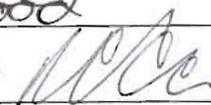


Survey Unit Release Record

Design #	EP-PPH 106	Revision #	Original	Page 1 of 3
Survey Unit #(s)	PPH 106			
Description	<p>1) Portions of Embedded Pipe (EP) Survey Unit PPH 106 that remain embedded in the building foundation walls (PPH) meet the definition of embedded pipe for Plum Brook Reactor Facility (PBRF). The portion of piping which transits in soil under the PPH does not meet the criteria for embedded piping. Upon demonstration of compliance with the release criteria, the piping under the PPH will be grouted, including the portions embedded in the building structure that will remain embedded for any future reuse and those portions in the ground that can be released for unrestricted use.</p> <p>2) EP PPH 106 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 106 were performed using a scintillation detector optimized to measure gamma energies representative of Co⁶⁰. Sample #EP 3-7 from Survey Request (SR)-13 was referenced for this decision.</p> <p>5) 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>6) 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		D Wojtkowiak	04/09/08	
Technical Reviewer (FSS/Characterization Engineer)			4-21-08	
FSS/Characterization Manager	R. Case 		5/6/08	

Survey Unit: PPH 106

1.0 History/Description

- 1.1 The subject pipe system consists of a section of the Reactor Off-Gas system that ran from the PPH to the HPT. This section of pipe was accessed from an excavation outside of the PPH foundation.
- 1.2 EP PPH 106 consists of a section of 2" diameter piping that is approximately 33 feet in total length.

2.0 Survey Design Information

- 2.1 EP PPH 106 was surveyed IAW Procedure #BSI/LVS-002.
- 2.2 100% of the 2" pipe section was accessible for survey. The accessible 2" pipe was surveyed by static measurement at one foot increments, for a total of 33 survey measurements.
- 2.3 Surface area for the 2" piping is 486 cm² for each foot of piping, corresponding to a total 2" piping surface area of 16,038 cm² (1.60 m²) for the entire length of (approximately 33') of 2" 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 (11,000 dpm/100cm²).
- 5.3 No individual measurement observed in EP PPH 106 exceeded the Unity Rule as provided in Section 3.6.3 of the FSSP. No Elevated Measurement Comparisons (EMC) was required or performed. The survey unit that is constituted by EP PPH 106 passes FSS. Mean unity for this survey unit was 0.365 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.
- 5.5 No area factors were used for this survey unit.
- 5.6 Background was not subtracted from the survey measurements.

Survey Unit: PPH 106

5.7 Statistical Summary Table

Statistical Parameter	4" Pipe
Total Number of Survey Measurements	33
Number of Measurements >MDC	13
Number of Measurements Above 50% of DCGL	3
Number of Measurements Above DCGL	0
Mean	0.365
Median	0.374
Standard Deviation	0.121
Maximum	0.673
Minimum	0.150

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 106 to be less than 25 mrem/yr. The dose contribution is estimated to be 9.125 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 106 Spreadsheet Disc

**SECTION 7
ATTACHMENT 1
2 PAGES**



BSI EP/BP SURVEY REPORT

Pipe ID	PPH 106	Survey Location	Outside PPH
Survey Date	8/10/06	2350-1 #	189094
Survey Time	09:04	Detector-Sled #	44-159 #238369 & no sled
Pipe Size	2"	Detector Efficiency	0.0005
DCGL (dpm/100cm ²)	1.10E+04	Pipe Area Incorporated by Detector Efficiency (in cm ²)	486
Pipe Area Incorporated by Survey Data (m ²)	1.6	Field BKG (cpm)	13
Routine Survey	X	Field MDCR (cpm)	15.4
QA Survey		Nominal MDC (dpm/100cm ²)	4,410

Survey Measurement Results

Total Number of Survey Measurements	33
Number of Measurements >MDC	13
Number of Measurements Above 50% DCGL	3
Number of Measurements Above DCGL	0
Mean	0.365
Median	0.374
Standard Deviation	0.121
Maximum	0.673
Minimum	0.150

Survey Technician(s)	Russell Phelps
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Survey Unit Classification	1
TBD 06-004 Piping Group	1
SR-13 Radionuclide Distribution Sample	EP 3-7
Measured Nuclide	Co-60
Area Factor/EMC Used	No
Pass/Fail FSS	Pass
MREM/YR Contribution	<25

