCi/g	Eu-154 pCi/g	U-233/234 pCi/g	U-235/236 pCi/g
CS022304-017		L0515-1	Loc #15	**4.16E+03**	**1.87E+01**	**222.46**	< 5.30e+00	**9.46E+02**			**1.28E+00**	< 9.10E-02
CS022304-021		L0516-1	Loc #16	**2.44E+02**	**6.23E+00**	**39.17**	< 5.20E+00	**7.83E+02**			**9.10E-01**	< 9.30E-02
CS050630-047		L05 20-1P1	Loc #20	**1.76E+04**	**3.25E+02**	**54.15**	**3.22E+01**	**3.73E+04**				
PB06-02266-T		SR24-4	HPT-SP1-SL1-T	**5.21E+03**	**5.91E+02**	**8.82**				< 3.85E+00		< 1.01E+00
PB06-02266-B		SR24-4	HPT-SP1-SL1-B	**4.40E+03**	**5.36E+02**	**8.21**				< 4.05E+00		< 1.35E+01
PB06-02267-T		SR24-4	HPT-SP1-SL2-T	**1.70E+03**	**1.79E+02**	**9.50**				< 2.56E+00		< 7.82E+00
PB06-02267-B		SR24-4	HPT-SP1-SL2-B	**1.64E+03**	**1.76E+02**	**9.32**				< 2.19E+00		< 8.19E+00
PB06-02268-T		SR24-4	HPT-SP1-SL3-T	**9.46E+02**	**1.55E+02**	**6.10**				< 2.39E+00		< 5.95E+00
PB06-02268-B		SR24-4	HPT-SP1-SL3-B	**9.51E+02**	**1.50E+02**	**6.34**				< 1.76E+00		< 6.87E+00
PB06-02269-T		SR24-4	HPT-SP1-SL4-T	**5.00E+02**	**5.59E+01**	**8.94**				< 1.36E+00		< 2.52E+00
PB06-02269-B		SR24-4	HPT-SP1-SL4-B	**4.69E+02**	**5.08E+01**	**9.23**				< 1.07E+00		< 4.56E+00
PB06-02270-T		SR24-4	HPT-SP1-SL5-T	**3.86E+02**	**3.03E+01**	**12.74**				< 1.54E+00		< 4.41E+00
PB06-02270-B		SR24-4	HPT-SP1-SL5-B	**3.71E+02**	**3.03E+01**	**12.24**				< 1.05E+00		< 5.25E+00
PB06-02271-T		SR24-4	HPT-SP1-SL6-T	**1.91E+02**	**2.28E+01**	**8.38**				< 8.76E-01		< 3.50E+00
PB06-02271-B		SR24-4	HPT-SP1-SL6-B	**1.88E+02**	**2.32E+01**	**8.10**				< 9.57E-01		< 3.77E+00
PB06-02260-T		SR24-3	HPT-SP2-SL1-T	**2.43E+03**	**6.58E+01**	**36.93**				< 2.07E+00		< 7.96E+00
PB06-02260-B		SR24-3	HPT-SP2-SL1-B	**2.22E+03**	**5.86E+01**	**37.88**				< 2.80E+00		< 7.08E+00
PB06-02262-T		SR24-3	HPT-SP2-SL2-T	**1.74E+03**	**3.05E+01**	**57.05**				< 2.61E+00		< 6.25E+00
PB06-02262-B		SR24-3	HPT-SP2-SL2-B	**1.75E+03**	**2.83E+01**	**61.84**				< 1.25E+00		< 5.32E+00
PB06-02263-T		SR24-3	HPT-SP2-SL3-T	**1.05E+03**	**1.29E+01**	**81.40**				< 1.66E+00		< 6.09E+00
PB06-02263-B		SR24-3	HPT-SP2-SL3-B	**1.00E+03**	**1.23E+01**	**81.30**				< 1.41E+00		< 5.62E+00
PB06-02264-T		SR24-3	HPT-SP2-SL4-T	**7.62E+02**	**1.49E+01**	**51.14**				< 1.74E+00		< 6.22E+00
PB06-02264-B		SR24-3	HPT-SP2-SL4-B	**7.45E+02**	**1.54E+01**	**48.38**				< 1.78E+00		< 3.37E+00
PB06-02265-T		SR24-3	HPT-SP2-SL5-T	**6.80E+02**	**7.52E+00**	**90.43**				< 1.29E+00		< 3.96E+00
PB06-02265-B		SR24-3	HPT-SP2-SL5-B	**6.56E+02**	**6.90E+00**	**95.07**				< 2.16E+00		< 4.08E+00
PB06-02289-T		SR24-7	HPT-SP3-SL1-T	**2.02E+04**	**9.00E+03**	**2.24**				**5.75E+01**		< 2.48E+01
PB06-02289-B		SR24-7	HPT-SP3-SL1-B	**1.10E+04**	**4.97E+03**	**2.21**				**2.09E+01**		< 1.37E+01
PB06-02290-T		SR24-7	HPT-SP3-SL2-T	**1.70E+01**	<MDA					< 1.74E-01		< 5.97E-01
PB06-02290-B		SR24-7	HPT-SP3-SL2-B	**1.12E+01**	<MDA					< 3.47E+01		< 6.77E-01
PB06-02291-T		SR24-7	HPT-SP3-SL3-T	**6.22E-01**	<MDA					< 1.94E-01		< 7.66E-01
PB06-02291-B		SR24-7	HPT-SP3-SL3-B	**7.81E-01**	**4.51E-01**	**1.73**				< 1.87E-01		< 5.19E-01
PB06-02292-T		SR24-7	HPT-SP3-SL4-T	**7.08E-01**	**6.26E-01**	**1.13**				< 2.77E-01		< 8.51E-01
PB06-02292-B		SR24-7	HPT-SP3-SL4-B	**5.25E-01**	**5.37E-01**	**0.98**				< 3.09E-01		< 1.05e+00
PB06-02293-T		SR24-7	HPT-SP3-SL5-T	**5.98E-01**	**4.06E-01**	**1.47**				< 2.20E-01		< 6.36E-01
PB06-02293-B		SR24-7	HPT-SP3-SL5-B	**5.22E-01**	<MDA					< 4.32E-01		< 4.40E-01
PB06-02294-T		SR24-7	HPT-SP3-SL6-T	**6.85E-01**	<MDA					< 1.86E-01		< 7.19E-01
PB06-02294-B		SR24-7	HPT-SP3-SL6-B	**7.35E-01**	**6.01E-01**	**1.22**				< 2.75E-01		< 8.88E-01
PB06-02295-T		SR24-7	HPT-SP3-SL7-T	**5.51E-01**	**3.17E-01**	**1.74**				< 1.56E-01		< 7.84E-01
PB06-02295-B		SR24-7	HPT-SP3-SL7-B	**3.87E-01**	<MDA					< 1.67E-01		< 6.81E-01
PB06-02296-T		SR24-7	HPT-SP3-SL8-T	**1.63E+00**	**1.44E+00**	**1.13**				< 2.64E-01		**9.29E-01**
PB06-02296-B		SR24-7	HPT-SP3-SL8-B	**1.42E+00**	<MDA					< 4.21E-01		< 1.16E=00
PB06-02317-T		SR24-8	HPT-SP4-SL1-T	**5.10E+04**	**9.13E+02**	**55.86**				< 1.07E+01		< 1.13E+01
PB06-02317-B		SR24-8	HPT-SP4-SL1-B	**3.52E+04**	**5.95E+02**	**59.16**				< 1.1E+01		< 4.96E+01
PB06-02318-T		SR24-8	HPT-SP4-SL2-T	**9.80E+02**	**2.70E+01**	**36.30**				< 1.63E+00		< 5.42E+00
PB06-02318-B		SR24-8	HPT-SP4-SL2-B	**7.76E+02**	**2.02E+01**	**38.42**				< 1.61E+00		< 4.87E+00

Sample Log #	Qualitative Only	Sample #	Location	Cs-137 pCi/g	Co-60 pCi/g	Cs:Co	H-3 pCi/g	Sr-90 pCi/g	I-129 pCi/g	Eu-154 pCi/g	U-233/234 pCi/g	U-235/236 pCi/g
PB06-02319-T		SR24-8	HPT-SP4-SL3-T	**7.50E+01**	**3.13E+00**	**23.96**				< 3.67E-01		< 8.84E-01
PB06-02319-B		SR24-8	HPT-SP4-SL3-B	**5.98E+01**	**4.06E+00**	**14.73**				< 4.82E-01		< 1.82E+00
STL Analysis			**HPT-SP4-SL3-T&B**	**4.59E+01**	**2.78E+00**	**16.51**	**7.20E+01**	< 9.1E-01	< 1.70E+00	< 1.4E+00	**6.30E-01**	**7.40E-02**
PB06-02320-T		SR24-8	HPT-SP4-SL4-T	**1.99E+00**	**5.13E+00**	**0.39**				< 3.26E-01		< 6.41E-01
PB06-02320-B		SR24-8	HPT-SP4-SL4-B	**2.02E+00**	**5.65E+00**	**0.36**				< 1.62E-01		< 8.10E-01
PB06-02322-T		SR24-8	HPT-SP4-SL5-T	**1.08E+00**	**4.20E+00**	**0.26**				< 2.19E-01		< 7.03E-01
PB06-02322-B		SR24-8	HPT-SP4-SL5-B	**7.54E-01**	**3.68E+00**	**0.20**				< 2.40E-01		< 7.97E-01
PB06-02323-T		SR24-8	HPT-SP4-SL6-T	**7.12E-01**	<MDA					< 2.31E-01		< 6.87E-01
PB06-02323-B		SR24-8	HPT-SP4-SL6-B	**7.96E-01**	<MDA					< 2.63E-01		< 5.93E-01
PB06-02324-T		SR24-8	HPT-SP4-SL7-T	**2.86E+00**	**5.55E-01**	**5.15**				< 2.64E-01		< 8.84E-01
PB06-02324-B		SR24-8	HPT-SP4-SL7-B	**3.47E+00**	<MDA					< 3.98E-01		< 6.89E-01
PB06-02325-T		SR24-9	HPT-SP5-SL1-T	**5.63E+02**	**2.63E+00**	**214.07**				< 1.40E+00		< 4.31E+00
PB06-02325-B		SR24-9	HPT-SP5-SL1-B	**3.03E+02**	**1.88E+00**	**161.17**				< 9.99E-01		< 4.47E+00
PB06-02326-T		SR24-9	HPT-SP5-SL2-T	<MDA	<MDA					< 2.39E-01		< 6.32E-01
PB06-02326-B		SR24-9	HPT-SP5-SL2-B	<MDA	<MDA					< 1.64E-01		< 8.56E-01
PB06-02272-T		SR24-5	HPT-SP6-SL1-T	**4.38E+03**	**7.96E+01**	**55.03**				< 3.16E+00		< 9.12E+00
PB06-02272-B		SR24-5	HPT-SP6-SL1-B	**3.11E+03**	**6.44E+01**	**48.29**				< 1.73E+00		< 1.30E+01
PB06-02273-T		SR24-5	HPT-SP6-SL2-T	**2.07E+02**	**1.32E+01**	**15.68**				< 9.99E-01		< 4.07E+00
PB06-02273-B		SR24-5	HPT-SP6-SL2-B	**1.77E+02**	**1.23E+01**	**14.39**				< 7.57E-01		< 2.03E+00
PB06-02274-T		SR24-5	HPT-SP6-SL3-T	**1.68E+01**	**3.10E+00**	**5.42**				< 2.23E-01		< 1.02E+00
PB06-02274-B		SR24-5	HPT-SP6-SL3-B	**1.61E+01**	**2.65E+00**	**6.08**				< 1.87E-01		< 5.89E-01
PB06-02275-T		SR24-5	HPT-SP6-SL4-T	**4.63E+00**	**1.15E+00**	**4.03**				< 1.33E-01		< 8.87E-01
PB06-02275-B		SR24-5	HPT-SP6-SL4-B	**4.21E+00**	**1.03E+00**	**4.09**				< 2.94E-01		< 8.87E-01
PB06-02276-T		SR24-5	HPT-SP6-SL5-T	**1.11E+00**	<MDA					< 1.36E-01		< 6.22E-01
PB06-02276-B		SR24-5	HPT-SP6-SL5-B	**9.95E-01**	<MDA					< 1.44E-01		< 5.23E-01
PB06-02277-T		SR24-5	HPT-SP6-SL6-T	**2.81E-01**	<MDA					< 2.48E-01		< 6.06E-01
PB06-02277-B		SR24-5	HPT-SP6-SL6-B	**2.23E-01**	<MDA					< 2.11E-01		< 5.61E-01
PB06-02279-T		SR24-6	HPT-SP6QC-SL1-T	**9.56E+03**	**9.83E+01**	**97.26**				< 3.21E+00		< 2.78E+01
PB06-02279-B		SR24-6	HPT-SP6QC-SL1-B	**7.51E+03**	**7.84E+01**	**95.79**				< 5.82E+00		< 1.15E+01
PB06-02280-T		SR24-6	HPT-SP6QC-SL2-T	**1.33E+02**	**5.19E+00**	**25.63**				< 4.51E-01		< 1.67E+00
PB06-02280-B		SR24-6	HPT-SP6QCSL2-B	**8.71E+01**	**3.83E+00**	**22.74**				< 3.39E-01		< 1.85E+00
PB06-02282-T		SR24-6	HPT-SP6QC-SL3-T	**2.34E+00**	<MDA					< 2.81E-01		< 8.21E-01
PB06-02282-B		SR24-6	HPT-SP6QCSL3-B	**1.93E+00**	<MDA					< 3.21E-01		< 8.97E-01
PB06-02283-T		SR24-6	HPT-SP6QC-SL4-T	**5.24E-01**	<MDA					< 4.68E-01		< 7.86E-01
PB06-02283-B		SR24-6	HPT-SP6QCSL4-B	<MDA	<MDA					< 2.59E-01		< 8.23E-01
PB06-02284-T		SR24-6	HPT-SP6QC-SL5-T	**5.31E-01**	<MDA					< 1.82E-01		< 5.22E-01
PB06-02284-B		SR24-6	HPT-SP6QCSL5-B	**5.56E-01**	<MDA					< 1.92E-01		< 4.61E-01
PB06-02285-T		SR24-6	HPT-SP6QC-SL6-T	**6.84E-01**	<MDA					< 1.65E-01		**1.11E+00**
PB06-02285-B		SR24-6	HPT-SP6QCSL6-B	**4.86E-01**	<MDA					< 1.15E-01		< 9.19E-01
PB06-02286-T		SR24-6	HPT-SP6QC-SL7-T	**1.50E+00**	<MDA					< 5.19E-01		< 1.04E+00
PB06-02286-B		SR24-6	HPT-SP6QCSL7-B	**1.58E+00**	<MDA					< 2.39E-01		< 8.49E-01
PB06-02336-T		SR24-10	HPT-SP7-SL1-T	**2.22E+04**	**3.04E+01**	**730.26**				< 6.67E+00		< 2.98E+01
PB06-02336-B		SR24-10	HPT-SP7-SL1-B	**1.31E+04**	**1.99E+01**	**658.29**				< 6.85E+00		< 2.70E+01
PB06-02337-T		SR24-10	HPT-SP7-SL2-T	**1.18E+00**	<MDA					< 1.78E-01		< 5.40E-01
PB06-02337-B		SR24-10	HPT-SP7-SL2-B	**5.79E-01**	<MDA					< 1.40E-01		< 7.99E-01
PB06-02339-T		SR24-10	HPT-SP7-SL3-T	<MDA	<MDA					< 1.17E-01		< 6.41E-01

Sample Log #	Qualitative Only	Sample #	Location	Cs-137 pCi/g	Co-60 pCi/g	Cs:Co	H-3 pCi/g	Sr-90 pCi/g	I-129 pCi/g	Eu-154 pCi/g	U-233/234 pCi/g	U-235/236 pCi/g
PB06-02339-B		SR24-10	HPT-SP7-SL3-B	<MDA	<MDA					< 1.80E-01		< 7.76E-01
PB06-02456-T		SR24-17	HPT-SP8-SL1-T	**1.15E+04**	**8.17E+02**	**14.08**				< 4.56E+00		< 2.12E+01
PB06-02456-B		SR24-17	HPT-SP8-SL1-B	**1.04E+04**	**7.71E+02**	**13.49**				< 7.32E+00		< 2.56E+01
PB06-02457-T		SR24-17	HPT-SP8-SL2-T	**4.32E+03**	**4.22E+02**	**10.24**				< 3.70E+00		< 1.19E+01
PB06-02457-B		SR24-17	HPT-SP8-SL2-B	**4.58E+03**	**4.36E+02**	**10.50**				< 3.94E+00		< 1.34E+01
PB06-02458-T		SR24-17	HPT-SP8-SL3-T	**2.76E+03**	**2.31E+02**	**11.95**				< 3.52E+00		< 1.62E+01
PB06-02458-B		SR24-17	HPT-SP8-SL3-B	**2.77E+03**	**2.30E+02**	**12.04**				< 4.22E+00		< 1.37E+01
PB06-02459-T		SR24-17	HPT-SP8-SL4-T	**1.92E+03**	**1.76E+02**	**10.91**				<2.42E+00		< 1.05E+01
PB06-02459-B		SR24-17	HPT-SP8-SL4-B	**1.81E+03**	**1.78E+02**	**10.17**				< 2.93E+00		< 9.77E+00
PB06-02460-T		SR24-17	HPT-SP8-SL5-T	**1.41E+03**	**1.52E+02**	**9.28**				< 3.17E+00		< 1.12E+01
PB06-02460-B		SR24-17	HPT-SP8-SL5-B	**1.39E+03**	**1.54E+02**	**9.03**				< 3.00E+00		< 9.77E+00
PB06-02462-T		SR24-17	HPT-SP8-SL6-T	**1.00E+03**	**1.14E+02**	**8.77**				< 4.51E+00		< 8.24E+00
PB06-02462-B		SR24-17	HPT-SP8-SL6-B	**1.00E+03**	**1.16E+02**	**8.62**				< 1.89E+00		< 7.04E+00
PB06-02463-T		SR24-17	HPT-SP8-SL7-T	**1.01E+03**	**3.10E+01**	**32.58**				< 1.71E+00		< 6.45E+00
PB06-02463-B		SR24-17	HPT-SP8-SL7-B	**9.59E+02**	**2.95E+01**	**32.51**				< 2.39E+00		< 5.41E+00
PB06-02464-T		SR24-17	HPT-SP8-SL8-T	**5.37E+02**	**1.99E+01**	**26.98**				< 1.61E+00		< 4.86E+00
PB06-02464-B		SR24-17	HPT-SP8-SL8-B	**5.39E+02**	**3.73E+01**	**14.45**				< 1.55E+00		< 4.73E+00
PB06-02465-T		SR24-17	HPT-SP8-SP9-T	**4.92E+02**	**1.58E+01**	**31.14**				< 6.72E-01		< 4.92E+00
PB06-02465-B		SR24-17	HPT-SP8-SL9-B	**4.77E+02**	**1.54E+01**	**30.97**				< 7.05E-01		< 5.73E+00
PB06-02466-T		SR24-17	HPT-SP8-SL10-T	**5.33E+02**	**1.98E+01**	**26.92**				< 1.40E+00		< 5.50E+00
PB06-02466-B		SR24-17	HPT-SP8-SL10-B	**5.52E+02**	**2.05E+01**	**26.93**				< 1.38E+00		< 4.36E+00
PB06-02467-T		SR24-17	HPT-SP8-SL11-T	**4.61E+02**	**1.49E+01**	**30.94**				< 1.38E+00		< 4.56E+00
PB06-02467-B		SR24-17	HPT-SP8-SL11-B	**4.47E+02**	**1.44E+01**	**31.04**				< 1.42E+00		< 3.37E+00
PB06-02468-T		SR24-17	HPT-SP8-SL12-T	**3.98E+02**	**1.50E+01**	**26.53**				< 6.55E-01		< 3.99E+00
PB06-02468-B		SR24-17	HPT-SP8-SL12-B	**3.99E+02**	**9.33E+00**	**42.77**				< 5.48E-01		< 3.68E+00
PB06-02475-T	1	SR24-17	HPT-SP8-SL13-T	**1.78E+02**	**6.68E+00**	**26.65**				< 5.77E-01		< 2.15E+00
PB06-02475-B	1	SR24-17	HPT-SP8-SL13-B	**1.46E+02**	**6.42E+00**	**22.74**				< 5.61E-01		< 9.58E-01
PB06-02476-T	1	SR24-17	HPT-SP8-SL14-T	**7.18E+01**	**1.13E+00**	**63.54**				< 4.37E-01		< 7.78E-01
PB06-02476-B	1	SR24-17	HPT-SP8-SL14-B	**5.16E+01**	**1.03E+00**	**50.10**				< 3.70E-01		< 1.08E+00
PB06-02477-T		SR24-18	HPT-SP9-SL1-T	**2.70E+03**	**2.07E+02**	**13.04**				< 3.75E+00		< 1.24E+01
PB06-02477-B		SR24-18	HPT-SP9-SL1-B	**1.93E+03**	**1.70E+02**	**11.35**				< 2.86E+00		< 1.13E+01
PB06-02478-T		SR24-18	HPT-SP9-SL2-T	**6.17E+01**	**2.03E+00**	**30.39**				< 5.10E-01		< 1.68E+00
PB06-02478-B		SR24-18	HPT-SP9-SL2-B	**4.65E+01**	**1.41E+00**	**32.98**				< 2.83E-01		< 1.82E+00
STL Analysis			**HPT-SP9-SL2-T&B**	**6.33E+01**	**2.34E+00**	**27.05**	< 6.70E-01	**6.70E+00**	< 3.00E+00	< 3.3E+00	**8.00E-01**	**5.80E-02**
PB06-02479-T		SR24-18	HPT-SP9-SL3-T	**5.96E-01**	<MDA					< 2.06E-01		< 9.11E-01
PB06-02479-B		SR24-18	HPT-SP9-SL3-B	**5.21E-01**	<MDA					< 1.66E-01		< 7.75E-01
PB06-02480-T		SR24-18	HPT-SP9-SL4-T	<MDA	<MDA					< 1.16E-01		< 8.23E-01
PB06-02480-B		SR24-18	HPT-SP9-SL4-B	<MDA	<MDA					< 2.45E-01		< 9.53E-01
PB06-02500-T		SR24-19	HPT-SP10-SL1-T	**2.94E+03**	**5.27E+01**	**55.79**				< 3.07E+00		< 1.04E+01
PB06-02500-B		SR24-19	HPT-SP10-SL1-B	**2.88E+03**	**4.92E+01**	**58.54**				< 2.23E+00		< 9.14E+00
PB06-02502-T		SR24-19	HPT-SP10-SL2-T	**1.61E+03**	**2.02E+01**	**79.70**				< 2.42E+00		< 9.00E+00
PB06-02502-B		SR24-19	HPT-SP10-SL2-B	**1.58E+03**	**2.00E+01**	**79.00**				< 2.43E+00		< 1.01E+01
PB06-02503-T		SR24-19	HPT-SP10-SL3-T	**9.44E+02**	**1.08E+01**	**87.41**				< 1.58E+00		< 5.96E+00
PB06-02503-B		SR24-19	HPT-SP10-SL3-B	**9.38E+02**	**1.01E+01**	**92.87**				< 1.66E+00		< 5.42E+00
PB06-02504-T		SR24-19	HPT-SP10-SL4-T	**6.33E+02**	**8.16E+00**	**77.57**				< 1.28E+00		< 4.12E+00
PB06-02504-B		SR24-19	HPT-SP10-SL4-B	**6.19E+02**	**8.28E+00**	**74.76**				< 1.46E+00		< 4.89E+00

Sample Log #	Qualitative Only	Sample #	Location	Cs-137 pCi/g	Co-60 pCi/g	Cs:Co	H-3 pCi/g	Sr-90 pCi/g	I-129 pCi/g	Eu-154 pCi/g	U-233/234 pCi/g	U-235/236 pCi/g
PB06-02505-T		SR24-19	HPT-SP10-SL5-T	**6.36E+02**	**9.05E+00**	**70.28**				< 1.35E+00		< 5.20E+00
PB06-02505-B		SR24-19	HPT-SP10-SL5-B	**6.34E+02**	**1.03E+01**	**61.55**				< 1.34E+00		< 3.91E+00
PB06-02506-T		SR24-19	HPT-SP10-SL6-T	**5.32E+02**	**5.85E+00**	**90.94**				< 1.03E+00		< 5.73E+00
PB06-02506-B		SR24-19	HPT-SP10-SL6-B	**5.58E+02**	**5.46E+00**	**102.20**				< 1.34E+00		< 4.90E+00
PB06-02507-T		SR24-19	HPT-SP10-SL7-T	**5.05E+02**	**4.02E+00**	**125.62**				< 1.10E+00		< 4.54E+00
PB06-02507-B		SR24-19	HPT-SP10-SL7-B	**5.49E+02**	**4.35E+00**	**126.21**				< 1.27E+00		< 3.61E+00
PB06-02508-T	1	SR24-19	HPT-SP10-SL8-T	**4.29E+02**	**4.80E+00**	**89.38**				< 1.11E+00		< 4.78E+00
PB06-02508-B	1	SR24-19	HPT-SP10-SL8-B	**4.22E+02**	**4.59E+00**	**91.94**				< 1.22E+00		< 3.76E+00
PB06-02509-T	1	SR24-19	HPT-SP10-SL9-T	**4.60E+02**	**6.52E+00**	**70.55**				< 7.53E-01		< 4.50E+00
PB06-02509-B	1	SR24-19	HPT-SP10-SL9-B	**4.47E+02**	**6.26E+00**	**71.41**				< 1.09E+00		< 3.71E+00
PB06-02510-T	1	SR24-19	HPT-SP10-SL10-T	**4.19E+02**	**5.13E+00**	**81.68**				< 1.50E+00		< 5.38E+00
PB06-02510-B	1	SR24-19	HPT-SP10-SL10-B	**4.50E+02**	**4.68E+00**	**96.15**				< 1.21E+00		< 5.12E+00
PB06-02511-T		SR24-19	HPT-SP10-SL11-T	**3.38E+02**	**5.33E+00**	**63.41**				< 8.07E-01		< 3.92E+00
PB06-02511-B		SR24-19	HPT-SP10-SL11-B	**3.17E+02**	**4.85E+00**	**65.36**				< 8.83E-01		< 3.02E+00
PB06-02512-T		SR24-19	HPT-SP10-SL12-T	**2.58E+02**	**3.24E+00**	**79.63**				< 8.35E-01		< 2.69E+00
PB06-02512-B		SR24-19	HPT-SP10-SL12-B	**2.57E+02**	**3.16E+00**	**81.33**				< 7.56E-01		< 1.56E+00
PB06-02513-T		SR24-19	HPT-SP10-SL13-T	**2.14E+02**	**7.62E+00**	**28.08**				< 7.55E-01		< 3.27E+00
PB06-02513-B		SR24-19	HPT-SP10-SL13-B	**2.14E+02**	**7.45E+00**	**28.72**				< 5.38E-01		< 2.88E+00
PB06-02514-T		SR24-19	HPT-SP10-SL14-T	**1.69E+02**	**5.25E+00**	**32.19**				< 4.59E-01		< 2.80E+00
PB06-02514-B		SR24-19	HPT-SP10-SL14-B	**1.60E+02**	**5.43E+00**	**29.47**				< 4.83E-01		< 3.17E+00
PB06-02515-T		SR24-20	HPT-SP11-SL1-T	**8.71E+02**	**3.50E+01**	**24.89**				< 1.64E+00		< 6.20E+00
PB06-02515-B		SR24-20	HPT-SP11-SL1-B	**6.61E+02**	**2.99E+01**	**22.11**				< 1.17E+00		< 5.34e+00
PB06-02516-T		SR24-20	HPT-SP11-SL2-T	**3.64E+00**	**1.92E+00**	**1.90**				< 2.99E-01		< 1.20E+00
PB06-02516-B		SR24-20	HPT-SP11-SL2-B	**2.48E+00**	**1.24E+00**	**2.00**				< 2.03e-01		< 6.81E-01
PB06-02517-T		SR24-20	HPT-SP11-SL3-T	<MDA	<MDA					< 1.68E-01		< 7.85E-01
PB06-02517-B		SR24-20	HPT-SP11-SL3-B	**4.50E-01**	<MDA					< 1.18E-01		< 6.82E-01
PB06-02518-T		SR24-20	HPT-SP11-SL4-T	<MDA	<MDA					< 2.36E-01		< 7.57E-01
PB06-02518-B		SR24-20	HPT-SP11-SL4-B	<MDA	<MDA					< 2.86E-01		< 7.63E-01
Qualitative Only	10		**Average Concentration**	**2.01E+03**	**1.84E+02**	**5.03E+01**	**5.21E+01**	**9.76E+03**		**3.92E+01**	**9.05E-01**	**5.43E-01**
			Average Cs-137 MDA	**1.38E-01**								
			Average Co-60 MDA		**1.93E-01**							
			Average Cs:Co Ratio			**50.3**						

Hot Laboratory - All Other Areas

Sample Log #	Qualitative Only	Sample #	Location	Cs-137 pCi/g	Co-60 pCi/g	Cs:Co	H-3 pCi/g	Sr-90 pCi/g	I-129 pCi/g	Eu-154 pCi/g	U-233/234 pCi/g	U-235/236 pCi/g
CS022004-008		L0511-01	Loc #11	**8.86E+02**	**1.26E+00**	**703.17**	< 5.2E+00	**1.10E+01**			**3.60E-01**	< 8.90E-02
CS022004-016		L0512-01	Loc #12	**1.06E+02**	**4.02E+00**	**26.37**	< 5.2E+00	**1.01E+02**			**1.04E+00**	< 3.80E-02
CS022004-020		L0513-01	Loc #13	**1.60E+03**	**1.88E-01**	**8510.64**	**6.17E+00**	**1.81E+02**			**9.60E-01**	**5.10E-02**
CS022004-012		L0514-01	Loc #14	**7.27E+02**	**2.17E+00**	**335.02**	< 5.20E+00	**3.09E+01**			**8.10E-01**	< 7.40E-02
Qualitative Only	0		**Average Concentration**	**8.30E+02**	**1.91E+00**	**2.39E+03**	**6.17E+00**	**8.10E+01**			**7.93E-01**	**5.10E-02**
			Average Cs-137 MDA	**4.75E-01**								
			Average Co-60 MDA		**1.48E-01**							
			Average Cs:Co Ratio			**2393.8**						

SEB - Cold Pipe Tunnel

Sample Log #	Qualitative Only	Sample #	Location	Cs-137 pCi/g	Co-60 pCi/g	Cs:Co	H-3 pCi/g	Sr-90 pCi/g	I-129 pCi/g	Eu-154 pCi/g	U-233/234 pCi/g	U-235/236 pCi/g
Qualitative Only	0		Average Concentration									
			Average Cs-137 MDA									
			Average Co-60 MDA									
			Average Cs:Co Ratio									

SEB - Non Cold Pipe Tunnel Areas

Sample Log #	Qualitative Only	Sample #	Location	Cs-137 pCi/g	Co-60 pCi/g	Cs:Co	H-3 pCi/g	Sr-90 pCi/g	I-129 pCi/g	Eu-154 pCi/g	U-233/234 pCi/g	U-235/236 pCi/g
Qualitative Only	0		**Average Concentration**									
			Average Cs-137 MDA									
			Average Co-60 MDA									
			Average Cs:Co Ratio									

Sample Log #	Qualitative Only	Sample #	Location	Cs-137 pCi/g	Co-60 pCi/g	Cs:Co	H-3 pCi/g	Sr-90 pCi/g	I-129 pCi/g	Eu-154 pCi/g	U-233/234 pCi/g	U-235/236 pCi/g
CS050630-036		**L05 16a1P1**	**Loc #16**	**1.29E+04**	**3.22E+01**	**400.62**	**4.21E+01**	**9.52E+02**				
CS022304-013		**L0510-1**	**Loc #10**	**2.95E+03**	< 1.10E-01		< 5.30E+00	**1.12E+00**			**5.50E-01**	**5.30E-02**
PB06-02227-T		SR24-1	WHB-SP-1-SL1-T	**1.85E+04**	**2.31E+01**	**800.87**	**2.31E+01**	**1.47E+00**		< 6.40E+00		< 2.36E+01
PB06-02227-B		SR24-1	WHB-SP-1-SL1-B	**1.31E+04**	**1.57E+01**	**834.39**	**1.57E+01**	**1.03E+00**		< 5.43E+00		< 1.34E+01
PB06-02228-T		SR24-1	WHB-SP-1-SL2-T	**1.42E+03**	<MDA					< 2.14E+00		< 5.29E+00
PB06-02228-B		SR24-1	WHB-SP-1-SL2-B	**1.12E+03**	<MDA					< 1.59E+00		< 7.22E+00
PB06-02231-T		SR24-1	WHB-SP-1-SL3-T	**4.18E+01**	<MDA					< 4.25E-01		< 1.31E+00
PB06-02231-B		SR24-1	WHB-SP-1-SL3-B	**3.10E+01**	<MDA					< 3.45E-01		< 6.28E-01
PB06-02232-T		SR24-1	WHB-SP-1-SL4-T	**1.15E+00**	<MDA					< 1.85E-01		< 8.84E-01
PB06-02232-B		SR24-1	WHB-SP-1-SL4-B	**1.15E+00**	<MDA					< 1.57E-01		< 8.10E-01
PB06-02233-T		SR24-1	WHB-SP-1-SL5-T	**5.74E-01**	<MDA					< 6.22E-01		< 5.01E-01
PB06-02233-B		SR24-1	WHB-SP-1-SL5-B	**5.77E-01**	<MDA					< 1.80E-01		< 6.45E-01
PB06-02242-T		SR24-2	WHB-SP-2-SL1-T	**1.25E+04**	**2.50E+01**	**500.00**	**2.50E+01**	**1.55E+00**		< 4.85E+00		< 1.67E+01
PB06-02242-B		SR24-2	WHB-SP-2-SL1-B	**8.66E+03**	**1.63E+01**	**531.29**	**1.63E+01**	**1.06E+00**		< 4.69E+00		< 2.88E+01
PB06-02243-T		SR24-2	WHB-SP-2-SL2-T	**4.02E+02**	<MDA					< 9.23E-01		< 3.70E+00
PB06-02243-B		SR24-2	WHB-SP-2-SL2-B	**3.32E+02**	<MDA					< 1.03E+00		< 3.53E+00
PB06-02244-T		SR24-2	WHB-SP-2-SL3-T	**4.78E+01**	<MDA					< 2.79E-01		< 1.01E+00
PB06-02244-B		SR24-2	WHB-SP-2-SL3-B	**3.98E+01**	<MDA					< 2.45E-01		< 8.79E-01
		STL Analysis	**WHB-SP-2-SL3-T&B**	**6.36E+01**	< 1.60E-01		**7.10E-01**	< 6.1E-01	< 2.0E+00	< 1.1E+00	**7.00E-01**	< 4.0E-02
PB06-02245-T		SR24-2	WHB-SP-2-SL4-T	**3.57E+00**	<MDA					< 2.30E-01		< 9.49E-01
PB06-02245-B		SR24-2	WHB-SP-2-SL4-B	**3.04E+00**	<MDA					< 3.18E-01		< 9.06E-01
PB06-02246-T		SR24-2	WHB-SP-2-SL5-T	**5.40E-01**	<MDA					< 1.15E-01		< 9.74E-01
PB06-02246-B		SR24-2	WHB-SP-2-SL5-B	**5.53E-01**	<MDA					<1.89E-01		< 6.46E-01
PB06-02247-T		SR24-2	WHB-SP-2-SL6-T	<MDA	<MDA					< 2.44e-01		< 7.27E-01
PB06-02700-T		SR29-1	WB-15 IM1 SL1-T	**1.50E+03**	<MDA					<1.13E+00		< 5.12E+00
PB06-02700-B		SR29-1	WB-15 IM1 SL1-B	**6.95E+02**	<MDA					< 9.96E-01		< 1.79E+00
PB06-02702-T		SR29-1	WB-15 IM1 SL2-T	**2.37E-01**	<MDA					< 1.87E-01		< 4.35E-01
PB06-02702-B		SR29-1	WB-15 IM1 SL2-B	<MDA	<MDA					< 1.16e-01		< 4.81e-01
PB06-02704-T		SR29-2	WB-15 IM14 SL1-T	**7.45E+01**	<MDA					< 9.20E-01		< 7.97E-01
PB06-02704-B		SR29-2	WB-15 IM14 SL1-B	**3.43E+01**	**3.88E-01**	**88.47**				< 3.57E-01		< 1.12E+00
PB06-02705-T		SR29-2	WB-15 IM14 SL2-T	**2.32E-01**	<MDA					< 2.22E-01		< 5.78E-01
PB06-02705-B		SR29-2	WB-15 IM14 SL2-B	**2.77E-01**	<MDA					< 1.46E-01		< 70.6E-01
PB06-02706-T		SR29-3	WB 0 IM1 SL1-T	**8.01E+02**	**3.00E+00**	**266.73**				< 1.06E+00		< 3.78E+00
PB06-02706-B		SR29-3	WB 0 IM1 SL1-B	**6.37E+02**	**2.64E+00**	**240.73**				< 6.12E-01		< 3.91E+00
PB06-02707-T		SR29-3	WB 0 IM1 SL2-T	**4.55E+02**	**1.54E+01**	**29.52**				< 8.66E-01		< 2.78E+00
PB06-02707-B		SR29-3	WB 0 IM1 SL2-B	**4.53E+02**	**1.66E+00**	**272.52**				< 8.38E-01		< 3.07e+00
PB06-02744-T		SR29-3	WB 0 IM1 SL3-T	**8.83E+02**	**1.85E+00**	**475.95**				< 1.12E+00		< 5.71e+00
PB06-02744-B		SR29-3	WB 0 IM1 SL3-B	**9.03E+02**	**1.72E+00**	**525.11**				< 1.31E+00		< 4.55E+00
PB06-02743-T		SR29-3	WB 0 IM1 SL4-T	**9.39E+02**	**1.97E+00**	**477.08**				< 1.25E+00		< 2.97E+00
PB06-02743-B		SR29-3	WB 0 IM1 SL4-B	**9.29E+02**	**1.94E+00**	**480.00**				< 9.20E-01		< 4.65E+00
PB06-02745-T		SR29-3	WB 0 IM1 SL5-T	**2.39E+02**	<MDA					< 4.95E-01		< 2.44e+00
PB06-02745-B		SR29-3	WB 0 IM1 SL5-B	**1.95E+02**	<MDA					< 2.96e-01		< 1.82e+00
PB06-02746-T		SR29-3	WB 0 IM1 SL6-T	**9.98E+00**	<MDA					< 2.43e-01		< 1.09E+00
PB06-02746-B		SR29-3	WB 0 IM1 SL6-B	**5.93E+00**	<MDA					< 1.91E-01		< 7.76E-01
PB06-02708-T		SR29-4	WB 0 IM2 SL1-T	**8.81E+01**	**1.38E+00**	**63.97**				< 4.34E-01		< 1.31E+00

Waste Handling Building - All Areas

Sample Log #	Qualitative Only	Sample #	Location	Cs-137 pCi/g	Co-60 pCi/g	Cs:Co	H-3 pCi/g	Sr-90 pCi/g	I-129 pCi/g	Eu-154 pCi/g	U-233/234 pCi/g	U-235/236 pCi/g
PB06-02708-B		SR29-4	WB 0 IM2 SL1-B	**3.85E+01**	<MDA					< 2.42 E-01		< 1.20E+00
PB06-02709-T		SR29-4	WB 0 IM2 SL2-T	**1.94E-01**	<MDA					< 1.27E-01		< 6.46E-01
PB06-02709-B		SR29-4	WB 0 IM2 SL2-B	<MDA	<MDA					< 2.14E-01		< 5.10E-01
Qualitative Only	0		**Average Concentration**	**1.80E+03**	**9.62E+00**	**3.99E+02**	**2.05E+01**	**1.60E+02**			**6.25E-01**	**5.30E-02**
			Average Cs-137 MDA	**9.39E-02**								
			Average Co-60 MDA		**1.49E-01**							
			Average Cs:Co Ratio			**399.1**						

Primary Pump House - All Areas

Sample Log #	Qualitative Only	Sample #	Location	Cs-137 pCi/g	Co-60 pCi/g	Cs:Co	H-3 pCi/g	Sr-90 pCi/g	I-129 pCi/g	Eu-154 pCi/g	U-233/234 pCi/g	U-235/236 pCi/g
PB06-02379-T		SR24-14	PPH-R3-SP1-SL1-T	**8.24E+00**	**3.92E+00**	**2.10**				< 3.80E-01		< 9.72E-01
PB06-02379-B		SR24-14	PPH-R3-SP1-SL1-B	**5.62E+00**	**2.09E+00**	**2.69**				**9.99E-01**		< 5.62E-01
PB06-02380-T		SR24-14	PPH-R3-SP1-SL2-T	<MDA	<MDA					< 1.61E-01		< 5.29E-01
PB06-02380-B		SR24-14	PPH-R3-SP1-SL2-B	**3.21E-01**	<MDA					< 1.37E-01		< 5.29E-01
PB06-02382-T		SR24-14	PPH-R3-SP1-SL3-T	<MDA	<MDA					< 2.54E-01		< 7.53E-01
PB06-02382-B		SR24-14	PPH-R3-SP1-SL3-B	<MDA	<MDA					< 1.58E-01		< 7.53E-01
PB06-02388-T		SR24-15	PPH-R4-SP1-SL1-T	**2.53E+01**	**6.90E+00**	**3.67**				< 5.57E-01		< 1.62E+00
PB06-02388-B		SR24-15	PPH-R4-SP1-SL1-B	**1.70E+01**	**4.66E+00**	**3.65**				< 2.75E-01		< 6.30E-01
PB06-02389-T		SR24-15	PPH-R4-SP1-SL2-T	**2.70E-01**	<MDA					< 1.05E-01		< 6.06E-01
PB06-02389-B		SR24-15	PPH-R4-SP1-SL2-B	**2.83E-01**	<MDA					< 2.43E-01		< 5.17E-01
PB06-02390-T		SR24-15	PPH-R4-SP1-SL3-T	<MDA	<MDA					< 2.16E-01		< 7.99E-01
PB06-02390-B		SR24-15	PPH-R4-SP1-SL3-B	<MDA	<MDA					< 1.85E-01		< 6.56E-01
PB06-02229-T		SR24-16	PPH-R4-SP2-SL1-T	**1.95E+00**	**1.77E+00**	**1.10**				**8.35E-01**		< 9.28E-01
PB06-02229-B		SR24-16	PPH-R4-SP2-SL1-B	**1.12E+00**	**1.19E+00**	**0.94**				**4.63E-01**		< 9.57E-01
STL Analysis			**PPH-R4-SP2-SL1-T&B**	**1.41E+00**	**1.73E+00**	**0.82**	**8.20E+00**	< 3.8E-01	**5.60E+00**	< 1.5E+00	**9.40E-01**	**4.70E-02**
PB06-02230-T		SR24-16	PPH-R4-SP2-SL2-T	<MDA	<MDA					< 2.17E-01		< 1.05E+00
PB06-02230-B		SR24-16	PPH-R4-SP2-SL2-B	<MDA	<MDA					< 2.07E-01		< 8.22E-01
PB06-02369-T		SR24-13	PPH-R5-SP1-SL1-T	**4.53E+01**	**3.25E+01**	**1.39**				< 3.91E-01		1.30E+00
PB06-02369-B		SR24-13	PPH-R5-SP1-SL1-B	**1.99E+01**	**1.70E+01**	**1.17**				< 4.04E-01		< 1.11E+00
PB06-02370-T		SR24-13	PPH-R5-SP1-SL2-T	<MDA	<MDA					< 1.58E-01		< 9.93E-01
PB06-02370-B		SR24-13	PPH-R5-SP1-SL2-B	<MDA	<MDA					< 2.82E-01		< 4.74E-01
PB06-02354-T		SR24-12	PPH-R6-SP1-SL1-T	**1.08E+01**	**1.22E+00**	**8.85**				< 3.49E-01		**1.17E+00**
PB06-02354-B		SR24-12	PPH-R6-SP1-SL1-B	**5.51E+00**	**6.36E-01**	**8.66**				< 1.57E-01		< 1.01E+00
PB06-02355-T		SR24-12	PPH-R6-SP1-SL2-T	<MDA	<MDA					< 1.88E-01		< 7.46E-01
PB06-02355-B		SR24-12	PPH-R6-SP1-SL2-B	<MDA	<MDA					< 2.91E-01		< 7.85E-01
STL Analysis			**PPH-R6-SP1-SL10-T&B**	< 1.6E-01	< 1.70E-01		**4.56E+00**	< 6.50E-01	< 1.20E+00	< 1.30E+00	**7.00E-01**	**8.00E-02**
PB06-02345-T		SR24-11	PPH-R8-SP1-SL1-T	<MDA	<MDA					< 2.74E-01		< 8.32E-01
PB06-02345-B		SR24-11	PPH-R8-SP1-SL1-B	<MDA	<MDA					< 2.40E-01		< 8.60E-01
Qualitative Only			**Average Concentration**	**1.02E+01**	**6.69E+00**							
			Average Cs-137 MDA	**1.23E-01**								
			Average Co-60 MDA		**1.80E-01**							
			Average Cs:Co Ratio			**3.19**						

Sample Log #	Qualitative Only	Sample #	Location	Cs-137 pCi/g	Co-60 pCi/g	Cs:Co	H-3 pCi/g	Sr-90 pCi/g	I-129 pCi/g	Eu-154 pCi/g	U-233/234 pCi/g	U-235/236 pCi/g
CS030404-002		L0521-1	Loc #21	< 1.0E-01	< 0.13						**6.00E-01**	
Qualitative Only	0		**Average Concentration**								**6.00E-01**	
			Average Cs-137 MDA	**1.00E-01**								
			Average Co-60 MDA		**1.30E-01**							
			Average Cs:Co Ratio			**N/A**						

ROLB - Other Areas

Sample Log #	Qualitative Only	Sample #	Location	Cs-137 pCi/g	Co-60 pCi/g	Cs:Co	H-3 pCi/g	Sr-90 pCi/g	I-129 pCi/g	Eu-154 pCi/g	U-233/234 pCi/g	U-235/236 pCi/g
Qualitative Only	0		Average Concentration									
			Average Cs-137 MDA									
			Average Co-60 MDA									
			Average Cs:Co Ratio									

Fan House - All Areas

Sample Log #	Qualitative Only	Sample #	Location	Cs-137 pCi/g	Co-60 pCi/g	Cs:Co	H-3 pCi/g	Sr-90 pCi/g	I-129 pCi/g	Eu-154 pCi/g	U-233/234 pCi/g	U-235/236 pCi/g
CS022704-001		**L0517-1**	**Loc #17**	**3.85E-01**	< 1.10E-01		**5.31E+00**				**1.14E+00**	< 1.10E-01
PB06-02747-T		SR28-1	IM-1 SL1-T	**1.13E+00**	<MDA					< 1.04E-01		< 6.68E-01
PB06-02747-B		SR28-1	IM-1 SL1-B	**8.11E-01**	<MDA					< 1.61E-01		< 7.49E-01
PB06-02748-T		SR28-1	IM-1 SL2-T	<MDA	<MDA					< 2.48E-01		< 6.55E-01
PB06-02748-B		SR28-1	IM-1 SL2-B	<MDA	<MDA					< 1.54E-01		< 8.02E-01
PB06-02752-T		SR28-2	IM-2 SL1-T	**3.12E+00**	<MDA					< 2.51E-01		< 7.90E-01
PB06-02752-B		SR28-2	IM-2 SL1-B	**2.14E+00**	<MDA					< 2.33E-01		< 6.90E-01
PB06-02753-T		SR28-2	IM-2 SL2-T	<MDA	<MDA					< 1.63E-01		< 1.18E+00
PB06-02753-B		SR28-2	IM-2 SL2-B	<MDA	<MDA					< 1.05E-01		< 8.04e-01
PB06-02756-T		SR28-4	IM-1-4 SL1-T	**3.52E+01**	**4.50E+00**	**7.82**				< 2.80E-01		< 1.71E+00
PB06-02756-B		SR28-4	IM-1-4 SL1-B	**2.00E+01**	**2.57E+00**	**7.77**				< 3.02E-01		< 1.36E+00
PB06-02757-T		SR28-4	IM-1-4 SL2-T	<MDA	<MDA					< 1.51E-01		< 5.88E-01
PB06-02757-B		SR28-4	IM-1-4 SL2-B	<MDA	<MDA					< 1.67E-01		< 5.21E-01
Qualitative Only			**Average Concentration**	**8.97E+00**	**3.54E+00**	**7.79E+00**	**5.31E+00**				**1.14E+00**	
			Average Cs-137 MDA	**1.30E-01**								
			Average Co-60 MDA		**1.30E-01**							
			Average Cs:Co Ratio			**7.80**						

Hot Retention Area

Sample Log #	Qualitative Only	Sample #	Location	Cs-137 pCi/g	Co-60 pCi/g	Cs:Co	H-3 pCi/g	Sr-90 pCi/g	I-129 pCi/g	Eu-154 pCi/g	U-233/234 pCi/g	U-235/236 pCi/g
PB06-02758-T		SR28-5	IM-2-5 SL1-T	**1.19E+01**	<MDA					< 2.98E-01		< 8.43E-01
PB06-02758-B		SR28-5	IM-2-5 SL1-B	**6.42E+00**	<MDA					< 2.35E-01		< 7.31E-01
PB06-02759-T		SR28-5	IM-2-5 SL2-T	**2.34E-01**	<MDA					< 2.45E-01		< 5.35E-01
PB06-02759-B		SR28-5	IM-2-5 SL2-B	<MDA	<MDA					< 4.46E-01		< 7.09E-01
Qualitative Only	0		**Average Concentration**	**6.17E+00**								
			Average Cs-137 MDA	**1.17E-01**								
			Average Co-60 MDA		**1.50E-01**							
			Average Cs:Co Ratio			**N/A**						

APPENDIX D

Concrete Core 10CFR61 Data
and
DCGL Calculations

(18 pages)

Concrete Core 10CFR61 Data and DCGL Calculations

The following is a general description of the calculations that are performed throughout Appendix D. They are also applicable to Appendix F. This description includes the evaluation of MDA values, mean distributions, and application of MARSSIM's 10% rule.

In order to be consistent with past practices at the Plum Brook site, PBRF-TBD-04-006, Approach and Basis for Development of Site-Specific Derived Concentration Guideline Levels (DCGL), was used as a template for the calculations in this Appendix. TBD-04-006 was based solely on data obtained from Survey Package C9000 101I1, DCGL Development – Radionuclide Distribution. Samples in that survey package were taken from the Primary Pump House, Reactor Building and Hot Laboratory.

Since the writing of TBD04-006, additional samples were collected from the Waste Handling Building, Fan House, ROLB, SEB, Hot Retention Area, and Cold Pipe Tunnel. Analyses of these samples, in conjunction with the TBD-04-006 data, revealed enough variation that 19 different DCGLs were chosen for site structures (see Table 5-3 and Appendix L).

An important distinction has to be drawn between the remainder of the writeup below and the calculations performed in the addenda to this Appendix. First, all data used in the calculations in the addenda were decay-corrected to 2/1/07: the projected start date for FSS at the PBRF. With respect to the addenda in this Appendix and Appendix F, blank spaces where data should be are due to the decay correction reducing the original data to less than MDA. Secondly, **the writeup below is based soley on characterization package C9000 101I1. This is the only survey package where all the concrete cores were analyzed for this large suite of radionuclides. Cores from all other survey packages and SRs were analyzed to a series of radionuclides culled from the original set in C9000 101I1.**

1. Evaluation of Sample Results and Elimination of Insignificant Radionuclides

1.1 Minimum Detectable Activity (MDA)

In both sample types (concrete core samples and smear samples), before the nuclide distribution could be evaluated, the analysis results reported as less than MDA were considered. It was expected that several of the nuclides would be reported as less than MDA since these nuclides have a low probability of being present. Two approaches were considered for evaluating MDA results: 1) include the MDA values as representing actual concentrations and 2) remove the less than MDA nuclides from the mixture. Removing the nuclides was considered more appropriate and representative of actual site conditions because the non-detected nuclides are believed either to not be present or to be present at negligible concentrations well below the MDA value. A nuclide was included in the "discarded" category if it was not detected at concentrations above MDA in any individual sample in the respective smear, core and/or soil sample population.

If a nuclide was detected above MDA in one or more samples in a given population, then the nuclide was retained and included in the mixture. For those radionuclides that were reported as positive in only a portion of the sample population, the MDA values were combined with the positive results to determine the mixture fraction. The MDA values were used in this case because it was conservatively assumed that if a radionuclide was

positive in an individual sample then it could also be present in the remaining samples of the population. Using the MDA also has the effect of reducing the probability that a single positive radionuclide result in a given sample population will skew the overall percentage relationship between the isotopes when those percentages are normalized.

The remaining nuclides were then evaluated for the presence of naturally occurring isotopes. Naturally occurring isotopes were ignored in subsequent calculations.

1.2 Mean Distribution Evaluation

Following the analysis of all nuclides identified at activities greater than their respective MDAs, an assessment was performed to ascertain the activity of radionuclides that could be attributed to background. K-40, Pb-212, Pb-214, Bi-214, Th-228, Th-230, Th-232, and Ra-226 were detected at concentrations commensurate with levels normally found in background. Subsequently, these isotopes were removed from consideration in all the sample populations.

The radionuclide distribution percentage for each remaining nuclide was then calculated by dividing the concentration for each nuclide by the sum of all remaining radionuclide concentrations in the sample population expressing the abundance of the specific nuclide compared against the total sample activity. The mean nuclide distribution was then calculated by taking the average of the individual core nuclide fractions in each sample population.

The concrete core samples are believed to be more representative of the mixture that will remain after license termination than the smear samples because the majority of loose contamination will be removed during remediation. The majority of the potentially contaminated surfaces that will remain following structural remediation will be concrete.

As previously stated, radionuclides that were not present in concentrations greater than their respective MDA values in any of the concrete core samples were removed from the mixture. These isotopes included Sb-125, Eu-152, Eu-154, Eu-155, Nb-95, I-129, Np-237, Ni-59, Tc-99 and Cm-243/244. The concrete core sample mean nuclide distribution in Table D-1 below contains all remaining radionuclides that were above MDA in one or more core samples.

Table D-1

Concrete Core Radionuclide Distribution

Radionuclide	Hot Laboratory	Balance of Plant	ROLB
Am-241	0.41%	0.29%	ND
C-14	1.97%	ND	ND
Co-60	0.65%	1.23%	ND
Cm-245/246	0.07%	0.19%	ND
Cs-137	78.04%	34.79%	ND
Fe-55	ND	18.93%	ND
H-3	0.83%	8.46%	ND
Ni-63	3.09%	19.71%	ND
Pu-238	0.06%	0.07%	ND
Pu-239/240	0.59%	0.06%	ND
Pu-241	0.81%	2.49%	ND
Sr-90	13.23%	11.74%	ND
U-233/234	0.14%	0.98%	ND
U-235/236	0.01%	0.09%	ND
U-238	0.11%	0.97%	ND

ND - Radionuclide Not Detected

The smear sample mean nuclide distribution in Table D-2 below contains all remaining radionuclides that were above MDA in one or more smear samples.

Table D-2

Smear Radionuclide Distribution

Radionuclide	Hot Laboratory	Balance of Plant	ROLB
Ag-108m	ND	0.06%	ND
Am-241	0.19%	0.13%	0.02%
C-14	0.20%	0.58%	0.26%
Co-57	0.03%	ND	ND
Co-60	2.38%	5.22%	0.98%
Cm-242	ND	ND	0.01%
Cm243/244	0.13%	0.02%	0.01%
Cm-245/246	ND	ND	ND
Cs-134	0.03%	ND	ND
Cs-137	43.69%	7.46%	16.62%
Eu-152	ND	0.13%	ND
Eu-154	0.08%	0.15%	ND
Eu-155	ND	ND	0.12%
Fe-55	2.75%	1.98%	ND
H-3	8.29%	66.53%	38.87%
I-129	0.02%	0.06%	2.66%
Na-22	0.03%	ND	ND
Nb-94	0.12%	0.03%	0.05%
Ni-59	0.33%	0.45%	1.68%
Ni-63	13.39%	13.66%	0.23%
Np-237	ND	ND	0.05%
Pu-238	0.11%	0.04%	ND
Pu-239/240	0.13%	0.02%	0.02%
Pu-241	1.19%	0.32%	0.45%
Pu-242	0.06%	ND	ND
Sb-125	ND	ND	0.23%
Sr-89	0.81%	0.03%	ND
Sr-90	25.43%	3.01%	4.03%
Tc-99	0.58%	0.12%	0.30%
U-233/234	0.03%	0.01%	31.87%
U-235/236	ND	ND	1.12%
U-238	ND	ND	0.42%

ND - Radionuclide Not Detected

The nuclide distribution for the Balance of Plant (BOP) smear population indicates a nuclide distribution for H-3 of 66.53%. It is unlikely that the actual contribution of tritium to the nuclide distribution is of this magnitude. The H-3 contribution is skewed by the inherent inaccuracy of the smear sample approach for material sampling as a means to quantify H-3 activity. The core sample data analysis provides a more realistic indication of H-3 concentrations as the core bore material sampling approach results in a volumetric

sample medium more appropriate for the quantification of H-3. However, as the presence of H-3 has very little effect on the calculation of the adjusted gross DCGL, the distribution of H-3 in the smear populations was not adjusted.

1.3 Application of the 10% Rule

The final step in determining the radionuclide distribution for each of the mixtures involved the elimination of radionuclides that have insignificant dose consequences. NUREG-1757, Vol. 2, Section 3.3, states that nuclides with a combined dose of less than 10% of the 25 mrem/yr unrestricted use criteria can be eliminated from further consideration. To determine which nuclides can be eliminated by the "10%" rule, a RESRAD or RESRAD-Build run was performed using the mean nuclide distribution derived for each sample population. The concentration entered for each radionuclide was the fraction listed in Table D-1 (using only those samples prefaced with C9000 101I1). The RESRAD/RESRAD-Build runs used to perform the "10%" rule calculations are provided in the FSSP and are available for review, as needed.

For the mean distribution derived from the smear samples, RESRAD-Build and RESRAD evaluations were performed for the Building Reuse and Subsurface Structure scenarios, respectively. Concrete K_d data were not available in the literature for three radionuclides with very low nuclide fractions; i.e. Na-22, Np-237, and Sb-125 at 0.03%, 0.00%, and 0.23%, respectively.

The RESRAD default K_d was used in the Subsurface Structure analysis for these radionuclides. Two radionuclides, Sr-89 and Cm-242, were reported as above MDA in one or more smear samples with mean fractions of 0.81% and 0.00%, respectively. RESRAD and RESRAD-Build do not list these radionuclides. Because of their very low fractions these nuclides were disregarded. In addition, Sr-89 is suspected to be a false positive because the half life is very short relative to the time since plant shutdown.

The radionuclides that, in aggregate, were less than 10% of the total dose for both of the scenarios were eliminated. The mixtures were readjusted to 100% based on the relative fractions of the radionuclides remaining after the insignificant radionuclides were removed.

The results of all RESRAD-Build and RESRAD runs (i.e., BOP and Hot Lab mixtures in the Subsurface Structure and Building Reuse scenarios) indicate that for the core sample population, the aggregate dose from four radionuclides, i.e., Cs-137, Sr-90, Co-60 and H-3, resulted in 90% or more of the 25 mrem/yr limit in all BOP cases and the aggregate dose from three radionuclides, i.e., Cs-137, Sr-90 and Co-60 resulted in 92% or more of the 25 mrem/yr limit in all Hot Lab cases.

The results of all RESRAD-Build and RESRAD runs (i.e., BOP, ROLB, and Hot Lab mixtures in the Subsurface Structure and Building Reuse scenarios) indicate that for the smear sample population, the aggregate dose from six radionuclides, i.e., Cs-137, Sr-90, Co-60, H-3, Eu-154 and I-129 resulted in 94% or more of the 25 mrem/yr limit in all BOP cases, the aggregate dose from five radionuclides, i.e., Cs-137, Sr-90, Co-60, H-3, and Eu-154 resulted in 93% or more of the 25 mrem/yr limit in all Hot Lab cases and the aggregate dose from seven radionuclides, i.e., Cs-137, Sr-90, Co-60, H-3, I-129, U-234 and U-235 resulted in 93% or more of the 25 mrem/yr limit in all ROLB cases.

The lowest total dose from the remaining radionuclides was 90% of the 25 mrem/yr criterion, which means that radionuclides potentially representing a dose of 2.5 mrem/yr were eliminated. To ensure the 25 mrem/yr criterion is met, any structural survey unit where the mean of FSS results indicates that the dose may be greater than 22.5 mrem/yr dose (including dose from embedded pipe in the given survey unit, if applicable) shall be reviewed for compliance with the unrestricted use limit. The final normalized radionuclide distributions for structural surfaces are provided in Tables D-3 and D-4 below.

The current decommissioning strategy for PBRF calls for the removal of activated portions of the concrete bioshield and disposition of the activated concrete as radioactive waste. Therefore, the activated concrete was not evaluated.

Table D-3

Final Concrete Core Radionuclide Distribution

Radionuclide	Hot Laboratory	Balance of Plant
Co-60	0.79%	7.84%
Cs-137	83.45%	41.45%
H-3	ND	35.35%
Sr-90	15.77%	15.36%

ND - Radionuclide Not Detected

Table D-4

Final Smear Radionuclide Distribution

Radionuclide	Hot Laboratory	Balance of Plant	ROLB
Co-60	3.41%	6.72%	1.01%
Cs-137	53.11%	7.74%	17.29%
Eu-154	0.12%	0.17%	ND
H-3	10.84%	82.15%	39.71%
I-129	ND	0.08%	2.82%
Sr-90	32.52%	3.13%	4.17%
U-233/234	ND	ND	33.82%
U-235/236	ND	ND	1.19%

ND - Radionuclide Not Detected

4

Containment, -25 ft, Area 17
Core Location #9
C9000 101I1 FL1C3 L0509-1 (CS022304-009)
C9000 101I1 FL1C1 L0509-2 (CS022304-011)

	Result pCi/gm	MDC pCi/gm	Used pCi/gm	Disribution %
H-3	9.51E+00	5.10E+00	9.51E+00	88.20%
Cs-137	5.72E-01	8.00E-02	5.72E-01	5.31%
U-234	7.00E-01	4.00E-02	7.00E-01	6.50%
	Cs/Co ratio=	indeterminate	1.08E+01	100%

Reactor Bldg., -25'0" El., Quad A (slant core)
Core Location #1
C9000 101I3 WL1C1 L05 1-2P4 (CS050630-058)

	Result pCi/gm	MDC pCi/gm	Used pCi/gm	Disribution %
Co-60	4.76E+00	1.73E-01	4.76E+00	89.35%
Cs-137	5.68E-01	1.76E-01	5.68E-01	10.65%
	Cs/Co ratio=	1.19E-01	5.33E+00	100%

Reactor Bldg., -25'0" El., Quad A (slant core)
Core Location #1
C9000 101I3 WL1C1 L05 1-2P5 (CS050630-059)

	Result pCi/gm	MDC pCi/gm	Used pCi/gm	Disribution %
Co-60	8.54E+00	2.07E-01	8.54E+00	81.35%
Cs-137	1.96E+00	1.98E-01	1.96E+00	18.65%
	Cs/Co ratio=	2.29E-01	1.05E+01	100%

Reactor Bldg., -25'0" El., Quad A (slant core)
Core Location #1
C9000 101I3 WL1C1 L05 1-3 (CS050630-057)

	Result pCi/gm	MDC pCi/gm	Used pCi/gm	Disribution %
Co-60	6.51E+00	1.83E-01	6.51E+00	54.27%
Cs-137	5.49E+00	1.59E-01	5.49E+00	45.73%
	Cs/Co ratio=	8.43E-01	1.20E+01	100%

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Average of three Location #1 analyses
Reactor Bldg., -25'0" El., Quad A (slant core)
Core Location #1 (cold joint floor)

	MEAN (pCi/gm)	MEAN (%)	STD DEV
Co-60	6.60E+00	74.99%	18.38%
Cs-137	2.67E+00	25.01%	18.38%
Cs/Co ratio=	4.04E-01	100.00%	

All three of these cores cut through the cold joint made at the interface of the Quad A wall and the floor on the -25'0" elevation. That is, all three pucks have been cut from the same core in succession. Since all three are co-located, it is appropriate to average the data to obtain the radionuclide concentration for that spot on the floor.

Reactor Bldg., -25'0" El., Quad C (slant core)
Core Location #2
C9000 101I3 WL1C1 L05 2-1P1 (CS050630-061)

	Result pCi/gm	MDC pCi/gm	Used pCi/gm	Disribution %
Co-60		1.37E-01	**1.37E-01**	21.72%
Cs-137	4.94E-01	9.83E-02	4.94E-01	78.28%
	Cs/Co ratio=	indeterminate	6.31E-01	100%

Reactor Bldg., -25'0" El., Quad C (slant core)
Core Location #2
C9000 101I3 WL1C1 L05 2-1P2 (CS050630-062)

	Result pCi/gm	MDC pCi/gm	Used pCi/gm	Disribution %
Co-60		2.90E-01	**2.90E-01**	53.82%
Cs-137	2.49E-01	1.95E-01	2.49E-01	46.18%
	Cs/Co ratio=	indeterminate	5.39E-01	100%

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Average of two Location #2 analyses
Reactor Bldg., -25'0" El., Quad C (slant core)
Core Location #2 (wall)

	MEAN (pCi/gm)	MEAN (%)	STD DEV
Co-60	2.14E-01	37.77%	22.70%
Cs-137	3.71E-01	62.23%	22.70%
Cs/Co ratio=	indeterminate	100.00%	

Both of these cores cut through the wall of Quad C just above the -25'0" elevation. That is, both pucks have been cut from the same core in succession. Since both are co-located, it is appropriate to average the data to obtain the radionuclide concentration for spot on the wall.

Reactor Bldg., -25'0" El., Quad C (slant core)
Core Location #2
C9000 101I3 WL1C1 L05 2-3 (CS050630-060)

	Result pCi/gm	MDC pCi/gm	Used pCi/gm	Disribution %
Co-60	3.54E-01	9.25E-02	3.54E-01	10.79%
Cs-137	2.93E+00	7.94E-02	2.93E+00	89.21%
	Cs/Co ratio=	8.27E+00	3.29E+00	100%

Reactor Bldg., -25'0" El., Quad C (slant core)
Core Location #2
C9000 101I3 WL1C1 L05 2-4P1 (CS050630-063)

	Result pCi/gm	MDC pCi/gm	Used pCi/gm	Disribution %
Co-60		1.62E-01	**1.62E-01**	45.90%
Cs-137	1.91E-01	1.55E-01	1.91E-01	54.10%
	Cs/Co ratio=	indeterminate	3.53E-01	100%

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Average of two Location #2 analyses
Reactor Bldg., -25'0" El., Quad C (slant core)
Core Location #2 (cold joint floor)

	MEAN (pCi/gm)	MEAN (%)	STD DEV
Co-60	2.58E-01	28.34%	24.83%
Cs-137	1.56E+00	71.66%	24.83%
Cs/Co ratio=	8.27E+00	100.00%	

Both of these cores cut through the cold joint made at the interface of the Quad C wall and the floor on the -25'0" elevation. That is, both pucks have been cut from the same core in succession. Since both are co-located, it is appropriate to average the data to obtain the radionuclide concentration for spot on the floor.

2

Containment, -25 ft, Canal E (Area 18)
Core Location #6
C9000 101I1 FL1C3 L0506-1 (CS022304-001)
C9000 101I1 FL1C1 L0506-2 (CS022304-003)

	Result pCi/gm	MDC pCi/gm	Used pCi/gm	Disribution %
H-3	5.48E+00	5.10E+00	5.48E+00	4.66%
Cs-137	1.10E+02	2.00E-01	1.10E+02	93.39%
Co-60	1.53E+00	1.20E-01	1.53E+00	1.31%
U-234	7.50E-01	3.00E-02	7.50E-01	0.64%
	Cs/Co ratio=	7.15E+01	1.18E+02	100%

Reactor Bldg., -25'0" El., Canal G (slant core)
Core Location #10
C9000 101I3 WL1C1 L05 10-1P1 (CS050630-065)

	Result pCi/gm	MDC pCi/gm	Used pCi/gm	Disribution %
Co-60	2.48E-01	1.21E-01	2.48E-01	8.38%
Cs-137	2.71E+00	1.11E-01	2.71E+00	91.62%
	Cs/Co ratio=	1.09E+01	2.96E+00	100%

Reactor Bldg., -25'0" El., Canal G (slant core)
Core Location #10
C9000 101I3 WL1C1 L05 10-1P3 (CS050630-066)

	Result pCi/gm	MDC pCi/gm	Used pCi/gm	Disribution %
		2.94E-01	**2.94E-01**	4.38%
	6.41E+00	2.20E-01	6.41E+00	95.62%
	Cs/Co ratio=	indeterminate	6.71E+00	100%

Reactor Bldg., -25'0" El., Canal G (slant core)
Core Location #10
C9000 101I3 WL1C1 L05 10-1P4 (CS050630-067)

	Result pCi/gm	MDC pCi/gm	Used pCi/gm	Disribution %
		7.88E-02	**7.88E-02**	7.73%
	9.40E-01	8.03E-02	9.40E-01	92.27%
	Cs/Co ratio=	indeterminate	1.02E+00	100%

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Average of three Location #10 analyses
Reactor Bldg., -25'0" El., Canal G (slant core)
Core Location #10 (wall)

	MEAN (pCi/gm)	MEAN (%)	STD DEV
Co-60	2.07E-01	6.83%	2.15%
Cs-137	3.35E+00	93.17%	2.15%
Cs/Co ratio=	1.09E+01	100.00%	

All three of these cores cut through the wall of Canal G just above the floor at the -25'0" elevation. That is, all three pucks have been cut from the same core in succession. Since all three are co-located, it is appropriate to average the data to obtain the radionuclide concentration for that spot on the wall.

Reactor Bldg., -25'0" El., Canal G (slant core)
Core Location #10
C9000 101I3 WL1C1 L05 10-3P1 (CS050630-068)

	Result pCi/gm	MDC pCi/gm	Used pCi/gm	Disribution %
Co-60		1.27E-01	**1.27E-01**	31.53%
Cs-137	2.76E-01	9.21E-02	2.76E-01	68.47%
	Cs/Co ratio=	indeterminate	4.03E-01	100%

Reactor Bldg., -25'0" El., Canal G (slant core)
Core Location #10
C9000 101I3 WL1C1 L05 10-3P2 (CS050630-069)

	Result pCi/gm	MDC pCi/gm	Used pCi/gm	Disribution %
Co-60		2.08E-01	**2.08E-01**	14.92%
Cs-137	1.19E+00	1.63E-01	1.19E+00	85.08%
	Cs/Co ratio=	indeterminate	1.39E+00	100%

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Average of two Location #10 analyses
Reactor Bldg., -25'0" El., Canal G (slant core)
Core Location #10 (cold joint floor)

	MEAN (pCi/gm)	MEAN (%)	STD DEV
Co-60	1.68E-01	23.22%	11.75%
Cs-137	7.31E-01	76.78%	11.75%
Cs/Co ratio=	indeterminate	100.00%	

Both of these cores cut through the cold joint made at the interface of the Canal G wall and the floor on the -25'0" elevation. That is, both pucks have been cut from the same core in succession. Since both are co-located, it is appropriate to average the data to obtain the radionuclide concentration for spot on the floor.

