Survey Unit Release Record				
Design #	EP 1.12	**Revision #**	Original	**Page 1 of 4**
Survey Unit #(s)	1.12			
Description	1) Embedded Pipe (EP) Survey Unit 1.12 meets the definition of embedded pipe for Plum Brook Reactor Facility (PBRF). 2) EP 1.12 is a Class 1, Group 1 survey unit as per the PBRF Final Status Survey Plan (FSSP) and Technical Basis Document (TBD)-06-004. 3) Surveys in EP 1.12 were performed using a scintillation detector optimized to measure beta energies ≥85 keV (ISO 7503-1 Table3, Tc99). This energy is lower than the beta energy for Co60 (96 keV, ISO 7503-1 Table 3), assuring the nuclide of concern for DCGL is assessed during data acquisition. 4) Survey Instructions for this survey unit are incorporated into and performed in accordance with (IAW) the Babcock Services Incorporated (BSI)/LVS-003, 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. 5) Instrument efficiency determinations are developed in accordance with the BSI/LVS-003, WEP 05-006, these determinations are appropriate for the types of radiation involved and the media being surveyed.			

Approval Signatures		**Date:**
FSS/Characterization Engineer	G. Wood	Feb 18, 2008
FSS/Characterization Manager	R. Case	2/25/08

Form
CS-09/1
Rev 0

1.0 History/Description

1.1 The subject pipe is the 24" hot leg for the PCW system. The function of this piping was to convey heated water away from the reactor core.

1.2 EP 1.12 consists of 24" diameter piping that is approximately 146 feet in length.

2.0 Survey Design Information

2.1 EP 1.12 was surveyed IAW Procedure #BSI/LVS-003.

2.2 87 feet of the 24" pipe was accessible for survey. The inaccessible piping includes elbows (8), weld bead transitions, and the three feet of piping between the 0' elevation and the -3' elevation in the PPH Room 4. The elbows and their approaches are inaccessible to the pipecrawler. The 3' in PPH Room 4 is released to the structural DCGL and will not be grouted. The survey for this piping will be accomplished as part of the structural release survey in PPH Room 4.

2.3 100% of the accessible piping was scanned.

2.4 16 survey locations were selected by a random number generator for static measurements. The locations were assigned as eight from the vessel access point and eight from the PPH Room 4 access point. Five of these locations were in the inaccessible elbows, one was inaccessible due to weld bead transitions. At each accessible location four static measurements were acquired IAW BSI/LVS-003 for a total of 40 static measurements (Att. 1A).

2.5 The surface area for the 24" piping is 5837 cm^2 for each foot of piping, corresponding to a piping surface area of 852202 cm^2 (85 m^2) for the 146 feet of embedded pipe 24" 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 1A & 1B.

5.2 This survey unit was assessed for compliance with the release criterion attributing all activity derived dose as a 100% Co60 nuclide distribution. This is the most conservative DCGL for the facility.

5.3 Scan measurements require a 90 second scan time to survey each section of accessible 24"piping at $\leq$ 1inch/second. The documented gross cpm measurement for each scan is the highest, instantaneous, cpm count rate observed during the 90 second scan. The derived activity from these scan measurements is the most conservative quantity for that section of assessed piping. This conservatism is replicated when determining compliance with the DCGL release criterion. (BSI/LVS 003, WEP 05-000-6).

5.4 When implementing the Unity Rule, provided in Section 3.6.3 of the FSSP, the survey unit that is constituted by EP 1.12 passes FSS.

5.5 Background was not subtracted from the survey measurements and the Elevated Measurement Comparison (EMC) was not employed for this survey unit.

5.6 Based upon the results of the final survey measurements including the scan survey of the upper piping boundary in the Primary Pump House, it is reasonable to conclude that the final survey of the accessible portions of this pipe system is appropriate to demonstrate the radiological condition of the entire pipe. Survey Unit EP 1.12 demonstrates compliance with the inaccessible piping acceptance criteria of Section 7.5 of the PBRF FSSP.

5.7 The physical configuration of this survey unit consists of a 24" pipe in a conformal steel support box which is surrounded by a concrete sarcophagus of at least two feet in thickness for the entire length of the piping bounded by the survey unit. There is no access into the survey unit from any adjacent survey units, and the steel support box is inaccessible to personnel.

5.8 It is presented that this piping constitutes a single, contiguous and distinct survey unit unto itself. This survey units' dose contribution is <2 mr/yr and is significantly within a release criterion of 25mr/yr. The dose contribution of this survey unit does not impact adjacent structural survey units.

5.9 Statistical Summary Table

Statistical Parameter	24" Pipe
Total Number of Static Survey Measurements	40
Number of Measurements >MDC	40
Number of Measurements Above 50% of DCGL	38
Number of Measurements Above DCGL	0
Mean	0.683
Median	0.697
Standard Deviation	0.094
Maximum	0.969
Minimum	0.462

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 1.12 to be less than 2 mrem/yr. The dose contribution is estimated to be 1.366 mrem/yr based on the average of the actual gross counts measured.

7.0 Attachments

Attachment 1A – BSI EP/BP Survey Report Static & Random Number Generated Static Locations

Attachment 1B – BSI EP/BP Survey Report Scan

Attachment 2 – Pipe Interior Radiological Survey Form

Attachment 3 – DQA Worksheet

Attachment 4 – EP 1.12 SURR & Spreadsheet Disc

SECTION 7
ATTACHMENT 1A
5 PAGES

BSI EP/BP SURVEY REPORT (STATIC)

Pipe ID	**1.12**		**Survey Location**	PPH RM4 / Vessel
Survey Date	See Survey sheets		**2350-1 #**	203488
Survey Time	See Survey sheets		**Detector-Sled #**	188383-LVS CRLR24
Pipe Size	24"		**Detector Efficiency**	0.0626
DCGL (dpm/100cm2)	481600		**Pipe Area Incorporated by Detector Efficiency (in cm2)**	100
50% DCGL (dpm/100cm2)	240800		**Field BKG** (cpm)	180
Routine Survey	X		**Field MDCR** (cpm)	49
QA Survey			**Nominal MDC** (dpm/100cm2)	787

Survey Measurement Results	
Total Number of Survey Measurements	40
Number of Measurements >MDC	40
Number of Measurements Above 50% DCGL	38
Number of Measurements Above DCGL	0
Mean	0.683
Median	0.697
Standard Deviation	0.094
Maximum	0.969
Minimum	0.462
Survey Technician(s)	WOOD

Survey Unit Classification	1
TBD 06-004 Piping Group	1
SR-13 Radionuclide Distribution Sample	EP 3-9
Area Factor/EMC Used	No
Pass/Fail FSS	Pass
MREM/YR Contribution	<2

COMMENTS:

ACTIVITY VALUES NOT BACKGROUND CORRECTED.

