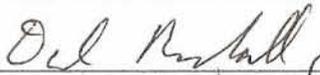
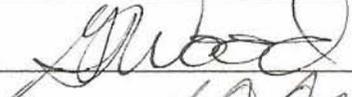


Survey Unit Release Record

Design #	EP-HPT-105	Revision #	Original	Page 1 of 3
Survey Unit #(s)	HPT-105			
Description	<p>1) Embedded Pipe (EP) Survey Unit HPT-105 meets the definition of embedded pipe for Plum Brook Reactor Facility (PBRF).</p> <p>2) EP HPT-105 is a Class 1, Group 3.1 survey unit as per the PBRF Final Status Survey Plan (FSSP) and Technical Basis Document (TBD)-06-004.</p> <p>3) Surveys in EP HPT-105 were performed using a scintillation detector optimized to measure gamma energies representative of Cs-137. Sample #EP 3-8 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			11-25-07	
Technical Reviewer (FSS/Characterization Engineer)			11-26-07	
FSS/Characterization Manager	<small>R. Case</small> 		11/29/07	

Form CS-09/1 Rev 0

Survey Unit: HPT-105

1.0 History/Description

- 1.1 The subject pipe system is a 4" drain line located in the Hot Pipe Tunnel at the -10' el.
- 1.2 EP HPT-105 consists of 4" diameter piping that is approximately 25 feet in length.

2.0 Survey Design Information

- 2.1 EP HPT-105 was surveyed IAW Procedure #BSI/LVS-002.
- 2.2 100% of the 4" ID pipe was accessible for survey. The accessible 4" ID pipe was surveyed by static measurement at one foot increments, for a total of 25 survey measurements.
- 2.3 The total surface area for the 4" ID piping is 24,322 cm² (2.4 m²) for the entire length of (approximately 25') of 4" 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 All measurement results are less than the Derived Concentration Guideline Level (DCGL) for radionuclide specific EP that corresponds to the 1 mrem/yr dose goal established in Table 3-3 of the FSSP.
- 5.3 When implementing the Unity Rule, provided in Section 3.6.3 of the FSSP, and applying the Nuclide Fraction (NF), provided in TBD-06-004, the survey unit that is constituted by EP HPT-105 passes FSS.
- 5.4 Background was not subtracted from the survey measurements and the Elevated Measurement Comparison (EMC) was not employed for this survey unit.

Survey Unit: HPT-105

5.5 Statistical Summary Table

Statistical Parameter	4" Pipe
Total Number of Survey Measurements	25
Number of Measurements >MDC	25
Number of Measurements Above 50% of DCGL	0
Number of Measurements Above DCGL	0
Mean	0.0071
Median	0.0074
Standard Deviation	0.0024
Maximum	0.0135
Minimum	0.0032

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 HPT-105 to be less than 1 mrem/yr. The dose contribution is estimated to be 0.007 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 – Disc containing RR for EP HPT-105 & Spreadsheet

SECTION 7
ATTACHMENT 1
2 **PAGE(S)**



BSI EP/BP SURVEY REPORT

Pipe ID	HPT-105	Survey Location	Hot Pipe Tunnel pen. el.-10
Survey Date	15-Nov-07	2350-1 #	203438
Survey Time	10:12	Detector-Sled #	44-89 238369 /101
Pipe Size	4"	Detector Efficiency	0.00024
DCGL (dpm/100cm ²)	3.79E+06	Pipe Area Incorporated by Detector Efficiency (in cm²)	973
Pipe Area Incorporated by Survey Data (m²)	2.4	Field BKG (cpm)	6.1
Routine Survey	X	Field MDCR (cpm)	11.5
QA Survey		Nominal MDC (dpm/100cm ²)	4,589
Survey Measurement Results			
Total Number of Survey Measurements		25	
Number of Measurements >MDC		25	
Number of Measurements Above 50% DCGL		0	
Number of Measurements Above DCGL		0	
Mean		0.0071	
Median		0.0074	
Standard Deviation		0.0024	
Maximum		0.0135	
Minimum		0.0032	
Survey Technician(s)	JACOBS		
Survey Unit Classification		1	
TBD 06-004 Piping Group		3.1	
SR-13 Radionuclide Distribution Sample		EP 3-6	
Measured Nuclide		CS-137	
Area Factor/EMC Used		No	
Pass/Fail FSS		Pass	
MREM/YR Contribution		<1	
COMMENTS:			
RP Engineer Date		<i>Dal Rowland 11-25-07</i>	