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Reactor Bldg., -25'0" El., Canal H (slant core)
Core Location #11
C9000 101I3 WL1C1 L05 11-1P6 (CS050630-071)

	Result pCi/gm	MDC pCi/gm	Used pCi/gm	Disribution %
Co-60		1.93E-01	**1.93E-01**	15.39%
Cs-137	1.06E+00	1.42E-01	1.06E+00	84.61%
	Cs/Co ratio=	indeterminate	1.25E+00	100%

3

Reactor Building, -15 ft, SE Area
Core Location #7
C9000 101I1 FL1C1 L0507-1 (CS022304-005)
C9000 101I1 FL1C1 L0507-2 (CS022304-007)

	Result pCi/gm	MDC pCi/gm	Used pCi/gm	Disribution %
Cs-137	6.75E-01	1.10E-01	6.75E-01	48.40%
U-234	7.20E-01	4.00E-02	7.20E-01	51.60%
	Cs/Co ratio=	indeterminate	1.40E+00	100%

	1				14			
	Reactor Building, -25ft, Area 22				**Reactor Bldg. -25'0" El., Pump Room Trench**			
	Core Location #5				**Core Location #9**			
	C9000 101I1 FL1C3 L0505-01 (CS022004-004)				**C9000 101I3 FL1C1 L05 9-1P1 (CS050630-013)**			
	C9000 101I1 FL1C1 L0505-02 (CS022004-006)							
	Result pCi/gm	**MDC pCi/gm**	**Used pCi/gm**	**Disribution %**	**Result pCi/gm**	**MDC pCi/gm**	**Used pCi/gm**	**Disribution %**
H-3					8.90E+00	5.11E+00	8.90E+00	14.57%
Cs-137	2.68E+00	1.70E-01	2.68E+00	20.30%	2.32E+00	3.86E-01	2.32E+00	3.80%
Co-60	7.85E+00	1.00E-01	7.85E+00	59.36%	2.96E+01	4.00E-01	2.96E+01	48.42%
Sr-90	1.94E+00	6.40E-01	1.94E+00	14.66%	1.82E+01	4.00E-01	1.82E+01	29.79%
Eu-154					2.09E+00	8.64E-01	2.09E+00	3.42%
U-234	6.40E-01	9.00E-02	6.40E-01	4.84%				
U-235	1.10E-01	7.70E-02	1.10E-01	0.83%				
	Cs/Co ratio=	3.42E-01	1.32E+01	100%	Cs/Co ratio=	7.85E-02	6.11E+01	100%

	9				10				11			
	Hot Laboratory 0 ft				**Hot Laboratory 0 ft**				**Hot Laboratory 0 ft**			
	Core Location #11				**Core Location #12**				**Core Location #13**			
	C9000 101I1 FL1C1 L0511-01 (CS022004-008)				**C9000 101I1 FL1C3 L0512-01 (CS022004-016)**				**C9000 101I1 FL1C3 L0513-01 (CS022004-020)**			
	C9000 101I1 FL1C1 L0511-02 (CS022004-010)				**C9000 101I1 FL1C1 L0512-02 (CS022004-018)**				**C9000 101I1 FL1C1 L0513-02 (CS022004-022)**			
	Result pCi/gm	**MDC pCi/gm**	**Used pCi/gm**	**Disribution %**	**Result pCi/gm**	**MDC pCi/gm**	**Used pCi/gm**	**Disribution %**	**Result pCi/gm**	**MDC pCi/gm**	**Used pCi/gm**	**Disribution %**
Cs-137	8.86E+02	5.00E-01	8.86E+02	98.58%	1.06E+02	3.00E-01	1.06E+02	49.95%	1.60E+03	6.00E-01	1.60E+03	89.81%
Co-60	1.26E+00	1.70E-01	1.26E+00	0.14%	4.02E+00	1.30E-01	4.02E+00	1.90%	1.88E-01	1.70E-01	1.88E-01	0.01%
Sr-90	1.10E+01	5.00E-01	1.10E+01	1.23%	1.01E+02	5.00E-01	1.01E+02	47.65%	1.81E+02	6.00E-01	1.81E+02	10.12%
U-234	3.60E-01	6.00E-02	3.60E-01	0.04%	1.04E+00	3.00E-02	1.04E+00	0.49%	9.60E-01	4.00E-02	9.60E-01	0.05%
U-235		8.90E-02	**8.90E-02**	0.01%		3.80E-02	**3.80E-02**	0.02%	5.10E-02	4.60E-02	5.10E-02	0.00%
	Cs/Co ratio=	7.01E+02	8.99E+02	100%	Cs/Co ratio=	2.64E+01	2.12E+02	100%	Cs/Co ratio=	8.55E+03	1.79E+03	100%

	12			
	Hot Laboratory 0 ft			
	Core Location #14			
	C9000 101I1 FL1C3 L0514-01 (CS022004-012)			
	C9000 101I1 FL1C1 L0514-02 (CS022004-014)			
	Result pCi/gm	**MDC pCi/gm**	**Used pCi/gm**	**Disribution %**
Cs-137	7.27E+02	5.00E-01	7.27E+02	95.54%
Co-60	2.17E+00	1.20E-01	2.17E+00	0.28%
Sr-90	3.09E+01	4.00E-01	3.09E+01	4.06%
U-234	8.10E-01	7.00E-02	8.10E-01	0.11%
U-235		7.40E-02	**7.40E-02**	0.01%
	Cs/Co ratio=	3.35E+02	7.61E+02	100%

	6				7				16			
	Hot Pipe Tunnel, -12 ft				**Hot Pipe Tunnel, -12 ft**				**Hot Pipe Tunnel, -12'0" El., Southwest Corner**			
	Core Location #15				**Core Location #16**				**Core Location #20**			
	C9000 101I1 FL1C1 L0515-1 (CS022304-017)				**C9000 101I1 FL1C1 L0516-1 (CS022304-021)**				**C9000 101I3 FL1C1 L05 20-1P1 (CS050630-047)**			
	C9000 101I1 FL1C1 L0515-2 (CS022304-019)				**C9000 101I1 FL1C1 L0516-2 (CS022304-023)**							
	Result pCi/gm	**MDC pCi/gm**	**Used pCi/gm**	**Disribution %**	**Result pCi/gm**	**MDC pCi/gm**	**Used pCi/gm**	**Disribution %**	**Result pCi/gm**	**MDC pCi/gm**	**Used pCi/gm**	**Disribution %**
H-3		5.30E+00	**5.30E+00**	0.10%		5.20E+00	**5.20E+00**	0.50%	3.22E+01	5.51E+00	3.22E+01	0.06%
Cs-137	4.16E+03	1.00E+00	4.16E+03	81.06%	2.44E+02	4.00E-01	2.44E+02	23.47%	1.76E+04	4.56E+00	1.76E+04	31.81%
Co-60	1.87E+01	3.00E-01	1.87E+01	0.36%	6.23E+00	2.40E-01	6.23E+00	0.60%	3.25E+02	2.69E+00	3.25E+02	0.59%
Sr-90	9.46E+02	1.00E+00	9.46E+02	18.45%	7.83E+02	2.00E+00	7.83E+02	75.33%	3.73E+04	2.36E+00	3.73E+04	67.55%
U-234	1.28E+00	7.00E-02	1.28E+00	0.02%	9.10E-01	6.00E-02	9.10E-01	0.09%				
U-235		9.10E-02	**9.10E-02**	0.00%		9.30E-02	**9.30E-02**	0.01%				
	Cs/Co ratio=	2.22E+02	5.13E+03	100%	Cs/Co ratio=	3.91E+01	1.04E+03	100%	Cs/Co ratio=	5.40E+01	5.52E+04	100%

	25				28			
	Hot Pipe Tunnel, -12'0" El., Area 25B				**Hot Pipe Tunnel, -12'0" El., Area 25B/Area B**			
	Core Location SR24-8				**Core Location SR24-18**			
	HPT-SP4-SL3 (PB06-02319-T & 02319-B)				**HPT-SP9-SL2 (PB06-02478-T & 02478-B)**			
	Result pCi/gm	**MDC pCi/gm**	**Used pCi/gm**	**Disribution %**	**Result pCi/gm**	**MDC pCi/gm**	**Used pCi/gm**	**Disribution %**
H-3	7.20E-01	6.70E-01	7.20E-01	1.41%		6.70E-01	**6.70E-01**	0.91%
Co-60	2.78E+00	1.40E-01	2.78E+00	5.45%	2.34E+00	3.20E-01	2.34E+00	3.17%
Sr-90		9.10E-01	**9.10E-01**	1.78%	6.70E+00	9.00E-01	6.70E+00	9.07%
Cs-137	4.59E+01	2.00E-01	4.59E+01	89.98%	6.33E+01	4.00E-01	6.33E+01	85.69%
U-234	6.30E-01	4.00E-02	6.30E-01	1.23%	8.00E-01	6.00E-02	8.00E-01	1.08%
U-235	7.40E-02	3.40E-02	7.40E-02	0.15%	5.80E-02	5.10E-02	5.80E-02	0.08%
	Cs/Co ratio=	1.65E+01	5.10E+01	100%	Cs/Co ratio=	2.71E+01	7.39E+01	100%

17

Cold Pipe Tunnel, -15'0" El., West of N-S Trench
Core Location #18
C9000 101I3 FL1C1 L05 18-1P1 (CS050617-017)

	Result pCi/gm	MDC pCi/gm	Used pCi/gm	Disribution %
Cs-137		3.00E-01	**3.00E-01**	1.54%
Ni-63	1.14E+01	1.80E+00	1.14E+01	58.64%
Sr-90	6.87E+00	1.20E-01	6.87E+00	35.39%
U-234	8.60E-01	1.30E-01	8.60E-01	4.43%
	Cs/Co ratio=	indeterminate	1.94E+01	100.00%

8

Fan House -12 ft
Core Location #17
C9000 101I1 FL1C1 L0517-1 (CS022704-001)
C9000 101I1 FL1C1 L0517-002 (CS022704-003)

	Result pCi/gm	MDC pCi/gm	Used pCi/gm	Disribution %
H-3	5.31E+00	5.30E+00	5.31E+00	77.69%
Cs-137	3.85E-01	9.00E-02	3.85E-01	5.63%
U-234	1.14E+00	4.00E-02	1.14E+00	16.68%
	Cs/Co ratio=	indeterminate	6.83E+00	100%

5

Waste Handling Building, -13 ft
Core Location #10
C9000 101I1 FL1C3 L0510-1 (CS022304-013)
C9000 101I1 FL1C1 L0510-2 (CS022304-015)

	Result pCi/gm	MDC pCi/gm	Used pCi/gm	Disribution %
H-3		5.30E+00	**5.30E+00**	0.18%
Cs-137	2.95E+03	8.00E-01	2.95E+03	99.76%
Co-60		1.10E-01	**1.10E-01**	0.00%
Sr-90	1.12E+00	4.20E-01	1.12E+00	0.04%
U-234	5.50E-01	8.00E-02	5.50E-01	0.02%
U-235	5.30E-02	4.80E-02	5.30E-02	0.00%
	Cs/Co ratio=	indeterminate	2.96E+03	100%

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Waste Handling Bldg., -14'6" El., Evaporator Pit
Core Location #16
C9000 101I3 FL1C1 L05 16a1P1 (CS050630-036)

	Result pCi/gm	MDC pCi/gm	Used pCi/gm	Disribution %
H-3	4.21E+01	5.57E+00	4.21E+01	0.30%
Cs-137	1.29E+04	3.80E+00	1.29E+04	92.64%
Co-60	3.22E+01	7.19E-01	3.22E+01	0.23%
Sr-90	9.52E+02	4.47E-01	9.52E+02	6.83%
U-234				
U-235				
	Cs/Co ratio=	4.01E+02	1.39E+04	100%

24

Waste Handling Bldg., -14'6" El., Evaporator Pit
Core Location SR24-2
WHB-SP2-SL3 (PB06-02244-T & 02244-B)

	Result pCi/gm	MDC pCi/gm	Used pCi/gm	Disribution %
H-3	7.10E-01	6.80E-01	7.10E-01	1.08%
Cs-137	6.36E+01	2.00E-01	6.36E+01	96.63%
Co-60		1.60E-01	**1.60E-01**	0.24%
Sr-90		6.10E-01	**6.10E-01**	0.93%
U-234	7.00E-01	5.00E-02	7.00E-01	1.06%
U-235		4.00E-02	**4.00E-02**	0.06%
	Cs/Co ratio=	indeterminate	6.58E+01	100%

26

Primary Pump House, 0'0" El., Room 6
Core Location SR24-12
PPH-R6-SP1-SL10 (PB06-02364-T & 02364-B)

	Result pCi/gm	MDC pCi/gm	Used pCi/gm	Disribution %
H-3	4.56E+00	6.70E-01	4.56E+00	66.38%
Co-60		1.70E-01	**1.70E-01**	2.47%
I-129		1.20E+00	**1.20E+00**	17.47%
Cs-137		1.60E-01	**1.60E-01**	2.33%
U-234	7.00E-01	7.00E-02	7.00E-01	10.19%
U-235	8.00E-02	3.60E-02	8.00E-02	1.16%
	Cs/Co ratio=	indeterminate	6.87E+00	

27

Primary Pump House, 0'0" El., Room 4
Core Location SR24-16
PPH-R4-SP2-SL1 (PB06-02229-T & 02229-B)

	Result pCi/gm	MDC pCi/gm	Used pCi/gm	Disribution %
H-3	8.20E+00	7.00E-01	8.20E+00	45.74%
Co-60	1.73E+00	1.70E-01	1.73E+00	9.65%
I-129	5.60E+00	1.60E+00	5.60E+00	31.24%
Cs-137	1.41E+00	1.40E-01	1.41E+00	7.87%
U-234	9.40E-01	3.00E-02	9.40E-01	5.24%
U-235	4.70E-02	2.60E-02	4.70E-02	0.26%
	Cs/Co ratio=	8.15E-01	1.79E+01	100%

13

ROLB Fuel Vault
Core Location #21
C9000 101I1 FL1C1 L0521-1 (CS030404-002)
C9000 101I1 FL1C1 L0521-2 (CS030404-004)

	Result pCi/gm	MDC pCi/gm	Used pCi/gm	Disribution %
U-234	6.00E-01	6.00E-02	6.00E-01	100.00%
	Cs/Co ratio=	indeterminate	6.00E-01	100%

CTMT -25 ft, Area 17
Core Location #9 4
C9000 101I1 FL1C3 L0509-1 (CS022304-009)
C9000 101I1 FL1C1 L0509-2 (CS022304-011)

	DCGL (dpm/100cm²)	Results (pCi/gram)	MDA (pCi/gram)	Used (pCi/gram)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
ALPHA							
U-234	**3.15E+04**	7.00E-01	4.00E-02	7.00E-01	6.50%	N/A	N/A
BETA							
Cs-137	**4.05E+04**	5.72E-01	8.00E-02	5.72E-01	5.31%	1.00	2.47E-05
H-3	**9.10E+06**	9.51E+00	5.10E+00	9.51E+00	88.20%	16.61	1.83E-06
Cs-137 to Co-60 ratio =		indeterminate		1.08E+01	100.00%		

Adjusted Gross DCGL

	DCGL (dpm/100cm²)	Nuclide Fraction	Alpha Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
ALPHA							
U-234	**3.15E+04**	0.0650	1.000	2.06E-06		31,500.00	1.00E+00
		0.0650	1.000	2.06E-06		31500	1.00
		Adjusted Gross DCGL		**31500**	**dpm/100cm²**	**(alpha)**	

	DCGL (dpm/100cm²)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
BETA							
Cs-137	**3.77E+04**	0.0531	1.000	1.41E-06		37,711.81	1.00E+00
		0.0531	1.000	1.41E-06		37712	1.00
		Adjusted Gross DCGL		**37712**	**dpm/100cm²**	**(beta)**	

Adjusted Gross DCGL (combined alpha plus beta)

	DCGL (dpm/100cm²)	Nuclide Fraction		Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
DCGL (alpha)	31500	0.0650		2.06E-06		2,418.46	7.68E-02
DCGL (beta)	37712	0.9350		2.48E-05		34,816.43	9.23E-01
		1.0000		2.69E-05		37235	1.00
		Adjusted Gross DCGL		**37235**	**dpm/100cm²**	**(alpha plus beta)**	

Average of three Location #1 analyses (cold joint)
Reactor Bldg., -25'0" El., Quad A (slant core) 18
C9000 101I3 WL1C1 L05 1-2P4 (CS050630-058)
C9000 101I3 WL1C1 L05 1-2P5 (CS050630-059)
C9000 101I3 WL1C1 L05 1-3 (CS050630-057)

	DCGL (dpm/100cm²)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
BETA							
Cs-137	**4.05E+04**	25.01%	0.250	6.1753E-06		3,363.91	8.31E-02
Co-60	**1.10E+04**	74.99%	0.750	6.8173E-05		10,086.35	9.17E-01
		100.00%	1.000	7.4348E-05			1
Cs/Co ratio	3.34E-01	**Adjusted Gross DCGL**		**13450**	**dpm/100cm²**		

Average of two Location #2 analyses (wall)
Reactor Bldg., -25'0" El., Quad C (slant core) 19
C9000 101I3 WL1C1 L05 2-1P1 (CS050630-061)
C9000 101I3 WL1C1 L05 2-1P2 (CS050630-062)

	DCGL (dpm/100cm²)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
BETA							
Cs-137	**4.05E+04**	62.23%	0.622	1.5365E-05		12,520.67	3.09E-01
Co-60	**1.10E+04**	37.77%	0.378	3.4336E-05		7,599.32	6.91E-01
		100.00%	1.000	4.9702E-05			1
Cs/Co ratio	indeterminate	**Adjusted Gross DCGL**		**20120**	**dpm/100cm²**		

Average of two Location #2 analyses (cold joint)
Reactor Bldg., -25'0" El., Quad C (slant core) 20
C9000 101I3 WL1C1 L05 2-3 (CS050630-060)
C9000 101I3 WL1C1 L05 2-4P1 (CS050630-063)

	DCGL (dpm/100cm²)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
BETA							
Cs-137	**4.05E+04**	71.66%	0.717	1.7694E-05		16,489.69	4.07E-01
Co-60	**1.10E+04**	28.34%	0.283	2.5764E-05		6,521.32	5.93E-01
		100.00%	1.000	4.3457E-05			1
Cs/Co ratio	8.27E+00	**Adjusted Gross DCGL**		**23011**	**dpm/100cm²**		

CTMT -25 ft, Canal E Area 18)
Core Location #6 2
C9000 101I1 FL1C3 L0506-1 (CS022304-001)
C9000 101I1 FL1C1 L0506-2 (CS022304-003)

	DCGL (dpm/100cm²)	Results (pCi/gram)	MDA (pCi/gram)	Used (pCi/gram)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
ALPHA							
U-234	**3.15E+04**	7.50E-01	3.00E-02	7.50E-01	0.64%	N/A	N/A
BETA							
Cs-137	**4.05E+04**	1.10E+02	2.00E-01	1.10E+02	93.39%	1.00	2.47E-05
H-3	**9.10E+06**	5.48E+00	5.10E+00	5.48E+00	4.66%	0.05	5.49E-09
Co-60	**1.10E+04**	1.53E+00	1.20E-01	1.53E+00	1.31%	N/A	N/A
Cs-137 to Co-60 ratio =		7.15E+01		1.18E+02	100.00%		

Adjusted Gross DCGL

	DCGL (dpm/100cm²)	Nuclide Fraction	Alpha Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
ALPHA							
U-234	**3.15E+04**	0.0064	1.000	2.03E-07		31,500.00	1.00E+00
		0.0064	1.000	2.03E-07		31500	1.00
		Adjusted Gross DCGL		**31500**	**dpm/100cm²**	**(alpha)**	

	DCGL (dpm/100cm²)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
BETA							
Cs-137	**4.05E+04**	0.9339	0.986	2.31E-05		38,508.96	9.51E-01
Co-60	**1.10E+04**	0.0131	0.014	1.19E-06		538.45	4.90E-02
		0.9470	1.000	2.43E-05		39047	1.00
		Adjusted Gross DCGL		**39047**	**dpm/100cm²**	**(beta)**	

Adjusted Gross DCGL (combined alpha plus beta)

	DCGL (dpm/100cm²)	Nuclide Fraction		Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
DCGL (alpha)	31500	0.0064		2.03E-07		248.84	7.90E-03
DCGL (beta)	39047	0.9936		2.54E-05		38,738.95	9.92E-01
		1.0000		2.56E-05		38988	1.00
		Adjusted Gross DCGL		**38988**	**dpm/100cm²**	**(alpha plus beta)**	

Average of three Location #10 analyses (wall)
Reactor Bldg., -25'0" El., Canal G (slant core) 21
C9000 101I3 WL1C1 L05 10-1P1 (CS050630-065)
C9000 101I3 WL1C1 L05 10-1P3 (CS050630-066)
C9000 101I3 WL1C1 L05 10-1P4 (CS050630-067)

	DCGL (dpm/100cm²)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
BETA							
Cs-137	**4.05E+04**	93.17%	0.932	2.3005E-05		31,892.21	7.87E-01
Co-60	**1.10E+04**	6.83%	0.068	6.2091E-06		2,337.92	2.13E-01
		100.00%	1.000	2.9214E-05			1
Cs/Co ratio	1.09E+01	**Adjusted Gross DCGL**		**34230**	**dpm/100cm²**		

Average of two Location #10 analyses (cold joint)
Reactor Bldg., -25'0" El., Canal G (slant core) 22
C9000 101I3 WL1C1 L05 10-3P1 (CS050630-068)
C9000 101I3 WL1C1 L05 10-3P2 (CS050630-069)

	DCGL (dpm/100cm²)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
BETA							
Cs-137	**4.05E+04**	76.78%	0.768	1.8958E-05		19,162.85	4.73E-01
Co-60	**1.10E+04**	23.22%	0.232	2.1109E-05		5,795.28	5.27E-01
		100.00%	1.000	4.0067E-05			1
Cs/Co ratio	indeterminate	**Adjusted Gross DCGL**		**24958**	**dpm/100cm²**		

Reactor Bldg., -25'0" El., Canal H (slant core)
Core Location #11 23
C9000 101I3 WL1C1 L05 11-1P6 (CS050630-071)

	DCGL (dpm/100cm²)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
BETA							
Cs-137	**4.05E+04**	84.61%	0.846	2.0891E-05		24,255.88	5.99E-01
Co-60	**1.10E+04**	15.39%	0.154	1.3991E-05		4,411.98	4.01E-01
		100.00%	1.000	3.4882E-05			1
Cs/Co ratio	indeterminate	**Adjusted Gross DCGL**		**28668**	**dpm/100cm²**		

Rx Bldg -15 ft, SF Area
Core Location #7 3
C9000 101I1 FL1C1 L0507-1 (CS022304-005)
C9000 101I1 FL1C1 L0507-2 (CS022304-007)

	DCGL (dpm/100cm²)	Results (pCi/gram)	MDA (pCi/gram)	Used (pCi/gram)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
ALPHA							
U-234	**3.15E+04**	7.20E-01	4.00E-02	7.20E-01	51.60%	N/A	N/A
BETA							
Cs-137	**4.05E+04**	6.75E-01	1.10E-01	6.75E-01	48.40%	N/A	N/A
Cs-137 to Co-60 ratio =		indeterminate		1.40E+00	100.00%		

Adjusted Gross DCGL

	DCGL (dpm/100cm²)	Nuclide Fraction	Alpha Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
ALPHA							
U-234	**3.15E+04**	0.5160	1.000	1.64E-05		31,500.00	1.00E+00
		0.5160	1.000	1.64E-05		31500	1.00
		Adjusted Gross DCGL		**31500**	**dpm/100cm²**	**(alpha)**	

	DCGL (dpm/100cm²)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
BETA							
Cs-137	**4.05E+04**	0.4840	1.000	1.20E-05		40,500.00	1.00E+00
		0.4840	1.000	1.20E-05		40500	1.00
		Adjusted Gross DCGL		**40500**	**dpm/100cm²**	**(beta)**	

Adjusted Gross DCGL (combined alpha plus beta)

	DCGL (dpm/100cm²)	Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
DCGL (alpha)	31500	0.5160	1.64E-05		18,212.89	5.78E-01
DCGL (beta)	40500	0.4840	1.20E-05		17,083.43	4.22E-01
		1.0000	2.83E-05		35296	1.00
		Adjusted Gross DCGL	**35296**	**dpm/100cm²**	**(alpha plus beta)**	

Rx Bldg -25ft, Area 22
Core Location #5 1
C9000 101I1 FL1C3 L0505-01 (CS022004-004)
C9000 101I1 FL1C1 L0505-02 (CS022004-006)

	DCGL (dpm/100cm²)	Results (pCi/gram)	MDA (pCi/gram)	Used (pCi/gram)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
ALPHA							
U-234	**3.15E+04**	6.40E-01	9.00E-02	6.40E-01	4.84%	N/A	N/A
U-235	**2.71E+04**	1.10E-01	7.70E-02	1.10E-01	0.83%	N/A	N/A
BETA							
Cs-137	**4.05E+04**	2.68E+00	1.70E-01	2.68E+00	20.30%	N/A	N/A
Co-60	**1.10E+04**	7.85E+00	1.00E-01	7.85E+00	59.36%	N/A	N/A
Sr-90	**3.31E+04**	1.94E+00	6.40E-01	1.94E+00	14.66%	N/A	N/A
Cs-137 to Co-60 ratio =		3.42E-01		1.32E+01	100.00%		

Adjusted Gross DCGL

	DCGL (dpm/100cm²)	Nuclide Fraction	Alpha Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
ALPHA							
U-234	**3.15E+04**	0.0484	0.853	1.54E-06		26,254.79	8.33E-01
U-235	**2.71E+04**	0.0083	0.147	3.07E-07		4,512.54	1.67E-01
		0.0567	1.000	1.84E-06		30767	1.00
		Adjusted Gross DCGL		**30767**	**dpm/100cm²**	**(alpha)**	

	DCGL (dpm/100cm²)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
BETA							
Cs-137	**4.05E+04**	0.2030	0.215	5.01E-06		3,200.95	7.90E-02
Co-60	**1.10E+04**	0.5936	0.629	5.40E-05		9,362.05	8.51E-01
Sr-90	**3.31E+04**	0.1466	0.155	4.43E-06		2,312.65	6.99E-02
		0.9433	1.000	6.34E-05		14876	1.00
		Adjusted Gross DCGL		**14876**	**dpm/100cm²**	**(beta)**	

Adjusted Gross DCGL (combined alpha plus beta)

	DCGL (dpm/100cm²)	Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
DCGL (alpha)	30767	0.0567	1.84E-06		869.61	2.83E-02
DCGL (beta)	14876	0.9433	6.34E-05		14,455.21	9.72E-01
		1.0000	6.53E-05		15325	1.00
		Adjusted Gross DCGL	**15325**	**dpm/100cm²**	**(alpha plus beta)**	

Reactor Bldg. -25'0" El., Pump Room Trench
Core Location #9 14
C9000 101I3 FL1C1 L05 9-1P1 (CS050630-013)

	DCGL (dpm/100cm²)	Results (pCi/gram)	MDA (pCi/gram)	Used (pCi/gram)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
BETA							
Cs-137	**4.05E+04**	2.32E+00	3.86E-01	2.32E+00	3.80%	1.00	2.47E-05
H-3	**9.10E+06**	8.90E+00	5.11E+00	8.90E+00	14.57%	3.83	4.21E-07
Co-60	**1.10E+04**	2.96E+01	4.00E-01	2.96E+01	48.42%	N/A	N/A
Sr-90	**3.31E+04**	1.82E+01	4.00E-01	1.82E+01	29.78%	N/A	N/A
Eu-154	**4.50E+03**	2.09E+00	8.64E-01	2.09E+00	3.42%	N/A	N/A
Cs-137 to Co-60 ratio =		7.85E-02		6.11E+01	100.00%		

Adjusted Gross DCGL

	DCGL (dpm/100cm²)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
BETA							
Cs-137	**3.98E+04**	0.0380	0.045	9.55E-07		617.61	1.55E-02
Co-60	**1.10E+04**	0.4842	0.567	4.40E-05		7,864.16	7.15E-01
Sr-90	**3.31E+04**	0.2978	0.349	9.00E-06		4,837.22	1.46E-01
Eu-154	**4.50E+03**	0.0342	0.040	7.60E-06		555.42	1.23E-01
		0.8543	1.000	6.16E-05		13874	1.00
		Adjusted Gross DCGL		**13874**	**dpm/100cm²**	**(beta)**	

Hot Laboratory 0 ft
Core Location #11 9
C9000 101I1 FL1C1 L0511-01 (CS022004-008)
C9000 101I1 FL1C1 L0511-02 (CS022004-010)

ALPHA	DCGL (dpm/100cm²)	Results (pCi/gram)	MDA (pCi/gram)	Used (pCi/gram)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
U-234	3.15E+04	3.60E-01	6.00E-02	3.60E-01	0.04%	N/A	N/A
U-235	2.71E+04		8.90E-02	8.90E-02	0.01%	N/A	N/A
BETA							
Cs-137	4.05E+04	8.86E+02	5.00E-01	8.86E+02	98.58%	N/A	N/A
Co-60	1.10E+04	1.26E+00	1.70E-01	1.26E+00	0.14%	N/A	N/A
Sr-90	3.31E+04	1.10E+01	5.00E-01	1.10E+01	1.23%	N/A	N/A
Cs-137 to Co-60 ratio =		7.01E+02		8.99E+02	100.00%		

Adjusted Gross DCGL

ALPHA	DCGL (dpm/100cm²)	Nuclide Fraction	Alpha Nuclide Fraction	Fraction/ DCGL	Unity Rule Check Gross*Fract	Fract/DCGL
U-234	3.15E+04	0.0004	0.802	1.27E-08	24,468.65	7.77E-01
U-235	2.71E+04	0.0001	0.198	3.65E-09	6,049.19	2.23E-01
		0.0005	1.000	1.64E-08	30518	1.00
			Adjusted Gross DCGL	30518	dpm/100cm²	(alpha)

BETA	DCGL (dpm/100cm²)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL	Unity Rule Check Gross*Fract	Fract/DCGL
Cs-137	4.05E+04	0.9858	0.986	2.43E-05	39,686.42	9.80E-01
Co-60	1.10E+04	0.0014	0.001	1.28E-07	56.58	5.14E-03
Sr-90	3.31E+04	0.0123	0.012	3.71E-07	494.67	1.49E-02
		0.9995	1.000	2.48E-05	40238	1.00
			Adjusted Gross DCGL	40238	dpm/100cm²	(beta)

Adjusted Gross DCGL (combined alpha plus beta)

	DCGL (dpm/100cm²)	Nuclide Fraction	Fraction/ DCGL	Unity Rule Check Gross*Fract	Fract/DCGL
DCGL (alpha)	30518	0.0005	1.64E-08	20.09	6.58E-04
DCGL (beta)	40238	0.9995	2.48E-05	40,211.18	9.99E-01
		1.0000	2.49E-05	40231	1.00
		Adjusted Gross DCGL	40231	dpm/100cm²	(alpha plus beta)

Hot Laboratory 0 ft
Core Location #12 10
C9000 101I1 FL1C3 L0512-01 (CS022004-016)
C9000 101I1 FL1C1 L0512-02 (CS022004-018)

ALPHA	DCGL (dpm/100cm²)	Results (pCi/gram)	MDA (pCi/gram)	Used (pCi/gram)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
U-234	3.15E+04	1.04E+00	3.00E-02	1.04E+00	0.49%	N/A	N/A
U-235	2.71E+04		3.80E-02	3.80E-02	0.02%	N/A	N/A
BETA							
Cs-137	4.05E+04	1.06E+02	3.00E-01	1.06E+02	49.95%	N/A	N/A
Co-60	1.10E+04	4.02E+00	1.30E-01	4.02E+00	1.90%	N/A	N/A
Sr-90	3.31E+04	1.01E+02	5.00E-01	1.01E+02	47.65%	N/A	N/A
Cs-137 to Co-60 ratio =		2.64E+01		2.12E+02	100.00%		

Adjusted Gross DCGL

ALPHA	DCGL (dpm/100cm²)	Nuclide Fraction	Alpha Nuclide Fraction	Fraction/ DCGL	Unity Rule Check Gross*Fract	Fract/DCGL
U-234	3.15E+04	0.0049	0.965	1.56E-07	30,216.66	9.59E-01
U-235	2.71E+04	0.0002	0.035	6.61E-09	1,104.08	4.07E-02
		0.0051	1.000	1.62E-07	31321	1.00
			Adjusted Gross DCGL	31321	dpm/100cm²	(alpha)

BETA	DCGL (dpm/100cm²)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL	Unity Rule Check Gross*Fract	Fract/DCGL
Cs-137	4.05E+04	0.4995	0.502	1.23E-05	17,555.55	4.33E-01
Co-60	1.10E+04	0.0190	0.019	1.72E-06	666.07	6.06E-02
Sr-90	3.31E+04	0.4765	0.479	1.44E-05	16,747.85	5.06E-01
		0.9949	1.000	2.85E-05	34969	1.00
			Adjusted Gross DCGL	34969	dpm/100cm²	(beta)

Adjusted Gross DCGL (combined alpha plus beta)

	DCGL (dpm/100cm²)	Nuclide Fraction	Fraction/ DCGL	Unity Rule Check Gross*Fract	Fract/DCGL
DCGL (alpha)	31321	0.0051	1.62E-07	177.52	5.67E-03
DCGL (beta)	34969	0.9949	2.85E-05	34,771.27	9.94E-01
		1.0000	2.86E-05	34949	1.00
		Adjusted Gross DCGL	34949	dpm/100cm²	(alpha plus beta)

Hot Laboratory 0 ft
Core Location #13 11
C9000 101I1 FL1C3 L0513-01 (CS022004-020)
C9000 101I1 FL1C1 L0513-02 (CS022004-022)

ALPHA	DCGL (dpm/100cm²)	Results (pCi/gram)	MDA (pCi/gram)	Used (pCi/gram)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
U-234	3.15E+04	9.60E-01	4.00E-02	9.60E-01	0.05%	N/A	N/A
U-235	2.71E+04	5.10E-02	4.60E-02	5.10E-02	0.00%	N/A	N/A
BETA							
Cs-137	4.05E+04	1.60E+03	6.00E-01	1.60E+03	89.81%	N/A	N/A
Co-60	1.10E+04	1.88E-01	1.70E-01	1.88E-01	0.01%	N/A	N/A
Sr-90	3.31E+04	1.81E+02	6.00E-01	1.81E+02	10.12%	N/A	N/A
Cs-137 to Co-60 ratio =		8.55E+03		1.79E+03	100.00%		

Adjusted Gross DCGL

ALPHA	DCGL (dpm/100cm²)	Nuclide Fraction	Alpha Nuclide Fraction	Fraction/ DCGL	Unity Rule Check Gross*Fract	Fract/DCGL
U-234	3.15E+04	0.0005	0.950	1.71E-08	29,667.97	9.42E-01
U-235	2.71E+04	0.0000	0.050	1.05E-09	1,576.13	5.82E-02
		0.0006	1.000	1.81E-08	31244	1.00
			Adjusted Gross DCGL	31244	dpm/100cm²	(alpha)

BETA	DCGL (dpm/100cm²)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL	Unity Rule Check Gross*Fract	Fract/DCGL
Cs-137	4.05E+04	0.8981	0.899	2.22E-05	35,580.18	8.79E-01
Co-60	1.10E+04	0.0001	0.000	9.55E-09	4.16	3.78E-04
Sr-90	3.31E+04	0.1012	0.101	3.06E-06	4,008.38	1.21E-01
		0.9994	1.000	2.52E-05	39593	1.00
			Adjusted Gross DCGL	39593	dpm/100cm²	(beta)

Adjusted Gross DCGL (combined alpha plus beta)

	DCGL (dpm/100cm²)	Nuclide Fraction	Fraction/ DCGL	Unity Rule Check Gross*Fract	Fract/DCGL
DCGL (alpha)	31244	0.0006	1.81E-08	22.41	7.17E-04
DCGL (beta)	39593	0.9994	2.52E-05	39,564.31	9.99E-01
		1.0000	2.53E-05	39587	1.00
		Adjusted Gross DCGL	39587	dpm/100cm²	(alpha plus beta)

Hot Laboratory 0 ft
Core Location #14 12
C9000 101I1 FL1C3 L0514-01 (CS022004-012)
C9000 101I1 FL1C1 L0514-02 (CS022004-014)

ALPHA	DCGL (dpm/100cm²)	Results (pCi/gram)	MDA (pCi/gram)	Used (pCi/gram)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
U-234	3.15E+04	8.10E-01	7.00E-02	8.10E-01	0.11%	N/A	N/A
U-235	2.71E+04		7.40E-02	7.40E-02	0.01%	N/A	N/A
BETA							
Cs-137	4.05E+04	7.27E+02	5.00E-01	7.27E+02	95.54%	N/A	N/A
Co-60	1.10E+04	2.17E+00	1.20E-01	2.17E+00	0.28%	N/A	N/A
Sr-90	3.31E+04	3.09E+01	4.00E-01	3.09E+01	4.06%	N/A	N/A
Cs-137 to Co-60 ratio =		3.35E+02		7.61E+02	100.00%		

Adjusted Gross DCGL

ALPHA	DCGL (dpm/100cm²)	Nuclide Fraction	Alpha Nuclide Fraction	Fraction/ DCGL	Unity Rule Check Gross*Fract	Fract/DCGL
U-234	3.15E+04	0.0011	0.916	3.38E-08	28,476.06	9.04E-01
U-235	2.71E+04	0.0001	0.084	3.59E-09	2,601.55	9.60E-02
		0.0012	1.000	3.74E-08	31078	1.00
			Adjusted Gross DCGL	31078	dpm/100cm²	(alpha)

BETA	DCGL (dpm/100cm²)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL	Unity Rule Check Gross*Fract	Fract/DCGL
Cs-137	4.05E+04	0.9554	0.956	2.36E-05	38,100.45	9.41E-01
Co-60	1.10E+04	0.0028	0.003	2.59E-07	113.58	1.03E-02
Sr-90	3.31E+04	0.0406	0.041	1.23E-06	1,619.35	4.89E-02
		0.9988	1.00	2.51E-05	39833	1.00
			Adjusted Gross DCGL	39833	dpm/100cm²	(beta)

Adjusted Gross DCGL (combined alpha plus beta)

	DCGL (dpm/100cm²)	Nuclide Fraction	Fraction/ DCGL	Unity Rule Check Gross*Fract	Fract/DCGL
DCGL (alpha)	31078	0.0012	3.74E-08	46.26	1.49E-03
DCGL (beta)	39833	0.9988	2.51E-05	39,774.08	9.99E-01
		1.0000	2.51E-05	39820	1.00
		Adjusted Gross DCGL	39820	dpm/100cm²	(alpha plus beta)

Hot Pipe Tunnel, -12 ft
Core Location #15 6
C9000 101I1 FL1C1 L0515-1 (CS022304-017)
C9000 101I1 FL1C1 L0515-2 (CS022304-019)

ALPHA	DCGL (dpm/100cm²)	Results (pCi/gram)	MDA (pCi/gram)	Used (pCi/gram)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
U-234	3.15E+04	1.28E+00	7.00E-02	1.28E+00	0.02%	N/A	N/A
U-235	2.71E+04		9.10E-02	**9.10E-02**	0.00%	N/A	N/A
BETA							
Cs-137	4.05E+04	4.16E+03	1.00E+00	4.16E+03	81.06%	1.00	2.47E-05
H-3	9.10E+06		5.30E+00	**5.30E+00**	0.10%	0.00	1.40E-10
Co-60	1.10E+04	1.87E+01	3.00E-01	1.87E+01	0.36%	N/A	N/A
Sr-90	3.31E+04	9.46E+02	1.00E+00	9.46E+02	18.45%	N/A	N/A
Cs-137 to Co-60 ratio =		2.22E+02		5.13E+03	100.00%		

Adjusted Gross DCGL

ALPHA	DCGL (dpm/100cm²)	Nuclide Fraction	Alpha Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
U-234	3.15E+04	0.00025	0.934	7.93E-09		29,095.62	9.24E-01
U-235	2.71E+04	0.00002	0.066	6.55E-10		2,068.53	7.63E-02
		0.00027	1.000	8.58E-09		31164	1.00
			Adjusted Gross DCGL	31164	dpm/100cm²	(alpha)	

BETA	DCGL (dpm/100cm²)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
Cs-137	4.05E+04	0.8106	0.812	2.00E-05		31,273.93	7.72E-01
Co-60	1.10E+04	0.0036	0.004	3.31E-07		140.62	1.28E-02
Sr-90	3.31E+04	0.1845	0.185	5.57E-06		7,117.04	2.15E-01
		0.9987	1.000	2.59E-05		38532	1.00
			Adjusted Gross DCGL	38532	dpm/100cm²	(beta)	

Adjusted Gross DCGL (combined alpha plus beta)

	DCGL (dpm/100cm²)	Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
DCGL (alpha)	31164	0.0003	8.58E-09		10.30	3.31E-04
DCGL (beta)	38532	0.9997	2.59E-05		38,518.85	1.00E+00
		1.0000	2.60E-05		38529	1.00
		Adjusted Gross DCGL	38529	dpm/100cm²	(alpha plus beta)	

Hot Pipe Tunnel, -12 ft
Core Location #16 7
C9000 101I1 FL1C1 L0516-1 (CS022304-021)
C9000 101I1 FL1C1 L0516-2 (CS022304-023)

ALPHA	DCGL (dpm/100cm²)	Results (pCi/gram)	MDA (pCi/gram)	Used (pCi/gram)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
U-234	3.15E+04	9.10E-01	6.00E-02	9.10E-01	0.09%	N/A	N/A
U-235	2.71E+04		9.30E-02	**9.30E-02**	0.01%	N/A	N/A
BETA							
Cs-137	4.05E+04	2.44E+02	4.00E-01	2.44E+02	23.47%	1.00	2.47E-05
H-3	9.10E+06		5.20E+00	**5.20E+00**	0.50%	0.02	2.34E-09
Co-60	1.10E+04	6.23E+00	2.40E-01	6.23E+00	0.60%	N/A	N/A
Sr-90	3.31E+04	7.83E+02	2.00E+00	7.83E+02	75.33%	N/A	N/A
Cs-137 to Co-60 ratio =		3.91E+01		1.04E+03	100.00%		

Adjusted Gross DCGL

ALPHA	DCGL (dpm/100cm²)	Nuclide Fraction	Alpha Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
U-234	3.15E+04	0.00088	0.907	2.78E-08		28,155.36	8.94E-01
U-235	2.71E+04	0.00009	0.093	3.30E-09		2,877.45	1.06E-01
		0.00097	1.000	3.11E-08		31033	1.00
			Adjusted Gross DCGL	31033	dpm/100cm²	(alpha)	

BETA	DCGL (dpm/100cm²)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
Cs-137	4.05E+04	0.2347	0.236	5.80E-06		8,065.90	1.99E-01
Co-60	1.10E+04	0.0060	0.006	5.45E-07		206.05	1.87E-02
Sr-90	3.31E+04	0.7533	0.758	2.28E-05		25,887.21	7.82E-01
		0.9940	1.000	2.91E-05		34159	1.00
			Adjusted Gross DCGL	34159	dpm/100cm²	(beta)	

Adjusted Gross DCGL (combined alpha plus beta)

	DCGL (dpm/100cm²)	Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
DCGL (alpha)	31033	0.0010	3.11E-08		32.97	1.06E-03
DCGL (beta)	34159	0.9990	2.92E-05		34,122.87	9.99E-01
		1.0000	2.93E-05		34156	1.00
		Adjusted Gross DCGL	34156	dpm/100cm²	(alpha plus beta)	

Hot Pipe Tunnel, -12'0" El., Southwest Corner
Core Location #20 16
C9000 101I3 FL1C1 L05 20-1P1 (CS050630-047)
Surrogate

BETA	DCGL (dpm/100cm²)	Results (pCi/gram)	MDA (pCi/gram)	Used (pCi/gram)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
Cs-137	4.05E+04	1.76E+04	4.56E+00	1.76E+04	31.81%	1.0000	2.47E-05
H-3	9.10E+06	3.22E+01	5.51E+00	3.22E+01	0.06%	0.0018	2.02E-10
Co-60	1.10E+04	3.25E+02	2.69E+00	3.25E+02	0.59%	N/A	N/A
Sr-90	3.31E+04	3.73E+04	2.36E+00	3.73E+04	67.55%	N/A	N/A
Cs-137 to Co-60 ratio =		5.40E+01		5.52E+04	100.00%		

Adjusted Gross DCGL

BETA	DCGL (dpm/100cm²)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
Cs-137	4.05E+04	0.3181	0.318	7.8536E-06		11,045.56	2.73E-01
Co-60	1.10E+04	0.0059	0.006	5.3576E-07		204.66	1.86E-02
Sr-90	3.31E+04	0.6755	0.676	2.0407E-05		23,456.73	7.09E-01
		0.9994	1.000	2.8796E-05		34707	1.00
			Adjusted Gross DCGL	34707	dpm/100cm²		

Hot Pipe Tunnel, -12'0" El., Area 25B/Area B
Core Location SR24-18 28
HPT-SP9-SL2 (PB06-02478-T & 02478-B)

ALPHA	DCGL (dpm/100cm²)	Results (pCi/gram)	MDA (pCi/gram)	Used (pCi/gram)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
U-234	3.15E+04	8.00E-01	6.00E-02	8.00E-01	1.08%	N/A	N/A
U-235	2.71E+04	5.80E-02	5.10E-02	5.80E-02	0.08%	N/A	N/A
BETA							
Cs-137	4.05E+04	6.33E+01	4.00E-01	6.33E+01	85.69%	1.00	2.47E-05
H-3	9.10E+06		6.70E-01	**6.70E-01**	0.91%	0.01	1.16E-09
Co-60	1.10E+04	2.34E+00	3.20E-01	2.34E+00	3.17%	N/A	N/A
Sr-90	3.31E+04	6.70E+00	9.00E-01	6.70E+00	9.07%	N/A	N/A
Cs-137 to Co-60 ratio =		2.71E+01		7.39E+01	100.00%		

Adjusted Gross DCGL

ALPHA	DCGL (dpm/100cm²)	Nuclide Fraction	Alpha Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
U-234	3.15E+04	0.0108	0.932	3.44E-07		29,051.77	9.22E-01
U-235	2.71E+04	0.0008	0.068	2.90E-08		2,106.25	7.77E-02
		0.0116	1.000	3.73E-07		31158	1.00
			Adjusted Gross DCGL	31158	dpm/100cm²	(alpha)	

BETA	DCGL (dpm/100cm²)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
Cs-137	4.05E+04	0.8569	0.875	2.12E-05		31,999.10	7.90E-01
Co-60	1.10E+04	0.0317	0.032	2.88E-06		1,182.91	1.08E-01
Sr-90	3.31E+04	0.0907	0.093	2.74E-06		3,386.95	1.02E-01
		0.9793	1.000	2.68E-05		36569	1.00
			Adjusted Gross DCGL	36569	dpm/100cm²	(beta)	

Adjusted Gross DCGL (combined alpha plus beta)

	DCGL (dpm/100cm²)	Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
DCGL (alpha)	31158	0.0116	3.73E-07		423.90	1.36E-02
DCGL (beta)	36569	0.9884	2.70E-05		36,071.43	9.86E-01
		1.0000	2.74E-05		36495	1.00
		Adjusted Gross DCGL	36495	dpm/100cm²	(alpha plus beta)	

Hot Pipe Tunnel, -12'0" El., Area 25B
Core Location SR24-8 25
HPT-SP4-SL3 (PB06-02319-T & 02319-B)

ALPHA	DCGL (dpm/100cm²)	Results (pCi/gram)	MDA (pCi/gram)	Used (pCi/gram)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
U-234	3.15E+04	6.30E-01	4.00E-02	6.30E-01	1.23%	N/A	N/A
U-235	2.71E+04	7.40E-02	3.40E-02	7.40E-02	0.15%	N/A	N/A
BETA							
Cs-137	4.05E+04	4.59E+01	2.00E-01	4.59E+01	89.98%	1.00	2.47E-05
H-3	9.10E+06	7.20E-01	6.70E-01	7.20E-01	1.41%	0.02	1.72E-09
Co-60	1.10E+04	2.78E+00	1.40E-01	2.78E+00	5.45%	N/A	N/A
Sr-90	3.31E+04		9.10E-01	**9.10E-01**	1.78%	N/A	N/A
Cs-137 to Co-60 ratio =		1.65E+01		5.10E+01	100.00%		

Adjusted Gross DCGL

ALPHA	DCGL (dpm/100cm²)	Nuclide Fraction	Alpha Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
U-234	3.15E+04	0.0123	0.8949	3.92E-07		27,715.91	8.80E-01
U-235	2.71E+04	0.0015	0.1051	5.35E-08		3,255.52	1.20E-01
		0.0138	1.0000	4.46E-07		30971	1.00
			Adjusted Gross DCGL	30971	dpm/100cm²	(alpha)	

BETA	DCGL (dpm/100cm²)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
Cs-137	4.05E+04	0.8998	0.926	2.22E-05		32,469.55	8.02E-01
Co-60	1.10E+04	0.0545	0.056	4.95E-06		1,966.57	1.79E-01
Sr-90	3.31E+04	0.0178	0.018	5.39E-07		643.73	1.94E-02
		0.9721	1.000	2.77E-05		35080	1.00
			Adjusted Gross DCGL	35080	dpm/100cm²	(beta)	

Adjusted Gross DCGL (combined alpha plus beta)

	DCGL (dpm/100cm²)	Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
DCGL (alpha)	30971	0.0138	4.46E-07		483.22	1.56E-02
DCGL (beta)	35080	0.9862	2.81E-05		34,532.52	9.84E-01
		1.0000	2.86E-05		35016	1.00
		Adjusted Gross DCGL	35016	dpm/100cm²	(alpha plus beta)	

Cold Pipe Tunnel, -15'0" El., West of N-S Trench
Core Location #18 17
C9000 101I3 FL1C1 L05 18-1P1 (CS050617-017)

	DCGL	Results	MDA	Used	Nuclide	Ratio to	Ratio/
ALPHA	**(dpm/100cm²)**	**(pCi/gram)**	**(pCi/gram)**	**(pCi/gram)**	**Distribution**	**Surrogate**	**DCGL**
U-234	**3.15E+04**	8.60E-01	1.30E-01	8.60E-01	11.12%	N/A	N/A
BETA							
Sr-90	**3.31E+04**	6.87E+00	1.20E-01	6.87E+00	88.88%	N/A	N/A
Cs-137 to Co-60 ratio =		indeterminate		7.73E+00	100.00%		

Adjusted Gross DCGL (combined alpha plus beta)

	DCGL	Nuclide	Fraction/	Unity Rule Check	
	(dpm/100cm²)	**Fraction**	**DCGL**	**Gross*Fract**	**Fract/DCGL**
DCGL (alpha)	**3.15E+04**	0.1112	3.53E-06	3,660.30	1.16E-01
DCGL (beta)	**3.31E+04**	0.8888	2.69E-05	29,253.78	8.84E-01
		1.0000	3.04E-05	32914	1.00
		Adjusted Gross DCGL	**32914**	**dpm/100cm² (alpha plus beta)**	

Actual sample was 59.6% Ni-63 and 35.9% Sr-90, and 4.5% U-234. Use Co-60 DCGL (11,000 dpm/100 cm2) because, based on detector efficiencies (15% Co-60, 0.5% Ni-63), even if we are just above 11,000 we will still be below the Ni-63 DCGL of 36,000,000 dpm/100cm2.

see Appendix D, Addendum 1 for actual sample results.

Fan House -12 ft
Core Location #17 8
C9000 101I1 FL1C1 L0517-1 (CS022704-001)
C9000 101I1 FL1C1 L0517-002 (CS022704-003)

	DCGL	Results	MDA	Used	Nuclide	Ratio to	Ratio/
ALPHA	**(dpm/100cm²)**	**(pCi/gram)**	**(pCi/gram)**	**(pCi/gram)**	**Distribution**	**Surrogate**	**DCGL**
U-234	**3.15E+04**	1.14E+00	4.00E-02	1.14E+00	16.68%	N/A	N/A
BETA							
Cs-137	**4.05E+04**	3.85E-01	9.00E-02	3.85E-01	5.63%	1.00	2.47E-05
H-3	**9.10E+06**	5.31E+00	5.30E+00	5.31E+00	77.69%	13.80	1.52E-06
Cs-137 to Co-60 ratio =		indeterminate		6.83E+00	100.00%		

Adjusted Gross DCGL

	DCGL	Nuclide	Alpha Nuclide	Fraction/	Unity Rule Check	
ALPHA	**(dpm/100cm²)**	**Fraction**	**Fraction**	**DCGL**	**Gross*Fract**	**Fract/DCGL**
U-234	**3.15E+04**	0.1668	1.000	5.30E-06	31,500.00	1.00E+00
		0.1668	1.000	5.30E-06	31500	1.00
		Adjusted Gross DCGL		**31500**	**dpm/100cm² (alpha)**	

	DCGL	Nuclide	Beta Nuclide	Fraction/	Unity Rule Check	
BETA	**(dpm/100cm²)**	**Fraction**	**Fraction**	**DCGL**	**Gross*Fract**	**Fract/DCGL**
Cs-137	**3.82E+04**	0.0563	1.000	1.47E-06	38,155.82	1.00E+00
		0.0563	1.000	1.47E-06	38156	1.00
		Adjusted Gross DCGL		**38156**	**dpm/100cm² (beta)**	

Adjusted Gross DCGL (combined alpha plus beta)

	DCGL	Nuclide	Fraction/	Unity Rule Check	
	(dpm/100cm²)	**Fraction**	**DCGL**	**Gross*Fract**	**Fract/DCGL**
DCGL (alpha)	31500	0.1668	5.30E-06	6,148.35	1.95E-01
DCGL (beta)	38156	0.8332	2.18E-05	30,708.35	8.05E-01
		1.0000	2.71E-05	36857	1.00
		Adjusted Gross DCGL	**36857**	**dpm/100cm² (alpha plus beta)**	

Waste Handling Bldg -13 ft
Core Location #10 5
C9000 101I1 FL1C3 L0510-1 (CS022304-013)
C9000 101I1 FL1C1 L0510-2 (CS022304-015)

	DCGL (dpm/100cm²)	Results (pCi/gram)	MDA (pCi/gram)	Used (pCi/gram)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
ALPHA							
U-234	**3.15E+04**	5.50E-01	8.00E-02	5.50E-01	0.02%	N/A	N/A
U-235	**2.71E+04**	5.30E-02	4.80E-02	5.30E-02	0.00%	N/A	N/A
BETA							
Cs-137	**4.05E+04**	2.95E+03	8.00E-01	2.95E+03	99.76%	1.00	2.47E-05
H-3	**9.10E+06**		5.30E+00	**5.30E+00**	0.18%	0.00	1.97E-10
Co-60	**1.10E+04**		1.10E-01	**1.10E-01**	0.00%	N/A	N/A
Sr-90	**3.31E+04**	1.12E+00	4.80E-02	1.12E+00	0.04%	N/A	N/A
Cs-137 to Co-60 ratio =		indeterminate		2.96E+03	100.00%		

Adjusted Gross DCGL

	DCGL (dpm/100cm²)	Nuclide Fraction	Alpha Nuclide Fraction	Fraction/ DCGL	Unity Rule Check Gross*Fract	Fract/DCGL
ALPHA						
U-234	**3.15E+04**	0.00019	0.912	5.90E-09	28,327.10	8.99E-01
U-235	**2.71E+04**	0.00002	0.088	6.60E-10	2,729.70	1.01E-01
		0.00020	1.000	6.56E-09	31057	1.00
			Adjusted Gross DCGL	**31057**	**dpm/100cm² (alpha)**	

	DCGL (dpm/100cm²)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL	Unity Rule Check Gross*Fract	Fract/DCGL
BETA						
Cs-137	**4.05E+04**	0.99759	0.99958	2.46E-05	40,475.30	9.99E-01
Co-60	**1.10E+04**	0.00004	0.00004	3.38E-09	1.51	1.37E-04
Sr-90	**3.31E+04**	0.00038	0.00038	1.15E-08	15.39	4.65E-04
		0.99801	1.00000	2.46E-05	40492	1.00
			Adjusted Gross DCGL	**40492**	**dpm/100cm² (beta)**	

Adjusted Gross DCGL (combined alpha plus beta)

	DCGL (dpm/100cm²)	Nuclide Fraction	Fraction/ DCGL	Unity Rule Check Gross*Fract	Fract/DCGL
DCGL (alpha)	31057	0.0002	6.56E-09	8.24	2.65E-04
DCGL (beta)	40492	0.9998	2.47E-05	40,481.45	1.00E+00
		1.0000	2.47E-05	40490	1.00
		Adjusted Gross DCGL	**40490**	**dpm/100cm² (alpha plus beta)**	

Waste Handling Bldg., -14'6" El., Evaporator Pit
Core Location #16 15
C9000 101I3 FL1C1 L05 16a1P1 (CS050630-036)

	DCGL (dpm/100cm²)	Results (pCi/gram)	MDA (pCi/gram)	Used (pCi/gram)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
BETA							
Cs-137	**4.05E+04**	1.29E+04	3.80E+00	1.29E+04	92.64%	1.00	2.47E-05
H-3	**9.10E+06**	4.21E+01	5.57E+00	4.21E+01	0.30%	0.00	3.58E-10
Co-60	**1.10E+04**	3.22E+01	7.19E-01	3.22E+01	0.23%	N/A	N/A
Sr-90	**3.31E+04**	9.52E+02	4.47E-01	9.52E+02	6.83%	N/A	N/A
Cs-137 to Co-60 ratio =		4.01E+02		1.39E+04	100.00%		

Adjusted Gross DCGL

	DCGL (dpm/100cm²)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL	Unity Rule Check Gross*Fract	Fract/DCGL
Cs-137	**4.05E+04**	0.9264	0.929	2.2874E-05	36,839.03	9.10E-01
Co-60	**1.10E+04**	0.0023	0.002	2.0982E-07	91.78	8.34E-03
Sr-90	**3.31E+04**	0.0683	0.068	2.0630E-06	2,715.44	8.20E-02
		0.9970	1.00	2.5147E-05	39646	1.00
			Adjusted Gross DCGL	**39646**	**dpm/100cm²**	

Waste Handling Bldg., -14'6" El., Evaporator Pit
Core Location SR24-2 24
WHB-SP2-SL3 (PB06-02244-T & 02244-B)

	DCGL (dpm/100cm²)	Results (pCi/gram)	MDA (pCi/gram)	Used (pCi/gram)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
ALPHA							
U-234	**3.15E+04**	7.00E-01	5.00E-02	7.00E-01	1.06%	N/A	N/A
U-235	**2.71E+04**		4.00E-02	**4.00E-02**	0.06%	N/A	N/A
BETA							
Cs-137	**4.05E+04**	6.36E+01	2.00E-01	6.36E+01	96.63%	1.00	2.47E-05
H-3	**9.10E+06**	7.10E-01	6.80E-01	7.10E-01	1.08%	0.01	1.23E-09
Co-60	**1.10E+04**		1.60E-01	**1.60E-01**	0.24%	N/A	N/A
Sr-90	**3.31E+04**		6.10E-01	**6.10E-01**	0.93%	N/A	N/A
Cs-137 to Co-60 ratio =		indeterminate		6.58E+01	100.00%		

Adjusted Gross DCGL

	DCGL (dpm/100cm²)	Nuclide Fraction	Alpha Nuclide Fraction	Fraction/ DCGL	Unity Rule Check Gross*Fract	Fract/DCGL
ALPHA						
U-234	**3.15E+04**	0.0106	0.946	3.38E-07	29,538.06	9.38E-01
U-235	**2.71E+04**	0.0006	0.054	2.24E-08	1,687.89	6.23E-02
		0.0112	1.000	3.60E-07	31226	1.00
			Adjusted Gross DCGL	**31226**	**dpm/100cm² (alpha)**	

	DCGL (dpm/100cm²)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL	Unity Rule Check Gross*Fract	Fract/DCGL
BETA						
Cs-137	**4.05E+04**	0.9663	0.988	2.39E-05	39,665.15	9.79E-01
Co-60	**1.10E+04**	0.0024	0.002	2.21E-07	99.79	9.07E-03
Sr-90	**3.31E+04**	0.0093	0.009	2.80E-07	380.44	1.15E-02
		0.9780	1.000	2.44E-05	40145	1.00
			Adjusted Gross DCGL	**40145**	**dpm/100cm² (beta)**	

Adjusted Gross DCGL (combined alpha plus beta)

	DCGL (dpm/100cm²)	Nuclide Fraction	Fraction/ DCGL	Unity Rule Check Gross*Fract	Fract/DCGL
DCGL (alpha)	31226	0.0112	3.60E-07	449.90	1.44E-02
DCGL (beta)	40145	0.9888	2.46E-05	39,566.96	9.86E-01
		1.0000	2.50E-05	40017	1.00
		Adjusted Gross DCGL	**40017**	**dpm/100cm² (alpha plus beta)**	

Primary Pump House, 0'0" El., Room 6
Core Location SR24-12 26
PPH-R6-SP1-SL10 (PB06-02364-T & 02364-B)

	DCGL (dpm/100cm²)	Results (pCi/gram)	MDA (pCi/gram)	Used (pCi/gram)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
ALPHA							
U-234	**3.15E+04**	7.00E-01	7.00E-02	7.00E-01	10.19%	N/A	N/A
U-235	**2.71E+04**	8.00E-02	3.60E-02	8.00E-02	1.16%	N/A	N/A
BETA							
Cs-137	**4.05E+04**		1.60E-01	**1.60E-01**	2.33%	1.00	2.47E-05
H-3	**9.10E+06**	4.56E+00	6.70E-01	4.56E+00	66.38%	28.50	3.13E-06
I-129	**1.49E+04**		1.20E+00	**1.20E+00**	17.47%	7.50	5.03E-04
Co-60	**1.10E+04**		1.70E-01	**1.70E-01**	2.47%	N/A	N/A
Cs-137 to Co-60 ratio =		indeterminate		6.87E+00	100.00%		

Adjusted Gross DCGL

	DCGL (dpm/100cm²)	Nuclide Fraction	Alpha Nuclide Fraction	Fraction/ DCGL	Unity Rule Check Gross*Fract	Fract/DCGL
ALPHA						
U-234	**3.15E+04**	0.1019	0.897	3.23E-06	27,806.19	8.83E-01
U-235	**2.71E+04**	0.0116	0.103	4.30E-07	3,177.85	1.17E-01
		0.1135	1.000	3.66E-06	30984	1.00
			Adjusted Gross DCGL	**30984**	**dpm/100cm² (alpha)**	

	DCGL (dpm/100cm²)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL	Unity Rule Check Gross*Fract	Fract/DCGL
BETA						
Cs-137	**1.88E+03**	0.0233	0.485	1.24E-05	1,592.94	8.46E-01
Co-60	**1.10E+04**	0.0247	0.515	2.25E-06	1,692.50	1.54E-01
		0.0480	1.000	1.46E-05	3285	1.00
			Adjusted Gross DCGL	**3285**	**dpm/100cm² (beta)**	

Adjusted Gross DCGL (combined alpha plus beta)

	DCGL (dpm/100cm²)	Nuclide Fraction	Fraction/ DCGL	Unity Rule Check Gross*Fract	Fract/DCGL
DCGL (alpha)	30984	0.1135	3.66E-06	415.16	1.34E-02
DCGL (beta)	3285	0.8865	2.70E-04	3,241.42	9.87E-01
		1.0000	2.73E-04	3657	1.00
		Adjusted Gross DCGL	**3657**	**dpm/100cm² (alpha plus beta)**	

Primary Pump House, 0'0" El., Room 4
Core Location SR24-16 27
PPH-R4-SP2-SL1 (PB06-02229-T & 02229-B)

	DCGL (dpm/100cm²)	Results (pCi/gram)	MDA (pCi/gram)	Used (pCi/gram)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
ALPHA							
U-234	**3.15E+04**	9.40E-01	3.00E-02	9.40E-01	5.24%	N/A	N/A
U-235	**2.71E+04**	4.70E-02	2.60E-02	4.70E-02	0.26%	N/A	N/A
BETA							
Cs-137	**4.05E+04**	1.41E+00	1.40E-01	1.41E+00	7.87%	1.00	2.47E-05
H-3	**9.10E+06**	8.20E+00	7.00E-01	8.20E+00	45.74%	5.82	6.39E-07
I-129	**1.49E+04**	5.60E+00	1.60E+00	5.60E+00	31.24%	3.97	2.67E-04
Co-60	**1.10E+04**	1.73E+00	1.70E-01	1.73E+00	9.65%	N/A	N/A
Cs-137 to Co-60 ratio =		8.15E-01		1.79E+01	100.00%		

Adjusted Gross DCGL

	DCGL (dpm/100cm²)	Nuclide Fraction	Alpha Nuclide Fraction	Fraction/ DCGL	Unity Rule Check Gross*Fract	Fract/DCGL
ALPHA						
U-234	**3.15E+04**	0.0524	0.952	1.66E-06	29,769.83	9.45E-01
U-235	**2.71E+04**	0.0026	0.048	9.67E-08	1,488.49	5.49E-02
		0.0551	1.000	1.76E-06	31258	1.00
			Adjusted Gross DCGL	**31258**	**dpm/100cm² (alpha)**	

	DCGL (dpm/100cm²)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL	Unity Rule Check Gross*Fract	Fract/DCGL
BETA						
Cs-137	**3.43E+03**	0.0787	0.449	2.30E-05	2,478.78	7.24E-01
Co-60	**1.10E+04**	0.0965	0.551	8.77E-06	3,041.34	2.76E-01
		0.1752	1.000	3.17E-05	5520	1.00
			Adjusted Gross DCGL	**5520**	**dpm/100cm² (beta)**	

Adjusted Gross DCGL (combined alpha plus beta)

	DCGL (dpm/100cm²)	Nuclide Fraction	Fraction/ DCGL	Unity Rule Check Gross*Fract	Fract/DCGL
DCGL (alpha)	31258	0.0551	1.76E-06	318.35	1.02E-02
DCGL (beta)	5520	0.9449	1.71E-04	5,463.91	9.90E-01
		1.0000	1.73E-04	5782	1.00
		Adjusted Gross DCGL	**5782**	**dpm/100cm² (alpha plus beta)**	

ROLB Fuel Vault
Core Location #21 13
C9000 101I1 FL1C1 L0521-1 (CS030404-002)
C9000 101I1 FL1C1 L0521-2 (CS030404-004)

ALPHA	DCGL (dpm/100cm²)	Results (pCi/gram)	MDA (pCi/gram)	Used (pCi/gram)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
U-234	**3.15E+04**	0.6000	0.06	6.00E-01	100.00%	N/A	N/A
Cs-137 to Co-60 ratio =		N/A		6.00E-01	100.00%		

Adjusted Gross DCGL **31500** **dpm/100cm² (alpha)**

APPENDIX E

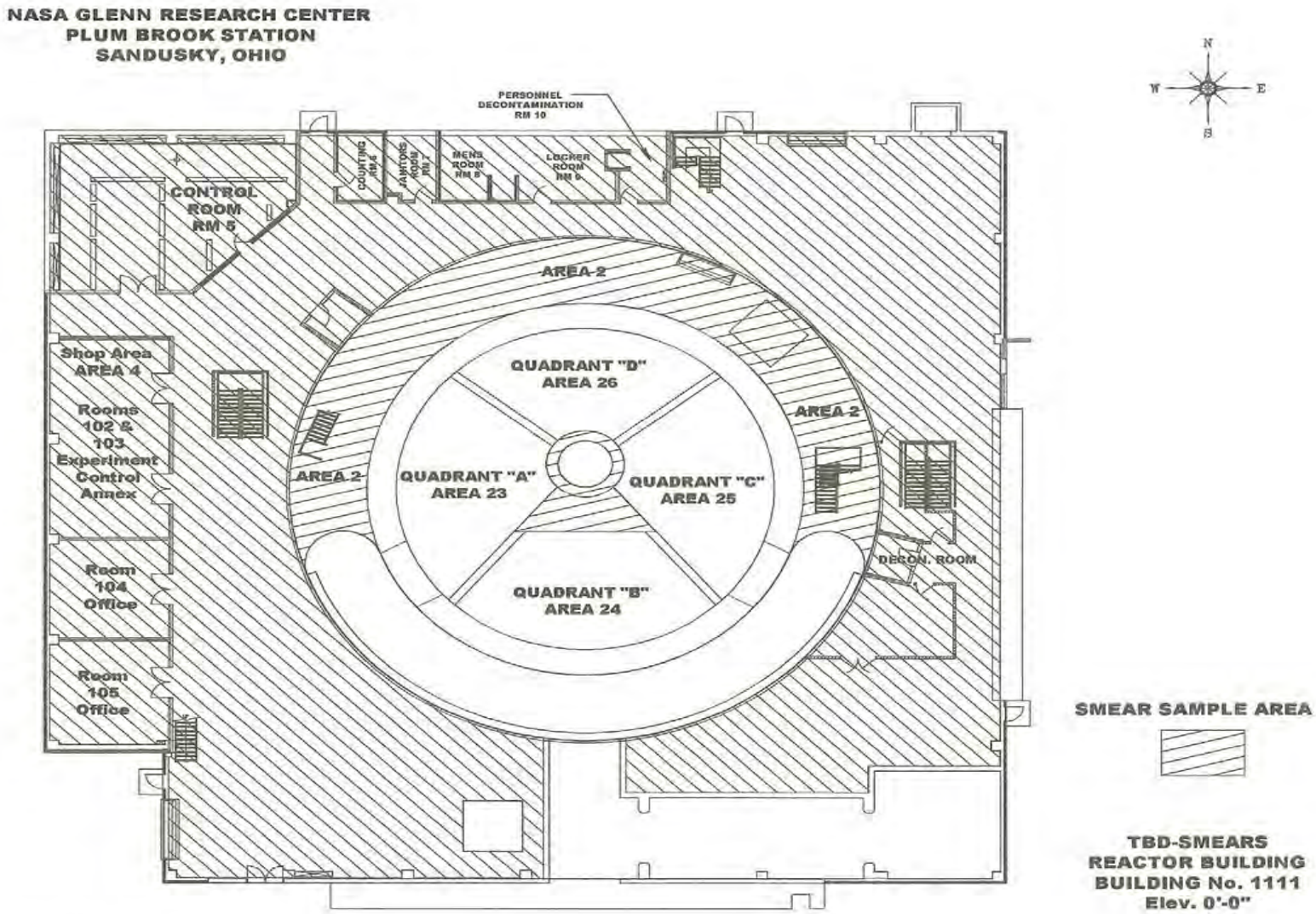
Smear Location Maps

(7 pages)

Smear location maps are provided to show the reader from where all smears were taken. Most areas of the PBRF are represented; however, one will note that both the Hot Laboratory and the Reactor Building are represented more than any of the other buildings. This is because, based upon the preponderance of the evidence, both those buildings showed plentiful signs of residual contamination with which to obtain concrete samples. The other buildings not only displayed limited contamination, but also appeared to be free of residual contamination altogether.

The smear data was originally presented in the 2004 FSSP. Since the headings above each sample, in the FSS, are so general (not specified by either sample number, location, or characterization package coding), there is no way to ascertain exactly where each smear or group of smears was taken; however general areas where smears were taken can be inferred.

Late in the writing of this TBD, data was found which related to the Waste Effluent Monitoring System (WEMS). This is referred to as Building 1192 on site maps. At any rate, three sludge samples were taken from the WEMS in November, 2006 and analyzed on site. The results are presented in Appendix F. Since the samples were not solid concrete cores, it was decided to cite their locations in this Appendix.



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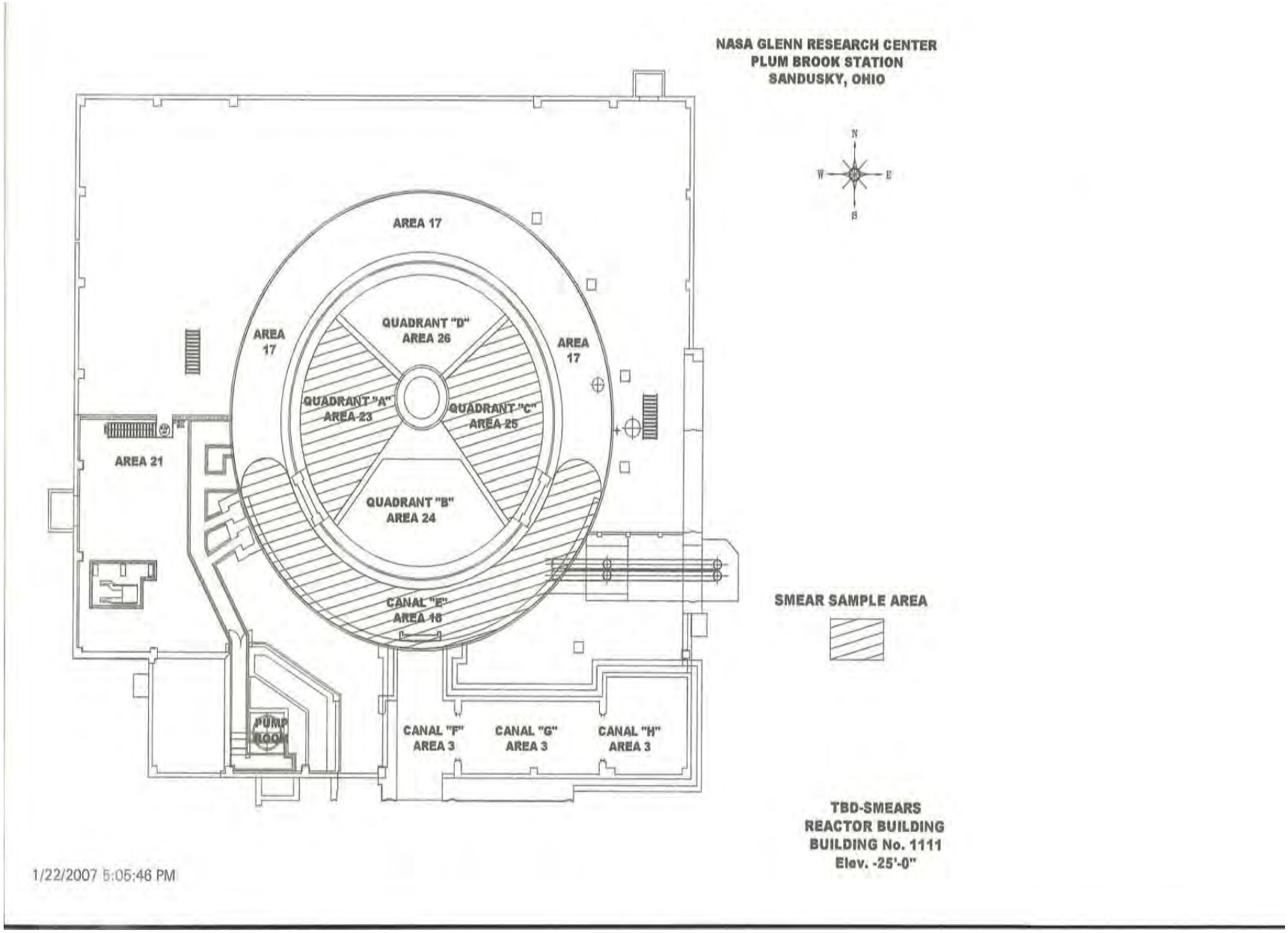
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QUADRANT "A"
AREA 23
QUADRANT "C"
AREA 25
QUADRANT "B"
AREA 24
AREA 21
CANAL "E"
AREA 18
PUMP ROOM
CANAL "F"
AREA 3
CANAL "G"
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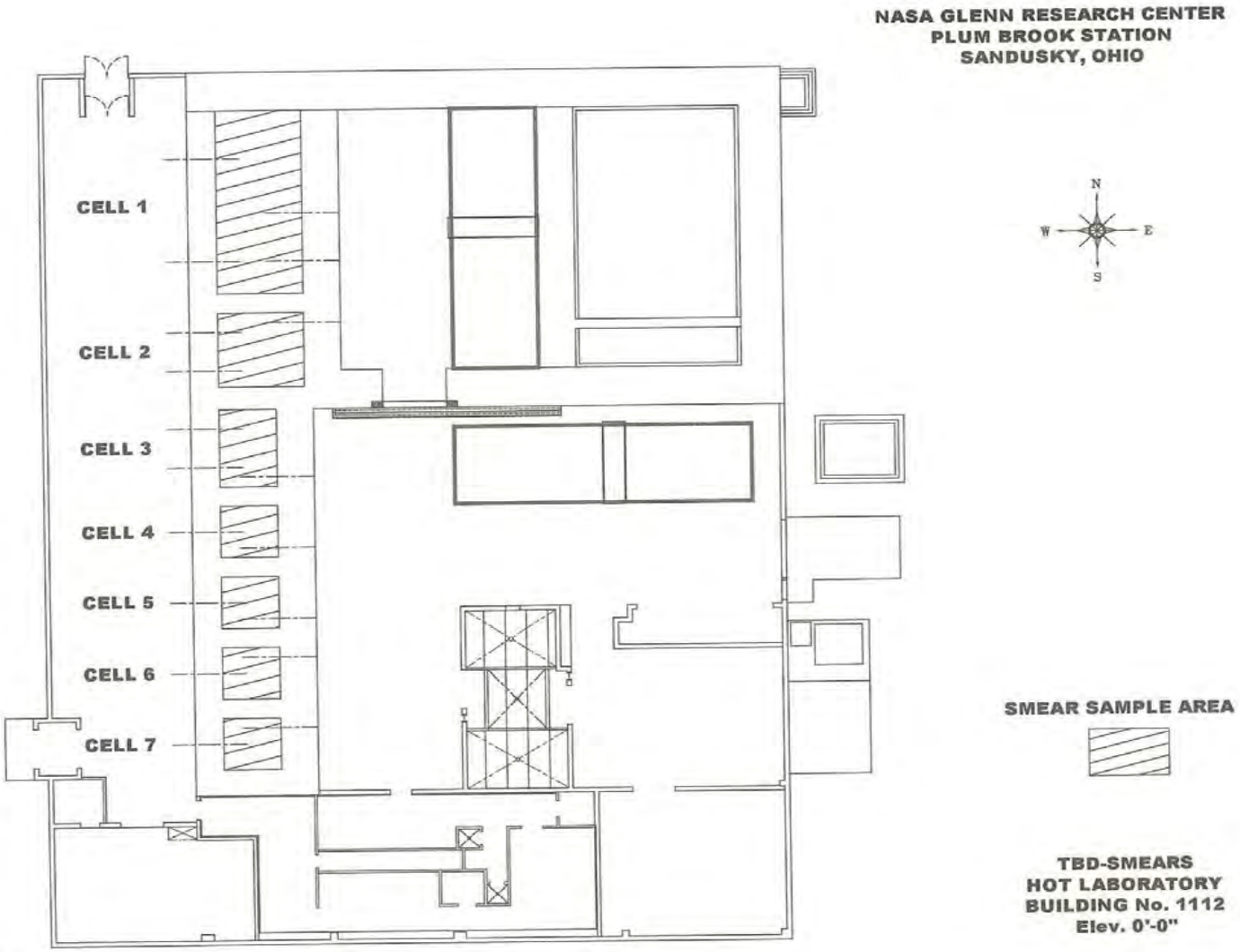

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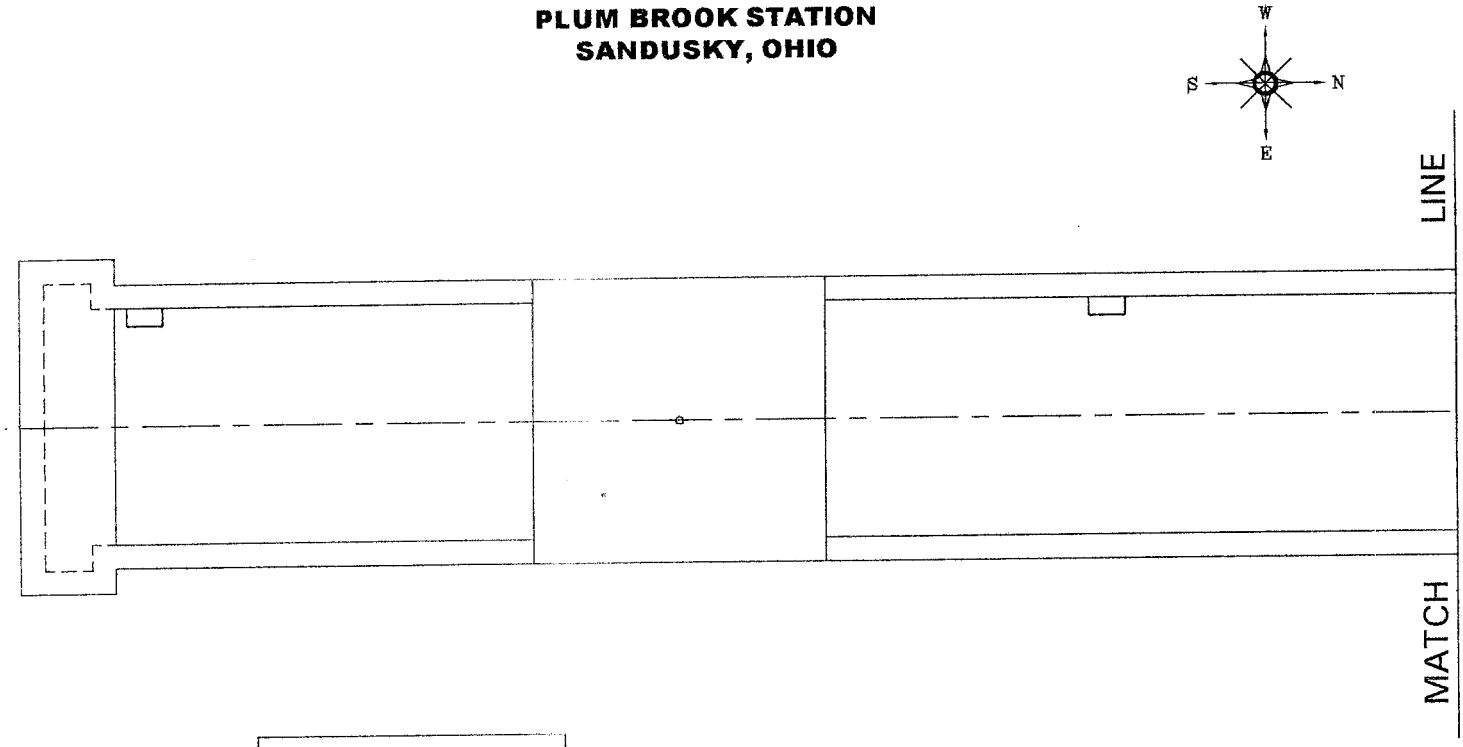
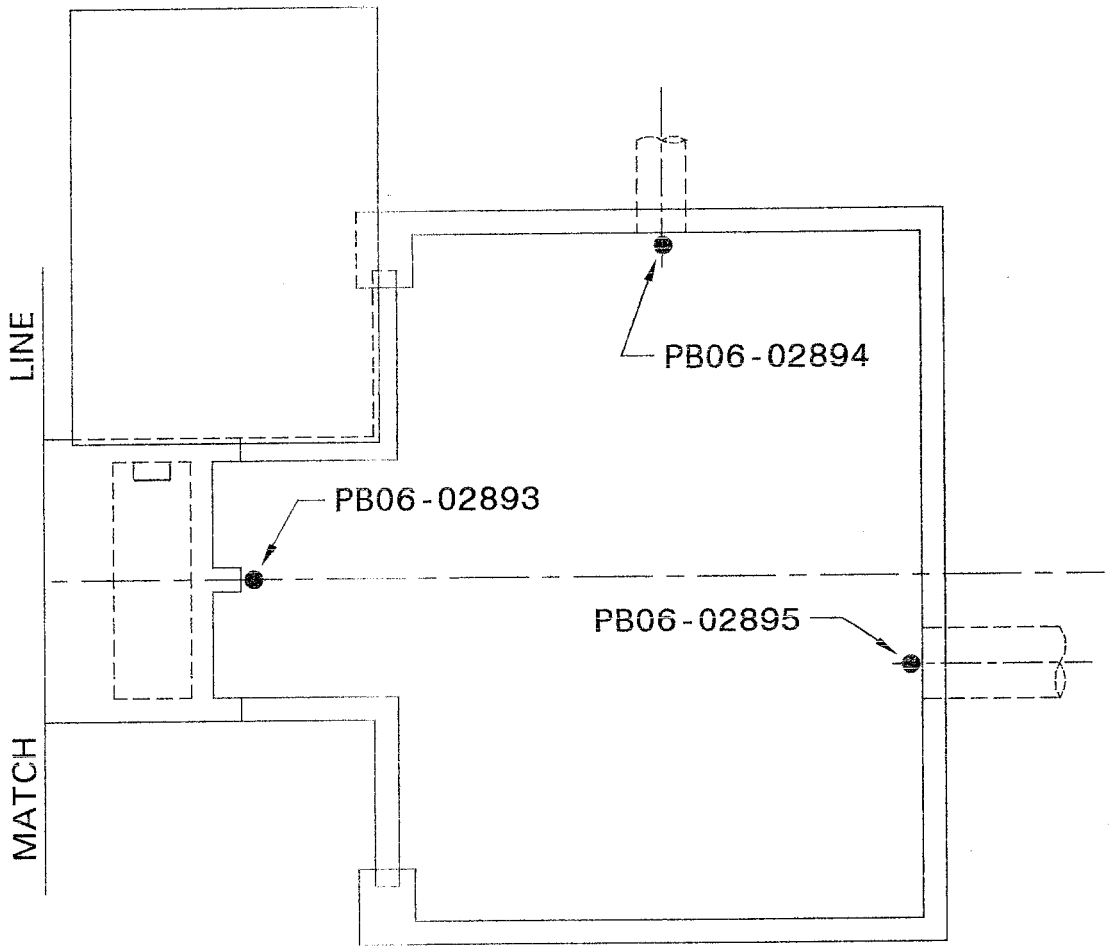
SANDUSKY, OHIO





WEMS
BUILDING No. 1192
Elev. -0'-2"

APPENDIX F

Smear 10CFR61 Data and DCGL Calculations

(10 pages)

Smears were sent off site for 10CFR61 analyses. For whatever reasons, documentation produced by the off-site analytical laboratory did not find its way to NASA's Document Control organization. Since the headings above each sample are so general (not specified by either sample number, location, or characterization package coding), there is no way to ascertain exactly where each smear or group of smears was taken.

This smear data was originally presented in the 2004 FSSP and has been decay-corrected to February 1, 2007: the proposed start of FSS.

