

Survey Unit Release Record

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Survey Unit #(s)	MA-1-6
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Description	<ol style="list-style-type: none"> 1) Survey Unit MA-1-6 is located underground between the Reactor Building –15 elevation and the Assembly, Test and Storage (ATS) Building basement. 2) MA-1-6 is designated as a Class 1 Area in accordance with (IAW) the PBRF Final Status Survey Plan (FSSP). 3) All surveys were performed with a Ludlum 2350-1 and a Model 44-116 plastic scintillation probe or a Model 43-37 large area gas flow proportional detector IAW the Survey Design. 4) All instruments used to perform these surveys were calibrated to detect surface beta activity IAW procedure CS-011, "Operation of the Ludlum Model 2350-1 Data Logger Survey Instrument." The gamma component was subtracted from the gross activity to calculate the actual surface beta activity at each survey (static measurement) location. 5) The Gross Beta DCGL_w applied to this survey unit is derived from PBRF-TBD-07-001, and the efficiency correction factor (EFC) for concrete surfaces used in MDC calculations was derived from PBRF-TBD-07-004. 6) Scan surveys were performed on 100% of the accessible surface areas IAW the requirements of the FSSP and the Survey Design. 7) Documentation that the end radiological conditions of survey unit MA-1-6 meet the site release criteria is presented in this release record. Data supporting this decision was collected under Survey Request No. 101
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Approval Signatures		Date:
FSS/Characterization Engineer	Robby L. Marquette / 	4/3/08
Technical Reviewer (FSS/Characterization Engineer)	R. Case 	4/3/08
FSS/Characterization Manager	R. Case 	4/3/08

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1.0 Description of the Survey Unit

Survey unit MA-1-6 is a Class 1 area located on the -15 elevation connecting the Reactor Building with the Assembly Test and Storage (ATS) building which is located outside of the current fence-line of the PBRF.

Although historical data indicated no activity above 941 dpm/100 cm², the tunnel connects the ATS building which was previously remediated, and the -15 elevation of the Reactor Building which is a Class 1 area. Therefore, the tunnel itself was also classified as a Class 1 area.

The surface of interest consists of bare, poured concrete and concrete block, and encompasses the North and South walls, the North end of the East and West walls, and the North end of the ceiling of the tunnel.

The total surface area for the survey unit has been calculated at 92.72 square meters.

2.0 Survey Unit Design Information

Survey Design No.22 covers survey unit MA-1-6 which is located between the ATS building and the Reactor Building at the -15 elevation. IAW PBRF-TBD-07-001, Table 5-3, the DCGL_w value for this survey unit is 35,296 dpm/100 cm². This Visual Sample Plan (VSP) was used to determine the number and locations of sample points within the survey unit. (See Design No.22, Section 2 for additional information)

The Gross Beta DCGL_w for this survey was 35,296 dpm/100cm². The scan investigation level was set at 3,000 gross cpm for the 44-116 detector in areas with surface irregularities < ½ inch, and 2,000 gcpm in areas > ½ inch to 1 ½ inches. The MDC_{scan} was 5932 dpm/100cm² based on a minimum net detectable count rate of 423.75. The scan investigation level for the 43-37 detector (floor monitor) was 5,000 gross cpm. The MDC_{scan} was 798 dpm/100cm² based on a minimum net detectable count rate of 351.94. These are all well below the DCGL_w and appropriate for this survey unit.

The calculated Static Count MDC was 732 dpm/100cm² based on the material background count rate of 379.4 cpm for poured concrete and 688 dpm/100cm² based on the material background count rate of 329 cpm for painted concrete block which was established under MWH Characterization survey package G9000 401B1. This is well below the DCGL_w and appropriate for this survey unit.

The following table summarizes the measurement design developed.

SUMMARY OF SAMPLING DESIGN	
Primary Objective of Design	Compare a site mean or median to a fixed threshold
Type of Sampling Design	Nonparametric
Sample Placement (Location) in the Field	Systematic with a random start location
Working (Null) Hypothesis	The median(mean) value at the site exceeds the threshold
Formula for calculating number of sampling locations	Sign Test - MARSSIM version
Calculated total number of samples	11
Number of samples on map	11
Number of selected sample areas	1
Specified sampling area	92.72 m ²
Size of grid / Area of grid cell	10.2355 feet / 90.73 ft ²
Grid pattern	Triangular

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3.0 Survey Unit measurement locations and corresponding data.