RP Engineer | Date	AJ Wood 12-18-08

EP 1.12
24" Pipe
TBD 06-004 Group 1

Measurement ID #	gcpm	net cpm	Co-60 activity (total dpm)	Co-60 activity (dpm/100cm2)	Unity
22	21066	21066	336,518	336,518	0.699
23	22227	22227	355,064	355,064	0.737
24	22039	22039	352,061	352,061	0.731
25	19161	19161	306,086	306,086	0.636
34	19066	19066	304,569	304,569	0.632
35	17932	17932	286,454	286,454	0.595
36	19741	19741	315,351	315,351	0.655
37	18112	18112	289,329	289,329	0.601
12	21682	21682	346,358	346,358	0.719
13	23414	23414	374,026	374,026	0.777
14	20971	20971	335,000	335,000	0.696
15	19899	19899	317,875	317,875	0.660
46	20693	20693	330,559	330,559	0.686
47	21714	21714	346,869	346,869	0.720
48	22655	22655	361,901	361,901	0.751
49	21397	21397	341,805	341,805	0.710
55	23680	23680	378,275	378,275	0.785
56	22001	22001	351,454	351,454	0.730
57	22683	22683	362,348	362,348	0.752
58	21746	21746	347,380	347,380	0.721
7	14270	14270	227,955	227,955	0.473
8	18863	18863	301,326	301,326	0.626
9	22601	22601	361,038	361,038	0.750
10	19036	19036	304,089	304,089	0.631
29	18007	18007	287,652	287,652	0.597
30	22265	22265	355,671	355,671	0.739
31	22320	22320	356,550	356,550	0.740
32	19230	19230	307,188	307,188	0.638

EP 1.12
24" Pipe
TBD 06-004 Group 1

Measurement ID #	gcpm	net cpm	Co-60 activity (total dpm)	Co-60 activity (dpm/100cm2)	Unity
3	19763	19763	315,703	315,703	0.656
4	23938	23938	382,396	382,396	0.794
5	29210	29210	466,613	466,613	0.969
6	21542	21542	344,121	344,121	0.715
23	15698	15698	250,767	250,767	0.521
24	13916	13916	222,300	222,300	0.462
25	20028	20028	319,936	319,936	0.664
26	15474	15474	247,188	247,188	0.513
30	23166	23166	370,064	370,064	0.768
31	20196	20196	322,620	322,620	0.670
32	22261	22261	355,607	355,607	0.738
33	19799	19799	316,278	316,278	0.657
				MEAN	0.683
				MEDIAN	0.697
				STD DEV	0.094
				MAX	0.969
				MIN	0.462

RANDOM GENERATED STATIC MEASUREMENT LOCATIONS VESSEL 1.12

SURVEY LOCATION	COMMENTS
7	
19	
34	
41	INACCESSIBLE
45	
53	
61	
70	

RANDOM GENERATED STATIC MEASUREMENT LOCATIONS PPH ROOM 4 1.12

SURVEY LOCATION	COMMENTS
5	INACCESSIBLE
17	
21	
32	INACCESSIBLE
33	INACCESSIBLE
41	
56	INACCESSIBLE
58	INACCESSIBLE

SECTION 7
ATTACHMENT 1B
6 PAGES

BSI EP/BP SURVEY REPORT (SCAN)

Pipe ID	**1.12**		**Survey Location**	PPH RM4 / Vessel
Survey Date	See Survey Sheets		**2350-1 #**	203438
Survey Time	See Survey Sheets		**Detector-Sled #**	188383-LVS CRLR24
Pipe Size	24"		**Detector Efficiency**	0.0595
DCGL (dpm/100cm2)	481600		**Pipe Area Incorporated by Detector Efficiency (in cm2)**	100
50% DCGL (dpm/100cm2)	240800		**Field BKG** (cpm)	180
Routine Survey	X		**Field MDCR** (cpm)	49
QA Survey			**Nominal MDC** (dpm/100cm2)	8,856

Survey Measurement Results	
Total Number of Survey Measurements	177
Number of Measurements >MDC	177
Number of Measurements Above 50% DCGL	168
Number of Measurements Above DCGL	0
Mean	0.631
Median	0.628
Standard Deviation	0.096
Maximum	0.911
Minimum	0.387

Survey Technician(s)	WOOD

Survey Unit Classification	1
TBD 06-004 Piping Group	1
SR-13 Radionuclide Distribution Sample	EP 3-9
Area Factor/EMC Used	No
Pass/Fail FSS	Pass
MREM/YR Contribution	<2

COMMENTS:

ACTIVITY VALUES NOT BACKGROUND CORRECTED.