	Lilly Pad Smear (pCi/filter)			R	**CTMT General Area Smear (Area 2) (pCi/filter)**			S
	Results	**MDA**	**Used**	**Distribution**	**Results**	**MDA**	**Used**	**Distribution**
Co-60	1.70E+02	4.03E+00	1.70E+02	3.04%	2.41E+03	6.77E+00	2.41E+03	1.16%
Cs-137	1.30E+01	4.05E+00	1.30E+01	0.23%	3.40E+02	9.38E+00	3.40E+02	0.16%
H-3	5.42E+03	3.09E+02	5.42E+03	96.57%	2.04E+05	9.07E+02	2.04E+05	98.57%
Sr-90	9.09E+00	8.11E+00	9.09E+00	0.16%	2.25E+02	8.64E+00	2.25E+02	0.11%
	Cs/Co ratio=	7.61E-02	5.62E+03	100.00%	Cs/Co ratio=	1.41E-01	2.07E+05	100.00%

	Rx Building Smear (pCi/filter)			T	**Rx Building Smear Duplicate (pCi/filter)**			U
	Results	**MDA**	**Used**	**Distribution**	**Results**	**MDA**	**Used**	**Distribution**
Co-60	1.60E+02	8.51E+00	1.60E+02	1.04%	1.70E+03	7.07E+00	1.70E+03	9.57%
Cs-137	4.33E+03	1.02E+01	4.33E+03	27.95%	5.25E+03	1.01E+01	5.25E+03	29.48%
Eu-154	5.64E+01	1.75E+01	5.64E+01	0.36%	7.55E+01	1.59E+01	7.55E+01	0.42%
H-3	9.04E+03	2.89E+01	9.04E+03	58.34%	8.87E+03	2.84E+01	8.87E+03	49.77%
I-129	1.02E+01	8.17E+00	1.02E+01	0.07%	1.94E+01	1.00E+01	1.94E+01	0.11%
Sr-90	1.90E+03	1.44E+01	1.90E+03	12.25%	1.90E+03	1.44E+01	1.90E+03	10.65%
	Cs/Co ratio=	2.70E+01	1.55E+04	100.00%	Cs/Co ratio=	3.08E+00	1.78E+04	100.00%

	Hot Cell Equipment #1 Smear (pCi/filter)			A	**Hot Cell Equipment #2 Smear (pCi/filter)**			B	**Hot Cell Equipment #3 Smear (pCi/filter)**			C
	Results	**MDA**	**Used**	**Distribution**	**Results**	**MDA**	**Used**	**Distribution**	**Results**	**MDA**	**Used**	**Distribution**
Co-60	1.85E+05	1.24E+02	1.85E+05	8.25%	5.82E+03	2.25E+01	5.82E+03	1.57%	1.80E+03	1.27E+01	1.80E+03	2.03%
Cs-137	7.53E+05	2.06E+02	7.53E+05	33.64%	2.53E+05	6.98E+01	2.53E+05	68.38%	4.21E+04	3.22E+01	4.21E+04	47.49%
Eu-154	1.41E+03	3.69E+02	1.41E+03	0.06%		8.27E+01	**8.27E+01**	0.02%	1.52E+02	7.49E+01	1.52E+02	0.17%
H-3	5.29E+05	3.49E+02	5.29E+05	23.63%	3.96E+03	2.53E+02	3.96E+03	1.07%	1.46E+03	4.51E+02	1.46E+03	1.65%
I-129		2.32E+01	**2.32E+01**	0.00%		2.14E+01	**2.14E+01**	0.01%		8.51E+00	**8.51E+00**	0.01%
Sr-90	7.70E+05	3.49E+02	7.70E+05	34.38%	1.07E+05	3.50E+02	1.07E+05	28.94%	4.31E+04	3.65E+02	4.31E+04	48.62%
U-233/234	6.69E+02	7.48E-01	6.69E+02	0.03%	4.23E+01	7.00E-01	4.23E+01	0.01%	2.48E+01	3.01E-01	2.48E+01	0.03%
U-235/236	4.34E+01	7.50E-01	4.34E+01	0.00%	2.84E+00	2.75E-01	2.84E+00	0.00%	1.11E+00	3.02E-01	1.11E+00	0.00%
	Cs/Co ratio=	4.08E+00	2.24E+06	100.00%	Cs/Co ratio=	4.34E+01	3.70E+05	100.00%	Cs/Co ratio=	2.34E+01	8.86E+04	100.00%

	Hot Cell Equipment #4 Smear (pCi/filter)			D	**Hot Cell Equipment #5 Smear (pCi/filter)**			E	**Hot Cell Equipment #6 Smear (pCi/filter)**			F
	Results	**MDA**	**Used**	**Distribution**	**Results**	**MDA**	**Used**	**Distribution**	**Results**	**MDA**	**Used**	**Distribution**
Co-60	1.06E+03	1.23E+01	1.06E+03	5.18%	2.18E+02	7.08E+00	2.18E+02	0.07%	3.31E+02	7.50E+00	3.31E+02	1.62%
Cs-137	3.72E+03	1.61E+01	3.72E+03	18.10%	2.66E+05	6.04E+01	2.66E+05	87.99%	1.08E+04	1.47E+01	1.08E+04	52.84%
Eu-154		3.99E+01	**3.99E+01**	0.19%		3.04E+01	**3.04E+01**	0.01%		3.11E+01	**3.11E+01**	0.15%
H-3	1.28E+04	3.94E+02	1.28E+04	62.02%		2.70E+02	**2.70E+02**	0.09%		2.63E+02	**2.63E+02**	1.28%
I-129		1.83E+01	**1.83E+01**	0.09%		2.33E+01	**2.33E+01**	0.01%		6.17E+00	**6.17E+00**	0.03%
Sr-90	2.96E+03	3.94E+02	2.96E+03	14.39%	3.57E+04	2.87E+02	3.57E+04	11.82%	9.03E+03	3.54E+02	9.03E+03	44.07%
U-233/234	3.88E+00	8.24E-01	3.88E+00	0.02%	8.16E+00	1.42E+00	8.16E+00	0.00%	2.15E+00	8.95E-01	2.15E+00	0.01%
U-235/236		8.26E-01	**8.26E-01**	0.00%	5.32E-01	3.19E-01	5.32E-01	0.00%		2.81E-01	**2.81E-01**	0.00%
	Cs/Co ratio=	3.50E+00	2.06E+04	100.00%	Cs/Co ratio=	1.22E+03	3.02E+05	100.00%	Cs/Co ratio=	3.27E+01	2.05E+04	100.00%

	Hot Cell Equipment #7 Smear (pCi/filter)			G	**Hot Cell #1 Surface Smear (pCi/filter)**			H	**Hot Cell #2 Surface Smear (pCi/filter)**			I
	Results	**MDA**	**Used**	**Distribution**	**Results**	**MDA**	**Used**	**Distribution**	**Results**	**MDA**	**Used**	**Distribution**
Co-60	4.10E+03	2.03E+01	4.10E+03	1.14%	3.48E+04	5.16E+01	3.48E+04	1.74%	1.35E+04	3.13E+01	1.35E+04	5.84%
Cs-137	1.02E+05	5.49E+01	1.02E+05	28.41%	7.49E+05	1.25E+02	7.49E+05	37.55%	1.02E+05	6.47E+01	1.02E+05	43.86%
Eu-154		7.95E+01	**7.95E+01**	0.02%	9.26E+02	1.44E+02	9.26E+02	0.05%	3.19E+02	7.91E+01	3.19E+02	0.14%
H-3	1.38E+05	6.91E+02	1.38E+05	38.46%	4.59E+04	4.01E+02	4.59E+04	2.30%	9.21E+03	5.33E+02	9.21E+03	3.97%
I-129		2.14E+01	**2.14E+01**	0.01%		3.33E+01	**3.33E+01**	0.00%		3.82E+01	**3.82E+01**	0.02%
Sr-90	1.14E+05	3.47E+02	1.14E+05	31.72%	1.16E+06	2.72E+02	1.16E+06	58.30%	1.07E+05	3.29E+02	1.07E+05	46.15%
U-233/234	7.82E+02	1.02E+00	7.82E+02	0.22%	1.05E+03	6.27E-01	1.05E+03	0.05%	5.43E+01	8.26E-01	5.43E+01	0.02%
U-235/236	4.09E+01	1.42E+00	4.09E+01	0.01%	5.52E+01	6.29E-01	5.52E+01	0.00%	3.03E+00	6.62E-01	3.03E+00	0.00%
	Cs/Co ratio=	2.48E+01	3.58E+05	100.00%	Cs/Co ratio=	2.15E+01	2.00E+06	100.00%	Cs/Co ratio=	7.51E+00	2.32E+05	100.00%

	Hot Cell #3 Surface Smear (pCi/filter)			J	**Hot Cell #4 Surface Smear (pCi/filter)**			K	**Hot Cell #5 Surface Smear (pCi/filter)**			L
	Results	**MDA**	**Used**	**Distribution**	**Results**	**MDA**	**Used**	**Distribution**	**Results**	**MDA**	**Used**	**Distribution**
Co-60	2.61E+02	8.70E+00	2.61E+02	4.40%	1.82E+02	5.70E+00	1.82E+02	1.72%	1.03E+02	9.69E+00	1.03E+02	0.47%
Cs-137	3.33E+03	9.55E+00	3.33E+03	56.15%	5.48E+03	1.17E+01	5.48E+03	51.73%	1.63E+04	1.70E+01	1.63E+04	74.06%
Eu-154		2.59E+01	**2.59E+01**	0.44%		1.69E+01	**1.69E+01**	0.16%		2.75E+01	**2.75E+01**	0.12%
H-3		2.26E+02	**2.26E+02**	3.81%	5.21E+02	4.37E+02	5.21E+02	4.92%		3.17E+02	**3.17E+02**	1.44%
I-129		N/A	**0.00E+00**	0.00%		1.53E+01	**1.53E+01**	0.14%	2.12E+00	7.17E-01	2.12E+00	0.01%
Sr-90	2.08E+03	3.67E+02	2.08E+03	35.13%	4.37E+03	3.00E+02	4.37E+03	41.30%	5.27E+03	3.56E+02	5.27E+03	23.89%
U-233/234	3.85E+00	1.61E+00	3.85E+00	0.06%	1.74E+00	8.34E-01	1.74E+00	0.02%	3.03E+00	2.84E-01	3.03E+00	0.01%
U-235/236	2.41E-01	9.23E-01	9.23E-01	0.02%		8.37E-01	**8.37E-01**	0.01%		7.27E-01	**7.27E-01**	0.00%
	Cs/Co ratio=	1.28E+01	5.93E+03	100.00%	Cs/Co ratio=	3.01E+01	1.06E+04	100.00%	Cs/Co ratio=	1.58E+02	2.20E+04	100.00%

	Hot Cell #6 Surface Smear (pCi/filter)			M	**Hot Cell #7 Surface Smear (pCi/filter)**			N
	Results	**MDA**	**Used**	**Distribution**	**Results**	**MDA**	**Used**	**Distribution**
Co-60	9.70E+02	9.69E+00	9.70E+02	0.86%	3.57E+02	9.30E+00	3.57E+02	0.82%
Cs-137	7.64E+04	2.75E+01	7.64E+04	67.77%	3.69E+04	2.40E+01	3.69E+04	85.04%
Eu-154		4.01E+01	**4.01E+01**	0.04%		3.46E+01	**3.46E+01**	0.08%
H-3	3.78E+02	2.44E+02	3.78E+02	0.33%	5.75E+02	2.44E+02	5.75E+02	1.33%
I-129		2.07E+01	**2.07E+01**	0.02%		1.11E+01	**1.11E+01**	0.03%
Sr-90	3.49E+04	2.89E+02	3.49E+04	30.95%	5.50E+03	2.95E+02	5.50E+03	12.69%
U-233/234	3.91E+01	8.38E-01	3.91E+01	0.03%	7.59E+00	1.26E+00	7.59E+00	0.02%
U-235/236	2.97E+00	8.41E-01	2.97E+00	0.00%		7.87E-01	**7.87E-01**	0.00%
	Cs/Co ratio=	7.87E+01	1.13E+05	100.00%	Cs/Co ratio=	1.03E+02	4.33E+04	100.00%

Units for sample concentrations are presented in pCi/filter. Filter in this context is defined as a standard smear sample take over a 100cm2 area.

	ROLB Smear (pCi/filter)			V
	Results	**MDA**	**Used**	**Distribution**
Co-60	2.76E+02	1.16E+01	2.76E+02	1.16%
Cs-137	4.45E+03	1.37E+01	4.45E+03	18.67%
H-3	1.76E+04	5.30E+01	1.76E+04	73.72%
I-129	1.67E+01	1.20E+01	1.67E+01	0.07%
Sr-90	1.42E+03	1.48E+01	1.42E+03	5.97%
U-233/234	9.15E+01	3.97E+00	9.15E+01	0.38%
U-235/236	5.82E+00	2.84E+00	5.82E+00	0.02%
	Cs/Co ratio=	1.61E+01	2.38E+04	100.00%

	ROLB Smear Duplicate (pCi/filter)			W
	Results	**MDA**	**Used**	**Distribution**
Co-60	2.76E+02	1.16E+01	2.76E+02	1.16%
Cs-137	4.45E+03	1.37E+01	4.45E+03	18.79%
H-3	1.76E+04	5.30E+01	1.76E+04	74.17%
I-129	1.67E+01	1.20E+01	1.67E+01	0.07%
Sr-90	1.29E+03	1.39E+01	1.29E+03	5.43%
U-233/234	8.52E+01	1.81E+00	8.52E+01	0.36%
U-235/236	4.42E+00	2.24E+00	4.42E+00	0.02%
	Cs/Co ratio=	1.61E+01	2.37E+04	100.00%

	ROLB Smear 2 (pCi/filter)			X
	Results	**MDA**	**Used**	**Distribution**
Co-60	6.00E+01	8.81E+00	6.00E+01	0.35%
Cs-137	2.77E+03	1.14E+01	2.77E+03	16.19%
H-3		6.84E+02	**6.84E+02**	4.00%
I-129	9.63E+02	1.04E+01	9.63E+02	5.63%
Sr-90	4.48E+02	1.23E+01	4.48E+02	2.61%
U-233/234	1.18E+04	4.93E+00	1.18E+04	68.92%
U-235/236	3.94E+02	3.35E+00	3.94E+02	2.30%
	Cs/Co ratio=	4.62E+01	1.71E+04	100.00%

	ROLB Smear 2 Duplicate (pCi/filter)			Y
	Results	**MDA**	**Used**	**Distribution**
Co-60	6.46E+01	7.77E+00	6.46E+01	0.39%
Cs-137	2.71E+03	1.17E+01	2.71E+03	16.54%
H-3		6.85E+02	**6.85E+02**	4.19%
I-129	9.32E+02	1.05E+01	9.32E+02	5.70%
Sr-90	4.62E+02	1.26E+01	4.62E+02	2.83%
U-233/234	1.11E+04	5.04E+00	1.11E+04	67.86%
U-235/236	4.08E+02	3.28E+00	4.08E+02	2.49%
	Cs/Co ratio=	4.19E+01	1.64E+04	100.00%

	Quad A Smear (pCi/filter)			O
	Results	**MDA**	**Used**	**Distribution**
Co-60	2.55E+03	7.07E+00	2.55E+03	26.67%
Cs-137	1.14E+02	9.49E+00	1.14E+02	1.19%
H-3	6.82E+03	5.22E+02	6.82E+03	71.37%
Sr-90	7.38E+01	8.56E+00	7.38E+01	0.77%
	Cs/Co ratio=	4.47E-02	9.55E+03	100.00%

	Quad C Smear (pCi/filter)			P
	Results	**MDA**	**Used**	**Distribution**
Co-60	3.03E+03	7.40E+00	3.03E+03	8.40%
Cs-137	6.94E+01	1.02E+01	6.94E+01	0.19%
H-3	3.29E+04	3.57E+02	3.29E+04	91.29%
Sr-90	3.97E+01	9.20E+00	3.97E+01	0.11%
U-233/234	7.96E-01	7.62E-01	7.96E-01	0.00%
	Cs/Co ratio=	2.29E-02	3.61E+04	100.00%

	Canal E Smear (pCi/filter)			Q
	Results	**MDA**	**Used**	**Distribution**
Co-60	5.13E+03	9.32E+00	5.13E+03	11.15%
Cs-137	1.34E+02	1.23E+01	1.34E+02	0.29%
H-3	4.06E+04	4.14E+02	4.06E+04	88.35%
Sr-90	9.49E+01	8.25E+00	9.49E+01	0.21%
	Cs/Co ratio=	2.62E-02	4.60E+04	100.00%

Units for sample concentrations are presented in pCi/filter. Filter in this context is defined as a standard smear sample take over a 100cm2 area.

	WEMS -12'0" Elevation, North Vault Sludge Sample #1 (South Side, PB06-02893) (pCi/gram)			Z
	Results	**MDA**	**Used**	**Distribution**
Cs-137	4.18E+00	4.00E-02	4.18E+00	89.96%
Co-60	4.67E-01	3.33E-02	4.67E-01	10.04%
	Cs/Co ratio=	1.12E-01	4.65E+00	100.00%

	WEMS -12'0" Elevation, North Vault Sludge Sample #2 (West Side, PB06-02894) (pCi/gram)			AA
	Results	**MDA**	**Used**	**Distribution**
Cs-137	3.78E+00	8.85E-02	3.78E+00	96.67%
Co-60		1.30E-01	**1.30E-01**	3.33%
	Cs/Co ratio=	indeterminate	3.91E+00	100.00%

	WEMS -12'0" Elevation, North Vault Sludge Sample #3 (North Side, PB06-02895) (pCi/gram)			AB
	Results	**MDA**	**Used**	**Distribution**
Cs-137	2.95E+00	8.21E-02	2.95E+00	90.70%
Co-60	3.02E-01	5.56E-02	3.02E-01	9.30%
	Cs/Co ratio=	1.02E-01	3.25E+00	100.00%

For the three samples directly above, units for sample concentrations are presented in pCi/gram because they are sludge samples.

Lilly Pad Smear R

	DCGL (dpm/100cm²)	Results (pCi/filter)	MDA (pCi/filter)	Used (pCi/filter)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
BETA							
Cs-137	**4.05E+04**	1.30E+01	4.05E+00	1.30E+01	0.23%	1.00	2.47E-05
H-3	**9.10E+06**	5.42E+03	3.09E+02	5.42E+03	96.57%	418.10	4.59E-05
Co-60	**1.10E+04**	1.70E+02	4.03E+00	1.70E+02	3.04%	N/A	N/A
Sr-90	**3.31E+04**	9.09E+00	8.11E+00	9.09E+00	0.16%	N/A	N/A
Cs-137 to Co-60 ratio =		7.61E-02		5.62E+03	100.00%		

Adjusted Gross DCGL

BETA	DCGL (dpm/100cm²)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL	Unity Rule Check Gross*Fract	Fract/DCGL
Cs-137	**1.42E+04**	0.0023	0.067	1.63E-07	777.08	5.49E-02
Co-60	**1.10E+04**	0.0304	0.885	2.76E-06	10,215.19	9.29E-01
Sr-90	**3.31E+04**	0.0016	0.047	4.89E-08	544.71	1.65E-02
		0.0343	1.000	2.97E-06	11537	1.00

Adjusted Gross DCGL 11537 dpm/100cm² (beta)

CTMT General Area Smear (Area 2) S

	DCGL (dpm/100cm²)	Results (pCi/filter)	MDA (pCi/filter)	Used (pCi/filter)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
BETA							
Cs-137	**4.05E+04**	3.40E+02	9.38E+00	3.40E+02	0.16%	1.00	2.47E-05
H-3	**9.10E+06**	2.04E+05	9.07E+02	2.04E+05	98.57%	601.83	6.61E-05
Co-60	**1.10E+04**	2.41E+03	6.77E+00	2.41E+03	1.16%	N/A	N/A
Sr-90	**3.31E+04**	2.25E+02	8.64E+00	2.25E+02	0.11%	N/A	N/A
Cs-137 to Co-60 ratio =		1.41E-01		2.07E+05	100.00%		

Adjusted Gross DCGL

BETA	DCGL (dpm/100cm²)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL	Unity Rule Check Gross*Fract	Fract/DCGL
Cs-137	**1.10E+04**	0.0016	0.114	1.49E-07	1,324.84	1.20E-01
Co-60	**1.10E+04**	0.0116	0.810	1.05E-06	9,384.44	8.53E-01
Sr-90	**3.31E+04**	0.0011	0.076	3.28E-08	878.42	2.65E-02
		0.0143	1.000	1.24E-06	11588	1.00

Adjusted Gross DCGL 11588 dpm/100cm² (beta)

Reactor Building Smear T
Surrogate

	DCGL (dpm/100cm²)	Results (pCi/filter)	MDA (pCi/filter)	Used (pCi/filter)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
Cs-137	**4.05E+04**	4.33E+03	1.02E+01	4.33E+03	27.95%	1.000	2.47E-05
H-3	**9.10E+06**	9.04E+03	2.89E+01	9.04E+03	58.34%	2.087	2.29E-07
I-129	**1.49E+04**	1.02E+01	8.17E+00	1.02E+01	0.07%	0.002	1.58E-07
Co-60	**1.10E+04**	1.60E+02	8.51E+00	1.60E+02	1.04%	N/A	N/A
Sr-90	**3.31E+04**	1.90E+03	1.44E+01	1.90E+03	12.25%	N/A	N/A
Eu-154	**4.50E+03**	5.64E+01	1.75E+01	5.64E+01	0.36%	N/A	N/A
Cs-137 to Co-60 ratio =		2.70E+01		1.55E+04	100.00%		

Adjusted Gross DCGL

	DCGL (dpm/100cm²)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL	Unity Rule Check Gross*Fract	Fract/DCGL
Cs-137	**3.99E+04**	0.2795	0.672	7.01E-06	22,428.48	5.62E-01
Co-60	**1.10E+04**	0.0104	0.025	9.41E-07	830.88	7.55E-02
Sr-90	**3.31E+04**	0.1225	0.295	3.70E-06	9,834.13	2.97E-01
Eu-154	**4.50E+03**	0.0036	0.009	8.08E-07	291.96	6.49E-02
		0.4160	1.000	1.25E-05	33385	1.00
Cs/Co ratio=	2.70E+01					

Adjusted Gross DCGL 33385 dpm/100cm²

Reactor Building Smear Duplicate U
Surrogate

	DCGL (dpm/100cm²)	Results (pCi/filter)	MDA (pCi/filter)	Used (pCi/filter)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
Cs-137	**4.05E+04**	5.25E+03	1.01E+01	5.25E+03	29.48%	1.000	2.47E-05
H-3	**9.10E+06**	8.87E+03	2.84E+01	8.87E+03	49.77%	1.688	1.86E-07
I-129	**1.49E+04**	1.94E+01	1.00E+01	1.94E+01	0.11%	0.004	2.48E-07
Co-60	**1.10E+04**	1.70E+03	7.07E+00	1.70E+03	9.57%	N/A	N/A
Sr-90	**3.31E+04**	1.90E+03	1.44E+01	1.90E+03	10.65%	N/A	N/A
Eu-154	**4.50E+03**	7.55E+01	1.59E+01	7.55E+01	0.42%	N/A	N/A
Cs-137 to Co-60 ratio =		3.08E+00		1.78E+04	100.00%		

Adjusted Gross DCGL

	DCGL (dpm/100cm²)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL	Unity Rule Check Gross*Fract	Fract/DCGL
Cs-137	**3.98E+04**	0.2948	0.588	7.41E-06	14,547.28	3.65E-01
Co-60	**1.10E+04**	0.0957	0.191	8.70E-06	4,721.39	4.29E-01
Sr-90	**3.31E+04**	0.1065	0.213	3.22E-06	5,256.87	1.59E-01
Eu-154	**4.50E+03**	0.0042	0.008	9.42E-07	209.11	4.65E-02
		0.5012	1.000	2.03E-05	24735	1.00
Cs/Co ratio=	3.08E+00					

Adjusted Gross DCGL 24735 dpm/100cm²

Hot Cell Equipment #1 Smear A

	DCGL (dpm/100cm²)	Results (pCi/filter)	MDA (pCi/filter)	Used (pCi/filter)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
ALPHA							
U-234	**3.15E+04**	6.69E+02	7.48E-01	6.69E+02	0.03%	N/A	N/A
U-235	**2.71E+04**	4.34E+01	7.50E-01	4.34E+01	0.00%	N/A	N/A
BETA							
Cs-137	**4.05E+04**	7.53E+05	2.06E+02	7.53E+05	33.64%	1.00	2.47E-05
H-3	**9.10E+06**	5.29E+05	3.49E+02	5.29E+05	23.63%	0.70	7.72E-08
I-129	**1.49E+04**		2.32E+01	**2.32E+01**	0.00%	0.00	2.07E-09
Co-60	**1.10E+04**	1.85E+05	1.24E+02	1.85E+05	8.25%	N/A	N/A
Sr-90	**3.31E+04**	7.70E+05	3.49E+02	7.70E+05	34.38%	N/A	N/A
Eu-154	**4.50E+03**	1.41E+03	3.69E+02	1.41E+03	0.06%	N/A	N/A
Cs-137 to Co-60 ratio =		4.08E+00		2.24E+06	100.00%		

Adjusted Gross DCGL

ALPHA	DCGL (dpm/100cm²)	Nuclide Fraction	Alpha Nuclide Fraction	Fraction/ DCGL	Unity Rule Check Gross*Fract	Fract/DCGL
U-234	**3.15E+04**	0.00030	0.939	9.49E-09	29,291.25	9.30E-01
U-235	**2.71E+04**	0.00002	0.061	7.16E-10	1,900.23	7.01E-02
		0.00032	1.000	1.02E-08	31191	1.00

Adjusted Gross DCGL 31191 dpm/100cm² (alpha)

BETA	DCGL (dpm/100cm²)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL	Unity Rule Check Gross*Fract	Fract/DCGL
Cs-137	**4.04E+04**	0.3364	0.441	8.33E-06	12,762.54	3.16E-01
Co-60	**1.10E+04**	0.0825	0.108	7.50E-06	3,129.61	2.85E-01
Sr-90	**3.31E+04**	0.3438	0.450	1.04E-05	13,043.47	3.94E-01
Eu-154	**4.50E+03**	0.0006	0.001	1.40E-07	23.81	5.29E-03
		0.7634	1.000	2.64E-05	28959	1.00

Adjusted Gross DCGL 28959 dpm/100cm² (beta)

Adjusted Gross DCGL (combined alpha plus beta)

	DCGL (dpm/100cm²)	Nuclide Fraction	Fraction/ DCGL	Unity Rule Check Gross*Fract	Fract/DCGL
DCGL (alpha)	31191	0.0003	1.02E-08	9.22	2.96E-04
DCGL (beta)	28959	0.9997	3.45E-05	28,950.87	1.00E+00
		1.0000	3.45E-05	28960	1.00

Adjusted Gross DCGL 28960 dpm/100cm² (alpha plus beta)

Hot Cell Equipment #2 Smear B

	DCGL (dpm/100cm²)	Results (pCi/filter)	MDA (pCi/filter)	Used (pCi/filter)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
ALPHA							
U-234	**3.15E+04**	4.23E+01	7.00E-01	4.23E+01	0.01%	N/A	N/A
U-235	**2.71E+04**	2.84E+00	2.75E-01	2.84E+00	0.00%	N/A	N/A
BETA							
Cs-137	**4.05E+04**	2.53E+05	6.98E+01	2.53E+05	68.38%	1.00	2.47E-05
H-3	**9.10E+06**	3.96E+03	2.53E+02	3.96E+03	1.07%	0.02	1.72E-09
I-129	**1.49E+04**		2.14E+01	**2.14E+01**	0.01%	0.00	5.68E-09
Co-60	**1.10E+04**	5.82E+03	2.25E+01	5.82E+03	1.57%	N/A	N/A
Sr-90	**3.31E+04**	1.07E+05	3.50E+02	1.07E+05	28.94%	N/A	N/A
Eu-154	**4.50E+03**		8.27E+01	**8.27E+01**	0.02%	N/A	N/A
Cs-137 to Co-60 ratio =		4.34E+01		3.70E+05	100.00%		

Adjusted Gross DCGL

ALPHA	DCGL (dpm/100cm²)	Nuclide Fraction	Alpha Nuclide Fraction	Fraction/ DCGL	Unity Rule Check Gross*Fract	Fract/DCGL
U-234	**3.15E+04**	0.00011	0.937	3.63E-09	29,219.67	9.28E-01
U-235	**2.71E+04**	0.00001	0.063	2.83E-10	1,961.81	7.24E-02
		0.00012	1.000	3.91E-09	31181	1.00

Adjusted Gross DCGL 31181 dpm/100cm² (alpha)

BETA	DCGL (dpm/100cm²)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL	Unity Rule Check Gross*Fract	Fract/DCGL
Cs-137	**4.05E+04**	0.6838	0.6913	1.69E-05	25,220.42	6.23E-01
Co-60	**1.10E+04**	0.0157	0.0159	1.43E-06	580.73	5.28E-02
Sr-90	**3.31E+04**	0.2894	0.2926	8.74E-06	10,673.44	3.22E-01
Eu-154	**4.50E+03**	0.0002	0.0002	4.97E-08	8.25	1.83E-03
		0.9891	1.0000	2.71E-05	36483	1.00

Adjusted Gross DCGL 36483 dpm/100cm² (beta)

Adjusted Gross DCGL (combined alpha plus beta)

	DCGL (dpm/100cm²)	Nuclide Fraction	Fraction/ DCGL	Unity Rule Check Gross*Fract	Fract/DCGL
DCGL (alpha)	31181	0.0001	3.91E-09	4.45	1.43E-04
DCGL (beta)	36483	0.9999	2.74E-05	36,477.63	1.00E+00
		1.0000	2.74E-05	36482	1.00

Adjusted Gross DCGL 36482 dpm/100cm² (alpha plus beta)

Hot Cell Equipment #3 Smear C

	DCGL (dpm/100cm²)	Results (pCi/filter)	MDA (pCi/filter)	Used (pCi/filter)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
ALPHA							
U-234	**3.15E+04**	2.48E+01	3.01E-01	2.48E+01	0.03%	N/A	N/A
U-235	**2.71E+04**	1.11E+00	3.02E-01	1.11E+00	0.00%	N/A	N/A
BETA							
Cs-137	**4.05E+04**	4.21E+04	3.22E+01	4.21E+04	47.49%	1.0000	2.47E-05
H-3	**9.10E+06**	1.46E+03	4.51E+02	1.46E+03	1.65%	0.0347	3.82E-09
I-129	**1.49E+04**		8.51E+00	**8.51E+00**	0.01%	0.0002	1.36E-08
Co-60	**1.10E+04**	1.80E+03	1.27E+01	1.80E+03	2.03%	N/A	N/A
Sr-90	**3.31E+04**	4.31E+04	3.65E+02	4.31E+04	48.62%	N/A	N/A
Eu-154	**4.50E+03**	1.52E+02	7.49E+01	1.52E+02	0.17%	N/A	N/A
Cs-137 to Co-60 ratio =		2.34E+01		8.86E+04	100.00%		

Adjusted Gross DCGL

	DCGL (dpm/100cm²)	Nuclide Fraction	Alpha Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
ALPHA							
U-234	**3.15E+04**	0.00028	0.957	8.88E-09		29,942.24	9.51E-01
U-235	**2.71E+04**	0.00001	0.043	4.62E-10		1,340.17	4.95E-02
		0.00029	1.000	9.35E-09		31282	1.00
			Adjusted Gross DCGL	**31282**	**dpm/100cm²**	**(alpha)**	

	DCGL (dpm/100cm²)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
BETA							
Cs-137	**4.05E+04**	0.4749	0.483	1.17E-05		16,575.11	4.10E-01
Co-60	**1.10E+04**	0.0203	0.021	1.85E-06		708.71	6.44E-02
Sr-90	**3.31E+04**	0.4862	0.495	1.47E-05		16,970.13	5.13E-01
Eu-154	**4.50E+03**	0.0017	0.002	3.82E-07		59.98	1.33E-02
		0.9831	1.000	2.87E-05		34314	1.00
			Adjusted Gross DCGL	**34314**	**dpm/100cm²**	**(beta)**	

Adjusted Gross DCGL (combined alpha plus beta)

	DCGL (dpm/100cm²)	Nuclide Fraction	Fraction/ DCGL	Unity Rule Check Gross*Fract	Fract/DCGL
DCGL (alpha)	31282	0.0003	9.35E-09	10.03	3.21E-04
DCGL (beta)	34314	0.9997	2.91E-05	34,302.93	1.00E+00
		1.0000	2.91E-05	34313	1.00
		Adjusted Gross DCGL	**34313**	**dpm/100cm²**	**(alpha plus beta)**

Hot Cell Equipment #4 Smear D

	DCGL (dpm/100cm²)	Results (pCi/filter)	MDA (pCi/filter)	Used (pCi/filter)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
ALPHA							
U-234	**3.15E+04**	3.88E+00	8.24E-01	3.88E+00	0.02%	N/A	N/A
U-235	**2.71E+04**		8.26E-01	**8.26E-01**	0.00%	N/A	N/A
BETA							
Cs-137	**4.05E+04**	3.72E+03	1.61E+01	3.72E+03	18.10%	1.00	2.47E-05
H-3	**9.10E+06**	1.28E+04	3.94E+02	1.28E+04	62.02%	3.43	3.76E-07
I-129	**1.49E+04**		1.83E+01	**1.83E+01**	0.09%	0.00	3.30E-07
Co-60	**1.10E+04**	1.06E+03	1.23E+01	1.06E+03	5.18%	N/A	N/A
Sr-90	**3.31E+04**	2.96E+03	3.94E+02	2.96E+03	14.39%	N/A	N/A
Eu-154	**4.50E+03**		3.99E+01	**3.99E+01**	0.19%	N/A	N/A
Cs-137 to Co-60 ratio =		3.50E+00		2.06E+04	100.00%		

Adjusted Gross DCGL

	DCGL (dpm/100cm²)	Nuclide Fraction	Alpha Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
ALPHA							
U-234	**3.15E+04**	0.00019	0.824	5.99E-09		25,251.45	8.02E-01
U-235	**2.71E+04**	0.00004	0.176	1.48E-09		5,375.74	1.98E-01
		0.00023	1.000	7.47E-09		30627	1.00
			Adjusted Gross DCGL	**30627**	**dpm/100cm²**	**(alpha)**	

	DCGL (dpm/100cm²)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
BETA							
Cs-137	**3.94E+04**	0.1810	0.478	4.60E-06		12,854.78	3.26E-01
Co-60	**1.10E+04**	0.0518	0.137	4.71E-06		3,676.40	3.34E-01
Sr-90	**3.31E+04**	0.1439	0.380	4.35E-06		10,217.46	3.09E-01
Eu-154	**4.50E+03**	0.0019	0.005	4.31E-07		137.77	3.06E-02
		0.3787	1.000	1.41E-05		26886	1.00
			Adjusted Gross DCGL	**26886**	**dpm/100cm²**	**(beta)**	

Adjusted Gross DCGL (combined alpha plus beta)

	DCGL (dpm/100cm²)	Nuclide Fraction	Fraction/ DCGL	Unity Rule Check Gross*Fract	Fract/DCGL
DCGL (alpha)	30627	0.0002	7.47E-09	6.15	2.01E-04
DCGL (beta)	26886	0.9998	3.72E-05	26,881.01	1.00E+00
		1.0000	3.72E-05	26887	1.00
		Adjusted Gross DCGL	**26887**	**dpm/100cm²**	**(alpha plus beta)**

Hot Cell Equipment #5 Smear E

	DCGL (dpm/100cm²)	Results (pCi/filter)	MDA (pCi/filter)	Used (pCi/filter)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
ALPHA							
U-234	**3.15E+04**	8.16E+00	1.42E+00	8.16E+00	0.00%	N/A	N/A
U-235	**2.71E+04**	5.32E-01	3.19E-01	5.32E-01	0.00%	N/A	N/A
BETA							
Cs-137	**4.05E+04**	2.66E+05	6.04E+01	2.66E+05	87.99%	1.0000	2.47E-05
H-3	**9.10E+06**		2.70E+02	**2.70E+02**	0.09%	0.0010	1.12E-10
I-129	**1.49E+04**		2.33E+01	**2.33E+01**	0.01%	0.0001	5.88E-09
Co-60	**1.10E+04**	2.18E+02	7.08E+00	2.18E+02	0.07%	N/A	N/A
Sr-90	**3.31E+04**	3.57E+04	2.87E+02	3.57E+04	11.82%	N/A	N/A
Eu-154	**4.50E+03**		3.04E+01	**3.04E+01**	0.01%	N/A	N/A
Cs-137 to Co-60 ratio =		1.22E+03		3.02E+05	100.00%		

Adjusted Gross DCGL

	DCGL (dpm/100cm²)	Nuclide Fraction	Alpha Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
ALPHA							
U-234	**3.15E+04**	0.000027	0.939	8.57E-10		29,281.02	9.30E-01
U-235	**2.71E+04**	0.000002	0.061	6.50E-11		1,909.02	7.04E-02
		0.000029	1.000	9.22E-10		31190	1.00
			Adjusted Gross DCGL	**31190**	**dpm/100cm²**	**(alpha)**	

	DCGL (dpm/100cm²)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
BETA							
Cs-137	**4.05E+04**	0.8799	0.881	2.17E-05		34,653.93	8.56E-01
Co-60	**1.10E+04**	0.0007	0.001	6.55E-08		28.37	2.58E-03
Sr-90	**3.31E+04**	0.1182	0.118	3.57E-06		4,656.53	1.41E-01
Eu-154	**4.50E+03**	0.0001	0.000	2.24E-08		3.96	8.80E-04
		0.9990	1.000	2.54E-05		39343	1.00
			Adjusted Gross DCGL	**39343**	**dpm/100cm²**	**(beta)**	

Adjusted Gross DCGL (combined alpha plus beta)

	DCGL (dpm/100cm²)	Nuclide Fraction	Fraction/ DCGL	Unity Rule Check Gross*Fract	Fract/DCGL
DCGL (alpha)	31190	0.00003	9.22E-10	1.13	3.63E-05
DCGL (beta)	39343	0.99997	2.54E-05	39,341.36	1.00E+00
		1.00000	2.54E-05	39342	1.00
		Adjusted Gross DCGL	**39342**	**dpm/100cm²**	**(alpha plus beta)**

Hot Cell Equipment #6 Smear F

	DCGL (dpm/100cm²)	Results (pCi/filter)	MDA (pCi/filter)	Used (pCi/filter)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
ALPHA							
U-234	**3.15E+04**	2.15E+00	8.95E-01	2.15E+00	0.01%	N/A	N/A
U-235	**2.71E+04**		2.81E-01	**2.81E-01**	0.00%	N/A	N/A
BETA							
Cs-137	**4.05E+04**	1.08E+04	1.47E+01	1.08E+04	52.84%	1.0000	2.47E-05
H-3	**9.10E+06**		2.63E+02	**2.63E+02**	1.28%	0.0243	2.67E-09
I-129	**1.49E+04**		6.17E+00	**6.17E+00**	0.03%	0.0006	3.83E-08
Co-60	**1.10E+04**	3.31E+02	7.50E+00	3.31E+02	1.62%	N/A	N/A
Sr-90	**3.31E+04**	9.03E+03	3.54E+02	9.03E+03	44.07%	N/A	N/A
Eu-154	**4.50E+03**		3.11E+01	**3.11E+01**	0.15%	N/A	N/A
Cs-137 to Co-60 ratio =		3.27E+01		2.05E+04	100.00%		

Adjusted Gross DCGL

	DCGL (dpm/100cm²)	Nuclide Fraction	Alpha Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
ALPHA							
U-234	**3.15E+04**	0.00010	0.884	3.33E-09		27,345.66	8.68E-01
U-235	**2.71E+04**	0.00001	0.116	5.06E-10		3,574.05	1.32E-01
		0.00012	1.000	3.84E-09		30920	1.00
			Adjusted Gross DCGL	**30920**	**dpm/100cm²**	**(alpha)**	

	DCGL (dpm/100cm²)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
BETA							
Cs-137	**4.04E+04**	0.5284	0.536	1.31E-05		18,746.06	4.64E-01
Co-60	**1.10E+04**	0.0162	0.016	1.47E-06		573.07	5.21E-02
Sr-90	**3.31E+04**	0.4407	0.447	1.33E-05		15,633.14	4.72E-01
Eu-154	**4.50E+03**	0.0015	0.002	3.37E-07		53.86	1.20E-02
		0.9867	1.000	2.82E-05		35006	1.00
			Adjusted Gross DCGL	**35006**	**dpm/100cm²**	**(beta)**	

Adjusted Gross DCGL (combined alpha plus beta)

	DCGL (dpm/100cm²)	Nuclide Fraction	Fraction/ DCGL	Unity Rule Check Gross*Fract	Fract/DCGL
DCGL (alpha)	30920	0.00012	3.84E-09	4.15	1.34E-04
DCGL (beta)	35006	0.99988	2.86E-05	35,001.43	1.00E+00
		1.00000	2.86E-05	35006	1.00
		Adjusted Gross DCGL	**35006**	**dpm/100cm²**	**(alpha plus beta)**

Hot Cell Equipment #7 Smear G

	DCGL (dpm/100cm²)	Results (pCi/filter)	MDA (pCi/filter)	Used (pCi/filter)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
ALPHA							
U-234	**3.15E+04**	7.82E+02	1.02E+00	7.82E+02	0.22%	N/A	N/A
U-235	**2.71E+04**	4.09E+01	1.42E+00	4.09E+01	0.01%	N/A	N/A
BETA							
Cs-137	**4.05E+04**	1.02E+05	5.49E+01	1.02E+05	28.41%	1.0000	2.47E-05
H-3	**9.10E+06**	1.38E+05	6.91E+02	1.38E+05	38.46%	1.3537	1.49E-07
I-129	**1.49E+04**		2.14E+01	**2.14E+01**	0.01%	0.0002	1.41E-08
Co-60	**1.10E+04**	4.10E+03	2.03E+01	4.10E+03	1.14%	N/A	N/A
Sr-90	**3.31E+04**	1.14E+05	3.47E+02	1.14E+05	31.72%	N/A	N/A
Eu-154	**4.50E+03**		7.95E+01	**7.95E+01**	0.02%	N/A	N/A
Cs-137 to Co-60 ratio =		2.48E+01		3.58E+05	100.00%		

Adjusted Gross DCGL

	DCGL (dpm/100cm²)	Nuclide Fraction	Alpha Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
ALPHA							
U-234	**3.15E+04**	0.0022	0.950	6.94E-08		29,694.73	9.43E-01
U-235	**2.71E+04**	0.0001	0.050	4.22E-09		1,553.10	5.73E-02
		0.0023	1.000	7.36E-08		31248	1.00
			Adjusted Gross DCGL	**31248**	**dpm/100cm²**	**(alpha)**	

	DCGL (dpm/100cm²)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
BETA							
Cs-137	**4.02E+04**	0.2841	0.4635	7.06E-06		16,022.18	3.98E-01
Co-60	**1.10E+04**	0.0114	0.0187	1.04E-06		645.47	5.87E-02
Sr-90	**3.31E+04**	0.3172	0.5174	9.58E-06		17,884.55	5.40E-01
Eu-154	**4.50E+03**	0.0002	0.0004	4.94E-08		12.52	2.78E-03
		0.6130	1.0000	1.77E-05		34565	1.00
			Adjusted Gross DCGL	**34565**	**dpm/100cm²**	**(beta)**	

Adjusted Gross DCGL (combined alpha plus beta)

	DCGL (dpm/100cm²)	Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
DCGL (alpha)	31248	0.0023	7.36E-08		79.45	2.54E-03
DCGL (beta)	34565	0.9977	2.89E-05		34,476.85	9.97E-01
		1.0000	2.89E-05		34556	1.00
		Adjusted Gross DCGL	**34556**	**dpm/100cm²**	**(alpha plus beta)**	

Hot Cell #1 Surface Smear H

	DCGL (dpm/100cm²)	Results (pCi/filter)	MDA (pCi/filter)	Used (pCi/filter)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
ALPHA							
U-234	**3.15E+04**	1.05E+03	6.27E-01	1.05E+03	0.05%	N/A	N/A
U-235	**2.71E+04**	5.52E+01	6.29E-01	5.52E+01	0.00%	N/A	N/A
BETA							
Cs-137	**4.05E+04**	7.49E+05	1.25E+02	7.49E+05	37.55%	1.00000	2.47E-05
H-3	**9.10E+06**	4.59E+04	4.01E+02	4.59E+04	2.30%	0.06121	6.73E-09
I-129	**1.49E+04**		3.33E+01	**3.33E+01**	0.00%	0.00004	2.98E-09
Co-60	**1.10E+04**	3.48E+04	5.16E+01	3.48E+04	1.74%	N/A	N/A
Sr-90	**3.31E+04**	1.16E+06	2.72E+02	1.16E+06	58.30%	N/A	N/A
Eu-154	**4.50E+03**	9.26E+02	1.44E+02	9.26E+02	0.05%	N/A	N/A
Cs-137 to Co-60 ratio =		2.15E+01		2.00E+06	100.00%		

Adjusted Gross DCGL

	DCGL (dpm/100cm²)	Nuclide Fraction	Alpha Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
ALPHA							
U-234	**3.15E+04**	0.00053	0.950	1.67E-08		29,685.96	9.42E-01
U-235	**2.71E+04**	0.00003	0.050	1.02E-09		1,560.65	5.76E-02
		0.00055	1.000	1.77E-08		31247	1.00
			Adjusted Gross DCGL	**31247**	**dpm/100cm²**	**(alpha)**	

	DCGL (dpm/100cm²)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
BETA							
Cs-137	**4.05E+04**	0.3755	0.3846	9.28E-06		13,141.17	3.25E-01
Co-60	**1.10E+04**	0.0174	0.0178	1.58E-06		609.88	5.54E-02
Sr-90	**3.31E+04**	0.5830	0.5971	1.76E-05		20,401.04	6.16E-01
Eu-154	**4.50E+03**	0.0005	0.0005	1.03E-07		16.25	3.61E-03
		0.9764	1.0000	2.86E-05		34168	1.00
			Adjusted Gross DCGL	**34168**	**dpm/100cm²**	**(beta)**	

Adjusted Gross DCGL (combined alpha plus beta)

	DCGL (dpm/100cm²)	Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
DCGL (alpha)	31247	0.0006	1.77E-08		18.93	6.06E-04
DCGL (beta)	34168	0.9994	2.93E-05		34,147.63	9.99E-01
		1.0000	2.93E-05		34167	1.00
		Adjusted Gross DCGL	**34167**	**dpm/100cm²**	**(alpha plus beta)**	

Hot Cell #2 Surface Smear I

	DCGL (dpm/100cm²)	Results (pCi/filter)	MDA (pCi/filter)	Used (pCi/filter)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
ALPHA							
U-234	**3.15E+04**	5.43E+01	8.26E-01	5.43E+01	0.02%	N/A	N/A
U-235	**2.71E+04**	3.03E+00	6.62E-01	3.03E+00	0.00%	N/A	N/A
BETA							
Cs-137	**4.05E+04**	1.02E+05	6.47E+01	1.02E+05	43.86%	1.0000	2.47E-05
H-3	**9.10E+06**	9.21E+03	5.33E+02	9.21E+03	3.97%	0.0905	9.95E-09
I-129	**1.49E+04**		3.82E+01	**3.82E+01**	0.02%	0.0004	2.52E-08
Co-60	**1.10E+04**	1.35E+04	3.13E+01	1.35E+04	5.84%	N/A	N/A
Sr-90	**3.31E+04**	1.07E+05	3.29E+02	1.07E+05	46.15%	N/A	N/A
Eu-154	**4.50E+03**	3.19E+02	7.91E+01	3.19E+02	0.14%	N/A	N/A
Cs-137 to Co-60 ratio =		7.51E+00		2.32E+05	100.00%		

Adjusted Gross DCGL

	DCGL (dpm/100cm²)	Nuclide Fraction	Alpha Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
ALPHA							
U-234	**3.15E+04**	0.00023	0.947	7.43E-09		29,581.31	9.39E-01
U-235	**2.71E+04**	0.00001	0.053	4.82E-10		1,650.68	6.09E-02
		0.00025	1.000	7.92E-09		31232	1.00
			Adjusted Gross DCGL	**31232**	**dpm/100cm²**	**(alpha)**	

	DCGL (dpm/100cm²)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
BETA							
Cs-137	**4.04E+04**	0.4386	0.457	1.08E-05		14,425.81	3.57E-01
Co-60	**1.10E+04**	0.0584	0.061	5.31E-06		1,921.26	1.75E-01
Sr-90	**3.31E+04**	0.4615	0.481	1.39E-05		15,178.69	4.59E-01
Eu-154	**4.50E+03**	0.0014	0.001	3.06E-07		45.31	1.01E-02
		0.9599	1.000	3.04E-05		31571	1.00
			Adjusted Gross DCGL	**31571**	**dpm/100cm²**	**(beta)**	

Adjusted Gross DCGL (combined alpha plus beta)

	DCGL (dpm/100cm²)	Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
DCGL (alpha)	31232	0.0002	7.92E-09		7.81	2.50E-04
DCGL (beta)	31571	0.9998	3.17E-05		31,563.18	1.00E+00
		1.0000	3.17E-05		31571	1.00
		Adjusted Gross DCGL	**31571**	**dpm/100cm²**	**(alpha plus beta)**	

Hot Cell #3 Surface Smear J

	DCGL (dpm/100cm²)	Results (pCi/filter)	MDA (pCi/filter)	Used (pCi/filter)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
ALPHA							
U-234	**3.15E+04**	3.85E+00	1.61E+00	3.85E+00	0.06%	N/A	N/A
U-235	**2.71E+04**	2.41E-01	9.23E-01	9.23E-01	0.02%	N/A	N/A
BETA							
Cs-137	**4.05E+04**	3.33E+03	9.55E+00	3.33E+03	56.15%	1.0000	2.47E-05
H-3	**9.10E+06**		2.26E+02	**2.26E+02**	3.81%	0.0678	7.46E-09
I-129	**1.49E+04**		N/A	**0.00E+00**	0.00%	0.0000	0.00E+00
Co-60	**1.10E+04**	2.61E+02	8.70E+00	2.61E+02	4.40%	N/A	N/A
Sr-90	**3.31E+04**	2.08E+03	3.67E+02	2.08E+03	35.13%	N/A	N/A
Eu-154	**4.50E+03**		2.59E+01	**2.59E+01**	0.44%	N/A	N/A
Cs-137 to Co-60 ratio =		1.28E+01		5.93E+03	100.00%		

Adjusted Gross DCGL

	DCGL (dpm/100cm²)	Nuclide Fraction	Alpha Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
ALPHA							
U-234	**3.15E+04**	0.0006	0.807	2.06E-08		24,635.03	7.82E-01
U-235	**2.71E+04**	0.0002	0.193	5.74E-09		5,906.05	2.18E-01
		0.0008	1.000	2.63E-08		30541	1.00
			Adjusted Gross DCGL	**30541**	**dpm/100cm²**	**(alpha)**	

	DCGL (dpm/100cm²)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
BETA							
Cs-137	**4.05E+04**	0.5615	0.584	1.39E-05		19,066.14	4.71E-01
Co-60	**1.10E+04**	0.0440	0.046	4.00E-06		1,492.73	1.36E-01
Sr-90	**3.31E+04**	0.3513	0.366	1.06E-05		11,930.68	3.60E-01
Eu-154	**4.50E+03**	0.0044	0.005	9.70E-07		148.24	3.29E-02
		0.9611	1.000	2.94E-05		32638	1.00
			Adjusted Gross DCGL	**32638**	**dpm/100cm²**	**(beta)**	

Adjusted Gross DCGL (combined alpha plus beta)

	DCGL (dpm/100cm²)	Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
DCGL (alpha)	30541	0.0008	2.63E-08		26.25	8.60E-04
DCGL (beta)	32638	0.9992	3.06E-05		32,609.73	9.99E-01
		1.0000	3.06E-05		32636	1.00
		Adjusted Gross DCGL	**32636**	**dpm/100cm²**	**(alpha plus beta)**	

Hot Cell #4 Surface Smear K

	DCGL (dpm/100cm²)	Results (pCi/filter)	MDA (pCi/filter)	Used (pCi/filter)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
ALPHA							
U-234	**3.15E+04**	1.74E+00	8.34E-01	1.74E+00	0.02%	N/A	N/A
U-235	**2.71E+04**		8.37E-01	**8.37E-01**	0.01%	N/A	N/A
BETA							
Cs-137	**4.05E+04**	5.48E+03	1.17E+01	5.48E+03	51.73%	1.000	2.47E-05
H-3	**9.10E+06**	5.21E+02	4.37E+02	5.21E+02	4.92%	0.095	1.05E-08
I-129	**1.49E+04**		1.53E+01	**1.53E+01**	0.14%	0.003	1.87E-07
Co-60	**1.10E+04**	1.82E+02	5.70E+00	1.82E+02	1.72%	N/A	N/A
Sr-90	**3.31E+04**	4.37E+03	3.00E+02	4.37E+03	41.30%	N/A	N/A
Eu-154	**4.50E+03**		1.69E+01	**1.69E+01**	0.16%	N/A	N/A
Cs-137 to Co-60 ratio =		3.01E+01		1.06E+04	100.00%		

Adjusted Gross DCGL

ALPHA	DCGL (dpm/100cm²)	Nuclide Fraction	Alpha Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
U-234	**3.15E+04**	0.00016	0.675	5.22E-09		20,203.46	6.41E-01
U-235	**2.71E+04**	0.00008	0.325	2.92E-09		9,718.61	3.59E-01
		0.00024	1.000	8.13E-09		29922	1.00
			Adjusted Gross DCGL	**29922**	**dpm/100cm²**	**(alpha)**	

BETA	DCGL (dpm/100cm²)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
Cs-137	**4.02E+04**	0.5173	0.545	1.29E-05		18,968.38	4.72E-01
Co-60	**1.10E+04**	0.0172	0.018	1.56E-06		630.13	5.73E-02
Sr-90	**3.31E+04**	0.4130	0.435	1.25E-05		15,146.55	4.58E-01
Eu-154	**4.50E+03**	0.0016	0.002	3.55E-07		58.53	1.30E-02
		0.9491	1.000	2.73E-05		34804	1.00
			Adjusted Gross DCGL	**34804**	**dpm/100cm²**	**(beta)**	

Adjusted Gross DCGL (combined alpha plus beta)

	DCGL (dpm/100cm²)	Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
DCGL (alpha)	29922	0.0002	8.13E-09		8.47	2.83E-04
DCGL (beta)	34804	0.9998	2.87E-05		34,793.74	1.00E+00
		1.0000	2.87E-05		34802	1.00
		Adjusted Gross DCGL	**34802**	**dpm/100cm²**	**(alpha plus beta)**	

Hot Cell #5 Surface Smear L

	DCGL (dpm/100cm²)	Results (pCi/filter)	MDA (pCi/filter)	Used (pCi/filter)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
ALPHA							
U-234	**3.15E+04**	3.03E+00	2.84E-01	3.03E+00	0.01%	N/A	N/A
U-235	**2.71E+04**		7.27E-01	**7.27E-01**	0.00%	N/A	N/A
BETA							
Cs-137	**4.05E+04**	1.63E+04	1.70E+01	1.63E+04	74.06%	1.000	2.47E-05
H-3	**9.10E+06**		3.17E+02	**3.17E+02**	1.44%	0.019	2.13E-09
I-129	**1.49E+04**	2.12E+00	7.17E-01	2.12E+00	0.01%	0.000	8.71E-09
Co-60	**1.10E+04**	1.03E+02	9.69E+00	1.03E+02	0.47%	N/A	N/A
Sr-90	**3.31E+04**	5.27E+03	3.56E+02	5.27E+03	23.89%	N/A	N/A
Eu-154	**4.50E+03**		2.75E+01	**2.75E+01**	0.12%	N/A	N/A
Cs-137 to Co-60 ratio =		1.58E+02		2.20E+04	100.00%		

Adjusted Gross DCGL

ALPHA	DCGL (dpm/100cm²)	Nuclide Fraction	Alpha Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
U-234	**3.15E+04**	0.00014	0.806	4.36E-09		24,630.68	7.82E-01
U-235	**2.71E+04**	0.00003	0.194	1.22E-09		5,909.80	2.18E-01
		0.00017	1.000	5.58E-09		30540	1.00
			Adjusted Gross DCGL	**30540**	**dpm/100cm²**	**(alpha)**	

BETA	DCGL (dpm/100cm²)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
Cs-137	**4.05E+04**	0.7406	0.752	1.83E-05		28,252.34	6.98E-01
Co-60	**1.10E+04**	0.0047	0.005	4.25E-07		178.40	1.62E-02
Sr-90	**3.31E+04**	0.2389	0.242	7.22E-06		9,112.88	2.75E-01
Eu-154	**4.50E+03**	0.0012	0.001	2.77E-07		47.58	1.06E-02
		0.9854	1.000	2.62E-05		37591	1.00
			Adjusted Gross DCGL	**37591**	**dpm/100cm²**	**(beta)**	

Adjusted Gross DCGL (combined alpha plus beta)

	DCGL (dpm/100cm²)	Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
DCGL (alpha)	30540	0.0002	5.58E-09		6.40	2.10E-04
DCGL (beta)	37591	0.9998	2.66E-05		37,583.32	1.00E+00
		1.0000	2.66E-05		37590	1.00
		Adjusted Gross DCGL	**37590**	**dpm/100cm²**	**(alpha plus beta)**	

Hot Cell #6 Surface Smear M

	DCGL (dpm/100cm²)	Results (pCi/filter)	MDA (pCi/filter)	Used (pCi/filter)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
ALPHA							
U-234	**3.15E+04**	3.91E+01	8.38E-01	3.91E+01	0.03%	N/A	N/A
U-235	**2.71E+04**	2.97E+00	8.41E-01	2.97E+00	0.00%	N/A	N/A
BETA							
Cs-137	**4.05E+04**	7.64E+04	2.75E+01	7.64E+04	67.77%	1.0000	2.47E-05
H-3	**9.10E+06**	3.78E+02	2.44E+02	3.78E+02	0.33%	0.0049	5.43E-10
I-129	**1.49E+04**		2.07E+01	**2.07E+01**	0.02%	0.0003	1.82E-08
Co-60	**1.10E+04**	9.70E+02	9.69E+00	9.70E+02	0.86%	N/A	N/A
Sr-90	**3.31E+04**	3.49E+04	2.89E+02	3.49E+04	30.95%	N/A	N/A
Eu-154	**4.50E+03**		4.01E+01	**4.01E+01**	0.04%	N/A	N/A
Cs-137 to Co-60 ratio =		7.87E+01		1.13E+05	100.00%		

Adjusted Gross DCGL

ALPHA	DCGL (dpm/100cm²)	Nuclide Fraction	Alpha Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
U-234	**3.15E+04**	0.00035	0.929	1.10E-08		28,944.42	9.19E-01
U-235	**2.71E+04**	0.00003	0.071	9.72E-10		2,198.61	8.11E-02
		0.00037	1.000	1.20E-08		31143	1.00
			Adjusted Gross DCGL	**31143**	**dpm/100cm²**	**(alpha)**	

BETA	DCGL (dpm/100cm²)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
Cs-137	**4.05E+04**	0.6777	0.6803	1.67E-05		25,140.29	6.21E-01
Co-60	**1.10E+04**	0.0086	0.0086	7.82E-07		319.25	2.90E-02
Sr-90	**3.31E+04**	0.3095	0.3107	9.35E-06		11,479.99	3.47E-01
Eu-154	**4.50E+03**	0.0004	0.0004	7.90E-08		13.19	2.93E-03
		0.9961	1.0000	2.70E-05		36953	1.00
			Adjusted Gross DCGL	**36953**	**dpm/100cm²**	**(beta)**	

Adjusted Gross DCGL (combined alpha plus beta)

	DCGL (dpm/100cm²)	Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
DCGL (alpha)	31143	0.0004	1.20E-08		13.78	4.43E-04
DCGL (beta)	36953	0.9996	2.71E-05		36,936.36	1.00E+00
		1.0000	2.71E-05		36950	1.00
		Adjusted Gross DCGL	**36950**	**dpm/100cm²**	**(alpha plus beta)**	

Hot Cell #7 Surface Smear N

	DCGL (dpm/100cm²)	Results (pCi/filter)	MDA (pCi/filter)	Used (pCi/filter)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
ALPHA							
U-234	**3.15E+04**	7.59E+00	1.26E+00	7.59E+00	0.02%	N/A	N/A
U-235	**2.71E+04**		7.87E-01	**7.87E-01**	0.00%	N/A	N/A
BETA							
Cs-137	**4.05E+04**	3.69E+04	2.40E+01	3.69E+04	85.04%	1.0000	2.47E-05
H-3	**9.10E+06**	5.75E+02	2.44E+02	5.75E+02	1.33%	0.0156	1.72E-09
I-129	**1.49E+04**		1.11E+01	**1.11E+01**	0.03%	0.0003	2.02E-08
Co-60	**1.10E+04**	3.57E+02	9.30E+00	3.57E+02	0.82%	N/A	N/A
Sr-90	**3.31E+04**	5.50E+03	2.95E+02	5.50E+03	12.69%	N/A	N/A
Eu-154	**4.50E+03**		3.46E+01	**3.46E+01**	0.08%	N/A	N/A
Cs-137 to Co-60 ratio =		1.03E+02		4.33E+04	100.00%		

Adjusted Gross DCGL

ALPHA	DCGL (dpm/100cm²)	Nuclide Fraction	Alpha Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
U-234	**3.15E+04**	0.00018	0.906	5.56E-09		28,111.82	8.92E-01
U-235	**2.71E+04**	0.00002	0.094	6.70E-10		2,914.91	1.08E-01
		0.00019	1.000	6.23E-09		31027	1.00
			Adjusted Gross DCGL	**31027**	**dpm/100cm²**	**(alpha)**	

BETA	DCGL (dpm/100cm²)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
Cs-137	**4.05E+04**	0.8504	0.8622	2.10E-05		32,991.43	8.15E-01
Co-60	**1.10E+04**	0.0082	0.0084	7.49E-07		319.71	2.91E-02
Sr-90	**3.31E+04**	0.1269	0.1287	3.83E-06		4,922.84	1.49E-01
Eu-154	**4.50E+03**	0.0008	0.0008	1.77E-07		30.97	6.88E-03
		0.9863	1.0000	2.58E-05		38265	1.00
			Adjusted Gross DCGL	**38265**	**dpm/100cm²**	**(beta)**	

Adjusted Gross DCGL (combined alpha plus beta)

	DCGL (dpm/100cm²)	Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
DCGL (alpha)	31027	0.0002	6.23E-09		7.40	2.38E-04
DCGL (beta)	38265	0.9998	2.61E-05		38,255.83	1.00E+00
		1.0000	2.61E-05		38263	1.00
		Adjusted Gross DCGL	**38263**	**dpm/100cm²**	**(alpha plus beta)**	

ROLB Smear V

	DCGL (dpm/100cm^2)	Results (pCi/filter)	MDA (pCi/filter)	Used (pCi/filter)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
ALPHA							
U-234	**3.15E+04**	9.15E+01	3.97E+00	9.15E+01	0.38%	N/A	N/A
U-235	**2.71E+04**	5.82E+00	2.84E+00	5.82E+00	0.02%	N/A	N/A
BETA							
Cs-137	**4.05E+04**	4.45E+03	1.37E+01	4.45E+03	18.67%	1.000	2.47E-05
H-3	**9.10E+06**	1.76E+04	5.30E+01	1.76E+04	73.72%	3.947	4.34E-07
I-129	**1.49E+04**	1.67E+01	1.20E+01	1.67E+01	0.07%	0.004	2.52E-07
Co-60	**1.10E+04**	2.76E+02	1.16E+01	2.76E+02	1.16%	N/A	N/A
Sr-90	**3.31E+04**	1.42E+03	1.48E+01	1.42E+03	5.97%	N/A	N/A
Cs-137 to Co-60 ratio =		1.61E+01		2.38E+04	100.00%		

Adjusted Gross DCGL

ALPHA	DCGL (dpm/100cm^2)	Nuclide Fraction	Alpha Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
U-234	**3.15E+04**	0.0038	0.940	1.22E-07		29,331.40	9.31E-01
U-235	**2.71E+04**	0.0002	0.060	9.01E-09		1,865.69	6.88E-02
		0.0041	1.000	1.31E-07		31197	1.00
			Adjusted Gross DCGL	**31197**	**dpm/100cm^2**		

BETA	DCGL (dpm/100cm^2)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
Cs-137	**3.94E+04**	0.1867	0.724	4.74E-06		24,587.56	6.24E-01
Co-60	**1.10E+04**	0.0116	0.045	1.05E-06		1,522.64	1.38E-01
Sr-90	**3.31E+04**	0.0597	0.231	1.80E-06		7,865.26	2.38E-01
		0.2581	1.000	7.60E-06		33975	1.00
			Adjusted Gross DCGL	**33975**	**dpm/100cm^2**		

Adjusted Gross DCGL (combined alpha plus beta)

	DCGL (dpm/100cm^2)	Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
DCGL (alpha)	31197	0.0041	1.31E-07		138.68	4.45E-03
DCGL (beta)	33975	0.9959	2.93E-05		33,824.42	9.96E-01
		1.0000	2.94E-05		33963	1.00
		Adjusted Gross DCGL	**33963**	**dpm/100cm^2**	**(alpha plus beta)**	

ROLB Smear Duplicate W

	DCGL (dpm/100cm^2)	Results (pCi/filter)	MDA (pCi/filter)	Used (pCi/filter)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
ALPHA							
U-234	**3.15E+04**	8.52E+01	1.81E+00	8.52E+01	0.36%	N/A	N/A
U-235	**2.71E+04**	4.42E+00	2.24E+00	4.42E+00	0.02%	N/A	N/A
BETA							
Cs-137	**4.05E+04**	4.45E+03	1.37E+01	4.45E+03	18.79%	1.000	2.47E-05
H-3	**9.10E+06**	1.76E+04	5.30E+01	1.76E+04	74.17%	3.947	4.34E-07
I-129	**1.49E+04**	1.67E+01	1.20E+01	1.67E+01	0.07%	0.004	2.52E-07
Co-60	**1.10E+04**	2.76E+02	1.16E+01	2.76E+02	1.16%	N/A	N/A
Sr-90	**3.31E+04**	1.29E+03	1.39E+01	1.29E+03	5.43%	N/A	N/A
Cs-137 to Co-60 ratio =		1.61E+01		2.37E+04	100.00%		

Adjusted Gross DCGL

ALPHA	DCGL (dpm/100cm^2)	Nuclide Fraction	Alpha Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
U-234	**3.15E+04**	0.0036	0.951	1.14E-07		29,708.53	9.43E-01
U-235	**2.71E+04**	0.0002	0.049	6.89E-09		1,541.23	5.69E-02
		0.0038	1.000	1.21E-07		31250	1.00
			Adjusted Gross DCGL	**31250**	**dpm/100cm^2**		

BETA	DCGL (dpm/100cm^2)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
Cs-137	**3.94E+04**	0.1879	0.740	4.77E-06		25,162.04	6.39E-01
Co-60	**1.10E+04**	0.0116	0.046	1.06E-06		1,558.21	1.42E-01
Sr-90	**3.31E+04**	0.0543	0.214	1.64E-06		7,275.65	2.20E-01
		0.2539	1.000	7.47E-06		33996	1.00
			Adjusted Gross DCGL	**33996**	**dpm/100cm^2**		

Adjusted Gross DCGL (combined alpha plus beta)

	DCGL (dpm/100cm^2)	Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
DCGL (alpha)	31250	0.0038	1.21E-07		128.57	4.11E-03
DCGL (beta)	33996	0.9962	2.93E-05		33,856.04	9.96E-01
		1.0000	2.94E-05		33985	1.00
		Adjusted Gross DCGL	**33985**	**dpm/100cm^2**	**(alpha plus beta)**	

ROLB Smear 2 X

	DCGL (dpm/100cm^2)	Results (pCi/filter)	MDA (pCi/filter)	Used (pCi/filter)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
ALPHA							
U-234	**3.15E+04**	1.18E+04	4.93E+00	1.18E+04	68.92%	N/A	N/A
U-235	**2.71E+04**	3.94E+02	3.35E+00	3.94E+02	2.30%	N/A	N/A
BETA							
Cs-137	**4.05E+04**	2.77E+03	1.14E+01	2.77E+03	16.19%	1.00	2.47E-05
H-3	**9.10E+06**		6.84E+02	**6.84E+02**	4.00%	0.25	2.71E-08
I-129	**1.49E+04**	9.63E+02	1.04E+01	9.63E+02	5.63%	0.35	2.33E-05
Co-60	**1.10E+04**	6.00E+01	8.81E+00	6.00E+01	0.35%	N/A	N/A
Sr-90	**3.31E+04**	4.48E+02	1.23E+01	4.48E+02	2.61%	N/A	N/A
Cs-137 to Co-60 ratio =		4.62E+01		1.71E+04	100.00%		

Adjusted Gross DCGL

ALPHA	DCGL (dpm/100cm^2)	Nuclide Fraction	Alpha Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
U-234	**3.15E+04**	0.6892	0.968	2.19E-05		30,324.27	9.63E-01
U-235	**2.71E+04**	0.0230	0.032	8.48E-07		1,011.50	3.73E-02
		0.7122	1.000	2.27E-05		31336	1.00
			Adjusted Gross DCGL	**31336**	**dpm/100cm^2**		

BETA	DCGL (dpm/100cm^2)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
Cs-137	**2.08E+04**	0.1619	0.845	7.78E-06		18,215.89	8.75E-01
Co-60	**1.10E+04**	0.0035	0.018	3.18E-07		394.24	3.58E-02
Sr-90	**3.31E+04**	0.0261	0.137	7.90E-07		2,942.13	8.89E-02
		0.1915	1.000	8.89E-06		21552	1.00
			Adjusted Gross DCGL	**21552**	**dpm/100cm^2**		

Adjusted Gross DCGL (combined alpha plus beta)

	DCGL (dpm/100cm^2)	Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
DCGL (alpha)	31336	0.7122	2.27E-05		19,739.79	6.30E-01
DCGL (beta)	21552	0.2878	1.34E-05		7,975.54	3.70E-01
		1.0000	3.61E-05		27715	1.00
		Adjusted Gross DCGL	**27715**	**dpm/100cm^2**	**(alpha plus beta)**	

ROLB Smear 2 Duplicate Y

	DCGL (dpm/100cm^2)	Results (pCi/filter)	MDA (pCi/filter)	Used (pCi/filter)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
ALPHA							
U-234	**3.15E+04**	1.11E+04	5.04E+00	1.11E+04	67.86%	N/A	N/A
U-235	**2.71E+04**	4.08E+02	3.28E+00	4.08E+02	2.49%	N/A	N/A
BETA							
Cs-137	**4.05E+04**	2.71E+03	1.17E+01	2.71E+03	16.54%	1.00	2.47E-05
H-3	**9.10E+06**		6.85E+02	**6.85E+02**	4.19%	0.25	2.78E-08
I-129	**1.49E+04**	9.32E+02	1.05E+01	9.32E+02	5.70%	0.34	2.31E-05
Co-60	**1.10E+04**	6.46E+01	7.77E+00	6.46E+01	0.39%	N/A	N/A
Sr-90	**3.31E+04**	4.62E+02	1.26E+01	4.62E+02	2.83%	N/A	N/A
Cs-137 to Co-60 ratio =		4.19E+01		1.64E+04	100.00%		

Adjusted Gross DCGL

ALPHA	DCGL (dpm/100cm^2)	Nuclide Fraction	Alpha Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
U-234	**3.15E+04**	0.6786	0.965	2.15E-05		30,209.61	9.59E-01
U-235	**2.71E+04**	0.0249	0.035	9.20E-07		1,110.15	4.10E-02
		0.7035	1.000	2.25E-05		31320	1.00
			Adjusted Gross DCGL	**31320**	**dpm/100cm^2**		

BETA	DCGL (dpm/100cm^2)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
Cs-137	**2.09E+04**	0.1654	0.837	7.91E-06		18,126.55	8.67E-01
Co-60	**1.10E+04**	0.0039	0.020	3.59E-07		432.47	3.93E-02
Sr-90	**3.31E+04**	0.0283	0.143	8.54E-07		3,098.11	9.36E-02
		0.1976	1.000	9.13E-06		21657	1.00
			Adjusted Gross DCGL	**21657**	**dpm/100cm^2**		

Adjusted Gross DCGL (combined alpha plus beta)

	DCGL (dpm/100cm^2)	Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
DCGL (alpha)	31320	0.7035	2.25E-05		19,458.85	6.21E-01
DCGL (beta)	21657	0.2965	1.37E-05		8,201.63	3.79E-01
		1.0000	3.62E-05		27660	1.00
		Adjusted Gross DCGL	**27660**	**dpm/100cm^2**	**(alpha plus beta)**	

Quad A Smear O

	DCGL (dpm/100cm^2)	Results (pCi/filter)	MDA (pCi/filter)	Used (pCi/filter)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
Cs-137	**4.05E+04**	1.14E+02	9.49E+00	1.14E+02	1.19%	1.00	2.47E-05
H-3	**9.10E+06**	6.82E+03	5.22E+02	6.82E+03	71.37%	59.88	6.58E-06
Co-60	**1.10E+04**	2.55E+03	7.07E+00	2.55E+03	26.67%	N/A	N/A
Sr-90	**3.31E+04**	7.38E+01	8.56E+00	7.38E+01	0.77%	N/A	N/A
Cs-137 to Co-60 ratio =		4.47E-02		9.55E+03	100.00%		

Adjusted Gross DCGL

	DCGL (dpm/100cm^2)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
Cs-137	**3.20E+04**	0.0119	0.0416	3.73E-07		479.58	1.50E-02
Co-60	**1.10E+04**	0.2667	0.9314	2.42E-05		10,731.72	9.76E-01
Sr-90	**3.31E+04**	0.0077	0.0270	2.33E-07		310.88	9.39E-03
		0.2863	1.0000	2.49E-05		11522	1.00
		Adjusted Gross DCGL		**11522**	**dpm/100cm^2**		

Quad C Smear P

	DCGL (dpm/100cm^2)	Results (pCi/filter)	MDA (pCi/filter)	Used (pCi/filter)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
ALPHA							
U-234	**3.15E+04**	1.18E+04	4.93E+00	1.18E+04	24.64%	N/A	N/A
BETA							
Cs-137	**4.05E+04**	6.94E+01	1.02E+01	6.94E+01	0.14%	1.00	2.47E-05
H-3	**9.10E+06**	3.29E+04	3.57E+02	3.29E+04	68.80%	474.52	5.21E-05
Co-60	**1.10E+04**	3.03E+03	7.40E+00	3.03E+03	6.33%	N/A	N/A
Sr-90	**3.31E+04**	3.97E+01	9.20E+00	3.97E+01	0.08%	N/A	N/A
Cs-137 to Co-60 ratio =		2.29E-02		4.79E+04	100.00%		

Adjusted Gross DCGL

	DCGL (dpm/100cm^2)	Nuclide Fraction	Alpha Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
ALPHA							
U-233/U-234	**3.15E+04**	0.2464	1.000	7.82E-06		31,500.00	1.00E+00
		0.2464	1.000	7.82E-06		31500	1.00
		Adjusted Gross DCGL		**31500**	**dpm/100cm^2**		

	DCGL (dpm/100cm^2)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
BETA							
Cs-137	**1.30E+04**	0.0014	0.022	1.11E-07		245.98	1.89E-02
Co-60	**1.10E+04**	0.0633	0.965	5.76E-06		10,745.31	9.77E-01
Sr-90	**3.31E+04**	0.0008	0.013	2.51E-08		140.79	4.25E-03
		0.0656	1.000	5.89E-06		11132	1.00
		Adjusted Gross DCGL		**11132**	**dpm/100cm^2**		

Adjusted Gross DCGL (combined alpha plus beta)

	DCGL (dpm/100cm^2)	Nuclide Fraction		Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
DCGL (alpha)	31500	0.2464		7.82E-06		3,263.26	1.04E-01
DCGL (beta)	11132	0.7536		6.77E-05		9,978.85	8.96E-01
		1.0000		7.55E-05		13242	1.00
		Adjusted Gross DCGL		**13242**	**dpm/100cm^2**	**(alpha plus beta)**	

Quad E Smear Q

	DCGL (dpm/100cm^2)	Results (pCi/filter)	MDA (pCi/filter)	Used (pCi/filter)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
Cs-137	**4.05E+04**	1.34E+02	1.23E+01	1.34E+02	0.29%	1.00	2.47E-05
H-3	**9.10E+06**	4.06E+04	4.14E+02	4.06E+04	88.35%	302.37	3.32E-05
Co-60	**1.10E+04**	5.13E+03	9.32E+00	5.13E+03	11.15%	N/A	N/A
Sr-90	**3.31E+04**	9.49E+01	8.25E+00	9.49E+01	0.21%	N/A	N/A
				4.60E+04	100.00%		

Adjusted Gross DCGL

	DCGL (dpm/100cm^2)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
Cs-137	**1.73E+04**	0.0029	0.0251	1.69E-07		281.76	1.63E-02
Co-60	**1.10E+04**	0.1115	0.9572	1.01E-05		10,754.34	9.78E-01
Sr-90	**3.31E+04**	0.0021	0.0177	6.24E-08		199.04	6.01E-03
		0.1165	1.0000	1.04E-05		11235	1.00
Cs/Co ratio=	2.62E-02	**Adjusted Gross DCGL**		**11235**	**dpm/100cm^2**		

WEMS -12'0" Elevation, North Vault
Sludge Sample #1 (South Side, PB06-02893) Z

	DCGL (dpm/100cm^2)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
BETA							
Cs-137	**4.05E+04**	89.96%	0.900	2.2212E-05		28,704.88	7.09E-01
Co-60	**1.10E+04**	10.04%	0.100	9.1273E-06		3,203.61	2.91E-01
		100.00%	1.000	3.1340E-05		31908	1
Cs/Co ratio=	8.96E+00	**Adjusted Gross DCGL**		**31908**	**dpm/100cm^2**		

WEMS -12'0" Elevation, North Vault
Sludge Sample #2 (West Side, PB06-02894) AA

	DCGL (dpm/100cm^2)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
BETA							
Cs-137	**4.05E+04**	96.67%	0.967	2.3869E-05		35,941.60	8.87E-01
Co-60	**1.10E+04**	3.33%	0.033	3.0273E-06		1,238.08	1.13E-01
		100.00%	1.000	2.6896E-05		37180	1
Cs/Co ratio	indeterminate	**Adjusted Gross DCGL**		**37180**	**dpm/100cm^2**		

WEMS -12'0" Elevation, North Vault
Sludge Sample #3 (North Side, PB06-02895) AB

	DCGL (dpm/100cm^2)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
BETA							
Cs-137	**4.05E+04**	90.70%	0.907	2.2395E-05		29,400.70	7.26E-01
Co-60	**1.10E+04**	9.30%	0.093	8.4545E-06		3,014.63	2.74E-01
		100.00%	1.000	3.0850E-05		32415	1
Cs/Co ratio=	9.75E+00	**Adjusted Gross DCGL**		**32415**	**dpm/100cm^2**		

APPENDIX G

Survey Request (SR) Concrete Core and Smear Data

(38 pages)

SR-15, Reactor Building Quads & Canals
SR-24, Hot Pipe Tunnel, Primary Pump House, Waste Handling Building
SR-28, Fan House, Hot Retention Area Pipe Trench
SR-29, Waste Handling Building
SR-31, Reactor Office and Laboratory Building
SR-32, Services and Equipment Building

The data presented in this Appendix is generated from analyses performed by the PBRF on-site laboratory. In addition to on-site analyses samples 2, 8, 12, 16, and 18 in SR24 were sent to an off-site laboratory for 10CFR61 analyses. Data from the aforementioned samples is presented in Appendix D, Concrete Core 10CFR61 Data and DCGL Calculations.

