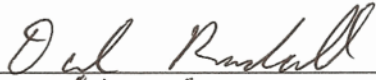




Survey Unit Release Record

Design #	EP-ROLB-111	Revision #	Original	Page 1 of 3
Survey Unit #(s)	ROLB-111			
Description	<p>1) Embedded Pipe (EP) Survey Unit ROLB-111 meets the definition of embedded pipe for Plum Brook Reactor Facility (PBRF).</p> <p>2) EP ROLB-111 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-111 were performed using a scintillation detector optimized to measure gamma energies representative of Co-60. Sample #EP 4-3 and EP 4-6 from Survey Request (SR)-13 were 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				8-24-07
Technical Reviewer (FSS/Characterization Engineer)				10-10-07
FSS/Characterization Manager	 <small>R. Case</small>			10/16/07

Form
CS-09/1
Rev 0

Survey Unit: ROLB-111

1.0 History/Description

- 1.1 The subject pipe system is located in the elevator shaft of the -15 ft elevation of the Reactor Office and Laboratory Building (ROLB). The purpose of this system is to convey water from the various floor drain openings to the ROLB sump located on the sump room on the -15 foot elevation of the ROLB.
- 1.2 EP ROLB-111 consists of approximately 27 feet of piping. The piping system is consists of 10" ID piping.

2.0 Survey Design Information

- 2.1 EP ROLB-111 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 27 survey measurements.
- 2.3 The total surface area for the piping system is approximately 65,669 cm² (6.6 m²) for the entire length of (27') 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-111 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-111

5.5 Cs-137 is designated as the primary nuclide of concern for piping Group 4.2 per Technical Basis Document (TBD)-06-004. The survey measurements and dose assessment for ROLB 111 were calculated and appropriately scaled for Piping Group 4.2 based on the direct measurement of Co-60. TBD-06-004 and the supporting sample analysis from Survey Request 13 were not approved or published at the time the ROLB 111 survey measurements were acquired.

5.6 Statistical Summary Table

Statistical Parameter	10" Pipe
Total Number of Survey Measurements	27
Number of Measurements >MDC	27
Number of Measurements Above 50% of DCGL	0
Number of Measurements Above DCGL	0
Mean	0.1845
Median	0.1881
Standard Deviation	0.0866
Maximum	0.3077
Minimum	0.0595

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-111 to be less than 1 mrem/yr. The dose contribution is estimated to be 0.185 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-111 & Spreadsheet

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



BSI EP/BP SURVEY REPORT

Pipe ID	EP ROLB-111	Survey Location	ROLB -15 el.
Survey Date	08-Mar-06	2350-1 #	203488
Survey Time	08:00	Detector-Sled #	B577A / 108
Pipe Size	10"	Detector Efficiency	0.0033
DCGL (dpm/100cm2)	2.41E+05	Pipe Area Incorporated by Detector Efficiency (in cm2)	2432
Pipe Area Incorporated by Survey Data (m ²)	6.6	Field BKG (cpm)	598.3
Routine Survey	X	Field MDCR (cpm)	87.3
QA Survey		Nominal MDC (dpm/100cm2)	879
Survey Measurement Results			
Total Number of Survey Measurements		27	
Number of Measurements >MDC		27	
Number of Measurements Above 50% DCGL		0	
Number of Measurements Above DCGL		0	
Mean		0.1845	
Median		0.1881	
Standard Deviation		0.0866	
Maximum		0.3077	
Minimum		0.0595	
Survey Technician(s)	ROSENHAGEN		
Survey Unit Classification		1	
TBD 06-004 Piping Group		4.2	
SR-13 Radionuclide Distribution Sample		EP 4-3	
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	Oul Randall 9-24-07		