RP Engineer | Date	2-18-08

EP 1.12
24" Pipe
TBD 06-004 Group 1

Measurement ID #	gcpm	net cpm	Co-60 activity (total dpm)	Co-60 activity (dpm/100cm2)	Unity
1	22200	22200	373,109	373,109	0.775
2	20100	20100	337,815	337,815	0.701
3	20300	20300	341,176	341,176	0.708
4	21600	21600	363,025	363,025	0.754
5	18500	18500	310,924	310,924	0.646
6	24400	24400	410,084	410,084	0.852
7	26100	26100	438,655	438,655	0.911
8	21400	21400	359,664	359,664	0.747
9	22600	22600	379,832	379,832	0.789
10	19700	19700	331,092	331,092	0.687
11	20200	20200	339,496	339,496	0.705
12	19100	19100	321,008	321,008	0.667
13	19900	19900	334,454	334,454	0.694
14	23600	23600	396,639	396,639	0.824
15	17300	17300	290,756	290,756	0.604
16	18100	18100	304,202	304,202	0.632
17	18200	18200	305,882	305,882	0.635
18	19900	19900	334,454	334,454	0.694
19	21100	21100	354,622	354,622	0.736
20	20700	20700	347,899	347,899	0.722
21	23300	23300	391,597	391,597	0.813
26	20700	20700	347,899	347,899	0.722
27	19300	19300	324,370	324,370	0.674
28	18900	18900	317,647	317,647	0.660
29	18900	18900	317,647	317,647	0.660
30	18100	18100	304,202	304,202	0.632
31	16000	16000	268,908	268,908	0.558
32	17300	17300	290,756	290,756	0.604
33	17700	17700	297,479	297,479	0.618
38	18100	18100	304,202	304,202	0.632
39	19900	19900	334,454	334,454	0.694
40	22100	22100	371,429	371,429	0.771
41	21000	21000	352,941	352,941	0.733
42	20700	20700	347,899	347,899	0.722
43	23100	23100	388,235	388,235	0.806
44	19300	19300	324,370	324,370	0.674
45	18900	18900	317,647	317,647	0.660
46	18500	18500	310,924	310,924	0.646
47	19900	19900	334,454	334,454	0.694
48	20100	20100	337,815	337,815	0.701
49	24500	24500	411,765	411,765	0.855

EP 1.12
24" Pipe
TBD 06-004 Group 1

Measurement ID #	gcpm	net cpm	Co-60 activity (total dpm)	Co-60 activity (dpm/100cm2)	Unity
50	23300	23300	391,597	391,597	0.813
51	21700	21700	364,706	364,706	0.757
1	17200	17200	289,076	289,076	0.600
2	18100	18100	304,202	304,202	0.632
3	16300	16300	273,950	273,950	0.569
4	16000	16000	268,908	268,908	0.558
5	17300	17300	290,756	290,756	0.604
6	15900	15900	267,227	267,227	0.555
7	16100	16100	270,588	270,588	0.562
8	16600	16600	278,992	278,992	0.579
9	17300	17300	290,756	290,756	0.604
10	15200	15200	255,462	255,462	0.530
11	17300	17300	290,756	290,756	0.604
16	19900	19900	334,454	334,454	0.694
17	21000	21000	352,941	352,941	0.733
18	18300	18300	307,563	307,563	0.639
19	18700	18700	314,286	314,286	0.653
20	19100	19100	321,008	321,008	0.667
21	17700	17700	297,479	297,479	0.618
22	17700	17700	297,479	297,479	0.618
23	18200	18200	305,882	305,882	0.635
24	16900	16900	284,034	284,034	0.590
25	21000	21000	352,941	352,941	0.733
26	20300	20300	341,176	341,176	0.708
27	19400	19400	326,050	326,050	0.677
28	19700	19700	331,092	331,092	0.687
29	14800	14800	248,739	248,739	0.516
30	15200	15200	255,462	255,462	0.530
31	15400	15400	258,824	258,824	0.537
32	13900	13900	233,613	233,613	0.485
33	15300	15300	257,143	257,143	0.534
34	15100	15100	253,782	253,782	0.527
35	14700	14700	247,059	247,059	0.513
36	12600	12600	211,765	211,765	0.440
37	11100	11100	186,555	186,555	0.387
38	15500	15500	260,504	260,504	0.541
39	17700	17700	297,479	297,479	0.618
40	17700	17700	297,479	297,479	0.618
41	17900	17900	300,840	300,840	0.625
42	18800	18800	315,966	315,966	0.656
43	18300	18300	307,563	307,563	0.639
44	18500	18500	310,924	310,924	0.646
45	18600	18600	312,605	312,605	0.649
50	22000	22000	369,748	369,748	0.768

EP 1.12
24" Pipe
TBD 06-004 Group 1

Measurement ID #	gcpm	net cpm	Co-60 activity (total dpm)	Co-60 activity (dpm/100cm2)	Unity
51	22200	22200	373,109	373,109	0.775
52	24100	24100	405,042	405,042	0.841
53	23900	23900	401,681	401,681	0.834
54	21700	21700	364,706	364,706	0.757
1	16200	16200	272,269	272,269	0.565
2	15100	15100	253,782	253,782	0.527
3	16200	16200	272,269	272,269	0.565
4	15800	15800	265,546	265,546	0.551
5	16000	16000	268,908	268,908	0.558
6	15200	15200	255,462	255,462	0.530
11	17800	17800	299,160	299,160	0.621
12	16600	16600	278,992	278,992	0.579
13	16700	16700	280,672	280,672	0.583
14	16900	16900	284,034	284,034	0.590
15	15600	15600	262,185	262,185	0.544
16	15500	15500	260,504	260,504	0.541
17	17700	17700	297,479	297,479	0.618
18	18000	18000	302,521	302,521	0.628
19	17400	17400	292,437	292,437	0.607
20	16100	16100	270,588	270,588	0.562
21	19400	19400	326,050	326,050	0.677
22	19200	19200	322,689	322,689	0.670
23	17000	17000	285,714	285,714	0.593
24	17500	17500	294,118	294,118	0.611
25	15900	15900	267,227	267,227	0.555
26	19200	19200	322,689	322,689	0.670
27	19100	19100	321,008	321,008	0.667
28	21100	21100	354,622	354,622	0.736
33	18900	18900	317,647	317,647	0.660
34	19900	19900	334,454	334,454	0.694
35	19900	19900	334,454	334,454	0.694
36	20100	20100	337,815	337,815	0.701
37	19100	19100	321,008	321,008	0.667
38	20000	20000	336,134	336,134	0.698
39	20000	20000	336,134	336,134	0.698
40	18100	18100	304,202	304,202	0.632
41	20100	20100	337,815	337,815	0.701
42	19800	19800	332,773	332,773	0.691
43	20200	20200	339,496	339,496	0.705
44	21100	21100	354,622	354,622	0.736
45	22000	22000	369,748	369,748	0.768
46	20300	20300	341,176	341,176	0.708
1	20800	20800	349,580	349,580	0.726