SR-15
Reactor Building Quads & Canals
(6 pages)

SR15 - CORE BORE SAMPLES

SR-15 Sample Results

Sample Log #	Qaulitative Only	Sample #	Location	Notes	Weight (g)	Cs-137 DCGL$_{(eff)}$ pCi/g	Cs-137 2.2 2σ	Slice average activity	dpm/100cm^2	Co-60 DCGL pCi/g	Co-60 3.3 2σ	% Unity	Cs:Co	Cs-137 MDA pCi/g	Co-60 MDA pCi/g
PB06-01623-T	1	SR15-1	EMP-QC-03-SL1-T		237.3	<MDA				<MDA		0%	N/A	3.48E-02	4.91E-02
PB06-01623-B	1	SR15-1	EMP-QC-03-SL1-B		237.3	<MDA				<MDA		0%	N/A	3.61E-02	4.91E-02
PB06-01624-T		SR15-1	EMP-QC-03-SL2-T		112.8	<MDA				<MDA		0%	N/A	6.91E-02	1.08E-01
PB06-01624-B		SR15-1	EMP-QC-03-SL2-B		112.8	<MDA				<MDA		0%	N/A	1.09E-01	1.08E-01
PB06-01628-T		SR15-1	EMP-QC-03-SL3-T		112.2	<MDA				<MDA		0%	N/A	6.95E-02	1.08E-01
PB06-01628-B		SR15-1	EMP-QC-03-SL3-B		112.2	<MDA				<MDA		0%	N/A	8.77E-02	1.08E-01
PB06-01629-T		SR15-1	EMP-QC-03-SL4-T		110.1	<MDA				<MDA		0%	N/A	6.58E-02	1.06E-01
PB06-01629-B		SR15-1	EMP-QC-03-SL4-B		110.1	<MDA				<MDA		0%	N/A	6.58E-02	1.06E-01
PB06-01634-T		SR15-1	EMP-QC-03-SL5-T		105.1	1.68E-01	7.95E-02		102	<MDA		8%	N/A		1.11E-01
PB06-01634-B		SR15-1	EMP-QC-03-SL5-B		105.1	<MDA				<MDA		0%	N/A	6.89E-02	1.22E-01
PB06-01635-T		SR15-1	EMP-QC-03-SL6-T		112.8	<MDA				<MDA		0%	N/A	9.46E-02	1.08E-01
PB06-01635-B		SR15-1	EMP-QC-03-SL6-B		112.8	<MDA				<MDA		0%	N/A	6.92E-02	1.18E-01
PB06-01636-T		SR15-1	EMP-QC-03-SL7-T		113.8	<MDA				<MDA		0%	N/A	9.31E-02	1.02E-01
PB06-01636-B		SR15-1	EMP-QC-03-SL7-B		113.8	<MDA				<MDA		0%	N/A	6.36E-02	1.02E-01
PB06-01637-T		SR15-1	EMP-QC-03-SL8-T		106.5	<MDA				<MDA		0%	N/A	8.67E-02	1.14E-01
PB06-01637-B		SR15-1	EMP-QC-03-SL8-B		106.5	<MDA				<MDA		0%	N/A	7.33E-02	1.14E-01
PB06-01638-T	1	SR15-1	EMP-QC-03-SL9-T		118.8	<MDA				<MDA		0%	N/A	1.20E-01	1.02E-01
PB06-01638-B	1	SR15-1	EMP-QC-03-SL9-B		118.8	<MDA				<MDA		0%	N/A	8.04E-02	1.02E-01
PB06-01639-T		SR15-1	EMP-QC-03-SL10-T		107.0	<MDA				<MDA		0%	N/A	6.77E-02	1.09E-01
PB06-01639-B		SR15-1	EMP-QC-03-SL10-B		107.0	1.56E-01	7.59E-02		96	<MDA		7%	N/A		1.09E-01
PB06-01649-T		SR15-1	EMP-QC-03-SL11-T		98.9	<MDA				<MDA		0%	N/A	8.29E-02	1.23E-01
PB06-01649-B		SR15-1	EMP-QC-03-SL11-B		98.9	<MDA				<MDA		0%	N/A	7.89E-02	1.23E-01
PB06-01650-T		SR15-1	EMP-QC-03-SL12-T		101.3	<MDA				<MDA		0%	N/A	7.51E-02	1.15E-01
PB06-01650-B		SR15-1	EMP-QC-03-SL12-B		101.3	<MDA				<MDA		0%	N/A	1.43E-01	1.15E-01
PB06-01651-T		SR15-1	EMP-QC-03-SL13-T		108.9	<MDA				<MDA		0%	N/A	1.43E-01	1.12E-01
PB06-01651-B		SR15-1	EMP-QC-03-SL13-B		108.9	<MDA				<MDA		0%	N/A	1.03E-01	1.12E-01
PB06-01657-T	1	SR15-1	EMP-QC-03-SL14-T		130.5	<MDA				<MDA		0%	N/A	9.10E-02	9.31E-02
PB06-01657-B	1	SR15-1	EMP-QC-03-SL14-B		130.5	<MDA				<MDA		0%	N/A	5.98E-02	1.18E-01
PB06-01726-T	1	SR15-2	EMP-QC-11-SL1-T		171.8	<MDA				<MDA		0%	N/A	8.85E-02	6.79E-02
PB06-01726-B	1	SR15-2	EMP-QC-11-SL1-B		171.8	<MDA				<MDA		0%	N/A	4.81E-02	6.77E-02
PB06-01727-T		SR15-2	EMP-QC-11-SL2-T		108.2	1.57E-01	7.84E-02	Avg		<MDA		7%	N/A		1.13E-01
PB06-01727-B		SR15-2	EMP-QC-11-SL2-B		108.2	2.45E-01	9.81E-02	2.01E-01	125	<MDA		11%	N/A		1.13E-01
PB06-01728-T		SR15-2	EMP-QC-11-SL3-T		106.8	<MDA				<MDA		0%	N/A	6.78E-02	1.09E-01
PB06-01728-B		SR15-2	EMP-QC-11-SL3-B		106.8	<MDA				<MDA		0%	N/A	9.92E-02	1.09E-01
PB06-01729-T		SR15-2	EMP-QC-11-SL4-T		105.4	<MDA				<MDA		0%	N/A	8.13E-02	1.16E-01
PB06-01729-B		SR15-2	EMP-QC-11-SL4-B		105.4	<MDA				<MDA		0%	N/A	1.21E-01	1.16E-01
PB06-01730-T		SR15-2	EMP-QC-11-SL5-T		104.1	<MDA				<MDA		0%	N/A	6.96E-02	1.12E-01
PB06-01730-B		SR15-2	EMP-QC-11-SL5-B		104.1	<MDA				<MDA		0%	N/A	6.95E-02	1.23E-01
PB06-01731-T		SR15-2	EMP-QC-11-SL6-T		113.6	<MDA				<MDA		0%	N/A	6.87E-02	1.07E-01
PB06-01731-B		SR15-2	EMP-QC-11-SL6-B		113.6	<MDA				<MDA		0%	N/A	1.36E-01	1.07E-01
PB06-01740-T		SR15-2	EMP-QC-11-SL7-T		90.7	<MDA				<MDA		0%	N/A	1.20E-01	1.34E-01
PB06-01740-B		SR15-2	EMP-QC-11-SL7-B		90.7	<MDA				<MDA		0%	N/A	8.60E-02	1.34E-01
PB06-01742-T		SR15-2	EMP-QC-11-SL8-T		106.4	<MDA				<MDA		0%	N/A	9.08E-02	1.10E-01
PB06-01742-B		SR15-2	EMP-QC-11-SL8-B		106.4	<MDA				<MDA		0%	N/A	7.48E-02	1.10E-01
PB06-01743-T		SR15-2	EMP-QC-11-SL9-T		106.1	<MDA				<MDA		0%	N/A	1.34E-02	1.15E-01
PB06-01743-B		SR15-2	EMP-QC-11-SL9-B		106.1	<MDA				<MDA		0%	N/A	1.31E-01	1.15E-01

SR15 - CORE BORE SAMPLES

SR-15 Sample Results

Sample Log #	Qaulitative Only	Sample #	Location	Notes	Weight (g)	Cs-137 DCGL$_{(eff)}$ pCi/g	Cs-137 2.2 2σ	Slice average activity	dpm/100cm^2	Co-60 DCGL pCi/g	Co-60 3.3 2σ	% Unity	Cs:Co	Cs-137 MDA pCi/g	Co-60 MDA pCi/g
PB06-01744-T	1	SR15-2	EMP-QC-11-SL10-T		134.3	<MDA				<MDA		0%	N/A	7.19E-02	8.65E-02
PB06-01744-B	1	SR15-2	EMP-QC-11-SL10-B		134.3	<MDA				<MDA		0%	N/A	7.37E-02	8.65E-02
PB06-01748-T	1	SR15-3	EMP-QA-6-SL1-T		320.5	<MDA				<MDA		0%	N/A	3.30E-02	3.64E-02
PB06-01748-B	1	SR15-3	EMP-QA-6-SL1-B		320.5	<MDA				<MDA		0%	N/A	2.26E-02	3.64E-02
PB06-01749-T	1	SR15-3	EMP-QA-6-SL2-T		116.9	<MDA				<MDA		0%	N/A	7.33E-02	1.04E-01
PB06-01749-B	1	SR15-3	EMP-QA-6-SL2-B		116.9	<MDA				<MDA		0%	N/A	6.67E-02	1.04E-01
PB06-01754-T		SR15-3	EMP-QA-6-SL3-T		107.5	<MDA				<MDA		0%	N/A	6.74E-02	1.08E-01
PB06-01754-B		SR15-3	EMP-QA-6-SL3-B		107.5	8.23E-02	5.49E-02		51	<MDA		4%	N/A		1.08E-01
PB06-01755-T		SR15-3	EMP-QA-6-SL4-T		106.8	<MDA				<MDA		0%	N/A	9.74E-02	1.14E-01
PB06-01755-B		SR15-3	EMP-QA-6-SL4-B		106.8	<MDA				<MDA		0%	N/A	9.74E-02	1.14E-01
PB06-01760-T		SR15-3	EMP-QA-6-SL5-T		100.1	<MDA				<MDA		0%	N/A	1.01E-01	1.22E-01
PB06-01760-B		SR15-3	EMP-QA-6-SL5-B		100.1	<MDA				<MDA		0%	N/A	7.23E-02	1.16E-01
PB06-01763-T	1	SR15-4	EMP-QA-6--Q-SL1-T		253.2	<MDA				<MDA		0%	N/A	3.38E-02	4.80E-02
PB06-01763-B	1	SR15-4	EMP-QA-6--Q-SL1-B		253.2	<MDA				<MDA		0%	N/A	4.69E-02	4.80E-02
PB06-01764-T		SR15-4	EMP-QA-6--Q-SL2-T		103.9	<MDA				<MDA		0%	N/A	6.97E-02	1.12E-01
PB06-01764-B		SR15-4	EMP-QA-6--Q-SL2-B		103.9	<MDA				<MDA		0%	N/A	1.17E-01	1.12E-01
PB06-01765-T		SR15-4	EMP-QA-6--Q-SL3-T		112.2	<MDA				<MDA		0%	N/A	9.74E-02	1.08E-01
PB06-01765-B		SR15-4	EMP-QA-6--Q-SL3-B		112.2	<MDA				<MDA		0%	N/A	6.95E-02	1.08E-01
PB06-01770-T		SR15-4	EMP-QA-6--Q-SL4-T		114.2	<MDA				<MDA		0%	N/A	8.46E-02	1.02E-01
PB06-01770-B		SR15-4	EMP-QA-6--Q-SL4-B		114.2	<MDA				<MDA		0%	N/A	6.34E-02	1.02E-01
PB06-01771-T	1	SR15-4	EMP-QA-6--Q-SL5-T		118.2	<MDA				<MDA		0%	N/A	8.57E-02	1.03E-01
PB06-01771-B	1	SR15-4	EMP-QA-6--Q-SL5-B		118.2	<MDA				<MDA		0%	N/A	1.04E-01	1.03E-01
PB06-01775-T		SR15-4	EMP-QA-6--Q-SL6-T		115.3	<MDA				<MDA		0%	N/A	7.17E-02	1.01E-01
PB06-01775-B		SR15-4	EMP-QA-6--Q-SL6-B		115.3	<MDA				<MDA		0%	N/A	9.56E-02	1.54E-01
PB06-01776-T	1	SR15-4	EMP-QA-6--Q-SL7-T		144.4	<MDA				<MDA		0%	N/A	8.22E-02	8.42E-02
PB06-01776-B	1	SR15-4	EMP-QA-6--Q-SL7-B		144.4	<MDA				<MDA		0%	N/A	5.40E-02	8.42E-02
PB06-01780-T	1	SR15-5	EMP-QA-5--SL1-T		251.3	<MDA				<MDA		0%	N/A	4.04E-02	4.64E-02
PB06-01780-B	1	SR15-5	EMP-QA-5--SL1-B		251.3	7.82E-02	3.51E-02		113	<MDA		4%	N/A		4.69E-02
PB06-01782-T		SR15-5	EMP-QA-5--SL2-T		110.9	<MDA				<MDA		0%	N/A	1.07E-01	1.10E-01
PB06-01782-B		SR15-5	EMP-QA-5--SL2-B		110.9	<MDA				<MDA		0%	N/A	1.07E-01	1.10E-01
PB06-01784-T	1	SR15-5	EMP-QA-5--SL3-T		119.7	<MDA				<MDA		0%	N/A	8.66E-02	9.74E-02
PB06-01784-B	1	SR15-5	EMP-QA-5--SL3-B		119.7	<MDA				<MDA		0%	N/A	1.05E-01	1.15E-01
PB06-01785-T		SR15-5	EMP-QA-5--SL4-T		114.7	<MDA				<MDA		0%	N/A	8.58E-02	1.06E-01
PB06-01785-B		SR15-5	EMP-QA-5--SL4-B		114.7	<MDA				<MDA		0%	N/A	6.80E-02	1.06E-01
PB06-01786-T	1	SR15-5	EMP-QA-5--SL5-T		120.5	1.47E-01	6.93E-02		102	<MDA		7%	N/A		9.67E-02
PB06-01786-B	1	SR15-5	EMP-QA-5--SL5-B		120.5	<MDA				<MDA		0%	N/A	7.80E-02	1.10E-01
PB06-01956-T		SR15-6	EMP-CE-7-SL1-T		104.6	<MDA				<MDA		0%	N/A	7.46E-02	1.16E-01
PB06-01956-B		SR15-6	EMP-CE-7-SL1-B		104.6	<MDA				<MDA		0%	N/A	9.41E-02	1.16E-01
PB06-01958-T		SR15-6	EMP-CE-7-SL2-T		114.5	<MDA				<MDA		0%	N/A	1.02E-01	1.06E-01
PB06-01958-B		SR15-6	EMP-CE-7-SL2-B		114.5	<MDA				<MDA		0%	N/A	6.81E-02	1.06E-01
PB06-01959-T		SR15-6	EMP-CE-7-SL3-T		115.6	3.04E-01	1.22E-01		203	<MDA		14%	N/A		1.05E-01
PB06-01959-B		SR15-6	EMP-CE-7-SL3-B		115.6	<MDA				<MDA		0%	N/A	1.54E-01	1.05E-01
PB06-01968-T	1	SR15-6	EMP-CE-7-SL4-T		119.5	<MDA				<MDA		0%	N/A	6.53E-02	1.02E-01
PB06-01968-B	1	SR15-6	EMP-CE-7-SL4-B		119.5	<MDA				<MDA		0%	N/A	6.53E-02	1.02E-01
PB06-01974-T	1	SR15-6	EMP-CE-7-SL5-T		120.0	<MDA				<MDA		0%	N/A	1.33E-01	1.01E-01
PB06-01974-B	1	SR15-6	EMP-CE-7-SL5-B		120.0	<MDA				<MDA		0%	N/A	6.50E-02	1.01E-01

SR15 - CORE BORE SAMPLES

SR-15 Sample Results

Sample Log #	Qaulitative Only	Sample #	Location	Notes	Weight (g)	Cs-137 DCGL$_{(eff)}$ pCi/g	Cs-137 2.2 2σ	Slice average activity	dpm/100cm^2	Co-60 DCGL pCi/g	Co-60 3.3 2σ	% Unity	Cs:Co	Cs-137 MDA pCi/g	Co-60 MDA pCi/g
PB06-01988-T	1	SR15-6	EMP-CE-7-SL6-T		120.6	<MDA				<MDA		0%	N/A	1.06E-01	1.01E-01
PB06-01988-B	1	SR15-6	EMP-CE-7-SL6-B		120.6	<MDA				<MDA		0%	N/A	1.02E-01	1.01E-01
PB06-01989-T	1	SR15-6	EMP-CE-7-SL7-T		124.1	<MDA				<MDA		0%	N/A	1.07E-01	9.80E-02
PB06-01989-B	1	SR15-6	EMP-CE-7-SL7-B		124.1	<MDA				<MDA		0%	N/A	6.29E-02	9.80E-02
PB06-01990-T	1	SR15-6	EMP-CE-7-SL8-T		115.8	<MDA				<MDA		0%	N/A	1.29E-01	1.05E-01
PB06-01990-B	1	SR15-6	EMP-CE-7-SL8-B		115.8	<MDA				<MDA		0%	N/A	1.13E-01	1.05E-01
PB06-01991-T	1	SR15-6	EMP-CE-7-SL9-T		231.6	<MDA				<MDA		0%	N/A	3.37E-02	5.25E-02
PB06-01991-B	1	SR15-6	EMP-CE-7-SL9-B		231.6	<MDA				<MDA		0%	N/A	3.70E-02	5.25E-02
PB06-01992-T		SR15-6	EMP-CE-7-SL10-T		111.5	<MDA				<MDA		0%	N/A	7.00E-02	1.09E-01
PB06-01992-B		SR15-6	EMP-CE-7-SL10-B		111.5	<MDA				<MDA		0%	N/A	1.14E-01	1.09E-01
PB06-01993-T	1	SR15-6	EMP-CE-7-SL11-T		125.6	2.19E-01	8.62E-02		159	<MDA		9.95%	N/A		9.68E-02
PB06-01993-B	1	SR15-6	EMP-CE-7-SL11-B		125.6	<MDA				<MDA		0%	N/A	1.16E-01	9.68E-02
PB06-01994-T	1	SR15-6	EMP-CE-7-SL12-T		128.2	<MDA				<MDA		0%	N/A	6.09E-02	1.27E-01
PB06-01994-B	1	SR15-6	EMP-CE-7-SL12-B		128.2	<MDA				<MDA		0%	N/A	6.09E-02	9.49E-02
PB06-01995-T	1	SR15-6	EMP-CE-7-SL13-T		155.7	<MDA				<MDA		0%	N/A	7.63E-02	8.58E-02
PB06-01995-B	1	SR15-6	EMP-CE-7-SL13-B		155.7	<MDA				<MDA		0%	N/A	5.93E-02	7.81E-02
PB06-01909-T	1	SR15-7	EMP-CE-14-SL1-T		227.8	<MDA				<MDA		0%	N/A	4.01E-02	5.10E-02
PB06-01909-B	1	SR15-7	EMP-CE-14-SL1-B		227.8	9.49E-02	4.06E-02		125	<MDA		4%	N/A		5.10E-02
PB06-01910-T		SR15-7	EMP-CE-14-SL2-T		98.8	<MDA				<MDA		0%	N/A	7.89E-02	1.23E-01
PB06-01910-B		SR15-7	EMP-CE-14-SL2-B		98.8	<MDA				<MDA		0%	N/A	1.22E-01	1.23E-01
PB06-01915-T		SR15-7	EMP-CE-14-SL3-T		108.5	<MDA				<MDA		0%	N/A	7.90E-02	1.07E-01
PB06-01915-B		SR15-7	EMP-CE-14-SL3-B		108.5	<MDA				<MDA		0%	N/A	9.56E-02	1.07E-01
PB06-01916-T		SR15-7	EMP-CE-14-SL4-T		108.6	<MDA				<MDA		0%	N/A	1.25E-01	1.12E-01
PB06-01916-B		SR15-7	EMP-CE-14-SL4-B		108.6	<MDA				<MDA		0%	N/A	1.07E-01	1.12E-01
PB06-01921-T		SR15-7	EMP-CE-14-SL5-T		114.3	<MDA				<MDA		0%	N/A	6.33E-02	1.02E-01
PB06-01921-B		SR15-7	EMP-CE-14-SL5-B		114.3	<MDA				<MDA		0%	N/A	9.27E-02	1.58E-01
PB06-01923-T		SR15-7	EMP-CE-14-SL6-T		114.1	1.48E-01	7.43E-02		97	<MDA		7%	N/A		1.06E-01
PB06-01923-B		SR15-7	EMP-CE-14-SL6-B		114.1	<MDA				<MDA		0%	N/A	6.84E-02	1.06E-01
PB06-01925-T	1	SR15-7	EMP-CE-14-SL7-T		116.4	<MDA				<MDA		0%	N/A	9.80E-02	1.04E-01
PB06-01925-B	1	SR15-7	EMP-CE-14-SL7-B		116.4	<MDA				<MDA		0%	N/A	1.40E-01	1.19E-01
PB06-01926-T	1	SR15-7	EMP-CE-14-SL8-T		119.2	<MDA				<MDA		0%	N/A	6.54E-02	1.02E-01
PB06-01926-B	1	SR15-7	EMP-CE-14-SL8-B		119.2	<MDA				<MDA		0%	N/A	1.17E-01	1.02E-01
PB06-01927-T		SR15-7	EMP-CE-14-SL9-T		113.8	<MDA				<MDA		0%	N/A	6.85E-02	1.07E-01
PB06-01927-B		SR15-7	EMP-CE-14-SL9-B		113.8	<MDA				<MDA		0%	N/A	9.60E-02	1.07E-01
PB06-01935-T		SR15-7	EMP-CE-14-SL10-T		98.3	<MDA				<MDA		0%	N/A	7.94E-02	1.24E-01
PB06-01935-B		SR15-7	EMP-CE-14-SL10-B		98.3	<MDA				<MDA		0%	N/A	7.94E-02	1.24E-01
PB06-01942-T		SR15-7	EMP-CE-14-SL11-T		96.8	<MDA				<MDA		0%	N/A	1.34E-01	1.26E-01
PB06-01942-B		SR15-7	EMP-CE-14-SL11-B		96.8	<MDA				<MDA		0%	N/A	8.06E-02	1.26E-01
PB06-01943-T		SR15-7	EMP-CE-14-SL12-T		94.4	<MDA				<MDA		0%	N/A	8.26E-02	1.29E-01
PB06-01943-B		SR15-7	EMP-CE-14-SL12-B		94.4	<MDA				<MDA		0%	N/A	8.26E-02	1.29E-01
PB06-01947-T		SR15-7	EMP-CE-14-SL13-T		108.6	<MDA				<MDA		0%	N/A	1.17E-01	1.12E-01
PB06-01947-B		SR15-7	EMP-CE-14-SL13-B		108.6	<MDA				<MDA		0%	N/A	1.17E-01	1.57E-01
PB06-01948-T		SR15-7	EMP-CE-14-SL14-T		109.5	<MDA				<MDA		0%	N/A	7.12E-02	1.11E-01
PB06-01948-B		SR15-7	EMP-CE-14-SL14-B		109.5	<MDA				<MDA		0%	N/A	7.12E-02	1.11E-01
PB06-01951-T		SR15-7	EMP-CE-14-SL15-T		118.7	4.55E-01	1.51E-01	Avg		<MDA		21%	N/A		1.02E-01
PB06-01951-B		SR15-7	EMP-CE-14-SL15-B		118.7	5.62E-01	1.43E-01	5.09E-01	348	<MDA		26%	N/A		1.02E-01

SR15 - CORE BORE SAMPLES

SR-15 Sample Results

Sample Log #	Qaulitative Only	Sample #	Location	Notes	Weight (g)	Cs-137 DCGL$_{(eff)}$ pCi/g	Cs-137 2.2 2σ	Slice average activity	dpm/100cm^2	Co-60 DCGL pCi/g	Co-60 3.3 2σ	% Unity	Cs:Co	Cs-137 MDA pCi/g	Co-60 MDA pCi/g
PB06-01996-T	1	SR15-8	EMP-CE-16B-SL1-T		132.7	<MDA				<MDA		0%	N/A	5.88E-02	9.16E-02
PB06-01996-B	1	SR15-8	EMP-CE-16B-SL1-B		132.7	<MDA				<MDA		0%	N/A	5.88E-02	9.16E-02
PB06-01998-T	1	SR15-8	EMP-CE-16B-SL2-T		147.7	<MDA				<MDA		0%	N/A	6.25E-02	1.04E-01
PB06-01998-B	1	SR15-8	EMP-CE-16B-SL2-B		147.7	1.65E-01	6.89E-02		141	1.85E-01	6.28E-02	13%	0.9		
Slice #3 crumbled while slicing															
PB06-01999-T	1	SR15-8	EMP-CE-16B-SL4-T		124.6	<MDA				<MDA		0%	N/A	1.17E-01	9.76E-02
PB06-01999-B	1	SR15-8	EMP-CE-16B-SL4-B		124.6	<MDA				<MDA		0%	N/A	6.26E-02	9.76E-02
PB06-02000-T	1	SR15-8	EMP-CE-16B-SL5-T		73.2	<MDA				<MDA		0%	N/A	1.35E-01	1.66E-01
PB06-02000-B	1	SR15-8	EMP-CE-16B-SL5-B		73.2	<MDA				<MDA		0%	N/A	1.07E-01	1.66E-01
PB06-02001-T		SR15-8	EMP-CE-16B-SL6-T		79.4	2.13E-01	1.07E-01		98	<MDA		9.7%	N/A		1.53E-01
PB06-02001-B		SR15-8	EMP-CE-16B-SL6-B		79.4	<MDA				<MDA		0%	N/A	1.75E-01	1.53E-01
PB06-02002-T-R		SR15-8	EMP-CE-16B-SL7-T		86.7	<MDA				<MDA		0%	N/A	1.00E-01	1.56E-01
PB06-02002-B		SR15-8	EMP-CE-16B-SL7-B		86.7	<MDA				<MDA		0%	N/A	1.07E-01	1.40E-01
PB06-02003-T		SR15-8	EMP-CE-16B-SL8-T		113.6	<MDA				<MDA		0%	N/A	6.87E-02	1.07E-01
PB06-02003-B		SR15-8	EMP-CE-16B-SL8-B		113.6	<MDA				<MDA		0%	N/A	1.22E-01	1.07E-01
PB06-02011-T		SR15-8	EMP-CE-16B-SL9-T		79.1	<MDA				<MDA		0%	N/A	1.35E-01	1.54E-01
PB06-02011-B		SR15-8	EMP-CE-16B-SL9-B		79.1	3.35E-01	1.34E-01		153	<MDA		15%	N/A		1.54E-01
PB06-02012-T		SR15-8	EMP-CE-16B-SL10-T		105.4	<MDA				<MDA		0%	N/A	1.17E-01	1.15E-01
PB06-02012-B		SR15-8	EMP-CE-16B-SL10-B		105.4	<MDA				<MDA		0%	N/A	7.40E-02	1.15E-01
PB06-02013-T		SR15-8	EMP-CE-16B-SL11-T		95.2	<MDA				<MDA		0%	N/A	8.77E-02	1.04E-01
PB06-02013-B		SR15-8	EMP-CE-16B-SL11-B		95.2	2.26E-01	8.91E-02		124	<MDA		10%	N/A		1.04E-01
PB06-02016-T	1	SR15-9	EMP-CE-16A-SL1-T		76.7	<MDA				<MDA		0%	N/A	1.42E-01	1.29E-01
PB06-02016-B	1	SR15-9	EMP-CE-16A-SL1-B		76.7	<MDA				<MDA		0%	N/A	1.11E-01	1.29E-01
PB06-02017-T	1	SR15-9	EMP-CE-16A-SL2-T		117.2	<MDA				<MDA		0%	N/A	1.22E-01	1.04E-01
PB06-02017-B	1	SR15-9	EMP-CE-16A-SL2-B		117.2	<MDA				<MDA		0%	N/A	7.60E-02	1.04E-01
PB06-02018-T		SR15-9	EMP-CE-16A-SL3-T		103.8	<MDA				<MDA		0%	N/A	5.88E-02	9.56E-02
PB06-02018-B		SR15-9	EMP-CE-16A-SL3-B		103.8	<MDA				<MDA		0%	N/A	1.20E-01	9.53E-02
PB06-02019-T		SR15-9	EMP-CE-16A-SL4-T		99.3	<MDA				<MDA		0%	N/A	7.86E-02	1.23E-01
PB06-02019-B		SR15-9	EMP-CE-16A-SL4-B		99.3	<MDA				<MDA		0%	N/A	1.28E-01	1.35E-01
PB06-02020-T		SR15-9	EMP-CE-16A-SL5-T		113.1	<MDA				<MDA		0%	N/A	9.48E-02	8.78E-02
PB06-02020-B		SR15-9	EMP-CE-16A-SL5-B		113.1	2.64E-01	8.84E-02		172	<MDA		12%	N/A		1.04E-01
PB06-02022-T	1	SR15-9	EMP-CE-16A-SL6-T		140.6	<MDA				<MDA		0%	N/A	5.55E-02	8.65E-02
PB06-02022-B	1	SR15-9	EMP-CE-16A-SL6-B		140.6	<MDA				<MDA		0%	N/A	5.55E-02	8.65E-02
PB06-02023-T	1	SR15-9	EMP-CE-16A-SL7-T		146.5	9.05E-02	4.53E-02	Avg		<MDA		4%	N/A		6.75E-02
PB06-02023-B	1	SR15-9	EMP-CE-16A-SL7-B		146.5	1.07E-01	4.94E-02	9.88E-02	83	<MDA		5%	N/A		6.75E-02
PB06-02024-T	1	SR15-9	EMP-CE-16A-SL8-T		132.4	<MDA				<MDA		0%	N/A	7.44E-02	9.19E-02
PB06-02024-B	1	SR15-9	EMP-CE-16A-SL8-B		132.4	<MDA				<MDA		0%	N/A	7.86E-02	9.19E-02
PB06-02025-T	1	SR15-10	EMP-CE-4-SL1-T		125.0	<MDA				<MDA		0%	N/A	7.70E-02	1.30E-01
PB06-02025-B	1	SR15-10	EMP-CE-4-SL1-B		125.0	<MDA				<MDA		0%	N/A	9.96E-02	7.91E-02
PB06-02026-T		SR15-10	EMP-CE-4-SL2-T		112.5	<MDA				<MDA		0%	N/A	8.21E-02	1.08E-01
PB06-02026-B		SR15-10	EMP-CE-4-SL2-B		112.5	<MDA				<MDA		0%	N/A	6.94E-02	1.08E-01
PB06-02027-T		SR15-10	EMP-CE-4-SL3-T		87.1	1.90E-01	8.53E-02		95	<MDA		9%	N/A		1.14E-01
PB06-02027-B		SR15-10	EMP-CE-4-SL3-B		87.1	<MDA				<MDA		0%	N/A	1.03E-01	1.14E-01
PB06-02028-T		SR15-10	EMP-CE-4-SL4-T		85.7	<MDA				<MDA		0%	N/A	1.21E-01	1.42E-01
PB06-02028-B		SR15-10	EMP-CE-4-SL4-B		85.7	2.97E-01	1.21E-01		147	<MDA		14%	N/A		1.42E-01
PB06-02029-T		SR15-10	EMP-CE-4-SL5-T		95.4	2.00E-01	8.36E-02		110	<MDA		9%	N/A		1.04E-01

SR15 - CORE BORE SAMPLES

SR-15 Sample Results

Sample Log #	Qaulitative Only	Sample #	Location	Notes	Weight (g)	Cs-137 DCGL$_{(eff)}$ pCi/g	Cs-137 2.2 2σ	Slice average activity	dpm/100cm^2	Co-60 DCGL pCi/g	Co-60 3.3 2σ	% Unity	Cs:Co	Cs-137 MDA pCi/g	Co-60 MDA pCi/g
PB06-02029-B		SR15-10	EMP-CE-4-SL5-B		95.4	<MDA				<MDA		0%	N/A	1.08E-01	1.04E-01
PB06-02030-T		SR15-10	EMP-CE-4-SL6-T		83.9	<MDA				<MDA		0%	N/A	1.27E-01	1.45E-01
PB06-02030-B		SR15-10	EMP-CE-4-SL6-B		83.9	<MDA				<MDA		0%	N/A	1.33E-01	1.45E-01
PB06-02031-T		SR15-10	EMP-CE-4-SL7-T		90.1	<MDA				<MDA		0%	N/A	9.90E-02	1.16E-01
PB06-02031-B		SR15-10	EMP-CE-4-SL7-B		90.1	2.30E-01	9.23E-02		120	<MDA		10%	N/A		1.10E-01
PB06-02032-T		SR15-10	EMP-CE-4-SL8-T		105.3	<MDA				<MDA		0%	N/A	8.46E-02	1.16E-01
PB06-02032-B		SR15-10	EMP-CE-4-SL8-B		105.3	<MDA				<MDA		0%	N/A	7.41E-02	1.16E-01
PB06-02033-T		SR15-10	EMP-CE-4-SL9-T		106.5	<MDA				<MDA		0%	N/A	9.36E-02	9.29E-02
PB06-02033-B		SR15-10	EMP-CE-4-SL9-B		106.5	<MDA				<MDA		0%	N/A	9.05E-02	1.10E-01
PB06-02034-T	1	SR15-10	EMP-CE-4-SL10-T		118.7	<MDA				<MDA		0%	N/A	7.78E-02	1.03E-01
PB06-02034-B	1	SR15-10	EMP-CE-4-SL10-B		118.7	<MDA				<MDA		0%	N/A	6.57E-02	1.03E-01
PB06-02035-T		SR15-10	EMP-CE-4-SL11-T		83.4	<MDA				<MDA		0%	N/A	1.16E-01	1.19E-01
PB06-02035-B		SR15-10	EMP-CE-4-SL11-B		83.4	1.69E-01	8.21E-02		81	<MDA		8%	N/A		1.19E-01
PB06-02036-T		SR15-11	EMP-CE-2-SL1-T		102.0	<MDA				<MDA		0%	N/A	9.36E-02	1.19E-01
PB06-02036-B		SR15-11	EMP-CE-2-SL1-B		102.0	<MDA				<MDA		0%	N/A	1.51E-01	1.51E-01
PB06-02040-T		SR15-11	EMP-CE-2-SL2-T		105.2	<MDA				<MDA		0%	N/A	8.30E-02	9.44E-02
PB06-02040-B		SR15-11	EMP-CE-2-SL2-B		105.2	<MDA				<MDA		0%	N/A	1.14E-01	9.44E-02
PB06-02046-T		SR15-11	EMP-CE-2-SL3-T		95.1	<MDA				<MDA		0%	N/A	8.21E-02	1.28E-01
PB06-02046-B		SR15-11	EMP-CE-2-SL3-B		95.1	<MDA				<MDA		0%	N/A	8.21E-02	1.28E-01
PB06-02047-T		SR15-11	EMP-CE-2-SL4-T		112.7	1.40E-01	6.43E-02		91	<MDA		6%	N/A		8.81E-02
PB06-02047-B		SR15-11	EMP-CE-2-SL4-B		112.7	<MDA				<MDA		0%	N/A	1.04E-01	8.81E-02
PB06-02048-T		SR15-11	EMP-CE-2-SL5-T		106.1	<MDA				<MDA		0%	N/A	1.34E-01	1.15E-01
PB06-02048-B		SR15-11	EMP-CE-2-SL5-B		106.1	<MDA				<MDA		0%	N/A	7.36E-02	1.15E-01
PB06-02049-T		SR15-11	EMP-CE-2-SL6-T		107.0	<MDA				<MDA		0%	N/A	1.12E-01	9.28E-02
PB06-02049-B		SR15-11	EMP-CE-2-SL6-B		107.0	<MDA				<MDA		0%	N/A	1.09E-01	9.28E-02
PB06-02050-T		SR15-11	EMP-CE-2-SL7-T		101.7	<MDA				<MDA		0%	N/A	1.47E-01	1.20E-01
PB06-02050-B		SR15-11	EMP-CE-2-SL7-B		101.7	<MDA				<MDA		0%	N/A	1.23E-01	1.20E-01
PB06-02051-T		SR15-11	EMP-CE-2-SL8-T		101.7	<MDA				<MDA		0%	N/A	7.79E-02	9.77E-02
PB06-02051-B		SR15-11	EMP-CE-2-SL8-B		101.7	1.47E-01	6.93E-02		86	<MDA		7%	N/A		9.77E-02
PB06-02052-T		SR15-11	EMP-CE-2-SL9-T		108.3	<MDA				<MDA		0%	N/A	7.21E-02	1.12E-01
PB06-02052-B		SR15-11	EMP-CE-2-SL9-B		108.3	<MDA				<MDA		0%	N/A	7.21E-02	1.12E-01
PB06-02053-T		SR15-11	EMP-CE-2-SL10-T		106.6	<MDA				<MDA		0%	N/A	9.03E-02	9.32E-02
PB06-02053-B		SR15-11	EMP-CE-2-SL10-B		106.6	1.79E-01	7.48E-02		110	<MDA		8%	N/A		9.32E-02
PB06-02054-T		SR15-11	EMP-CE-2-SL11-T		84.6	<MDA				<MDA		0%	N/A	1.29E-01	1.58E-01
PB06-02054-B		SR15-11	EMP-CE-2-SL11-B		84.6	<MDA				<MDA		0%	N/A	9.22E-02	1.44E-01
PB06-02055-T		SR15-11	EMP-CE-2-SL12-T		104.2	1.18E-01	7.42E-02		71	<MDA		5%	N/A		9.53E-02
PB06-02055-B		SR15-11	EMP-CE-2-SL12-B		104.2	<MDA				<MDA		0%	N/A	1.08E-01	9.53E-02
PB06-02056-T		SR15-11	EMP-CE-2-SL13-T		106.4	<MDA				<MDA		0%	N/A	1.12E-01	1.14E-01
PB06-02056-B		SR15-11	EMP-CE-2-SL13-B		106.4	2.49E-01	9.98E-02		153	<MDA		11%	N/A		1.14E-01
PB06-02057-T		SR15-11	EMP-CE-2-SL14-T		110.4	1.43E-01	6.56E-02		91	<MDA		7%	N/A		8.96E-02
PB06-02057-B		SR15-11	EMP-CE-2-SL14-B		110.4	<MDA				<MDA		0%	N/A	8.41E-02	9.00E-02
Number	72	Qualitative Only			224	31	31			1	1	224	1	193	223
Max					320.5	5.62E-01	1.51E-01			1.85E-01	6.28E-02	26%	0.9	1.75E-01	1.66E-01
Avg					117.9	2.03E-01	8.40E-02			1.85E-01	6.28E-02	1%	0.9	8.87E-02	1.07E-01
SD					36.59	1.06E-01	2.83E-02							2.77E-02	2.23E-02
Conf int +/-					1.65	1.28E-02	3.42E-03							1.34E-03	1.01E-03

SR15 - CORE BORE SAMPLES

SR-15 Sample Results

Sample Log #	Qaulitative Only	Sample #	Location	Notes	Weight (g)	Cs-137 DCGL$_{(eff)}$ pCi/g	Cs-137 2.2 2σ	Slice average activity	dpm/100cm^2	Co-60 DCGL pCi/g	Co-60 3.3 2σ	% Unity	Cs:Co	Cs-137 MDA pCi/g	Co-60 MDA pCi/g

	= >50% Unity
########	= >100% Unity

	= >MDA
	= >10% DCGL

SR-15 Additional Isotope Data

HPGe Log #	Sample #	Location	2s	Eu-154 pCi/g	Eu-154 2s			U-235 pCi/g	U-235 2s
None detected									

SR-24
Hot Pipe Tunnel, Primary Pump House, and Waste Handling Building

(10 pages)

SR-24
CORE BORE SAMPLES

SR-24 Sample Results

Sample Log #		Sample #	Location	Field Measurement Shielded	Field Measurement Un-Shielded	Field Measurement DPM/ slice	Weight (g)	Cs-137 DCGL$_{(eff)}$ pCi/g	Cs-137 2.2 2σ	Slice average activity	dpm/ 100cm^2	Co-60 DCGL pCi/g	Co-60 3.3 2σ	% Unity	Cs:Co	Cs-137 MDA pCi/g	Co-60 MDA pCi/g
PB06-02227-T		SR24-1	WHB-SP-1-SL1-T	9,004	113,098	1,020,529	105.3	1.85E+04	6.58E+02	Avg		2.31E+01	1.47E+00	841609%	801		
PB06-02227-B		SR24-1	WHB-SP-1-SL1-B	5,981	11,120	50,382	105.3	1.31E+04	4.65E+02	1.58E+04	9,599,780	1.57E+01	1.03E+00	595930%	834		
PB06-02228-T		SR24-1	WHB-SP-1-SL2-T	787	2,925	20,961	97.4	1.42E+03	4.32E+01	Avg		<MDA		64545%	N/A		2.09E-01
PB06-02228-B		SR24-1	WHB-SP-1-SL2-B	629	958	3,225	97.4	1.12E+03	3.43E+01	1.27E+03	713,737	<MDA		50909%	N/A		2.09E-01
PB06-02231-T		SR24-1	WHB-SP-1-SL3-T	221	370	1,461	101.3	4.18E+01	2.12E+00	Avg		<MDA		1900%	N/A		1.64E-01
PB06-02231-B		SR24-1	WHB-SP-1-SL3-B	226	317	892	101.3	3.10E+01	1.71E+00	3.64E+01	21,276	<MDA		1409%	N/A		1.64E-01
PB06-02232-T		SR24-1	WHB-SP-1-SL4-T	194	276	804	101.3	1.15E+00	2.85E-01	Avg		<MDA		52%	N/A		2.01E-01
PB06-02232-B		SR24-1	WHB-SP-1-SL4-B	229	296	657	101.3	1.15E+00	2.85E-01	1.15E+00	672	<MDA		52%	N/A		2.01E-01
PB06-02233-T		SR24-1	WHB-SP-1-SL5-T	272	275	29	98.6	5.74E-01	1.81E-01	Avg		<MDA		26%	N/A		1.68E-01
PB06-02233-B		SR24-1	WHB-SP-1-SL5-B	240	310	686	98.6	5.77E-01	2.17E-01	5.76E-01	327	<MDA		26%	N/A		1.68E-01
PB06-02242-T		SR24-2	WHB-SP-2-SL1-T	5,015	88,794	821,363	88.9	1.25E+04	4.44E+02	Avg		2.50E+01	1.55E+00	568939%	500		
PB06-02242-B		SR24-2	WHB-SP-2-SL1-B	3,476	5,091	15,833	88.9	8.66E+03	3.07E+02	1.06E+04	5,427,043	1.63E+01	1.06E+00	394130%	531		
PB06-02243-T		SR24-2	WHB-SP-2-SL2-T	412	1,008	5,843	104.8	4.02E+02	1.30E+01	Avg		<MDA		18273%	N/A		1.94E-01
PB06-02243-B		SR24-2	WHB-SP-2-SL2-B	344	666	3,157	104.8	3.32E+02	1.09E+01	3.67E+02	221,923	<MDA		15091%	N/A		1.94E-01
PB06-02244-T		SR24-2	WHB-SP-2-SL3-T	215	403	1,843	105.1	4.78E+01	2.32E+00	Avg		<MDA		2173%	N/A		1.58E-01
PB06-02244-B		SR24-2	WHB-SP-2-SL3-B	263	341	765	105.1	3.98E+01	2.03E+00	4.38E+01	26,562	<MDA		1809%	N/A		1.58E-01
PB06-02245-T		SR24-2	WHB-SP-2-SL4-T	198	289	892	104.0	3.57E+00	5.03E-01	Avg		<MDA		162%	N/A		1.96E-01
PB06-02245-B		SR24-2	WHB-SP-2-SL4-B	237	262	245	104.0	3.04E+00	4.63E-01	3.31E+00	1,983	<MDA		138%	N/A		1.96E-01
PB06-02246-T		SR24-2	WHB-SP-2-SL5-T	200	282	804	107.4	5.40E-01	1.68E-01	Avg		<MDA		25%	N/A		1.63E-01
PB06-02246-B		SR24-2	WHB-SP-2-SL5-B	196	258	608	107.4	5.53E-01	1.70E-01	5.47E-01	339	<MDA		25%	N/A		1.55E-01
PB06-02247-T		SR24-2	WHB-SP-2-SL6-T	209	307	961	91.8	<MDA				<MDA		0%	N/A	1.42E-01	2.22E-01
PB06-02247-B		SR24-2	WHB-SP-2-SL6-B	230	292	608	91.8	<MDA				<MDA		0%	N/A	1.42E-01	2.22E-01
PB06-02260-T		SR24-3	HPT-SP2-SL1-T	1,650	29,078	268,902	118.4	2.43E+03	8.67E+01	Avg		6.58E+01	2.86E+00	112448%	37		
PB06-02260-B		SR24-3	HPT-SP2-SL1-B	1,423	10,573	89,706	118.4	2.22E+03	7.92E+01	2.33E+03	1,588,366	5.86E+01	2.58E+00	102685%	38		
PB06-02262-T		SR24-3	HPT-SP2-SL2-T	1,150	8,584	72,882	120.5	1.74E+03	5.24E+01	Avg		3.05E+01	1.51E+00	80015%	57		
PB06-02262-B		SR24-3	HPT-SP2-SL2-B	1,072	6,913	57,265	120.5	1.75E+03	5.26E+01	1.75E+03	1,213,272	2.83E+01	1.45E+00	80403%	62		
PB06-02263-T		SR24-3	HPT-SP2-SL3-T	678	4,516	37,627	109.1	1.05E+03	3.80E+01	Avg		1.29E+01	8.44E-01	48118%	81		
PB06-02263-B		SR24-3	HPT-SP2-SL3-B	674	4,763	40,088	109.1	1.00E+03	3.63E+01	1.03E+03	645,245	1.23E+01	8.24E-01	45827%	81		
PB06-02264-T		SR24-3	HPT-SP2-SL4-T	571	4,208	35,657	111.6	7.62E+02	2.36E+01	Avg		1.49E+01	1.00E+00	35088%	51		
PB06-02264-B		SR24-3	HPT-SP2-SL4-B	591	4,313	36,490	111.6	7.45E+02	2.31E+01	7.54E+02	485,203	1.54E+01	9.82E-01	34330%	48		
PB06-02265-T		SR24-3	HPT-SP2-SL5-T	564	3,164	25,490	105.5	6.80E+02	2.48E+01	Avg		7.52E+00	8.45E-01	31137%	90		
PB06-02265-B		SR24-3	HPT-SP2-SL5-B	475	2,737	22,176	105.5	6.56E+02	2.40E+01	6.68E+02	406,635	6.90E+00	5.82E-01	30027%	95		
PB06-02266-T		SR24-4	HPT-SP1-SL1-T	3,764	98,079	924,657	102.9	5.21E+03	1.55E+02	Avg		5.91E+02	1.85E+01	254727%	8.8		
PB06-02266-B		SR24-4	HPT-SP1-SL1-B	3,161	53,089	489,490	102.9	4.40E+03	1.31E+02	4.81E+03	2,852,887	5.36E+02	1.68E+01	216242%	8.2		
PB06-02267-T		SR24-4	HPT-SP1-SL2-T	1,265	18,864	172,539	106.5	1.70E+03	6.10E+01	Avg		1.79E+02	6.92E+00	82697%	9.5		
PB06-02267-B		SR24-4	HPT-SP1-SL2-B	1,407	18,575	168,314	106.5	1.64E+03	5.87E+01	1.67E+03	1,026,223	1.76E+02	6.82E+00	79879%	9.3		
PB06-02268-T		SR24-4	HPT-SP1-SL3-T	799	13,828	127,735	103.4	9.46E+02	2.91E+01	Avg		1.55E+02	5.46E+00	47697%	6.1		
PB06-02268-B		SR24-4	HPT-SP1-SL3-B	834	13,707	126,206	103.4	9.51E+02	2.92E+01	9.49E+02	565,892	1.50E+02	5.30E+00	47773%	6.3		
PB06-02269-T		SR24-4	HPT-SP1-SL4-T	541	11,358	106,049	101.3	5.00E+02	1.85E+01	Avg		5.59E+01	2.55E+00	24421%	8.9		
PB06-02269-B		SR24-4	HPT-SP1-SL4-B	496	8,970	83,078	101.3	4.69E+02	1.74E+01	4.85E+02	283,191	5.08E+01	2.36E+00	22858%	9.2		
PB06-02270-T		SR24-4	HPT-SP1-SL5-T	440	7,967	73,794	99.1	3.86E+02	1.26E+01	Avg		3.03E+01	1.62E+00	18464%	13		
PB06-02270-B		SR24-4	HPT-SP1-SL5-B	455	8,547	79,333	99.1	3.71E+02	1.21E+01	3.79E+02	216,429	3.03E+01	1.61E+00	17782%	12		
PB06-02271-T		SR24-4	HPT-SP1-SL6-T	317	7,164	67,127	98.4	1.91E+02	7.54E+00	Avg		2.28E+01	1.31E+00	9373%	8.4		
PB06-02271-B		SR24-4	HPT-SP1-SL6-B	318	5,085	46,735	98.4	1.88E+02	7.43E+00	1.90E+02	107,592	2.32E+01	1.32E+00	9248%	8.1		

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SR-24 Sample Results

Sample Log #		Sample #	Location	Field Measurement Shielded	Field Measurement Un-Shielded	Field Measurement DPM/ slice	Weight (g)	Cs-137 DCGL$_{(eff)}$ pCi/g	Cs-137 2.2 2σ	Slice average activity	dpm/ 100cm^2	Co-60 DCGL pCi/g	Co-60 3.3 2σ	% Unity	Cs:Co	Cs-137 MDA pCi/g	Co-60 MDA pCi/g
PB06-02272-T		SR24-5	HPT-SP6-SL1-T	3,411	152,017	1,456,922	124.4	4.38E+03	1.56E+02	Avg		7.96E+01	3.44E+00	201503%	55		
PB06-02272-B		SR24-5	HPT-SP6-SL1-B	2,048	6,838	46,961	124.4	3.11E+03	1.11E+02	3.75E+03	2,688,116	6.44E+01	2.77E+00	143315%	48		
PB06-02273-T		SR24-5	HPT-SP6-SL2-T	274	1,402	11,059	86.4	2.07E+02	7.40E+00	Avg		1.32E+01	9.77E-01	9809%	16		
PB06-02273-B		SR24-5	HPT-SP6-SL2-B	233	734	4,912	86.4	1.77E+02	6.49E+00	1.92E+02	95,717	1.23E+01	9.58E-01	8418%	14		
PB06-02274-T		SR24-5	HPT-SP6-SL3-T	187	610	4,147	101.4	1.68E+01	1.15E+00	Avg		3.10E+00	3.79E-01	858%	5.4		
PB06-02274-B		SR24-5	HPT-SP6-SL3-B	176	504	3,216	101.4	1.61E+01	1.11E+00	1.65E+01	9,625	2.65E+00	3.49E-01	812%	6.1		
PB06-02275-T		SR24-5	HPT-SP6-SL4-T	175	463	2,824	101.9	4.63E+00	5.83E-01	Avg		1.15E+00	2.46E-01	245%	4.0		
PB06-02275-B		SR24-5	HPT-SP6-SL4-B	174	504	3,235	101.9	4.21E+00	5.54E-01	4.42E+00	2,599	1.03E+00	2.35E-01	223%	4.1		
PB06-02276-T		SR24-5	HPT-SP6-SL5-T	176	525	3,422	113.4	1.11E+00	2.36E-01	Avg		<MDA		50%	N/A		1.46E-01
PB06-02276-B		SR24-5	HPT-SP6-SL5-B	161	438	2,716	113.4	9.95E-01	2.65E-01	1.05E+00	689	<MDA		45%	N/A		2.50E-01
PB06-02277-T		SR24-5	HPT-SP6-SL6-T	178	408	2,255	100.4	2.81E-01	1.41E-01	Avg		<MDA		13%	N/A		2.03E-01
PB06-02277-B		SR24-5	HPT-SP6-SL6-B	167	442	2,696	100.4	2.23E-01	1.02E-01	2.52E-01	146	<MDA		10%	N/A		1.34E-01
PB06-02278-T		SR24-5	HPT-SP6-SL7-T	171	716	5,343	81.5	<MDA				<MDA		0%	N/A	2.04E-01	2.04E-01
PB06-02278-B		SR24-5	HPT-SP6-SL7-B	161	476	3,088	81.5	3.05E-01	1.44E-01			<MDA		14%	N/A		2.04E-01
PB06-02279-T		SR24-6	HPT-SP6QC-SL1-T	4,982	214,711	2,056,167	93.4	9.56E+03	2.83E+02	Avg		9.83E+01	5.57E+00	437570%	97.3		
PB06-02279-B		SR24-6	HPT-SP6QC-SL1-B	3,107	14,071	107,490	93.4	7.51E+03	2.23E+02	8.54E+03	4,599,935	7.84E+01	3.16E+00	343739%	95.8		
PB06-02280-T		SR24-6	HPT-SP6QC-SL2-T	232	916	6,706	101.1	1.33E+02	5.43E+00	Avg		5.19E+00	5.12E-01	6203%	25.6		
PB06-02280-B		SR24-6	HPT-SP6QCSL2-B	212	612	3,922	101.1	8.71E+01	3.80E+00	1.10E+02	64,197	3.83E+00	4.42E-01	4075%	22.7		
PB06-02282-T		SR24-6	HPT-SP6QC-SL3-T	159	398	2,343	96.3	2.34E+00	4.54E-01	Avg		<MDA		106%	N/A		2.11E-01
PB06-02282-B		SR24-6	HPT-SP6QCSL3-B	202	436	2,294	96.3	1.93E+00	3.80E-01	2.14E+00	1,186	<MDA		88%	N/A		2.11E-01
PB06-02283-T		SR24-6	HPT-SP6QC-SL4-T	175	317	1,392	100.1	5.24E-01	1.71E-01			<MDA		24%	N/A		1.66E-01
PB06-02283-B		SR24-6	HPT-SP6QCSL4-B	164	389	2,206	100.1	<MDA				<MDA		0%	N/A	1.39E-01	1.66E-01
PB06-02284-T		SR24-6	HPT-SP6QC-SL5-T	198	294	941	111.9	5.31E-01	2.14E-01	Avg		<MDA		24%	N/A		1.48E-01
PB06-02284-B		SR24-6	HPT-SP6QCSL5-B	186	255	676	111.9	5.56E-01	1.67E-01	5.44E-01	351	<MDA		25%	N/A		1.48E-01
PB06-02285-T		SR24-6	HPT-SP6QC-SL6-T	187	402	2,108	105.4	6.84E-01	2.65E-01	Avg		<MDA		31%	N/A		1.93E-01
PB06-02285-B		SR24-6	HPT-SP6QCSL6-B	169	372	1,990	105.4	4.86E-01	1.81E-01	5.85E-01	356	<MDA		22%	N/A		1.93E-01
PB06-02286-T		SR24-6	HPT-SP6QC-SL7-T	198	453	2,500	79.2	1.50E+00	3.28E-01	Avg		<MDA		68%	N/A		2.10E-01
PB06-02286-B		SR24-6	HPT-SP6QCSL7-B	213	454	2,363	79.2	1.58E+00	2.77E-01	1.54E+00	704	<MDA		72%	N/A		1.77E-01
PB06-02289-T		SR24-7	HPT-SP3-SL1-T	24,544	295,243	2,653,912	109.0	2.02E+04	7.17E+02	Avg		9.00E+03	3.19E+02	1190909%	2.2		
PB06-02289-B		SR24-7	HPT-SP3-SL1-B	13,131	15,830	26,461	109.0	1.10E+04	3.89E+02	1.56E+04	9,811,308	4.97E+03	1.77E+02	650606%	2.2		
PB06-02290-T		SR24-7	HPT-SP3-SL2-T	225	519	2,882	99.5	1.70E+01	1.21E+00	Avg		<MDA		773%	N/A		2.05E-01
PB06-02290-B		SR24-7	HPT-SP3-SL2-B	220	450	2,255	99.5	1.12E+01	9.64E-01	1.41E+01	8,095	<MDA		509%	N/A		2.05E-01
PB06-02291-T		SR24-7	HPT-SP3-SL3-T	217	434	2,127	104.4	6.22E-01	1.83E-01	Avg		<MDA		28%	N/A		1.58E-01
PB06-02291-B		SR24-7	HPT-SP3-SL3-B	204	471	2,618	104.4	7.81E-01	2.05E-01	7.02E-01	423	4.51E-01	1.44E-01	49%	1.7		
PB06-02292-T		SR24-7	HPT-SP3-SL4-T	207	399	1,882	99.8	7.08E-01	2.25E-01	Avg		6.26E-01	1.83E-01	51%	1.1		
PB06-02292-B		SR24-7	HPT-SP3-SL4-B	224	451	2,225	99.8	5.25E-01	2.36E-01	6.17E-01	355	5.37E-01	1.69E-01	40%	1.0		
PB06-02293-T		SR24-7	HPT-SP3-SL5-T	236	486	2,451	108.5	5.98E-01	1.76E-01	Avg		4.06E-01	1.32E-01	39%	1.5		
PB06-02293-B		SR24-7	HPT-SP3-SL5-B	212	432	2,157	108.5	5.22E-01	1.64E-01	5.60E-01	351	<MDA		24%	N/A		2.83E-01
PB06-02294-T		SR24-7	HPT-SP3-SL6-T	223	405	1,784	105.7	6.85E-01	2.15E-01	Avg		<MDA		31%	N/A		1.93E-01
PB06-02294-B		SR24-7	HPT-SP3-SL6-B	212	446	2,294	105.7	7.35E-01	2.23E-01	7.10E-01	433	6.01E-01	2.51E-01	52%	1.2		
PB06-02295-T		SR24-7	HPT-SP3-SL7-T	221	434	2,088	113.6	5.51E-01	1.82E-01	Avg		3.17E-01	1.10E-01	35%	1.7		
PB06-02295-B		SR24-7	HPT-SP3-SL7-B	236	473	2,324	113.6	3.87E-01	1.78E-01	4.69E-01	307	<MDA		18%	N/A		1.46E-01
PB06-02296-T	1	SR24-7	HPT-SP3-SL8-T	255	455	1,961	59.1	1.63E+00	3.64E-01	Avg		1.44E+00	2.95E-01	118%	1.1		
PB06-02296-B	1	SR24-7	HPT-SP3-SL8-B	236	467	2,265	59.1	1.42E+00	3.93E-01	1.53E+00	520	<MDA		65%	N/A		5.81E-01

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SR-24 Sample Results

Sample Log #		Sample #	Location	Field Measurement Shielded	Field Measurement Un-Shielded	Field Measurement DPM/ slice	Weight (g)	Cs-137 DCGL$_{(eff)}$ pCi/g	Cs-137 2.2 2σ	Slice average activity	dpm/ 100cm^2	Co-60 DCGL pCi/g	Co-60 3.3 2σ	% Unity	Cs:Co	Cs-137 MDA pCi/g	Co-60 MDA pCi/g
PB06-02317-T		SR24-8	HPT-SP4-SL1-T	25,653	202,672	1,735,480	103.1	5.10E+04	1.81E+03	Avg		9.13E+02	3.31E+01	2318182%	55.9		
PB06-02317-B		SR24-8	HPT-SP4-SL1-B	16,991	25,039	78,902	103.1	3.52E+04	1.25E+03	4.31E+04	25,639,630	5.95E+02	2.24E+01	1600000%	59.2		
PB06-02318-T		SR24-8	HPT-SP4-SL2-T	693	2,339	16,137	108.4	9.80E+02	3.00E+01	Avg		2.70E+01	1.42E+00	44545%	36.3		
PB06-02318-B		SR24-8	HPT-SP4-SL2-B	596	1,200	5,922	108.4	7.76E+02	2.40E+01	8.78E+02	549,161	2.02E+01	1.18E+00	35273%	38.4		
PB06-02319-T		SR24-8	HPT-SP4-SL3-T	224	476	2,471	102.3	7.50E+01	3.19E+00	Avg		3.13E+00	4.11E-01	3409%	24.0		
PB06-02319-B		SR24-8	HPT-SP4-SL3-B	206	550	3,373	102.3	5.98E+01	2.73E+00	6.74E+01	39,784	4.06E+00	6.73E-01	2718%	14.7		
PB06-02320-T		SR24-8	HPT-SP4-SL4-T	253	306	520	105.9	1.99E+00	3.45E-01	Avg		5.13E+00	5.02E-01	90%	0.4		
PB06-02320-B		SR24-8	HPT-SP4-SL4-B	235	511	2,706	105.9	2.02E+00	2.91E-01	2.01E+00	1,225	5.65E+00	4.44E-01	92%	0.4		
PB06-02322-T		SR24-8	HPT-SP4-SL5-T	213	327	1,118	114.0	1.08E+00	2.61E-01	Avg		4.20E+00	6.50E-01	49%	0.3		
PB06-02322-B		SR24-8	HPT-SP4-SL5-B	237	300	618	114.0	7.54E-01	2.47E-01	9.17E-01	603	3.68E+00	4.27E-01	34%	0.2		
PB06-02323-T		SR24-8	HPT-SP4-SL6-T	174	290	1,137	114.5	7.12E-01	1.87E-01	Avg		<MDA		32%	N/A		1.60E-01
PB06-02323-B		SR24-8	HPT-SP4-SL6-B	217	353	1,333	114.5	7.96E-01	1.98E-01	7.54E-01	498	<MDA		36%	N/A		1.44E-01
PB06-02324-T		SR24-8	HPT-SP4-SL7-T	191	554	3,559	93.2	2.86E+00	4.44E-01	Avg		5.55E-01	1.50E-01	130%	5.2		
PB06-02324-B		SR24-8	HPT-SP4-SL7-B	206	550	3,373	93.2	3.47E+00	5.23E-01	3.17E+00	1,702	<MDA		158%	N/A		2.19E-01
PB06-02325-T		SR24-9	HPT-SP5-SL1-T	415	14,685	139,902	99.9	5.63E+02	1.78E+01	Avg		2.63E+00	5.61E-01	25591%	214.1		
PB06-02325-B		SR24-9	HPT-SP5-SL1-B	271	614	3,363	99.9	3.03E+02	1.01E+01	4.33E+02	249,591	1.88E+00	4.60E-01	13773%	161.2		
PB06-02326-T		SR24-9	HPT-SP5-SL2-T	151	1,019	8,510	104.4	<MDA				<MDA		0%	N/A	9.74E-02	1.59E-01
PB06-02326-B		SR24-9	HPT-SP5-SL2-B	187	874	6,735	104.4	<MDA				<MDA		0%	N/A	1.43E-01	1.59E-01
PB06-02327-T		SR24-9	HPT-SP5-SL3-T	165	312	1,441	102.4	<MDA				<MDA		0%	N/A	1.05E-01	1.08E-01
PB06-02327-B		SR24-9	HPT-SP5-SL3-B	154	321	1,637	102.4	<MDA				<MDA		0%	N/A	1.39E-01	1.62E-01
PB06-02328-T		SR24-9	HPT-SP5-SL4-T	178	291	1,108	103.9	<MDA				<MDA		0%	N/A	1.58E-01	1.96E-01
PB06-02328-B		SR24-9	HPT-SP5-SL4-B	173	346	1,696	103.9	<MDA				<MDA		0%	N/A	1.83E-01	1.96E-01
PB06-02332-T		SR24-9	HPT-SP5-SL5-T	156	281	1,225	100.1	2.82E-01	1.41E-01			<MDA		13%	N/A		2.04E-01
PB06-02332-B		SR24-9	HPT-SP5-SL5-B	147	256	1,069	100.1	<MDA				<MDA		0%	N/A	1.30E-01	2.04E-01
PB06-02333-T		SR24-9	HPT-SP5-SL6-T	169	363	1,902	110.7	<MDA				<MDA		0%	N/A	1.57E-01	1.50E-01
PB06-02333-B		SR24-9	HPT-SP5-SL6-B	180	422	2,373	110.7	<MDA				<MDA		0%	N/A	9.18E-02	1.50E-01
PB06-02334-T		SR24-9	HPT-SP5-SL7-T	161	864	6,892	106.9	<MDA				<MDA		0%	N/A	9.51E-02	1.56E-01
PB06-02334-B		SR24-9	HPT-SP5-SL7-B	173	1,045	8,549	106.9	2.20E-01	1.07E-01			<MDA		10%	N/A		1.56E-01
PB06-02335-T	1	SR24-9	HPT-SP5-SL8-T	162	818	6,431	71.2	<MDA				<MDA		0%	N/A	4.01E-01	2.86E-01
PB06-02335-B	1	SR24-9	HPT-SP5-SL8-B	180	1,029	8,324	71.2	5.71E-01	2.39E-01			<MDA		26%	N/A		3.27E-01
PB06-02336-T		SR24-10	HPT-SP7-SL1-T	11,690	394,835	3,756,324	103.6	2.22E+04	7.88E+02	Avg		3.04E+01	2.84E+00	1009091%	730.3		
PB06-02336-B		SR24-10	HPT-SP7-SL1-B	5,327	6,782	14,265	103.6	1.31E+04	4.64E+02	1.77E+04	10,550,676	1.99E+01	1.25E+00	595455%	658.3		
PB06-02337-T		SR24-10	HPT-SP7-SL2-T	170	721	5,402	105.8	1.18E+00	3.25E-01	Avg		<MDA		54%	N/A		1.93E-01
PB06-02337-B		SR24-10	HPT-SP7-SL2-B	168	222	529	105.8	5.79E-01	2.33E-01	8.80E-01	537	<MDA		26%	N/A		1.91E-01
PB06-02339-T		SR24-10	HPT-SP7-SL3-T	185	255	686	103.0	<MDA				<MDA		0%	N/A	9.87E-02	1.62E-01
PB06-02339-B		SR24-10	HPT-SP7-SL3-B	164	246	804	103.0	<MDA				<MDA		0%	N/A	1.38E-01	1.62E-01
PB06-02340-T		SR24-10	HPT-SP7-SL4-T	154	267	1,108	101.5	<MDA				<MDA		0%	N/A	1.28E-01	2.01E-01
PB06-02340-B		SR24-10	HPT-SP7-SL4-B	195	264	676	101.5	<MDA				<MDA		0%	N/A	1.28E-01	2.01E-01
PB06-02342-T		SR24-10	HPT-SP7-SL5-T	176	247	696	105.7	<MDA				<MDA		0%	N/A	1.32E-01	1.57E-01
PB06-02342-B		SR24-10	HPT-SP7-SL5-B	150	289	1,363	105.7	<MDA				<MDA		0%	N/A	9.62E-02	1.57E-01
PB06-02343-T		SR24-10	HPT-SP7-SL6-T	154	346	1,882	110.4	<MDA				<MDA		0%	N/A	1.18E-01	1.85E-01
PB06-02343-B		SR24-10	HPT-SP7-SL6-B	200	228	275	110.4	<MDA				<MDA		0%	N/A	1.18E-01	1.85E-01
PB06-02344-T		SR24-10	HPT-SP7-SL7-T	183	252	676	109.0	<MDA				<MDA		0%	N/A	9.33E-02	1.53E-01
PB06-02344-B		SR24-10	HPT-SP7-SL7-B	169	254	833	109.9	<MDA				<MDA		0%	N/A	9.33E-02	1.53E-01

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SR-24 Sample Results

Sample Log #		Sample #	Location	Field Measurement Shielded	Field Measurement Un-Shielded	Field Measurement DPM/ slice	Weight (g)	Cs-137 DCGL$_{(eff)}$ pCi/g	Cs-137 2.2 2σ	Slice average activity	dpm/ 100cm^2	Co-60 DCGL pCi/g	Co-60 3.3 2σ	% Unity	Cs:Co	Cs-137 MDA pCi/g	Co-60 MDA pCi/g
PB06-02345-T		SR24-11	PPH-R8-SP1-SL1-T	147	208	610	113.8	<MDA				<MDA		0%	N/A	1.14E-01	1.79E-01
PB06-02345-B		SR24-11	PPH-R8-SP1-SL1-B	168	169	10	113.8	<MDA				<MDA		0%	N/A	1.14E-01	1.79E-01
PB06-02346-T		SR24-11	PPH-R8-SP1-SL2-T	132	184	520	104.4	<MDA				<MDA		0%	N/A	1.33E-01	1.59E-01
PB06-02346-B		SR24-11	PPH-R8-SP1-SL2-B	143	193	500	104.4	<MDA				<MDA		0%	N/A	9.75E-02	1.59E-01
PB06-02347-T		SR24-11	PPH-R8-SP1-SL3-T	172	199	270	105.9	<MDA				<MDA		0%	N/A	1.23E-01	1.93E-01
PB06-02347-B		SR24-11	PPH-R8-SP1-SL3-B	145	164	190	105.9	<MDA				<MDA		0%	N/A	1.23E-01	1.93E-01
PB06-02348-T		SR24-11	PPH-R8-SP1-SL4-T	176	189	130	106.7	2.46E-01	1.13E-01	Avg		<MDA		11%	N/A		1.56E-01
PB06-02348-B		SR24-11	PPH-R8-SP1-SL4-B	182	182	0	106.7	2.20E-01	1.07E-01	2.33E-01	143	<MDA		10%	N/A		1.56E-01
PB06-02349-T		SR24-11	PPH-R8-SP1-SL5-T	177	205	280	106.6	<MDA				<MDA		0%	N/A	1.22E-01	1.91E-01
PB06-02349-B		SR24-11	PPH-R8-SP1-SL5-B	158	172	140	106.6	<MDA				<MDA		0%	N/A	1.22E-01	1.91E-01
PB06-02350-T		SR24-11	PPH-R8-SP1-SL6-T	149	189	400	92.6	<MDA				<MDA		0%	N/A	1.10E-01	1.80E-01
PB06-02350-B		SR24-11	PPH-R8-SP1-SL6-B	138	184	460	92.6	<MDA				<MDA		0%	N/A	1.10E-01	1.78E-01
PB06-02351-T		SR24-11	PPH-R8-SP1-SL7-T	168	150	-180	101.9	<MDA				<MDA		0%	N/A	1.28E-01	2.00E-01
PB06-02351-B		SR24-11	PPH-R8-SP1-SL7-B	163	137	-260	101.9	<MDA				<MDA		0%	N/A	1.28E-01	2.00E-01
PB06-02352-T		SR24-11	PPH-R8-SP1-SL8-T	160	178	180	112.8	<MDA				<MDA		0%	N/A	1.37E-01	1.48E-01
PB06-02352-B		SR24-11	PPH-R8-SP1-SL8-B	183	168	-150	112.8	<MDA				<MDA		0%	N/A	1.37E-01	1.48E-01
PB06-02353-T		SR24-11	PPH-R8-SP1-SL9-T	150	152	20	116.7	<MDA				<MDA		0%	N/A	1.12E-01	1.75E-01
PB06-02353-B		SR24-11	PPH-R8-SP1-SL9-B	152	157	50	116.7	<MDA				<MDA		0%	N/A	1.12E-01	1.84E-01
PB06-02354-T	1	SR24-12	PPH-R6-SP1-SL1-T	158	55,766	545,176	118.4	1.08E+01	8.05E-01	Avg		1.22E+00	3.08E-01	491%	8.9		
PB06-02354-B	1	SR24-12	PPH-R6-SP1-SL1-B	182	369	1,833	118.4	5.51E+00	5.43E-01	8.16E+00	5,571	6.36E-01	1.54E-01	250%	8.7		
PB06-02355-T		SR24-12	PPH-R6-SP1-SL2-T	147	413	2,608	104.6	<MDA				<MDA		0%	N/A	1.24E-01	1.95E-01
PB06-02355-B		SR24-12	PPH-R6-SP1-SL2-B	149	569	4,118	104.6	<MDA				<MDA		0%	N/A	1.24E-01	1.95E-01
PB06-02356-T		SR24-12	PPH-R6-SP1-SL3-T	160	472	3,059	99.3	<MDA				<MDA		0%	N/A	1.03E-01	1.67E-01
PB06-02356-B		SR24-12	PPH-R6-SP1-SL3-B	169	499	3,235	99.3	<MDA				<MDA		0%	N/A	1.02E-01	1.67E-01
PB06-02357-T		SR24-12	PPH-R6-SP1-SL4-T	176	290	1,118	111.1	<MDA				<MDA		0%	N/A	1.29E-01	1.83E-01
PB06-02357-B		SR24-12	PPH-R6-SP1-SL4-B	165	819	6,412	111.1	<MDA				<MDA		0%	N/A	1.17E-01	1.83E-01
PB06-02358-T		SR24-12	PPH-R6-SP1-SL5-T	137	306	1,657	92.3	<MDA				<MDA		0%	N/A	1.26E-01	1.80E-01
PB06-02358-B		SR24-12	PPH-R6-SP1-SL5-B	155	304	1,461	92.3	2.69E-01	1.27E-01			<MDA		12%	N/A		1.80E-01
PB06-02359-T		SR24-12	PPH-R6-SP1-SL6-T	168	341	1,696	86.7	<MDA				<MDA		0%	N/A	1.50E-01	2.35E-01
PB06-02359-B		SR24-12	PPH-R6-SP1-SL6-B	138	430	2,863	86.7	<MDA				<MDA		0%	N/A	1.50E-01	2.35E-01
PB06-02360-T		SR24-12	PPH-R6-SP1-SL7-T	175	499	3,176	101.4	<MDA				<MDA		0%	N/A	1.00E-01	1.64E-01
PB06-02360-B		SR24-12	PPH-R6-SP1-SL7-B	172	448	2,706	101.4	<MDA				<MDA		0%	N/A	1.00E-01	1.64E-01
PB06-02362-T	1	SR24-12	PPH-R6-SP1-SL8-T	178	386	2,039	145.9	<MDA				<MDA		0%	N/A	8.92E-02	1.40E-01
PB06-02362-B	1	SR24-12	PPH-R6-SP1-SL8-B	152	197	441	145.9	<MDA				<MDA		0%	N/A	8.92E-02	1.40E-01
PB06-02363-T		SR24-12	PPH-R6-SP1-SL9-T	162	385	2,186	108.4	<MDA				<MDA		0%	N/A	9.38E-02	1.52E-01
PB06-02363-B		SR24-12	PPH-R6-SP1-SL9-B	169	1,122	9,343	108.4	<MDA				<MDA		0%	N/A	1.19E-01	1.53E-01
PB06-02364-T		SR24-12	PPH-R6-SP1-SL10-T	169	1,310	11,186	85.1	3.11E-01	1.61E-01			<MDA		14%	N/A		2.39E-01
PB06-02364-B		SR24-12	PPH-R6-SP1-SL10-B	164	516	3,451	85.1	<MDA				<MDA		0%	N/A	1.53E-01	2.39E-01
PB06-02369-T		SR24-13	PPH-R5-SP1-SL1-T	213	4,257	40,440	105.2	4.53E+01	2.28E+00	Avg		3.25E+01	1.64E+00	2059%	1.4		
PB06-02369-B		SR24-13	PPH-R5-SP1-SL1-B	164	197	330	105.2	1.99E+01	1.29E+00	3.26E+01	19,788	1.70E+01	1.04E+00	905%	1.2		
PB06-02370-T		SR24-13	PPH-R5-SP1-SL2-T	163	161	-20	110.6	<MDA				<MDA		0%	N/A	2.04E-01	1.84E-01
PB06-02370-B		SR24-13	PPH-R5-SP1-SL2-B	149	176	270	110.6	<MDA				<MDA		0%	N/A	1.18E-01	1.84E-01
PB06-02371-T		SR24-13	PPH-R5-SP1-SL3-T	169	185	160	108.4	<MDA				<MDA		0%	N/A	1.25E-01	1.53E-01
PB06-02371-B		SR24-13	PPH-R5-SP1-SL3-B	175	166	-90	108.4	<MDA				<MDA		0%	N/A	9.38E-02	1.53E-01

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SR-24 Sample Results

Sample Log #		Sample #	Location	Field Measurement Shielded	Field Measurement Un-Shielded	Field Measurement DPM/ slice	Weight (g)	Cs-137 DCGL$_{(eff)}$ pCi/g	Cs-137 2.2 2σ	Slice average activity	dpm/ 100cm^2	Co-60 DCGL pCi/g	Co-60 3.3 2σ	% Unity	Cs:Co	Cs-137 MDA pCi/g	Co-60 MDA pCi/g
PB06-02372-T		SR24-13	PPH-R5-SP1-SL4-T	162	155	-70	108.0	<MDA				<MDA		0%	N/A	1.21E-01	1.89E-01
PB06-02372-B		SR24-13	PPH-R5-SP1-SL4-B	149	187	380	108.0	<MDA				<MDA		0%	N/A	1.21E-01	1.89E-01
PB06-02373-T		SR24-13	PPH-R5-SP1-SL5-T	155	171	160	102.0	<MDA				<MDA		0%	N/A	1.91E-01	1.63E-01
PB06-02373-B		SR24-13	PPH-R5-SP1-SL5-B	162	190	280	102.0	<MDA				<MDA		0%	N/A	1.40E-01	1.63E-01
PB06-02374-T		SR24-13	PPH-R5-SP1-SL6-T	137	164	270	106.7	<MDA				<MDA		0%	N/A	1.39E-01	1.91E-01
PB06-02374-B		SR24-13	PPH-R5-SP1-SL6-B	133	157	240	106.7	<MDA				<MDA		0%	N/A	1.22E-01	1.91E-01
PB06-02375-T		SR24-13	PPH-R5-SP1-SL7-T	158	171	130	105.6	<MDA				<MDA		0%	N/A	1.06E-01	1.57E-01
PB06-02375-B		SR24-13	PPH-R5-SP1-SL7-B	139	160	210	105.6	<MDA				<MDA		0%	N/A	1.29E-01	1.57E-01
PB06-02376-T		SR24-13	PPH-R5-SP1-SL8-T	142	158	160	110.3	<MDA				<MDA		0%	N/A	1.40E-01	1.85E-01
PB06-02376-B		SR24-13	PPH-R5-SP1-SL8-B	154	144	-100	110.3	<MDA				<MDA		0%	N/A	1.18E-01	1.85E-01
PB06-02377-T		SR24-13	PPH-R5-SP1-SL9-T	132	152	200	109.4	<MDA				<MDA		0%	N/A	9.29E-02	1.52E-01
PB06-02377-B		SR24-13	PPH-R5-SP1-SL9-B	134	146	120	109.4	<MDA				<MDA		0%	N/A	9.29E-02	1.52E-01
PB06-02378-T		SR24-13	PPH-R5-SP1-SL10-T	121	143	220	91.3	<MDA				<MDA		0%	N/A	1.43E-01	2.23E-01
PB06-02378-B		SR24-13	PPH-R5-SP1-SL10-B	124	160	360	91.3	<MDA				<MDA		0%	N/A	1.43E-01	2.23E-01
PB06-02379-T		SR24-14	PPH-R3-SP1-SL1-T	147	37,307	371,600	104.0	8.24E+00	6.34E-01	Avg		3.92E+00	4.96E-01	375%	2.1		
PB06-02379-B		SR24-14	PPH-R3-SP1-SL1-B	124	174	500	104.0	5.62E+00	5.99E-01	6.93E+00	4,159	2.09E+00	3.02E-01	255%	2.7		
PB06-02380-T		SR24-14	PPH-R3-SP1-SL2-T	147	194	470	99.1	<MDA				<MDA		0%	N/A	1.31E-01	2.06E-01
PB06-02380-B		SR24-14	PPH-R3-SP1-SL2-B	149	168	190	99.1	3.21E-01	1.52E-01			<MDA		15%	N/A		2.06E-01
PB06-02382-T		SR24-14	PPH-R3-SP1-SL3-T	128	172	440	109.0	<MDA				<MDA		0%	N/A	1.19E-01	1.87E-01
PB06-02382-B		SR24-14	PPH-R3-SP1-SL3-B	147	193	460	109.9	<MDA				<MDA		0%	N/A	1.19E-01	1.87E-01
PB06-02383-T		SR24-14	PPH-R3-SP1-SL4-T	156	157	10	105.8	<MDA				<MDA		0%	N/A	9.61E-02	1.57E-01
PB06-02383-B		SR24-14	PPH-R3-SP1-SL4-B	168	173	50	105.8	<MDA				<MDA		0%	N/A	1.06E-01	1.57E-01
PB06-02384-T		SR24-14	PPH-R3-SP1-SL5-T	120	153	330	99.3	<MDA				<MDA		0%	N/A	1.31E-01	2.05E-01
PB06-02384-B		SR24-14	PPH-R3-SP1-SL5-B	137	179	420	99.3	<MDA				<MDA		0%	N/A	1.31E-01	2.05E-01
PB06-02385-T		SR24-14	PPH-R3-SP1-SL6-T	148	154	60	101.5	2.59E-01	1.19E-01			<MDA		12%	N/A		1.64E-01
PB06-02385-B		SR24-14	PPH-R3-SP1-SL6-B	148	161	130	101.5	<MDA				<MDA		0%	N/A	1.00E-01	1.64E-01
PB06-02386-T		SR24-14	PPH-R3-SP1-SL7-T	156	188	320	98.8	<MDA				<MDA		0%	N/A	1.32E-01	2.06E-01
PB06-02386-B		SR24-14	PPH-R3-SP1-SL7-B	155	150	-50	98.8	<MDA				<MDA		0%	N/A	1.32E.01	2.06E-01
PB06-02387-T		SR24-14	PPH-R3-SP1-SL8-T	128	172	440	111.0	<MDA				<MDA		0%	N/A	1.40E-01	1.50E-01
PB06-02387-B		SR24-14	PPH-R3-SP1-SL8-B	162	163	10	111.0	<MDA				<MDA		0%	N/A	1.25E-01	1.50E-01
PB06-02388-T		SR24-15	PPH-R4-SP1-SL1-T	174	42,289	421,150	95.7	2.53E+01	1.38E+00	Avg		6.90E+00	5.41E-01	1150%	3.7		
PB06-02388-B		SR24-15	PPH-R4-SP1-SL1-B	187	258	710	95.7	1.70E+01	1.05E+00	2.12E+01	11,679	4.66E+00	4.35E-01	773%	3.6		
PB06-02389-T		SR24-15	PPH-R4-SP1-SL2-T	165	165	0	107.5	2.70E-01	1.18E-01	Avg		<MDA		12%	N/A		1.53E-01
PB06-02389-B		SR24-15	PPH-R4-SP1-SL2-B	162	162	0	107.5	2.83E-01	1.21E-01	2.77E-01	172	<MDA		13%	N/A		1.55E-01
PB06-02390-T		SR24-15	PPH-R4-SP1-SL3-T	182	187	50	108.1	<MDA				<MDA		0%	N/A	1.20E-01	1.88E-01
PB06-02390-B		SR24-15	PPH-R4-SP1-SL3-B	194	183	-110	108.1	<MDA				<MDA		0%	N/A	1.20E-01	1.98E-01
PB06-02391-T		SR24-15	PPH-R4-SP1-SL4-T	169	174	50	101.7	<MDA				<MDA		0%	N/A	1.28E-01	2.00E-01
PB06-02391-B		SR24-15	PPH-R4-SP1-SL4-B	167	198	310	101.7	<MDA				<MDA		0%	N/A	1.28E-01	2.00E-01
PB06-02392-T		SR24-15	PPH-R4-SP1-SL5-T	151	171	200	104.4	<MDA				<MDA		0%	N/A	9.74E-02	1.59E-01
PB06-02392-B		SR24-15	PPH-R4-SP1-SL5-B	152	196	440	104.4	<MDA				<MDA		0%	N/A	1.74E-01	1.59E-01
PB06-02393-T		SR24-15	PPH-R4-SP1-SL6-T	175	184	90	101.5	<MDA				<MDA		0%	N/A	1.00E-01	1.72E-01
PB06-02393-B		SR24-15	PPH-R4-SP1-SL6-B	176	185	90	101.5	2.31E-01	1.12E-01			<MDA		11%	N/A		1.64E-01
PB06-02394-T		SR24-15	PPH-R4-SP1-SL7-T	181	169	-120	102.2	<MDA				<MDA		0%	N/A	1.27E-01	1.99E-01
PB06-02394-B		SR24-15	PPH-R4-SP1-SL7-B	141	177	360	102.2	<MDA				<MDA		0%	N/A	1.27E-01	1.99E-01