COMMENTS: ACTIVITY VALUES NOT BACKGROUND CORRECTED

RP Engineer | Date

D. Wojtkowiak - 4/9/2008

EP PPH 106
2" Pipe

Measurement #	gcpm	ncpm	Co-60 activity (total dpm)	Co-60 activity (dpm/100cm ²)	Unity
1	6	6	12,000	2,469	0.224
2	8	8	16,000	3,292	0.299
3	11	11	22,000	4,527	0.412
4	9	9	18,000	3,704	0.337
5	6	6	12,000	2,469	0.224
6	4	4	8,000	1,646	0.150
7	10	10	20,000	4,115	0.374
8	11	11	22,000	4,527	0.412
9	7	7	14,000	2,881	0.262
10	12	12	24,000	4,938	0.449
11	12	12	24,000	4,938	0.449
12	10	10	20,000	4,115	0.374
13	9	9	18,000	3,704	0.337
14	9	9	18,000	3,704	0.337
15	18	18	36,000	7,407	0.673
16	10	10	20,000	4,115	0.374
17	10	10	20,000	4,115	0.374
18	15	15	30,000	6,173	0.561
19	7	7	14,000	2,881	0.262
20	10	10	20,000	4,115	0.374
21	5	5	10,000	2,058	0.187
22	6	6	12,000	2,469	0.224
23	12	12	24,000	4,938	0.449
24	8	8	16,000	3,292	0.299
25	16	16	32,000	6,584	0.599
26	7	7	14,000	2,881	0.262
27	11	11	22,000	4,527	0.412
28	9	9	18,000	3,704	0.337
29	12	12	24,000	4,938	0.449
30	11	11	22,000	4,527	0.412
31	13	13	26,000	5,350	0.486
32	13	13	26,000	5,350	0.486
33	5	5	10,000	2,058	0.187
				MEAN	0.365
				MEDIAN	0.374
				STANDARD DEVEIATION	0.121
				MAXIMUM	0.673
				MINIMUM	0.150

**SECTION 7
ATTACHMENT 2
3 PAGES**

Pipe Interior Radiological Survey Form

Date: 8/10/06 Time: 0904
 Pipe ID#: PPH-106 Pipe Diameter: 2.0" Access Point Area: BIG DIG
 Building: N/A Elevation: -6' System: OFF-GAS

Type of Survey Investigation Characterization Final Survey Other

Gross Co60 Cs

Detector ID# / Sled ID# 44-159 ^u 238369 / NO SLED

Detector Cal Date: 3/6/06 Detector Cal Due Date: 3/6/07

Instrument: 2350-1 Instrument ID #: 18909F

Instrument Cal Date: 3/15/06 Instrument Cal Due Date: 3/15/07

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

Background Value 13.0 cpm

MDCR_{static} 15.4 cpm

Efficiency Factor for Pipe Diameter 0.0005 (from detector efficiency determination)

MDC_{static} 4410 dpm/ 100 cm²

Is the MDC_{static} acceptable? Yes No (if no, adjust sample count time and recalculate MDC_{static})

Comments: CONTINUATION SURVEY - EP3-7

STOPPED AT VERTICAL ELBOW

Technician Signature [Signature]

Pipe Interior Radiological Survey

Position #	Feet into Pipe from Opening	Count Time (min)	Gross Counts	Gross cpm	Net cpm	dpm/100cm ²
1	1	7	6	6	n/a	n/a
2	2	↓	8	8	↓	↓
3	3		11	11		
4	4		9	9		
5	5		6	6		
6	6		4	4		
7	7		10	10		
8	8		11	11		
9	9		7	7		
10	10		12	12		

Pipe Interior Radiological Survey Form (Continuation Form)

Date: 8/10/06
 Pipe ID#: PPH-106 Pipe Diameter: 2.0" Access Point Area: BIG DIG
 Building: N/A Elevation: -6' System: OFF GAS