EP HPT-105
4" Pipe
TBD 06-004 Group 3.1

Measurement #	gcpm	ncpm	Cs-137 activity (total dpm)	Cs-137 activity (dpm/100cm2)	Co-60 activity (dpm/100cm2)	Eu-152 activity (dpm/100cm2)	Eu-154 activity (dpm/100cm2)	Nb-94 activity (dpm/100cm2)	Ag-108m activity (dpm/100cm2)	Unity
1	34	34	141,667	14,562	893	-	60	-	-	0.008
2	26	26	108,333	11,135	683	-	46	-	-	0.006
3	23	23	95,833	9,850	604	-	40	-	-	0.005
4	23	23	95,833	9,850	604	-	40	-	-	0.005
5	40	40	166,667	17,131	1,050	-	70	-	-	0.009
6	35	35	145,833	14,990	919	-	61	-	-	0.008
7	15	15	62,500	6,424	394	-	26	-	-	0.003
8	14	14	58,333	5,996	368	-	25	-	-	0.003
9	18	18	75,000	7,709	473	-	32	-	-	0.004
10	27	27	112,500	11,564	709	-	47	-	-	0.006
11	24	24	100,000	10,279	630	-	42	-	-	0.005
12	33	33	137,500	14,133	866	-	58	-	-	0.007
13	28	28	116,667	11,992	735	-	49	-	-	0.006
14	28	28	116,667	11,992	735	-	49	-	-	0.006
15	37	37	154,167	15,846	971	-	65	-	-	0.008
16	40	40	166,667	17,131	1,050	-	70	-	-	0.009
17	37	37	154,167	15,846	971	-	65	-	-	0.008
18	34	34	141,667	14,562	893	-	60	-	-	0.008
19	30	30	125,000	12,848	788	-	53	-	-	0.007
20	34	34	141,667	14,562	893	-	60	-	-	0.008
21	20	20	83,333	8,566	525	-	35	-	-	0.005
22	60	60	250,000	25,697	1,575	-	105	-	-	0.014
23	47	47	195,833	20,129	1,234	-	82	-	-	0.011
24	43	43	179,167	18,416	1,129	-	75	-	-	0.010
25	39	39	162,500	16,703	1,024	-	68	-	-	0.009
									MEAN	0.007
									MEDIAN	0.007
									STD DEV	0.002
									MAX	0.014
									MIN	0.003

SECTION 7
ATTACHMENT 2
3 **PAGE(S)**

Pipe Interior Radiological Survey Form

Date: 11.15.07 Time: 1012
 Pipe ID#: HPT-105 Pipe Diameter: 4" Access Point Area: HPT
 Building: HPT Elevation: -10' System: Pene.
 Type of Survey Investigation Characterization Final Survey Other
 Gross Co60 Cs
 Detector ID# / Sled ID# 44-69/238369#101 / #101
 Detector Cal Date: 16 OCT 07 Detector Cal Due Date: 16 OCT 08
 Instrument: 2350-1 Instrument ID #: 203438
 Instrument Cal Date: 16 OCT 07 Instrument Cal Due Date: 16 OCT 08

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

Background Value 6.1 cpm
 MDCR_{static} 11.52 cpm
 Efficiency Factor for Pipe Diameter 0.00024 (from detector efficiency determination)
 MDC_{static} 4589 dpm/ 100 cm²
 Is the MDC_{static} acceptable? Yes No (if no, adjust sample count time and recalculate MDC_{static})
 Comments: _____

Technician Signature Steven Jacobs

Pipe Interior Radiological Survey

Position #	Feet into Pipe from Opening	Count Time (min)	Gross Counts	Gross cpm	Net cpm	dpm/100cm ²
1	1	1	34	34	n/a	n/a
2	2	1	26	26	↓	↓
3	3	1	23	23		
4	4	1	23	23		
5	5	1	40	40		
6	6	1	35	35		
7	7	1	15	15		
8	8	1	14	14		
9	9	1	18	18		
10	10	1	27	27		