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SR-24 Sample Results

Sample Log #		Sample #	Location	Field Measurement Shielded	Field Measurement Un-Shielded	Field Measurement DPM/ slice	Weight (g)	Cs-137 DCGL$_{(eff)}$ pCi/g	Cs-137 2.2 2σ	Slice average activity	dpm/ 100cm^2	Co-60 DCGL pCi/g	Co-60 3.3 2σ	% Unity	Cs:Co	Cs-137 MDA pCi/g	Co-60 MDA pCi/g
PB06-02395-T		SR24-15	PPH-R4-SP1-SL8-T	206	196	-100	100.3	<MDA				<MDA		0%	N/A	1.01E-01	1.66E-01
PB06-02395-B		SR24-15	PPH-R4-SP1-SL8-B	187	195	80	100.3	<MDA				<MDA		0%	N/A	1.35E-01	1.66E-01
PB06-02396-T		SR24-15	PPH-R4-SP1-SL9-T	173	171	-20	105.6	<MDA				<MDA		0%	N/A	1.23E-01	1.93E-01
PB06-02396-B		SR24-15	PPH-R4-SP1-SL9-B	164	186	220	105.6	<MDA				<MDA		0%	N/A	1.23E-01	1.93E-01
PB06-02397-T		SR24-15	PPH-R4-SP1-SL10-T	174	191	170	95.0	<MDA				<MDA		0%	N/A	1.07E-01	1.75E-01
PB06-02397-B		SR24-15	PPH-R4-SP1-SL10-B	188	205	170	95.0	<MDA				<MDA		0%	N/A	1.07E-01	1.75E-01
PB06-02229-T		SR24-16	PPH-R4-SP2-SL1-T	204	21137	209330	103.2	1.95E+00	3.53E-01	Avg		1.77E+00	2.78E-01	142%	1.1		
PB06-02229-B		SR24-16	PPH-R4-SP2-SL1-B	186	182	-40	103.2	1.12E+00	2.68E-01	1.54E+00	914	1.19E+00	2.28E-01	87%	0.9		
PB06-02230-T		SR24-16	PPH-R4-SP2-SL2-T	148	164	160	102.8	<MDA				<MDA		0%	N/A	1.27E-01	1.97E-01
PB06-02230-B		SR24-16	PPH-R4-SP2-SL2-B	192	223	310	102.8	<MDA				<MDA		0%	N/A	1.50E-01	1.97E-01
PB06-02234-T		SR24-16	PPH-R4-SP2-SL3-T	148	204	560	100.0	<MDA				<MDA		0%	N/A	1.90E-01	2.03E-01
PB06-02234-B		SR24-16	PPH-R4-SP2-SL3-B	184	200	160	100.0	<MDA				<MDA		0%	N/A	1.30E-01	2.03E-01
PB06-02235-T		SR24-16	PPH-R4-SP2-SL4-T	201	196	-50	97.5	<MDA				<MDA		0%	N/A	1.04E-01	1.70E-01
PB06-02235-B		SR24-16	PPH-R4-SP2-SL4-B	184	191	70	97.5	<MDA				<MDA		0%	N/A	1.28E-01	1.70E-01
PB06-02236-T		SR24-16	PPH-R4-SP2-SL5-T	168	184	160	103.6	<MDA				<MDA		0%	N/A	1.26E-01	1.96E-01
PB06-02236-B		SR24-16	PPH-R4-SP2-SL5-B	180	202	220	103.6	<MDA				<MDA		0%	N/A	1.26E-01	1.96E-01
PB06-02237-T		SR24-16	PPH-R4-SP2-SL6-T	157	185	280	101.3	2.18E-01	1.09E-01			<MDA		10%	N/A		1.64E-01
PB06-02237-B		SR24-16	PPH-R4-SP2-SL6-B	191	194	30	101.3	<MDA				<MDA		0%	N/A	1.00E-01	1.63E-01
PB06-02456-T		SR24-17	HPT-SP8-SL1-T	5650	162019	1563690	92.6	1.15E+04	3.40E+02	Avg		8.17E+02	2.54E+01	547485%	14.1		
PB06-02456-B		SR24-17	HPT-SP8-SL1-B	4659	56046	513870	92.6	1.04E+04	3.09E+02	1.10E+04	5,850,607	7.71E+02	2.39E+01	496091%	13.5		
PB06-02457-T		SR24-17	HPT-SP8-SL2-T	2475	40991	385160	115.5	4.32E+03	1.54E+02	Avg		4.22E+02	1.55E+01	209152%	10.2		
PB06-02457-B		SR24-17	HPT-SP8-SL2-B	2957	45580	426230	115.5	4.58E+03	1.63E+02	4.45E+03	2,965,636	4.36E+02	1.60E+01	221394%	10.5		
PB06-02458-T		SR24-17	HPT-SP8-SL3-T	1419	32166	307470	91.6	2.76E+03	8.28E+01	Avg		2.31E+02	7.96E+00	132455%	11.9		
PB06-02458-B		SR24-17	HPT-SP8-SL3-B	1657	36447	347900	91.6	2.77E+03	8.32E+01	2.77E+03	1,461,391	2.30E+02	7.99E+00	132879%	12.0		
PB06-02459-T		SR24-17	HPT-SP8-SL4-T	1426	35940	345140	91.7	1.92E+03	6.88E+01	Avg		1.76E+02	6.96E+00	92606%	10.9		
PB06-02459-B		SR24-17	HPT-SP8-SL4-B	1116	20813	196970	91.7	1.81E+03	6.49E+01	1.87E+03	986,788	1.78E+02	7.00E+00	87667%	10.2		
PB06-02460-T		SR24-17	HPT-SP8-SL5-T	1017	24998	239810	97.0	1.41E+03	4.28E+01	Avg		1.52E+02	5.48E+00	68697%	9.3		
PB06-02460-B		SR24-17	HPT-SP8-SL5-B	949	14983	140340	97.0	1.39E+03	4.23E+01	1.40E+03	783,566	1.54E+02	5.55E+00	67848%	9.0		
PB06-02462-T		SR24-17	HPT-SP8-SL6-T	789	9345	85560	91.9	1.00E+03	3.63E+01	Avg		1.14E+02	4.69E+00	48909%	8.8		
PB06-02462-B		SR24-17	HPT-SP8-SL6-B	670	11789	111190	91.9	1.00E+03	3.63E+01	1.00E+03	530,263	1.16E+02	4.79E+00	48970%	8.6		
PB06-02463-T		SR24-17	HPT-SP8-SL7-T	639	10080	94410	100.2	1.01E+03	3.10E+01	Avg		7.55E+01	3.10E+00	48197%	13.4		
PB06-02463-B		SR24-17	HPT-SP8-SL7-B	647	8455	78080	100.2	9.59E+02	2.95E+01	9.85E+02	569,193	7.88E+01	3.28E+00	45979%	12.2		
PB06-02464-T		SR24-17	HPT-SP8-SL8-T	390	8282	78920	93.5	5.37E+02	1.99E+01	Avg		3.93E+01	1.96E+00	25600%	13.7		
PB06-02464-B		SR24-17	HPT-SP8-SL8-B	436	4810	43740	93.5	5.39E+02	1.99E+01	5.38E+02	290,248	3.73E+01	1.91E+00	25630%	14.5		
PB06-02465-T		SR24-17	HPT-SP8-SP9-T	350	2967	26170	88.3	4.92E+02	1.58E+01	Avg		1.83E+01	1.20E+00	22918%	26.9		
PB06-02465-B		SR24-17	HPT-SP8-SL9-B	373	2554	21810	88.3	4.77E+02	1.54E+01	4.85E+02	246,848	1.78E+01	1.19E+00	22221%	26.8		
PB06-02466-T		SR24-17	HPT-SP8-SL10-T	369	3142	27730	83.9	5.33E+02	1.98E+01	Avg		1.98E+01	1.25E+00	24827%	26.9		
PB06-02466-B		SR24-17	HPT-SP8-SL10-B	370	2836	24660	83.9	5.52E+02	2.05E+01	5.43E+02	262,626	1.95E+01	1.23E+00	25682%	28.3		
PB06-02467-T		SR24-17	HPT-SP8-SL11-T	337	2215	18780	92.4	4.61E+02	1.49E+01	Avg		1.96E+01	1.23E+00	21548%	23.5		
PB06-02467-B		SR24-17	HPT-SP8-SL11-B	337	1836	14990	92.4	4.47E+02	1.44E+01	4.54E+02	242,049	1.70E+01	1.14E+00	20833%	26.3		
PB06-02468-T		SR24-17	HPT-SP8-SL12-T	318	1424	11060	90.0	3.98E+02	1.50E+01	Avg		9.53E+00	7.51E-01	18380%	41.8		
PB06-02468-B		SR24-17	HPT-SP8-SL12-B	307	1012	7050	90.0	3.99E+02	1.50E+01	3.99E+02	206,941	9.33E+00	7.53E-01	18419%	42.8		
PB06-02475-T	1	SR24-17	HPT-SP8-SL13-T	337	1173	8360	272.5	1.78E+02	5.68E+00	Avg		6.68E+00	4.24E-01	8293%	26.6		
PB06-02475-B	1	SR24-17	HPT-SP8-SL13-B	338	742	4040	272.5	1.46E+02	4.76E+00	1.62E+02	254,717	6.42E+00	4.04E-01	6831%	22.7		

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SR-24 Sample Results

Sample Log #		Sample #	Location	Field Measurement Shielded	Field Measurement Un-Shielded	Field Measurement DPM/ slice	Weight (g)	Cs-137 DCGL$_{(eff)}$ pCi/g	Cs-137 2.2 2σ	Slice average activity	dpm/ 100cm^2	Co-60 DCGL pCi/g	Co-60 3.3 2σ	% Unity	Cs:Co	Cs-137 MDA pCi/g	Co-60 MDA pCi/g
PB06-02476-T	1	SR24-17	HPT-SP8-SL14-T	202	405	2030	134.4	7.18E+01	3.07E+00	Avg		1.13E+00	1.93E-01	3298%	63.5		
PB06-02476-B	1	SR24-17	HPT-SP8-SL14-B	197	357	1600	134.4	5.16E+01	2.36E+00	6.17E+01	47,848	1.03E+00	1.91E-01	2377%	50.1		
PB06-02477-T		SR24-18	HPT-SP9-SL1-T	2055	125655	1,211,765	88.1	2.70E+03	9.64E+01	Avg		2.07E+02	8.16E+00	129000%	13.0		
PB06-02477-B		SR24-18	HPT-SP9-SL1-B	1154	12485	111,088	88.1	1.93E+03	6.92E+01	2.32E+03	1,176,800	1.70E+02	6.73E+00	92879%	11.4		
PB06-02478-T		SR24-18	HPT-SP9-SL2-T	199	2040	18,049	96.2	6.17E+01	2.90E+00	Avg		2.03E+00	3.08E-01	2866%	30.4		
PB06-02478-B		SR24-18	HPT-SP9-SL2-B	209	400	1,873	96.2	4.65E+01	2.32E+00	5.41E+01	30,030	1.41E+00	2.74E-01	2156%	33.0		
PB06-02479-T		SR24-18	HPT-SP9-SL3-T	191	314	1,206	98.1	5.96E-01	2.04E-01	Avg		<MDA		27%	N/A		1.68E-01
PB06-02479-B		SR24-18	HPT-SP9-SL3-B	185	300	1,127	98.1	5.21E-01	1.72E-01	5.59E-01	316	<MDA		24%	N/A		1.68E-01
PB06-02480-T		SR24-18	HPT-SP9-SL4-T	195	285	882	97.2	<MDA				<MDA		0%	N/A	1.05E-01	1.70E-01
PB06-02480-B		SR24-18	HPT-SP9-SL4-B	188	321	1,304	97.2	<MDA				<MDA		0%	N/A	1.05E-01	1.70E-01
PB06-02482-T		SR24-18	HPT-SP9-SL5-T	174	304	1,275	98.3	<MDA				<MDA		0%	N/A	1.03E-01	1.68E-01
PB06-02482-B		SR24-18	HPT-SP9-SL5-B	193	309	1,137	98.3	2.81E-01	1.26E-01			<MDA		13%	N/A		1.68E-01
PB06-02483-T		SR24-18	HPT-SP9-SL6-T	180	321	1,382	95.6	<MDA				<MDA		0%	N/A	1.06E-01	1.73E-01
PB06-02483-B		SR24-18	HPT-SP9-SL6-B	140	332	1,882	95.6	<MDA				<MDA		0%	N/A	1.56E-01	1.73E-01
PB06-02484-T		SR24-18	HPT-SP9-SL7-T	166	278	1,098	93.9	<MDA				<MDA		0%	N/A	1.08E-01	1.76E-01
PB06-02484-B		SR24-18	HPT-SP9-SL7-B	206	288	804	93.9	2.50E-01	1.22E-01			<MDA		11%	N/A		1.76E-01
PB06-02485-T		SR24-18	HPT-SP9-SL8-T	196	255	578	92.1	<MDA				<MDA		0%	N/A	1.10E-01	1.79E-01
PB06-02485-B		SR24-18	HPT-SP9-SL8-B	155	264	1,069	92.1	<MDA				<MDA		0%	N/A	1.10E-01	1.79E-01
PB06-02486-T		SR24-18	HPT-SP9-SL9-T	185	300	1,127	85.0	4.55E-01	1.73E-01			<MDA		21%	N/A		1.94E-01
PB06-02486-B		SR24-18	HPT-SP9-SL9-B	161	288	1,245	85.0	<MDA				<MDA		0%	N/A	1.56E-01	1.29E-01
PB06-02493-T		SR24-18	HPT-SP9-SL10-T	205	320	1,127	87.8	<MDA				<MDA		0%	N/A	1.87E-01	2.31E-01
PB06-02493-B		SR24-18	HPT-SP9-SL10-B	166	300	1,314	87.8	<MDA				<MDA		0%	N/A	1.48E-01	2.31E-01
PB06-02494-T	1	SR24-18	HPT-SP9-SL11-T	185	350	1,618	75.3	<MDA				<MDA		0%	N/A	1.35E-01	2.20E-01
PB06-02494-B	1	SR24-18	HPT-SP9-SL11-B	199	328	1,265	75.3	<MDA				<MDA		0%	N/A	1.70E-01	2.19E-01
PB06-02495-T		SR24-18	HPT-SP9-SL12-T	186	332	1,431	85.6	<MDA				<MDA		0%	N/A	1.92E-01	2.37E-01
PB06-02495-B		SR24-18	HPT-SP9-SL12-B	182	281	971	85.6	<MDA				<MDA		0%	N/A	1.52E-01	2.37E-01
PB06-02496-T		SR24-18	HPT-SP9-SL13-T	196	341	1,422	92.3	3.41E-01	1.63E-01	Avg		<MDA		16%	N/A		1.79E-01
PB06-02496-B		SR24-18	HPT-SP9-SL13-B	185	363	1,745	92.3	3.56E-01	1.66E-01	3.49E-01	186	<MDA		16%	N/A		1.79E-01
PB06-02497-T		SR24-18	HPT-SP9-SL14-T	184	326	1,392	89.1	5.25E-01	2.36E-01	Avg		<MDA		24%	N/A		2.27E-01
PB06-02497-B		SR24-18	HPT-SP9-SL14-B	204	329	1,225	89.1	6.53E-01	2.66E-01	5.89E-01	303	<MDA		30%	N/A		2.27E-01
PB06-02498-T		SR24-18	HPT-SP9-SL15-T	192	360	1,647	100.9	3.69E-01	1.43E-01	Avg		<MDA		17%	N/A		1.64E-01
PB06-02498-B		SR24-18	HPT-SP9-SL15-B	201	387	1,824	100.9	6.29E-01	2.10E-01	4.99E-01	291	<MDA		29%	N/A		1.80E-01
PB06-02499-T	1	SR24-18	HPT-SP9-SL16-T	175	537	3,549	133.2	2.52E-01	1.16E-01	Avg		<MDA		11%	N/A		1.52E-01
PB06-02499-B	1	SR24-18	HPT-SP9-SL16-B				133.2	3.31E-01	1.33E-01	2.92E-01	224	<MDA		15%	N/A		1.52E-01
PB06-02500-T		SR24-19	HPT-SP10-SL1-T	1487	22211	203,176	91.8	2.94E+03	1.05E+02	Avg		5.27E+01	2.49E+00	135233%	55.8		
PB06-02500-B		SR24-19	HPT-SP10-SL1-B	1289	7099	56,961	91.8	2.88E+03	1.03E+02	2.91E+03	1,541,386	4.92E+01	2.34E+00	132400%	58.5		
PB06-02502-T		SR24-19	HPT-SP10-SL2-T	793	4588	37,206	101.9	1.61E+03	4.85E+01	Avg		2.02E+01	1.22E+00	73794%	79.7		
PB06-02502-B		SR24-19	HPT-SP10-SL2-B	906	5082	40,941	101.9	1.58E+03	4.79E+01	1.60E+03	937,801	2.00E+01	1.21E+00	72424%	79.0		
PB06-02503-T		SR24-19	HPT-SP10-SL3-T	555	3697	30,804	100.6	9.44E+02	3.42E+01	Avg		1.08E+01	7.95E-01	43236%	87.4		
PB06-02503-B		SR24-19	HPT-SP10-SL3-B	570	4143	35,029	100.6	9.38E+02	3.40E+01	9.41E+02	546,215	1.01E+01	7.89E-01	42942%	92.9		
PB06-02504-T		SR24-19	HPT-SP10-SL4-T	480	4242	36,882	98.7	6.33E+02	1.99E+01	Avg		8.16E+00	7.66E-01	29020%	77.6		
PB06-02504-B		SR24-19	HPT-SP10-SL4-B	454	3412	29,000	98.7	6.19E+02	1.95E+01	6.26E+02	356,506	8.28E+00	7.65E-01	28387%	74.8		
PB06-02505-T		SR24-19	HPT-SP10-SL5-T	513	3399	28,294	100.3	6.36E+02	2.33E+01	Avg		9.05E+00	7.14E-01	29183%	70.3		
PB06-02505-B		SR24-19	HPT-SP10-SL5-B	486	2945	24,108	100.3	6.34E+02	2.32E+01	6.35E+02	367,494	1.03E+01	7.63E-01	29130%	61.6		

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SR-24 Sample Results

Sample Log #		Sample #	Location	Field Measurement Shielded	Field Measurement Un-Shielded	Field Measurement DPM/ slice	Weight (g)	Cs-137 DCGL$_{(eff)}$ pCi/g	Cs-137 2.2 2σ	Slice average activity	dpm/ 100cm^2	Co-60 DCGL pCi/g	Co-60 3.3 2σ	% Unity	Cs:Co	Cs-137 MDA pCi/g	Co-60 MDA pCi/g
PB06-02506-T		SR24-19	HPT-SP10-SL6-T	362	2075	16,794	87.7	5.32E+02	1.70E+01	Avg		5.85E+00	6.14E-01	24359%	90.9		
PB06-02506-B		SR24-19	HPT-SP10-SL6-B	418	1401	9,637	87.7	5.58E+02	1.78E+01	5.45E+02	275,786	5.46E+00	5.92E-01	25529%	102.2		
PB06-02507-T		SR24-19	HPT-SP10-SL7-T	391	1262	8,539	82.7	5.05E+02	1.88E+01	Avg		4.02E+00	4.76E-01	23076%	125.6		
PB06-02507-B		SR24-19	HPT-SP10-SL7-B	396	1183	7,716	82.7	5.49E+02	2.04E+01	5.27E+02	251,473	4.35E+00	4.97E-01	25086%	126.2		
PB06-02508-T	1	SR24-19	HPT-SP10-SL8-T	337	1179	8,255	75.6	4.29E+02	1.42E+01	Avg		4.80E+00	6.17E-01	19645%	89.4		
PB06-02508-B	1	SR24-19	HPT-SP10-SL8-B	328	1114	7,706	75.6	4.22E+02	1.40E+01	4.26E+02	185,608	4.59E+00	6.17E-01	19321%	91.9		
PB06-02509-T	1	SR24-19	HPT-SP10-SL9-T	330	1101	7,559	75.3	4.60E+02	1.73E+01	Avg		6.52E+00	6.49E-01	21107%	70.6		
PB06-02509-B	1	SR24-19	HPT-SP10-SL9-B	332	1111	7,637	75.3	4.47E+02	1.69E+01	4.54E+02	197,037	6.26E+00	6.34E-01	20508%	71.4		
PB06-02510-T	1	SR24-19	HPT-SP10-SL10-T	323	1016	6,794	65.9	4.19E+02	1.41E+01	Avg		5.13E+00	6.88E-01	19201%	81.7		
PB06-02510-B	1	SR24-19	HPT-SP10-SL10-B	303	978	6,618	65.9	4.50E+02	1.50E+01	4.35E+02	165,216	4.68E+00	6.25E-01	20596%	96.2		
PB06-02511-T		SR24-19	HPT-SP10-SL11-T	346	1048	6,882	92.2	3.38E+02	1.28E+01	Avg		5.33E+00	5.55E-01	15525%	63.4		
PB06-02511-B		SR24-19	HPT-SP10-SL11-B	334	879	5,343	92.2	3.17E+02	1.21E+01	3.28E+02	174,228	4.85E+00	5.03E-01	14556%	65.4		
PB06-02512-T		SR24-19	HPT-SP10-SL12-T	308	750	4,333	92.5	2.58E+02	9.94E+00	Avg		3.24E+00	4.03E-01	11825%	79.6		
PB06-02512-B		SR24-19	HPT-SP10-SL12-B	285	777	4,824	92.5	2.57E+02	9.94E+00	2.58E+02	137,434	3.16E+00	4.06E-01	11778%	81.3		
PB06-02513-T		SR24-19	HPT-SP10-SL13-T	316	742	4,176	94.0	2.14E+02	7.51E+00	Avg		7.62E+00	7.02E-01	9958%	28.1		
PB06-02513-B		SR24-19	HPT-SP10-SL13-B	269	759	4,804	94.0	2.14E+02	7.52E+00	2.14E+02	116,069	7.45E+00	6.90E-01	9953%	28.7		
PB06-02514-T		SR24-19	HPT-SP10-SL14-T	264	730	4,569	82.9	1.69E+02	6.29E+00	Avg		5.25E+00	5.95E-01	7841%	32.2		
PB06-02514-B		SR24-19	HPT-SP10-SL14-B	289	691	3,941	82.9	1.60E+02	6.00E+00	1.65E+02	78,686	5.43E+00	6.06E-01	7437%	29.5		
PB06-02515-T		SR24-20	HPT-SP11-SL1-T	575	13362	125,363	91.7	8.71E+02	3.17E+01	Avg		3.50E+01	1.83E+00	40652%	24.9		
PB06-02515-B		SR24-20	HPT-SP11-SL1-B	468	1274	7,902	91.7	6.61E+02	2.43E+01	7.66E+02	405,297	2.99E+01	1.60E+00	30952%	22.1		
PB06-02516-T		SR24-20	HPT-SP11-SL2-T	198	290	902	95.9	3.64E+00	5.29E-01	Avg		1.92E+00	4.73E-01	224%	1.9		
PB06-02516-B		SR24-20	HPT-SP11-SL2-B	194	264	686	95.9	2.48E+00	3.79E-01	3.06E+00	1,693	1.24E+00	2.16E-01	150%	2.0		
PB06-02517-T		SR24-20	HPT-SP11-SL3-T	199	290	892	100.2	<MDA				<MDA		0%	N/A	1.35E-01	1.73E-01
PB06-02517-B		SR24-20	HPT-SP11-SL3-B	161	298	1,343	100.2	4.50E-01	2.06E-01			<MDA		20%	N/A		1.65E-01
PB06-02518-T		SR24-20	HPT-SP11-SL4-T	193	272	775	96.0	<MDA				<MDA		0%	N/A	1.35E-01	2.11E-01
PB06-02518-B		SR24-20	HPT-SP11-SL4-B	195	287	902	96.0	<MDA				<MDA		0%	N/A	1.35E-01	2.11E-01
PB06-02519-T		SR24-20	HPT-SP11-SL5-T	160	278	1,157	94.5	<MDA				<MDA		0%	N/A	1.45E-01	2.14E-01
PB06-02519-B		SR24-20	HPT-SP11-SL5-B	165	272	1,049	94.5	<MDA				<MDA		0%	N/A	9.17E-02	1.43E-01
PB06-02520-T		SR24-20	HPT-SP11-SL6-T	154	270	1,137								0%			
PB06-02520-B		SR24-20	HPT-SP11-SL6-B	167	299	1,294	93.0	<MDA				<MDA		0%	N/A	1.25E-01	1.78E-01
PB06-02522-T		SR24-20	HPT-SP11-SL7-T	194	234	392	90.7	<MDA				<MDA		0%	N/A	1.12E-01	1.82E-01
PB06-02522-B		SR24-20	HPT-SP11-SL7-B	187	265	765	90.7	<MDA				<MDA		0%	N/A	1.42E-01	1.82E-01
PB06-02524-T		SR24-20	HPT-SP11-SL8-T	173	274	990	95.0	<MDA				<MDA		0%	N/A	1.07E-01	1.74E-01
PB06-02524-B		SR24-20	HPT-SP11-SL8-B	178	253	735	95.0	<MDA				<MDA		0%	N/A	1.07E-01	1.74E-01
PB06-02525-T		SR24-20	HPT-SP11-SL9-T	176	252	745	92.9	<MDA				<MDA		0%	N/A	1.67E-01	1.78E-01
PB06-02525-B		SR24-20	HPT-SP11-SL9-B	166	283	1,147	92.9	<MDA				<MDA		0%	N/A	2.17E-01	1.78E-01
PB06-02526-T		SR24-20	HPT-SP11-SL10-T	167	264	951	94.0	<MDA				<MDA		0%	N/A	1.38E-01	2.16E-01
PB06-02526-B		SR24-20	HPT-SP11-SL10-B	172	270	961	94.0	<MDA				<MDA		0%	N/A	1.38E-01	2.16E-01
PB06-02527-T		SR24-20	HPT-SP11-SL11-T	174	267	912	94.2	<MDA				<MDA		0%	N/A	1.08E-01	1.76E-01
PB06-02527-B		SR24-20	HPT-SP11-SL11-B	160	281	1,186	94.2	<MDA				<MDA		0%	N/A	1.36E-01	1.76E-01
PB06-02528-T		SR24-20	HPT-SP11-SL12-T	197	293	941	90.0	<MDA				<MDA		0%	N/A	1.13E-01	1.83E-01
PB06-02528-B		SR24-20	HPT-SP11-SL12-B	171	317	1,431	90.0	2.91E-01	1.34E-01			<MDA		13%	N/A		1.84E-01
PB06-02529-T		SR24-20	HPT-SP11-SL13-T	200	289	873	85.5	<MDA				<MDA		0%	N/A	1.52E-01	2.37E-01
PB06-02529-B		SR24-20	HPT-SP11-SL13-B	185	273	863	85.5	<MDA				<MDA		0%	N/A	2.03E-01	2.37E-01

SR-24
CORE BORE SAMPLES

SR-24 Sample Results

Sample Log #		Sample #	Location	Field Measurement Shielded	Field Measurement Un-Shielded	Field Measurement DPM/ slice	Weight (g)	Cs-137 DCGL$_{(eff)}$ pCi/g	Cs-137 2.2 2σ	Slice average activity	dpm/ 100cm^2	Co-60 DCGL pCi/g	Co-60 3.3 2σ	% Unity	Cs:Co	Cs-137 MDA pCi/g	Co-60 MDA pCi/g
PB06-02530-T		SR24-20	HPT-SP11-SL14-T	168	310	1,392	85.5	2.74E-01	1.33E-01			<MDA		12%	N/A		1.93E-01
PB06-02530-B		SR24-20	HPT-SP11-SL14-B	187	288	990	85.5	<MDA				<MDA		0%	N/A	1.62E-01	1.70E-01
PB06-02531-T		SR24-20	HPT-SP11-SL15-T	171	334	1,598	96.7	<MDA				<MDA		0%	N/A	1.34E-01	2.10E-01
PB06-02531-B		SR24-20	HPT-SP11-SL15-B	185	332	1,441	96.7	<MDA				<MDA		0%	N/A	1.34E-01	2.10E-01
PB06-02532-T		SR24-20	HPT-SP11-SL16-T	166	427	2,559	87.8	<MDA				<MDA		0%	N/A	1.95E-01	1.88E-01
PB06-02532-B		SR24-20	HPT-SP11-SL16-B	176	361	1,814	87.8	3.30E-01	1.45E-01			<MDA		15%	N/A		1.88E-01
PB06-02533-T	1	SR24-20	HPT-SP11-SL17-T	160	653	4,833	157.5	<MDA				<MDA		0%	N/A	8.26E-02	1.29E-01
PB06-02533-B	1	SR24-20	HPT-SP11-SL17-B				157.5	<MDA				<MDA		0%	N/A	8.25E-02	1.29E-01
Number	24	Qualitative Only					359	208	208			136	136	360	136	150	223
Max							272.5	5.10E+04	1.81E+03			9.00E+03	3.19E+02	23181.8	834.4	4.01E-01	5.81E-01
Avg							103.7	2.01E+03	7.37E+01			2.21E+02	8.12E+00	592.4	73.6	1.27E-01	1.84E-01
SD							17.65	5.97E+03	2.19E+02			1.01E+03	3.57E+01	2305.64	178.66	3.52E-02	4.24E-02
Conf int +/-							0.63	2.79E+02	1.02E+01			5.83E+01	2.06E+00	8196%	10	1.94E-03	1.92E-03

	= >50% Unity
########	= >100% Unity

SR-24 Additional Isotope Data

HPGe Log #	Sample #	Location	Eu-152 pCi/g	Eu-152	Eu-152 2s	Eu-154 pCi/g	Eu-154 2s	Am-241 pCi/g	Am-241 2s	U-235 pCi/g	U-235 2s	Cm-243 pCi/g	Cm-243 2s
PB06-02289-T	SR24-7	HPT-SP3-SL1-T				5.75E+01	9.43E+00	1.55E+02	9.58E+00				
PB06-02289-B	SR24-7	HPT-SP3-SL1-B				2.09E+01	5.54E+00	3.44E+01	7.00E+00				
PB06-02295-T	SR24-7	HPT-SP3-SL7-T										7.63E-01	3.41E-01
PB06-02354-T	SR24-12	PPH-R6-SP1-SL1-T								1.17E+00	9.07E-01		
PB06-02379-B	SR24-14	PPH-R3-SP1-SL1-B				9.99E-01	6.91E-01						

SR-28
Fan House, Hot Retention Area Pipe Trench
(2 pages)

SR-28
CORE BORE AND SMEAR COMPOSITE SAMPLES

SR-28 Sample Results

Sample Log #		Sample #	Location	Field Measurement Shielded	Un-Shielded	DPM/ slice	Weight (g)	Cs-137 DCGL$_{(eff)}$ pCi/g	2.2 2σ	Slice average activity	dpm/ 100cm^2	Co-60 DCGL pCi/g	3.3 2σ	% Unity	Cs:Co	Cs-137 MDA pCi/g	Co-60 MDA pCi/g
PB06-02747-T		SR28-1	IM-1 SL1-T				82.6	1.13E+00	2.62E-01	Avg		<MDA		52%	N/A		1.21E-01
PB06-02747-B		SR28-1	IM-1 SL1-B				82.6	8.11E-01	1.91E-01	9.73E-01	464	<MDA		37%	N/A		1.47E-01
PB06-02748-T		SR28-1	IM-1 SL2-T				81.4	<MDA		Avg		<MDA		0%	N/A	1.06E-01	1.63E-01
PB06-02748-B		SR28-1	IM-1 SL2-B				81.4	<MDA				<MDA		0%	N/A	1.38E-01	1.63E-01
PB06-02749-T		SR28-1	IM-1 SL3-T				84.8	<MDA		Avg		<MDA		0%	N/A	1.01E-01	1.17E-01
PB06-02749-B		SR28-1	IM-1 SL3-B				84.8	<MDA				<MDA		0%	N/A	9.08E-02	1.17E-01
PB06-02752-T		SR28-2	IM-2 SL1-T				71.6	3.12E+00	4.40E-01	Avg		<MDA		142%	N/A		8.15E-02
PB06-02752-B		SR28-2	IM-2 SL1-B				71.6	2.14E+00	3.12E-01	2.63E+00	1,087	<MDA		97%	N/A		1.15E-01
PB06-02753-T		SR28-2	IM-2 SL2-T				74.0	<MDA		Avg		<MDA		0%	N/A	1.33E-01	1.80E-01
PB06-02753-B		SR28-2	IM-2 SL2-B				74	<MDA				<MDA		0%	N/A	1.38E-01	1.80E-01
PB06-02754-T		SR28-3	IM-5 SL1-T				75.7	<MDA		Avg		<MDA		0%	N/A	1.14E-01	1.78E-01
PB06-02754-B		SR28-3	IM-5 SL1-B				75.7	<MDA				<MDA		0%	N/A	1.14E-01	1.76E-01
PB06-02755-T		SR28-3	IM-5 SL2-T				76.8	2.16E-01	1.02E-01	Avg		<MDA		10%	N/A		1.43E-01
PB06-02755-B		SR28-3	IM-5 SL2-B				76.8	<MDA				<MDA		0%	N/A	1.29E-01	1.43E-01
PB06-02756-T		SR28-4	IM-1-4 SL1-T				78.3	3.52E+01	1.65E+00	Avg		4.50E+00	4.47E-01	1736%	8		
PB06-02756-B		SR28-4	IM-1-4 SL1-B				78.3	2.00E+01	1.24E+00	2.76E+01	12,462	2.57E+00	3.44E-01	986%	8		
PB06-02757-T		SR28-4	IM-1-4 SL2-T				85.8	<MDA		Avg		<MDA		0%	N/A	1.25E-01	1.28E-01
PB06-02757-B		SR28-4	IM-1-4 SL2-B				85.8	<MDA				<MDA		0%	N/A	1.21E-01	9.62E-02
PB06-02758-T		SR28-5	IM-2-5 SL1-T				84.3	1.19E+01	8.93E-01	Avg		<MDA		539%	N/A		1.58E-01
PB06-02758-B		SR28-5	IM-2-5 SL1-B				84.3	6.42E+00	6.35E-01	9.14E+00	4,444	<MDA		292%	N/A		1.99E-01
PB06-02759-T		SR28-5	IM-2-5 SL2-T				90.6	2.34E-01	9.77E-02	Avg		<MDA		11%	N/A		1.21E-01
PB06-02759-B		SR28-5	IM-2-5 SL2-B				90.6	<MDA				<MDA		0%	N/A	9.71E-02	1.21E-01
PB06-02750-T		SR28-6	0' FH Smear				1.0	2.05E+02	2.73E+01			3.94E+01	1.27E+01	10533%	5		
PB06-02751-B		SR28-7	FH-15' Smear				1.0	2.69E+03	1.13E+02			1.27E+02	1.84E+01	125920%	21		
Number	0						24	12	12			4	4	24	4	12	20
Max							90.6	2.69E+03	1.13E+02			1.27E+02	1.84E+01	1259.2	21.1	1.38E-01	1.99E-01
Avg							73.9	2.48E+02	1.22E+01			4.34E+01	7.97E+00	58.5	10.5	1.17E-01	1.42E-01
SD							23.09	7.70E+02	3.27E+01			5.83E+01	9.05E+00	256.65	7.20	1.61E-02	3.15E-02
Conf int +/-							3.18	1.50E+02	6.37E+00			1.97E+01	3.05E+00	3534%	2	3.13E-03	4.75E-03

= >50% Unity

######## = >100% Unity

Qualitative Only

SR-29 Additional Isotope Data

HPGe Log #	Sample #	Location	Eu-152 pCi/g		2s	Eu-154 pCi/g	2s	Am-241 pCi/g	2s	U-235 pCi/g	2s	Cm-243 pCi/g	2s
		NONE											

SR-29
Waste Handling Building
(3 pages)

SR-29
CORE BORE AND SMEAR SAMPLES

SR-29 Sample Results

Sample Log #		Sample #	Location	Field Measurement Shielded	Field Measurement Un-Shielded	Field Measurement DPM/ slice	Weight (g)	Cs-137 DCGL$_{(eff)}$ pCi/g	Cs-137 2.2 2σ	Slice average activity	dpm/ 100cm^2	Co-60 DCGL pCi/g	Co-60 3.3 2σ	% Unity	Cs:Co	Cs-137 MDA pCi/g	Co-60 MDA pCi/g
PB06-02700-T		SR29-1	WB-15 IM1 SL1-T				97.8	1.50E+03	5.34E+01	Avg		<MDA		68086%	N/A		8.44E-02
PB06-02700-B		SR29-1	WB-15 IM1 SL1-B				97.8	6.95E+02	2.50E+01	1.10E+03	618,759	<MDA		31595%	N/A		8.43E-02
PB06-02702-T		SR29-1	WB-15 IM1 SL2-T				101.1	2.37E-01	9.32E-02	Avg		<MDA		11%	N/A		1.09E-01
PB06-02702-B		SR29-1	WB-15 IM1 SL2-B				101.1	<MDA		1.70E-01	99	<MDA		0%	N/A	6.70E-02	1.09E-01
PB06-02704-T		SR29-2	WB-15 IM14 SL1-T				95.8	7.45E+01	3.15E+00	Avg		<MDA		3388%	N/A		1.15E-01
PB06-02704-B		SR29-2	WB-15 IM14 SL1-B				95.8	3.43E+01	1.68E+00	5.44E+01	30,070	3.88E-01	1.09E-01	1570%	88		
PB06-02705-T		SR29-2	WB-15 IM14 SL2-T				103.1	2.32E-01	9.14E-02	Avg		<MDA		11%	N/A		1.07E-01
PB06-02705-B		SR29-2	WB-15 IM14 SL2-B				103.1	2.77E-01	9.99E-02	2.55E-01	151	<MDA		13%	N/A		1.07E-01
PB06-02706-T		SR29-3	WB 0 IM1 SL1-T				100.1	8.01E+02	2.89E+01	Avg		3.00E+00	3.10E-01	36501%	267		
PB06-02706-B		SR29-3	WB 0 IM1 SL1-B				100.1	6.37E+02	2.31E+01	7.19E+02	415,278	2.64E+00	3.11E-01	29022%	241		
PB06-02707-T		SR29-3	WB 0 IM1 SL2-T				105.6	4.55E+02	1.62E+01	Avg		1.54E+01	3.01E-01	21167%	30		
PB06-02707-B		SR29-3	WB 0 IM1 SL2-B				105.6	4.53E+02	1.65E+01	4.54E+02	276,628	1.66E+00	2.19E-01	20639%	273		
PB06-02708-T		SR29-4	WB 0 IM2 SL1-T				99.3	8.81E+01	3.63E+00	Avg		1.38E+00	2.18E-01	4045%	64		
PB06-02708-B		SR29-4	WB 0 IM2 SL1-B				99.3	3.85E+01	1.82E+00	6.33E+01	36,268	<MDA		1748%	N/A		3.51E-01
PB06-02709-T		SR29-4	WB 0 IM2 SL2-T				99.4	1.94E-01	8.51E-02	Avg		<MDA		9%	N/A		1.11E-01
PB06-02709-B		SR29-4	WB 0 IM2 SL2-B				99.4	<MDA		1.33E-01	76	<MDA		0%	N/A	6.82E-02	1.11E-01
PB06-02740-T		SR29-4	WB 0 IM2 SL3-T				82.1	<MDA		Avg		<MDA		0%	N/A	8.26E-02	1.35E-01
PB06-02740-B		SR29-4	WB 0 IM2 SL3-B				82.1	<MDA		<MDA	N/A	<MDA		0%	N/A	8.26E-02	1.35E-01
PB06-02742-T		SR29-4	WB 0 IM2 SL4-T				102.9	<MDA		Avg		<MDA		0%	N/A	7.28E-02	1.08E-01
PB06-02742-B		SR29-4	WB 0 IM2 SL4-B				102.9	1.94E-01	9.73E-02	1.33E-01	79	<MDA		9%	N/A		1.08E-01
PB06-02744-T		SR29-3	WB 0 IM1 SL3-T				101.4	8.83E+02	2.51E+01	Avg		1.85E+00	0.28246	40170%	476		1.96E-01
PB06-02744-B		SR29-3	WB 0 IM1 SL3-B				101.4	9.03E+02	2.56E+01	8.93E+02	522,428	1.72E+00	0.24692	41113%	525		1.96E-01
PB06-02743-T		SR29-3	WB 0 IM1 SL4-T				99.4	9.39E+02	3.38E+01	Avg		1.97E+00	0.25778	42745%	477		1.63E-01
PB06-02743-B		SR29-3	WB 0 IM1 SL4-B				99.4	9.29E+02	3.34E+01	9.16E+02	525,401	1.94E+00	0.34886	42277%	480		1.55E-01
PB06-02745-T		SR29-3	WB 0 IM1 SL5-T				100.9	2.39E+02	8.96E+00	Avg		<MDA		10853%	N/A		2.37E-01
PB06-02745-B		SR29-3	WB 0 IM1 SL5-B				100.9	1.95E+02	7.42E+00	2.17E+02	126,278	<MDA		8865%	N/A		3.09E-01
PB06-02746-T		SR29-3	WB 0 IM1 SL6-T				108.0	9.98E+00	7.22E-01	Avg		<MDA		454%	N/A		1.24E-01
PB06-02746-B		SR29-3	WB 0 IM1 SL6-B				108.0	5.93E+00	5.48E-01	4.99E+00	3,110	<MDA		269%	N/A		1.24E-01
PB06-02731		SR29-5	WHB Mezz Smears				1.0	<MDA				<MDA		0%	N/A	1.83E+01	9.15E+00
PB06-02732		SR29-6	WHB 0' Smears				1.0	4.07E+02	5.06E+01			<MDA		18486%	N/A		1.24E+01
PB06-02733		SR29-7	WHB -15' Smears				1	1.48E+04	4.47E+02			3.31E+01	9.23E+00	672958%	446		
Number	0						31	25	25			11	11	31	11	6	24
Max							108.0	1.48E+04	4.47E+02			3.31E+01	9.23E+00	6729.6	525.1	1.83E+01	1.24E+01
Avg							90.2	9.63E+02	3.23E+01			5.92E+00	1.08E+00	353.5	306.0	3.12E+00	1.03E+00
SD							30.20	2.91E+03	8.79E+01			9.92E+00	2.71E+00	1197.63	185.85	7.45E+00	3.04E+00
Conf int +/-							3.66	3.92E+02	1.19E+01			2.02E+00	5.50E-01	14508%	38	2.05E+00	4.18E-01

= >50% Unity

######## = >100% Unity

Qualitative Only

SR-29
CORE BORE AND SMEAR SAMPLES

SR-29 Sample Results

Sample Log #		Sample #	Location	Field Measurement			Weight (g)	Cs-137		Slice average activity	dpm/ 100cm^2	Co-60		% Unity	Cs:Co	Cs-137	Co-60
				Shielded	Un-Shielded	DPM/ slice		DCGL$_{(eff)}$	2.2			DCGL	3.3			MDA	MDA
								pCi/g	2σ			pCi/g	2σ			pCi/g	pCi/g

SR-29 Additional Isotope Data

HPGe Log #	Sample #	Location	Eu-152			Eu-154		Am-241		U-235		Cm-243	
			pCi/g		2s	pCi/g	2s	pCi/g	2s	pCi/g	2s	pCi/g	2s
PB06-02704-T	SR29-2	WB -15' IM14 SL1-T						8.40E-01	5.04E-01				
PB06-02708-T	SR29-4	WB 0' IM-2 SL1-T						1.47E+00	5.07E-01				

SR-31
Reactor Office and Laboratory Building
(8 pages)

SR-31
CONCRETE, TILE, AND SMEAR SAMPLES

SR-31 Sample Results

Sample Log #		Sample #	Location		Weight (g)	Cs-137 DCGL$_{(eff)}$ pCi/g	Cs-137 2.2 2σ	Co-60 DCGL pCi/g	Co-60 3.3 2σ	% Unity	Cs:Co	Cs-137 MDA pCi/g	Co-60 MDA pCi/g
PB06-02897		SR31-1	ROLB -15' Smears		1	<MDA		<MDA		0%	N/A	8.52E+00	8.24E+00
PB06-02925		SR31-2	ROLB-RM210-IM-1		115.7	7.68E+01	3.59E+00	<MDA		3490%	N/A		8.43E-02
PB06-02926		SR31-3	ROLB-RM210-IM-4		72.6	3.98E+00	4.30E-01	6.56E-01	0.1262	201%	6		
PB06-02965		SR31-4	ROLB 2nd Floor Men's Room Wall Tile		1	<MDA		<MDA		0%	N/A	1.75E+01	1.24E+01
PB06-02966		SR31-5	ROLB 2nd Floor Men's Room Floor Tile		1	<MDA		<MDA		0%	N/A	1.42E+01	1.37E+01
PB06-03002		SR31-6	ROLB 1st Floor Lobby Floor Tile		1	<MDA		<MDA		0%	N/A	2.21E+01	3.06E+01
PB06-03030		SR31-7	ROLB IM Smears		1	<MDA		<MDA		0%	N/A	1.06E+01	8.23E+00
PB06-03031		SR31-8	ROLB 1st Floor Smears		1	1.80E+01	9.92E+00	<MDA		819%	N/A		7.44E+00
PB06-03032		SR31-9	ROLB 2nd Floor Smears		1.0	<MDA		<MDA		0%	N/A	1.27E+01	8.23E+00
PB06-03574		N/A	ROLB -15' North Sump Sludge		960.1	2.70E-02	2.29E-02	<MDA					2.54E-02
PB06-03575		N/A	ROLB -15' South Sump Sludge		971.5	<MDA		<MDA				2.13E-02	2.21E-02
PB06-03576		N/A	ROLB -15' Middle Sump Sludge		938.5	3.97E-02	1.83E-02	<MDA					2.23E-02

	= >50% Unity
########	= >100% Unity

All samples are Qualitative Only

SR-31 Additional Isotope Data

HPGe Log #	Sample #	Location		2s	Eu-154 pCi/g	Eu-154 2s	U-235 pCi/g	U-235 2s	Cm-243 pCi/g	Cm-243 2s

RADIATION PROTECTION SURVEY FORM

Location: ROLB Room 208,208A,208B,209,210,&211 SR- 31 DL- 317

RWP: PB-06-N/A
Date: 10/11/06
Time: 1027
Survey #: NASA-06-2903

Instrument(s)

Model	S/N	Cal. Due	Bkg / cpm	MDA / dpm
23050-1	201186	9-11-07	N/A	N/A
44-116	PR197312	9-11-07	173	N/A
Tennelec	82938	1-6-07	α 0.03 / β 3.50	α 11.34/β 26.99
N/A	N/A	N/A	N/A	N/A

Reason for Survey:
☐ Daily ☐ Job Coverage
☐ Weekly ☒ Other: Final Post Remediation

☐ Dose rates in mr/hr unless otherwise noted
☐ Dose rates in μr/hr unless otherwise noted
☒ N/A

Smear # & Location	Contamination (dpm/100cm²) β·γ	α
1Floor	-7.53	-0.11
2Floor	-10.54	-0.11
3Floor	1.51	3.31
4Floor	-4.52	-0.11
5Floor	-4.52	-0.11
6Floor	-10.54	-0.11
7		
8		
9		
10		
11		
12		
13		
14		
15	N	
16	A	
17		
18		
19		
20		
21		
22		
23		
24		
25		

All areas scanned were < 540 ncpm except at IM-1 - IM-6.

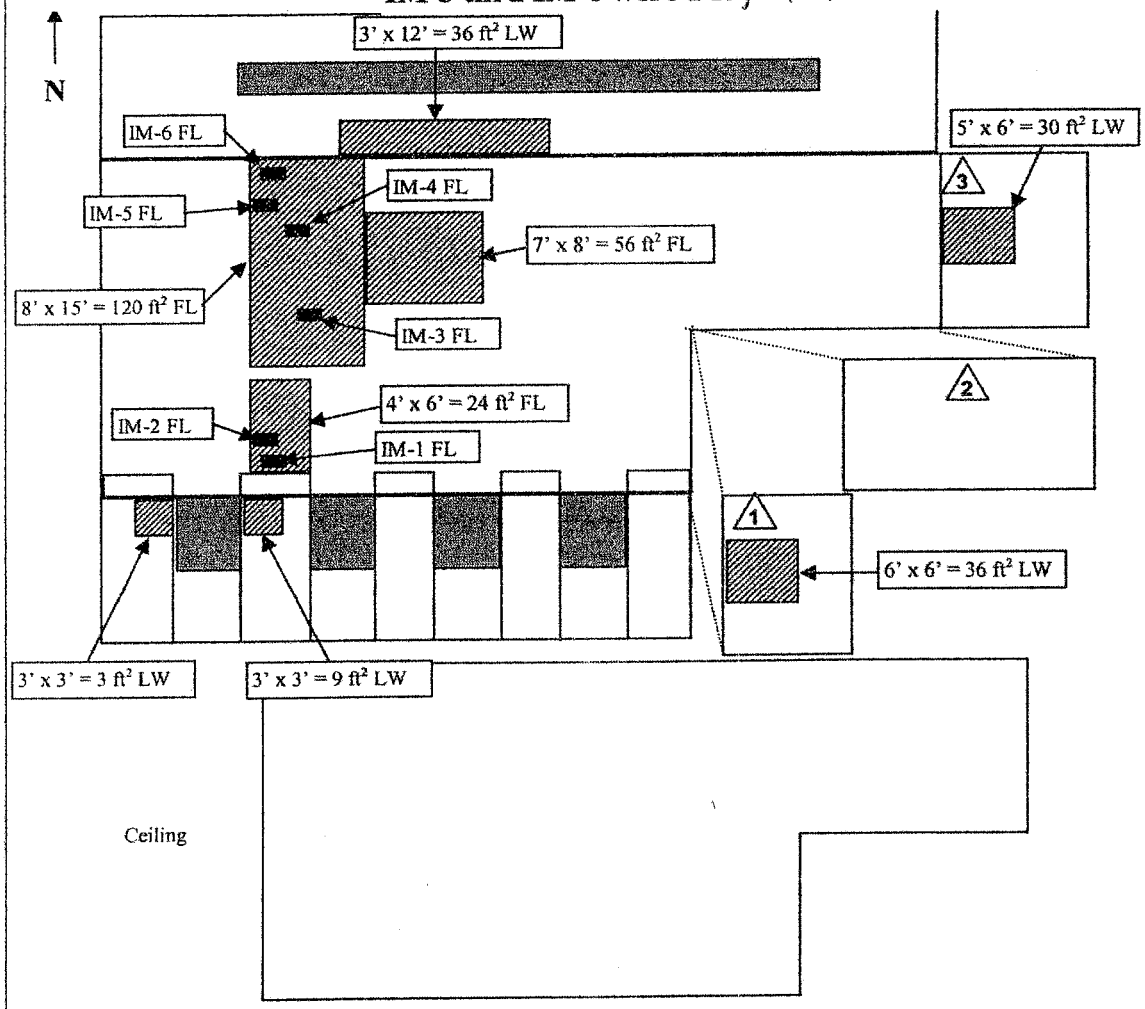
Areas scanned were:

- **Floor – 200 ft²**
- **Lower Walls – 120 ft²**
- **Upper Walls – N/A**
- **Ceiling – N/A**
- **Total – 320 ft²**

IM-1 & IM-2 were bounded. Bounded area was 5 ft².
IM-3 thru IM-6 were 1 ft², EACH.

COPY

Room areas
FL = 142.4 m²
LW = 100.3 m²
UW = 78.2 m²
CL = 142.4 m²



Legend
xxxx - Radiological boundary
x-x-x- Contaminated area
(#) - BCR Location
▨ - Area scanned
■ - Static Measurement Location

Performed by: (print/sign/date)
J. Sorg
10/11/06

Reviewed by: (sign/date)
10-16-06

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SURVEY REQUEST CONTINUATION SHEET			
SR NUMBER	SR-31	AREA / LOCATION	ROLB – All Elevations
SPECIFIC SAMPLING AND SURVEYING INSTRUCTIONS / COMMENTS			

SURVEY REQUEST CLOSE-OUT SUMMARY

Background: This SR was written to document the performance of a final post-remediation survey of all 3 elevations of the Reactor Office and Laboratory Building, and to obtain static measurements for a variability study to be used for the design of the Final Status Survey of the ROLB.

Number and types of surveys:

This Survey Request required technicians to perform scan surveys of approximately 10% of each room of the ROLB. Any area which scanned above the alarm set-point (540 ncpm) also required static measurements to be taken to quantify the activity. Any location that exceeded the Static Measurement Action Level of 770 ncpm required a bounding survey to be performed and sufficient static measurements to be obtained in accordance with CS-01 procedure, "Survey Methodology to Support PBRF License Termination."

Additionally, approximately 40 locations on each elevation were to be selected for the collection of Static Measurements and smear samples. Alpha static readings were required in addition to Beta static readings. These were not to include any static measurements locations identified during scan surveys and were to be chosen based on providing representative coverage of the elevation being surveyed.

Summary of Scan and Static Measurements:

The investigation level for this scan survey was 5,500dpm/100 cm^2.

The total available surface area in the basement is 3972 square meters. The Crawl Space has an area of 829 sq meters. This area was not surveyed due to a previous characterization survey of 100% of this area. The area for the Northeast stairwell from the basement to the first floor was added to the basement area. Therefore, the available surface area for the basement is 3257 sq meters. Scan surveys were performed covering 337 square meters, representing 10.4 % of the total area.

All areas scanned less than 540 ncpm (1,527 dpm/100 cm^2) except for IM-1 in Room 9. The activity level at IM-1 was 34,383 dpm/100 cm^2. IM-1 is an area of approximately 1 sq ft. This location was remediated. Subsequent survey indicated less than 770 ncpm (5,500 dpm/100 cm^2).

Random alpha and beta static measurements were performed at 40 locations in the basement. All static measurement results (Open window minus closed window) were below the RAL.

The total available surface area in the first floor is 4,480 square meters. This number comes from the actual area available after taking into account walls that have been removed and adding in the area of the stairwells from the first floor to the second floor. Scan surveys were performed covering 479 sq meters, representing 10.7% of the total area.

All scans were less than 540 ncpm.

Random alpha and beta static measurements were performed at 40 locations in the first floor. All static measurement results (Open window minus closed window) were below the RAL.

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SURVEY REQUEST CONTINUATION SHEET			
SR NUMBER	SR-31	AREA / LOCATION	ROLB – All Elevations
SPECIFIC SAMPLING AND SURVEYING INSTRUCTIONS / COMMENTS			

SURVEY REQUEST CLOSE-OUT SUMMARY (continued)

The total available surface area in the second floor is 4,335 square meters. This number comes from the actual area available after taking into account walls that have been removed and adding in the area of the landing of the southeast stairwell and the northeast stairwell from the second floor to the penthouse, including the penthouse. Scan surveys were performed covering 458.8 sq meters, representing 10.6% of the total area.

All scans were less than 540 ncpm except five locations on the floor in Room 210. One of the elevated areas was 5 square feet. The other four areas were one square foot, each. Investigations at IM-1 and IM-2 were performed in the first area and were bounded. Investigations at IM-3 through IM-6 were performed in the remaining areas. The highest activity was at IM-4. IM-4 activity was 9902 dpm/100 cm^2. Alpha static measurements were also taken at these locations. All alpha readings were less than the RAL. These areas were remediated. Subsequent surveys were less than 770 ncpm (5,500 dpm/100 cm^2).

Random alpha and beta static measurements were performed at 40 locations in the second floor. All static measurement results (Open window minus closed window) were below the RAL.

All instruments were in current calibration and daily pre and post use source checks were performed satisfactorily.

Summary of Smear, Tile, and Concrete Samples

Smear samples were obtained at each static measurement and investigation measurement location. The maximum smearable activity detected was 15.78 dpm/100 cm^2 beta gamma, and 3.39 dpm/100 cm^2 alpha. The smears from each elevation and the Investigation Measurement smears were composited and a qualitative analysis was performed on the gamma spectroscopy system. The following identifies the activity level detected for each elevation of the Reactor Office and Laboratory Building and the Investigation Measurement smears from the smear composite analysis:

Gross activity of the composite sample on the basement was < MDA for CS-137 and <MDA for Co-60.

Gross activity of the composite sample on the first floor was 18.0 pCi for Cs-137 and < MDA for Co-60.

Gross activity of the composite sample on the second floor was < MDA for CS-137 and <MDA for Co-60.

Gross activity of the composite sample for the investigation measurement locations was < MDA for CS-137 and <MDA for Co-60.

There are three different types of tile in various rooms of the ROLB. These include restroom floor tile, restroom wall tile, and entrance lobby/stairway floor tile. A sample of each type of tile was collected and a qualitative analysis was performed on the gamma spectroscopy system. The following identifies the activity detected for each type of tile:

Gross activity of the 2nd floor restroom wall tile was < MDA for CS-137 and <MDA for Co-60.

Gross activity of the 2nd floor restroom floor tile was < MDA for CS-137 and <MDA for Co-60.

Gross activity of the Lobby floor tile was < MDA for CS-137 and <MDA for Co-60.

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SURVEY REQUEST CONTINUATION SHEET			
SR NUMBER	SR-31	**AREA / LOCATION**	ROLB – All Elevations
SPECIFIC SAMPLING AND SURVEYING INSTRUCTIONS / COMMENTS			

SURVEY REQUEST CLOSE-OUT SUMMARY (continued)

A sample of concrete pieces was collected from two of the Investigation Measurement locations on the second floor in Room 210 and a qualitative analysis was performed on the gamma spectroscopy system. The following identifies the activity detected for each of the concrete samples:

Gross activity of the IM-1 concrete was 76.8 pCi/g for CS-137 and <MDA for Co-60.

Gross activity of the IM-4 concrete was 4.0 pCi/g for CS-137 and 0.7 pCi/g for Co-60 for a Cs-137 to Co-60 ratio of 6.

Summary of QC survey and QC sample results, including corrective actions taken when acceptance criteria are not met.

A total of 1267.9 square meters was surveyed which represents 10.6% of the total surface area available for survey. QC scans were performed on 83 square meters, which represents 6.5% of the area scanned.

All QC surface scans met the acceptance criteria of section 4.5.2.4, CS-01, generating the same conclusion as the original scan survey.

127 beta static measurements (this includes investigation measurements) were performed. QC static measurements were taken at 8 of these locations. This represents 6.3% of the static measurement locations.

All beta QC static measurements obtained the same conclusion as the original survey that the results were less than the investigation level of 770 ncpm (5,500dpm/100 cm^2), however, only 2 of the 8 QC static measurements fell within 20% of the original measurements. This is due to the fact that all of the QC readings were performed on locations that read at or very near to background.

126 alpha static measurements (this includes investigation measurements) were performed. QC static measurements were taken at 8 of these locations. This represents 6.3% of the static measurement locations.

All alpha QC static measurements obtained the same conclusion as the original survey that the results were less than the investigation level of 2025 ncpm (13,500 dpm/100 cm^2), however, none of the 8 QC static measurements fell within 20% of the original measurements. This is due to the fact that all of the QC readings were performed on locations that read at or very near to background.

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SURVEY REQUEST CONTINUATION SHEET			
SR NUMBER	SR-31	AREA / LOCATION	ROLB – All Elevations
SPECIFIC SAMPLING AND SURVEYING INSTRUCTIONS / COMMENTS			

SURVEY REQUEST CLOSE-OUT SUMMARY (continued)

Problems encountered during surveying:

Surveying in all areas required the use of scaffolding or other lifting devices to reach the survey points. A small scissor lift was acquired to allow access through narrow doorways, however, this still required removing the lift's platform rails to allow access through some doors. On the first and second floor, load limits could not be verified by existing records. This limited where the lifts could be used and necessitated extensive use of scaffolding and ladders. Moving from location to location proved to be time consuming.

Several areas of elevated activity were found. Since this is a final post remediation survey, the decision was made to remediate these areas. At one of the areas on the second floor, the contamination went several inches into the concrete. This was deeper than anticipated and took longer to remediate than it was expected to take.

In some of the rooms on the basement level there were puddles of rain water which had to be surveyed around.

The survey of the floor of the telephone exchange room in the basement had to be deferred until after asbestos floor tile was removed.

Most of the combined rooms 109, 110, and 111 were full of asbestos waste bags from floor tile removal. This made it difficult to survey at least 10% of these rooms.

The first floor women's restroom was an asbestos storage location. This delayed surveying this room until after the asbestos was removed.

Additionally, painted surfaces throughout the area have experienced significant degradation leaving blistered and peeling paint in many areas.

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SURVEY REQUEST CONTINUATION SHEET			
SR NUMBER	SR-31	AREA / LOCATION	ROLB – All Elevations
SPECIFIC SAMPLING AND SURVEYING INSTRUCTIONS / COMMENTS			

SURVEY REQUEST CLOSE-OUT SUMMARY (continued)

Additional Survey Data

A survey was performed on 11-29-2006 to release the sumps in the ROLB basement Room 6. This survey was not performed as part of the SR-31 package, however, the survey results are included in this summary as additional information on the radiological condition of the ROLB. Three of the four sumps were surveyed and sampled. A scan survey was performed of 100% of the bottom surface and 50% of the wall surface in these three sumps. The survey was performed with a M-3 meter using a 44-116 probe. Maximum scan results were 200 cpm above background. The samples consisted of sludge from the bottom of the sumps. The samples were processed and analyzed on the gamma spectroscopy system. Trace amounts of Cs-137 were found in two of the sumps. The following identifies the activity detected for each of the concrete samples:

Gross activity of the North sump sludge was 2.7E-02 pCi/g for CS-137 and <MDA for Co-60.

Gross activity of the South sump sludge was <MDA for CS-137 and <MDA for Co-60.

Gross activity of the Middle sump sludge was 4.0E-02 pCi/g for CS-137 and <MDA for Co-60.

Conclusion:

Based on the results of the surveys obtained under SR-31, the current classification (Class 1, 2, and 3) listed in the FSSP for the ROLB is correct and requires no modifications.

The predominant isotope for ROLB is Cs—137.

Scan, Static and smear measurements all indicate that activity in the ROLB is at background level with little or no concentration of any isotopes of any significance. From a radiological perspective, the ROLB is ready for Isolation and Control in preparation for FSS. A significant amount of surface preparation will be required prior to establishing I&C, including paint removal and general cleaning of the ceiling, walls and floors.

J. SORG / [signature] — 11-30-06

FSS/Characterization Supervisor (print/sign) — **Date**

NASA Project RSO (print/sign) — **Date**

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SR-32
Services and Equipment Building
(7 pages)

SR-32
CONCRETE, SLUDGE, AND SMEAR SAMPLES

SR-32 Sample Results

Sample Log #		Sample #	Location		Weight (g)	Cs-137 DCGL$_{(eff)}$ pCi/g	Cs-137 2.2 2σ	Co-60 DCGL pCi/g	Co-60 3.3 2σ	% Unity	Cs:Co	Cs-137 MDA pCi/g	Co-60 MDA pCi/g
PB06-03232		SR32-1	Diesel Trench Smear Composite		1	2.57E+01	1.18E+01	<MDA		1169%	N/A		1.12E+02
PB06-03222		SR32-2	CPT Trench Sludge		135.3	<MDA		5.86E+01	2.57E+00	1775%	N/A	7.73E-01	
PB06-03316		SR32-3	Smear Composite		1	<MDA		<MDA		0%	N/A	1.46E+01	8.18E+00
PB06-03317		SR32-4	IM Smear Composite		1	<MDA		<MDA		0%	N/A	1.26E+01	9.23E+00
PB06-03315		SR32-5	CPT IM-1 Concrete		69.7	<MDA		<MDA		0%	N/A	2.54E-01	4.41E-01
PB06-03564		SR32-6	CPT Trench Smear Composite		1	2.48E+01	1.04E+01	2.17E+01	7.71E+00	1788%	1		
Number	0				6	2	2	2	2	6	1	4	4
Max					135.3	2.57E+01	1.18E+01	5.86E+01	7.71E+00	17.9	1.1	1.46E+01	1.12E+02
Avg					34.8	2.53E+01	1.11E+01	4.02E+01	5.14E+00	7.9	1.1	7.04E+00	3.23E+01
SD					56.37	0.63	0.97	26.05	3.63	8.92		7.58E+00	5.29E+01
Conf int +/-					15.52	0.30	0.46	12.42	1.73	246%		2.56E+00	1.79E+01

= >50% Unity

######## = >100% Unity

All samples are Qualitative except Sample Number SR32-2

SR-31 Additional Isotope Data

HPGe Log #	Sample #	Location		2s	Eu-154 pCi/g	Eu-154 2s	U-235 pCi/g	U-235 2s	Cm-243 pCi/g	Cm-243 2s
			NONE							

SURVEY REQUEST CONTINUATION SHEET			
SR NUMBER	SR-32	AREA / LOCATION	SEB – All Elevations
SPECIFIC SAMPLING AND SURVEYING INSTRUCTIONS / COMMENTS			

SURVEY REQUEST CLOSE-OUT SUMMARY

Background: This SR was written to document the performance of a final post-remediation survey of all 3 elevations of the Service Equipment Building (SEB) and Cold Pipe Tunnel (CPT), and to obtain static measurements for a variability study to be used for the design of the Final Status Survey of the SEB.

Number and types of surveys:

This Survey Request required technicians to perform scan surveys of approximately 10% of each room of the SEB and CPT. Any area which scanned above the alarm set-point (540 ncpm) also required static measurements to be taken to quantify the activity. Any location that exceeded the Static Measurement Action Level of 770 ncpm required a bounding survey to be performed and sufficient static measurements to be obtained in accordance with CS-01 procedure, "Survey Methodology to Support PBRF License Termination."

Additionally, approximately 40 locations on the first floor, 20 locations on the Mezzanine, 25 locations in the Basement, and 25 locations in the CPT were to be selected for the collection of Static Measurements and smear samples. These were not to include any static measurement locations identified during scan surveys and were to be chosen based on providing representative coverage of the elevation being surveyed.

Summary of Scan and Static Measurements:

The Static Measurement Action Level for this survey was 770 ncpm, which equates to 5,500dpm/100 cm^2.

The Scan Alarm set-point was 540 ncpm. Any area that scanned at or above this set-point required static measurements to quantify the activity.

The total available surface area in the basement is 1664 square meters. Scan surveys were performed covering 175 square meters, representing 10.5 % of the total area.

All areas scanned less than 540 ncpm except for IM-1 on the floor in room 25. The activity level at IM-1 was 7708dpm/100 cm^2. IM-1 is an area of approximately 1 sq ft. This location was remediated. Subsequent survey indicated less than 770 ncpm.

Random beta static measurements were performed at 25 locations in the basement. All static measurement results (Open window minus closed window) were less than 770 ncpm.

The total available surface area in the CPT is 3280 square meters. Scan surveys were performed covering 358 sq meters, representing 10.9% of the total area.

All scans were less than 540 ncpm except for IM-1, which was on the floor near the west end of the Cold Pipe Tunnel. The activity level at IM-1 was 5,941dpm/100 cm^2. IM-1 was an area of approximately 2 sq ft. This area was remediated. Subsequent survey indicated less than 770 ncpm.

Random beta static measurements were performed at 25 locations in the CPT. All static measurement results (Open window minus closed window) were less than 770 ncpm.

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SURVEY REQUEST CONTINUATION SHEET			
SR NUMBER	SR-32	AREA / LOCATION	SEB – All Elevations
SPECIFIC SAMPLING AND SURVEYING INSTRUCTIONS / COMMENTS			

SURVEY REQUEST CLOSE-OUT SUMMARY (continued)

The total available surface area in the first floor is 6,446 square meters. Scan surveys were performed covering 683 sq meters, representing 10.6% of the total area.

All scans were less than 540 ncpm.

Random beta static measurements were performed at 40 locations in the first floor. All static measurement results (Open window minus closed window) were less than 770 ncpm.

The total available surface area in the mezzanine is 1,165 square meters. Scan surveys were performed covering 127.9 sq meters, representing 11.0% of the total area.

All scans were less than 540 ncpm except IM-1 on the floor in Area 14. The activity level at IM-1 was 5,816 dpm/100 cm^2. IM-1 was an area of approximately 1 sq ft. This area has not been remediated.

Random beta static measurements were performed at 20 locations in the mezzanine. All static measurement results (Open window minus closed window) were less than 770 ncpm.

All instruments were in current calibration and daily pre and post use source checks were performed satisfactorily.

Summary of Smear, Sludge, and Concrete Samples

Smear samples were obtained at each static measurement and investigation measurement location. The maximum smearable activity detected was 16.12 dpm/100 cm^2 beta gamma, and 3.32 dpm/100 cm^2 alpha. The smears from the static measurement locations were composited and the Investigation Measurement smears were composited and a qualitative analysis was performed on the gamma spectroscopy system. The following identifies the activity level detected for each of the smear composite analyses:

Gross activity of the composite sample on the static measurement smears was < MDA for CS-137 and <MDA for Co-60.

Gross activity of the composite sample on the investigation measurement smears was <MDA for Cs-137 and < MDA for Co-60.

Smear samples were collected from the trench between the diesel foundations for data gathering purposes. The maximum activity detected was 6.82 dpm/100 cm^2 beta gamma, and 6.73 dpm/100 cm^2 alpha. These smears were composited and a qualitative analysis was performed on the gamma spectroscopy system. The following identifies the activity detected for the smear analysis:

Gross activity of the composite sample on the diesel trench investigational smears was 2.57E+01 pCi/g for CS-137 and <MDA for Co-60.

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SURVEY REQUEST CONTINUATION SHEET			
SR NUMBER	SR-32	AREA / LOCATION	SEB – All Elevations
SPECIFIC SAMPLING AND SURVEYING INSTRUCTIONS / COMMENTS			

SURVEY REQUEST CLOSE-OUT SUMMARY (continued)

There is a trench in the west end of the CPT. This trench was dried and a sample of sludge/dirt was collected, dried and processed. Ten smear samples were also collected in the trench. The smears were composited for analysis. A quantitative analysis was performed on the gamma spectroscopy system for the sludge and for the smear composite. The following identifies the activity detected for the trench sludge and the smear composite:

Gross activity of the CPT trench sludge was < MDA for CS-137 and 5.86E+01 pCi/g for Co-60.

Gross activity of the CPT trench smear composite was 2.48E+01 pCi/g for Cs-137 and 2.17E+01 pCi/g for Co-60. The smear composite results had bad curve shapes. These results are presented for information and comparison purposes.

A sample of concrete pieces was collected from the Investigation Measurement location on the CPT floor and a qualitative analysis was performed on the gamma spectroscopy system. The following identifies the activity detected for the concrete sample:

Gross activity of the IM-1 concrete was <MDA for CS-137 and <MDA for Co-60.

Summary of QC survey and QC sample results, including corrective actions taken when acceptance criteria are not met.

A total of 1344.2 square meters was surveyed which represents 10.7% of the total surface area available for survey. QC scans were performed on 71 square meters, which represents 5.3% of the area scanned.

All QC surface scans met the acceptance criteria of section 4.5.2.4, CS-01, generating the same conclusion as the original scan survey.

113 static measurements (this includes investigation measurements) were performed. QC static measurements were taken at 8 of these locations. This represents 7.1% of the static measurement locations.

All QC static measurements obtained the same conclusion as the original survey that the results were less than or greater than (IM-1) the Static Measurement Action Level of 770 ncpm (5,500dpm/100 cm^2), however, only 3 of the 8 QC static measurements fell within 20% of the original measurements. This is due to the fact that all of the QC readings except IM-1 were performed on locations that read at or very near to background. Of the 5 QC static measurements that did not agree within 20%, 3 of them were within 25%.

Form
CS-01/2
Rev. 0

SURVEY REQUEST CONTINUATION SHEET			
SR NUMBER	SR-32	AREA / LOCATION	SEB – All Elevations
SPECIFIC SAMPLING AND SURVEYING INSTRUCTIONS / COMMENTS			

SURVEY REQUEST CLOSE-OUT SUMMARY (continued)

Problems encountered during surveying:

Surveying in all areas required the use of scaffolding, ladders, or other lifting devices to reach the survey points. A small scissor lift was acquired to allow access through narrow doorways, however, this required removing the lift's platform rails to allow access through some doors. Moving from location to location proved to be time consuming. Room 18 on the first floor of the SEB was mainly grating. This limited accessibility to the west end of the SEB.

Several areas of elevated activity were found. Since this is a final post remediation survey, the decision was made to remediate the CPT and Basement areas. The elevated area at the top of the steps that lead to Mezzanine Area 14 was not remediated.

In portions of the CPT there were puddles of water, which had to be surveyed around. Additionally, the floor of the section of the CPT that runs from the Cooling Tower to the Water Tower and the section under the Water Tower had approximately one half inch of standing water. The floor of these two sections was not surveyed.

In the section of the CPT from the Cooling Tower to the Water Tower, two snakes were encountered. The snakes were removed by D&D Technicians.

On the SEB main floor, several rooms were being used for material storage such as tools, spare parts, spare PPE, etc. This material was stored in Rooms 15 and 18 and Area 1. Room 16 had a large number of lockers stored in it. The storage of material in these rooms limited technician access. Rather than being able to spread the required 10-20% survey surface area throughout the room, the technicians had to survey what was accessible. The survey in Room 15, for example, was confined to the southeast corner of the room for lower walls and to the east end of the room for upper walls and ceiling.

There was insufficient lighting in some parts of the basement and CPT. Entry into the Clear Well required a confined space entry.

Painted surfaces throughout the area have experienced significant degradation leaving blistered and peeling paint in many areas.

Form
CS-01/2
Rev. 0

SURVEY REQUEST CONTINUATION SHEET			
SR NUMBER	SR-32	AREA / LOCATION	SEB – All Elevations
SPECIFIC SAMPLING AND SURVEYING INSTRUCTIONS / COMMENTS			

SURVEY REQUEST CLOSE-OUT SUMMARY (continued)

Conclusion:

Based on the results of the surveys obtained under SR-32, the current classification (Class 1, 2, and 3) listed in the FSSP for the SEB and CPT is correct and requires no modifications.

The predominant isotope for the SEB is Cs-137.

Although Co-60 was found in the CPT trench, the predominant isotope for the CPT is Cs-137. There was an 18 inch Primary Water pipe that ran the length of the CPT. When this pipe was cut apart during the fixed equipment removal phase of the project, Cobalt 60 was encountered. Discussions with PBRF Retirees reveal that there was a pipe leak in the CPT that resulted in a spill. Review of MWH survey package D1131 406C1 indicated that three sediment samples were collected in the CPT as part of that package. One of these samples was from the CPT trench. The ratio of Cesium to Cobalt was very similar to the ratio found in the sediment sample from the CPT trench performed as part of this survey. The other two sediment samples collected during D1131 406C1 indicate a more typical Cesium to Cobalt ratio. Another MWH package, C9000 101I3, collected two core bores from the CPT. On of these was collected from the CPT floor and one was collected from the CPT trench. The top slice of each core bore was analyzed on the gamma spectroscopy system. On both slices no nuclides were identified. It is believed that the source of the Co-60 found in the CPT trench was the leak in the Primary Water pipe and that the higher levels of cobalt are limited to the debris/sediment in the trench.

Scan, static and smear measurements all indicate that activity in the SEB is at background level with little or no concentration of any isotopes of any significance. From a radiological perspective, the SEB is ready for Isolation and Control in preparation for FSS. A significant amount of surface preparation will be required prior to establishing I&C, including paint removal and general cleaning of the ceiling, walls and floors. Additionally, the CPT will require a significant effort to stop ground water from entering during survey activities.

FSS/Characterization Supervisor (print/sign)	**Date**
NASA Project RSO (print/sign)	**Date**

Form
CS-01/2
Rev. 0

APPENDIX H

Cold Pipe Tunnel (CPT)
Drain Piping Data

(57 pages)

The data presented in this Appendix was provided by Babcock Services, Inc. At the Plum Brook Reactor Facility (PBRF), Babcock provides radioactive material detection capability for under floor and underground piping using its patented pipe centering devices with 2” x 2” Sodium Iodide detectors. This data represents information gathered in the Cold Pipe Tunnel drainage system from a point about100 feet west of the SEB sump to a north-south running tie-in to the sump (see drawings throughout this Appendix).

Locations in the Cold Pipe Tunnel

	Cs-137 (dpm/100 cm^2)			Co-60 (dpm/100 cm^2)			Cs:Co
Identifier	maximum	minimum	Average	maximum	minimum	average	ratio
CPT-1	20,576	6,173	14,191	13,889	4,630	9,138	1.55
CPT-2	15,850	7,711	11,599	18,114	2,937	6,897	1.68

Locations not in the Cold Pipe Tunnel but on the same -15’0” elevation

	Cs-137 (dpm/100 cm^2)			Co-60 (dpm/100 cm^2)			Cs:Co
Identifier	maximum	minimum	Average	maximum	minimum	average	ratio
CPT-4	19,033	6,687	12,159	7,197	2,056	4,824	2.52
CPT-6	27,778	12,860	17,732	9,259	4,630	6,566	2.70
CPT-7	20,576	14,918	18,073	10,802	4,630	8,333	2.17
CPT-7A	20,062	7,202	13,689	7,716	3,601	6,344	2.16
CPT-8	22,634	12,860	16,902	10,802	3,601	6,944	2.43
CPT-9	13,379	10,288	12,088	9,259	4,115	5,787	2.09

The data show that for locations inside the Cold Pipe Tunnel, on average, the Cs:Co ratio is about 1.62:1 over almost 97 linear feet of pipe monitored for both Cs-137 and Co-60. The remaining pipe in the Cold Pipe Tunnel was monitor for Cs-137 only so no ratio is possible. Interestingly enough, the approximate 101 feet of piping which is not in the tunnel but drains to the sump on the SEB -15’0 elevation, averages a Cs:Co ratio of about 2.35.

Results from drains outside the tunnel give credibility to the use of an Adjusted Gross DCGL based on a mixture of Cs-137 and Co-60. Results obtained from drains originating within the tunnel proper also give credibility to the use of a mixture of the two radionuclides previously mentioned; however, there are extenuating circumstances involved and, as such, the Co-60 DCGL will be used exclusively while implementing the final status survey of the Cold Pipe Tunnel. Concrete core data (see Appendix D) appears to conflict with the drain data leading to the decision to use the more conservative DCGL for Co-60.