See Attachment 1 for a map that shows measurement locations, and a table that lists measurement location coordinates and the corresponding data.

4.0 Survey Unit investigations performed and their results.

There were no investigations performed in this survey unit.

5.0 Data assessment results.

Scans were performed with the 43-37 detector except for the wall to ceiling seams which were scanned with the 44-116 detector. No activity above the investigation level was identified on the surface scans performed.

The highest activity on the 11 static measurement locations was 1,009 dpm/100cm² at location SM-11. (See table below).

The following table identifies the individual measurement locations, the results of those measurements in dpm/100 cm², and the % unity for each measurement based on the stated DCGL_w for the survey unit in dpm/100 cm². The right hand side of the table presents the Sign Test for the Static Measurement data acquired in this survey unit.

Measurement Location	Measurement DPM/100 cm ²	DCGL=	(1) ^a - (% Unity)=	Sign
		35,296 dpm 100cm ²		
		% Unity		
SM1	912	0.0258	0.9742	+
SM2	549	0.0156	0.9844	+
SM3	212	0.0060	0.9940	+
SM4	327	0.0093	0.9907	+
SM5	947	0.0268	0.9732	+
SM6	752	0.0213	0.9787	+
SM7	460	0.0130	0.9870	+
SM8	487	0.0138	0.9862	+
SM9	451	0.0128	0.9872	+
SM10	664	0.0188	0.9812	+
SM11	1009	0.0286	0.9714	+
Mean	615.45	0.0174	S+ =	11
Median	549.00	0.0156	*Critical value =	8
St.Deviation	263.03	0.0075		
(1) ^a DCGL _w Unity		* From Table I.3 of NUREG 1575 (MARSSIM) based on α=0.05		

Smears were taken at each of the static measurement locations. All smears were counted on the Tennelec with results below the MDA of 11.37 dpm for alpha and 16.29 dpm for beta. The stated MDA's are less than 10% of the DCGL_w and therefore appropriate for this survey unit.

The survey methods and instrumentation used to collect the data were appropriate for both the types of radiation involved and the media being surveyed. Additionally, MDC calculations for scan measurements were based on a movement rate 30 cm/sec. A more conservative rate of 15 cm/sec was employed through the Survey Request to facilitate the scanning technique and to maintain a consistent distance between the detector and the surface of interest.

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Quality control scans verified the original scans as being accurate and Quality Inspections of the technicians performing the measurements indicate that the data was collected in accordance with the survey design.

At 2%, the Quality Control Static Measurement met the acceptance criteria for the Relative Percent Difference (RPD) of $\pm 20\%$.

As identified above, all results were less than the $DCGL_w$ and therefore the survey unit meets the release criteria.

6.0 Evaluations pertaining to compliance with the unrestricted use limit of 25 mr/yr and dose contributions from embedded pipe and radionuclides contributing 10% in aggregate of the total dose.

Compliance with the unrestricted use limit of 25 mr/yr is demonstrated in the above Data Assessment since there is no dose contribution from embedded pipe in this survey unit and the radionuclides contributing 10% in aggregate of the total dose were taken into consideration in the establishment of the DCGL's within the technical basis document PBRF TBD-07-001.

DQA Check Sheet

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Preliminary Data Review

Answers to the following questions should be fully documented in the Survey Unit Release Record	Yes	No	N/A
1. Have surveys been performed in accordance with survey instructions in the Survey Design?	X		
2. Is the instrumentation MDC for structure static measurements below the DCGL _W for Class 1 and 2 survey units, or below 0.5 DCGL _W for Class 3 survey units?	X		
3. Is the instrumentation MDC for embedded/buried piping static measurements below the DCGL _W ?			X
4. Was the instrumentation MDC for structure scan measurements, soil scan measurements, and embedded/buried piping scan measurements below the DCGL _W , or, if not, was the need for additional static measurements or soil samples addressed in the survey design?	X		
5. Was the instrumentation MDC for volumetric measurements and smear analysis < 10% DCGL _W ?	X		
6. Were the MDCs and assumptions used to develop them appropriate for the instruments and techniques used to perform the survey?	X		
7. Were the survey methods used to collect data proper for the types of radiation involved and for the media being surveyed?	X		
8. Were "Special Methods" for data collection properly applied for the survey unit under review?			X
9. Is the data set comprised of qualified measurement results collected in accordance with the survey design, which accurately reflects the radiological status of the facility?	X		