EP 1.12
24" Pipe
TBD 06-004 Group 1

Measurement ID #	gcpm	net cpm	Co-60 activity (total dpm)	Co-60 activity (dpm/100cm2)	Unity
2	20100	20100	337,815	337,815	0.701
10	18000	18000	302,521	302,521	0.628
11	16200	16200	272,269	272,269	0.565
12	15900	15900	267,227	267,227	0.555
13	15700	15700	263,866	263,866	0.548
14	15700	15700	263,866	263,866	0.548
15	16100	16100	270,588	270,588	0.562
16	13900	13900	233,613	233,613	0.485
17	14800	14800	248,739	248,739	0.516
18	15100	15100	253,782	253,782	0.527
19	14700	14700	247,059	247,059	0.513
20	14800	14800	248,739	248,739	0.516
21	15500	15500	260,504	260,504	0.541
22	18800	18800	315,966	315,966	0.656
27	16000	16000	268,908	268,908	0.558
28	17100	17100	287,395	287,395	0.597
1	14200	14200	238,655	238,655	0.496
2	15100	15100	253,782	253,782	0.527
3	13900	13900	233,613	233,613	0.485
4	13700	13700	230,252	230,252	0.478
5	15100	15100	253,782	253,782	0.527
6	15200	15200	255,462	255,462	0.530
7	14400	14400	242,017	242,017	0.503
8	14700	14700	247,059	247,059	0.513
9	14200	14200	238,655	238,655	0.496
10	15400	15400	258,824	258,824	0.537
11	15200	15200	255,462	255,462	0.530
12	14900	14900	250,420	250,420	0.520
13	16300	16300	273,950	273,950	0.569
14	16700	16700	280,672	280,672	0.583
15	15500	15500	260,504	260,504	0.541
16	14400	14400	242,017	242,017	0.503
17	13300	13300	223,529	223,529	0.464
18	15700	15700	263,866	263,866	0.548
19	15800	15800	265,546	265,546	0.551
20	14900	14900	250,420	250,420	0.520
21	15800	15800	265,546	265,546	0.551
22	16600	16600	278,992	278,992	0.579
23	16400	16400	275,630	275,630	0.572
24	16100	16100	270,588	270,588	0.562
25	15300	15300	257,143	257,143	0.534
26	14900	14900	250,420	250,420	0.520

EP 1.12
24" Pipe
TBD 06-004 Group 1

Measurement ID #	gcpm	net cpm	Co-60 activity (total dpm)	Co-60 activity (dpm/100cm2)	Unity
27	17000	17000	285,714	285,714	0.593
28	22000	22000	369,748	369,748	0.768
29	22200	22200	373,109	373,109	0.775
34	21000	21000	352,941	352,941	0.733
35	21300	21300	357,983	357,983	0.743
36	22100	22100	371,429	371,429	0.771
37	19100	19100	321,008	321,008	0.667
				MEAN	0.631
				MEDIAN	0.628
				STD DEV	0.096
				MAX	0.911
				MIN	0.387

SECTION 7
ATTACHMENT 2
18 PAGES

Pipe Interior Radiological Survey Form

Date: 3-7-07 Time: 1130

Pipe ID#: 1.12 Pipe Diameter: 24" Access Point Area: PPH Room 4

Building: PPH Elevation: 0' System: PCW

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

Gross X Co60 ____ Cs137 ____

Detector ID# / Sled ID# 186383 / LVSPCRLR24

Detector Cal Date: 9-5-06 Detector Cal Due Date: 9-5-07

Instrument: 2350-1 Instrument ID #: ~~9-5-07~~ 203438

Instrument Cal Date: 9-5-06 Instrument Cal Due Date: 9-5-07

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

Background Value 180 cpm

$MDCR_{static}$ 49 cpm

Efficiency Factor for Pipe Diameter 0.0626 (from detector efficiency determination)

MDC_{static} 787 dpm/ 100 cm^2

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

Comments:

Scan eff => .0595, Scan MDC => 8856

Technician Signature

Pipe Interior Radiological Survey

Measurment ID #	Location in Pipe	Scan/Count Time (min/sec)	Gross Counts	Gross cpm	Net cpm	dpm/100cm²
1	31'	90s	22.2K	27.2K	n/a	n/a
2	30.5'		20.1K	20.1K		
3	30'		20.3K	20.3K		
4	29.5'		21.6K	21.6K		
5	29'		18.5K	18.5K		
6	28.5'		24.4K	24.4K		
7	28'		26.1K	26.1K		
8	27.5'		21.4K	21.4K		
9	27'		22.6K	22.6K		
10	26.5'		19.7K	19.7K		

Pipe Interior Radiological Survey Form (Continuation Form)

Date: 3-7-07
Pipe ID#: 1.12 Pipe Diameter: 24" Access Point Area: PPH Rm 4
Building: PPH Elevation: 0' System: PCW

Measurment ID #	Location in Pipe	Scan/Count Time (min/sec)	Gross Counts	Gross cpm	Net cpm	dpm/100cm^2
11	26'	90s	20.2 K	20.2 K	n/a	n/a
12	25.5'		19.1 K	19.1 K		
13	25'		19.9 K	19.9 K		
14	24.5'		23.6 K	23.6 K		
15	24'		17.3 K	17.3 K		
16	23.5'		18.1 K	18.1 K		
17	23'		18.2 K	18.2 K		
18	22.5'		19.9 K	19.9 K		
19	22'		21.1 K	21.1 K		
20	21.5'		20.7 K	20.7 K		
21	21'		23.3 K	23.3 K		
22	21' 90°	1.0 m	21066	21066		
23	180°		22227	22227		
24	270°		22039	22039		
25	360°		19161	19161		
26	20.5'	90s	20.7 K	20.7 K		
27	20'		19.3 K	19.3 K		
28	19.5'		18.9 K	18.9 K		
29	19'		18.9 K	18.9 K		
30	18.5'		18.1 K	18.1 K		
31	18'		16 K	16 K		
32	17.5'		17.3 K	17.3 K		
33	17'		17.7 K	17.7 K		
34	17' 90°	1.0 m	19066	19066		
35	180°		17932	17932		
36	270°		19741	19741		
37	360°		18112	18112		
38	16.5'	90s	18.1 K	18.1 K		
39	16'		19.9 K	19.9 K		
40	15.5'		22.1 K	22.1 K		
41	15'		21 K	21 K		
42	14.5'		20.7 K	20.7 K		
43	14'		23.1 K	23.1 K		
44	13.5'		19.3 K	19.3 K		
45	13'		18.9 K	18.9 K		