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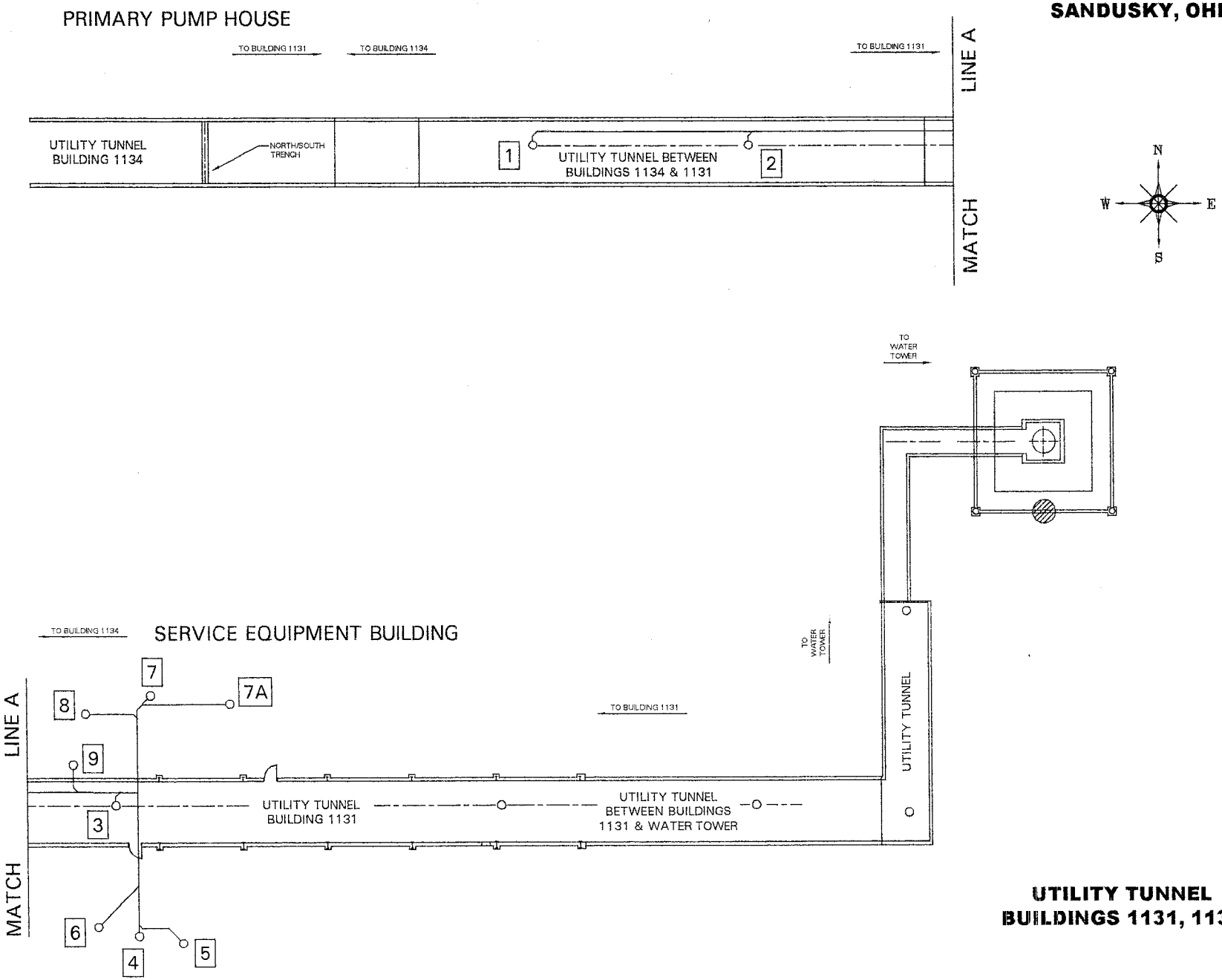
PLUM BROOK STATION
SANDUSKY, OHIO



UTILITY TUNNEL
BUILDINGS 1131, 1134

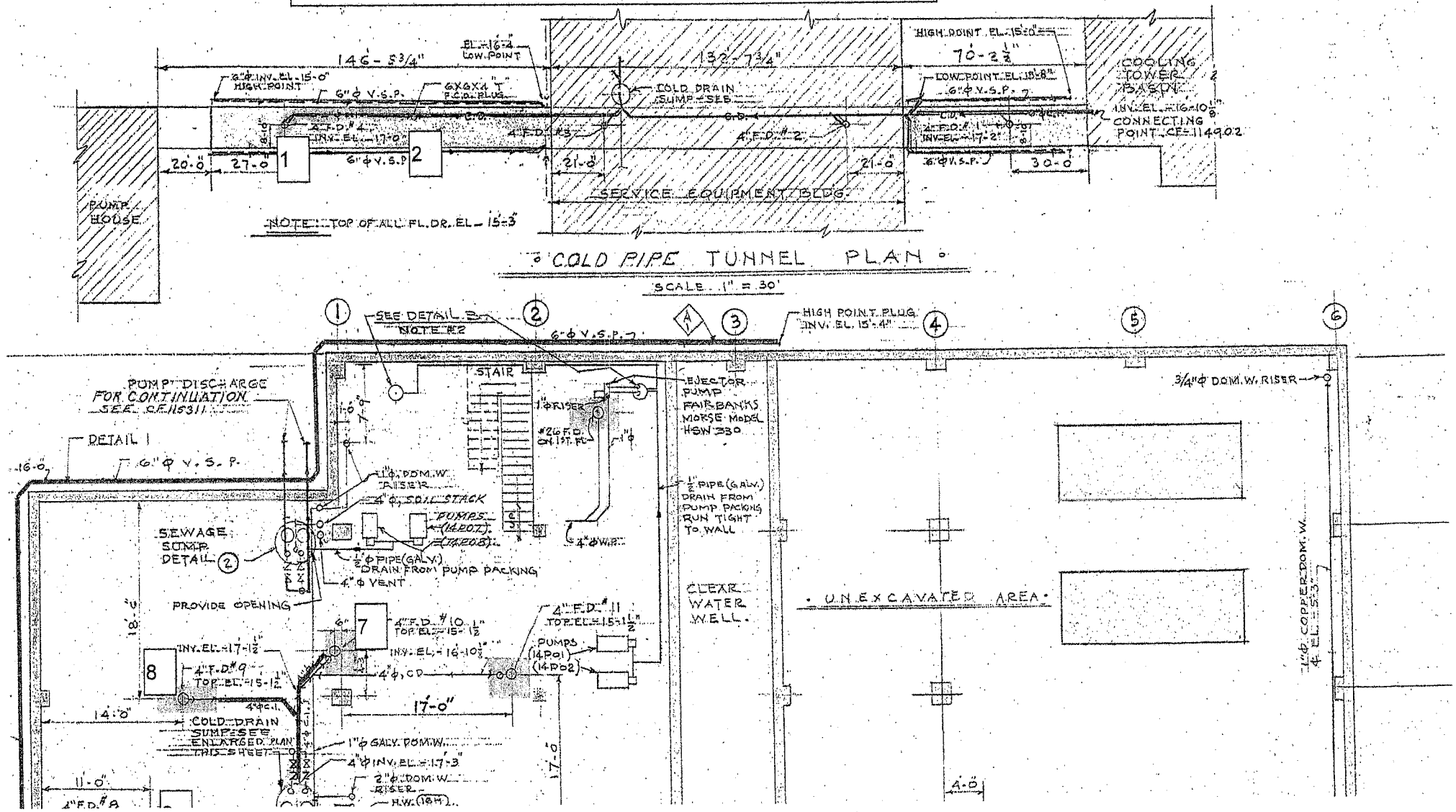
CPT-1

(8 pages)

Cs-137 average 14,191 dpm/100 cm^2
Co-60 average 9,138 dpm/100 cm^2

Cs-137 to Co-60 ratio = 1.55

Drawing PF-06065 -15' ,floor drains



= pipe surveyed
NAT - 1

BSI EP/BP SURVEY REPORT

Pipe ID	**CPT 1**		**Survey Location**	-15 CPT
Survey Date	18-Apr-06		**2350-1 #**	203440
Survey Time	1255		**Detector-Sled #**	238367 - 101
Pipe Size	4"		**Detector Efficiency**	0.0002
DCGL (dpm/100cm2)	50500		Pipe Area Incorporated by Detector Efficiency (in cm2)	972
50% DCGL (dpm/100cm2)	25250		**BKG**	40
Routine Survey	X		**MDCR**	25
QA Survey		Cs	**MDC** (dpm/100cm2)	12769
Survey Measurement Results				

Ft into Pipe from Access	gcpm	net cpm	Cs activity (total dpm)	Cs activity (dpm/100cm2)
1	24	24	120,000	12,346
2	30	30	150,000	15,432
3	22	22	110,000	11,317
4	21	21	105,000	10,802
5	30	30	150,000	15,432
6	26	26	130,000	13,374
7	31	31	155,000	15,947
8	23	23	115,000	11,831
9	26	26	130,000	13,374
10	23	23	115,000	11,831
11	36	36	180,000	18,519
12	29	29	145,000	14,918
13	19	19	95,000	9,774
14	33	33	165,000	16,975
15	33	33	165,000	16,975
16	22	22	110,000	11,317
17	23	23	115,000	11,831
18	28	28	140,000	14,403
19	30	30	150,000	15,432
20	26	26	130,000	13,374
21	27	27	135,000	13,889
22	19	19	95,000	9,774
23	31	31	155,000	15,947
24	30	30	150,000	15,432
25	21	21	105,000	10,802
26	12	12	60,000	6,173
27	25	25	125,000	12,860
28	28	28	140,000	14,403
29	23	23	115,000	11,831
30	30	30	150,000	15,432

31	40	40	200,000	20,576
32	27	27	135,000	13,889
33	23	23	115,000	11,831
34	26	26	130,000	13,374
35	33	33	165,000	16,975
36	28	28	140,000	14,403
37	28	28	140,000	14,403
38	29	29	145,000	14,918
39	27	27	135,000	13,889
40	26	26	130,000	13,374
41	28	28	140,000	14,403
42	18	18	90,000	9,259
43	34	34	170,000	17,490
44	35	35	175,000	18,004
45	37	37	185,000	19,033
46	29	29	145,000	14,918
47	23	23	115,000	11,831
48	26	26	130,000	13,374
49	36	36	180,000	18,519
50	37	37	185,000	19,033
51	36	36	180,000	18,519

Bkgd	0

AVERAGE	14,191
MINIMUM	6,173
MAXIMUM	20,576

BSI EP/BP SURVEY REPORT

Pipe ID	**CPT 1**		**Survey Location**	-15 CPT
Survey Date	13-Apr-06		**2350-1 #**	212223
Survey Time	1117		**Detector-Sled #**	238369 - 101
Pipe Size	4"		**Detector Efficiency**	0.0002
DCGL (dpm/100cm2)	50500		Pipe Area Incorporated by Detector Efficiency (in cm2)	972
50% DCGL (dpm/100cm2)	25250		**BKG**	12
Routine Survey	X		**MDCR**	15
QA Survey		Co	**MDC** (dpm/100cm2)	7692
Survey Measurement Results				

Ft into Pipe from Access	gcpm	net cpm	Co activity (total dpm)	Co (dpm/100cm2)
1	13	13	65,000	6,687
2	17	17	85,000	8,745
3	13	13	65,000	6,687
4	10	10	50,000	5,144
5	18	18	90,000	9,259
6	16	16	80,000	8,230
7	14	14	70,000	7,202
8	9	9	45,000	4,630
9	19	19	95,000	9,774
10	27	27	135,000	13,889
11	10	10	50,000	5,144
12	15	15	75,000	7,716
13	27	27	135,000	13,889
14	17	17	85,000	8,745
15	16	16	80,000	8,230
16	18	18	90,000	9,259
17	19	19	95,000	9,774
18	20	20	100,000	10,288
19	17	17	85,000	8,745
20	14	14	70,000	7,202
21	18	18	90,000	9,259
22	18	18	90,000	9,259
23	14	14	70,000	7,202
24	19	19	95,000	9,774
25	18	18	90,000	9,259
26	20	20	100,000	10,288
27	19	19	95,000	9,774
28	17	17	85,000	8,745
29	23	23	115,000	11,831
30	17	17	85,000	8,745

1/22/2007

31	26	26	130,000	13,374
32	22	22	110,000	11,317
33	13	13	65,000	6,687
34	15	15	75,000	7,716
35	9	9	45,000	4,630
36	22	22	110,000	11,317
37	13	13	65,000	6,687
38	15	15	75,000	7,716
39	22	22	110,000	11,317
40	20	20	100,000	10,288
41	15	15	75,000	7,716
42	24	24	120,000	12,346
43	20	20	100,000	10,288
44	15	15	75,000	7,716
45	15	15	75,000	7,716
46	27	27	135,000	13,889
47	25	25	125,000	12,860
48	18	18	90,000	9,259
49	20	20	100,000	10,288
50	17	17	85,000	8,745
51	21	21	105,000	10,802

Bkgd	0

AVERAGE	9,138
MINIMUM	4,630
MAXIMUM	13,889

CPT-2

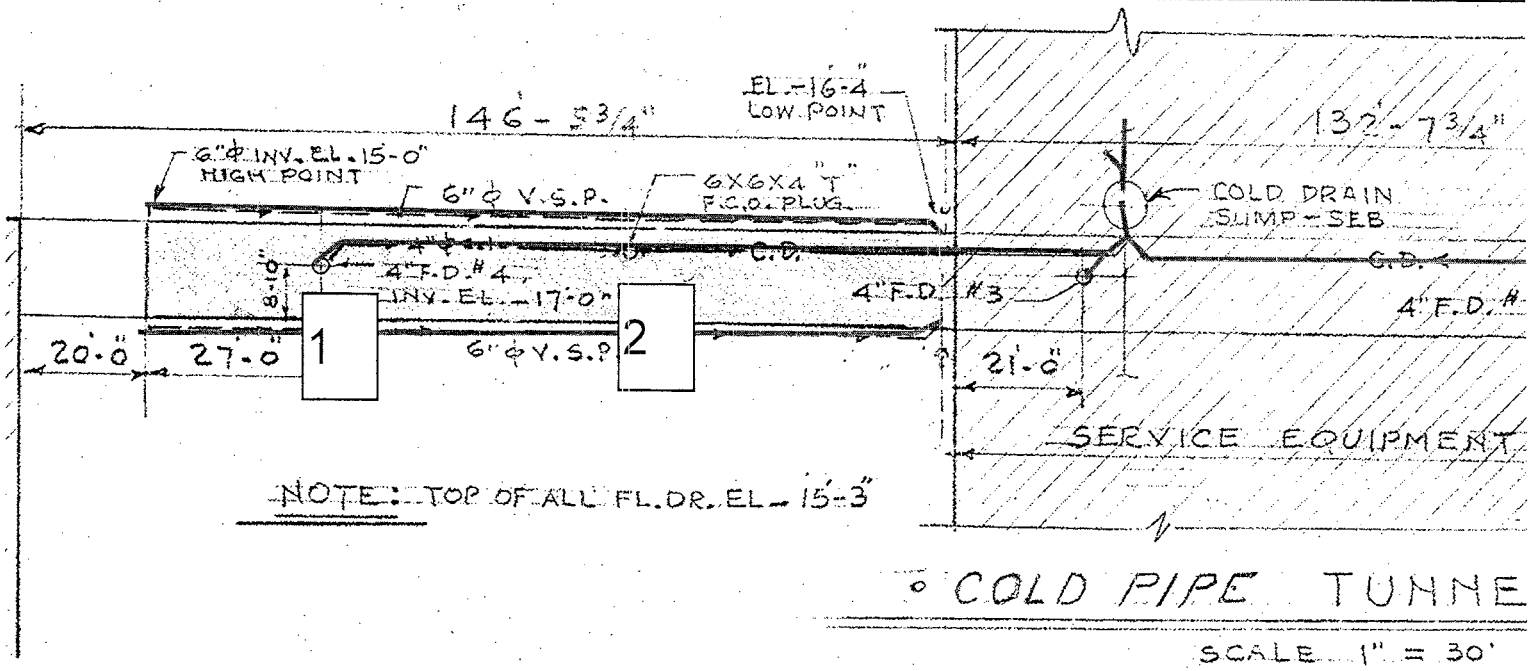
(8 pages)

Cs-137 average 11,599 dpm/100 cm^2
Co-60 average 6,897 dpm/100 cm^2

Cs-137 to Co-60 ratio = 1.68

N

Drawing PF-06065 -15' ,floor drains



= Pipe surveyed
CPT - 2

4-14-06

pages 3 of 3

BSI EP/BP SURVEY REPORT

Pipe ID	**CPT 2**		**Survey Location**	-15 CPT
Survey Date	19-Apr-06		**2350-1 #**	203440
Survey Time	0815		**Detector-Sled #**	238367 - 101
Pipe Size	6"		**Detector Efficiency**	0.0002
DCGL (dpm/100cm2)	50500		**Pipe Area Incorporated by Detector Efficiency (in cm2)**	1459
50% DCGL (dpm/100cm2)	25250		**BKG**	40
Routine Survey	X		**MDCR**	25
QA Survey		Cs	**MDC** (dpm/100cm2)	8507
Survey Measurement Results				

Ft into Pipe from Access	gcpm	net cpm	Cs activity (total dpm)	Cs activity (dpm/100cm2)
1	19	19	118,750	12,217
2	22	22	137,500	14,146
3	26	26	162,500	11,138
4	20	20	125,000	8,568
5	23	23	143,750	9,853
6	36	36	225,000	15,422
7	26	26	162,500	11,138
8	24	24	150,000	10,281
9	26	26	162,500	11,138
10	23	23	143,750	9,853
11	37	37	231,250	15,850
12	25	25	156,250	10,709
13	27	27	168,750	11,566
14	22	22	137,500	9,424
15	24	24	150,000	10,281
16	27	27	168,750	11,566
17	35	35	218,750	14,993
18	27	27	168,750	11,566
19	31	31	193,750	13,280
20	28	28	175,000	11,995
21	29	29	181,250	12,423
22	32	32	200,000	13,708
23	33	33	206,250	14,136
24	31	31	193,750	13,280
25	32	32	200,000	13,708
26	31	31	193,750	13,280
27	26	26	162,500	11,138
28	29	29	181,250	12,423
29	25	25	156,250	10,709
30	34	34	212,500	14,565

31	26	26	162,500	11,138
32	22	22	137,500	9,424
33	24	24	150,000	10,281
34	18	18	112,500	7,711
35	24	24	150,000	10,281
36	27	27	168,750	11,566
37	19	19	118,750	8,139
38	25	25	156,250	10,709
39	30	30	187,500	12,851
40	29	29	181,250	12,423
41	21	21	131,250	8,996
42	25	25	156,250	10,709
43	27	27	168,750	11,566
44	18	18	112,500	7,711
45	24	24	150,000	10,281
46	36	36	225,000	15,422

Bkgd	0

AVERAGE	11,599
MINIMUM	7,711
MAXIMUM	15,850

BSI EP/BP SURVEY REPORT

Pipe ID	**CPT 2**		**Survey Location**	-15 CPT
Survey Date	14-Apr-06		**2350-1 #**	212223
Survey Time	1040		**Detector-Sled #**	238369 - 101
Pipe Size	6"		**Detector Efficiency**	0.0001
DCGL (dpm/100cm2)	50500		Pipe Area Incorporated by Detector Efficiency (in cm2)	1459
50% DCGL (dpm/100cm2)	25250		**BKG**	12
Routine Survey	X		**MDCR**	15
QA Survey		Co	**MDC** (dpm/100cm2)	10249
Survey Measurement Results				

Ft into Pipe from Access	gcpm	net cpm	Co activity (total dpm)	Co activity (dpm/100cm2)
1	5	5	35,714	3,674
2	11	11	78,571	8,083
3	7	7	50,000	3,427
4	9	9	64,286	4,406
5	14	14	100,000	6,854
6	7	7	50,000	3,427
7	6	6	42,857	2,937
8	15	15	107,143	7,344
9	13	13	92,857	6,364
10	21	21	150,000	10,281
11	37	37	264,286	18,114
12	13	13	92,857	6,364
13	11	11	78,571	5,385
14	18	18	128,571	8,812
15	13	13	92,857	6,364
16	10	10	71,429	4,896
17	17	17	121,429	8,323
18	14	14	100,000	6,854
19	23	23	164,286	11,260
20	16	16	114,286	7,833
21	9	9	64,286	4,406
22	13	13	92,857	6,364
23	15	15	107,143	7,344
24	9	9	64,286	4,406
25	18	18	128,571	8,812
26	18	18	128,571	8,812
27	17	17	121,429	8,323
28	10	10	71,429	4,896
29	18	18	128,571	8,812
30	13	13	92,857	6,364

31	19	19	135,714	9,302
32	18	18	128,571	8,812
33	11	11	78,571	5,385
34	12	12	85,714	5,875
35	11	11	78,571	5,385
36	14	14	100,000	6,854
37	15	15	107,143	7,344
38	10	10	71,429	4,896
39	12	12	85,714	5,875
40	12	12	85,714	5,875
41	11	11	78,571	5,385
42	14	14	100,000	6,854
43	16	16	114,286	7,833
44	21	21	150,000	10,281
45	14	14	100,000	6,854
46	10	10	71,429	4,896

Bkgd	0

AVERAGE	6,897
MINIMUM	2,937
MAXIMUM	18,114

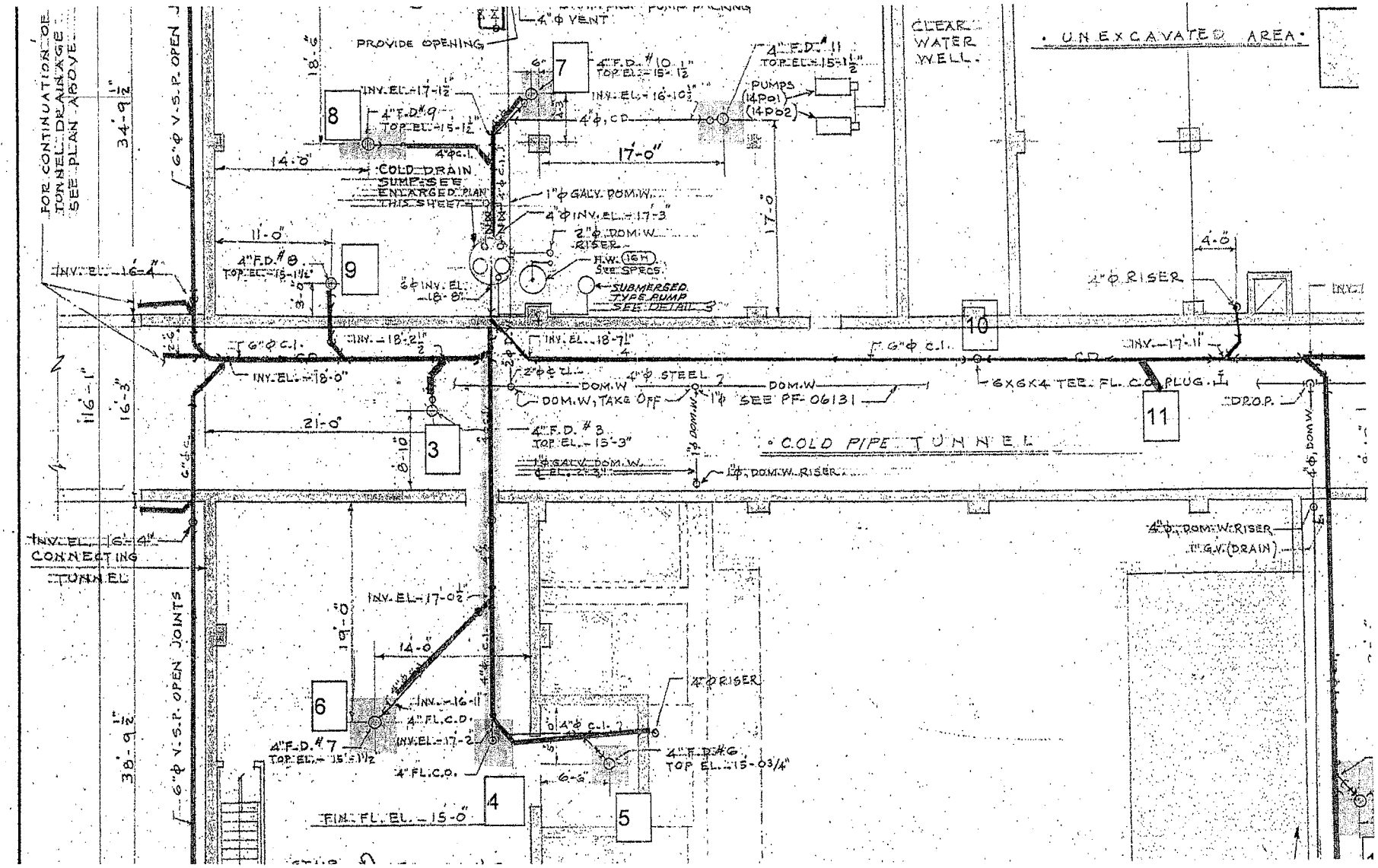
CPT-4

(8 pages)

Cs-137 average 12,159 dpm/100 cm^2
Co-60 average 4,824 dpm/100 cm^2

Cs-137 to Co-60 ratio = 2.52

N



= pipe surveyed

CPT-4

PAGES 3 of 3

BSI EP/BP SURVEY REPORT

Pipe ID	**CPT 4**		**Survey Location**	-15 CPT
Survey Date	19-Apr-06		**2350-1 #**	203440
Survey Time	1245		**Detector-Sled #**	238367 - 101
Pipe Size	4"		**Detector Efficiency**	0.0002
DCGL (dpm/100cm2)	50500		**Pipe Area Incorporated by Detector Efficiency (in cm2)**	972
50% DCGL (dpm/100cm2)	25250		**BKG**	40
Routine Survey	X		**MDCR**	25
QA Survey		Cs	**MDC** (dpm/100cm2)	12769
Survey Measurement Results				

Ft into Pipe from Access	gcpm	net cpm	Cs activity (total dpm)	Cs activity (dpm/100cm2)
1	27	27	135,000	13,889
2	18	18	90,000	9,259
3	20	20	100,000	10,288
4	21	21	105,000	10,802
5	24	24	120,000	12,346
6	30	30	150,000	15,432
7	26	26	130,000	13,374
8	28	28	140,000	14,403
9	22	22	110,000	11,317
10	19	19	95,000	9,774
11	24	24	120,000	12,346
12	13	13	65,000	6,687
13	25	25	125,000	12,860
14	37	37	185,000	19,033
15	25	25	125,000	12,860
16	28	28	140,000	14,403
17	23	23	115,000	11,831
18	26	26	130,000	13,374
19	22	22	110,000	11,317
20	31	31	155,000	15,947
21	22	22	110,000	11,317
22	27	27	135,000	13,889
23	27	27	135,000	13,889
24	30	30	150,000	15,432
25	25	25	125,000	12,860
26	22	22	110,000	11,317
27	24	24	120,000	12,346
28	18	18	90,000	9,259
29	21	21	105,000	10,802
30	19	19	95,000	9,774

31	22	22	110,000	11,317
32	17	17	85,000	8,745
33	17	17	85,000	8,745

Bkgd	0

AVERAGE	12,159
MINIMUM	6,687
MAXIMUM	19,033

BSI EP/BP SURVEY REPORT

Pipe ID	**CPT 4**		**Survey Location**	-15 CPT
Survey Date	21-Apr-06		**2350-1 #**	212223
Survey Time	1045		**Detector-Sled #**	238369 - 101
Pipe Size	4"		**Detector Efficiency**	0.0002
DCGL (dpm/100cm2)	50500		Pipe Area Incorporated by Detector Efficiency (in cm2)	972
50% DCGL (dpm/100cm2)	25250		**BKG**	12
Routine Survey	X		**MDCR**	15
QA Survey		Co	**MDC** (dpm/100cm2)	7692
Survey Measurement Results				

Ft into Pipe from Access	gcpm	net cpm	Co activity (total dpm)	Co activity (dpm/100cm2)
1	12	12	60,000	6,173
2	9	9	45,000	4,630
3	10	10	50,000	3,427
4	10	10	50,000	3,427
5	13	13	65,000	4,455
6	11	11	55,000	3,770
7	13	13	65,000	4,455
8	21	21	105,000	7,197
9	20	20	100,000	6,854
10	13	13	65,000	4,455
11	9	9	45,000	3,084
12	10	10	50,000	3,427
13	6	6	30,000	2,056
14	16	16	80,000	5,483
15	14	14	70,000	4,798
16	12	12	60,000	4,112
17	15	15	75,000	5,141
18	13	13	65,000	4,455
19	13	13	65,000	4,455
20	10	10	50,000	3,427
21	16	16	80,000	5,483
22	17	17	85,000	5,826
23	19	19	95,000	6,511
24	21	21	105,000	7,197
25	14	14	70,000	4,798
26	12	12	60,000	4,112
27	12	12	60,000	4,112
28	17	17	85,000	5,826
29	16	16	80,000	5,483
30	20	20	100,000	6,854

31	13	13	65,000	4,455
32	15	15	75,000	5,141
33	12	12	60,000	4,112

Bkgd	0

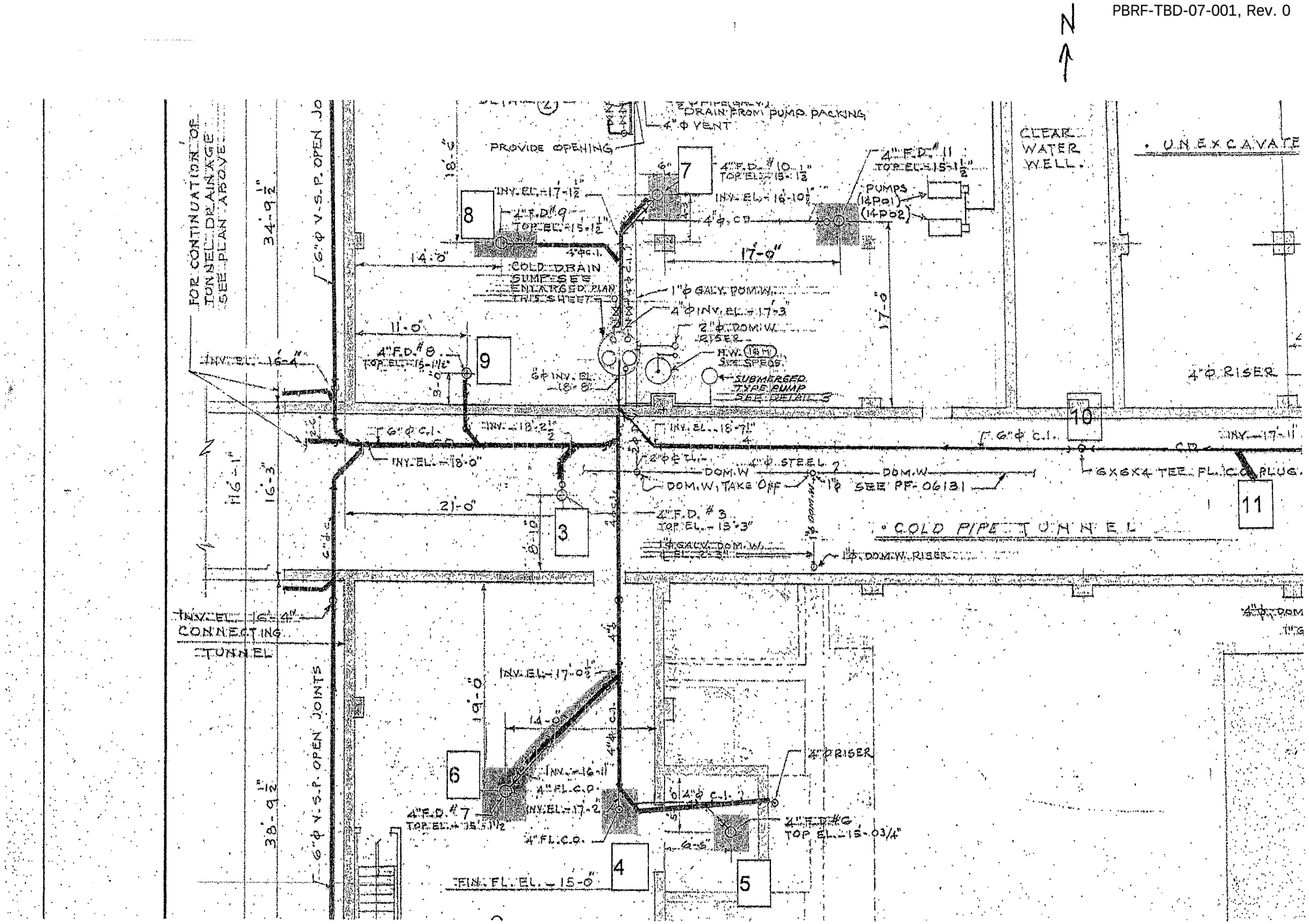
AVERAGE	4,824
MINIMUM	2,056
MAXIMUM	7,197

CPT-6

(6 pages)

Cs-137 average 17,732 dpm/100 cm^2
Co-60 average 6,566 dpm/100 cm^2

Cs-137 to Co-60 ratio = 2.70



= pipe surveyed
CAT-6

BSI EP/BP SURVEY REPORT

Pipe ID	**CPT 6**		**Survey Location**	-15 CPT
Survey Date	24-Apr-06		**2350-1 #**	203440
Survey Time	0810		**Detector-Sled #**	238367 - 101
Pipe Size	4"		**Detector Efficiency**	0.0002
DCGL (dpm/100cm2)	50500		Pipe Area Incorporated by Detector Efficiency (in cm2)	972
50% DCGL (dpm/100cm2)	25250		**BKG**	40
Routine Survey	X		**MDCR**	25
QA Survey		Cs	**MDC** (dpm/100cm2)	12769
Survey Measurement Results				

Ft into Pipe from Access	gcpm	net cpm	Cs activity (total dpm)	Cs activity (dpm/100cm2)
1	25	25	125,000	12,860
2	31	31	155,000	15,947
3	36	36	180,000	18,519
4	49	49	245,000	25,206
5	31	31	155,000	15,947
6	36	36	180,000	18,519
7	42	42	210,000	21,605
8	38	38	190,000	19,547
9	37	37	185,000	19,033
10	42	42	210,000	21,605
11	54	54	270,000	27,778
12	32	32	160,000	16,461
13	27	27	135,000	13,889
14	29	29	145,000	14,918
15	25	25	125,000	12,860
16	26	26	130,000	13,374
17	26	26	130,000	13,374

Bkgd	0

AVERAGE	17,732	
MINIMUM	12,860	
MAXIMUM	27,778	

BSI EP/BP SURVEY REPORT

Pipe ID	**CPT 6**		**Survey Location**	-15 CPT
Survey Date	20-Apr-06		**2350-1 #**	212223
Survey Time	1330		**Detector-Sled #**	238369 - 101
Pipe Size	4"		**Detector Efficiency**	0.0002
DCGL (dpm/100cm2)	50500		Pipe Area Incorporated by Detector Efficiency (in cm2)	972
50% DCGL (dpm/100cm2)	25250		**BKG**	12
Routine Survey	X		**MDCR**	15
QA Survey		Co	**MDC** (dpm/100cm2)	7692
Survey Measurement Results				

Ft into Pipe from Access	gcpm	net cpm	Co-60 activity (total dpm)	Co-60 activity (dpm/100cm2)
1	10	10	50,000	5,144
2	15	15	75,000	7,716
3	13	13	65,000	6,687
4	10	10	50,000	5,144
5	13	13	65,000	6,687
6	9	9	45,000	4,630
7	11	11	55,000	5,658
8	9	9	45,000	4,630
9	13	13	65,000	6,687
10	14	14	70,000	7,202
11	10	10	50,000	5,144
12	14	14	70,000	7,202
13	16	16	80,000	8,230
14	12	12	60,000	6,173
15	12	12	60,000	6,173
16	18	18	90,000	9,259
17	18	18	90,000	9,259

Bkgd	0

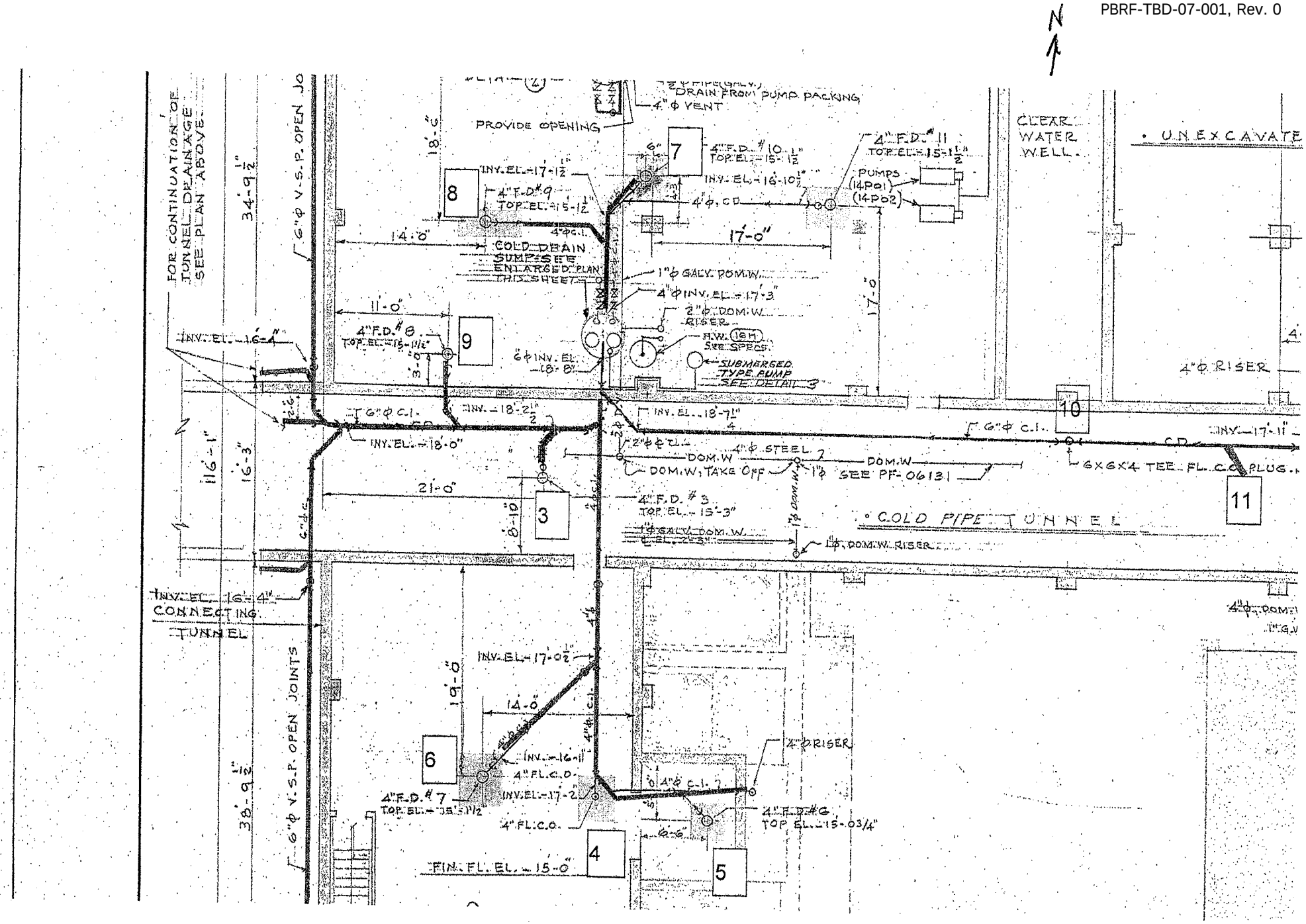
AVERAGE	6,566	
MINIMUM	4,630	
MAXIMUM	9,259	

CPT-7

(6 pages)

Cs-137 average 18,073 dpm/100 cm^2
Co-60 average 8,333 dpm/100 cm^2

Cs-137 to Co-60 ratio = 2.17



Pipe surveyed CPT 7

BSI EP/BP SURVEY REPORT

Pipe ID	**CPT 7**		**Survey Location**	-15 CPT
Survey Date	24-Apr-06		**2350-1 #**	203440
Survey Time	0835		**Detector-Sled #**	238367 - 101
Pipe Size	4"		**Detector Efficiency**	0.0002
DCGL (dpm/100cm2)	50500		**Pipe Area Incorporated by Detector Efficiency (in cm2)**	972
50% DCGL (dpm/100cm2)	25250		**BKG**	40
Routine Survey	X		**MDCR**	25
QA Survey		Cs	**MDC** (dpm/100cm2)	12769
Survey Measurement Results				

Ft into Pipe from Access	gcpm	net cpm	Cs activity (total dpm)	Cs activity (dpm/100cm2)
1	38	38	190,000	19,547
2	32	32	160,000	16,461
3	40	40	200,000	20,576
4	33	33	165,000	16,975
5	34	34	170,000	17,490
6	35	35	175,000	18,004
7	34	34	170,000	17,490
8	35	35	175,000	18,004
9	29	29	145,000	14,918
10	34	34	170,000	17,490
11	37	37	185,000	19,033
12	40	40	200,000	20,576
13	38	38	190,000	19,547
14	33	33	165,000	16,975
15	35	35	175,000	18,004

Bkgd	0

AVERAGE	18,073
MINIMUM	14,918
MAXIMUM	20,576

BSI EP/BP SURVEY REPORT

Pipe ID	**CPT 7**		**Survey Location**	-15 CPT
Survey Date	20-Apr-06		**2350-1 #**	212223
Survey Time	1015		**Detector-Sled #**	238369 - 101
Pipe Size	4"		**Detector Efficiency**	0.0002
DCGL (dpm/100cm2)	50500		**Pipe Area Incorporated by Detector Efficiency (in cm2)**	972
50% DCGL (dpm/100cm2)	25250		**BKG**	12
Routine Survey	X		**MDCR**	15
QA Survey		Co	**MDC (dpm/100cm2)**	7692
Survey Measurement Results				

Ft into Pipe from Access	gcpm	net cpm	Co activity (total dpm)	Co activity (dpm/100cm2)
1	14	14	70,000	7,202
2	11	11	55,000	5,658
3	13	13	65,000	6,687
4	20	20	100,000	10,288
5	9	9	45,000	4,630
6	21	21	105,000	10,802
7	14	14	70,000	7,202
8	13	13	65,000	6,687
9	18	18	90,000	9,259
10	16	16	80,000	8,230
11	17	17	85,000	8,745
12	21	21	105,000	10,802
13	18	18	90,000	9,259
14	18	18	90,000	9,259
15	20	20	100,000	10,288

Bkgd	0

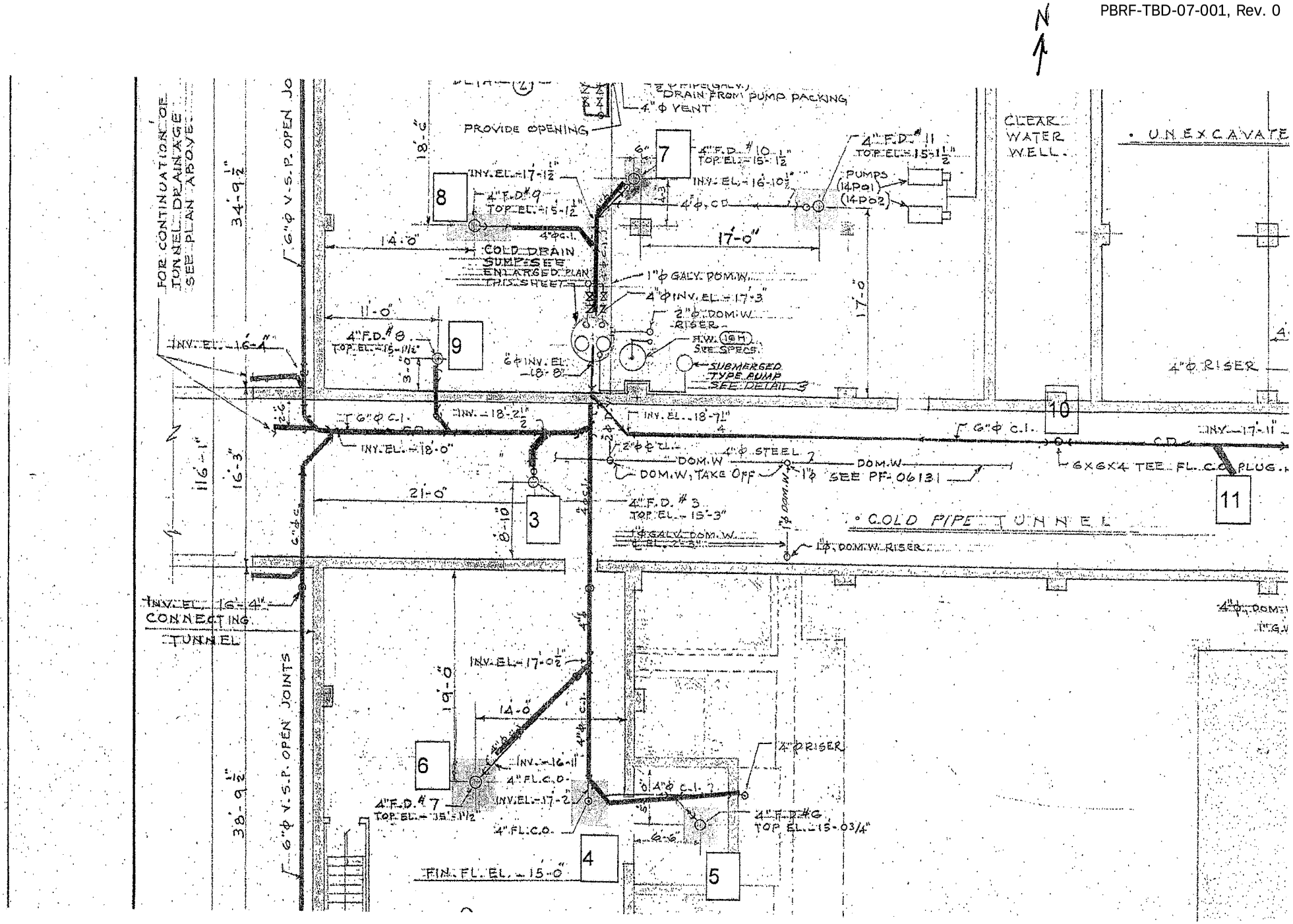
AVERAGE	8,333
MINIMUM	4,630
MAXIMUM	10,802

CPT-7A

(6 pages)

Cs-137 average 13,689 dpm/100 cm^2
Co-60 average 6,344 dpm/100 cm^2

Cs-137 to Co-60 ratio = 2.16



= pipe surveyed
CPT 7

Pages 3 of 3

BSI EP/BP SURVEY REPORT

Pipe ID	**CPT 7**		**Survey Location**	-15 CPT
Survey Date	24-Apr-06		**2350-1 #**	203440
Survey Time	0835		**Detector-Sled #**	238367 - 101
Pipe Size	4"		**Detector Efficiency**	0.0002
DCGL (dpm/100cm2)	50500		Pipe Area Incorporated by Detector Efficiency (in cm2)	972
50% DCGL (dpm/100cm2)	25250		**BKG**	40
Routine Survey	X		**MDCR**	25
QA Survey		Cs	**MDC** (dpm/100cm2)	12769
Survey Measurement Results				

Ft into Pipe from Access	gcpm	net cpm	Cs activity (total dpm)	Cs activity (dpm/100cm2)
1	17	17	85,000	8,745
2	15	15	75,000	7,716
3	24	24	120,000	12,346
4	20	20	100,000	10,288
5	25	25	125,000	12,860
6	39	39	195,000	20,062
7	29	29	145,000	14,918
8	29	29	145,000	14,918
9	28	28	140,000	14,403
10	33	33	165,000	16,975
11	26	26	130,000	13,374
12	22	22	110,000	11,317
13	35	35	175,000	18,004
14	32	32	160,000	16,461
15	29	29	145,000	14,918
16	36	36	180,000	18,519
17	14	14	70,000	7,202
18	26	26	130,000	13,374

Bkgd	0

AVERAGE	13,689
MINIMUM	7,202
MAXIMUM	20,062

1/22/2007

BSI EP/BP SURVEY REPORT

Pipe ID	**CPT 7A**		**Survey Location**	-15 CPT
Survey Date	21-Apr-06		**2350-1 #**	212223
Survey Time	1000		**Detector-Sled #**	238369 - 101
Pipe Size	4"		**Detector Efficiency**	0.0002
DCGL (dpm/100cm2)	50500		Pipe Area Incorporated by Detector Efficiency (in cm2)	972
50% DCGL (dpm/100cm2)	25250		**BKG**	12
Routine Survey	X		**MDCR**	15
QA Survey		Co	**MDC** (dpm/100cm2)	7692
Survey Measurement Results				

Ft into Pipe from Access	gcpm	net cpm	Co activity (total dpm)	Co activity (dpm/100cm2)
1	14	14	70,000	7,202
2	12	12	60,000	6,173
3	7	7	35,000	3,601
4	14	14	70,000	7,202
5	9	9	45,000	4,630
6	10	10	50,000	5,144
7	13	13	65,000	6,687
8	12	12	60,000	6,173
9	15	15	75,000	7,716
10	13	13	65,000	6,687
11	13	13	65,000	6,687
12	14	14	70,000	7,202
13	15	15	75,000	7,716
14	12	12	60,000	6,173
15	13	13	65,000	6,687
16	11	11	55,000	5,658
17	11	11	55,000	5,658
18	14	14	70,000	7,202

Bkgd	0

AVERAGE	6,344
MINIMUM	3,601
MAXIMUM	7,716

CPT-8

(6 pages)

Cs-137 average 16,902 dpm/100 cm^2
Co-60 average 6,944 dpm/100 cm^2

Cs-137 to Co-60 ratio = 2.43

BSI EP/BP SURVEY REPORT

Pipe ID	**CPT 8**		**Survey Location**	-15 CPT
Survey Date	24-Apr-06		**2350-1 #**	203440
Survey Time	0900		**Detector-Sled #**	238367 - 101
Pipe Size	4"		**Detector Efficiency**	0.0002
DCGL (dpm/100cm2)	50500		**Pipe Area Incorporated by Detector Efficiency (in cm2)**	972
50% DCGL (dpm/100cm2)	25250		**BKG**	40
Routine Survey	X		**MDCR**	25
QA Survey		Cs	**MDC** (dpm/100cm2)	12769
Survey Measurement Results				

Ft into Pipe from Access	gcpm	net cpm	Cs activity (total dpm)	Cs activity (dpm/100cm2)
1	29	29	145,000	14,918
2	43	43	215,000	22,119
3	28	28	140,000	14,403
4	39	39	195,000	20,062
5	32	32	160,000	16,461
6	44	44	220,000	22,634
7	28	28	140,000	14,403
8	30	30	150,000	15,432
9	34	34	170,000	17,490
10	25	25	125,000	12,860
11	30	30	150,000	15,432
12	36	36	180,000	18,519
13	29	29	145,000	14,918
14	33	33	165,000	16,975

Bkgd	0

AVERAGE	16,902
MINIMUM	12,860
MAXIMUM	22,634

BSI EP/BP SURVEY REPORT

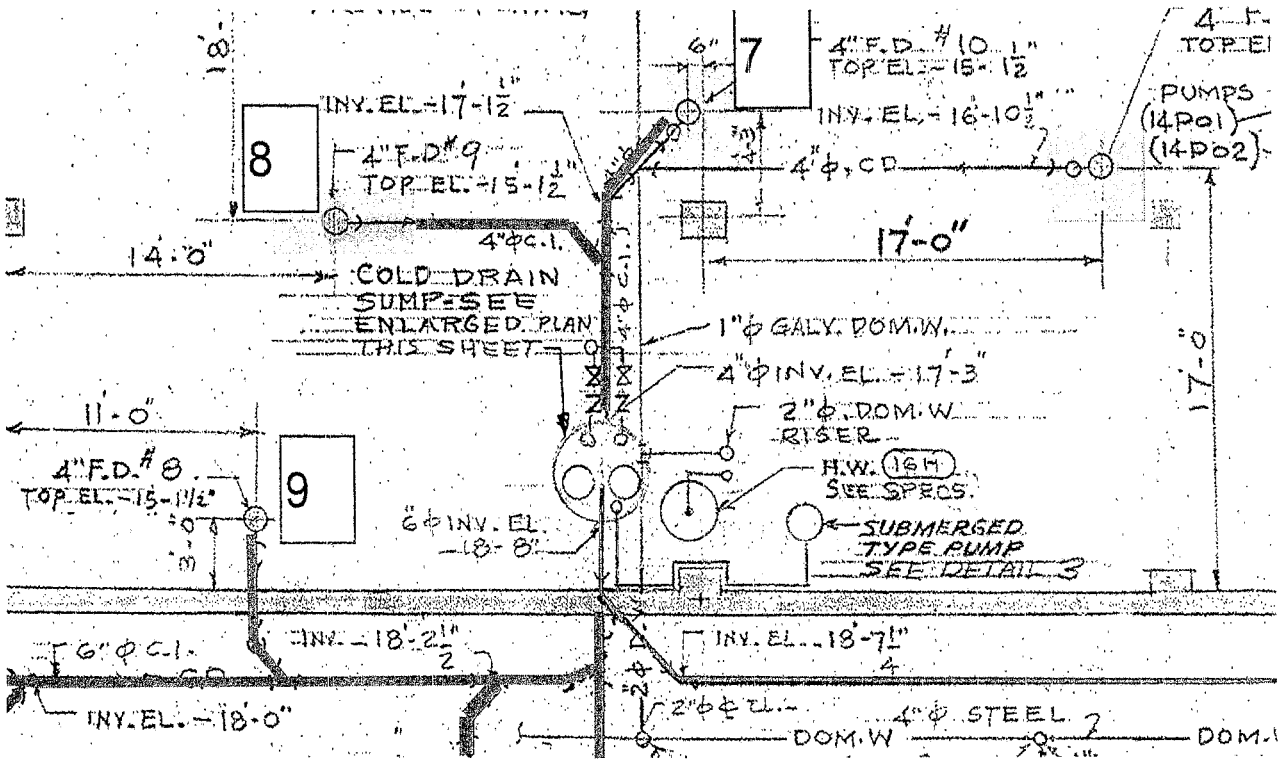
Pipe ID	CPT 8		**Survey Location**	-15 CPT
Survey Date	20-Apr-06		**2350-1 #**	212223
Survey Time	1045		**Detector-Sled #**	238369 - 101
Pipe Size	4"		**Detector Efficiency**	0.0002
DCGL (dpm/100cm2)	50500		**Pipe Area Incorporated by Detector Efficiency (in cm2)**	972
50% DCGL (dpm/100cm2)	25250		**BKG**	12
Routine Survey	X		**MDCR**	15
QA Survey		Co	**MDC** (dpm/100cm2)	7692
Survey Measurement Results				

Ft into Pipe from Access	gcpm	net cpm	Co activity (total dpm)	Co activity (dpm/100cm2)
1	21	21	105,000	10,802
2	18	18	90,000	9,259
3	11	11	55,000	5,658
4	14	14	70,000	7,202
5	15	15	75,000	7,716
6	7	7	35,000	3,601
7	14	14	70,000	7,202
8	9	9	45,000	4,630
9	8	8	40,000	4,115
10	17	17	85,000	8,745
11	10	10	50,000	5,144
12	20	20	100,000	10,288
13	10	10	50,000	5,144
14	15	15	75,000	7,716

Bkgd	0

AVERAGE	6,944
MINIMUM	3,601
MAXIMUM	10,802

N



= pipe Surveyed
CPT - 8

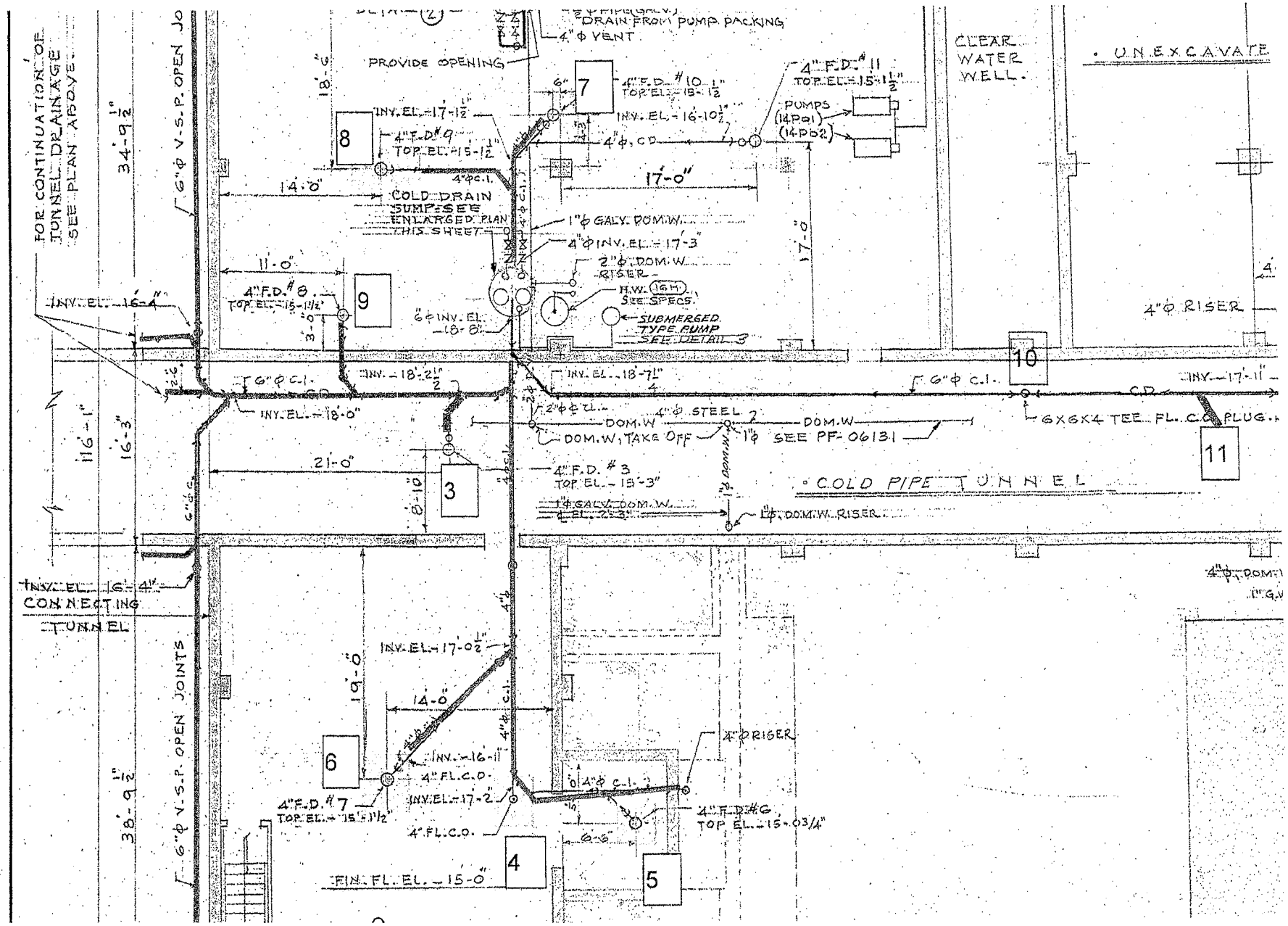
Pages 3 of 3

CPT-9

(6 pages)

Cs-137 average 12,088 dpm/100 cm^2
Co-60 average 5,787 dpm/100 cm^2

Cs-137 to Co-60 ratio = 2.09



pipe surveyed
OPT-9

BSI EP/BP SURVEY REPORT

Pipe ID	**CPT 9**		**Survey Location**	-15 CPT
Survey Date	24-Apr-06		**2350-1 #**	203440
Survey Time	1025		**Detector-Sled #**	238367 - 101
Pipe Size	4"		**Detector Efficiency**	0.0002
DCGL (dpm/100cm2)	50500		**Pipe Area Incorporated by Detector Efficiency (in cm2)**	972
50% DCGL (dpm/100cm2)	25250		**BKG**	40
Routine Survey	X		**MDCR**	25
QA Survey		Cs	**MDC** (dpm/100cm2)	12769
Survey Measurement Results				

Ft into Pipe from Access	gcpm	net cpm	Cs activity (total dpm)	Cs activity (dpm/100cm2)
1	23	23	115,000	11,831
2	26	26	130,000	13,374
3	25	25	125,000	12,860
4	20	20	100,000	10,288

Bkgd	0

AVERAGE	12,088
MINIMUM	10,288
MAXIMUM	13,374

BSI EP/BP SURVEY REPORT

Pipe ID	**CPT 9**		**Survey Location**	-15 CPT
Survey Date	20-Apr-06		**2350-1 #**	212223
Survey Time	1100		**Detector-Sled #**	238369 - 101
Pipe Size	4"		**Detector Efficiency**	0.0002
DCGL (dpm/100cm2)	50500		**Pipe Area Incorporated by Detector Efficiency (in cm2)**	972
50% DCGL (dpm/100cm2)	25250		**BKG**	12
Routine Survey	X		**MDCR**	15
QA Survey		Co	**MDC** (dpm/100cm2)	7692
Survey Measurement Results				

Ft into Pipe from Access	gcpm	net cpm	Co activity (total dpm)	Co activity (dpm/100cm2)
1	18	18	90,000	9,259
2	8	8	40,000	4,115
3	10	10	50,000	5,144
4	9	9	45,000	4,630

Bkgd	0

AVERAGE	5,787
MINIMUM	4,115
MAXIMUM	9,259

APPENDIX I

Hot Retention Area (HRA) Data

(20 pages)

The data presented in this Appendix was taken from an old MWH characterization package C1155-101C1, Hot Retention Area (HRA). The Table I-1 below shows results from two samples (concrete pieces and pipe debris) taken inside the HRA and analyzed by Eberline Services at their Scarboro Road laboratory in Oak Ridge, Tennessee.

Table I-1
Off-Site Laboratory Analyses of Hot Retention Area
Concrete Pieces and Drain Pipe Debris

Identifiers	CS050714-004 COC 05-217-ON		CS050714-007 COC 05-218-ON	
	CS050823-011 COC 05-255-OFF		CS050823-012 COC 05-255-OFF	
	C1155 101C1 MI1G1 L04 2 2		C1155 101C1 MI1R1 L04 3 2	
Description	concrete pieces		drain pipe debris	
Results	Activity (pCi/g)	MDA* (pCi/g)	Activity (pCi/g)	MDA* (pCi/g)
Ni-63	.658	**6.14**	9.22	6.38
Sr-90	.978	.431	19.6	.447
U-234	.826	.0884	.323	.0416
U-235	.121	.0545	.0189	**.0513**
U-238	.533	.0751	.214	.0414
C-14	3.00	2.88	2.52	**3.29**
H-3	7.30	4.05	3.85	**5.34**
Fe-55	-1.27	**2.08**	-.496	**2.20**
Bi-214	.926	.236		
Co-60	1.32	.112	13.4	.234
Cs-137	18.8	.121	187	.336
Eu-152	.184	**.738**	-.0257	**.694**
Eu-154	.0572	**.277**	.0255	**.430**
Eu-155	.260	.233	.377	**.572**
Ni-94	.00752	**.105**	.143	**.282**
Sb-125	.120	**.511**	-.431	**1.66**
Cs-137/Co-60 ratio	14.2		14.0	

* Boldface items indicate the result was less than MDA

The data show that for locations inside the Hot Retention Area, on average, the Cs:Co ratio is about 14.1:1. Results from the HRA give credibility to the use of an Adjusted Gross DCGL based on a mixture of Cs-137 and Co-60. The datum from SR28 (sample 28-5) shows only Cs-

137 with no Co-60 (see Appendix G, SR-28) and Table I-2 below shows the results of Hot Retention Area samples analyzed on site.

Table I-2
On-Site Analyses of Samples Taken from the Hot Retention Area

Sample Number	Cs-137 (pCi/g)	Co-60 (pCi/g)	Cs-137:Co-60 ratio
1-1 floor debris	6.78	.598	11.34
1-2 floor debris	6.39	.467	13.68
2-1 concrete pieces	20	.978	20.45
2-2 concrete pieces	21.2	1.47	14.42
2-3 concrete pieces	27.2	1.69	16.09
3-1 drain pipe debris	111	8.24	13.47
3-2drain pipe debris	178	12.4	14.35
4C1 floor drain sediment	5.34	.343	15.57
4C2 floor drain sediment	6.25	.508	12.30

Average	14.63

NASA PBRF DECOMMISSIONING PROJECT

SANDUSKY, OHIO

Appendix C - Characterization Survey Unit Summary Report

Survey Package Number: C1155 101C1 **Package Type:** Structure
Survey Area Name: Hot Retention Area (1155)
Survey Unit Name: Hot Retention Area Subsurface Structure

Summary of Hot Retention Area Sample Analysis Results

Sample Number and Description	Sample Size	On-Site Analysis Nuclide Activity (pCi/gm)	Vendor Lab Report Nuclide Activity (pCi/gm)	Lab Report Sample ID Number On-Site (Off-Site-Eberline Report 05-08120)
# 1-1 Floor Debris	5.027 E +2 g	Co-60 0.598 Cs-137 6.78	N/A	PB05-01994
# 1-2 Floor Debris	5.040 E +2 g	Co-60 0.467 Cs-137 6.39	N/A	PB05-01995
# 2-1 Concrete Pieces	2.731 E +2 g	Co-60 0.978 Cs-137 20.0	N/A	PB05-01996
# 2-2 Concrete Pieces	2.597 E +2 g	Co-60 1.47 Cs-137 21.2 Am-241 0.170	Sr-90 0.978 U-235 0.121 U-238 0.533 C-14 3.00 H-3 7.30 Co-60 1.32 Cs-137 18.8 Eu-155 0.260	PB05-01997 (CS050823-011)
# 2-3 Concrete Pieces	3.161 E +2 g	Co-60 1.69 Cs-137 27.2	N/A	PB05-01998
# 3-1 Drain Pipe Debris	5.231 E +2 g	Co-60 8.24 Cs-137 111 Nb-94 0.114	N/A	PB05-01992
# 3-2 Drain Pipe Debris	5.858 E +2 g	Co-60 12.4 Cs-137 178 Nb-94 0.108	Ni-63 9.22 Sr-90 19.6 U-234 0.323 U-238 0.214 Co-60 13.4 Cs-137 187	PB05-01993 (CS050823-012)
# 4 C1 Floor Drain Sediment	5.124 E +2 g	Co-60 0.343 Cs-137 5.34	N/A	PB05-02022
# 4 C2 Floor Drain Sediment	5.014 E +2 g	Co-60 0.508 Cs-137 6.25 Cm-245 0.316	N/A	PB05-02023

00

APPENDIX A
RADIATION PROTECTION SURVEY FORM

Page 1 of 1

Location: Hot Retention Area Tank Vault, -25' Elevation

RWP: PB-05- NA

Date: 7/14 – 7/20/05

Time: NA

Survey #: PB-05- NA

Instrument(s)

Model	S/N	Cal. Due	Bkgd / cpm	MDA / dpm
		N/A		

Reason for Survey:
- ☐ Daily
- ☐ Weekly
- ☐ Job Coverage
- ☒ Other: CHARACTERIZATION

- ☐ Dose rates in mr/hr unless otherwise noted
- ☐ Dose rates in µr/hr unless otherwise noted
- ☒ N/A

Smear # & Location	Contamination (dpm/100cm²) β γ	α
1		
2		
3		
4		
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10	N/A	
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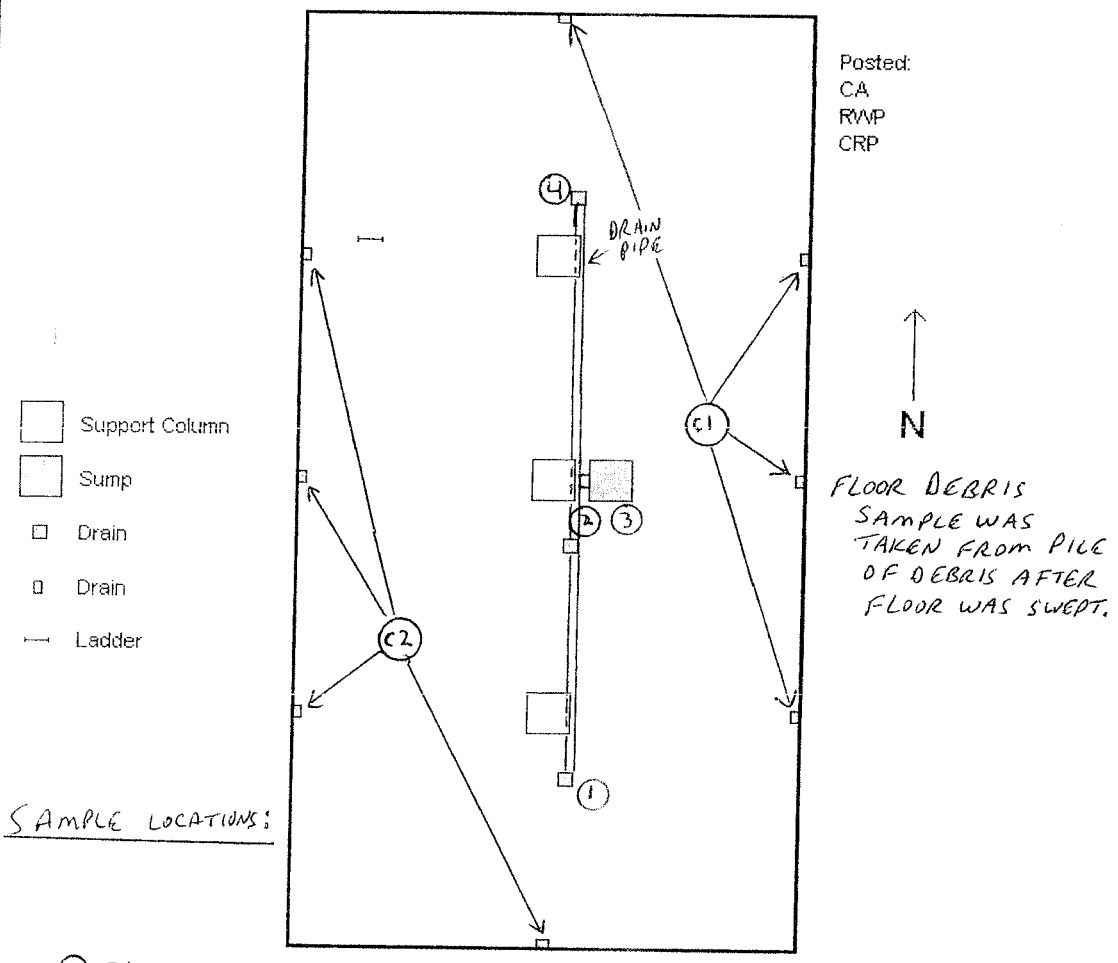
HRA CHARACTERIZATION SAMPLE LOCATIONS.



FLOOR DEBRIS SAMPLE WAS TAKEN FROM PILE OF DEBRIS AFTER FLOOR WAS SWEPT.

SAMPLE LOCATIONS:

1. 7/14/05 CONCRETE PIECES
2. 7/14/05 PIPE DEBRIS
3. 7/20/05 CONCRETE PIECES
4. 7/20/05 CONCRETE PIECES

C1. 7/19/05 FLOOR DRAIN SEDIMENT COMPOSITE SAMPLE.

C2. 7/19/05 FLOOR DRAIN SEDIMENT COMPOSITE SAMPLE.

Legend
- xxxx - Radiological boundary
- x-x-x- Contaminated area
- # - General area dose rate
- *Contact/30cm dose rates
- O - Smear location
- LAS - Large area smear
- # - Direct frisk
- A/S - Air sampler location

Performed by: (print/sign/date) N/A

Reviewed by: (sign/date) N/A

MAP FOR ILLUSTRATIVE PURPOSES ONLY

Field Chain of Custody Record

MWH Constructors

Project Name: PBRF	**Project Number:** 2440040
Send report To: MWH Constructors	**Sampler (Print Name):** J. Sorg
Address: ATTN: Bruce X. Mann	**Sampler (Print Name):** R. Fowler
6100 Columbus Avenue	**Shipment Method:** Federal Express
Sandusky, OH 44870	**Airbill Number:**
Phone: (419) 609-4826	**Laboratory Receiving:** Eberline Services Lab
Fax: (419) 627-1619	**Survey Package #** C1155 101C1

Chain Of Custody # 05-255-OFF

Laboratory Information:
Eberline Services Lab
601 Scarboro Road
Oak Ridge, TN 37830
Contacts: Kathy Shaulis/Mike McDougall
(865)481-0683
Purchase Order # 4013BOAWO0015

Analysis Requested

Field Sample ID	Sample #	Sample Date	Sample Time	Sample Matrix	Number of Containers	10 CFR 61 Analysis (See Attached DMDS)	Gamma Spectroscopy		Gross Alpha/Beta Air Sample			IAW Attachment 1	See Note below	Comments, Special Instructions, etc.	Lab Sample ID (To Be completed by Lab)
CS050823-011 C1155 10" C1 MI1G1 L04 2 2	1	7/14/05	1015	Concrete Pieces	1		X					X		Transferred from 05-217-ON CS050714-004	
CS050823-012 C1155 10" C1 MI1R1 L04 3 2	2	7/14/05	1530	Pipe Debris	1		X					X		Transferred from 05-218-ON CS050714-007	

N/A

COPY

Relinquished by: (print/initials)	Received By: (print/initials)	Date:	Time:
J. SORG / JB	EBERLINE	8-23-05	1100

Sample Custodian Remarks (Completed by Laboratory)

QA/QC Level	Turnaround	Sample Receipt	
Level I ☐	Routine ☐	Total # Containers Received?	
Level II ☐	24 Hour ☐	COC Seals Present?	
Level III ☐	1 Week ☐	COC Seals Intact?	
Other ☐	Other _____	Received Containers Intact?	
		Temperature?	

Final Sample Disposition	Date:	Time:	Disposition: Analysis type- IAW 4013BOAWO0015. The sample shall be retained by the Eberline Services Lab until MWH Constructors acceptance of analysis results. Upon acceptance of results, the original Chain of Custody will be returned to MWH Constructors with the sample analysis results and the sample will be disposed by the Lab.

Field Chain of Custody Record

PBRF-TBD-07-001, Rev. 0 MWH Constructors

Project Name: NASA PBRF Decommissioning	**Project Number:** 7011089
Send report To: MWH Constructors	**Sampler (Print Name):** Sorg
Address: On-Site	**Sampler (Print Name):** Stock
	Shipment Method: NA
	Airbill Number: NA
Phone: X 4826 / 4840 / 4847 / 4890	**Laboratory Receiving:** On-Site Lab (Trailer 9)
Fax: (419) 627-1619	**Survey Package #** C1155 101C1

Chain Of Custody # 05-217-ON

*NOTE: All samples are retained in on-site storage unless otherwise noted. This Chain Of Custody record will be kept with the applicable sample(s).

Analysis Requested

Field Sample ID	Sample #	Sample Date	Sample Time	Sample Matrix	Number of Containers	10 CFR 61 Analysis (See Attached DMDS)	Gamma Spectroscopy	Gross Alpha/Beta Smears	Gross Alpha/Beta Air Sample	H3 Smears	H3 Water			Comments, Special Instructions, etc.	Lab Sample ID (To Be completed by Lab)
CS050714-003 C1155 101C1 MI1G1 L04 2 1	1	7/14/05	1015	Concrete Pieces	1		X								05-01996
CS050714-004 C1155 101C1 MI1G1 L04 2 2	2	7/14/05	1015	Concrete Pieces	1		X								05-01997
CS050714-005 C1155 101C1 MI1G1 L04 2 3	3	7/14/05	1015	Concrete Pieces	1		X								05-01998

COPY

Relinquished by: (print/initials)	Received By: (print/initials)	Date:	Time:
J. SORG / JS	J. Ryp [signature]	7-15-05	1047
A. Huff / [signature]	M Stock / [signature]	7-18-05	0800

Sample Custodian Remarks (Completed by Laboratory)

QA/QC Level	Turnaround	Sample Receipt	
Level I ☐	Routine ☐	Total # Containers Received?	
Level II ☐	24 Hour ☐	COC Seals Present?	
Level III ☐	1 Week ☐	COC Seals Intact?	
Other ☐	Other _____	Received Containers Intact?	
		Temperature?	

Final Sample Disposition	Date:	Time:	Disposition:

Field Chain of Custody Record

PBRF-TBD-07-001, Rev. 0

MWH Constructors

Project Name: NASA PBRF Decommissioning	**Project Number:** 7011089
Send report To: MWH Constructors	**Sampler (Print Name):** J. Sorg
Address: On-Site	**Sampler (Print Name):** M. Stock
	Shipment Method: NA
	Airbill Number: NA
Phone: X 4826 / 4840 / 4847 / 4890	**Laboratory Receiving:** On-Site Lab (Trailer 9)
Fax: (419) 627-1619	**Survey Package #** C1155 101C1

Chain Of Custody # 05-218-ON

*NOTE: All samples are retained in on-site storage unless otherwise noted. This Chain Of Custody record will be kept with the applicable sample(s).

Analysis Requested

Field Sample ID	Sample #	Sample Date	Sample Time	Sample Matrix	Number of Containers	10 CFR 61 Analysis (See Attached DMDS)	Gamma Spectroscopy	Gross Alpha/Beta Smears	Gross Alpha/Beta Air Sample	H3 Smears	H3 Water			Comments, Special Instructions, etc.	Lab Sample ID (To Be completed by Lab)
CS0507014-006 C1155 101C1 MI1R1 L04 3 1	1	7/14/05	1530	Pipe Debris	1		X								05-01992
CS0507014-007 C1155 101C1 MI1R1 L04 3 2	2	7/14/05	1530	Pipe Debris	1		X								05-01993

N

A

COPY

Relinquished by: (print/initials)	Received By: (print/initials)	Date:	Time:
J. SORG / JS	J. Rupp / [signature]	7/15/05	1047
Alicia Huff / [signature]	M STOCK / [signature]	7-18-05	0800

Sample Custodian Remarks (Completed by Laboratory)

QA/QC Level	Turnaround	Sample Receipt	
Level I ☐	Routine ☐	Total # Containers Received?	
Level II ☐	24 Hour ☐	COC Seals Present?	
Level III ☐	1 Week ☐	COC Seals Intact?	
Other ☐	Other _____	Received Containers Intact?	
		Temperature?	

Final Sample Disposition	Date:	Time:	Disposition:

05-08120

Attachment 1
Sample Analysis Instructions for Eberline Services Lab
Work Order # BOA 4013WO 015
Survey Packages: C1155 101 C1 & C1154 101C2
Hot Retention Area and Cold Retention Basin

1. One sediment sample and one concrete sample were removed from the Hot Retention Area. The net sample weights are provided below.

   Sample # CS050714-007, Pipe Sediment, 585.8 grams
   Sample # CS050714-004, Pulverized Concrete, 259.7 grams

   NOTE: Each sample is listed on Chain of Custody Form 05-255-OFF.

2. One core bore sample and one debris sample were removed from the North Cold Retention Basin. The net sample weights are provided below.

   Sample # CS050816-015, Floor Core, Top Section, 92.0 grams
   Sample # CS050809-001, Floor Debris, 416.4 grams

   NOTE: Each sample is listed on Chain of Custody Form 05-256-OFF.

3. The following analyses shall be performed:

   a. Gamma Spectroscopy (Count time shall be sufficient to achieve MDA of $\leq$0.1 pci/g Co-60).
   b. Tritium
   c. C-14
   d. Sr-90
   e. Fe-55
   f. Ni-63
   g. U-Isotopic

   Requested turn around time is 7 days.

4. All samples shall be retained by Eberline Services Lab until MWH Constructors acceptance of analysis results. Upon acceptance of results, the original Chain of Custody will be returned to MWH Constructors with the sample analysis results at the following address:

   ATTN: Bruce Mann / Robert Massengill
   6100 Columbus Avenue
   Sandusky, OH 44870

   All samples will be disposed of by the Eberline Services Lab.

   Direct questions related to processing of these samples to:

   Bruce Mann 419-609-4888
   Robert Massengill 419-609-4831

RECEIVED
AUG 25 2005
Eberline
LAB

007

EBERLINE SERVICES

Oak Ridge Laboratory
601 Scarboro Road
Oak Ridge, TN 37830
Phone (865) 481-0683
Fax (865) 483-4621

EBS-OR-22931

September 13, 2005

Bruce Mann
Plumbrook Station Decommissioning Project
6100 Columbus Avenue
Sandusky, OH 44870

CASE NARRATIVE
Work Order # 05-08120-OR

SAMPLE RECEIPT

This work order contains four solid samples received 08/25/05. All samples were analyzed for Isotopic Uranium, Strontium-90, Tritium, Carbon-14, Nickel-63, Iron-55 by Gamma LEPS and by Gamma Spectroscopy.

CLIENT ID	LAB ID	CLIENT ID	LAB ID
CS050823-011	05-08120-04	CS050823-013	05-08120-06
CS050823-012	05-08120-05	CS050823-014	05-08120-07

ANALYTICAL METHODS

Isotopic Uranium was analyzed using Method EML U-02 Modified. Strontium-90 was analyzed using EIChroM Method SRW01 Modified. Tritium was performed by beta liquid scintillation using Method LANL ER-210 Modified. Carbon-14 was performed using EPA Method 520.0 Modified. Nickel-63 was performed using Method ASTM 3500-Ni Modified. Gamma Spectroscopy and Gamma LEPS were performed using Method LANL ER-130 Modified.

ANALYTICAL RESULTS

ISOTOPIC URANIUM

Samples were prepared by removing a representative aliquot from each sample followed by mixed acid digestions and dilutions as appropriate. An aliquot was taken from this dilution and Uranium was selectively extracted by ion exchange. Uranium was eluted, micro-precipitated and mounted on micro-porous filter media. Sample activities were then determined by alpha spectroscopy using energy specific regions of interest for Uranium-234, Uranium-235 and Uranium-238. Chemical recovery was determined by the use of a Uranium-232 tracer. Activity of the Uranium-232 tracer was determined by alpha spectroscopy using an energy specific region of interest.

Samples demonstrated background equivalent results for Uranium-234, Uranium-235 and Uranium-238 activity. Chemical recovery was acceptable for all samples. Results for the Uranium-234, Uranium-235 and Uranium-238 method blank demonstrated background equivalent activity. Results for the Uranium-234 and Uranium-238 replicate demonstrated an acceptable relative percent difference and normalized difference. Results for the Uranium-235 replicate demonstrated a high relative percent difference;

ANALYTICAL RESULTS CONTINUED

ISOTOPIC URANIUM CONTINUED

however, normalized difference is within acceptable limits for the analytical technique. Results for the Uranium-234 and Uranium-238 laboratory control sample demonstrated an acceptable percent recovery. Results for the Uranium-235 laboratory control sample demonstrated a high percent recovery; however, normalized difference is within acceptable limits for the analytical technique.

STRONTIUM-90

Samples were prepared by acid digestions and dilutions as appropriate for the matrix. Chemical separations were conducted using EIChroM stabilized chemical resins. Subsequent extractions of Strontium-90 were conducted and Yttrium-90 was allowed to reach radioactive equilibrium. The Yttrium-90 fraction of each sample was selectively eluted onto a steel planchet and evaporated to dryness. Chemical recovery was determined by use of a stable Strontium carrier. Sample activities were determined by gas flow proportional counting. Sample results were corrected for Yttrium-90 decay after elution.

Samples demonstrated non-detect equivalent results for Strontium-90 activity. Chemical recovery was acceptable for all samples. Results for the Strontium-90 method blank demonstrated non-detect equivalent activity. Results for the Strontium-90 replicate demonstrated a high relative percent difference; however, normalized difference is within acceptable limits for the analytical technique. Results for the Strontium-90 laboratory control sample demonstrated an acceptable percent recovery.

TRITIUM

A representative aliquot of each sample was oxidized using a Harvey Oxidizer. Tritium was captured during oxidization in a selective scintillation cocktail. Samples were then counted by beta liquid scintillation. A matrix-spiked sample was used to determine chemical recovery and instrument efficiency.

Samples demonstrated non-detect equivalent to slightly positive results for Tritium activity. Results for the Tritium method blank demonstrated non-detect equivalent activity. Results for the Tritium replicate demonstrated an acceptable relative percent difference and normalized difference. Results for the Tritium laboratory control sample demonstrated an acceptable percent recovery.

CARBON-14

An aliquot from each sample, as received, was high temperature oxidized using a Harvey Oxidizer. Carbon-14 emissions from the oxidization process were selectively extracted into scintillation cocktail. Samples were then counted by beta liquid scintillation using energy specific windows to encompass Carbon-14 energies emitted. Samples were then spiked with a NIST traceable Carbon-14 standard and recounted for efficiency determinations.

Samples demonstrated non-detect equivalent to slightly positive results for Carbon-14 activity. Results for the Carbon-14 method blank demonstrated non-detect equivalent activity. Results for the Carbon-14 replicate demonstrated a high relative percent difference and normalized difference. Due to the fact that Carbon-14 samples are analyzed on an "as received" basis, samples may be slightly heterogeneous. This

ANALYTICAL RESULTS CONTINUED

CARBON-14 CONTINUED

can and does cause slight differences in Carbon-14 results. In these instances, the mean of replicated results, plus or minus the population standard deviation at 3-sigma, is generally the most appropriate value in these cases. Results for the Carbon-14 laboratory control sample demonstrated an acceptable percent recovery.

NICKEL-63

A representative aliquot of each sample was digested in mixed acids followed by dilution. An aliquot from this dilution was placed into an appropriately sized beaker. Stable elemental Nickel carrier was added to each sample prior to digestion. Samples were digested in concentrated nitric acid. After digestion, sample pH was adjusted. Nickel-63 was precipitated selectively with Dimethylglyoxime. Precipitates were selectively separated, redissolved and residual acid was effectively neutralized. Sample residuals were placed into scintillation vials, scintillation cocktail was added and Nickel-63 activity was determined by beta liquid scintillation.

Samples demonstrated non-detect equivalent to slightly positive results for Nickel-63 activity. Results for the Nickel-63 method blank demonstrated non-detect equivalent activity. Results for the Nickel-63 replicate demonstrated a high relative percent difference; however, normalized difference is within acceptable limits for the analytical technique. Results for the Nickel-63 laboratory control sample demonstrated a high percent recovery.

IRON-55 (LEPS)

A representative aliquot from each sample was placed into a Petri geometry container. Samples were then counted on a planar, low energy photon spectroscopy (LEPS) detector.

Samples demonstrated non-detect equivalent results for Iron-55 activity. Results for the Iron-55 method blank demonstrated non-detect equivalent activity. Results for the Iron-55 replicate demonstrated a high relative percent difference; however, normalized difference is within acceptable limits for the analytical technique. Results for the Americium-241 and Cobalt-57 laboratory control sample demonstrated an acceptable percent recovery.

GAMMA SPECTROSCOPY

Samples for Gamma Spectroscopy analysis were prepared by transferring a known mass/aliquot of each prepared and homogenized sample to a standard geometry container. Samples were counted on High Purity Germanium (HPGe) gamma ray detectors.

Samples demonstrated slightly positive results for Silver-108m (sample fraction -06 [Client ID: CS050823-013] only), Cobalt-60 and Cesium-137 activity. Samples demonstrated non-detect or background equivalent to slightly positive results for Europium-152, Europium-154 and Potassium-40 activity. Samples demonstrated non-detect equivalent results for Europium-155, Niobium-94 and Antimony-125 activity. In some instances detection limits are slightly high. This is directly related to the positive nature of some samples and subsequent Compton effects. Results for the method blank

ANALYTICAL RESULTS CONTINUED

GAMMA SPECTROSCOPY CONTINUED

demonstrated non-detect or background equivalent activity for all gamma-emitting radionuclides as reported. Results for the Cobalt-60, Cesium-137 and Potassium-40 replicate demonstrated an acceptable relative percent difference and normalized difference. Results for the Cobalt-60 and Cesium-137 laboratory control sample demonstrated an acceptable percent recovery.