EP ROLB-111
10" Pipe
TBD 06-004 Group 4.2

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	200	200	606,061	24,918	131,800	-	-	-	-	0.138
2	250	250	757,576	31,148	164,750	-	-	-	-	0.173
3	411	411	1,245,455	51,207	270,850	-	-	-	-	0.284
4	432	432	1,309,091	53,823	284,689	-	-	-	-	0.299
5	445	445	1,348,485	55,443	293,256	-	-	-	-	0.308
6	426	426	1,290,909	53,076	280,735	-	-	-	-	0.295
7	414	414	1,254,545	51,581	272,827	-	-	-	-	0.286
8	393	393	1,190,909	48,964	258,988	-	-	-	-	0.272
9	356	356	1,078,788	44,354	234,605	-	-	-	-	0.246
10	272	272	824,242	33,889	179,248	-	-	-	-	0.188
11	320	320	969,697	39,869	210,880	-	-	-	-	0.221
12	292	292	884,848	36,381	192,428	-	-	-	-	0.202
13	379	379	1,148,485	47,220	249,762	-	-	-	-	0.262
14	410	410	1,242,424	51,082	270,191	-	-	-	-	0.284
15	397	397	1,203,030	49,463	261,624	-	-	-	-	0.275
16	291	291	881,818	36,256	191,769	-	-	-	-	0.201
17	227	227	687,879	28,282	149,593	-	-	-	-	0.157
18	166	166	503,030	20,682	109,394	-	-	-	-	0.115
19	157	157	475,758	19,561	103,463	-	-	-	-	0.109
20	86	86	260,606	10,715	56,674	-	-	-	-	0.059
21	88	88	266,667	10,964	57,992	-	-	-	-	0.061
22	138	138	418,182	17,194	90,942	-	-	-	-	0.095
23	146	146	442,424	18,190	96,214	-	-	-	-	0.101
24	125	125	378,788	15,574	82,375	-	-	-	-	0.086
25	122	122	369,697	15,200	80,398	-	-	-	-	0.084
26	142	142	430,303	17,692	93,578	-	-	-	-	0.098
27	118	118	357,576	14,702	77,762	-	-	-	-	0.082
									MEAN	0.184
									MEDIAN	0.188
									STD DEV	0.087
									MAX	0.308
									MIN	0.059

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

Pipe Interior Radiological Survey Form

Date: 3-8-06 Time: 6800
 Pipe ID#: ROLB 111 Pipe Diameter: 10" Access Point Area: -15 ROLB ELEVATOR SHAFT
 Building: ROLB Elevation: -15 System: ROLB 111 OIL STORAGE
 Type of Survey Investigation _____ Characterization _____ Final Survey X Other ✓
 Gross _____ Co60 ✓ Cs _____
 Detector ID# / Sled ID# G3 BICRON / B577A 1 108
 Detector Cal Date: 17-NOV-05 Detector Cal Due Date: 17-NOV-06
 Instrument: 2350-1 Instrument ID #: 203488
 Instrument Cal Date: 17-NOV-05 Instrument Cal Due Date: 17-NOV-06

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

Background Value 598.3 cpm

MDCR_{static} 87.3 cpm

Efficiency Factor for Pipe Diameter 0.0033 (from detector efficiency determination)

MDC_{static} 879 dpm/ 100 cm²

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

Comments: INITIAL SURVEY

Technician Signature complete

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	200	200	n/a	n/a
2	2		250	250		
3	3		411	411		
4	4		432	432		
5	5		445	445		
6	6		426	426		
7	7		414	414		
8	8		393	393		
9	9		356	356		
10	10		272	272		