Pipe Interior Radiological Survey Form (Continuation Form)

Date: 3-7-07
Pipe ID#: 1.12 Pipe Diameter: 24" Access Point Area: PPHRM4
Building: PPH Elevation: 0' System: PCW

Measurment ID #	Location in Pipe	Scan/Count Time (min/sec)	Gross Counts	Gross cpm	Net cpm	dpm/100cm^2
46	12.5'	90s	18.5 K	18.5 K	n/a	n/a
47	12'		19.9 K	19.9 K		
48	11.5'		20.1 K	20.1 K		
49	11'		24.5 K	24.5 K		
50	10.5'		23.3 K	23.3 K		
51	10'		21.7 K	21.7 K		
52	3'		19 K	19 K		

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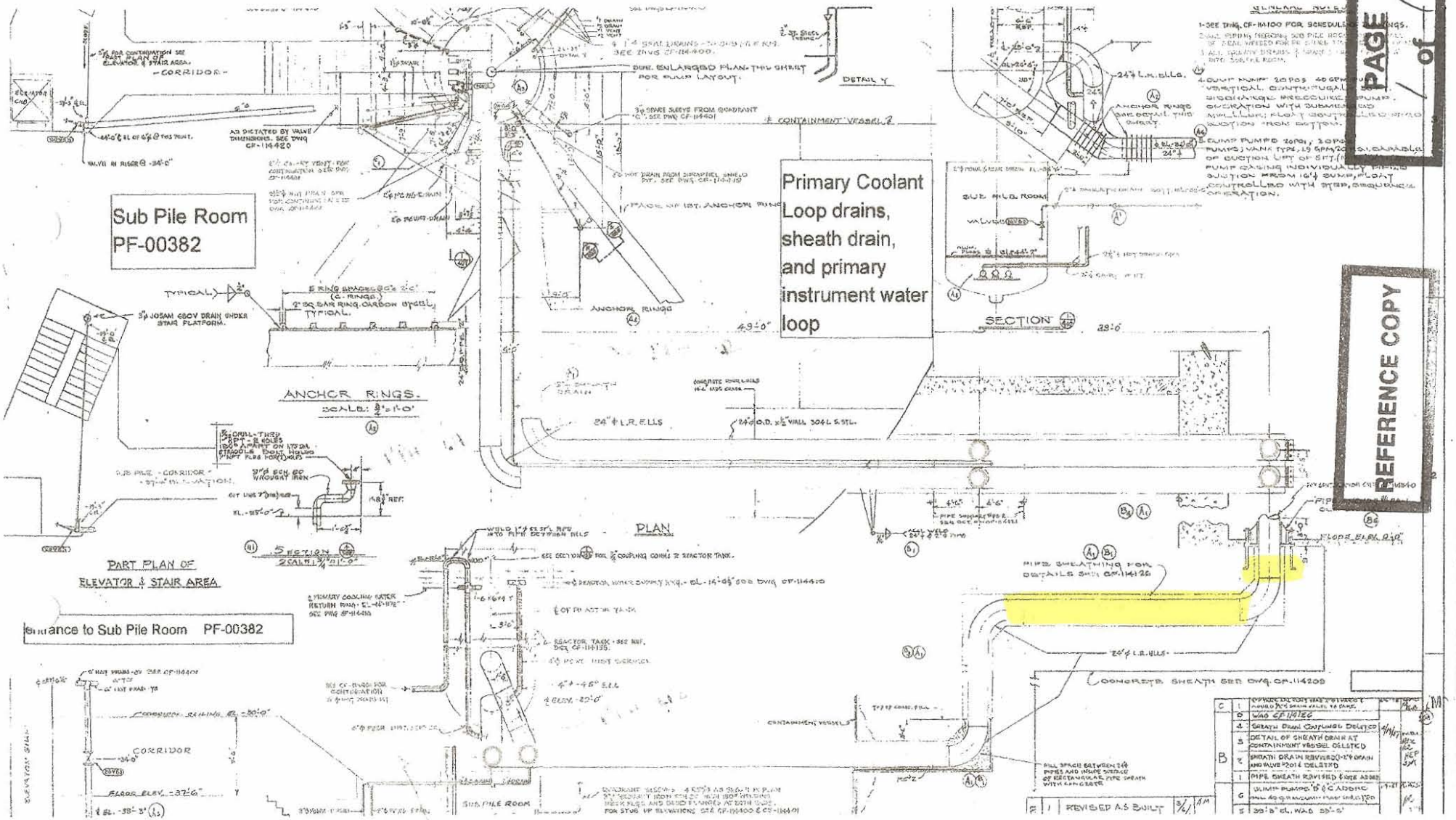
Sub Pile Room
PF-00382
Primary Coolant Loop drains, sheath drain, and primary instrument water loop
ANCHOR RINGS.
SCALE: 3/4"=1'-0"
PART PLAN OF ELEVATOR & STAIR AREA
Entrance to Sub Pile Room PF-00382
PLAN
SECTION
CONCRETE SHEATH SEE DWG. CF-114209
PAGE of
REFERENCE COPY

Pipe Interior Radiological Survey Form

Date: 3-27-07 Time: 1300

Pipe ID#: 1.12 Pipe Diameter: 24" Access Point Area: Vessel

Building: CV Elevation: -25' System: PCW

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

Gross X Co60 ____ Cs137 ____

Detector ID# / Sled ID# 188383 / LVS PCRLR24

Detector Cal Date: 9-5-06 Detector Cal Due Date: 9-5-07

Instrument: 2350-1 Instrument ID #: 203438

Instrument Cal Date: 9-5-06 Instrument Cal Due Date: 9-5-07

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

Background Value 180 cpm

$MDCR_{static}$ 49 cpm

Efficiency Factor for Pipe Diameter 0.0626 (from detector efficiency determination)

MDC_{static} 787 dpm/ 100 cm^2

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

Comments:

SCAN EFF. => .0595, SCAN MDC => 8856

Technician Signature

Pipe Interior Radiological Survey

Measurment ID #	Location in Pipe	Scan/Count Time (min/sec)	Gross Counts	Gross cpm	Net cpm	dpm/100cm²
1	39'	90s	17.2 K	17.2 K	n/a	n/a
2	38.5'		18.1 K	18.1 K		
3	38'		16.3 K	16.3 K		
4	37.5'		16 K	16 K		
5	37'		17.3 K	17.3 K		
6	36.5'		15.9 K	15.9 K		
7	36'		16.1 K	16.1 K		
8	35.5'		16.6 K	16.6 K		
9	35'		17.3 K	17.3 K		
10	34.5'		15.2 K	15.2 K		

Pipe Interior Radiological Survey Form (Continuation Form)

Date: 3-27-07
Pipe ID#: 1.12 Pipe Diameter: 24" Access Point Area: Vessel
Building: CV Elevation: -25' System: PCW

Measurment ID #	Location in Pipe	Scan/Count Time (min/sec)	Gross Counts	Gross cpm	Net cpm	dpm/100cm^2
11	34'	90s	17.3 K	17.3 K	n/a	n/a
12	34' 90°	1.0m	21682	21682		
13	180°		23414	23414		
14	270°		20971	20971		
15	360°		19899	19899		
16	33.5'	90s	19.9 K	19.9 K		
17	33'		21 K	21 K		
18	32.5'		18.3 K	18.3 K		
19	32'		18.7 K	18.7 K		
20	31.5'		19.1 K	19.1 K		
21	31'		17.7 K	17.7 K		
22	30.5'		17.7 K	17.7 K		
23	30'		18.2 K	18.2 K		
24	29.5'		16.9 K	16.9 K		
25	29'		21 K	21 K		
26	28.5'		20.3 K	20.3 K		
27	28'		19.4 K	19.4 K		
28	27.5'		19.7 K	19.7 K		
29	27'		14.8 K	14.8 K		
30	26.5'		15.2 K	15.2 K		
31	26'		15.4 K	15.4 K		
32	25.5'		13.9 K	13.9 K		
33	25'		15.3 K	15.3 K		
34	24.5'		15.1 K	15.1 K		
35	24'		14.7 K	14.7 K		
36	23.5'		12.6 K	12.6 K		
37	23'		11.1 K	11.1 K		
38	22.5'		15.5 K	15.5 K		
39	22'		17.7 K	17.7 K		
40	21.5'		17.7 K	17.7 K		
41	21'		17.9 K	17.9 K		
42	20.5'		18.8 K	18.8 K		
43	20'		18.3 K	18.3 K		
44	19.5'		18.5 K	18.5 K		
45	19'		18.6 K	18.6 K		

Pipe Interior Radiological Survey Form (Continuation Form)

Date: 3-27-07
Pipe ID#: 1.12 Pipe Diameter: 24" Access Point Area: Vessel
Building: CW Elevation: -25' System: PCW

Measurment ID #	Location in Pipe	Scan/Count Time (min/sec)	Gross Counts	Gross cpm	Net cpm	dpm/100cm^2
46	19' 90°	1.0 M	20693	20693	n/a	n/a
47	180°		21714	21714		
48	270°		22655	22655		
49	360°		21397	21397		
50	18.5'	90s	22K	22K		
51	18'		22.2K	22.2K		
52	8'		24.1K	24.1K		
53	7.5'		23.9K	23.9K		
54	7'		21.7K	21.7K		
55	7' 90°	1.0 M	23680	23680		
56	180°		22001	22001		
57	270°		22683	22683		
58	360°		21746	21746		

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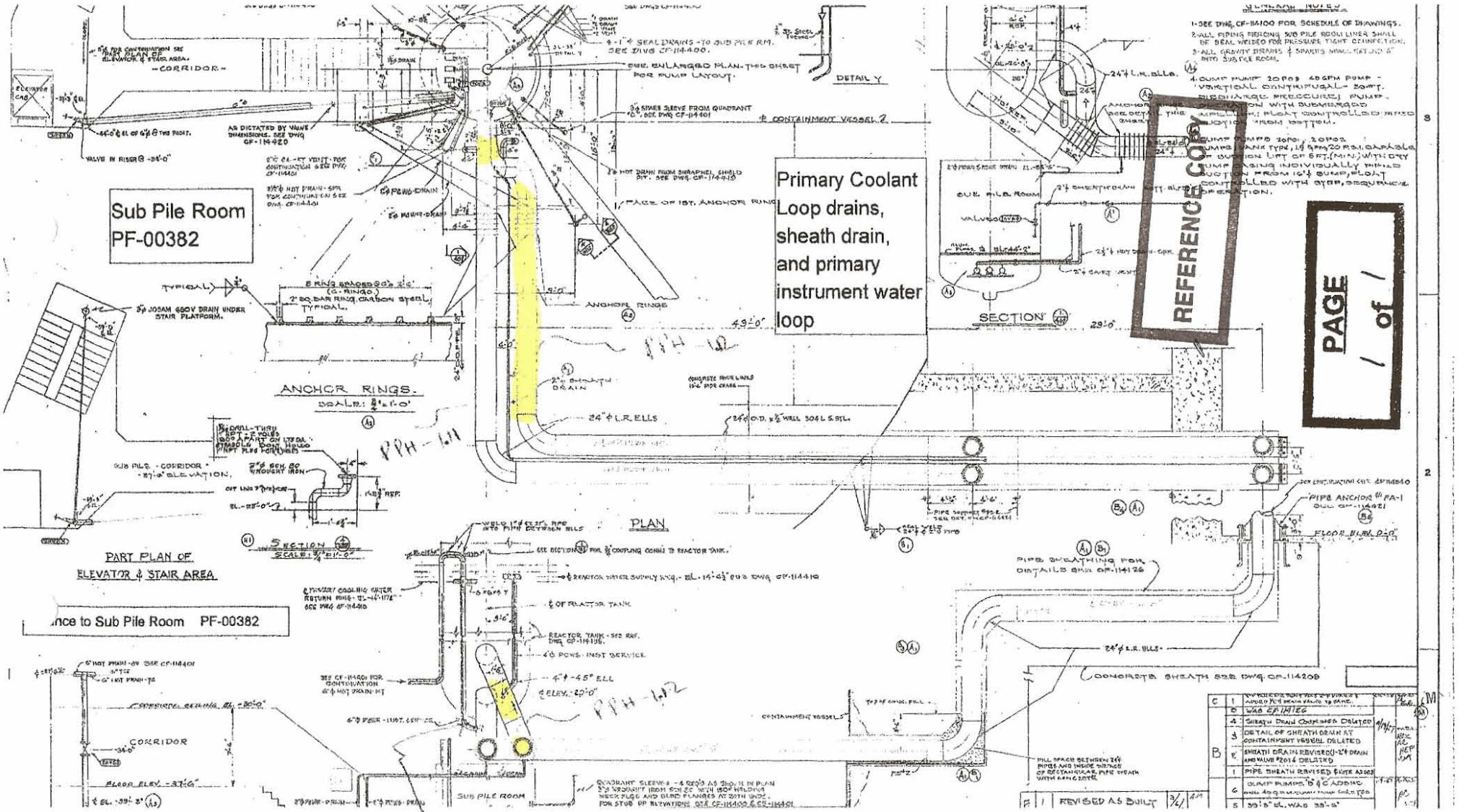
Sub Pile Room
PF-00382
Primary Coolant Loop drains, sheath drain, and primary instrument water loop
REFERENCE COPY
PAGE 1 of 1
ANCHOR RINGS.
SCALE: 3/4"=1'-0"
PART PLAN OF ELEVATOR & STAIR AREA
PLAN
SECTION
SECTION
SECTION
SUB PILE ROOM
CORRIDOR
CONCRETE SHEATH SEE DWG. CF-114208
REVISED AS BUILT