CERTIFICATION OF ACCURACY

I certify that this data report is in compliance with the terms and conditions of the Purchase Order, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the cognizant project manager or his/her designee to be accurate as verified by the following signature.

M.R. McDougall
Laboratory Manager

Date: 9/13/2005

Printed: 9/21/2005 6:27 PM

Eberline Services
Final Report of Analysis

Report To:	
Bruce Mann	
MWH Constructors	
6100 Columbus Avenue	
Sandusky, OH 44870	

Work Order Details:	
SDG:	05-08120
Purchase Order:	BOA4013WO015
Analysis Category:	ENVIRONMENTAL
Sample Matrix:	SO

Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	TPU	MDA	Report Units
05-08120-01	LCS	KNOWN	08/25/05 00:00	8/25/2005	9/2/2005	05-08120	Nickel-63	ASTM 3500-Ni Modified	2.95E+03	1.21E+02			pCi/g
05-08120-01	LCS	SPIKE	08/25/05 00:00	8/25/2005	9/2/2005	05-08120	Nickel-63	ASTM 3500-Ni Modified	3.97E+03	3.09E+01	5.05E+02	6.92E+00	pCi/g
05-08120-02	MBL	BLANK	08/25/05 00:00	8/25/2005	9/2/2005	05-08120	Nickel-63	ASTM 3500-Ni Modified	2.38E-01	3.70E+00	3.70E+00	6.36E+00	pCi/g
05-08120-03	DUP	CS050823-011	07/14/05 10:15	8/25/2005	9/2/2005	05-08120	Nickel-63	ASTM 3500-Ni Modified	2.46E-01	3.82E+00	3.82E+00	6.55E+00	pCi/g
05-08120-04	DO	CS050823-011	07/14/05 10:15	8/25/2005	9/2/2005	05-08120	Nickel-63	ASTM 3500-Ni Modified	6.58E-01	3.59E+00	3.59E+00	6.14E+00	pCi/g
05-08120-05	TRG	CS050823-012	07/14/05 15:30	8/25/2005	9/2/2005	05-08120	Nickel-63	ASTM 3500-Ni Modified	9.22E+00	3.97E+00	4.14E+00	6.38E+00	pCi/g
05-08120-06	TRG	CS050823-013	08/09/05 13:15	8/25/2005	9/2/2005	05-08120	Nickel-63	ASTM 3500-Ni Modified	1.75E+02	7.39E+00	2.34E+01	6.63E+00	pCi/g
05-08120-07	TRG	CS050823-014	08/16/05 09:44	8/25/2005	9/2/2005	05-08120	Nickel-63	ASTM 3500-Ni Modified	2.39E+01	5.35E+00	6.15E+00	8.08E+00	pCi/g
05-08120-01	LCS	KNOWN	08/25/05 00:00	8/25/2005	9/1/2005	05-08120	Strontium-90	ElChroM SRW01 Modified	4.81E+01	2.70E-01			pCi/g
05-08120-01	LCS	SPIKE	08/25/05 00:00	8/25/2005	9/1/2005	05-08120	Strontium-90	ElChroM SRW01 Modified	4.18E+01	1.59E+00	5.86E+00	3.75E-01	pCi/g
05-08120-02	MBL	BLANK	08/25/05 00:00	8/25/2005	9/1/2005	05-08120	Strontium-90	ElChroM SRW01 Modified	2.53E-01	5.29E-01	5.30E-01	4.63E-01	pCi/g
05-08120-03	DUP	CS050823-013	08/09/05 13:15	8/25/2005	9/1/2005	05-08120	Strontium-90	ElChroM SRW01 Modified	5.18E-01	5.30E-01	5.35E-01	4.52E-01	pCi/g
05-08120-04	TRG	CS050823-011	07/14/05 10:15	8/25/2005	9/1/2005	05-08120	Strontium-90	ElChroM SRW01 Modified	9.78E-01	5.33E-01	5.49E-01	4.31E-01	pCi/g
05-08120-05	TRG	CS050823-012	07/14/05 15:30	8/25/2005	9/1/2005	05-08120	Strontium-90	ElChroM SRW01 Modified	1.96E+01	1.15E+00	2.88E+00	4.47E-01	pCi/g
05-08120-06	DO	CS050823-013	08/09/05 13:15	8/25/2005	9/1/2005	05-08120	Strontium-90	ElChroM SRW01 Modified	5.77E-02	6.06E-01	6.06E-01	5.38E-01	pCi/g
05-08120-07	TRG	CS050823-014	08/16/05 09:44	8/25/2005	9/1/2005	05-08120	Strontium-90	ElChroM SRW01 Modified	2.63E+00	6.11E-01	7.06E-01	4.29E-01	pCi/g
05-08120-01	LCS	KNOWN	08/25/05 00:00	8/25/2005	8/30/2005	05-08120	Uranium-234	EML U-02 Modified	8.02E+00	2.89E-01			pCi/g
05-08120-01	LCS	SPIKE	08/25/05 00:00	8/25/2005	8/30/2005	05-08120	Uranium-234	EML U-02 Modified	9.00E+00	1.57E+00	1.67E+00	7.60E-02	pCi/g
05-08120-02	MBL	BLANK	08/25/05 00:00	8/25/2005	8/30/2005	05-08120	Uranium-234	EML U-02 Modified	1.76E-01	1.07E-01	1.07E-01	6.88E-02	pCi/g
05-08120-03	DUP	CS050823-011	07/14/05 10:15	8/25/2005	8/30/2005	05-08120	Uranium-234	EML U-02 Modified	7.02E-01	2.29E-01	2.33E-01	6.79E-02	pCi/g
05-08120-04	DO	CS050823-011	07/14/05 10:15	8/25/2005	8/30/2005	05-08120	Uranium-234	EML U-02 Modified	8.26E-01	2.65E-01	2.71E-01	8.84E-02	pCi/g
05-08120-05	TRG	CS050823-012	07/14/05 15:30	8/25/2005	8/30/2005	05-08120	Uranium-234	EML U-02 Modified	3.23E-01	1.49E-01	1.50E-01	4.16E-02	pCi/g
05-08120-06	TRG	CS050823-013	08/09/05 13:15	8/25/2005	8/30/2005	05-08120	Uranium-234	EML U-02 Modified	5.99E-01	2.03E-01	2.07E-01	3.78E-02	pCi/g
05-08120-07	TRG	CS050823-014	08/16/05 09:44	8/25/2005	8/30/2005	05-08120	Uranium-234	EML U-02 Modified	7.74E-01	2.33E-01	2.38E-01	3.62E-02	pCi/g
05-08120-01	LCS	KNOWN	08/25/05 00:00	8/25/2005	8/30/2005	05-08120	Uranium-235	EML U-02 Modified	3.64E-01	1.31E-02			pCi/g
05-08120-01	LCS	SPIKE	08/25/05 00:00	8/25/2005	8/30/2005	05-08120	Uranium-235	EML U-02 Modified	4.86E-01	2.12E-01	2.14E-01	5.49E-02	pCi/g
05-08120-02	MBL	BLANK	08/25/05 00:00	8/25/2005	8/30/2005	05-08120	Uranium-235	EML U-02 Modified	8.24E-02	8.37E-02	8.39E-02	1.11E-01	pCi/g
05-08120-03	DUP	CS050823-011	07/14/05 10:15	8/25/2005	8/30/2005	05-08120	Uranium-235	EML U-02 Modified	5.12E-02	6.34E-02	6.35E-02	8.37E-02	pCi/g
05-08120-04	DO	CS050823-011	07/14/05 10:15	8/25/2005	8/30/2005	05-08120	Uranium-235	EML U-02 Modified	1.21E-01	1.00E-01	1.01E-01	5.45E-02	pCi/g

CU=Counting Uncertainty;TPU=Total Propagated Uncertainty;MDA=Minimal Detected Activity;LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original

Printed: 9/21/2005 6:27 PM

Eberline Services
Final Report of Analysis

Report To:
Bruce Mann
MWH Constructors
6100 Columbus Avenue
Sandusky, OH 44870

Work Order Details:
SDG: 05-08120
Purchase Order: BOA4013WO015
Analysis Category: ENVIRONMENTAL
Sample Matrix: SO

Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	TPU	MDA	Report Units
05-08120-05	TRG	CS050823-012	07/14/05 15:30	8/25/2005	8/30/2005	05-08120	Uranium-235	EML U-02 Modified	1.89E-02	3.80E-02	3.80E-02	5.13E-02	pCi/g
05-08120-06	TRG	CS050823-013	08/09/05 13:15	8/25/2005	8/30/2005	05-08120	Uranium-235	EML U-02 Modified	0.00E+00	0.00E+00	0.00E+00	4.66E-02	pCi/g
05-08120-07	TRG	CS050823-014	08/16/05 09:44	8/25/2005	8/30/2005	05-08120	Uranium-235	EML U-02 Modified	4.66E-02	5.77E-02	5.78E-02	7.62E-02	pCi/g
05-08120-01	LCS	KNOWN	08/25/05 00:00	8/25/2005	8/30/2005	05-08120	Uranium-238	EML U-02 Modified	7.81E+00	2.81E-01			pCi/g
05-08120-01	LCS	SPIKE	08/25/05 00:00	8/25/2005	8/30/2005	05-08120	Uranium-238	EML U-02 Modified	9.21E+00	1.60E+00	1.71E+00	4.43E-02	pCi/g
05-08120-02	MBL	BLANK	08/25/05 00:00	8/25/2005	8/30/2005	05-08120	Uranium-238	EML U-02 Modified	6.65E-02	6.76E-02	6.77E-02	8.93E-02	pCi/g
05-08120-03	DUP	CS050823-011	07/14/05 10:15	8/25/2005	8/30/2005	05-08120	Uranium-238	EML U-02 Modified	5.38E-01	1.95E-01	1.98E-01	6.76E-02	pCi/g
05-08120-04	DO	CS050823-011	07/14/05 10:15	8/25/2005	8/30/2005	05-08120	Uranium-238	EML U-02 Modified	5.33E-01	2.04E-01	2.07E-01	7.51E-02	pCi/g
05-08120-05	TRG	CS050823-012	07/14/05 15:30	8/25/2005	8/30/2005	05-08120	Uranium-238	EML U-02 Modified	2.14E-01	1.19E-01	1.20E-01	4.14E-02	pCi/g
05-08120-06	TRG	CS050823-013	08/09/05 13:15	8/25/2005	8/30/2005	05-08120	Uranium-238	EML U-02 Modified	4.58E-01	1.73E-01	1.76E-01	3.76E-02	pCi/g
05-08120-07	TRG	CS050823-014	08/16/05 09:44	8/25/2005	8/30/2005	05-08120	Uranium-238	EML U-02 Modified	4.39E-01	1.66E-01	1.68E-01	3.60E-02	pCi/g
05-08120-01	LCS	KNOWN	08/25/05 00:00	8/25/2005	8/28/2005	05-08120	Carbon-14	EPA 520.0 Modified	3.65E+02	1.02E+01			pCi/g
05-08120-01	LCS	SPIKE	08/25/05 00:00	8/25/2005	8/28/2005	05-08120	Carbon-14	EPA 520.0 Modified	3.46E+02	6.58E+00	1.53E+01	3.53E+00	pCi/g
05-08120-02	MBL	BLANK	08/25/05 00:00	8/25/2005	8/28/2005	05-08120	Carbon-14	EPA 520.0 Modified	9.82E-01	2.04E+00	2.04E+00	3.45E+00	pCi/g
05-08120-03	DUP	CS050823-011	07/14/05 10:15	8/25/2005	8/28/2005	05-08120	Carbon-14	EPA 520.0 Modified	8.18E+00	1.93E+00	1.96E+00	2.95E+00	pCi/g
05-08120-04	DO	CS050823-011	07/14/05 10:15	8/25/2005	8/28/2005	05-08120	Carbon-14	EPA 520.0 Modified	3.00E+00	1.76E+00	1.76E+00	2.88E+00	pCi/g
05-08120-05	TRG	CS050823-012	07/14/05 15:30	8/25/2005	8/28/2005	05-08120	Carbon-14	EPA 520.0 Modified	2.52E+00	1.98E+00	1.99E+00	3.29E+00	pCi/g
05-08120-06	TRG	CS050823-013	08/09/05 13:15	8/25/2005	8/28/2005	05-08120	Carbon-14	EPA 520.0 Modified	9.79E+00	2.08E+00	2.12E+00	3.14E+00	pCi/g
05-08120-07	TRG	CS050823-014	08/16/05 09:44	8/25/2005	8/28/2005	05-08120	Carbon-14	EPA 520.0 Modified	2.65E+00	1.79E+00	1.79E+00	2.95E+00	pCi/g
05-08120-01	LCS	KNOWN	08/25/05 00:00	8/25/2005	8/28/2005	05-08120	Tritium	LANL ER-210 Modified	4.57E+02	1.64E+01			pCi/g
05-08120-01	LCS	SPIKE	08/25/05 00:00	8/25/2005	8/28/2005	05-08120	Tritium	LANL ER-210 Modified	4.58E+02	1.08E+01	4.94E+01	5.08E+00	pCi/g
05-08120-02	MBL	BLANK	08/25/05 00:00	8/25/2005	8/28/2005	05-08120	Tritium	LANL ER-210 Modified	5.49E+00	3.14E+00	3.19E+00	5.08E+00	pCi/g
05-08120-03	DUP	CS050823-011	07/14/05 10:15	8/25/2005	8/28/2005	05-08120	Tritium	LANL ER-210 Modified	6.33E+00	2.77E+00	2.85E+00	4.39E+00	pCi/g
05-08120-04	DO	CS050823-011	07/14/05 10:15	8/25/2005	8/28/2005	05-08120	Tritium	LANL ER-210 Modified	7.30E+00	2.61E+00	2.72E+00	4.05E+00	pCi/g
05-08120-05	TRG	CS050823-012	07/14/05 15:30	8/25/2005	8/28/2005	05-08120	Tritium	LANL ER-210 Modified	3.85E+00	3.23E+00	3.25E+00	5.34E+00	pCi/g
05-08120-06	TRG	CS050823-013	08/09/05 13:15	8/25/2005	8/28/2005	05-08120	Tritium	LANL ER-210 Modified	4.16E+01	4.24E+00	6.10E+00	5.02E+00	pCi/g
05-08120-07	TRG	CS050823-014	08/16/05 09:44	8/25/2005	8/28/2005	05-08120	Tritium	LANL ER-210 Modified	2.26E+02	6.65E+00	2.47E+01	3.78E+00	pCi/g
05-08120-01	LCS	KNOWN	08/25/05 00:00	8/25/2005	8/26/2005	05-08120	Americium-241	LANL ER-130 Modified	3.48E+03	1.15E+02			pCi/g

CU=Counting Uncertainty;TPU=Total Propagated Uncertainty;MDA=Minimal Detected Activity;LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original

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Eberline Services
Final Report of Analysis

Report To:
Bruce Mann
MWH Constructors
6100 Columbus Avenue
Sandusky, OH 44870

Work Order Details:
SDG: **05-08120**
Purchase Order: BOA4013WO015
Analysis Category: ENVIRONMENTAL
Sample Matrix: SO

Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	TPU	MDA	Report Units
05-08120-01	LCS	KNOWN	08/25/05 00:00	8/25/2005	8/26/2005	05-08120	Cobalt-57	LANL ER-130 Modified	1.21E+03	5.10E+01			pCi/g
05-08120-01	LCS	SPIKE	08/25/05 00:00	8/25/2005	8/26/2005	05-08120	Americium-241	LANL ER-130 Modified	3.69E+03	2.68E+02	2.76E+02	4.94E+00	pCi/g
05-08120-01	LCS	SPIKE	08/25/05 00:00	8/25/2005	8/26/2005	05-08120	Cobalt-57	LANL ER-130 Modified	1.26E+03	9.67E+01	9.95E+01	6.38E+00	pCi/g
05-08120-02	MBL	BLANK	08/25/05 00:00	8/25/2005	8/26/2005	05-08120	Iron-55	LANL ER-130 Modified	-4.69E-01	1.74E+00	1.74E+00	2.95E+00	pCi/g
05-08120-03	DUP	CS050823-011	07/14/05 10:15	8/25/2005	8/26/2005	05-08120	Iron-55	LANL ER-130 Modified	-6.93E-03	1.36E+00	1.36E+00	2.34E+00	pCi/g
05-08120-04	DO	CS050823-011	07/14/05 10:15	8/25/2005	8/26/2005	05-08120	Iron-55	LANL ER-130 Modified	-1.27E+00	1.32E+00	1.33E+00	2.08E+00	pCi/g
05-08120-05	TRG	CS050823-012	07/14/05 15:30	8/25/2005	8/26/2005	05-08120	Iron-55	LANL ER-130 Modified	-4.96E-01	1.33E+00	1.33E+00	2.20E+00	pCi/g
05-08120-06	TRG	CS050823-013	08/09/05 13:15	8/25/2005	8/26/2005	05-08120	Iron-55	LANL ER-130 Modified	3.90E-01	1.27E+00	1.27E+00	2.22E+00	pCi/g
05-08120-07	TRG	CS050823-014	08/16/05 09:44	8/25/2005	8/26/2005	05-08120	Iron-55	LANL ER-130 Modified	-4.98E-01	9.26E-01	9.30E-01	1.53E+00	pCi/g
05-08120-01	LCS	KNOWN	08/25/05 00:00	8/25/2005	8/25/2005	05-08120	Cobalt-60	LANL ER-130 Modified	2.55E+02	6.76E+00			pCi/g
05-08120-01	LCS	KNOWN	08/25/05 00:00	8/25/2005	8/25/2005	05-08120	Cesium-137	LANL ER-130 Modified	1.55E+02	4.64E+00			pCi/g
05-08120-01	LCS	SPIKE	08/25/05 00:00	8/25/2005	8/25/2005	05-08120	Cobalt-60	LANL ER-130 Modified	2.59E+02	1.36E+01	1.45E+01	8.62E-01	pCi/g
05-08120-01	LCS	SPIKE	08/25/05 00:00	8/25/2005	8/25/2005	05-08120	Cesium-137	LANL ER-130 Modified	1.58E+02	1.19E+01	1.23E+01	6.84E-01	pCi/g
05-08120-02	MBL	BLANK	08/25/05 00:00	8/25/2005	8/25/2005	05-08120	Cobalt-60	LANL ER-130 Modified	-5.72E-03	2.05E-02	2.05E-02	3.72E-02	pCi/g
05-08120-02	MBL	BLANK	08/25/05 00:00	8/25/2005	8/25/2005	05-08120	Cesium-137	LANL ER-130 Modified	1.27E-03	1.82E-02	1.82E-02	3.42E-02	pCi/g
05-08120-02	MBL	BLANK	08/25/05 00:00	8/25/2005	8/25/2005	05-08120	Europium-152	LANL ER-130 Modified	5.26E-02	9.87E-02	9.87E-02	2.26E-01	pCi/g
05-08120-02	MBL	BLANK	08/25/05 00:00	8/25/2005	8/25/2005	05-08120	Europium-154	LANL ER-130 Modified	1.85E-02	4.55E-02	4.55E-02	9.76E-02	pCi/g
05-08120-02	MBL	BLANK	08/25/05 00:00	8/25/2005	8/25/2005	05-08120	Europium-155	LANL ER-130 Modified	-3.54E-02	3.69E-02	3.69E-02	6.05E-02	pCi/g
05-08120-02	MBL	BLANK	08/25/05 00:00	8/25/2005	8/25/2005	05-08120	Niobium-94	LANL ER-130 Modified	9.33E-04	1.60E-02	1.60E-02	3.06E-02	pCi/g
05-08120-02	MBL	BLANK	08/25/05 00:00	8/25/2005	8/25/2005	05-08120	Antimony-125	LANL ER-130 Modified	1.49E-02	3.96E-02	3.96E-02	7.68E-02	pCi/g
05-08120-03	DUP	CS050823-011	07/14/05 10:15	8/25/2005	8/25/2005	05-08120	Bismuth-214	LANL ER-130 Modified	9.87E-01	2.03E-01	2.04E-01	2.41E-01	pCi/g
05-08120-03	DUP	CS050823-011	07/14/05 10:15	8/25/2005	8/25/2005	05-08120	Cobalt-60	LANL ER-130 Modified	1.33E+00	1.45E-01	1.47E-01	1.07E-01	pCi/g
05-08120-03	DUP	CS050823-011	07/14/05 10:15	8/25/2005	8/25/2005	05-08120	Cesium-137	LANL ER-130 Modified	1.83E+01	1.52E+00	1.56E+00	1.18E-01	pCi/g
05-08120-03	DUP	CS050823-011	07/14/05 10:15	8/25/2005	8/25/2005	05-08120	Europium-152	LANL ER-130 Modified	-1.54E-01	3.67E-01	3.67E-01	6.64E-01	pCi/g
05-08120-03	DUP	CS050823-011	07/14/05 10:15	8/25/2005	8/25/2005	05-08120	Europium-154	LANL ER-130 Modified	-3.51E-02	1.44E-01	1.44E-01	2.71E-01	pCi/g
05-08120-03	DUP	CS050823-011	07/14/05 10:15	8/25/2005	8/25/2005	05-08120	Europium-155	LANL ER-130 Modified	2.08E-01	1.32E-01	1.32E-01	2.24E-01	pCi/g
05-08120-03	DUP	CS050823-011	07/14/05 10:15	8/25/2005	8/25/2005	05-08120	Potassium-40	LANL ER-130 Modified	5.32E+00	1.29E+00	1.29E+00	6.70E-01	pCi/g
05-08120-03	DUP	CS050823-011	07/14/05 10:15	8/25/2005	8/25/2005	05-08120	Niobium-94	LANL ER-130 Modified	-2.57E-02	6.28E-02	6.28E-02	1.06E-01	pCi/g
05-08120-03	DUP	CS050823-011	07/14/05 10:15	8/25/2005	8/25/2005	05-08120	Lead-214	LANL ER-130 Modified	1.00E+00	4.18E-01	4.18E-01	3.09E-01	pCi/g

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Eberline Services
Final Report of Analysis

Report To:
Bruce Mann
MWH Constructors
6100 Columbus Avenue
Sandusky, OH 44870

Work Order Details:
SDG: 05-08120
Purchase Order: BOA4013WO015
Analysis Category: ENVIRONMENTAL
Sample Matrix: SO

Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	TPU	MDA	Report Units
05-08120-03	DUP	CS050823-011	07/14/05 10:15	8/25/2005	8/25/2005	05-08120	Antimony-125	LANL ER-130 Modified	-2.88E-02	2.92E-01	2.92E-01	5.13E-01	pCi/g
05-08120-04	DO	CS050823-011	07/14/05 10:15	8/25/2005	8/25/2005	05-08120	Bismuth-214	LANL ER-130 Modified	9.26E-01	2.03E-01	2.03E-01	2.36E-01	pCi/g
05-08120-04	DO	CS050823-011	07/14/05 10:15	8/25/2005	8/25/2005	05-08120	Cobalt-60	LANL ER-130 Modified	1.32E+00	1.37E-01	1.39E-01	1.12E-01	pCi/g
05-08120-04	DO	CS050823-011	07/14/05 10:15	8/25/2005	8/25/2005	05-08120	Cesium-137	LANL ER-130 Modified	1.88E+01	1.56E+00	1.60E+00	1.21E-01	pCi/g
05-08120-04	DO	CS050823-011	07/14/05 10:15	8/25/2005	8/25/2005	05-08120	Europium-152	LANL ER-130 Modified	1.84E-01	3.52E-01	3.52E-01	7.38E-01	pCi/g
05-08120-04	DO	CS050823-011	07/14/05 10:15	8/25/2005	8/25/2005	05-08120	Europium-154	LANL ER-130 Modified	5.72E-02	1.32E-01	1.32E-01	2.77E-01	pCi/g
05-08120-04	DO	CS050823-011	07/14/05 10:15	8/25/2005	8/25/2005	05-08120	Europium-155	LANL ER-130 Modified	2.60E-01	1.31E-01	1.31E-01	2.33E-01	pCi/g
05-08120-04	DO	CS050823-011	07/14/05 10:15	8/25/2005	8/25/2005	05-08120	Potassium-40	LANL ER-130 Modified	4.97E+00	1.16E+00	1.16E+00	8.27E-01	pCi/g
05-08120-04	DO	CS050823-011	07/14/05 10:15	8/25/2005	8/25/2005	05-08120	Niobium-94	LANL ER-130 Modified	7.52E-03	5.83E-02	5.83E-02	1.05E-01	pCi/g
05-08120-04	DO	CS050823-011	07/14/05 10:15	8/25/2005	8/25/2005	05-08120	Lead-214	LANL ER-130 Modified	1.18E+00	4.56E-01	4.57E-01	2.91E-01	pCi/g
05-08120-04	DO	CS050823-011	07/14/05 10:15	8/25/2005	8/25/2005	05-08120	Antimony-125	LANL ER-130 Modified	1.20E-01	2.86E-01	2.86E-01	5.11E-01	pCi/g
05-08120-05	TRG	CS050823-012	07/14/05 15:30	8/25/2005	8/25/2005	05-08120	Cobalt-60	LANL ER-130 Modified	1.34E+01	7.48E-01	7.88E-01	2.34E-01	pCi/g
05-08120-05	TRG	CS050823-012	07/14/05 15:30	8/25/2005	8/25/2005	05-08120	Cesium-137	LANL ER-130 Modified	1.87E+02	1.40E+01	1.44E+01	3.36E-01	pCi/g
05-08120-05	TRG	CS050823-012	07/14/05 15:30	8/25/2005	8/25/2005	05-08120	Europium-152	LANL ER-130 Modified	-2.57E-02	3.75E-01	3.75E-01	6.94E-01	pCi/g
05-08120-05	TRG	CS050823-012	07/14/05 15:30	8/25/2005	8/25/2005	05-08120	Europium-154	LANL ER-130 Modified	2.55E-02	2.39E-01	2.39E-01	4.30E-01	pCi/g
05-08120-05	TRG	CS050823-012	07/14/05 15:30	8/25/2005	8/25/2005	05-08120	Europium-155	LANL ER-130 Modified	3.77E-01	4.27E-01	4.27E-01	5.72E-01	pCi/g
05-08120-05	TRG	CS050823-012	07/14/05 15:30	8/25/2005	8/25/2005	05-08120	Potassium-40	LANL ER-130 Modified	2.54E+00	1.14E+00	1.14E+00	7.97E-01	pCi/g
05-08120-05	TRG	CS050823-012	07/14/05 15:30	8/25/2005	8/25/2005	05-08120	Niobium-94	LANL ER-130 Modified	1.43E-01	1.60E-01	1.60E-01	2.82E-01	pCi/g
05-08120-05	TRG	CS050823-012	07/14/05 15:30	8/25/2005	8/25/2005	05-08120	Antimony-125	LANL ER-130 Modified	-4.31E-01	9.75E-01	9.75E-01	1.66E+00	pCi/g
05-08120-06	TRG	CS050823-013	08/09/05 13:15	8/25/2005	8/25/2005	05-08120	Silver-108m	LANL ER-130 Modified	1.85E+00	1.44E-01	1.48E-01	1.66E-01	pCi/g
05-08120-06	TRG	CS050823-013	08/09/05 13:15	8/25/2005	8/25/2005	05-08120	Cobalt-60	LANL ER-130 Modified	1.80E+01	9.90E-01	1.04E+00	1.45E-01	pCi/g
05-08120-06	TRG	CS050823-013	08/09/05 13:15	8/25/2005	8/25/2005	05-08120	Cesium-137	LANL ER-130 Modified	9.51E+00	7.75E-01	7.95E-01	1.65E-01	pCi/g
05-08120-06	TRG	CS050823-013	08/09/05 13:15	8/25/2005	8/25/2005	05-08120	Europium-152	LANL ER-130 Modified	3.04E+00	4.18E-01	4.22E-01	5.10E-01	pCi/g
05-08120-06	TRG	CS050823-013	08/09/05 13:15	8/25/2005	8/25/2005	05-08120	Europium-154	LANL ER-130 Modified	1.86E+00	7.46E-01	7.47E-01	3.34E-01	pCi/g
05-08120-06	TRG	CS050823-013	08/09/05 13:15	8/25/2005	8/25/2005	05-08120	Europium-155	LANL ER-130 Modified	6.60E-03	1.48E-01	1.48E-01	2.47E-01	pCi/g
05-08120-06	TRG	CS050823-013	08/09/05 13:15	8/25/2005	8/25/2005	05-08120	Potassium-40	LANL ER-130 Modified	3.40E-02	4.39E-01	4.39E-01	8.25E-01	pCi/g
05-08120-06	TRG	CS050823-013	08/09/05 13:15	8/25/2005	8/25/2005	05-08120	Niobium-94	LANL ER-130 Modified	1.59E-01	1.44E-01	1.44E-01	2.16E-01	pCi/g
05-08120-06	TRG	CS050823-013	08/09/05 13:15	8/25/2005	8/25/2005	05-08120	Antimony-125	LANL ER-130 Modified	1.80E-02	2.93E-01	2.93E-01	4.39E-01	pCi/g

CU=Counting Uncertainty;TPU=Total Propagated Uncertainty;MDA=Minimal Detected Activity;LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original

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Eberline Services
Final Report of Analysis

Report To:	
Bruce Mann	
MWH Constructors	
6100 Columbus Avenue	
Sandusky, OH 44870	

Work Order Details:	
SDG:	05-08120
Purchase Order:	BOA4013WO015
Analysis Category:	ENVIRONMENTAL
Sample Matrix:	SO

Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	TPU	MDA	Report Units
05-08120-07	TRG	CS050823-014	08/16/05 09:44	8/25/2005	8/25/2005	05-08120	Cobalt-60	LANL ER-130 Modified	7.42E+00	9.31E-01	9.41E-01	6.06E-01	pCi/g
05-08120-07	TRG	CS050823-014	08/16/05 09:44	8/25/2005	8/25/2005	05-08120	Cesium-137	LANL ER-130 Modified	3.35E+00	8.68E-01	8.70E-01	7.21E-01	pCi/g
05-08120-07	TRG	CS050823-014	08/16/05 09:44	8/25/2005	8/25/2005	05-08120	Europium-152	LANL ER-130 Modified	-7.19E-01	2.28E+00	2.28E+00	4.20E+00	pCi/g
05-08120-07	TRG	CS050823-014	08/16/05 09:44	8/25/2005	8/25/2005	05-08120	Europium-154	LANL ER-130 Modified	1.55E-01	7.14E-01	7.14E-01	1.56E+00	pCi/g
05-08120-07	TRG	CS050823-014	08/16/05 09:44	8/25/2005	8/25/2005	05-08120	Europium-155	LANL ER-130 Modified	9.03E-01	5.03E-01	5.03E-01	8.63E-01	pCi/g
05-08120-07	TRG	CS050823-014	08/16/05 09:44	8/25/2005	8/25/2005	05-08120	Potassium-40	LANL ER-130 Modified	2.72E+00	4.32E+00	4.32E+00	9.45E+00	pCi/g
05-08120-07	TRG	CS050823-014	08/16/05 09:44	8/25/2005	8/25/2005	05-08120	Niobium-94	LANL ER-130 Modified	-2.74E-01	4.35E-01	4.35E-01	7.39E-01	pCi/g
05-08120-07	TRG	CS050823-014	08/16/05 09:44	8/25/2005	8/25/2005	05-08120	Antimony-125	LANL ER-130 Modified	8.62E-02	8.98E-01	8.98E-01	1.66E+00	pCi/g

CU=Counting Uncertainty;TPU=Total Propagated Uncertainty;MDA=Minimal Detected Activity;LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original

	Hot Retention Area -6'0" Survey Point #2-2 (Concrete Pieces) C1155 101C1 MI1G1 L04 2 2 (CS050823-011)				Hot Retention Area -6'0" Survey Point #3-2 (Drain Pipe Debris) C1155 101C1 MI1R1 L04 3 2 (CS050823-012)			
	Result pCi/gm	**MDC pCi/gm**	**Used pCi/gm**	**Disribution %**	**Result pCi/gm**	**MDC pCi/gm**	**Used pCi/gm**	**Disribution %**
H-3	7.30E+00	4.05E+00	7.30E+00	24.88%	3.85E+00	5.34E+00	**5.34E+00**	2.37%
Cs-137	1.88E+01	1.21E-01	1.88E+01	64.07%	1.87E+02	3.36E-01	1.87E+02	82.85%
Co-60	1.32E+00	1.12E-01	1.32E+00	4.50%	1.34E+01	2.34E-01	1.34E+01	5.94%
Sr-90	9.78E-01	4.31E-01	9.78E-01	3.33%	1.96E+01	4.47E-01	1.96E+01	8.68%
U-234	8.26E-01	8.84E-02	8.26E-01	2.81%	3.23E-01	4.16E-02	3.23E-01	0.14%
U-235	1.21E-01	5.45E-02	1.21E-01	0.41%	1.89E-02	5.13E-02	**5.13E-02**	0.02%
	Cs/Co ratio=	1.42E+01	2.93E+01	100%	Cs/Co ratio=	1.40E+01	2.26E+02	100%

HOT RETENTION AREA

Hot Retention Area -6'0" ft
Survey Point #2-2 (Concrete Pieces)
C1155 101C1 MI1G1 L04 2 2 (CS050823-011)

ALPHA	DCGL (dpm/100cm²)	Results (pCi/gram)	MDA (pCi/gram)	Used (pCi/gram)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
U-234	**3.15E+04**	8.26E-01	8.84E-02	8.26E-01	2.81%	N/A	N/A
U-235	**2.71E+04**	1.21E-01	5.45E-02	1.21E-01	0.41%	N/A	N/A
BETA							
Cs-137	**4.05E+04**	1.88E+01	1.21E-01	1.88E+01	64.07%	1.00	2.47E-05
H-3	**9.10E+06**	7.30E+00	4.05E+00	7.30E+00	24.88%	0.39	4.27E-08
Co-60	**1.10E+04**	1.32E+00	1.12E-01	1.32E+00	4.50%	N/A	N/A
Sr-90	**3.31E+04**	9.78E-01	4.31E-01	9.78E-01	3.33%	N/A	N/A
Cs-137 to Co-60 ratio =		1.42E+01		2.93E+01	100.00%		

Adjusted Gross DCGL

ALPHA	DCGL (dpm/100cm²)	Nuclide Fraction	Alpha Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
U-234	**3.15E+04**	0.0281	0.872	8.94E-07		26,916.79	8.55E-01
U-235	**2.71E+04**	0.0041	0.128	1.52E-07		3,943.02	1.45E-01
		0.0323	1.000	1.05E-06		30860	1.00
			Adjusted Gross DCGL	**30860**	**dpm/100cm²**	**(alpha)**	

BETA	DCGL (dpm/100cm²)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
Cs-137	**4.04E+04**	0.6407	0.891	1.58E-05		30,591.66	7.57E-01
Co-60	**1.10E+04**	0.0450	0.063	4.09E-06		2,147.93	1.95E-01
Sr-90	**3.31E+04**	0.0333	0.046	1.01E-06		1,591.42	4.81E-02
		0.7190	1.000	2.09E-05		34331	1.00
			Adjusted Gross DCGL	**34331**	**dpm/100cm²**	**(beta)**	

Adjusted Gross DCGL (combined alpha plus beta)

	DCGL (dpm/100cm²)	Nuclide Fraction		Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
DCGL (alpha)	30860	0.0323		1.05E-06		1,103.90	3.58E-02
DCGL (beta)	34331	0.9677		2.82E-05		33,102.94	9.64E-01
		1.0000		2.92E-05		34207	1.00
			Adjusted Gross DCGL	**34207**	**dpm/100cm²**	**(alpha plus beta)**	

Hot Retention Area -6'0" ft
Survey Point #3-2 (Drain Pipe Debris)
C1155 101C1 MI1R1 L04 3 2 (CS050823-012)

ALPHA	DCGL (dpm/100cm²)	Results (pCi/gram)	MDA (pCi/gram)	Used (pCi/gram)	Nuclide Distribution	Ratio to Surrogate	Ratio/ DCGL
U-234	**3.15E+04**	3.23E-01	4.16E-02	3.23E-01	0.14%	N/A	N/A
U-235	**2.71E+04**	1.89E-02	5.13E-02	**5.13E-02**	0.02%	N/A	N/A
BETA							
Cs-137	**4.05E+04**	1.87E+02	3.36E-01	1.87E+02	82.85%	1.00	2.47E-05
H-3	**9.10E+06**	3.85E+00	5.34E+00	**5.34E+00**	2.37%	0.03	3.14E-09
Co-60	**1.10E+04**	1.34E+01	2.34E-01	1.34E+01	5.94%	N/A	N/A
Sr-90	**3.31E+04**	1.96E+01	4.47E-01	1.96E+01	8.68%	N/A	N/A
Cs-137 to Co-60 ratio =		1.40E+01		2.26E+02	100.00%		

Adjusted Gross DCGL

ALPHA	DCGL (dpm/100cm²)	Nuclide Fraction	Alpha Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
U-234	**3.15E+04**	0.0014	0.863	4.54E-08		26,591.02	8.44E-01
U-235	**2.71E+04**	0.0002	0.137	8.39E-09		4,223.28	1.56E-01
		0.0017	1.000	5.38E-08		30814	1.00
			Adjusted Gross DCGL	**30814**	**dpm/100cm²**	**(alpha)**	

BETA	DCGL (dpm/100cm²)	Nuclide Fraction	Beta Nuclide Fraction	Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
Cs-137	**4.05E+04**	0.8285	0.850	2.05E-05		29,090.58	7.18E-01
Co-60	**1.10E+04**	0.0594	0.061	5.40E-06		2,084.57	1.90E-01
Sr-90	**3.31E+04**	0.0868	0.089	2.62E-06		3,049.07	9.21E-02
		0.9747	1.000	2.85E-05		34224	1.00
			Adjusted Gross DCGL	**34224**	**dpm/100cm²**	**(beta)**	

Adjusted Gross DCGL (combined alpha plus beta)

	DCGL (dpm/100cm²)	Nuclide Fraction		Fraction/ DCGL		Unity Rule Check Gross*Fract	Fract/DCGL
DCGL (alpha)	30814	0.0017		5.38E-08		56.74	1.84E-03
DCGL (beta)	34224	0.9983		2.92E-05		34,161.19	9.98E-01
		1.0000		2.92E-05		34218	1.00
			Adjusted Gross DCGL	**34218**	**dpm/100cm²**	**(alpha plus beta)**	

APPENDIX J

Building Exterior Surfaces

(34 pages)

C1111 301C1 Reactor Building Roof and Exterior Walls
C1112 301C1 Hot Laboratory Roof and Exterior Walls
C1132 301C1 Fan House Roof and Exterior Walls
C1133 301C1 Waste Handling Building Exterior Walls
C1134 301C1 Primary Pump House Exterior Walls and Roof
C1134 301C2 Primary Pump House Exterior Walls
C1141 215C1 ROLB Roof and Exterior Walls

This Appendix contains the summary sheets from seven characterization survey packages performed to document the radiological status of the roofs and exterior wall surfaces of six buildings: Reactor Building, Hot Laboratory, Fan House, Waste Handling, Primary Pump House, and ROLB. The Primary Pump House survey was performed once when jib cranes and various other pieces of fixed equipment were still in place on the roof and again after all fixed equipment was removed from both outside and inside the building.

C1111 301C1
Reactor Building Roof and Exterior Walls
(5 pages)

NASA PBRF DECOMMISSIONING PROJECT

SANDUSKY, OHIO

Characterization Survey Unit Summary Report

Survey Package Number:	C1111 301C1	**Package Type:**	Structure
Survey Area Name:	Reactor Building (1111)		
Survey Unit Name:	Roof & Exterior Walls		

Survey Unit Description

The Reactor Building is a 46 × 49 meter (150 ft × 160 ft) flat-roofed, four-story building (two basement levels, main level, and a second story level). The part of the roof above the CV is dome shaped, rising more than 7 ½ meters (25 ft) above the flat portion of the Reactor Building roof.

The roof itself is concrete overlaid with a tarpaper/mastic material and covered with approximately six inches of foam insulation.

The objective of this survey was to determine the extent of radiological contamination on the roof and exterior walls to aid in proper classification.

Survey Unit Initial Classification

Originally, the decommissioning plan classified the roof and exterior walls as class 3.

Survey Unit Design

Between 1973 and 1985, roofs of the Reactor Building (1111), Reactor Office and Lab Building (1141), Fan House (1132), and Waste Handling Building (1133) were recoated. The roofs of these buildings were surveyed just prior to recoating to verify that contamination was not present. As part of the 1985 Initial Characterization Survey, radiological monitoring performed at 3 grid points on the Hot Lab Roof (1112), Services Equipment Building (1131) and the Primary Pump House (1134) found no detectable contamination.

Subsequent discussion with NASA retirees on 08/12/04 determined that some stone removed from roof surfaces between 1973 and 1985 was reported to have elevated activity that was equal to or greater than twice background (background was not quantified). This stone was retained on site and is in three piles just west of the Hot Retention Tanks.

The surveys for this package consisted of the following:

- Perform a beta scan survey of up to 100% accessible exterior surfaces (i.e., roof and walls to 2 meters only) paying particular attention to areas of highest activity (e.g. pits and cracks in the roofing material, roof/wall interfaces).
- Perform a gamma scan survey of accessible surfaces of the roof only, paying particular attention to areas of highest activity.
- Take a direct beta measurement at each location identified as elevated during either the beta scan or gamma scan. A minimum of 8 direct measurements must be taken.
- Take a direct alpha measurement at each location where the direct beta measurement was greater than 1,000/100 cm^2 above background. A minimum of 1 direct measurement must be taken.

NASA PBRF DECOMMISSIONING PROJECT

SANDUSKY, OHIO

Characterization Survey Unit Summary Report

Survey Package Number:	C1111 301C1	**Package Type:**	Structure
Survey Area Name:	Reactor Building (1111)		
Survey Unit Name:	Roof & Exterior Walls		

Survey Unit Design

- Take a contact gamma measurement at each direct beta measurement location where the result was greater than 5,000 dpm/100 square centimeters or where elevated readings were observed during the gamma scan.
- Take an exposure rate measurement (at one meter) at each contact gamma measurement location.
- Take a smear for removable alpha and beta contamination at each direct beta location.
- Combine and analyze, by gamma spectroscopy, any alpha/beta smears collected at locations where the removable contamination levels were greater than either 100 dpm/100 cm^2 alpha or 1,000 dpm/100 cm^2 beta.
- At random, choose four locations, from the minimum eight direct beta locations, and remove the roof insulation. Take the same series of measurements, direct beta and, as needed, direct alpha, gamma contact, and gamma exposure on the tar paper/roof felt beneath. Remove the tar paper/roof felt and take the same series of measurements on the metal roof beneath.
- At each of the four locations, gather the tar paper/roof felt and any stone into a 250 ml Marinelli beaker and analyze by gamma spectroscopy.

Survey Unit Data Assessment

Both beta and gamma scans of the building exterior surfaces revealed no elevated areas of activity. Four direct beta measurements were taken, on the walls, ranging from -8 to 181 dpm/100 cm^2. Twenty four direct beta measurements were taken on the roof. Measurements ranged from -160 to 5188 dpm/100 cm^2. The mean and median for all direct beta measurements were 658 and 298 dpm/100 cm^2, respectively.

Four direct alpha measurements, ranging from 8 to 207 dpm/100 cm^2, were taken. The mean and median for all direct alpha measurements were 79 and 50 dpm/100 cm^2, respectively.

As only one direct beta reading was greater than 5,000 dpm/100 cm^2, one contact gamma and one exposure rate measurement were taken: 7.2 uR/hr and 7.4 uR/hr, respectively.

Twelve smears were taken at the direct beta measurement locations. Alpha measurements ranged from less than MDA to 6.55 dpm/100 cm^2 and loose beta contamination ranged from less than MDA to 26.62 dpm/100 cm^2.

As none of the smears had activities greater than either 100 dpm/100 cm^2 alpha or 1000 dpm/100 cm^2 beta, no gamma spectroscopy analyses were performed.

Due to a number of reasons, the initial survey was deemed incomplete; however, under very close scrutiny, it is now clear that original survey was performed as prescribed with the exception of one direct alpha measurement and two smears not being taken. The results, at

NASA PBRF DECOMMISSIONING PROJECT

SANDUSKY, OHIO

Characterization Survey Unit Summary Report

Survey Package Number: C1111 301C1 **Package Type:** Structure
Survey Area Name: Reactor Building (1111)
Survey Unit Name: Roof & Exterior Walls

Survey Unit Data Assessment

each of the four locations where roofing insulation was removed, are as follows:

Location 5-1	Insulation Date, Sample ID	Tar paper/felt Date/Sample ID	Metal Date/Sample ID
Direct beta (dpm/100cm^2)	3,234 9/28/04, 5-1	173 10/7/04, 5-1	-36 10/7/04, 5-2
Direct alpha (dpm/100cm^2)	41 9/28/04, 5-1	N/A	N/A
Smears (dpm/100cm^2)	<MDA alpha 21 beta 10/7/04, 5-1	<MDA alpha 2 beta 10/7/04, 5-2	<MDA alpha <MDA beta 10/7/04, 5-3
Contact gamma (uR/hr)	N/A	N/A	N/A
Exposure rate (uR/hr)	N/A	N/A	N/A
Gamma spec (pCi/g)	N/A	<MDA 10/11/04, 5-1	N/A

Location 5-2	Insulation Date, Sample ID	Tar paper/felt Date/Sample ID	Metal Date/Sample ID
Direct beta (dpm/100cm^2)	1,647 9/28/04, 5-2	4 10/7/04, 5-3	200 10/7/04, 5-4
Direct alpha (dpm/100cm^2)	8 9/28/04, 5-2	N/A	N/A
Smears (dpm/100cm^2)	<MDA alpha 2 beta 10/7/04, 5-4	<MDA alpha <MDA beta 10/7/04, 5-5	<MDA alpha <MDA beta 10/7/04, 5-6
Contact gamma (uR/hr)	N/A	N/A	N/A
Exposure rate (uR/hr)	N/A	N/A	N/A
Gamma spec (pCi/g)	N/A	<MDA 10/11/04, 5-2	N/A

Location 5-3	Insulation Date, Sample ID	Tar paper/felt Date/Sample ID	Metal Date/Sample ID
Direct beta (dpm/100cm^2)	464 9/28/04, 5-2	5,188 10/13/04, 5-3	-160 10/13/04, 5-4
Direct alpha (dpm/100cm^2)	58 9/28/04, 5-3	not taken	N/A
Smears (dpm/100cm^2)	not taken	<MDA alpha 17 beta 10/13/04, 5-5	<MDA alpha 17 beta 10/13/04, 5-6
Contact gamma (uR/hr)	N/A	7.2 11/19/04, 5-3	N/A
Exposure rate (uR/hr)	N/A	7.4	N/A

NASA PBRF DECOMMISSIONING PROJECT

SANDUSKY, OHIO

Characterization Survey Unit Summary Report

Survey Package Number: C1111 301C1 **Package Type:** Structure
Survey Area Name: Reactor Building (1111)
Survey Unit Name: Roof & Exterior Walls

Survey Unit Data Assessment

		11/19/04, 5-3	
Gamma spec (pCi/g)	N/A	<MDA 10/27/04, 5-3	N/A

Location 5-4	Insulation Date, Sample ID	Tar paper/felt Date/Sample ID	Metal Date/Sample ID
Direct beta (dpm/100cm^2)	354 9/28/04, 5-2	120 10/20/04, 5-7	23 10/20/04, 5-8
Direct alpha (dpm/100cm^2)	207 9/28/04, 5-4	N/A	N/A
Smears (dpm/100cm^2)	not taken	<MDA alpha 4 beta 10/20/04, 5-7	<MDA alpha 17 beta 10/20/04, 5-8
Contact gamma (uR/hr)	N/A	N/A	N/A
Exposure rate (uR/hr)	N/A	N/A	N/A
Gamma spec (pCi/g)	N/A	8 x MDA Cs-137 10/27/04, 5-4	N/A

Looking at the smear data from sample locations 5-1 and 5-2, it is believed that smears at locations 5-3 and 5-4, both smears not taken, would be similarly inconsequential. It is unknown what the missing direct alpha measurement, at location 5-3, would have shown. After determining that the direct alpha measurement was missed, it was decided not to go back to take it because it required asbestos abatement just to remove the insulation in the first place and now the insulation had already been caulked back in place.

Because of what was initially perceived as insufficient data, eight additional direct beta measurements were taken, on the surface of the insulation, on 11/23/04. Those points are 5-21 through 5-25, 2-26 (dome), 5-27, and 5-28. The reason the LC5/LC6 codes started with 5-21 was because, though it was expected that the highest LC6 codes were in the teens, it was known that no LC6 values in the twenties existed prior to taking these measurements. Seven of the eight were taken on the flat portion of the roof and one was taken on the southwest quadrant of dome at approximately chest level. The first four, 5-21 through 5-24, were taken immediately adjacent to the four solid roof sample locations and the remaining four were taken at random. All eight of these direct beta readings were between 213 to 511 dpm/100 cm^2.

Conclusions and Recommendations

This survey package was designed to aid in the classification of the exterior surfaces and roof of the Reactor Building.

Based on data obtained during this survey, the roof should be upgraded from class 3 to class 2 and the vertical walls should remain class 3.

C1112 301C1
Hot Laboratory Roof and Exterior Walls
(5 pages)

NASA PBRF DECOMMISSIONING PROJECT

SANDUSKY, OHIO

Characterization Survey Unit Summary Report

Survey Package Number:	C1112 301C1	**Package Type:**	Structure
Survey Area Name:	Hot Laboratory (1112)		
Survey Unit Name:	Hot Lab Roof & Exterior Walls		

Survey Unit Description

The Hot Laboratory is a 32m × 41m (104 × 136 ft.), two-story (basement and main level), concrete building attached to the south side of the Reactor Building. The roof has three elevations: 6.1m, 10.8m, and 12.3m (20' 0", 35' 6", and 40' 3"), respectively.

The roof is constructed of either metal or concrete overlaid with a tar paper/mastic material and covered with approximately six inches of foam insulation.

The objective of this survey was to determine the extent of radiological contamination on the roof and exterior walls to aid in proper classification.

Survey Unit Initial Classification

Originally, the decommissioning plan classified the roof and exterior walls as class 3.

Survey Unit Design

Between 1973 and 1985, roofs of the Reactor Building (1111), Reactor Office and Lab Building (1141), Fan House (1132), and Waste Handling Building (1133) were recoated. The roofs of these buildings were surveyed just prior to recoating to verify that contamination was not present. As part of the 1985 Initial Characterization Survey, radiological monitoring performed at 3 grid points on the Hot Lab Roof (1112), Services Equipment Building (1131) and the Primary Pump House (1134) found no detectable contamination.

Subsequent discussion with NASA retirees on 08/12/04 determined that some stone removed from roof surfaces between 1973 and 1985 was reported to have elevated activity that was equal to or greater than twice background (background was not quantified). This stone was retained on site and is in three piles just west of the Hot Retention Tanks.

The surveys for this package consisted of the following:

- Perform a beta scan survey of up to 100% accessible exterior surfaces (i.e., roof and walls to 2 meters only) paying particular attention to areas of highest activity (e.g. pits and cracks in the roofing material, roof/wall interfaces).
- Perform a gamma scan survey of accessible surfaces of the roof only, paying particular attention to areas of highest activity.
- Take a direct beta measurement at each location identified as elevated during either the beta scan or gamma scan. A minimum of 8 direct measurements must be taken.
- Take a direct alpha measurement at each location where the direct beta measurement was greater than 1,000 dpm/100 cm^2 above background.
- Take a contact gamma measurement at each direct beta measurement location where the result was greater than 5,000 dpm/100 square centimeters or where elevated

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SANDUSKY, OHIO

Characterization Survey Unit Summary Report

Survey Package Number:	C1112 301C1	**Package Type:**	Structure
Survey Area Name:	Hot Laboratory (1112)		
Survey Unit Name:	Hot Lab Roof & Exterior Walls		

Survey Unit Design

readings were observed during the gamma scan.

- Take an exposure rate measurement (at one meter) at each contact gamma measurement location.
- Take a smear for removable alpha and beta contamination at each direct beta location.
- Combine and analyze, by gamma spectroscopy, any alpha/beta smears collected at locations where the removable contamination levels were greater than either 100 dpm/100 cm^2 alpha or 1,000 dpm/100 cm^2 beta.
- At random, choose four locations, from the minimum eight direct beta locations, and remove the roof insulation. Take the same series of measurements, direct beta and, as needed, direct alpha, gamma contact, and gamma exposure on the tar paper/roof felt beneath. Remove the tar paper/roof felt and take the same series of measurements on the metal roof beneath.
- At each of the four locations, gather the tar paper/roof felt and any stone into a 250 ml Marinelli beaker and analyze by gamma spectroscopy.

Survey Unit Data Assessment

Both beta and gamma scans of the building exterior surfaces revealed no elevated areas of activity due to material on the roof. There were two locations of elevated activity (60,000 cpm and 91,000 cpm) identified by gamma scan; however, it was determined that both results originated with radioactive material movements being performed in the hot work area directly beneath the roof. On the exterior walls, eight direct beta measurements were taken ranging from 175 to 917 dpm/100 cm^2. Six direct beta measurements were taken on the roof. Measurements ranged from -13 to 415 dpm/100 cm^2. The roof measurements were taken after the insulating material was removed from the roof (see paragraph immediately preceding the table).

Since no direct beta readings exceeded 1000 dpm/100 cm^2, neither direct alpha, contact gamma, nor exposure rate measurements were taken.

Originally, fourteen smears were taken at the direct beta measurement locations. Alpha measurements ranged from less than MDA to 3.17 dpm/100 cm^2 and loose beta contamination ranged from less than 1.58 to 36.72 dpm/100 cm^2.

As none of the smears had activities greater than either 100 dpm/100 cm^2 alpha or 1000 dpm/100 cm^2 beta, no gamma spectroscopy analyses were performed.

During the original performance of the survey, there was confusion as to the sample requirements for direct beta measurements and smears on the surface of the roof insulation. To remedy that confusion, additional direct beta measurements and smears were taken on 12/21/04. All results, at each of the four roof locations where roofing insulation was removed,

NASA PBRF DECOMMISSIONING PROJECT

SANDUSKY, OHIO

Characterization Survey Unit Summary Report

Survey Package Number: C1112 301C1 **Package Type:** Structure
Survey Area Name: Hot Laboratory (1112)
Survey Unit Name: Hot Lab Roof & Exterior Walls

Survey Unit Data Assessment

are listed below. The mean and median for all direct beta measurements were 344 and 323 dpm/100 cm^2, respectively

Location 6-1	Insulation Date, Sample ID	Tar paper/felt Date/Sample ID	Concrete Date/Sample ID
Direct beta (dpm/100cm^2)	not taken	N/A	405 10/26/04, 6-1
Smears (dpm/100cm^2)	not taken	N/A	<MDA alpha 21 beta 10/27/04, 6-1
Gamma spec (pCi/g)	N/A	<MDA	N/A

Location 6-2	Insulation Date, Sample ID	Tar paper/felt Date/Sample ID	Concrete Date/Sample ID
Direct beta (dpm/100cm^2)	not taken	N/A	350 10/26/04, 6-2
Smears (dpm/100cm^2)	not taken	N/A	<MDA alpha 11 beta 10/27/04, 6-2
Gamma spec (pCi/g)	N/A	1.5 x MDA Cs-137 10/27/04, 6-4	N/A

Location 6-3	Insulation Date, Sample ID	Tar paper/felt Date/Sample ID	Metal Date/Sample ID
Direct beta (dpm/100cm^2)	173 12/21/04, 6-3	97 10/26/04, 6-3	114 10/26/04, 6-5
Smears (dpm/100cm^2)	<MDA alpha 33 beta 12/21/04, 6-3	<MDA alpha 8 beta 10/27/04, 6-3	<MDA alpha 11 beta 10/27/04, 6-5
Gamma spec (pCi/g)	N/A	<MDA	N/A

Location 6-4	Insulation Date, Sample ID	Tar paper/felt Date/Sample ID	Metal Date/Sample ID
Direct beta (dpm/100cm^2)	296 12/21/04, 6-4	51 10/26/04, 6-4	-13 10/26/04, 6-6
Smears (dpm/100cm^2)	<MDA alpha 14 beta 12/21/04, 6-4	3 alpha 8 beta 10/27/04, 6-4	<MDA alpha 18 beta 10/27/04, 6-6
Gamma spec (pCi/g)	N/A	1.9 x MDA Cs-137 10/27/04, 6-4	N/A

The smear data obtained from surface of the roof insulation (sample points 6-3 and 6-4, taken

NASA PBRF DECOMMISSIONING PROJECT

SANDUSKY, OHIO

Characterization Survey Unit Summary Report

Survey Package Number:	C1112 301C1	**Package Type:**	Structure
Survey Area Name:	Hot Laboratory (1112)		
Survey Unit Name:	Hot Lab Roof & Exterior Walls		

Survey Unit Data Assessment

12/21/04 on the east side of the 20' 0" elevation) show no detectable contamination. When Characterization Technicians went to survey the west side of the 20'0" elevation, they found that the ladder, from the top of the Reactor Building to the Hot Laboratory roof, had been removed making the west side inaccessible. Consequently, direct beta measurements and smears were not taken on the insulation surface at sample locations 6-1 and 6-2. The surface of the insulation, at sample locations 6-1 and 6-2, would not be expected to exhibit any higher activity levels than would be found on the east side roof of the building. Therefore, it is believed that the measurements at these two locations would be as inconsequential as those at locations 6-3 and 6-4.

Conclusions and Recommendations

This survey package was designed to aid in the classification of the exterior surfaces and roof of the Hot Laboratory Building.

Based on data obtained during this survey, and knowing that some roofing material previously removed was found to be greater than twice background, the roof should be upgraded from class 3 to class 2. The vertical walls should remain class 3.

C1132 301C1
Fan House Roof and Exterior Walls
(4 pages)

NASA PBRF DECOMMISSIONING PROJECT

SANDUSKY, OHIO

Characterization Survey Unit Summary Report

Survey Package Number:	C1132 301C1	**Package Type:**	Structure
Survey Area Name:	Reactor Fan House (1132)		
Survey Unit Name:	Reactor Fan House Exterior Walls (Rev. 0)		

Survey Unit Description

The Reactor Fan House (Fan House) is a two story building located 40 meters southeast of the Reactor Building and 10 meters east of the Hot Laboratory. The Fan House conjoins with the northwest wall of the Waste Handling Building. During operation the Fan House housed air moving and filtration equipment for several PBRF buildings. Room air from these buildings flowed into the Fan House, was filtered and exhausted through the Fan House stack. Equipment in the Fan House would have included air pumps and compressors, scrubbers, storage tanks, activated carbon absorbers, and exhaust monitoring systems. The floor plan of the Fan House is shown in Figure 1-13 of the decommissioning plan.

Survey Unit Initial Classification

The roof and exterior walls of the Fan House were not surveyed as part of the 1985 Initial Characterization Survey or 1998 Confirmatory Survey. Radiological surveys were performed to support roof recoating between 1973 and 1985, these surveys determined no radiological contamination to be present. Ballast stone removed from the roof surfaces between 1973 and 1985 was determined to have elevated activity equal to or greater than twice background, this stone has been retained on-site. The purpose of this characterization survey is to determine an appropriate classification for the Fan House exterior roof and walls, there is no initial classification.

Survey Unit Design

The following survey scheme was implemented for the Fan House roof and exterior walls under this survey package:

- Beta scan of approximately 100% of accessible roof surfaces and wall surfaces lower than 2 meters; with the potential to increase scan surveys of surfaces above 2 meters based on findings.
    - A maximum beta scan speed of one detector width per second was to be used.
    - Beta scans were not to be logged but quantities of surface area scanned were to be indicated on survey documentation.
- A minimum of 16 (60 second) direct beta count measurements and shielded measurements from surfaces of highest activity or from random locations if no elevated activity locations were identified.
- A direct alpha (60 second) count measurement and shielded measurement at each direct beta measurement location where the result is > 1,000 dpm/100 cm².
- A gamma scan of 100% of the Fan House roof.
- A contact gamma measurement at each direct beta measurement location where the result is greater than 5,000 dpm/100 cm², and each elevated area determined during the roof gamma scan.
- A one meter gamma exposure rate measurement at each contact gamma measurement.
- A 100 cm² smear for removable alpha and beta contamination at each direct beta measurement location.
- Gamma spectroscopy of composite A/B smear samples where > 100 dpm/100 cm² alpha or > 1000 dpm/100 cm² beta is detected.
- Gamma spectroscopy of four roof samples collected at the highest elevated areas determined during gamma scan or randomly if no elevated areas determined.
- Five timed exposure rate counts on the roof, one at each corner, and one at the roof center.
- A minimum of 5% of the sample points and surface area scans to be replicated as QC survey points.

NASA PBRF DECOMMISSIONING PROJECT

SANDUSKY, OHIO

Characterization Survey Unit Summary Report

Survey Package Number:	C1132 301C1	**Package Type:**	Structure
Survey Area Name:	Reactor Fan House (1132)		
Survey Unit Name:	Reactor Fan House Exterior Walls (Rev. 0)		

Survey Unit Data Assessment

Survey results of the Fan House under this survey package are as follows:

- Beta scan of 100% of accessible roof surfaces and wall surfaces below 2 meters was performed. Scanned surface areas were documented on survey maps. Surface scan activity levels ranged from 350–400 cpm on the roof, north and east walls; levels ranged from 350–500 cpm on the west wall. Beta scan of 100% of accessible surfaces on the air monitor roof/slab and areaway roof/slab were performed, surface scan activity levels ranged from 350-400 cpm for both surfaces.
  Beta scan was not performed on the resin pit roof/slab due to high background counts (>600cpm), planned activities in the resin pit will nullify any current characterization summaries for this small area. Beta scan was not performed on a length of the lower west wall ~10 feet wide due to high background counts (>600cpm), background was determined to be due to source storage in deionizer room, survey area affected is too small to warrant personnel radiation exposure during source transfer for this characterization survey. Beta scans of 100% of accessible surfaces on the lower south wall were performed with results consistent with situation described for 10 foot section of lower west wall. Likewise, source storage in deionizer room accounts for this result. The same determination as to resolution applies for lower south wall. No elevated areas were determined in accessible areas defined in this assessment. Gamma scan surveys of the accessible north, south, east and west lower walls, air monitor roof/slab, areaway roof/slab, and resin pit roof/slab were performed to provide corroborating information for assessing beta scan results.
  An assessment of surface area scanned versus total surface area available was performed, 52% of available surface area was beta scanned in the performance of this characterization survey.
- Twenty direct beta count measurements and shielded measurements were obtained on the roof and lower wall surfaces. The highest activity acquired was collected on a painted concrete surface with a yield of 580 dpm/100 cm².
- Direct alpha count measurements were not acquired, the survey instruction threshold of 1000 dpm/100 cm² beta was not exceeded.
- Direct gamma (contact) measurements were not acquired, the survey instruction threshold of 5000 dpm/100 cm² beta was not exceeded.
- Smears were collected at each direct beta measurement location. The highest activity was determined to be 68.18 dpm/100 cm² beta and 3.18 dpm/100 cm² alpha.
- Gamma spectroscopy of composite A/B smear samples were not acquired, the survey instruction threshold of > 1000 dpm/100 cm² beta or > 100 dpm/100 cm² alpha was not exceeded.
- Gamma scan of 100% of accessible roof surfaces was performed. Scanned surface areas were documented on survey maps. Surface scan activity levels ranged from 15000–20000 cpm on the roof, intermittent levels >15000 are attributable from radioactive material in storage around the Fan House, and some contribution from source storage in deionizer room, a beta scan survey with a gamma insensitive 43-37 gas proportional detector was performed, survey results were consistent with this assessment.
- Direct gamma (contact) measurements were not acquired, the survey instruction action level of 2X background was not exceeded.
- Five timed exposure rate measurements were acquired on the roof in accordance with the survey instructions, these one meter readings ranged from 10.2 μR/hr to 14.1 μR/hr.

NASA PBRF DECOMMISSIONING PROJECT

SANDUSKY, OHIO

Characterization Survey Unit Summary Report

Survey Package Number:	C1132 301C1	**Package Type:**	Structure
Survey Area Name:	Reactor Fan House (1132)		
Survey Unit Name:	Reactor Fan House Exterior Walls (Rev. 0)		

- Gamma spectroscopy of four roofing material samples were acquired in accordance with the survey instructions. Gamma spectroscopy results yielded one sample above action level for Cs-137.
- QC replicate surveys were collected from a minimum of 5% of the beta/gamma scan measurements in accordance with survey instructions. These replicate scan surveys corroborate the characterization scan survey results and assessment.
- QC replicate surveys were collected from a minimum of 5% of the direct (static) beta measurement locations in accordance with survey instructions.
    - The QC direct beta survey point LC5 - 00001 / LC6 – 00001 resulted in a net 764 dpm/100 cm² as compared with FS beta survey point LC5 - 00001 / LC6 – 00001 which resulted in 340 dpm/100 cm².
    - The QC direct beta survey point LC5 - 00002 / LC6 – 00001 resulted in a net 316 dpm/100 cm² as compared with FS beta survey point LC5 - 00002 / LC6 – 00001 which resulted in 243 dpm/100 cm².
    - Comparisons of these replicate direct measurements corroborate the characterization direct measurement survey results. These replicate results were noted to exceed the original result by > ±20%, this statistics anomaly has been explored and resolved in the Survey Unit Data Assessment for C1134 301C2 Primary Pump House. There is no change to the data assessment of this survey package due to this statistics anomaly.

Conclusions & Recommendations

Based on the Survey Unit Data Assessment for this characterization survey and the history of ballast stone exhibiting elevated activity with no resolution to source, scope or magnitude of this elevated activity, the classification for the surfaces characterized within the scope of this survey will be Class 2.

C1133 301C1
Waste Handling Building Exterior walls
(4 pages)

NASA PBRF DECOMMISSIONING PROJECT

SANDUSKY, OHIO

Characterization Survey Unit Summary Report

Survey Package Number:	C1133 301C1	**Package Type:**	Structure
Survey Area Name:	Reactor Waste Handling Building (1133)		
Survey Unit Name:	Reactor Waste Handling Building Exterior Walls (Rev. 0)		

Survey Unit Description

The Waste Handling Building (WHB) is a two story building located 50 meters southeast of the Reactor Building. The WHB conjoins with the southeast wall of the Fan House. During operation the WHB housed waste packaging equipment, contaminated laundry equipment, and waste storage facilities. The liquid waste evaporator system and associated boiler were housed and operated in the WHB. The floor plan of the WHB is shown in Figure 1-14 of the decommissioning plan.

Survey Unit Initial Classification

The roof and exterior walls of the WHB were not surveyed as part of the 1985 Initial Characterization Survey or 1998 Confirmatory Survey. Radiological surveys were performed to support roof recoating between 1973 and 1985, these surveys determined no radiological contamination to be present. Ballast stone removed from the roof surfaces between 1973 and 1985 was determined to have elevated activity equal to or greater than twice background, this stone has been retained on-site. The purpose of this characterization survey is to determine an appropriate classification for the WHB exterior roof and walls, there is no initial classification.

Survey Unit Design

The following survey scheme was implemented for the WHB roof and exterior walls under this survey package:

- Beta scan of approximately 100% of accessible roof surfaces and wall surfaces lower than 2 meters; with the potential to increase scan surveys of surfaces above 2 meters based on findings.
    - A maximum beta scan speed of one detector width per second was to be used.
    - Beta scans were not to be logged but quantities of surface area scanned were to be indicated on survey documentation.
- A minimum of 16 (60 second) direct beta count measurements and shielded measurements from surfaces of highest activity or from random locations if no elevated activity locations were identified.
- A direct alpha (60 second) count measurement and shielded measurement at each direct beta measurement location where the result is > 1,000 dpm/100 cm².
- A gamma scan of 100% of the WHB roof.
- A contact gamma measurement at each direct beta measurement location where the result is greater than 5,000 dpm/100 cm², and each elevated area determined during the roof gamma scan.
- A one meter gamma exposure rate measurement at each contact gamma measurement.
- A 100 cm² smear for removable alpha and beta contamination at each direct beta measurement location.
- Gamma spectroscopy of composite A/B smear samples where > 100 dpm/100 cm² alpha or > 1000 dpm/100 cm² beta is detected.
- Gamma spectroscopy of four roof samples collected at the highest elevated areas determined during gamma scan or randomly if no elevated areas determined.
- Five timed exposure rate counts on the roof, one at each corner, and one at the roof center.
- A minimum of 5% of the sample points and surface area scans to be replicated as QC survey points.

NASA PBRF DECOMMISSIONING PROJECT

SANDUSKY, OHIO

Characterization Survey Unit Summary Report

Survey Package Number:	C1133 301C1	**Package Type:**	Structure
Survey Area Name:	Reactor Waste Handling Building (1133)		
Survey Unit Name:	Reactor Waste Handling Building Exterior Walls (Rev. 0)		

Survey Unit Data Assessment

Survey results of the WHB under this survey package are as follows:

- Beta scan of 100% of accessible roof surfaces and wall surfaces below 2 meters was performed. Scanned surface areas were documented on survey maps. Surface scan activity levels ranged from 600–800 cpm on the 15'5" roof elevation with the 43-37 detector, with two small areas of higher activity. Surface scan activity levels ranged from 700–900 cpm on the east side of the 20'7" roof elevation with the 43-37 detector, and 1000-2000 cpm on the west side of the 20'7" roof elevation with the 43-37 detector. Surface scan activity variations were determined to be due to the influence of radiation and contamination areas inside the southwest areas of the WHB.
  Lower walls were beta scanned with the 44-116 detector, surface scan activity levels ranged from 300-440 cpm on the north and east walls, 250-450 cpm on the south and northwest walls, and surface scan activity was 250-450 cpm on the south and west boiler room walls. Surface scan activity levels ranged from 500-1000 cpm on the southwest wall, surface scan activity variations were determined to be due to the influence of radiation and contamination areas inside the southwest areas of the WHB.
  The north and west walkway slabs surface scan activity levels ranged from 350-500 cpm. The sand hopper surface scan activity levels ranged from 350-400 cpm.
  No elevated areas were determined in accessible areas defined in this assessment.
  An assessment of surface area actually scanned versus total surface area available was performed, 50.8% of available surface area was beta scanned in the performance of this characterization survey.
- Twenty direct beta count measurements and shielded measurements were obtained on the roof and lower wall surfaces. The highest activity acquired was collected on a metal surface with a yield of 349 dpm/100 cm².
- Direct alpha count measurements were not acquired, the survey instruction threshold of 1000 dpm/100 cm² beta was not exceeded.
- Direct gamma (contact) measurements were not acquired, the survey instruction threshold of 5000 dpm/100 cm² beta was not exceeded.
- Smears were collected at each direct beta measurement location. The highest activity was determined to be 29.77 dpm/100 cm² beta and 3.18 dpm/100 cm² alpha.
- Gamma spectroscopy of composite A/B smear samples were not acquired, the survey instruction threshold of > 1000 dpm/100 cm² beta or > 100 dpm/100 cm² alpha was not exceeded.
- Gamma scan of 100% of accessible roof surfaces was performed. Scanned surface areas were documented on survey maps. Surface scan activity levels ranged from 10000–42000 cpm on the roof, levels >15000 are attributable to influence of radiation and contamination areas inside the southwest areas of the WHB.
- Direct gamma (contact) measurements were not required, the survey instruction action level of 2X background was not exceeded. A single corroborative gamma contact measurement was acquired on the WHB southwest wall as a reference point for dose profile assessment.
- A single corroborative one meter gamma exposure rate measurement was acquired on the WHB southwest wall as a reference point for dose profile assessment.
- Five timed exposure rate measurements were acquired on the roof in accordance with the survey instructions, these one meter readings ranged from 9.8 μR/hr to 41.8 μR/hr, exposure rate variation is due to the influence of radiation and contamination areas inside the southwest areas of the WHB.

NASA PBRF DECOMMISSIONING PROJECT

SANDUSKY, OHIO

Characterization Survey Unit Summary Report

Survey Package Number:	C1133 301C1	**Package Type:**	Structure
Survey Area Name:	Reactor Waste Handling Building (1133)		
Survey Unit Name:	Reactor Waste Handling Building Exterior Walls (Rev. 0)		

- Gamma spectroscopy of four roofing material samples were acquired in accordance with the survey instructions. Gamma spectroscopy results yielded one sample above action level for Cs-137.
- QC replicate surveys were collected from a minimum of 5% of the beta/gamma scan measurements in accordance with survey instructions. These replicate scan surveys corroborate the characterization scan survey results and assessment.
- QC replicate surveys were collected from a minimum of 5% of the direct (static) beta measurement locations in accordance with survey instructions.
    - The QC direct beta survey point LC5 - 00002 / LC6 – 00001 resulted in a net 355 dpm/100 cm² as compared with FS beta survey point LC5 - 00002 / LC6 – 00001 which resulted in 33 dpm/100 cm².
    - The QC direct beta survey point LC5 - 00001 / LC6 – 00001 resulted in a net 71 dpm/100 cm² as compared with FS beta survey point LC5 - 00001 / LC6 – 00001 which resulted in -113 dpm/100 cm².
    - Comparisons of these replicate direct measurements corroborate the characterization direct measurement survey results. These replicate results were noted to exceed the original result by > ±20%, this statistics anomaly has been explored and resolved in the Survey Unit Data Assessment for C1134 301C2 Primary Pump House. There is no change to the data assessment of this survey package due to this statistics anomaly.

Conclusions & Recommendations

Based on the Survey Unit Data Assessment for this characterization survey and the history of ballast stone exhibiting elevated activity with no resolution to source, scope or magnitude of this elevated activity, the classification for the surfaces characterized within the scope of this survey will be Class 2.

C1134 301C1
Primary Pump House Exterior Walls and Roof
(5 pages)

NASA PBRF DECOMMISSIONING PROJECT

SANDUSKY, OHIO

Characterization Survey Unit Summary Report

Survey Package Number:	C1134 301C1	**Package Type:**	Structure
Survey Area Name:	Primary Pump House (1134)		
Survey Unit Name:	Exterior Walls and Roof		

Survey Unit Description

The Primary Pump House (PPH), Building 1134 is a one story building attached to the east side of the Reactor Building. The PPH housed the reactor coolant recirculating .pumps, heat exchangers and ion exchangers for the primary coolant system. At the time of this survey, internal areas of the PPH are posted and controlled as Contamination Areas, High Contamination Areas, Radiation Areas, and High Radiation Areas. There are no radiological access restrictions to either the roof or the exterior walls.

Survey Unit Initial Classification

The exterior walls and roof for this building were not assigned a specific initial classification by the decommissioning plan.

Survey Unit Design

The objective of this survey was to determine the extent of radiological contamination on accessible exterior structural surfaces of the PPH building as well as on fixed equipment located on the roof of the building in order to aid in commodity removal, waste disposition and to provide radiological survey information as a basis for the classification of this survey unit.

The radiological survey components for this package consisted of the following:

- Beta scan surveys were performed on accessible structural surfaces, focusing on areas with the highest potential for exhibiting elevated activity (e.g. pits, cracks, seams). A minimum of 10 % of the accessible roof and lower wall surfaces were scanned. Since no elevated activity was identified by the scan of the lower walls, no scan of the upper wall surfaces above two (2) meters was required. In addition, beta scan surveys were performed on approximately 10% of the accessible surfaces of fixed equipment located on the PPH roof.

- The beta scan results did not identify any areas exhibiting elevated activity. In this case, the minimum number of direct beta measurements required by the survey instructions was eight (8). The direct beta measurement locations were to be distributed as follows:

  - Five (5) measurement locations selected on the PPH Roof
  - Three (3) measurement locations selected on the PPH exterior walls lower than two (2) meters

NASA PBRF DECOMMISSIONING PROJECT

SANDUSKY, OHIO

Characterization Survey Unit Summary Report

Survey Package Number:	C1134 301C1	**Package Type:**	Structure
Survey Area Name:	Primary Pump House (1134)		
Survey Unit Name:	Exterior Walls and Roof		

Survey Unit Design

A total of eight (8) direct beta measurements were selected. However, the locations were not selected in accordance with the survey instructions. Three (3) direct beta measurement locations were selected on the building exterior walls lower than two (2) meters. The five (5) direct beta measurement locations that were selected on the roof were actually located on fixed equipment, not the structural surfaces of the roof. The rational behind the selection was that the locations exhibited the highest scan activity as identified by the beta scan surveys. In accordance with the survey instructions, locations selected on fixed equipment were intended to be taken in addition to the five (5) locations selected on structural surfaces. Therefore, the minimum number of direct beta measurements on the roof surfaces that was required by the survey instructions was not accomplished.

- The survey instructions required that a direct alpha measurement was to be performed at each location where the direct beta measurement exceeded 1,000 dom/100cm^2. In addition, if all direct beta measurements were less than 1,000 dpm/100cm^2, then a direct alpha measurement was required at 10% of the direct beta measurement locations. As this was the case for the direct beta measurements taken on the PPH roof and lower exterior walls, the minimum number of direct alpha measurements required was one (1). A total of four (4) direct alpha measurements were taken, three (3) on the lower building exterior walls and one (1) on a piece of fixed equipment located on the roof.

- The survey instructions required that a contact & 1-meter gamma measurements were to be performed at each direct beta location where measurement results were >5,000 dpm/100 cm^2. No direct beta measurement exceeded 5,000 dpm/100 cm^2. Therefore, no gamma measurements were performed as part of this survey.

- In accordance with the survey instructions, a smear sample for removable alpha and beta contamination was taken at each of the eight (8) direct beta measurement locations. None of the smear samples indicated removable contamination levels that exceeded either 100 dpm/100 cm^2 alpha or 1,000 dpm/100 cm^2 beta. Therefore no gamma spectroscopy analysis was required.

- In accordance with the survey instructions, a sample was to be taken of any debris located on the PPH roof and analyzed by gamma spectroscopy. Two (2) samples were taken of debris identified on the roof and four (4) samples were taken of the roof material. In addition, a sample was taken of a metallic "particle" that was discovered on the roof. All samples were analyzed by gamma spectroscopy.

NASA PBRF DECOMMISSIONING PROJECT

SANDUSKY, OHIO

Characterization Survey Unit Summary Report

Survey Package Number: C1134 301C1 **Package Type:** Structure
Survey Area Name: Primary Pump House (1134)
Survey Unit Name: Exterior Walls and Roof

Survey Unit Data Assessment

Beta scans were performed on 10% of accessible lower wall structural surfaces and 10% of the roof structural surfaces. One area of elevated activity was identified by the scan surveys on the roof. This was discovered to be a "particle" of material of unknown origin. The particle was collected as a sample and subsequently analyzed by gamma spectroscopy. A scan of the area where the particle was located after it was retrieved did not identify any additional areas of elevated activity.

At total of eight (8) direct beta measurement locations were selected combining three measurement locations selected on the lower exterior walls and five (5) measurement locations selected on fixed equipment located on the PPH roof. As previously stated, the intent of the survey instructions was to take direct beta measurements on fixed equipment in addition to five (5) direct beta measurements that were to be taken of the structural surfaces of the roof. This was not accomplished. Therefore the number of direct beta measurements taken for this survey is less than the number prescribed by the survey instructions. Direct alpha measurements were obtained at four (4) of the eight (8) direct beta measurement locations. The maximum direct alpha and beta measurements were located on the north exterior wall less than two (2) meters. No gamma measurements were taken as part of this survey. Eight (8) smear samples were acquired at each of the direct beta locations and were analyzed on the Tennelec IPC-9025 for removable alpha and beta contamination. The smear sample with the maximum removable alpha and beta activity was taken on a piece of fixed equipment located on the PPH roof.

A summary of the significant results for the direct beta, direct alpha, gamma measurements and smear sample results is as follows:

Sample Parameter	# of Measure-ments	Min	Max	Avg.	Std. Dev	Action Level	# > Action Level
		(direct alpha, beta & smear results in dpm/100cm^2, gamma results in μr/hr)					
Direct Beta	8	-302	713	116	294	29,329	None
Direct Alpha	4	31	80	61	21	200	None
ά Smear Results	8	-0.23	4.19	1.45	2.27	200	None
β Smear Results	8	-3.61	9.71	2.85	5.44	1,000	None

NASA PBRF DECOMMISSIONING PROJECT

SANDUSKY, OHIO

Characterization Survey Unit Summary Report

Survey Package Number:	C1134 301C1	**Package Type:**	Structure
Survey Area Name:	Primary Pump House (1134)		
Survey Unit Name:	Exterior Walls and Roof		

Survey Unit Data Assessment

None of the eight (8) smears taken exhibited removable activity greater than either 100 dpm/100 cm^2 alpha or 1000 dpm/100 cm^2 beta. Therefore, none of the smears taken for this survey was analyzed by gamma spectroscopy.

Two (2) samples were taken of debris identified on the roof, one (1) sample was taken of a metallic particle discovered on the roof and four (4) samples were taken of the roof material. All samples were analyzed by gamma spectroscopy. The gamma spectroscopy results for Co-60 and Cs-137 concentrations in all the samples analyzed was less that the respective MDA with the exception of Cs-137 concentrations greater than MDA detected in the two (2) debris samples. The Cs-137 concentrations in these two samples were 1.53 ρC/g and 457 ρCi/sample respectively.

