Survey Unit Release Record

Design #	EP-RPHD-1	Revision #	1	Page 1 of 3
Survey Unit #(s)	RPHD-1			
Description	1) Embedded Pipe (EP) Survey Unit RPHD-1 was remediated and surveyed in December of 2007 as Embedded Pipe, at that time meeting the definition of embedded pipe as per the PBRF Final Status Survey Plan (FSSP). All measurement results were 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. This survey was documented in Revision 0 of this Release Record. 2) Since December of 2007, the envisioned end-state configuration of the Primary Pump House (PPH) was revised. Subsequently, the portions of Embedded Pipe (EP) Survey Unit RPHD-1 which transits in soil under and between the buildings no longer meets the criteria for embedded piping. The portions of Embedded Pipe (EP) Survey Unit RPHD-1 that are embedded in the building foundation walls (PPH and Hot Pipe Tunnel) remain classified as embedded pipe. 3) This FSS survey documented in Revision 1 of this release record was performed after the performance of additional remediation to this system. Upon demonstration of compliance with the release criteria, the complete piping system 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. 4) EP RPHD-1 is a Class 1, Group 1 survey unit as per the PBRF Final Status Survey Plan (FSSP) and Technical Basis Document (TBD)-06-004. 5) Surveys in EP RPHD-1 were performed using a scintillation detector optimized to measure gamma energies representative of Co-60. Sample #EP 3-7 from Survey Request (SR)-13 was referenced for this decision. 6) 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. 7) 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.			

Approval Signatures		**Date:**
FSS/Characterization Engineer		5/5/08
FSS/Characterization Manager	R. Case	5/7/08

Form
CS-09/1
Rev 0

1.0 History/Description

1.1 The subject pipe system is the 4" line running from the Resin Pit -10'.

1.2 EP RPHD-1 consists of 4" diameter piping that is approximately 17 feet in length.

2.0 Survey Design Information

2.1 EP RPHD-1 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 17 survey measurements.

2.3 Surface area for the 4" ID piping is 973 cm^2 for each foot of piping, corresponding to a total 4" ID piping surface area of 16,539 cm^2 (1.7 m^2) for the entire length of (approximately 17') 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 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/100cm^2).

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 RPHD-1 passes FSS after application of Elevated Measurement Comparisons (EMC) and Elevated Measurement Tests (EMT). The EMC Unity sum was 0.058 of unity, and the EMT Unity sum was 0.556 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 40.2 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.

5.7 Statistical Summary Table

Statistical Parameter	4" Pipe
Total Number of Survey Measurements	
Number of Measurements >MDC	17
Number of Measurements Above 50% of DCGL	9
Number of Measurements Above DCGL	2
Mean	0.598
Median	0.527
Standard Deviation	0.293
Maximum	1.198
Minimum	0.264

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-1 to be less than 25 mrem/yr. The dose contribution is estimated to be 13.1 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-1 & Spreadsheet

SECTION 7
ATTACHMENT 1
2 PAGES

BSI EP/BP SURVEY REPORT

Pipe ID	RPHD-1	Survey Location	Resin Drain Sump
Survey Date	09-Apr-08	2350-1 #	203438
Survey Time	1600	Detector-Sled #	LVS 1 - 101
Pipe Size	4"	Detector Efficiency	0.00039
DCGL (dpm/100cm2)	1.10E+04	Pipe Area Incorporated by Detector Efficiency (in cm2)	973
Pipe Area Incorporated by Survey Data (m^2)	1.7	Field BKG (cpm)	2.8
Routine Survey	X	Field MDCR (cpm)	9.0
QA Survey		Nominal MDC (dpm/100cm2)	2,366

Survey Measurement Results	
Total Number of Survey Measurements	17
Number of Measurements >MDC	17
Number of Measurements Above 50% DCGL	9
Number of Measurements Above DCGL	2
Mean	0.598
Median	0.527
Standard Deviation	0.293
Maximum	1.198
Minimum	0.264

Survey Technician(s)	PHELPS

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	Yes
Pass/Fail FSS	Pass
MREM/YR Contribution	<25

COMMENTS:
ACTIVITY VALUES NOT BACKGROUND CORRECTED

RP Engineer | Date	
	5-5-08

EP RPHD-1
4" Pipe
TBD 06-004 Group 1

Measurement #	gcpm	ncpm	Co-60 activity (total dpm)	Co-60 activity (dpm/100cm 2)	Unity	EMC Unity	EMT Unity	
1	16	16	41,026	4,216	0.383		0.383	
2	30	30	76,923	7,906	0.719		0.719	
3	22	22	56,410	5,798	0.527		0.527	
4	50	50	128,205	13,176	1.198	0.030		0.018
5	28	28	71,795	7,379	0.671		0.671	
6	32	32	82,051	8,433	0.767		0.767	
7	36	36	92,308	9,487	0.862		0.862	
8	37	37	94,872	9,750	0.886		0.886	
9	48	48	123,077	12,649	1.150	0.029		0.017
10	22	22	56,410	5,798	0.527		0.527	
11	14	14	35,897	3,689	0.335		0.335	
12	14	14	35,897	3,689	0.335		0.335	
13	20	20	51,282	5,271	0.479		0.479	
14	13	13	33,333	3,426	0.311		0.311	
15	17	17	43,590	4,480	0.407		0.407	
16	11	11	28,205	2,899	0.264		0.264	
17	14	14	35,897	3,689	0.335		0.335	
				5,053		**0.058**	**0.556**	
				MEAN	0.598	**EMC Unity**	**EMT Unity**	
				MEDIAN	0.527			
				STD DEV	0.293			
				MAX	1.198			
				MIN	0.264			