Package Page 1 of 3

REFERENCE COPY

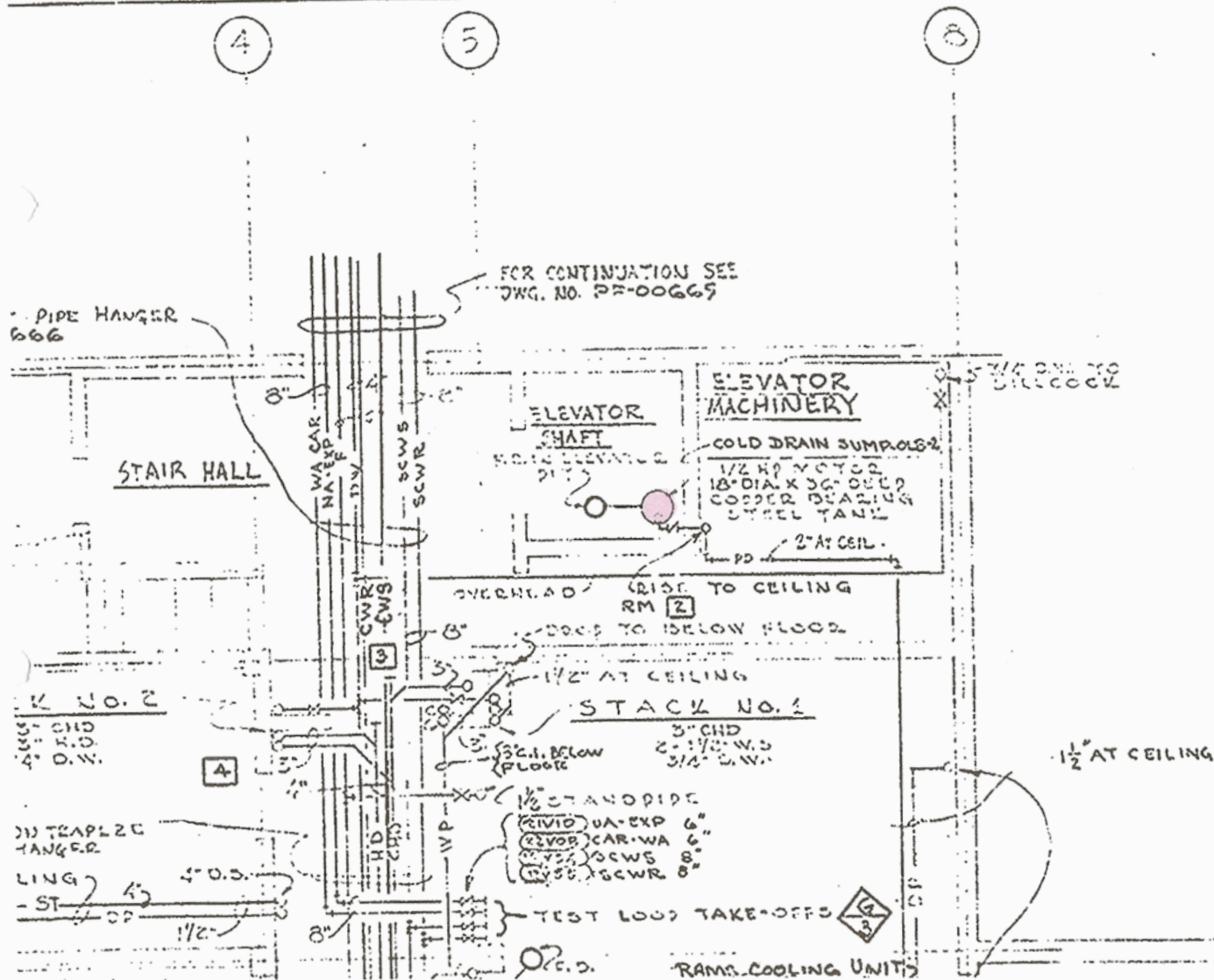
Date: 3-8-06
 Pipe ID#: ROLB 111 Pipe Diameter: 10" Access Point Area: -15 ROLB ELEVATOR SHAFT
 Building: ROLB Elevation: -15 System: ROLB 111

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Package Page 2 of 3

REFERENCE COPY

REACTOR BUILDING - BASEMENT LEVEL



SECTION 7
ATTACHMENT 3
1 PAGE(S)

DQA Check Sheet

Design #	EP ROLB-111	Revision #	Original			
Survey Unit #	EP ROLB-111					
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 Randolph</i>		Date 9-29-07
FSS/ Characterization Manager (print/sign)				<i>R. Case</i>		Date 10/16/07

Form
CS-09/2
Rev 0

SECTION 7
ATTACHMENT 4
1 DISC