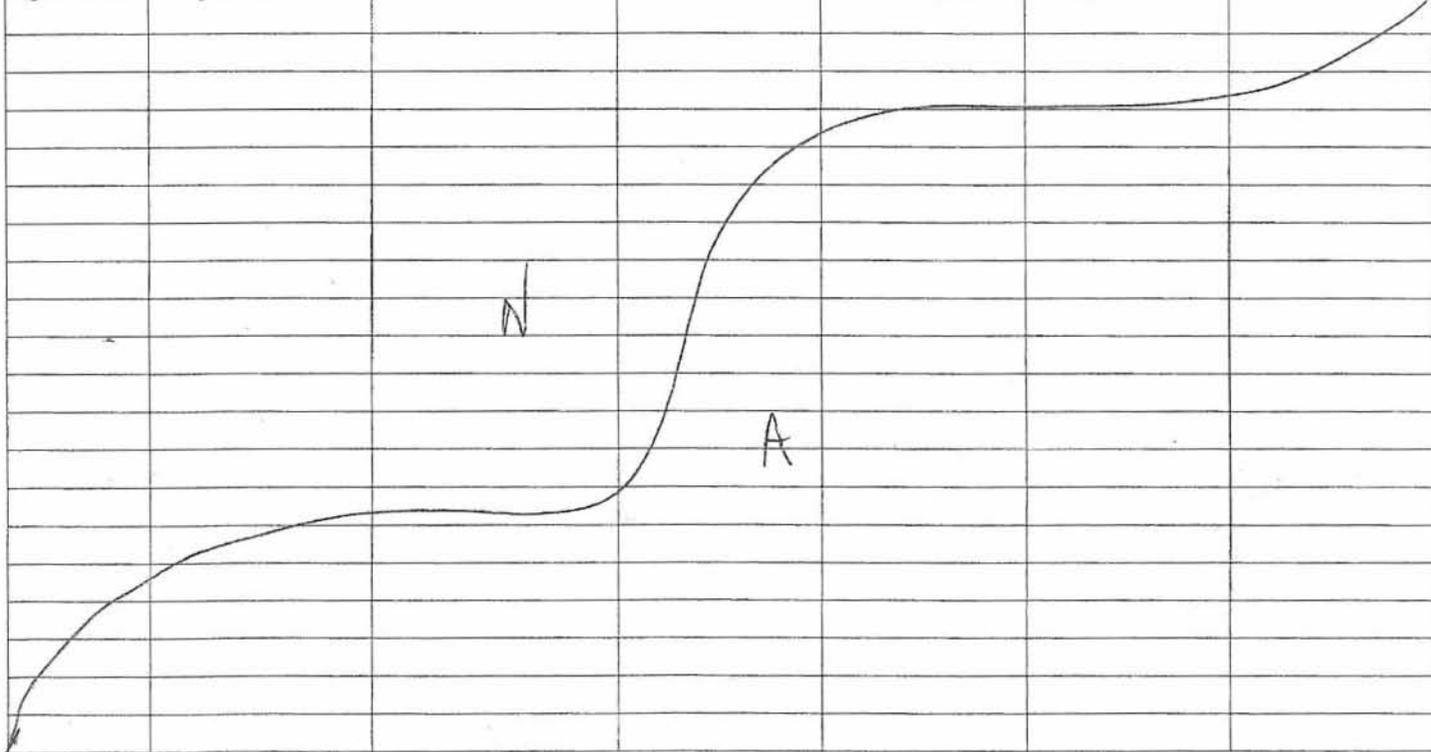
Package Page 1 of 3

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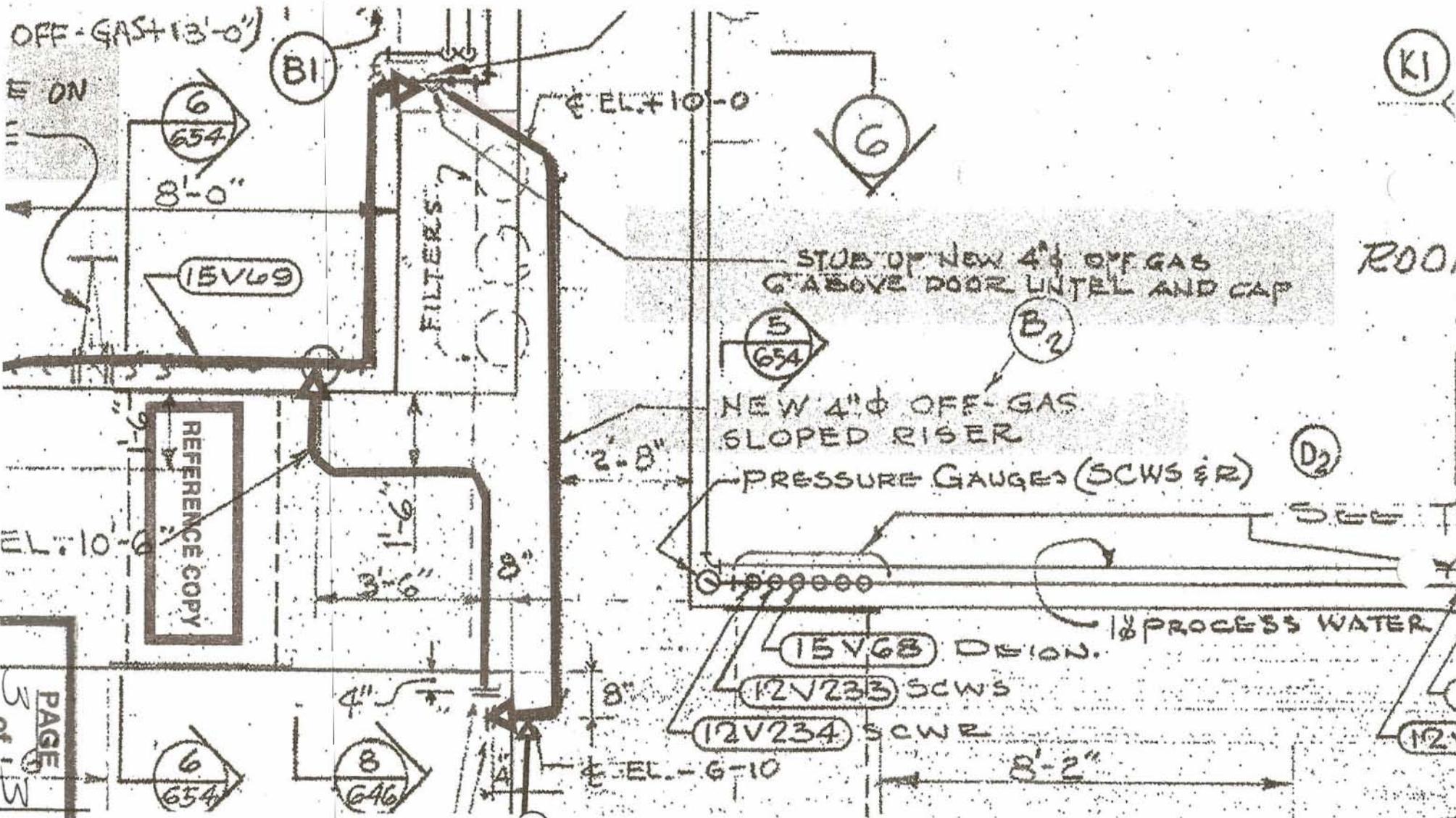
Pipe Interior Radiological Survey Form (Continuation Form)

Date: 11.15.07
 Pipe ID#: HPT-105 Pipe Diameter: 4" Access Point Area: HPT
 Building: HPT Elevation: -10' System: Pene.

Position #	Feet into Pipe from Opening	Count Time (min)	Gross Counts	Gross cpm	Net cpm	dpm/100cm ²
11	11	1	24	24	n/a	n/a
12	12	1	33	33		
13	13	1	28	28		
14	14	1	28	28		
15	15	1	37	37		
16	16	1	40	40		
17	17	1	37	37		
18	18	1	34	34		
19	19	1	30	30		
20	20	1	34	34		
21	21	1	20	20		
22	22	1	60	60		
23	23	1	47	47		
24	24	1	43	43		
25	25	1	39	39		



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PAGE 3 of 1 M

HPT-105 8F-4649

SECTION 7
ATTACHMENT 3
 1 **PAGE(S)**

DQA Check Sheet

Design #	EP HPT-105	Revision #	Original			
Survey Unit #	EP HPT-105					
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)			<i>Dale Randall</i>		Date	11-25-07
FSS/ Characterization Manager (print/sign)			R. Case <i>[Signature]</i>		Date	11/29/07

Form
 CS-09/2
 Rev 0

**SECTION 7
ATTACHMENT 4
1 DISC**