Conclusions and Recommendations

The requisite number of measurements prescribed by the survey instruction for this characterization survey was not performed. However it is concluded that the acquisition of additional characterization survey measurements in this area is not necessary. The characterization survey results did not indicate the presence of total beta activity on structural surfaces that is greater than the proposed adjusted gross DCGL for this area. However, access to the pump rooms and heat exchanger rooms inside the PPH are through shield plugs accessed from the PPH roof. Each of these rooms contains radiologically contaminated commodities that will be removed from the rooms through the shield plug opening and onto the roof. Consequently, as material with known loose contamination greater than the proposed adjusted gross DCGL will be transported onto and through this area, the classification of the roof and exterior walls of the PPH is designated as impacted Class 1.

C1134 301C2
Primary Pump House Exterior Walls
(4 pages)

NASA PBRF DECOMMISSIONING PROJECT

SANDUSKY, OHIO

Characterization Survey Unit Summary Report

Survey Package Number:	C1134 301C2	**Package Type:**	Structure
Survey Area Name:	Primary Pump House (1134)		
Survey Unit Name:	Primary Pump House Exterior Walls (Rev. 0)		

Survey Unit Description

The Reactor Primary Pump House (PPH) is a one story building attached to the east side of the Reactor Building. The PPH contains the reactor primary pumps, heat exchangers, ion exchangers for the primary cooling system, primary coolant strainer, resin pits, and a hot sump. The exterior wall surface of the PPH is made of concrete with metal doors and windows.

Survey Unit Initial Classification

The exterior walls of the PPH were not surveyed as part of the 1985 Initial Characterization Survey or 1998 Confirmatory Survey. The decommissioning plan classified the PPH as Class 2.

Survey Unit Design

The following surveys were supposed to be performed on the exterior walls of the Reactor Primary Pump House under this survey package:

- Beta scan of approximately 100% of accessible surfaces lower than 2 meters; with the potential to increase scan surveys of surfaces above 2 meters based on findings.
    - A maximum beta scan speed of one detector width per second was to be used.
    - Beta scans were not to be logged but quantities of surface area scanned were to be indicated on survey documentation.
- A minimum of 8 (60 second) direct beta count measurements and shielded measurements from surfaces of highest activity or from random locations if no elevated activity locations were identified.
- A direct alpha (60 second) count measurement and shielded measurement at each direct beta measurement location where the result is > 1,000 dpm/100 cm² or a minimum of one measurement if all direct beta measurements are < 1,000 dpm/100 cm².
- A contact and 1 meter gamma (15 second) measurement at each direct beta measurement location where the result is greater than 5,000 dpm/100 cm².
- A 100 cm² smear for removable alpha and beta contamination at each direct beta measurement location.
- Gamma spectroscopy of composite A/B smear samples where > 100 dpm/100 cm² alpha or > 1000 dpm/100 cm² beta is detected.
- A minimum of 5 % of the sample points and surface area scans were to be resurveyed as QC replicate survey points.

Survey Unit Data Assessment

Survey results of the Reactor Primary Pump House under this survey package are as follows:

- Beta scan of 100% accessible surfaces lower than 2 meters was performed. Scanned surface areas were documented on survey maps. Background levels ranged from 188 - 270 cpm on the north and east walls and 245 – 644 cpm on the south wall (ranges based on direct readings results). One location of fixed contamination (3,311 dpm/100 cm²) was identified at beta survey point 3-4 on the ledge walkway of the wall opening on the west side of the south wall. The surface area with elevated activity was limited in size (< the probe face of a 44-116 probe). The elevated activity location was marked in-field (circled with a sharpie). No other elevated activity locations were found on the remainder of the exterior walls. However, elevated activity (approximately 20,000 cpm) was

NASA PBRF DECOMMISSIONING PROJECT

SANDUSKY, OHIO

Characterization Survey Unit Summary Report

Survey Package Number:	C1134 301C2	**Package Type:**	Structure
Survey Area Name:	Primary Pump House (1134)		
Survey Unit Name:	Primary Pump House Exterior Walls (Rev. 0)		

determined to be present on the dirt adjacent to the wall surface at approximately 6 inches beneath the fixed contamination location on the ledge walkway. A soil sample was collected from the location under survey package A2400 307C3.

- Eight direct beta count measurements and shielded measurements were obtained the lower wall surfaces. Direct readings from survey points seven of the eight measurements ranged from 240 – 751 dpm/100 cm². Survey point 3-4 indicated 3.311 dpm/100 cm² of fixed activity. Each static survey point was marked in-field (circled with a sharpie).
- Direct alpha count measurements and shielded measurements were obtained from survey point 3-4. The activity was 44 dpm/100 cm².
- Direct gamma (contact and 1 meter) measurements were obtained from survey point 3-4. The highest contact reading was 24.7 μR/hr and highest 1 meter reading was 13.3 μR/hr.
- Smears were collected at each direct beta measurement location. The highest activity was determined to be 34.53 dpm/100 cm² beta and < MDA dpm/100 cm² alpha.
- Gamma spectroscopy of composite A/B smear samples was not required.
- QC replicate surveys were collected from a minimum of 5% of the direct beta/alpha measurement locations and smear locations.
    - The QC direct beta survey point LC5 - 00002 / LC6 – 00003 resulted in a net 280 dpm/100 cm² as compared with FS beta survey point LC5 - 00002 / LC6 – 00002 which resulted in 287 dpm/100 cm².
    - The QC direct alpha survey point LC5 - 00003 / LC6 – 00004 resulted in a net - 8 dpm/100 cm² as compared with FS alpha survey point LC5 - 00003 / LC6 – 00004 which resulted in 44 dpm/100 cm².
        - On 10/19/04, two alpha counts were taken with the results being 0 counts shielded and 6 counts unshielded: both 60-second counts. Using modifying factors for both surface area and efficiency, this corresponds to 44 dpm/100 cm^2.
        - On 11/8/04, two alpha counts were taken for QC with the results being 3 counts shielded and 2 counts unshielded. Again, both counts were of 60-second duration. Using modifying factors for both surface area and efficiency, this corresponds to -8 dpm/100 cm^2.
            - Notice that the difference between the original alpha measurement of 44 dpm/100 cm^2 and the QC measurement of -8 dpm/100 cm^2 is greater than 20%. This is mainly due to the modifying factors of efficiency and surface area exacerbating the differences between the actual counts.
            - Let's look at the actual counts and the counting statistics involved. The standard deviation of a single count is the square root of the count. That means that the standard deviations of the two 10/19/04 counts are 0 (the square root of zero is indeterminate, so the standard deviation is set to zero) and 2.449 (square root of 6). Similarly, the standard deviations of the two 11/8/04 counts are 1.414 and 1.732.
            - The net counts of the 10/19/04 measurements with standard deviation is (6-0) +/- $\sqrt{(2.449)^2 + (0)^2}$ or 6 +/- 2.449 counts.
            - The net counts of the 11/8/04 measurements with standard deviation is (2-3) +/- $\sqrt{(1.414)^2 + (1.732)^2}$ or -1 +/- 2.236 counts.
                - 6 +/- 2 std. dev. = 1.101 to 10.899 counts or 1 to 11 counts
                - -1 +/- 2 std. dev. = -5.472 to 3.472 counts or -5 to 3 counts

NASA PBRF DECOMMISSIONING PROJECT

SANDUSKY, OHIO

Characterization Survey Unit Summary Report

Survey Package Number:	C1134 301C2	**Package Type:**	Structure
Survey Area Name:	Primary Pump House (1134)		
Survey Unit Name:	Primary Pump House Exterior Walls (Rev. 0)		

- Notice that the low range of the original alpha net count is less than the high range of the QC count. This shows that even though the difference in the two values, measured in dpm/100 cm^2, is much greater than 20%, the true counts can really be considered to be under the same distribution.
- The fact of the matter is this, the measurements being compared are so low that unless the two measurements are consecutive and the lower of the two is 5 or greater, then there is no way for the difference in the counts to be less than 20%. At this level of radiation detection the variability of instrument response is due to background radiation.

Conclusions & Recommendations

Based on the characterization results reported above for this survey unit, the initial classification of Class 2 is determined to be correct.

C1141 215C1
ROLB Roof and Exterior Walls
(5 pages)

NASA PBRF DECOMMISSIONING PROJECT

SANDUSKY, OHIO

Characterization Survey Unit Summary Report

Survey Package Number:	C1141 215C1	**Package Type:**	Structure
Survey Area Name:	Reactor Office and Laboratory Building (1141)		
Survey Unit Name:	ROLB Roof & Exterior Walls (Rev. 0)		

Survey Unit Description

The PBRF Reactor Office and Laboratory Building (ROLB) connects to the west side of the Reactor Building. This building housed offices for engineering staff, repair shops, health physics offices, a first aid facility, and radiochemistry laboratories. The vast majority of fixed and loose equipment has been removed from this building. Permanent utility services have been disconnected from this building. Temporary electrical service is currently provided to this building.

Survey Unit Initial Classification

The roof and exterior wall surfaces of the ROLB were not surveyed nor were they classified as part of the 1985 Initial Characterization Survey or the 1998 Confirmatory Characterization Survey.

The roof surface is coated with foam/rubber insulation and the exterior walls are covered with glazed speckled brick. At some time in the past, the hot lab ventilation duct work and filter housing were removed from the roof. Between 1973 and 1985 the ROLB roof was recoated and stone removed from various roof surfaces at that time was determined to have elevated activity that was equal to or greater than twice background. The stone was retained on site and is in three piles just west of the Hot Retention Tanks.

Survey Unit Design

The following surveys were performed on the ROLB roof and exterior walls under this survey package:

- Beta scan of approximately 100% of accessible roof surfaces, including sub-surface roof areas where roof material samples are collected, and the lower 2 meters of wall surfaces with the potential to increase scan surveys of wall surfaces above 2 meters based on findings.
    - A maximum beta scan speed of one detector width per second was to be used.
    - Beta scans were not to be logged but quantities of surface area scanned were to be indicated on survey documentation.
- A minimum of 16 (60 second) direct beta count measurements and shielded measurements from surfaces of highest activity (8 from the roof and 8 from the walls) or from random locations if no elevated activity was identified.
- A direct alpha (60 second) count measurement and shielded measurement at each direct beta measurement location where the result is > 1,000 dpm/100 cm².
- A gamma scan of 100% of the accessible roof surfaces.
- A contact gamma measurement at each direct beta measurement location where the result is greater than 5,000 dpm/100 cm² and each elevated area determined during the roof gamma scan.
- A one meter gamma exposure rate measurement at each contact gamma measurement.
- Five one meter gamma exposure rate measurements on the roof, one at each corner, and one at the roof center.
- A 100 cm² smear for removable alpha and beta contamination at each direct beta measurement location.
- Gamma spectroscopy of composite A/B smear samples where > 100 dpm/100 cm² alpha or > 1000 dpm/100 cm² beta is detected.
- Gamma spectroscopy of four roof samples collected at the highest elevated areas determined during gamma scan or randomly if no elevated areas determined.
- A minimum of 5% of the sample points and surface area scans to be replicated as QC survey points.

NASA PBRF DECOMMISSIONING PROJECT

SANDUSKY, OHIO

Characterization Survey Unit Summary Report

Survey Package Number:	C1141 215C1	**Package Type:**	Structure
Survey Area Name:	Reactor Office and Laboratory Building (1141)		
Survey Unit Name:	ROLB Roof & Exterior Walls (Rev. 0)		

Survey Unit Data Assessment

Survey results of the ROLB roof and exterior wall surfaces under this survey package are as follows:

- With the exception of the 6 foot perimeter from the roof edge, beta scans were performed on the roof surface, including sub-surface roof areas where roof material samples were collected, and the lower 2 meters of wall surfaces. Scanned surface areas were documented on survey maps.
    - Scans of the roof surface were performed with the 44-116 probe. Activity generally observed on the roof surface ranged from 300 – 450 cpm. Elevated activity was observed on the roof at various locations where grit had accumulated. When the grit was removed scan readings increased up to 750 cpm in some locations.
    - Scans of the roof surface were also performed with the 43-37B Floor Monitor. Activity generally observed on the roof surface ranged from 700 to 1,800 cpm. At locations where accumulated grit was removed, activity levels ranged from 1700 to 2400 cpm. Activity in close proximity to the roof drain near the penthouse located on the east side of the ROLB east-west corridor ranged from 1,500 to 3,300 cpm.

      At the northwest corner of the roof, the general activity observed ranged from 700 to 1400 cpm. Scan readings up to 3,000 cpm were identified in this area.
    - Scans of the lower 2 meter wall surfaces were performed with the 44-116 probe. Activity generally observed on the speckled glazed brick ranged from 600 to 800 cpm. Activity generally observed on glass windows ranged from 200 to 335 cpm. No elevated rates of activity were detected above these activity ranges.
- Thirty-two direct beta count measurements and shielded measurements were obtained, twenty from the roof and twelve from the lower walls.
    - Three locations where grit had accumulated on the roof were selected for evaluation of direct beta activity. The average shielded background reading at the three locations was 277 cpm (1179 dpm/100 cm^2). The average unshielded direct beta reading on top of the roof grit was 60 net cpm (255 net dpm/100 cm^2). The average unshielded direct beta reading of the roof surface directly beneath the grit was 238 net cpm (1012 net dpm/100 cm^2).
    - Four locations on the roof were selected for surface and subsurface evaluation. One direct beta measurement was collected from the top surface of the insulation at each sample location. When the insulation was removed, approximately 2 – 4 inches of the top layer of foam was also extracted which exposed the original roofing material. Beta scans of the original roofing material were then performed and the 1st subsurface direct measurements/samples/smears were obtained. The original roof material was then removed down to the subsurface building roof structure where the 2nd subsurface beta scans/direct measurements/smears were obtained. The direct beta activity observed on the surface of the insulation and on the 2nd subsurface was generally higher than the activity at the 1st subsurface. The activity on the surface of the insulation is believed to be

NASA PBRF DECOMMISSIONING PROJECT

SANDUSKY, OHIO

Characterization Survey Unit Summary Report

Survey Package Number: C1141 215C1 **Package Type:** Structure
Survey Area Name: Reactor Office and Laboratory Building (1141)
Survey Unit Name: ROLB Roof & Exterior Walls (Rev. 0)

attributed to Cs-137 fallout. The activity of the 2nd subsurface may be attributable to natural radiation of the concrete subsurface building material or remnant activity from previous roof resurfacing activities. The lower activity observed on the 1st subsurface may be due to shielding of higher radiation levels on the 2nd subsurface. Subsurface roof data is provided below.

Survey Point	Beta Direct (dpm/100 cm²)			Highest Loose (dpm/100 cm²)		Gamma Spec Qualitative
	Surface	Sub 1	Sub 2	Beta	Alpha	
Sample Point 1	1009	120	775	18	-0.21	Cs-137
Sample Point 2	187	291	595	14.73	3.29	Cs-137
Sample Point 3	-0.72	131	439	14.73	-0.21	Cs-137
Sample Point 4	247	152	431	11.47	-0.21	Cs-137

- Direct beta measurements were obtained from twelve locations on the lower 2 meters of the ROLB exterior walls (speckled glazed brick). Eleven of the twelve measurements had activity levels generally ranging from 800 to 1,667 net dpm/100 cm² (591 to 667 gross cpm/ 180 to 375 net cpm).

- Seven direct alpha measurements were obtained from the ROLB exterior wall surface which ranged from 17 to 107 dpm/100 cm².
- With exception of the 6 foot perimeter from the roof edge, gamma scan was performed of the roof surface yielding readings that ranged from 6,000 to 8,000 cpm. No elevated locations were identified.
- Direct gamma (contact and associated 1 meter) measurements were not acquired as the direct beta threshold of 5,000 dpm/100 cm² was not exceeded.
- Five 1-meter gamma measurements were collected on the roof, one at each corner and one at the roof center, that ranged from 6,404 to 7,437 cpm (6.2 to 7.2 μR/hr).
- Smears were collected at each direct beta measurement location. The highest activity was determined to be 18 dpm/100 cm² beta and 3.29 dpm/100 cm² alpha.
- Gamma spectroscopy of composite A/B smear samples was not acquired as the threshold of >1000 dpm/100 cm² beta or > 100 dpm/100 cm² alpha was not exceeded.
- Four subsurface roof samples of the original roof were submitted for gamma spec analysis and resulted in qualitative identification of Cs-137, up to twice the MDA. A 250 ml marinelli sample of grit, collected from locations on the roof where accumulated grit was surveyed, was submitted for gamma spec analysis and resulted in < MDA Co-60 and Cs-137. (Pictures of roof survey/sample locations are provided in Appendix C Section 3 Photographs.)
- QC replicate surveys were collected from a minimum of 5% of the direct beta/alpha measurement locations.
  - The QC beta survey point LC5 - 00001 / LC6 – 00001 (glazed speckled brick) resulted in a net 803 dpm/100 cm² as compared with the original beta survey point LC5 - 00001 / LC6 – 00001 which resulted in 929 dpm/100 cm². The QC beta survey point LC5 - 00002 / LC6 – 00008 (roof) resulted in a net 443 dpm/100 cm² as compared with the original beta survey point LC5 - 00002 / LC6 – 00008 which resulted in 431 dpm/100 cm².
  - The QC alpha survey point LC5 - 00001 / LC6 – 00004 (glazed speckled brick) resulted in a net 52 dpm/100 cm² as compared with the original alpha survey point LC5 - 00001 / LC6 – 00004 of 33 dpm/100 cm².
    - On 11/5/04, two alpha counts were taken with the results being 1 count shielded and 5 counts unshielded: both 60-second counts. Using modifying factors for both surface area and efficiency, this corresponds to 33 dpm/100 cm².

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SANDUSKY, OHIO

Characterization Survey Unit Summary Report

Survey Package Number:	C1141 215C1	**Package Type:**	Structure
Survey Area Name:	Reactor Office and Laboratory Building (1141)		
Survey Unit Name:	ROLB Roof & Exterior Walls (Rev. 0)		

- On 11/5/04, two alpha counts were taken for QC with the results being 1 count shielded and 8 counts unshielded. Again, both counts were of 60-second duration. Using modifying factors for both surface area and efficiency, this corresponds to 52 dpm/100 cm^2.
  - Notice that the difference between the original alpha measurement of 33 dpm/100 cm^2 and the QC measurement of 52 dpm/100 cm^2 is greater than 20%. This is mainly due to the modifying factors of efficiency and surface area exacerbating the differences between the actual counts.
  - Let's look at the actual counts and the counting statistics involved. The standard deviation of a single count is the square root of the count. That means that the standard deviations of the two original counts are 1 (square root of 1) and 2.236 (square root of 5). Similarly, the standard deviations of the two QC counts are 1 and 2.828.
  - The net counts of the original measurements with standard deviation is (5-1) +/- $\sqrt{(2.236)^2 + (1)^2}$ or 4 +/- 2.449 counts.
  - The net counts of the QC measurements with standard deviation is (8-1) +/- $\sqrt{(2.828)^2 + (1)^2}$ or 7 +/- 2.999 counts.
    - 4 +/- 2 std. dev. = -0.898 to 8.898 counts or -1 to 9 counts
    - 7 +/- 2 std. dev. = 1.002 to 12.998 counts or 1 to 13 counts
  - Notice that the low range of the original alpha net count is less than the high range of the QC count. This shows that even though the difference in the two values, measured in dpm/100 cm^2, is much greater than 20%, the true counts can really be considered to be under the same distribution.
  - The fact of the matter is this, the measurements being compared are so low that unless the two measurements are consecutive and the lower of the two is 5 or greater, then there is no way for the difference in the counts to be less than 20%. At this level of radiation detection the variability of instrument response is due to background radiation.

Conclusions & Recommendations

Based on the characterization results reported above for this survey unit it is recommended that the roof be classified as Class 2 and the exterior walls Class 3.

APPENDIX K

Out Buildings

(19 pages)

D1135 402C1 Interior and Exterior Surfaces of the Gas Services Building
D1136 402C1 Interior & Exterior Surfaces of the Reactor Compressor Building
D1151 401C1 Reactor Water Tower Structural Surfaces, Interior and Exterior
D1191 401C1 Reactor Security Building Interior Surfaces
D1191 402C1 Reactor Security Building Exterior Walls and Roof
D1195 401C1 Reactor Cryogenic and Gas Supply Farm and Building (1195 & 9837) Interior and Exterior Structure Surfaces

In this Appendix are data that can be used as summaries from six characterization survey packages performed to document the radiological status of the interior and exterior surfaces of five structures. These structures supported operations inside the reactor building, but they did not contain systems or equipment that would have the potential to become contaminated by those same operations.

For the most part, these survey packages are some of the earliest written on this project, dating back to 2003. As such, they may not be considered as rigorous as packages written more recently. Also, they may not appear to be as rigorous due to the lack of potential for contamination.

At the outset of this decommissioning project, both the Gas Services Building (1135) and the Gas Compressor Building (1136) were found to contain a large amount of loose equipment and materials which had to be surveyed and removed prior to taking the two buildings down. With the exception of the Reactor Security Building (1191) and the Reactor Radar and Weather Tower House, all that remains of the other structures are either the concrete pads that the buildings sat on or concrete trenches or basins. Building 1191 is still in use by the Project and excavation work will have to be performed to expose the concrete pad for 1152 prior to its being surveyed. Not all of the Out Buildings have been surveyed; however, the ones that have not been surveyed are not expected to show signs of detectable contamination from operations at the PBRF.

The list of Out Buildings is as follows:
1135 – Reactor Gas Services Building
1136 – Reactor Compressor Building
1151 – Reactor Water Tower
1152 – Reactor Cooling Tower
1153 – Reactor Sludge Basins
1154 – Cold Retention Basins
1157 – Reactor Precipitator
1161 – Reactor Substation
1191 – Reactor Security Building
1192 – Reactor Effluent Metering System
1193 – Reactor Radar and Weather Tower House
1195/9837 – Reactor Cryogenic and Gas Supply System
1196 – Reactor Gas Storage Structure

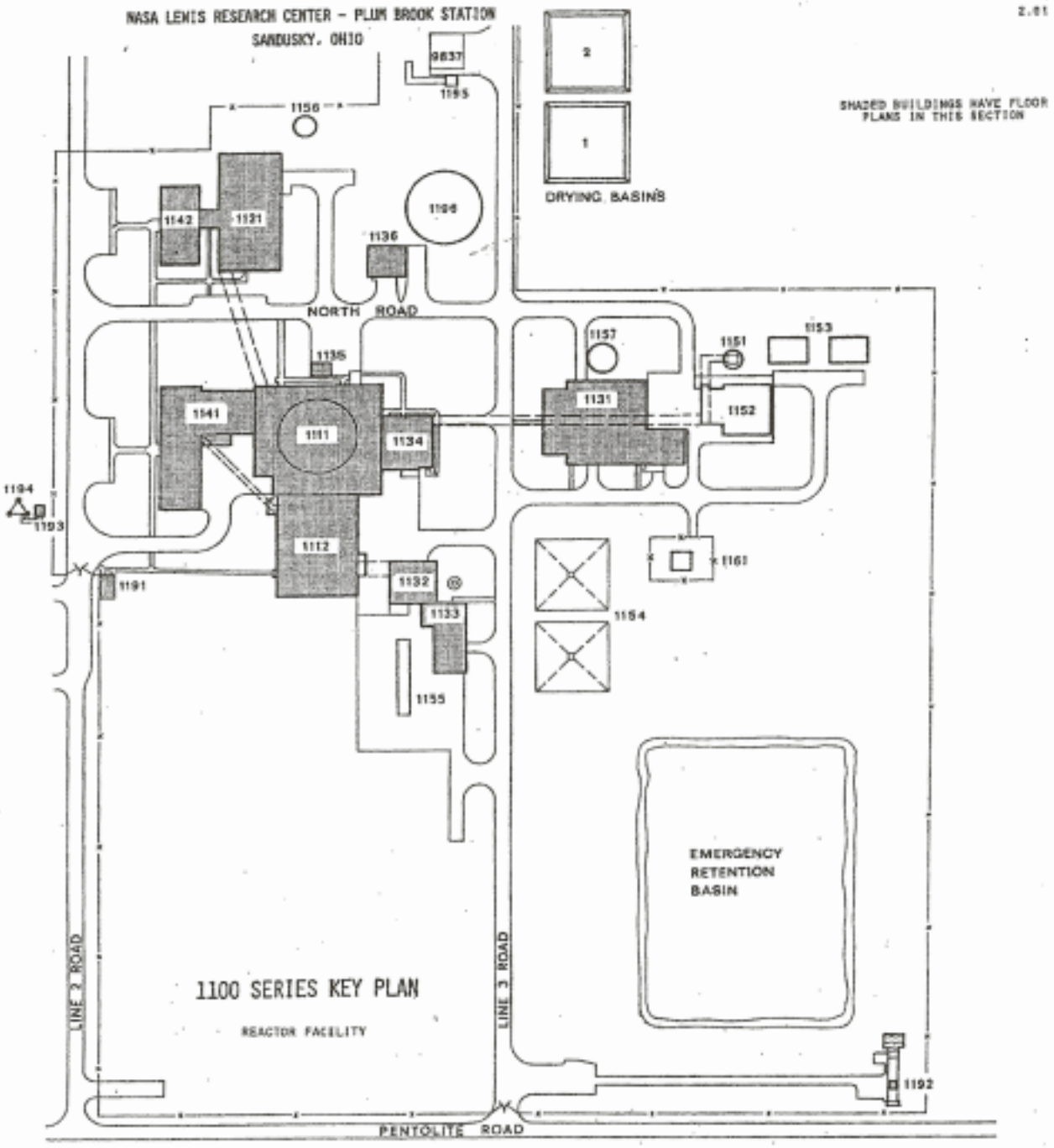
On the next page, a site map shows where each of the structures in this Appendix is located.

At this time, a DCGL cannot be determined for either the Cold Retention Basins (1157) or the Reactor Effluent Metering System (1192). No samples have been taken on these structures because they are still in use. Structure 1192 is the PBRF liquid release point and, as such, is known to have controlled the release of radioactive effluents during plant operations. In addition, soil samples taken both upstream and downstream of this structure have revealed the presence of plant-related radioactivity dominated by the isotopes Cs-137, Co-60, and Sr-90.

It is known that the Cold Retention Basins have leaked in the past and plant-related radioactive material has been found on the underside of the basins.

A DCGL of 40,500 dpm/100 cm^2 should be used during the FSS of the remaining eleven structures. Since the results of the six survey packages revealed no detectable contamination greater than release criteria, the other structures were built at the same time and of the same materials, and there is no reason to believe that plant-related contaminants migrated to any of the buildings not surveyed, they should be surveyed to the least stringent criteria.

These are miscellaneous structures, other than building foundations, which can be found around the site. These consist of field drainage wing walls, foundations for abandoned towers, transformer pads, electrical and piping vaults adjacent to buildings, valve pits, tank and transformer pedestals, sidewalks, and slabs outside of personnel doors and roll-up doors. These miscellaneous structures are listed in Appendix L with their proposed DCGLs.


NASA LEWIS RESEARCH CENTER - PLUM BROOK STATION
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2.81
SHADED BUILDINGS HAVE FLOOR PLANS IN THIS SECTION
9837
1195
1156
2
1
DRYING BASINS
1142
1121
1196
1136
NORTH ROAD
1157
1151
1153
1135
1141
1111
1134
1131
1152
1194
1193
1112
1161
1191
1132
1133
1154
1155
EMERGENCY RETENTION BASIN
LINE 2 ROAD
LINE 3 ROAD
1100 SERIES KEY PLAN
REACTOR FACILITY
1192
PENTOLITE ROAD

D1135 402C1
Reactor Gas Services Building
Interior and Exterior Surveys
(3 pages)

D1135 402C1

Interior and Exterior Surveys of the Gas Services Building

Direct Alpha dpm/100 cm^2	Direct Beta dpm/100 cm^2	Loose Alpha dpm/100 cm^2	Loose Beta dpm/100 cm^2	Tritium dpm/100 cm^2
4	-74	<MDA	<MDA	0
27	-16	<MDA	<MDA	0
-6	333	<MDA	<MDA	0
-7	-16	<MDA	<MDA	0
	39	<MDA	<MDA	0
	157	<MDA	<MDA	0
	-78	<MDA	<MDA	10
	228	<MDA	<MDA	0
	178	<MDA	<MDA	
	-215	<MDA	<MDA	
	133	<MDA	<MDA	
	253	<MDA	<MDA	
	245	<MDA	<MDA	
	96	<MDA	<MDA	
	439	<MDA	<MDA	
	-42	<MDA	<MDA	
	427	<MDA	<MDA	
	667	<MDA	<MDA	
	352	<MDA	<MDA	
	650	<MDA	<MDA	
	530	<MDA	<MDA	
	456	<MDA	<MDA	
	750	<MDA	<MDA	
	522	<MDA	<MDA	
	489	<MDA	<MDA	
	328	<MDA	<MDA	
	820	<MDA	<MDA	
	-12	<MDA	<MDA	
	107	<MDA	<MDA	
	120	<MDA	<MDA	
	-145	<MDA	<MDA	
	137	<MDA	<MDA	
	195	<MDA	<MDA	
	207	<MDA	<MDA	
	170	<MDA	<MDA	

	Direct Alpha	Direct Beta	Loose Alpha	Loose Beta	Tritium
	dpm/100 cm^2	dpm/100 cm^2	dpm/100 cm^2	dpm/100 cm^2	dpm/100 cm^2
		985	<MDA	<MDA	
		474	<MDA	<MDA	
			<MDA	22.66	
			<MDA	<MDA	
MAX	27	985	0	23	10
MIN	-7	-215	0	23	0
MEDIAN	-1.00	207	N/A	22.66	0.00
MEAN	4.50	267	N/A	22.66	1.25
STD. DEV.	15.80	282	N/A	N/A	3.54
dev/mean	351.13%	105.61%	N/A	N/A	282.84%

Gamma spec of 1L sump water sample 0.267 pCi/g (MDA 0.231 pCi/g) Cs-137
Survey of brick, metal, bare concrete, and miscellaneous material

D1136 402C1
Interior & Exterior Surveys
of the
Reactor Compressor Building
(3 pages)

D1136 402C1

Reactor Compressor Building Interior and Exterior Structural Surfaces

Direct Alpha	Direct Beta	Loose Alpha	Loose Beta	Tritium
dpm/100 cm^2	dpm/100 cm^2	dpm/100 cm^2	dpm/100 cm^2	dpm/100 cm^2
	692	<MDA	<MDA	0
	497	<MDA	<MDA	0
	500	<MDA	<MDA	0
	895	<MDA	<MDA	0
	791	<MDA	<MDA	0
	638	<MDA	<MDA	0
	882	<MDA	<MDA	
	646	<MDA	<MDA	
	903	<MDA	<MDA	
	435	<MDA	<MDA	
	688	<MDA	<MDA	
	551	<MDA	<MDA	
	547	<MDA	<MDA	
	447	<MDA	<MDA	
	447	<MDA	<MDA	
	580	<MDA	<MDA	
	103	<MDA	<MDA	
	120	<MDA	<MDA	
	-12	<MDA	<MDA	
	103	<MDA	<MDA	
	-112	<MDA	<MDA	
	170	<MDA	<MDA	
	207	<MDA	<MDA	
	158	<MDA	<MDA	
	28	<MDA	<MDA	
	-318	<MDA	<MDA	
	-266	<MDA	<MDA	
	-5	<MDA	<MDA	
	373	<MDA	<MDA	
	-46	<MDA	<MDA	
	-32	<MDA	<MDA	
	313	<MDA	<MDA	
	-159	<MDA	<MDA	
	117	<MDA	<MDA	
	126	<MDA	<MDA	

	Direct Alpha	Direct Beta	Loose Alpha	Loose Beta	Tritium
	dpm/100 cm^2	dpm/100 cm^2	dpm/100 cm^2	dpm/100 cm^2	dpm/100 cm^2
		-168	<MDA	<MDA	
		159	<MDA	<MDA	
		5	<MDA	<MDA	
		135	<MDA	<MDA	
		-70	<MDA	<MDA	
		285	<MDA	<MDA	
		131	<MDA	<MDA	
		70	<MDA	<MDA	
		-225	<MDA	<MDA	
		75	<MDA	<MDA	
		303	<MDA	<MDA	
		79	<MDA	<MDA	
		-374	<MDA	<MDA	
		-224	<MDA	<MDA	
		-56	<MDA	<MDA	
		87	<MDA	<MDA	
		114	<MDA	<MDA	
		63	<MDA	<MDA	
		337	<MDA	<MDA	
MAX	0	903	0	0	0
MIN	0	-374	0	0	0
MEDIAN	N/A	129	N/A	N/A	0.00
MEAN	N/A	217	N/A	N/A	0.00
STD. DEV.	N/A	323.62	N/A	N/A	N/A
dev/mean	N/A	148.94%	N/A	N/A	N/A

Survey of brick, metal, bare concrete, and miscellaneous material

Note: There were no direct alpha measurement downloads in this survey package.

Note: It is suspected that the surveyor may have mixed up the beta field count from the background counts because it is unlikely that one could obtain rather large negative values from shielded versus unshielded. The bottom line is that, even with these suspected reversing errors, there is no contamination above the relaease criteria for this structure. The corrugated metal building itself was removed and all that remains is a concrete pad to which the building was attached.

D1151 401C1
Reactor Water Tower
Structural Surfaces, Interior and Exterior
(2 pages)

D1151 401C1

Reactor Water Tower Structural Surfaces Interior and Exterior

	Direct Alpha	Direct Beta	Loose Alpha	Loose Beta	Tritium
	dpm/100 cm^2	dpm/100 cm^2	dpm/100 cm^2	dpm/100 cm^2	dpm/100 cm^2
	19	1715	<MDA	<MDA	0
	15	-112	<MDA	26.25	38
	-3	-196	<MDA	<MDA	0
	19	40	<MDA	<MDA	0
		-175	<MDA	<MDA	0
		-181	<MDA	<MDA	0
			<MDA	<MDA	0
			<MDA	<MDA	0
			<MDA	<MDA	0
			<MDA	<MDA	0
			<MDA	<MDA	0
			<MDA	<MDA	
			<MDA	<MDA	
			<MDA	<MDA	
			<MDA	<MDA	
MAX	19	1715	<MDA	26	38
MIN	-3	-196	<MDA	26	0
MEDIAN	17.00	-144	N/A	26.25	0.00
MEAN	12.50	182	N/A	26.25	3.45
STD. DEV.	10.50	756.15	N/A	N/A	11.46
dev/mean	84.03%	415.85%	N/A	N/A	331.66%

Survey of metal and miscellaneous material

Note: It is apparent that the surveyor mixed up the field count from the background counts because it is unlikely that one could obtain four out of six negative values from shielded vs. unshielded readings. It is strongly suspected that the sign on readings -112, -196, 40, -175, and -181 should be reversed. The bottom line is that there is no contamination above the release criteria present on this structure. As of this writing the water tower was removed in October, 2004 and all that exists is a concrete pedestal.

D1191 401C1
Reactor Security Building Interior Surfaces
(2 pages)

D1191 401C1
Reactor Security Building Interior Surfaces

	Direct Alpha dpm/100 cm^2	Direct Beta dpm/100 cm^2	Loose Alpha dpm/100 cm^2	Loose Beta dpm/100 cm^2	Tritium dpm/100 cm^2
		416	<MDA	<MDA	
		523	<MDA	<MDA	
		-94	<MDA	<MDA	
		259	<MDA	<MDA	
		-45	<MDA	<MDA	
		255	<MDA	<MDA	
		81	<MDA	<MDA	
		22	<MDA	<MDA	
MAX	0	523	<MDA	<MDA	0
MIN	0	-94	<MDA	<MDA	0
MEDIAN	N/A	168	N/A	N/A	N/A
MEAN	N/A	177	N/A	N/A	N/A
STD. DEV.	N/A	222.20	N/A	N/A	N/A
dev/mean	N/A	125.45%	N/A	N/A	N/A

Survey of metal, concrete, and miscellaneous material

Note: Since the direct beta readings were so low, no direct alpha readings were taken. Since the loose contamination levels were all <MDA, no tritium smears were taken.

D1191 402C1
Reactor Security Building Exterior Walls and Roof
(2 pages)

D1191 402C1
Reactor Security Building Exterior Surfaces

	Direct Alpha dpm/100 cm^2	Direct Beta dpm/100 cm^2	Loose Alpha dpm/100 cm^2	Loose Beta dpm/100 cm^2	Tritium dpm/100 cm^2
		26	<MDA	20.75	
		-120	<MDA	<MDA	
		-62	<MDA	<MDA	
		138	<MDA	<MDA	
		-89	<MDA	<MDA	
		-13	<MDA	<MDA	
		93	<MDA	33.53	
		-71	<MDA	39.91	
MAX	0	138	<MDA	40	0
MIN	0	-120	<MDA	21	0
MEDIAN	N/A	-38	N/A	34	N/A
MEAN	N/A	-12	N/A	31	N/A
STD. DEV.	N/A	91.45	N/A	9.76	N/A
dev/mean	N/A	-746.54%	N/A	31.08%	N/A

Survey of metal, concrete, and miscellaneous material

Note: Since the direct beta readings were so low, no direct alpha readings were taken. Since the loose beta contamination levels were all <1000 dpm/100 cm^2, no tritium smears were taken.

D1195 401C1
Reactor Cryogenic and Gas Supply
Farm and Building (1195 & 9837)
Interior and Exterior Structure Surfaces

(3 pages)

D1195 401C1

Reactor Cryogenic & Gas Supply Building

Direct Alpha dpm/100 cm^2	Direct Beta dpm/100 cm^2	Loose Alpha dpm/100 cm^2	Loose Beta dpm/100 cm^2	Tritium dpm/100 cm^2
18	76	<MDA	<MDA	0
47	71	<MDA	<MDA	0
62	-101	<MDA	<MDA	2
31	-34	<MDA	32.93	
0	172	<MDA	<MDA	
	310	<MDA	<MDA	
	80	<MDA	<MDA	
	214	<MDA	<MDA	
	76	<MDA	<MDA	
	71	<MDA	<MDA	
	-146	<MDA	<MDA	
	214	<MDA	<MDA	
	-84	<MDA	<MDA	
	138	<MDA	<MDA	
	-71	<MDA	<MDA	
	25	<MDA	<MDA	
	113	<MDA	<MDA	
	534	<MDA	<MDA	
	381	<MDA	<MDA	
	704	<MDA	<MDA	
	915	<MDA	<MDA	
	737	<MDA	<MDA	
	754	<MDA	<MDA	
	-8	<MDA	<MDA	
	74	<MDA	<MDA	
	-199	<MDA	<MDA	
	-178	<MDA	<MDA	
	-166	<MDA	<MDA	
	-116	<MDA	<MDA	
	-137	<MDA	<MDA	
	-348	<MDA	<MDA	
	-348	<MDA	<MDA	
	-402	<MDA	<MDA	
	-58	<MDA	<MDA	
	67	<MDA	<MDA	

	Direct Alpha	Direct Beta	Loose Alpha	Loose Beta	Tritium
	dpm/100 cm^2	dpm/100 cm^2	dpm/100 cm^2	dpm/100 cm^2	dpm/100 cm^2
		150	<MDA	<MDA	
		223	<MDA	<MDA	
		-62	<MDA	<MDA	
		79	<MDA	<MDA	
		120	<MDA	<MDA	
		302	<MDA	<MDA	
		618	<MDA	<MDA	
		-20	<MDA	<MDA	
		-35			
		-40			
		142			
		4			
		-565			
		12			
		357			
		8			
		-409			
		188			
		506			
		632			
		110			
		118			
		-137			
		-11			
		67			
MAX	62	915	0	33	2
MIN	0	-565	0	33	0
MEDIAN	31.00	71.00	N/A	32.93	0.00
MEAN	31.60	100.73	N/A	32.93	0.67
STD. DEV.	24.21	295.57	N/A	N/A	1.15
dev/mean	76.63%	293.43%	N/A	N/A	173.21%

Sand from blast shield was 0.0717 pCi/g Cs-137 (MDA 0.0384 pCi/g)
Survey of metal, miscellaneous material, and bare concrete

Note: It is apparent that the surveyor mixed up the field count from the background counts because it is highly unlikely that one could obtain a run of nine straight negative readings and rather large negative readings at that (-199, -178, -166, -116, -137, -348, -348, -402, -58). Even if the values were all positive, it would have no material effect on the outcome -- that there is no contamination above the release crieteria present on this structure.

APPENDIX L

Building Structural Surface DCGLs

(27 pages)

Appendices D, F, G, H, I, J, and K present data, calculations, and/or arguments for using various DCGLs at the PBRF. This Appendix will delineate the applicable DCGLs on a room-by-room and building-by-building basis. Good engineering judgment has been used to extend the DCGLs to adjacent areas where data has not been and can not be collected but, because of both the historical and operational use of the area, would be expected to result in having the same DCGL.

REACTOR BUILDING	FSS Class	Area (m^2)					DCGL
Building 1111		Floor	Lower Walls	Upper Walls	Ceiling	Total	(dpm/100 cm^2)
INTERIOR:							
INSIDE CONTAINMENT VESSEL:							
Area 2							
Work Space Inside Containment, 0'	1	337.11	191.51	630.67	912.08	2,071.37	11,563
Area 17							
Test Area Inside Containment, -25'	1	187.08	226.20	601.14	187.08	1,201.50	37,235
Area 18							
Canal E	1	123.28	151.50	425.72	0.00	700.50	31711
Area 23							
Quadrant A	1	84.36	80.61	226.51	0.00	391.48	13,450
Area 24							
Quadrant B	1	55.68	59.38	184.95	0.00	300.01	21,566
Area 25							
Quadrant C	1	84.36	80.61	226.51	0.00	391.48	21,566
Area 26							
Quadrant D	1	61.19	62.82	176.53	0.00	300.54	21,566
Area 29							
Sub-Pile Room	1	7.30	19.15	21.71	0.00	48.16	11,563
Area 30							
Elevator Pit and Stairwell	1	38.41	99.30	0.00	0.00	137.71	11,563
TOTAL:		**978.77**	**971.08**	**2,493.74**	**1,099.16**	**5,542.75**	
OUTSIDE CONTAINMENT VESSEL:							
Area 1							
General Floor Area at Grade	1/2	1,091.61	389.69	1,203.92	1,201.89	3,887.11	29,060
Area 3, Canals							
Canal F	1	34.93	34.44	137.89	0.00	207.26	31,711
Canal G	1	42.18	46.13	170.73	0.00	259.04	31,711
Canal H	1	33.17	39.01	109.63	0.00	181.81	31,711
Area 4, Shop Area							
Rooms 102 and 103	3	76.18	73.76	61.13	76.18	287.25	29,060
Room 104	3	38.09	49.38	40.92	38.09	166.48	29,060
Room 105	3	38.09	49.38	40.92	38.09	166.48	29,060
Count Rooms							
Room 5, Experimental Control Room	2	76.44	42.88	35.53	76.44	231.29	29,060

REACTOR BUILDING	FSS Class	Area (m^2)					DCGL
Building 1111		Floor	Lower Walls	Upper Walls	Ceiling	Total	(dpm/100 cm^2)
Room 6, Counting Room	2	9.45	25.60	21.22	9.45	65.72	29,060
Room 7, Janitor Closet	2	10.49	26.62	22.06	10.49	69.66	29,060
Room 8, Restroom	2	9.97	26.11	21.64	9.97	67.69	29,060
Room 9, Locker	2	27.01	42.77	35.45	27.01	132.24	29,060
Room 10, Personnel Decontamination	2	9.97	26.11	21.64	9.97	67.69	29,060
Area 11, Office Area Mezzanine							
Room 15, Reactor Control Room	2	76.44	42.88	48.60	76.44	244.36	29,060
Room 16, Restroom at Elevation 12'	2	6.50	20.73	23.50	6.50	57.23	29,060
Room 28, Storage	2	7.90	22.56	25.57	7.90	63.93	29,060
Rooms 202 and 203, Electrical Rooms	2	58.22	67.87	76.94	58.22	261.25	29,060
Room 204, Office	2	29.11	43.48	49.29	29.11	150.99	29,060
Room 205, Office	2	32.02	45.92	52.06	32.02	162.02	29,060
Room 206, Office	2	15.18	31.19	35.35	15.18	96.90	29,060
Room 207, Office	2	15.18	31.19	35.35	15.18	96.90	29,060
Room 208, Office	2	15.18	31.19	35.35	15.18	96.90	29,060
Room 209, Office	2	15.18	31.19	35.35	15.18	96.90	29,060
Pipe Chase	2	4.10	20.22	22.92	4.10	51.34	29,060
Mezzanine Walkway	2	92.25	0.00	0.00	0.00	92.25	29,060
Area 20							
Work Area at Elevation -15'	1	740.64	214.53	253.98	740.64	1,949.79	35,296
Area 21							
Work Area at Elevation -25'	1	276.13	164.09	444.59	276.13	1,160.94	14,600
Area 22							
Pump Room and Roof	1/2	124.33	62.38	73.09	62.16	321.96	14,600
Area 33							
Air Locks 1 and 2	1	23.78	71.35	0.00	11.89	107.02	11,563
TOTAL:		**3,029.72**	**1,772.65**	**3,134.62**	**2,863.41**	**10,800.40**	
BUILDING EXTERIOR:							
Building Roof	2	2,388.31	0.00	0.00	0.00	2,388.31	27,166
Building Exterior Walls	3	0.00	273.25	959.58	0.00	1,232.83	27,166
TOTAL:		2,388.31	273.25	959.58	0.00	3,621.14	

HOT LABORATORY	FSS Class	Area (m^2)					DCGL
Building 1112		Floor	Lower Walls	Upper Walls	Ceiling	Total	(dpm/100 cm^2)
BUILDING INTERIOR:							
Hot Cells							
Hot Cell 1		31.77	49.38	67.26	31.77	180.18	34,404
Hot Cell 2		12.82	28.65	39.03	12.82	93.32	34,404
Hot Cell 3		8.92	24.38	33.22	8.92	75.44	34,404
Hot Cell 4		5.95	19.51	26.57	5.95	57.98	34,404
Hot Cell 5		5.95	19.51	26.57	5.95	57.98	34,404
Hot Cell 6		5.95	19.51	26.57	5.95	57.98	34,404
Hot Cell 7		5.95	19.51	26.57	5.95	57.98	34,404
Mezzanine							
Above Hot Cells 1 and 2		87.85	80.05	112.10	56.07	336.07	38,647
Above Hot Cells 3 through 7		96.15	94.18	149.83	96.15	436.31	38,647
Cold Work Areas							
Room 8 and Air Lock		207.84	166.42	298.47	207.84	880.57	38,647
Room 8A, Vestibule		5.89	21.03	0.00	5.89	32.81	38,647
Room 9, Manipulator Repair Shop		46.25	55.78	29.23	46.25	177.51	38,647
Room 10, Office		8.88	17.99	0.00	4.44	31.31	38,647
Lavatory Areas							
Room 11, Locker Area		21.27	51.18	0.00	21.27	93.72	38,647
Room 12, Cold Lavatory		20.21	47.82	0.00	20.21	88.24	38,647
Area 13, Pipe Space		5.57	34.19	0.00	5.57	45.33	38,647
Room 14, Change Room		19.28	43.73	0.00	19.28	82.29	38,647
Room 15, Hot Lavatory		26.33	82.32	0.00	26.33	134.98	38,647
Room 15A, Closet		2.32	14.86	0.00	2.32	19.50	38,647
Room 16, Hot Work Area		184.25	82.65	159.37	277.51	703.78	38,647
Hot Handling Area							
Room 17, Hot Handling Room		64.28	53.92	119.26	124.90	362.36	38,647

HOT LABORATORY	FSS Class	Area (m^2)					DCGL
Building 1112		Floor	Lower Walls	Upper Walls	Ceiling	Total	(dpm/100 cm^2)
Area 26, Valve Pit							38,647
Area 18							
Canal J		58.90	79.04	222.10	0.00	360.04	38,647
Hot Dry Storage							
Room 19, Hot Dry Storage		70.37	68.07	232.77	0.00	371.21	38,647
Room 19A, Off-Gas Cleanup		14.04	36.27	124.03	0.00	174.34	38,647
Room 19, Removable Slabs and Area Above		19.75	77.80	164.11	123.12	384.78	38,647
Area 20							
Canal K		63.41	73.76	207.27	0.00	344.44	38,647
Decontamination Areas							
Room 21, Storage and Roof		22.69	36.80	0.00	11.35	70.84	38,647
Room 22, Repair Shop		64.34	70.81	119.88	64.34	319.37	38,647
Room 23, Decontamination Room		35.92	51.82	58.74	35.92	182.40	38,647
Room 24, Storage		54.87	59.44	100.62	54.87	269.80	38,647
Hot Pipe Tunnel							
Area 25A		136.58	125.78	46.74	136.58	445.68	35,781
Area 25B		129.59	139.35	73.02	129.59	471.55	35,781
Area 25C		18.81	50.17	0.00	18.81	87.79	35,781
Mezzanine							
Room 27		131.00	126.25	137.98	131.00	526.23	38,647
TOTAL:		**1,693.95**	**2,021.93**	**2,601.31**	**1,696.92**	**8,014.11**	
BUILDING EXTERIOR:							
Building Roof		1,312.93	0.00	0.00	0.00	1,312.93	27,166
Building Exterior Walls		0.00	229.43	3,102.62	0.00	3,332.05	27,166

HOT LABORATORY	FSS Class	Area (m^2)					DCGL
Building 1112		Floor	Lower Walls	Upper Walls	Ceiling	Total	(dpm/100 cm^2)
TOTAL:		1,312.93	229.43	3,102.62	0.00	4,644.98	

SERVICE EQUIPMENT BUILDING	FSS Class	Area (m^2)					DCGL
Building 1131		Floor	Lower Walls	Upper Walls	Ceiling	Total	(dpm/100 cm^2)
BUILDING INTERIOR:							
First Floor Areas							
Area 1, Shop and Equipment	1/3	216.68	118.07	208.76	216.68	760.19	27,166
Room 1, Chemistry Laboratory & Records	2/3	36.37	51.82	42.95	36.37	167.51	27,166
Room 2, Counting	2/3	13.44	29.36	24.33	13.44	80.57	27,166
Room 3, Office	2/3	13.44	29.36	24.33	13.44	80.57	27,166
Room 4, Corridor	2/3	10.06	35.26	29.22	10.06	84.60	27,166
Room 5, Locker	2/3	7.75	22.86	18.95	7.75	57.31	27,166
Room 6, Restroom	2/3	14.42	30.48	25.26	14.42	84.58	27,166
Room 7, Janitor's Closet	2/3	2.79	14.02	11.62	2.79	31.22	27,166
Room 8, Restroom Vestibule	2/3	1.30	9.14	7.58	1.30	19.32	27,166
Room 9, Vestibule	2/3	5.08	18.19	15.08	5.08	43.43	27,166
Room 10, Corridor	2/3	18.52	39.12	32.43	18.52	108.59	27,166
Room 11, Control Room	2/3	99.89	83.42	69.14	106.20	358.65	27,166
Room 12, Chlorine	2/3	19.50	25.09	16.97	9.75	71.31	27,166
Room 13, Water Treatment	2/3	415.82	163.98	381.46	198.13	1,159.39	27,166
Room 15, Boiler	2/3	182.79	108.61	272.08	182.79	746.27	27,166
Room 16, Parts and Storage	2/3	26.99	42.27	38.25	26.99	134.50	27,166
Room 17, Vertical Lift	2/3	18.43	34.34	31.08	18.43	102.28	27,166
Room 18, Engine Room	2/3	498.64	188.56	472.38	498.64	1,658.22	27,166
Mezzanine Areas							
Room 1A, Instrument Repair	3	21.03	37.19	23.28	21.03	102.53	27,166
Room 2A, Instrument Repair	3	25.56	40.54	25.38	25.56	117.04	27,166
Room 3A, Instrument Repair	3	30.77	45.42	28.43	30.77	135.39	27,166
Addition Mezzanine Walkway and Stairs		16.09	24.38	15.27	16.09	71.83	27,166
Area 14, Mezzanine	2/3	23.54	9.55	5.01	23.54	61.64	27,166
Room 19, Chemical Storage	2/3	147.08	18.80	9.85	147.08	322.81	27,166
Room 19A, Chemical Storage	1/3	47.07	0.00	0.00	47.07	94.14	27,166

SERVICE EQUIPMENT BUILDING	FSS Class	Area (m^2)					DCGL
Building 1131		**Floor**	**Lower Walls**	**Upper Walls**	**Ceiling**	**Total**	**(dpm/100 cm^2)**
Cold Pipe Tunnel							
Area 23, under Building 1131	1	170.39	176.78	200.40	170.38	717.95	11,000
Area 23, from 1131 to 1152	1	91.04	102.41	116.10	91.04	400.59	11,000
Area 23, under 1152	1	50.63	78.64	116.11	50.63	296.01	11,000
Area 23, from 1151 to 1152	1	28.18	83.50	18.06	0.00	129.74	11,000
Area 23, under 1151	1	5.95	16.72	0.00	4.12	26.79	11,000
Area 23, from 1111 to 1131	1	284.84	284.07	148.85	284.84	1,002.60	11,000
Basement Areas							
Room 20, Auxiliary Equipment	3	90.11	58.32	70.56	90.11	309.10	27,166
Room 21, Water Treatment Pump	3	145.10	80.16	96.97	145.10	467.33	27,166
Area 22, Clear Well	3	39.57	68.68	75.24	39.57	223.06	27,166
Area 27, Generator/Compressor Pit	3	42.96	70.92	91.20	0.00	205.08	27,166
Room 25, Electrical and Batteries	2/3	92.60	46.63	53.77	92.60	285.60	27,166
Area 26, Pit	3	14.81	40.05	21.57	0.00	76.43	27,166
Area 24, Closet, Basement	3	9.10	34.75	44.68	9.10	97.63	27,166
TOTAL:		**2,978.33**	**2,361.46**	**2,882.60**	**2,669.41**	**10,891.80**	
BUILDING EXTERIOR:							
Building Roof	2	1,572.61	0.00	0.00	0.00	1,572.61	27,166
Building Exterior Walls	3	0.00	361.30	901.23	0.00	1,262.53	27,166
TOTAL:		**1,572.61**	**361.30**	**901.23**	**0.00**	**2,835.14**	

FAN HOUSE	FSS Class	Area (m^2)					DCGL
Building 1132		Floor	Lower Walls	Upper Walls	Ceiling	Total	(dpm/100 cm^2)
BUILDING INTERIOR:							
First Floor Operating Area							
Room 1, Operating Area	1	257.57	140.21	180.31	280.17	858.26	36,857
Room 2, Restroom	1	18.58	24.38	5.34	9.29	57.59	36,857
Room 3, Janitor's Closet	1	10.22	18.90	4.14	5.11	38.37	36,857
Room 4, Deionizer	1	14.91	41.45	40.34	14.91	111.61	36,857
Room 5, Office	1	6.50	20.73	26.65	6.50	60.38	36,857
Basement Areas							
Room 6, Air Monitor	1	17.03	34.03	26.49	17.03	94.58	36,857
Room 7, Sump Room	1	20.16	44.92	20.02	20.45	105.55	36,857
Room 8, Equipment Room	1	255.41	128.17	99.78	255.41	738.77	36,857
Lab	1	39.05	35.97	13.37	39.05	127.44	36,857
Area 10, Stairwell	1	8.47	24.69	19.22	0.00	52.38	36,857
Resin Pit	1	12.63	30.48	0.50	8.71	52.32	36,857
Hot Pipe Chase to Fan House	1	45.38	126.23	0.00	45.38	216.99	36,857
TOTAL:		**705.91**	**670.16**	**436.16**	**702.01**	**2,514.24**	
BUILDING EXTERIOR:							
Building Roof	2	325.42	0.00	0.00	0.00	325.42	27,166
Building Exterior Walls	2	0.00	144.51	196.86	0.00	341.37	27,166
TOTAL:		**325.42**	**144.51**	**196.86**	**0.00**	**666.79**	

WASTE HANDLING BLDG.	FSS Class	Area (m^2)					DCGL
Building 1133		Floor	Lower Walls	Upper Walls	Ceiling	Total	(dpm/100 cm^2)
BUILDING INTERIOR:							
Operating Areas							
Room 1, Operating Area	1	173.31	127.00	260.10	204.97	765.38	40,051
Room 2, Decontamination	1	39.39	50.50	103.42	39.39	232.70	40,051
Area 16, Stair Housing	1	9.20	26.12	25.62	0.00	60.94	40,051
Laundry Area							
Room 3, Laundry	1	20.32	36.58	13.59	20.32	90.81	40,051
Room 4, Clean Clothing	1	15.68	31.70	11.78	15.68	74.84	40,051
Room 5, Storage	1	8.32	23.98	8.91	8.32	49.53	40,051
Room 6, Laboratory	1	14.72	31.29	11.63	14.72	72.36	40,051
Room 7, Office	1	14.60	31.19	11.59	14.60	71.98	40,051
Room 8, Corridor	1	11.94	33.43	12.42	11.94	69.73	40,051
Room 9, Janitor's Closet	1	1.80	12.50	4.64	1.80	20.74	40,051
Room 10, Closet	1	1.34	10.06	3.74	1.34	16.48	40,051
Room 11, Contaminated Change	1	11.35	28.04	10.42	11.35	61.16	40,051
Room 12, Clean Restroom	1	16.36	34.50	12.82	16.36	80.04	40,051
Room 13, Corridor	1	12.26	46.63	17.33	12.26	88.48	40,051
Pipe Chase	1	2.09	14.02	5.21	2.09	23.41	40,051
Room 14, Boiler Room	1	36.75	50.60	65.07	36.75	189.17	40,051
Basement Work Areas							
Room 15, Access and Work Area	1	147.92	72.38	71.02	147.92	439.24	40,051
Room 19, Access Tunnel	1	28.99	41.45	45.32	28.99	144.75	40,051
Evaporator Work Areas							
Room 17, Preparation	1	43.28	44.76	43.92	43.28	175.24	40,051
Room 18, Evaporator	1	48.55	67.69	60.18	48.55	224.97	40,051
Mezzanine	1	143.89	88.63	0.00	143.89	376.41	40,051
TOTAL:		**802.06**	**903.05**	**798.73**	**824.52**	**3,328.36**	
BUILDING EXTERIOR:							

WASTE HANDLING BLDG.	FSS Class	Area (m^2)					DCGL
Building 1133		Floor	Lower Walls	Upper Walls	Ceiling	Total	(dpm/100 cm^2)
Building Roof	2	437.63	0.00	0.00	0.00	437.63	27,166
Building Exterior Walls	2	0.00	188.72	362.97	0.00	551.69	27,166
TOTAL:		**437.63**	**188.72**	**362.97**	**0.00**	**989.32**	

PRIMARY PUMP HOUSE	FSS Class	Area (m^2)					DCGL
Building 1134		Floor	Lower Walls	Upper Walls	Ceiling	Total	(dpm/100 cm^2)
BUILDING INTERIOR:							
Interior Rooms							
Room 1, Pump	1	35.95	32.00	47.25	11.37	126.57	26,348
Room 2, Pump	1	35.95	32.00	47.25	11.37	126.57	26,348
Room 3, Pump	1	35.95	32.00	47.25	11.37	126.57	26,348
Room 4, Heat Exchanger	1	99.64	79.86	117.91	97.04	394.45	11,186
Room 5	1	13.97	29.81	44.01	11.80	99.59	26,348
Room 6, Bypass Deionizer	1	23.83	39.32	58.05	21.66	142.86	26,348
Room 7	1	90.81	96.97	235.54	90.81	514.13	26,348
Room 8	1	82.74	107.22	138.54	77.87	406.37	26,348
Mezzanine	1	0.00	0.00	0.00	0.00	0.00	26,348
Resin Pit	1	12.63	27.87	0.00	12.63	53.13	26,348
TOTAL:		**431.47**	**477.05**	**735.80**	**345.92**	**1,990.24**	
BUILDING EXTERIOR:							
Building Roof	1	482.27	0.00	0.00	0.00	482.27	27,166
Building Exterior Walls	1	0.00	134.88	276.23	0.00	411.11	27,166
TOTAL:		**482.27**	**134.88**	**276.23**	**0.00**	**893.38**	

OFFICE AND LABORATORY BUILDING	FSS Class	Area (m^2)					DCGL
Building 1141		Floor	Lower Walls	Upper Walls	Ceiling	Total	(dpm/100 cm^2)
BUILDING INTERIOR:							
Area 1, Northeast Stairwell	2	28.99	23.77	29.38	14.59	96.73	27,166
Area 2, Elevator and Shaft	2	5.58	18.90	104.94	5.58	135.00	27,166
Area 3, Elevator Machinery	2	19.52	41.65	51.46	19.52	132.15	27,166
Area 4, Cold Test Area	1	163.98	91.09	112.56	163.98	531.61	27,166
Area 5, Areaway	1	65.23	51.97	69.44	65.23	251.87	27,166
Area 8, Vestibule	1	9.59	26.52	32.77	9.59	78.47	27,166
Area 9, Restroom	1	7.59	22.15	27.37	7.59	64.70	27,166
Area 10, Janitor's Closet	1	3.54	15.65	19.34	3.54	42.07	27,166
Area 11, Building Service Equipment	2	156.85	111.56	137.85	156.85	563.11	27,166
Area 14, Tool Crib	2	12.12	19.81	24.48	12.12	68.53	27,166
Area 15, General Shop Area	2	87.97	69.38	85.73	87.97	331.05	27,166
Area 16, Telephone Exchange	2	27.53	43.49	53.74	27.53	152.29	27,166
Area 17, Vault	1	13.41	29.46	36.40	13.41	92.68	30,831
Area 6, Sump Room	1	48.71	60.25	71.83	48.71	229.50	27,166
Area 7, Crawl Space	3	344.90	139.53	0.00	344.90	829.33	27,166
Area 12, Counting Rooms	2	33.64	49.69	61.41	33.64	178.38	27,166
Area 13, Electronic Shop	2	16.10	32.10	39.67	16.10	103.97	27,166
Area 13A, Calibration Room	2	15.91	22.15	36.54	15.91	90.51	27,166
Utility Tunnel	1	0.00	206.64	0.00	0.00	206.64	27,166
First (1st) Floor Offices							
Room 100	3	19.03	34.95	27.21	19.03	100.22	27,166
Room 101	3	19.03	34.95	27.21	19.03	100.22	27,166
Room 102	3	19.03	34.95	27.21	19.03	100.22	27,166
Room 103	3	19.03	34.95	27.21	19.03	100.22	27,166
Room 104	3	15.60	33.74	26.26	15.60	91.20	27,166
Room 105	3	16.21	36.48	28.40	16.21	97.30	27,166
Room 106	3	15.41	33.53	26.10	15.41	90.45	27,166

OFFICE AND LABORATORY BUILDING	FSS Class	Area (m^2)					DCGL
Building 1141		Floor	Lower Walls	Upper Walls	Ceiling	Total	(dpm/100 cm^2)
Room 107	3	18.35	34.34	26.74	18.35	97.78	27,166
Room 108	3	17.09	34.14	26.58	17.09	94.90	27,166
Room 109, 110 and 111, Classroom	2/3	55.74	67.06	52.20	55.74	230.74	27,166
Room 121, Conference Room	2/3	38.57	52.83	41.13	38.57	171.10	27,166
Room 122	2/3	29.61	46.02	35.83	29.61	141.07	27,166
Room 123	2/3	17.37	34.75	27.05	17.37	96.54	27,166
Room 124	2/3	17.72	34.75	27.05	17.72	97.24	27,166
Room 125	2/3	17.72	34.75	27.05	17.72	97.24	27,166
Room 126	2/3	18.57	34.75	27.05	18.57	98.94	27,166
Men's Restroom	2	13.71	34.14	26.58	13.71	88.14	27,166
Women's Restroom	2	13.54	34.14	26.58	13.54	87.80	27,166
Lavatory	2	4.12	16.30	12.69	4.12	37.23	27,166
Janitor's Closet	2	2.55	12.80	9.97	2.55	27.87	27,166
Pipe Chase	2	3.56	21.74	16.92	3.56	45.78	27,166
Hallways	3	307.17	201.32	156.73	307.17	972.39	27,166
First (1st) Floor Work Areas							
Room 112, First Aid	2	28.56	48.37	37.65	28.56	143.14	27,166
Room 113, Office	2	5.78	19.30	15.03	5.78	45.89	27,166
Room 114, Health and Safety Operations	2	37.51	51.32	39.95	37.51	166.29	27,166
Room 115, Office	2	32.26	45.72	35.59	32.26	145.83	27,166
Room 116, Receiving	2	18.01	41.30	32.15	18.01	109.47	27,166
Room 117 and 118, Electronic Laboratory	1/2	68.64	77.02	59.96	68.64	274.26	27,166
Room 119 and 120, Electronic Laboratory	1/2	55.36	59.95	46.67	55.36	217.34	27,166
East/West Hallways	2	51.48	87.17	67.86	51.48	257.99	27,166
Middle Stairwell	2	0.00	0.00	0.00	0.00	0.00	27,166
Northeast Stairwell		28.99	32.31	25.15	0.00	86.45	27,166
Southeast Stairwell	2	16.55	24.99	19.46	0.00	61.00	27,166
Second (2nd) Floor Offices							
Room 200	3	18.80	35.76	28.27	18.80	101.63	27,166
Room 201	3	19.81	35.76	28.27	19.81	103.65	27,166

OFFICE AND LABORATORY BUILDING	FSS Class	Area (m^2)					DCGL
Building 1141		Floor	Lower Walls	Upper Walls	Ceiling	Total	(dpm/100 cm^2)
Room 202	3	19.81	35.76	28.27	19.81	103.65	27,166
Room 203	3	19.81	35.76	28.27	19.81	103.65	27,166
Room 216	3	20.07	35.97	28.44	20.07	104.55	27,166
Room 217, Library	3	46.97	55.97	44.26	46.97	194.17	27,166
Room 218	3	20.07	35.97	28.44	20.07	104.55	27,166
Room 219	3	20.07	35.97	28.44	20.07	104.55	27,166
Room 220	3	20.07	35.97	28.44	20.07	104.55	27,166
Room 221	3	20.07	35.97	28.44	20.07	104.55	27,166
Room 222	3	49.52	65.84	52.06	49.52	216.94	27,166
Room 223	3	19.81	35.76	28.27	19.81	103.65	27,166
Men's Restroom	3	7.06	26.42	20.89	7.06	61.43	27,166
Men's Locker Room		8.75	35.61	28.15	8.75	81.26	27,166
Women's Restroom	3	4.18	20.12	15.91	4.18	44.39	27,166
Women's Locker Room		8.64	29.52	28.15	8.64	74.95	27,166
Janitor's Closet	3	2.55	12.80	10.12	2.55	28.02	27,166
Hallways	3	86.21	146.30	119.54	86.21	438.26	27,166
Second (2nd) Floor Work Areas							
Room 204/206, Materials Laboratory	1	66.16	90.22	71.34	66.16	293.88	27,166
Room 205, Materials Laboratory	1	19.68	37.70	29.81	19.68	106.87	27,166
Room 206, Materials Laboratory	1	0.00	0.00	0.00	0.00	0.00	27,166
Room 207, Chemical Storage	1	32.55	50.35	39.81	32.55	155.26	27,166
Room 207A, Counting Room	1	15.05	31.09	24.58	15.05	85.77	27,166
Room 208, Office	1	14.64	34.95	27.64	14.64	91.87	27,166
Room 208A, Darkroom	1	12.08	32.61	25.79	12.08	82.56	27,166
Room 208B, Darkroom	1	12.08	32.61	25.79	12.08	82.56	27,166
Room 209, Chemical Laboratory	1	27.59	43.28	34.22	27.59	132.68	27,166
Room 210, Chemical Laboratory	1	27.59	43.28	34.22	27.59	132.68	27,166
Room 211/212, Chemical Laboratory	1	63.08	67.15	53.10	63.08	246.41	27,166

OFFICE AND LABORATORY BUILDING	FSS Class	Area (m^2)					DCGL
Building 1141		**Floor**	**Lower Walls**	**Upper Walls**	**Ceiling**	**Total**	**(dpm/100 cm^2)**
Room 213, Chemical Laboratory	1	32.89	49.38	39.04	32.89	154.20	27,166
Room 213A, Chemical Laboratory	1	34.84	49.38	39.04	34.84	158.10	27,166
Room 214/215, Chemical Laboratory	1	38.86	53.04	41.93	38.86	172.69	27,166
Janitor's Closet	1	3.10	14.23	11.25	3.10	31.68	27,166
Pipe Chase	1	2.81	16.76	13.26	2.81	35.64	27,166
Hallways	1	55.00	90.22	71.34	55.00	271.56	27,166
Northeast Stairwell		28.43	29.26	23.14	28.43	109.26	27,166
Southeast Stairwell		17.42	18.29	14.46	17.42	67.59	27,166
TOTAL:		**3,019.15**	**4,035.62**	**3,326.52**	**2,959.21**	**13,340.50**	
BUILDING EXTERIOR:							
Building Roof	2	1,176.07	0.00	0.00	0.00	1,176.07	27,166
Building Exterior Walls	3	0.00	343.45	918.73	0.00	1,262.18	27,166
TOTAL:		**1,176.07**	**343.45**	**918.73**	**0.00**	**2,438.25**	

HOT RETENTION AREA	FSS Class	Area (m^2)					DCGL
Building 1155		Floor	Lower Walls	Upper Walls	Ceiling	Total	(dpm/100 cm^2)
Hot Retention Area "Vault"	1	409.70	174.35	494.43	409.70	1,488.18	34,213
Above-grade Pipe Chase	1	121.52	146.14	0.00	121.52	389.18	34,213
Hot Pipe Chase to Fan House	1	0.00	0.00	0.00	0.00	0.00	34,213
TOTAL:		**531.22**	**320.49**	**494.43**	**531.22**	**1,877.36**	
BUILDING EXTERIOR:							
Roof							27,166
Exterior Walls							27,166
TOTAL:		**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	

OUT BUILDINGS and STRUCTURES	FSS Class	Area (m^2)					DCGL
		Floor	Lower Walls	Upper Walls	Ceiling	Total	(dpm/100 cm^2)
Numbered Facilities							
1135 - Gas Services Building							
Concrete slab	3						27,166
Electrical trench	3						27,166
Electrical vault	3						27,166
Concrete pad at former east roll-up door	3						27,166
Concrete pad (extended Driveway A - N of 1135)	3	44' by 1135 to Driveway A					27,166
Cryogenic tank supports (WNW of 1135)	3	5' x 2'4" x 2' tall					27,166
1136 - Compressor Building							
Concrete slab	3						27,166
Compressor foundation	3						27,166
Surge tank supports	3						27,166
Concrete pipe trench	3						27,166
Electrical Man Hole (between North Rd and 1136)	3	7' square pad, 2'6" OD metal MH cover					27,166
Electrical Man Hole interior	3						27,166
Electrical Man Hole (W of above Man Hole)	3	7' square pad, 2'6" OD metal MH cover					27,166
Electrical Man Hole interior	3						27,166
1151 - Water Tower							
Four tower pedestals	3						27,166
1152 - Cooling Tower							
Cooling Tower slab	3	approx. 70' x 70'					27,166
Pump Clearwell (internal surfaces)	3						27,166

OUT BUILDINGS and STRUCTURES	FSS Class	Area (m^2)					DCGL
		Floor	Lower Walls	Upper Walls	Ceiling	Total	(dpm/100 cm^2)
Pump Clearwell & Cold Pipe Tunnel (external surfaces)	3	145.35	47.98				27,166
Concrete pedestals (S of Clearwell)	3	1.18					27,166
Valve pit (E of Cooling Tower pad and CB #10A)	3						27,166
1153 - Sludge Settling Basins							
Sludge Settling Basin #1	3						27,166
Valve pit (SE corner of Basin #1)	3						27,166
Sludge Settling Basin #2	3						27,166
Valve pit (SW corner of Basin #2)	3						27,166
Pump pit (between the two basins)	3						27,166
Valve pit (WNW of Basin #1)	3	4' x 5.5' outside dim.					27,166
Wing wall (SE of Basin #2)	3						27,166
Valve pit (N of wing wall)	3		4' OD				27,166
1154 - Cold Retention Basins							To Be Removed
Cold Retention Basin #1	1						To Be Removed
Cold Retention Basin #2	1						To Be Removed
CRB valve pit cover (W of CRB #1)	3						To Be Removed
CRB valve pit interior	1						To Be Removed
Electrical Manhole #3 (N of CRB #1)	3						27,166
Wing wall (W of CRB #1)	3						27,166
1157 - Precipitator							
Pit (NE of precipitator)	3						27,166
Sludge Blow Off pit (E of precipitator)	3						27,166

OUT BUILDINGS and STRUCTURES	FSS Class	Area (m^2)					DCGL
		Floor	Lower Walls	Upper Walls	Ceiling	Total	(dpm/100 cm^2)
Raw water pipe pit (SE of precipitator)	3						27,166
Sump pit (SE of precipitator)	3						27,166
1161 - Substation							
Sub-Station E transformer pad	3						27,166
Cable vault under Sub-Station E pad	3						27,166
Unit Sub-Station #1 transformer pad (WNW of main pad)	3						27,166
Unit Sub-Station #2 transformer pad (WSW of main pad)	3						27,166
Five concrete pads (E of main pad)	3						27,166
One concrete pad (SW of main pad)	3						27,166
1191 - Security Building							
Room 100, Visitor Control	3	44.38	53.64	24.02	44.38	166.42	27,166
Room 101, Utility	3	2.82	13.72	6.14	2.82	25.50	27,166
Room 102, Furnace	3	5.44	18.80	8.42	5.44	38.10	27,166
Lavatory	3	3.50	15.03	5.73	3.50	27.76	27,166
Sub-Total (interior surfaces)		**56.14**	**101.19**	**44.31**	**56.14**	**257.78**	
Building Roof	3	61.14	0.00	0.00	0.00	61.14	27,166
Building Exterior Walls	3	0.00	64.31	33.70	0.00	98.01	27,166
Sub-Total (exterior surfaces)		**61.14**	**64.31**	**33.70**	**0.00**	**159.15**	
Electrical pit (SE corner of building)	3						27,166
Radio tower foundation (S wall)	3						27,166
Pad at W personnel door	3						27,166
Pad at personnel access/egress (W side of N wall)	3						27,166
Pad at personnel access/egress (E side of N wall)	3						27,166

OUT BUILDINGS and STRUCTURES	FSS Class	Area (m^2)					DCGL
		Floor	Lower Walls	Upper Walls	Ceiling	Total	(dpm/100 cm^2)
Sidewalks into Control Point trailer	3						27,166
Wing wall (S of building)	3						27,166
Abandoned weather tower concrete foundation (ESE of 1191 and WSW of 1112)	3						27,166
Abandoned weather tower electrical pit	3						27,166
1192 - Effluent Metering System							
Internal surfaces	1						33,834
External surfaces	3						33,834
Wing wall (S of Pentoliote Road)	1						33,834
1193 - Radar and Weather Tower House							
Internal surfaces	3						27,166
External surfaces	3						27,166
Concrete pad	3						27,166
Electrical pit (N of building)	3						27,166
1195/9837 - Cryogenic & Gas Supply System							
1195 concrete pad	3						27,166
9837 concrete pad	3						27,166
Concrete pipe trench to 1136 and 1111 (interior)	3						27,166
Concrete pipe trench to 1136 and 1111 (exterior)	3						27,166
Concrete pipe trench access (E side of N wall of 1111)	3						27,166
Concrete pad (N of 1195)	3	7' x 9' x 8" thick					27,166
Concrete piping supports (2) between 1195 to 7' x 9' pad	3	16" square					27,166

OUT BUILDINGS and STRUCTURES	FSS Class	Area (m^2)					DCGL
		Floor	Lower Walls	Upper Walls	Ceiling	Total	(dpm/100 cm^2)
1196 - Gas Storage Structure	3						
Concrete ring with 2 pads	3						27,166
Concrete piping supports (8) from concrete pipe trench	3						27,166
Helium heater pad	3	7' square pad					27,166
Un-numbered Facilities							
Structures associated with the Fan House (1132)							
Electrical pit (N side of E wall)	3						27,166
Covering outside east personnel door	3						27,166
Resin pit pad (W side of S wall)	3						27,166
Resin pit interior	3						27,166
Corrugated pipe in ground (just off SW corner of building)		2'9" OD, visible water approx. 11' below grade					27,166
Four tank pedestals (W side of building)		rise to 4'4" above grade					27,166
Electrical pit (N wall with plywood cover)	3						27,166
Pad at north roll-up door	3						27,166
Pad at north personnel door	3						27,166
Two exhaust duct pedestals (between stack & 1132)	3						27,166
Stack pedestal	1						
Structures associated with Waste Handling (1133)							
Pad at north personnel door	3						27,166
Sidewalk from north personnel door	3						27,166
Vault cover (E side of building)	3						27,166

OUT BUILDINGS and STRUCTURES	FSS Class	Area (m^2)					DCGL
		Floor	Lower Walls	Upper Walls	Ceiling	Total	(dpm/100 cm^2)
Vault interior	3						27,166
Pad at south side roll-up door	1						27,166
Pad at west roll-up and personnel doors	3						27,166
Radwaste Staging area (S of Waste Handling)	3						27,166
Wing wall (between RW staging and Line 3 Road)	3						27,166
Radwaste scale area concrete pad (S of Waste Handling)	3						27,166
Structures associated with the Hot Laboratory (1112)							
Electrical Manhole #1 (N side of E wall)	3						27,166
Unit Sub-Station #4 transformer pad (E side of 1112)	1						27,166
Cable vault under Sub-Station #4	1						27,166
Pad at east side roll-up and personnel doors	3						27,166
Hot Pipe Tunnel covering (S of E personnel door)	1						27,166
Sidewalk at west side personnel entrance	3						27,166
Unit Sub-Station #5 transformer pad (north end of 1112 west wall)	3						27,166
Cable vault under Sub-Station #5	3						27,166
Structures associated with the ROLB (1141)							
Front porch on west side of building	3	15' x 6'6" outside dimensions					27,166
Sidewalks on west side (including out to Line 2 Rd.)	3						27,166
Pad at east personnel door	3						27,166
Pad at south side roll-up and personnel doors (by 1111)	3						27,166
Outside stairwell pit (adjacent to Area Way cover)	3						27,166

OUT BUILDINGS and STRUCTURES	FSS Class	Area (m^2)					DCGL
		Floor	Lower Walls	Upper Walls	Ceiling	Total	(dpm/100 cm^2)
Structures associated with the Reactor Bldg. (1111)							
Pad at personnel door (W side of N wall)	3						27,166
Pad at personnel door (E side of N wall)	3						27,166
Sidewalks on north side of building	3						27,166
Pad with rail extensions at north roll-up door	1						27,166
Vault (E side of N wall)	3						27,166
Unit Sub-Station #3 transformer pad (N end of E wall)	3						27,166
Cable vault under Sub-Station #3	3						27,166
Pad at personnel door (S side of E wall next to 1134)	1						27,166
Pad at west roll-up door	1						27,166
Pad at west personnel door	1						27,166
Air intake pit on the west wall	3						27,166
Structures assoc. with Primary Pump House (1134)							
Sidewalks on north side	3						27,166
Pad at north side personnel entrance	3						27,166
Vault with checker plate cover (N wall)	3	7' x 3' outside dimensions					27,166
Vault interior	3						27,166
Sidewalks on east side	3						27,166
Pad at east side roll-up door	3						27,166
Pad at south personnel entrance	3						27,166
Resin pit pad (south wall)	3						27,166
Resin pit interior	3						27,166
Pump pit pad and adjacent slab (south of resin pit)	3						27,166
Pump pit interior	3						27,166

OUT BUILDINGS and STRUCTURES	FSS Class	Area (m^2)					DCGL
		Floor	Lower Walls	Upper Walls	Ceiling	Total	(dpm/100 cm^2)
Structures associated with the SEB (1131)							
Pad at east side roll-up door (boiler room)	3						27,166
Pad at north personnel door (SEB Addition)	3						27,166
Pad at east personnel door (SEB addition)	3						27,166
Pad at south personnel door (SEB addition)	3						27,166
Pad at roll-up door (E end of S wall)	3						27,166
Pad at personnel door (E side of S wall)	3						27,166
Sidewalks from east doors to Driveway E	3						27,166
Two air intake structures on south side	3						27,166
Pad at roll-up door (W end of S wall)	3						27,166
Pad at personnel door (W end of S wall)	3						27,166
Pad at west personnel door	3						27,166
Sidewalk from W personnel door to Line 3 Rd.	3						27,166
Pipe pit (W end of N wall next to personnel door)	3	2.5' x 7'8" outside dimensions					27,166
Pad at personnel door (W end of N wall)	3						27,166
Sidewalks along north side of building	3						27,166
Pad at roll-up door (W end of N wall)	3						27,166
Pad at personnel door (E end of N wall)	3						27,166
Valve pit (NE of SEB)	3	2.5' OD metal cover					27,166
Structures associated with the ERB							
Pipe support (inside SW corner)	1						27,166
Structures associated with the Drying Basins							

OUT BUILDINGS and STRUCTURES	FSS Class	Area (m^2)					DCGL
		Floor	Lower Walls	Upper Walls	Ceiling	Total	(dpm/100 cm^2)
Drying Basin #1	3	filled with bull rushes and water					27,166
Basin #1 discharge to drainage ditch	3						27,166
Drying Basin #2	3	filled with bull rushes and water					27,166
Basin #2 discharge to drainage ditch	3						27,166
TOTAL:		**381.09**	**378.98**	**156.02**	**112.28**	**833.86**	