

Survey Unit Release Record

Design #	EP-PPH 103	Revision #	Original	Page 1 of 3
Survey Unit #(s)	PPH 103			
Description	<p>1) Embedded Pipe (EP) Survey Unit PPH 103 meets the definition of embedded pipe for Plum Brook Reactor Facility (PBRF) for those portions of piping embedded in the building foundation walls of the Primary Pump House (PPH). The portion of piping which transits in soil under the buildings does not meet the criteria for embedded piping. The complete piping will be grouted, the portions embedded in the building structure will remain embedded for any future reuse, those portions in the ground can be released for unrestricted use.</p> <p>2) EP PPH 103 is a Class 1, Group 1 survey unit as per the PBRF Final Status Survey Plan (FSSP) and Technical Basis Document (TBD)-06-004.</p> <p>3) Surveys in EP PPH 103 were performed using a scintillation detector optimized to measure gamma energies representative of Co-60. Sample #EP 3-9 from Survey Request (SR)-13 was referenced for this decision.</p> <p>4) Survey Instructions for this survey unit are incorporated into and performed in accordance with (IAW) the Babcock Services Incorporated (BSI)/LVS-002, Work Execution Package (WEP) 05-006. Survey instructions described in this document constitute "Special Methods" and the survey design used in the acquisition of survey measurements.</p> <p>5) Instrument efficiency determinations are developed in accordance with the BSI/LVS-002, WEP 05-006, these determinations are appropriate for the types of radiation involved and the media being surveyed.</p>			
Approval Signatures			Date:	
FSS/Characterization Engineer			3/4/08	
FSS/Characterization Manager			3/5/08	

Survey Unit: PPH 103

1.0 History/Description

- 1.1 The subject pipe is an 8" emergency fill line in PPH Room.
- 1.2 EP PPH 103 consists of 8" diameter piping that is approximately 11 feet in length.

2.0 Survey Design Information

- 2.1 EP PPH 103 was surveyed IAW Procedure #BSI/LVS-002.
- 2.2 100% of the 8" pipe was accessible for survey. The accessible 8" pipe was surveyed by static measurement at one foot increments, for a total of 11 survey measurements.
- 2.3 Surface area for the 8" piping is 1946 cm² for each foot of piping, corresponding to a total 8" piping surface area of 21406 cm² (2.1 m²) for the entire length of (approximately 11') of 8" piping.

3.0 Survey Unit Measurement Locations/Data

- 3.1 Pipe interior radiological survey forms are provided in Attachment 2 of this release record.

4.0 Survey Unit Investigations/Results

- 4.1 None

5.0 Data Assessment Results

- 5.1 Data assessment results are provided in the EP/Buried Pipe (BP) Survey Report provided in Attachment 1.
- 5.2 This survey unit was assessed as a building re-use scenario with all activity derived dose as a 100% Co60 nuclide distribution. This is the most conservative DCGL for the facility (11,000dpm/100cm²).
- 5.3 When implementing the Unity Rule, provided in Section 3.6.3 of the FSSP, two survey measurements exceeded unity. The survey unit that is constituted by EP PPH 103 passes FSS after application of Elevated Measurement Comparisons (EMC) and Elevated Measurement Tests (EMT). The EMC Unity sum was 0.086 of unity, and the EMT Unity sum was 0.672 of unity.
- 5.4 DCGL's for the building reuse scenario are used to demonstrate compliance with the release criterion for this release record. The DCGL's for embedded pipe are not applied, therefore the Structural Area Factors listed in Table 3-5 of the FSS are the appropriate area factors for EMC and EMT evaluations.
- 5.5 The area factor of 20.8 was utilized for this survey unit, this is the appropriate area factor listed in Table 3-5 of the PBRF FSSP.
- 5.6 Background was not subtracted from the survey measurements.

Survey Unit: PPH 103

5.7 Statistical Summary Table

Statistical Parameter	8" Pipe
Total Number of Survey Measurements	11
Number of Measurements >MDC	11
Number of Measurements Above 50% of DCGL	10
Number of Measurements Above DCGL	2
Mean	0.829
Median	0.671
Standard Deviation	0.494
Maximum	1.940
Minimum	0.431

6.0 Documentation of evaluations pertaining to compliance with the unrestricted use limit of 25 mrem/yr and dose contributions from Embedded Pipe and radionuclides contributing 10% in aggregate of the total dose for both structural scenarios and soils.

6.1 A review of the survey results has shown that the dose contribution for EP PPH 103 to be less than 25 mrem/yr. The dose contribution is estimated to be 20.7 mrem/yr based on the average of the actual gross counts measured.

