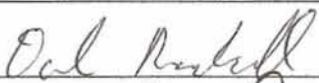
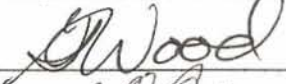
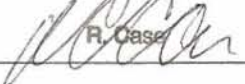


## Survey Unit Release Record

<b>Design #</b>	EP-RPHD-2	<b>Revision #</b>	Original	<b>Page 1 of 3</b>
<b>Survey Unit #(s)</b>	RPHD-2			
<b>Description</b>	<p>1) Embedded Pipe (EP) Survey Unit RPHD-2 meets the definition of embedded pipe for Plum Brook Reactor Facility (PBRF).</p> <p>2) EP RPHD-2 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 RPHD-2 were performed using a scintillation detector optimized to measure gamma energies representative of Co-60. Sample #EP3-7 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>			
<b>Approval Signatures</b>			<b>Date:</b>	
FSS/Characterization Engineer			10-18-07	
Technical Reviewer (FSS/Characterization Engineer)			11-5-07	
FSS/Characterization Manager	 <small>R. Case</small>		11/5/07	

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## Survey Unit: RPHD-2

**1.0 History/Description**

- 1.1 The subject pipe system is the 2" drain line running from the Resin Pit -8' el.
- 1.2 EP RPHD-2 consists of 2" diameter piping that is approximately 8 feet in length.

**2.0 Survey Design Information**

- 2.1 EP RPHD-2 was surveyed IAW Procedure #BSI/LVS-002.
- 2.2 100% of the 2" ID pipe was accessible for survey. The accessible 2" ID pipe was surveyed by static measurement at one foot increments, for a total of 8 survey measurements.
- 2.3 Surface area for the 2" ID piping is 486 cm<sup>2</sup> for each foot of piping, corresponding to a total 2" ID piping surface area of 3,892 cm<sup>2</sup> (0.4 m<sup>2</sup>) for the entire length of (approximately 8') 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 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 RPHD-2 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: RPHD-2

### 5.5 Statistical Summary Table

Statistical Parameter	2" Pipe
Total Number of Survey Measurements	8
Number of Measurements >MDC	6
Number of Measurements Above 50% of DCGL	0
Number of Measurements Above DCGL	0
Mean	0.0303
Median	0.0319
Standard Deviation	0.0072
Maximum	0.0392
Minimum	0.0196

**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 RPHD-2 to be less than 1 mrem/yr. The dose contribution is estimated to be 0.030 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 RPHD-2 & Spreadsheet

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





### BSI EP/BP SURVEY REPORT

Pipe ID	EP RPHD-2	Survey Location	Resin Pit Drain -8'el.
Survey Date	15-Jun-06	2350-1 #	203488
Survey Time	08:30	Detector-Sled #	238369 / no sled
Pipe Size	2"	Detector Efficiency	0.0005
DCGL (dpm/100cm <sup>2</sup> )	2.41E+05	Pipe Area Incorporated by Detector Efficiency (in cm <sup>2</sup> )	486
Pipe Area Incorporated by Survey Data (in <sup>2</sup> )	0.4	Field BKG (cpm)	11.3
Routine Survey	X	Field MDCR (cpm)	14.5
QA Survey		Nominal MDC (dpm/100cm <sup>2</sup> )	4,410
Survey Measurement Results			
Total Number of Survey Measurements		8	
Number of Measurements >MDC		6	
Number of Measurements Above 50% DCGL		0	
Number of Measurements Above DCGL		0	
Mean		0.0303	
Median		0.0319	
Standard Deviation		0.0072	
Maximum		0.0392	
Minimum		0.0196	
Survey Technician(s)	STOCK		
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		<1	
COMMENTS: ACTIVITY VALUES NOT BACKGROUND CORRECTED			
RP Engineer   Date	<i>Olal Powell 10-18-07</i>		