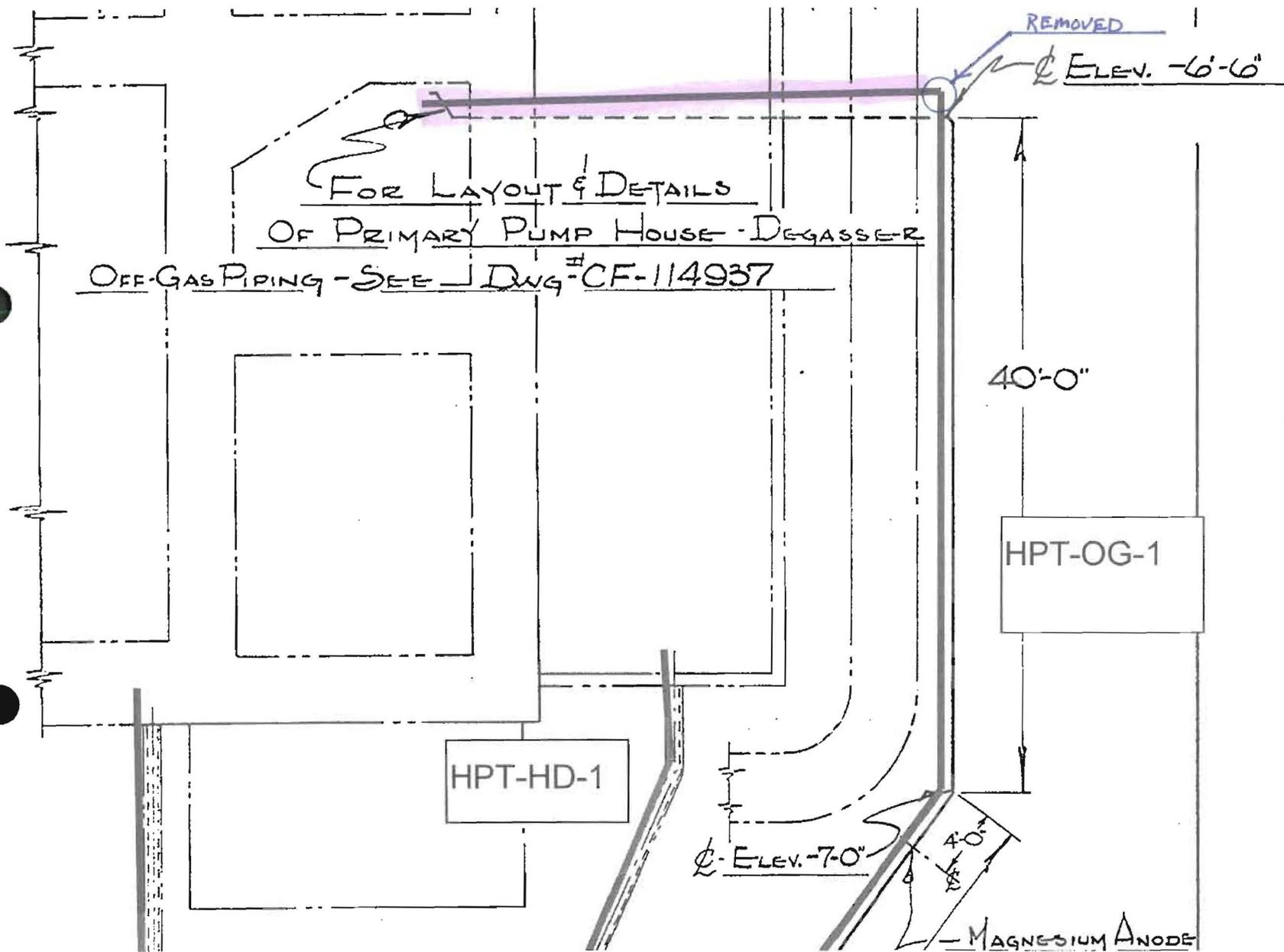
Position #	Feet into Pipe from Opening	Count Time (min)	Gross Counts	Gross cpm	Net cpm	dpm/100cm ²
11	11	1	12	12	n/a	n/a
12	12		10	10		
13	13		9	9		
14	14		9	9		
15	15		18	18		
16	16		10	10		
17	17		10	10		
18	18		15	15		
19	19		7	7		
20	20		10	10		
21	21		5	5		
22	22		6	6		
23	23		12	12		
24	24		8	8		
25	25		16	16		
26	26		7	7		
27	27		11	11		
28	28		9	9		
29	29		12	12		
30	30		11	11		
31	31		13	13		
32	32		13	13		
33	33	↓	5	5	↓	↓

N
A



DRAWING # PF-00778

PIPE SURVEYED
PPH 1Ø6



PAGE
3 of 3

REFERENCE COPY

**SECTION 7
ATTACHMENT 3
1 PAGE**

DQA Check Sheet

Design #	EP PPH-106	Revision #	Original
Survey Unit #	EP PPH-106		

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)	D Wojtkowiak 	Date	04/09/08
FSS/ Characterization Manager (print/sign)	R. Case 	Date	5/6/08

Form
CS-09/2
Rev 0

**SECTION 7
ATTACHMENT 4
1 DISC**