SECTION 7
ATTACHMENT 2
3 PAGES

Pipe Interior Radiological Survey Form

Date: 4·9·08 Time: 1600

Pipe ID#: RPHD-1 Pipe Diameter: 4" Access Point Area: Resin Drain Samp

Building: ~~RWFA~~ PPH Elevation: -9 System: RD

Type of Survey Investigation ____ Characterization ____ Final Survey X Other ✓

Gross ____ Co60 ✓ Cs ____

Detector ID# / Sled ID# LVS-1 / 101

Detector Cal Date: 1·25·08 Detector Cal Due Date: 1·25·09

Instrument: 2350-1 Instrument ID #: 203438

Instrument Cal Date: 10·16·07 Instrument Cal Due Date: 10·16·08

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

Background Value 2·8 cpm

$MDCR_{static}$ 9 cpm

Efficiency Factor for Pipe Diameter 0.00039 (from detector efficiency determination)

MDC_{static} 2366 dpm/ 100 cm^2

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

Comments: started survey in Resin sump pipe went to Sump in Rm 8.

Technician Signature Russel A. Phelps

Pipe Interior Radiological Survey

Position #	Feet into Pipe from Opening	Count Time (min)	Gross Counts	Gross cpm	Net cpm	dpm/100cm²
1	1	1	16	16		
2	2		30	30		
3	3		22	22		
4	4		50	50		
5	5		28	28	N/A	
6	6		32	32		
7	7		36	36		
8	8		37	37		
9	9		48	48		
10	10		22	22		

Pipe Interior Radiological Survey Form (Continuation Form)

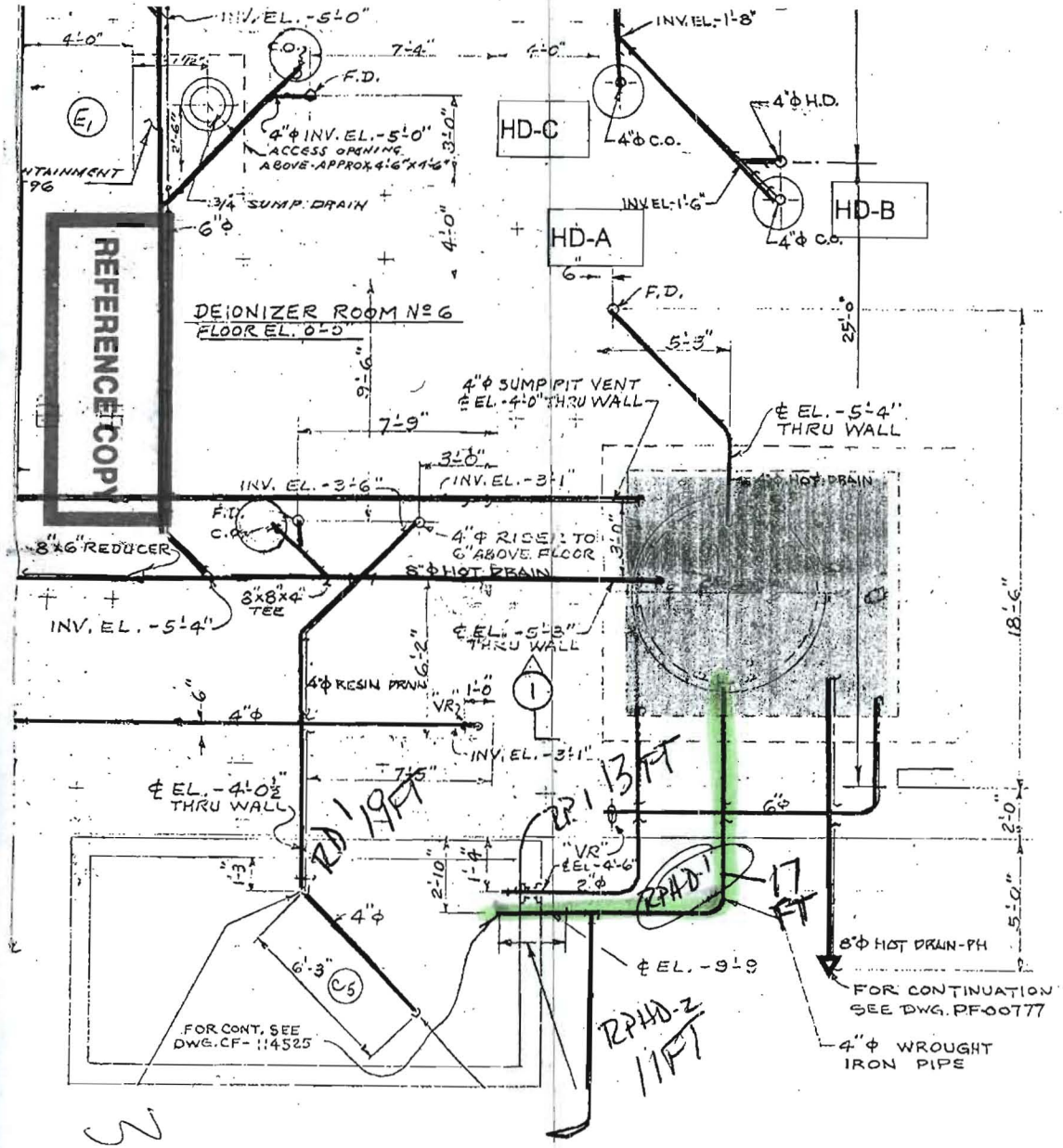
Date: 4-9-08
Pipe ID#: RPHD-1 Pipe Diameter: 4" Access Point Area: RD Sump
Building: N/A Elevation: -9 System: RD

