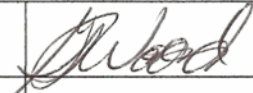
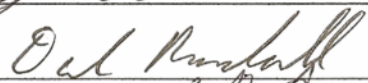



## Survey Unit Release Record

<b>Design #</b>	EP-ROLB-109	<b>Revision #</b>	Original	<b>Page 1 of 3</b>
<b>Survey Unit #(s)</b>	ROLB-109			
<b>Description</b>	<p>1) Embedded Pipe (EP) Survey Unit ROLB-109 meets the definition of embedded pipe for Plum Brook Reactor Facility (PBRF).</p> <p>2) EP ROLB-109 is a Class 1, Group 4.2 survey unit as per the PBRF Final Status Survey Plan (FSSP) and Technical Basis Document (TBD)-06-004.</p> <p>3) Surveys in EP ROLB-109 were performed using a scintillation detector optimized to measure gamma energies representative of Cs-137. Sample #EP 4-3 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			10-10-07	
Technical Reviewer (FSS/Characterization Engineer)			10-17-07	
FSS/Characterization Manager	 <small>Dr</small>		10/22/07	

10-17-07

Form CS-09/1 Rev 0
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## Survey Unit: ROLB-109

**1.0 History/Description**

- 1.1 The subject pipe system is the elevator drain system for the elevator shaft in the -15 ft elevation of the Reactor Office and Laboratory Building (ROLB). The purpose of this system is to convey water from the shaft floor drain opening to the ROLB sump.
- 1.2 EP ROLB-109 consists of approximately 3 feet of piping. The piping system consists of 4" piping.

**2.0 Survey Design Information**

- 2.1 EP ROLB-109 was surveyed IAW Procedure #BSI/LVS-002.
- 2.2 100% of the piping was accessible for survey. The accessible pipe was surveyed by static measurement at one foot increments, for a total of 3 survey measurements.
- 2.3 The total surface area for the piping system is approximately 29000 cm<sup>2</sup> (2.9 m<sup>2</sup>) for the entire length of (3') of 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 ROLB-109 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: ROLB-109

### 5.5 Statistical Summary Table

Statistical Parameter	4" Pipe
Total Number of Survey Measurements	3
Number of Measurements >MDC	3
Number of Measurements Above 50% of DCGL	0
Number of Measurements Above DCGL	0
Mean	0.003
Median	0.002
Standard Deviation	0.001
Maximum	0.004
Minimum	0.002

**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 ROLB-109 to be less than 1 mrem/yr. The dose contribution is estimated to be 0.003 mrem/yr based on the average of the actual gross counts.

### 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 ROLB-102 & Spreadsheet

**SECTION 7  
ATTACHMENT 1  
2 PAGES**



### BSI EP/BP SURVEY REPORT

Pipe ID	EP ROLB-109	Survey Location	ROLB -15 el.
Survey Date	07-Feb-07	2350-1 #	203488
Survey Time	1355	Detector-Sled #	238369 / 101
Pipe Size	4"	Detector Efficiency	0.00083
DCGL (dpm/100cm <sup>2</sup> )	3.79E+06	Pipe Area Incorporated by Detector Efficiency (in cm <sup>2</sup> )	973
Pipe Area Incorporated by Survey Data (m <sup>2</sup> )	2.9	Field BKG (cpm)	4.4
Routine Survey	X	Field MDCR (cpm)	10.2
QA Survey		Nominal MDC (dpm/100cm <sup>2</sup> )	1,852

Survey Measurement Results	
Total Number of Survey Measurements	3
Number of Measurements >MDC	2
Number of Measurements Above 50% DCGL	0
Number of Measurements Above DCGL	0
Mean	0.0026
Median	0.0023
Standard Deviation	0.0011
Maximum	0.0038
Minimum	0.0016

Survey Technician(s)	STOCK
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Survey Unit Classification	1
TBD 06-004 Piping Group	4.2
SR-13 Radionuclide Distribution Sample	EP 4-3
Measured Nuclide	Cs-137
Area Factor/EMC Used	No
Pass/Fail FSS	Pass
MREM/YR Contribution	<1

COMMENTS:  
 ACTIVITY VALUES NOT BACKGROUND CORRECTED

RP Engineer | Date *[Signature]* / 10.10.07

**EP ROLB-109**  
**4" Pipe**  
**TBD 06-004 Group 4.2**

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	29	29	34,940	3,591	679	-	-	-	-	0.004
2	18	18	21,687	2,229	421	-	-	-	-	0.002
3	12	12	14,458	1,486	281	-	-	-	-	0.002
									MEAN	0.003
									MEDIAN	0.002
									STD DEV	0.001
									MAX	0.004
									MIN	0.002

**SECTION 7  
ATTACHMENT 2  
2 PAGES**

## Pipe Interior Radiological Survey Form

Date: 2/7/07 Time: 1355  
 Pipe ID#: ROLB 109 Pipe Diameter: 4" Access Point Area: THE SHAFT  
 Building: ROLB Elevation: -20' System: DRAIN TO SUMP

Type of Survey Investigation \_\_\_\_\_ Characterization \_\_\_\_\_ Final Survey X Other ✓  
 Gross \_\_\_\_\_ Co60 \_\_\_\_\_ Cs ✓  
 Detector ID# / Sled ID# 44-159 # 2383691 101  
 Detector Cal Date: 9/5/06 Detector Cal Due Date: 9/5/07  
 Instrument: 2350-1 Instrument ID #: 203488  
 Instrument Cal Date: 7/5/06 Instrument Cal Due Date: 7/5/07

