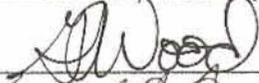
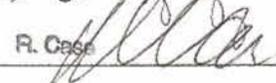


Survey Unit Release Record

Design #	EP-CRT-6	Revision #	Original	Page 1 of 3
Survey Unit #(s)	CRT-6			
Description	<p>1) Embedded Pipe (EP) Survey Unit CRT-6 meets the definition of embedded pipe for Plum Brook Reactor Facility (PBRF).</p> <p>2) EP CRT-6 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 CRT-6 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	 <small>R. Case</small>		11/15/07	

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Survey Unit: CRT-6

1.0 History/Description

- 1.1 The subject pipe system is a 2.5" diameter penetration located on 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 CRT-6 consists of 2.5" diameter piping that is approximately 3 feet in length.

2.0 Survey Design Information

- 2.1 EP CRT-6 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 1,824 cm² (0.2 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 CRT-6 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: CRT-6

5.5 Statistical Summary Table

Statistical Parameter	2.5" 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	0.0317
Median	0.0089
Standard Deviation	0.0474
Maximum	0.0862
Minimum	0.0000

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 CRT-6 to be less than 1 mrem/yr. The dose contribution is estimated to be 0.032 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

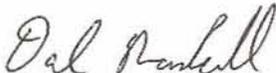
Attachment 3 – DQA Worksheet

Attachment 4 – Disc containing RR for EP CRT-6 & Spreadsheet

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BSI EP/BP SURVEY REPORT

Pipe ID	EP CRT-6	Survey Location	Sub Pile Room Pen. -34 el.
Survey Date	24-Oct-07	2350-1 #	189094
Survey Time	16:46	Detector-Sled #	1MG1 LVS-1/ no sled
Pipe Size	2.5"	Detector Efficiency	0.00033
DCGL (dpm/100cm²)	2.41E+05	Pipe Area Incorporated by Detector Efficiency (in cm²)	608
Pipe Area Incorporated by Survey Data (m²)	0.2	Field BKG (cpm)	3.4
Routine Survey	X	Field MDCR (cpm)	10
QA Survey		Nominal MDC (dpm/100cm²)	3,927
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		0.0317	
Median		0.0089	
Standard Deviation		0.0474	
Maximum		0.0862	
Minimum		0.0000	
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		 11-12-07	

EP CRT-6
2.5" 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	3	3	9,091	1,495	59	1,418	377	44	10	0.009
2	0	0	-	-	-	-	-	-	-	0.000
3	29	29	87,879	14,453	573	13,710	3,645	422	101	0.086
									MEAN	0.032
									MEDIAN	0.009
									STD DEV	0.047
									MAX	0.086
									MIN	0.000

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 2 **PAGE(S)**

Pipe Interior Radiological Survey Form

Date: 10-24-07 Time: 1646
 Pipe ID#: CRT-6 Pipe Diameter: 2.5" Access Point Area: Sub Pile Rm
 Building: CV Elevation: -34' System: Penetration
 Type of Survey Investigation Characterization Final Survey X Other ✓
 Gross Co60 ✓ Cs
 Detector ID# / Sled ID# 1mb1 / LVS-1 / No Sled
 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 0.00033 (from detector efficiency determination)
 MDC_{static} 3927 dpm/ 100 cm²
 Is the MDC_{static} acceptable? (Yes) No (if no, adjust sample count time and recalculate MDC_{static})
 Comments: Post Devn 100% Complete

Technician Signature R Farh

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	3	3	n/a	n/a
2	2	↓	0	0	↓	↓
3	3	↓	29	29	↓	↓
4						
5						
6						
7						
8						
9						
10						

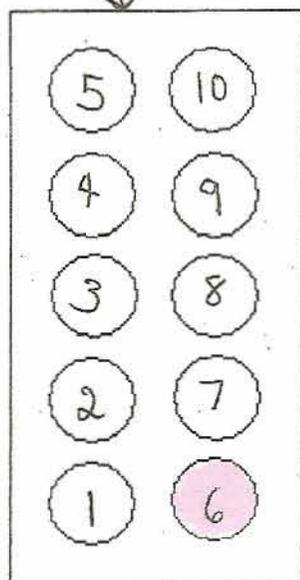
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North
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IT-12

CRT Plate
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IT-14

IT-13

IT-11

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DQA Check Sheet

Design #	EP CRT-6	Revision #	Original			
Survey Unit #	EP-CRT-6					
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>Date Randall / [Signature]</i>			Date	11-12-07
FSS/ Characterization Manager (print/sign)		R. Case <i>[Signature]</i>			Date	11/15/07

Form
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ATTACHMENT 4
1 DISC**