Graphical Data Review

1. Has a posting plot been created?			X
2. Has a histogram (or other frequency plot) been created?			X
3. Have other graphical data tools been created to assist in analyzing the data?			X

Data Analysis

1. Are all sample measurements below the DCGL _W (Class 1 & 2), or 0.5 DCGL _W (Class 3)?	X		
2. Is the mean of the sample data < DCGL _W ?	X		
3. If elevated areas have been identified by scans and/or sampling, is the average activity in each elevated area < DCGL _{EMC} (Class 1), < DCGL _W (Class 2), or < 0.5 DCGL _W (Class 3)?			X
4. Is the result of the Elevated Measurements Test < 1.0?			X
5. Is the result of the statistical test (S+ for Sign Test or W_r for WRS Test) ≥ the critical value?			X

Comments:

FSS/Characterization Engineer (print/sign)	R. Marquette 	Date	4/15/08
FSS/ Characterization Manager (print/sign)	R. Case 	Date	4/3/08

Form
CS-09/2
Rev 0

Attachment 1
Survey Unit Release Record MA-1-6

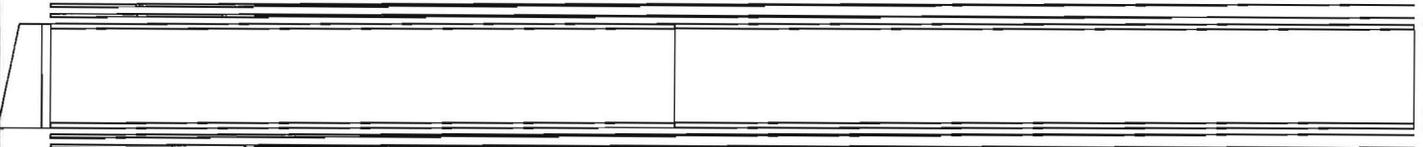
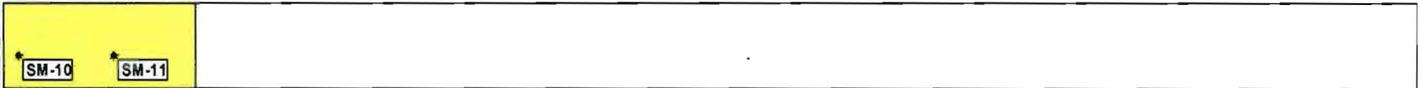
The following chart identifies the X and Y coordinates for the measurement locations within the survey unit based on a computer generated random starting point. A CAD drawing of the survey unit and a representation of the location of the measurements is provided on the following page.

AREA:					
Measurement Locations and results					
X Co-ord (m)	Y Co-ord (m)	Location / DPM/100cm2		Type	Notes
2.8	1.3	SM1	912	Systematic	N/A
5.9	1.3	SM2	549	Systematic	N/A
9.0	1.3	SM3	212	Systematic	N/A
12.1	1.3	SM4	327	Systematic	N/A
2.8	1.6	SM5	947	Systematic	N/A
5.9	1.6	SM6	752	Systematic	N/A
0.2	0.7	SM7	460	Systematic	N/A
2.9	2.2	SM8	487	Systematic	N/A
0.2	0.9	SM9	451	Systematic	N/A
0.5	1.0	SM10	664	Systematic	N/A
3.6	1.0	SM11	1009	Systematic	N/A

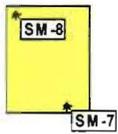
* All sample points are measured from the lower left corner of the surface on which they rest.

Attachment 1
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MA-1-6



**North
Wall**



**South
Wall**