**EP RPHD-2**  
**2" Pipe**  
**TBD 06-004 Group 1**

Measurement #	gcpm	ncpm	Co-60 activity (total dpm)	Co-60 activity (dpm/100cm2)	Cs-137 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	9	9	18,000	3,700	147	3,510	933	108	26	0.022
2	13	13	26,000	5,345	212	5,070	1,348	156	37	0.032
3	8	8	16,000	3,289	130	3,120	829	96	23	0.020
4	11	11	22,000	4,523	179	4,290	1,141	132	32	0.027
5	16	16	32,000	6,578	261	6,240	1,659	192	46	0.039
6	13	13	26,000	5,345	212	5,070	1,348	156	37	0.032
7	13	13	26,000	5,345	212	5,070	1,348	156	37	0.032
8	16	16	32,000	6,578	261	6,240	1,659	192	46	0.039
									MEAN	0.030
									MEDIAN	0.032
									STD DEV	0.007
									MAX	0.039
									MIN	0.020

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

**Pipe Interior Radiological Survey Form**

Date: 6/15/06 Time: 0830  
 Pipe ID#: PHD-2 Pipe Diameter: 2" Access Point Area: RESIN PIT  
 Building: PPH Elevation: -8' System: DRAIN

Type of Survey Investigation  Characterization  Final Survey  Other   
 Gross  Co60  Cs   
 Detector ID# / Sled ID# 238369 / NO SLED  
 Detector Cal Date: 3/6/06 Detector Cal Due Date: 3/6/07  
 Instrument: 2350-1 Instrument ID #: 203488  
 Instrument Cal Date: 11/17/05 Instrument Cal Due Date: 11/17/06

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

Background Value 11.3 cpm  
 MDCR<sub>static</sub> 14.5 cpm  
 Efficiency Factor for Pipe Diameter 0.0003 (from detector efficiency determination)  
 MDC<sub>static</sub> 2779 dpm/ 100 cm<sup>2</sup>  
 Is the MDC<sub>static</sub> acceptable?  Yes  No (if no, adjust sample count time and recalculate MDCR<sub>static</sub>)  
 Comments: INITIAL SURVEY EP3-7 COMPLETE

Technician Signature [Signature]

**Pipe Interior Radiological Survey**

Position #	Feet into Pipe from Opening	Count Time (min)	Gross Counts	Gross cpm	Net cpm	dpm/100cm <sup>2</sup>
1	1	1	9	9	n/a	n/a
2	2	↓	13	13	↓	↓
3	3		8	8		
4	4		11	11		
5	5		16	16		
6	6		13	13		
7	7		13	13		
8	8		16	16		
9	9		N/A	N/A		
10	10		N/A	N/A		

**REFERENCE COPY**







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

**DQA Check Sheet**

Design #	EP RPHD-2	Revision #	Original			
Survey Unit #	EP RPHD-2					
<b>Preliminary Data Review</b>						
<b>Answers to the following questions should be fully documented in the Survey Unit Release Record</b>				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 <sub>W</sub> for Class 1 and 2 survey units, or below 0.5 DCGL <sub>W</sub> for Class 3 survey units?					X
3.	Is the instrumentation MDC for embedded/buried piping static measurements below the DCGL <sub>W</sub> ?			X		
4.	Was the instrumentation MDC for structure scan measurements, soil scan measurements, and embedded/buried piping scan measurements below the DCGL <sub>W</sub> , 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 <sub>W</sub> ?					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		
<b>Graphical Data Review</b>						
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
<b>Data Analysis</b>						
1.	Are all sample measurements below the DCGL <sub>W</sub> (Class 1 & 2), or 0.5 DCGL <sub>W</sub> (Class 3)?			X		
2.	Is the mean of the sample data < DCGL <sub>W</sub> ?			X		
3.	If elevated areas have been identified by scans and/or sampling, is the average activity in each elevated area < DCGL <sub>EMC</sub> (Class 1), < DCGL <sub>W</sub> (Class 2), or <0.5 DCGL <sub>W</sub> (Class 3)?					X
4.	Is the result of the Elevated Measurements Test < 1.0?					X
5.	Is the result of the statistical test ( <b>S+</b> for Sign Test or <b>W<sub>r</sub></b> for WRS Test) ≥ the critical value?					X
Comments:						
FSS/Characterization Engineer (print/sign)		Dale Randall / <i>Dale Randall</i>			Date	10-18-07
FSS/ Characterization Manager (print/sign)		R. Case / <i>R. Case</i>			Date	11/5/07

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**SECTION 7  
ATTACHMENT 4  
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