7.0 Attachments

Attachment 1 – BSI EP/BP Survey Report

Attachment 2 – Pipe Interior Radiological Survey Form

Attachment 3 – DQA Worksheet

Attachment 4 – EP PPH 103 SURR & Spreadsheet Disc

**SECTION 7
ATTACHMENT 1
2 PAGES**



BSI EP/BP SURVEY REPORT

Pipe ID	PPH 105	Survey Location	PPH RM 4
Survey Date	03-Mar-08	2350-1 #	189094
Survey Time	1350	Detector-Sled #	B577A-108
Pipe Size	8"	Detector Efficiency	0.0069
DCGL (dpm/100cm ²)	1.10E+04	Pipe Area Incorporated by Detector Efficiency (in cm ²)	1946
Pipe Area Incorporated by Survey Data (m ²)	2.1	Field BKG (cpm)	83
Routine Survey	X	Field MDCR (cpm)	34
QA Survey		Nominal MDC (dpm/100cm ²)	222

Survey Measurement Results

Total Number of Survey Measurements	11
Number of Measurements >MDC	11
Number of Measurements Above 50% DCGL	10
Number of Measurements Above DCGL	2
Mean	0.829
Median	0.671
Standard Deviation	0.494
Maximum	1.940
Minimum	0.431

Survey Technician(s)	STOCK
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Survey Unit Classification	1
TBD 06-004 Piping Group	1
SR-13 Radionuclide Distribution Sample	EP 3-9
Measured Nuclide	Co-60
Area Factor/EMC Used	Yes
Pass/Fail FSS	Pass
MREM/YR Contribution	<25

COMMENTS:

ACTIVITY VALUES NOT BACKGROUND CORRECTED.

RP Engineer Date	<i>Wood / 3-4-08</i>
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PPH 103
8" Pipe
TBD 06-004 Group 1

Measurement #	gcpm	ncpm	Co-60 activity (total dpm)	Co-60 activity (dpm/100cm2)	Unity	EMC Unity	EMT Unity	
1	991	991	143,623	7,380	0.671		0.671	
2	637	637	92,319	4,744	0.431		0.431	
3	754	754	109,275	5,615	0.510		0.510	
4	1017	1017	147,391	7,574	0.689		0.689	
5	1286	1286	186,377	9,577	0.871		0.871	
6	2865	2865	415,217	21,337	1.940	0.086		0.056
7	2414	2414	349,855	17,978	1.634			
8	998	998	144,638	7,433	0.676		0.676	
9	752	752	108,986	5,600	0.509		0.509	
10	759	759	110,000	5,653	0.514		0.514	
11	990	990	143,478	7,373	0.670		0.670	
				6,772		0.086	0.672	
				MEAN	0.829	EMC Unity	EMT Unity	
				MEDIAN	0.671			
				STD DEV	0.494			
				MAX	1.940			
				MIN	0.431			

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Pipe Interior Radiological Survey Form

Date: 3-3-08 Time: 1350
 Pipe ID#: PPH-103 Pipe Diameter: 8" Access Point Area: PPH Rm 4
 Building: PPH Elevation: 0 System: Emergency Fill Lines
 Type of Survey Investigation Characterization Final Survey X Other
 Gross Co60 Cs
 Detector ID# / Sled ID# BS77A 1 108
 Detector Cal Date: 1.25.08 Detector Cal Due Date: 1.25.09
 Instrument: 2350-1 Instrument ID #: 189094
 Instrument Cal Date: 1.25.08 Instrument Cal Due Date: 1.25.09

From the Daily Pipe Survey Detector Control Form for the Selected Detector

Background Value 83 cpm
 MDCR_{static} 34 ~~128~~ cpm
 Efficiency Factor for Pipe Diameter 0.0069 (from detector efficiency determination)
 MDC_{static} 222 dpm/ 100 cm²
 Is the MDC_{static} acceptable? Yes - No (if no, adjust sample count time and recalculate MDCR_{static})
 Comments: Dec # 1

Technician Signature Russell A. Phelps

Pipe Interior Radiological Survey

Position #	Feet into Pipe from Opening	Count Time (min)	Gross Counts	Gross cpm	Net cpm	dpm/100cm ²
1	11'	1	991	991		N/A
2	10'	}	637	637		
3	9'		754	754		
4	8'		1017	1017		
5	7'		1286	1286		
6	6'		2865	2865		
7	5'		2414	2414		
8	4'		998	998		
9	3'		752	752		
10	2'		1	759	759	

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DQA Check Sheet

Design #	EP PPH-103	Revision #	Original			
Survey Unit #	EP PPH-103					
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: See Section 5 of this Survey Unit Release Record						
FSS/Characterization Engineer (print/sign)		<i>Ch Wood / Wood</i>			Date	3/4/08
FSS/ Characterization Manager (print/sign)		R. Case <i>[Signature]</i>			Date	3/5/08

Form
 CS-09/2
 Rev 0

**SECTION 7
ATTACHMENT 4
1 DISC**