1/12/07
3/22/07

Pipe Interior Radiological Survey Form

Date: 3-28-07 Time: 1520

Pipe ID#: 1.12 Pipe Diameter: 24" Access Point Area: Vessel

Building: CV Elevation: -25' System: PCW

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

Gross X Co60 ____ Cs137 ____

Detector ID# / Sled ID# 188383 / LVSPCRLR24

Detector Cal Date: 9-5-06 Detector Cal Due Date: 9-5-07

Instrument: 2350-1 Instrument ID #: 203438

Instrument Cal Date: 9-5-06 Instrument Cal Due Date: 9-5-07

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

Background Value 180 cpm

$MDCR_{static}$ 49 cpm

Efficiency Factor for Pipe Diameter 0.0626 (from detector efficiency determination)

MDC_{static} 787 dpm/ 100 cm^2

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

Comments:

Scan eff. => 0.0595, SCAN MDC => 8856

Technician Signature D Wood

Pipe Interior Radiological Survey

Measurment ID #	Location in Pipe	Scan/Count Time (min/sec)	Gross Counts	Gross cpm	Net cpm	dpm/100cm²
1	72.5'	90s	16.2K	16.2K	n/a	n/a
2	72'	↓	15.1K	15.1K	↓	↓
3	71.5'		16.2K	16.2K		
4	71'		15.8K	15.8K		
5	70.5'		16K	16K		
6	70'	↓	15.2K	15.2K		
7	70' 90°	1.0m	14270	14270		
8	70' 180°	↓	18863	18863		
9	70' 270°		22601	22601		
10	70' 360°	↓	19036	19036	↓	↓

Pipe Interior Radiological Survey Form (Continuation Form)

Date: 3-28-07
Pipe ID#: 1.12 Pipe Diameter: 24" Access Point Area: Vessel
Building: CV Elevation: -25' System: PCW

Measurment ID #	Location in Pipe	Scan/Count Time (min/sec)	Gross Counts	Gross cpm	Net cpm	dpm/100cm^2
11	69.5'	90s	17.8 K	17.8 K	n/a	n/a
12	69'		16.6 K	16.6 K		
13	68.5'		16.7 K	16.7 K		
14	68'		16.9 K	16.9 K		
15	67.5'		15.6 K	15.6 K		
16	67'		15.5 K	15.5 K		
17	66.5'		17.7 K	17.7 K		
18	66'		18 K	18 K		
19	65.5'		17.4 K	17.4 K		
20	65'		16.1 K	16.1 K		
21	64.5'		19.4 K	19.4 K		
22	64'		19.2 K	19.2 K		
23	63.5'		17 K	17 K		
24	63'		17.5 K	17.5 K		
25	62.5'		15.9 K	15.9 K		
26	62'		19.2K	19.2K		
27	61.5'		19.1 K	19.1 K		
28	61'		21.1 K	21.1 K		
29	61' 90°	1.0M	18007	18007		
30	180°		22265	22265		
31	270°		22320	22320		
32	360°		19230	19230		
33	60.5'	90s	18.9K	18.9K		
34	60'		19.9K	19.9K		
35	59.5'		19.9K	19.9K		
36	59'		20.1 K	20.1 K		
37	58.5'		19.1 K	19.1 K		
38	58'		20 K	20 K		
39	57.5'		20 K	20 K		
40	57'		18.1K	18.1 K		
41	56.5'		20.1 K	20.1 K		
42	56'		19.8 K	19.8 K		
43	55.5'		20.2 K	20.2 K		
44	55'		21.1 K	21.1 K		
45	54.5'		22 K	22 K		

Pipe Interior Radiological Survey Form (Continuation Form)

Date: 3-28-07
Pipe ID#: 1.12 Pipe Diameter: 24" Access Point Area: Vessel
Building: CV Elevation: -25' System: PCW

Measurment ID #	Location in Pipe	Scan/Count Time (min/sec)	Gross Counts	Gross cpm	Net cpm	dpm/100cm^2
46	54'	90s	20.3K	20.3K	n/a	n/a