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

Background Value 4.4 cpm

MDCR<sub>static</sub> 10.2 cpm

Efficiency Factor for Pipe Diameter 0.00083 (from detector efficiency determination)

MDC<sub>static</sub> 1852 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: EP4-3 COMPLETE  
CAS - 0295AM

RE-SURVEYED DUE TO BEVERAGE SPILL ON INITIAL SURVEY FORMS

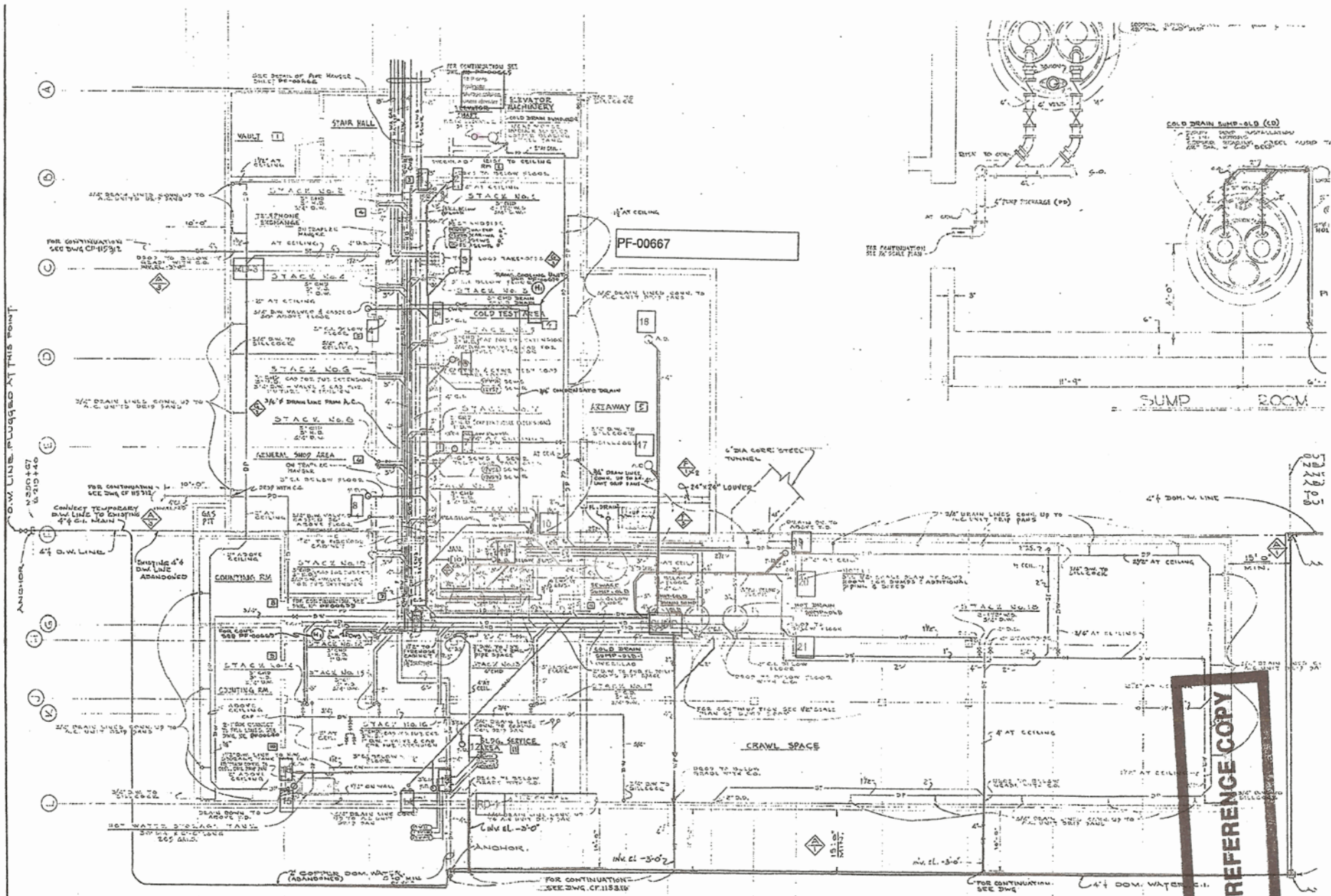
Technician Signature [Signature]

## 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	29	29	nla	nla
2	2	↓	18	18	↓	↓
3	3	↓	12	12	↓	↓
4	4	↓	N	A	↓	↓
5	5	↓				
6						
7			N			
8			A			
9						
10						

Package Page 1 of 1

ROLB-109



REFERENCE COPY

D.W. LINE PLUGGED AT THIS POINT  
2320+07  
2320+40

PF-00667

COLD DRAIN SUMP-SLB (CO)

SUMP ROOM

CRAWL SPACE

FOR CONTINUATION - SEE DWG. CP-11535

FOR CONTINUATION - SEE DWG.

C-4 DOM. WATER

2320+07  
2320+40

**SECTION 7  
ATTACHMENT 3  
1 PAGE**

### DQA Check Sheet

Design #	EP ROLB-109	Revision #	Original	
Survey Unit #	EP ROLB-109			

#### 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 <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		

#### 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 <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)	<i>CS Wood</i>	Date	10-10-07
FSS/ Characterization Manager (print/sign)	R. Case	Date	10/22/07

Form  
CS-09/2  
Rev 0

**SECTION 7  
ATTACHMENT 4  
1 DISC**