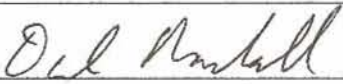

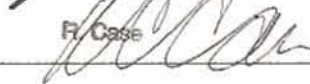


Survey Unit Release Record

Design #	EP-IT-12	Revision #	Original	Page 1 of 3
Survey Unit #(s)	IT-12			
Description	<p>1) Embedded Pipe (EP) Survey Unit IT-12 meets the definition of embedded pipe for Plum Brook Reactor Facility (PBRF).</p> <p>2) EP IT-12 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 IT-12 were performed using a scintillation detector optimized to measure gamma energies representative of Co-60. Sample #EP 3-9 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			11-12-07	
Technical Reviewer (FSS/Characterization Engineer)			11-14-07	
FSS/Characterization Manager	 F. Case		11/15/07	

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Survey Unit: IT-12

1.0 History/Description

- 1.1 The subject pipe system is a 4" diameter penetration located adjacent to the CRT plate within the Sub Pile Room. The system access point is located on the -34' el. of the Rx building.
- 1.2 EP IT-12 consists of 4" diameter piping that is approximately 3 feet in length.

2.0 Survey Design Information

- 2.1 EP IT-12 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 2,919 cm² (0.3 m²) 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 IT-12 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.

5.5 Statistical Summary Table

Statistical Parameter	4" Pipe
Total Number of Survey Measurements	3
Number of Measurements >MDC	1
Number of Measurements Above 50% of DCGL	0
Number of Measurements Above DCGL	0
Mean	0.0159
Median	0.0136
Standard Deviation	0.0039
Maximum	0.0204
Minimum	0.0136

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 IT-12 to be less than 1 mrem/yr. The dose contribution is estimated to be 0.016 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 IT-12 & Spreadsheet

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ATTACHMENT 1
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BSI EP/BP SURVEY REPORT

Pipe ID	EP IT-12	Survey Location	Sub Pile Room Pen. -34 el.
Survey Date	24-Oct-07	2350-1 #	189094
Survey Time	16:07	Detector-Sled #	1MG1 LVS-1/101
Pipe Size	4"	Detector Efficiency	0.00036
DCGL (dpm/100cm ²)	2.41E+05	Pipe Area Incorporated by Detector Efficiency (in cm ²)	973
Pipe Area Incorporated by Survey Data (m ²)	0.3	Field BKG (cpm)	3.4
Routine Survey	X	Field MDCR (cpm)	10
QA Survey		Nominal MDC (dpm/100cm ²)	3,059
Survey Measurement Results			
Total Number of Survey Measurements		3	
Number of Measurements >MDC		1	
Number of Measurements Above 50% DCGL		0	
Number of Measurements Above DCGL		0	
Mean		0.0159	
Median		0.0136	
Standard Deviation		0.0039	
Maximum		0.0204	
Minimum		0.0136	
Survey Technician(s)		FOWLER	
Survey Unit Classification		1	
TBD 06-004 Piping Group		1	
SR-13 Radionuclide Distribution Sample		EP 3-9	
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		Orel Runkall 11-12-07	

EP IT-12
4" 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	8	8	22,222	2,284	91	2,167	576	67	16	0.014
2	8	8	22,222	2,284	91	2,167	576	67	16	0.014
3	12	12	33,333	3,426	136	3,250	864	100	24	0.020
									MEAN	0.016
									MEDIAN	0.014
									STD DEV	0.004
									MAX	0.020
									MIN	0.014

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Pipe Interior Radiological Survey Form

Date: 10-24-07 Time: 1607
 Pipe ID#: IT-12 Pipe Diameter: 4" Access Point Area: Sub Pk Rm
 Building: CV Elevation: -34' System: Restriction
 Type of Survey Investigation Characterization Final Survey X Other ✓
 Gross Co60 ✓ Cs
 Detector ID# / Sled ID# 1M61 / LVS-1 / Sled # 101
 Detector Cal Date: 1-11-07 Detector Cal Due Date: 1-11-08
 Instrument: 2350-1 Instrument ID #: 189094
 Instrument Cal Date: 1-11-07 Instrument Cal Due Date: 1-11-08

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

Background Value 3.4 cpm
 MDCR_{static} 10 cpm
 Efficiency Factor for Pipe Diameter 0.00036 (from detector efficiency determination)
 MDC_{static} 30.59 dpm/ 100 cm²
 Is the MDC_{static} acceptable? (Yes) No (if no, adjust sample count time and recalculate MDCR_{static})
 Comments: Post Decon 100% complete

Technician Signature R. Fowler

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	8	8		
2	2	1	8	8		
3	3	1	12	12		
4						
5						
6						
7						
8						
9						
10						

Package Page 1 of 2

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North
↓

IT-12

CRT Plate
↓

5	10
4	9
3	8
2	7
1	6

IT-14

IT-13

IT-11

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ATTACHMENT 3
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DQA Check Sheet

Design #	EP IT-12	Revision #	Original			
Survey Unit #	EP-IT-12					
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 (<i>S</i> + for Sign Test or <i>W</i> _r for WRS Test) ≥ the critical value?						X
Comments:						
FSS/Characterization Engineer (print/sign)				<i>Dale Randolph</i>		Date 11-12-07
FSS/ Characterization Manager (print/sign)				<i>R. Case</i>		Date 11/15/07

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