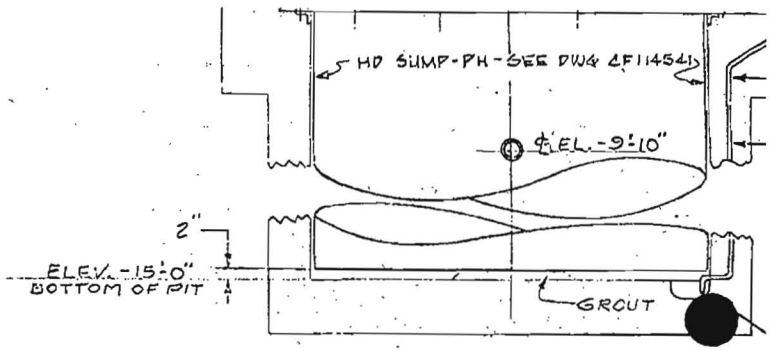
Position #	Feet into Pipe from Opening	Count Time (min)	Gross Counts	Gross cpm	Net cpm	dpm/100cm^2
11	11	1	14	n/a	n/a	
12	12	1	14	↓	↓	
13	13	1	20	↓	↓	
14	14	1	13	↓	↓	
15	15	1	17	↓	↓	
16	16	1	11	↓	↓	
17	17	1	14	↓	↓	

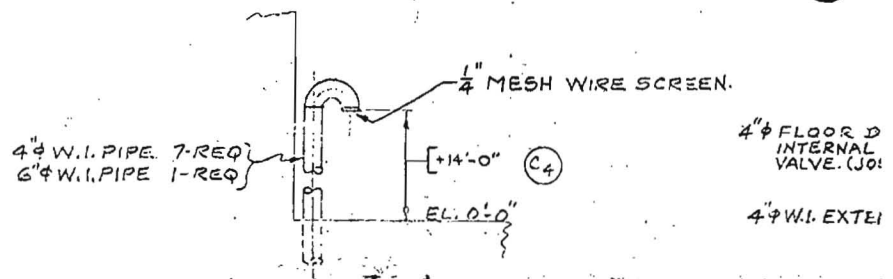
N/A

REFERENCE COPY

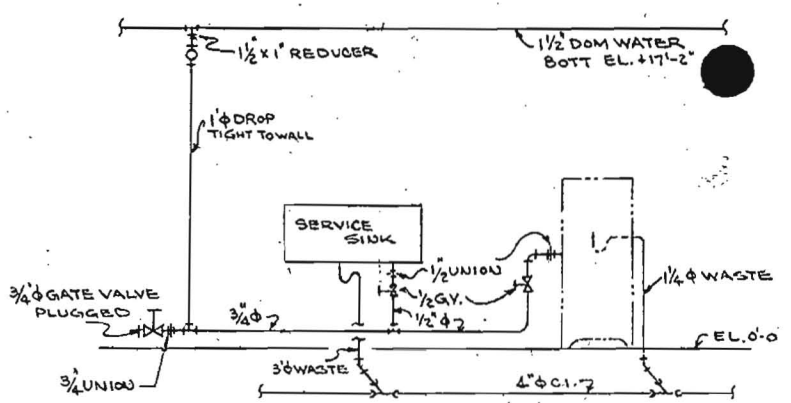
Babcock Services, Inc.







TYPICAL VENT RISER (VR) DETAIL
CONTAMINATED AIR-PH VENT SYSTEM
SCALE: 1/2"=1'-0"



5 of 13

SECTION 7
ATTACHMENT 3
1 PAGE

DQA Check Sheet

Design #	EP RPHD-1	Revision #	1	
Survey Unit #	EP RPHD-1			

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,*** for WRS Test) ≥ the critical value?			X

Comments: See Section 5 of this Release Record

FSS/Characterization Engineer (print/sign)	G.L. Wood / G.L. Wood	Date	5/5/08
FSS/ Characterization Manager (print/sign)	R. Case	Date	5/7/08

Form CS-09/2 Rev 0

SECTION 7
ATTACHMENT 4
1 DISC