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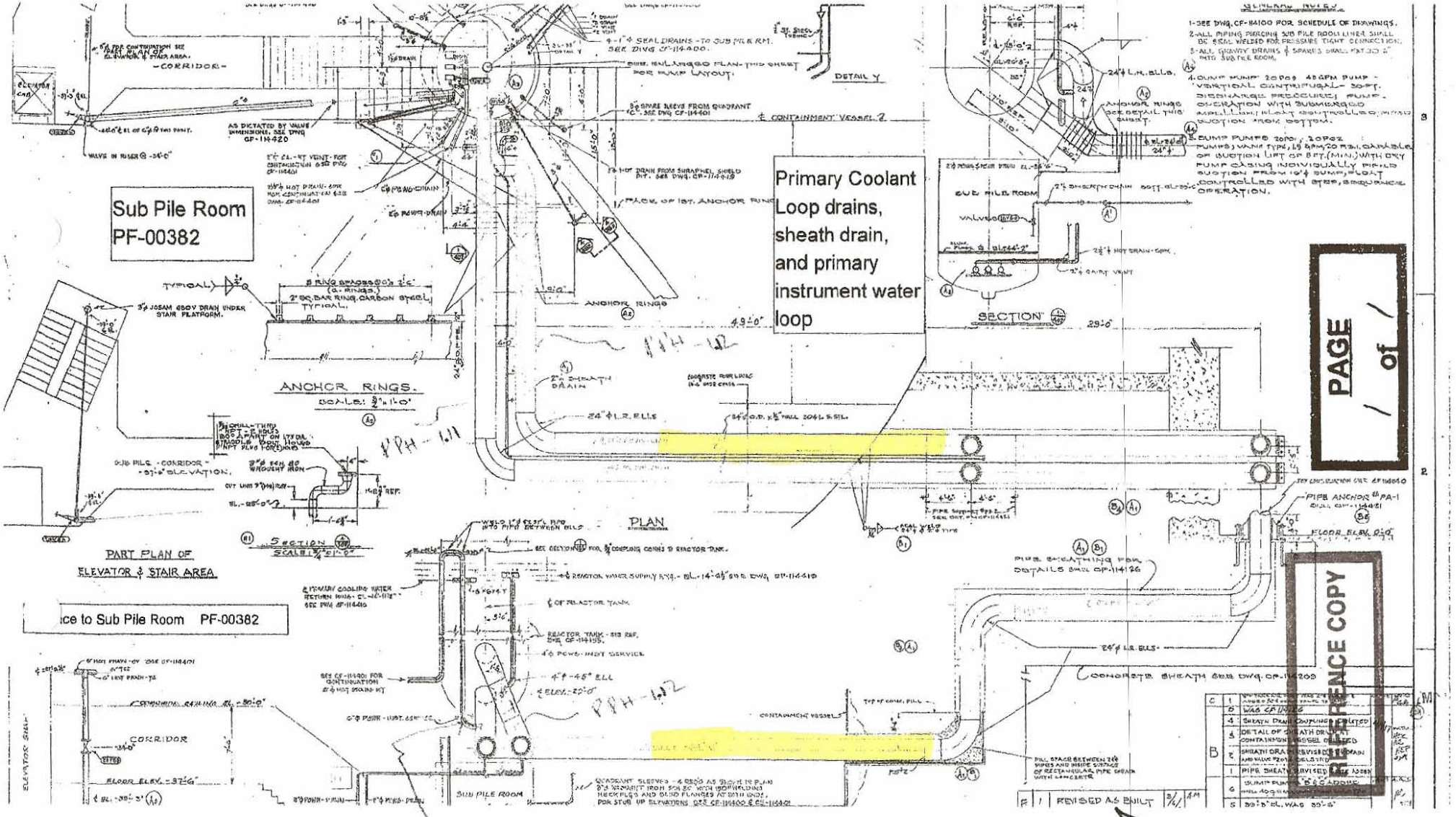

PPH-1.11

PPH-1.12

PPH-1.11

11-2-10-82-3

Pipe Interior Radiological Survey Form

Date: 3-29-07 Time: 0950

Pipe ID#: 1.12 Pipe Diameter: 24" Access Point Area: Vessel

Building: CV Elevation: -25' System: PCW

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

Gross X Co60 ____ Cs137 ____

Detector ID# / Sled ID# 188383 / LVSPCRLR24

Detector Cal Date: 9-5-06 Detector Cal Due Date: 9-5-07

Instrument: 2350-1 Instrument ID #: 203438

Instrument Cal Date: 9-5-06 Instrument Cal Due Date: 9-5-07

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

Background Value 180 cpm

$MDCR_{static}$ 49 cpm

Efficiency Factor for Pipe Diameter 0.06260 (from detector efficiency determination)

MDC_{static} 787 dpm/ 100 cm^2

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

Comments:

Scan eff => 0.0595, Scan MDC = 8856

Technician Signature

Pipe Interior Radiological Survey

Measurment ID #	Location in Pipe	Scan/Count Time (min/sec)	Gross Counts	Gross cpm	Net cpm	dpm/100cm²
1	53.5'	90s	20.8K	20.8K	n/a	n/a
2	53'	90s	20.1K	20.1K		
3	53' 90°	1.0M	19763	19763		
4	180°	↓	~~12940~~ 23938	23938		
5	270°	↓	29210	29210		
6	360°	↓	21542	21542		
7	52.5'	90s	INACCESSIBLE			
8	52'	↓	WELD			
9	51.5'	↓	INTERFERENCE			
10	51'	↓	18K	18K	↓	↓

Pipe Interior Radiological Survey Form (Continuation Form)

Date: 3-29-07
Pipe ID#: 1.12 Pipe Diameter: 24" Access Point Area: Vessel
Building: CV Elevation: -25' System: PCW

Measurment ID #	Location in Pipe	Scan/Count Time (min/sec)	Gross Counts	Gross cpm	Net cpm	dpm/100cm^2
11	50.5'	90s	16.21K	16.2K	n/a	n/a
12	50'		15.91K	15.9K		
13	49.5'		15.7K	15.7K		
14	49'		15.7K	15.7K		
15	48.5'		16.1K	16.1K		
16	48'		13.9K	13.9K		
17	47.5'		14.8K	14.8K		
18	47'		15.1K	15.1K		
19	46.5'		14.7K	14.7K		
20	46'		14.8K	14.8K		
21	45.5'		15.5K	15.5K		
22	45'		18.8K	18.8K		
23	45' 90°	1.0M	15698	15698		
24	180°		13916	13916		
25	270°		20068	20068		
26	360°		15474	15474		
27	44.5'	90s	16K	16K		
28	44'	90s	17.1K	17.1K		

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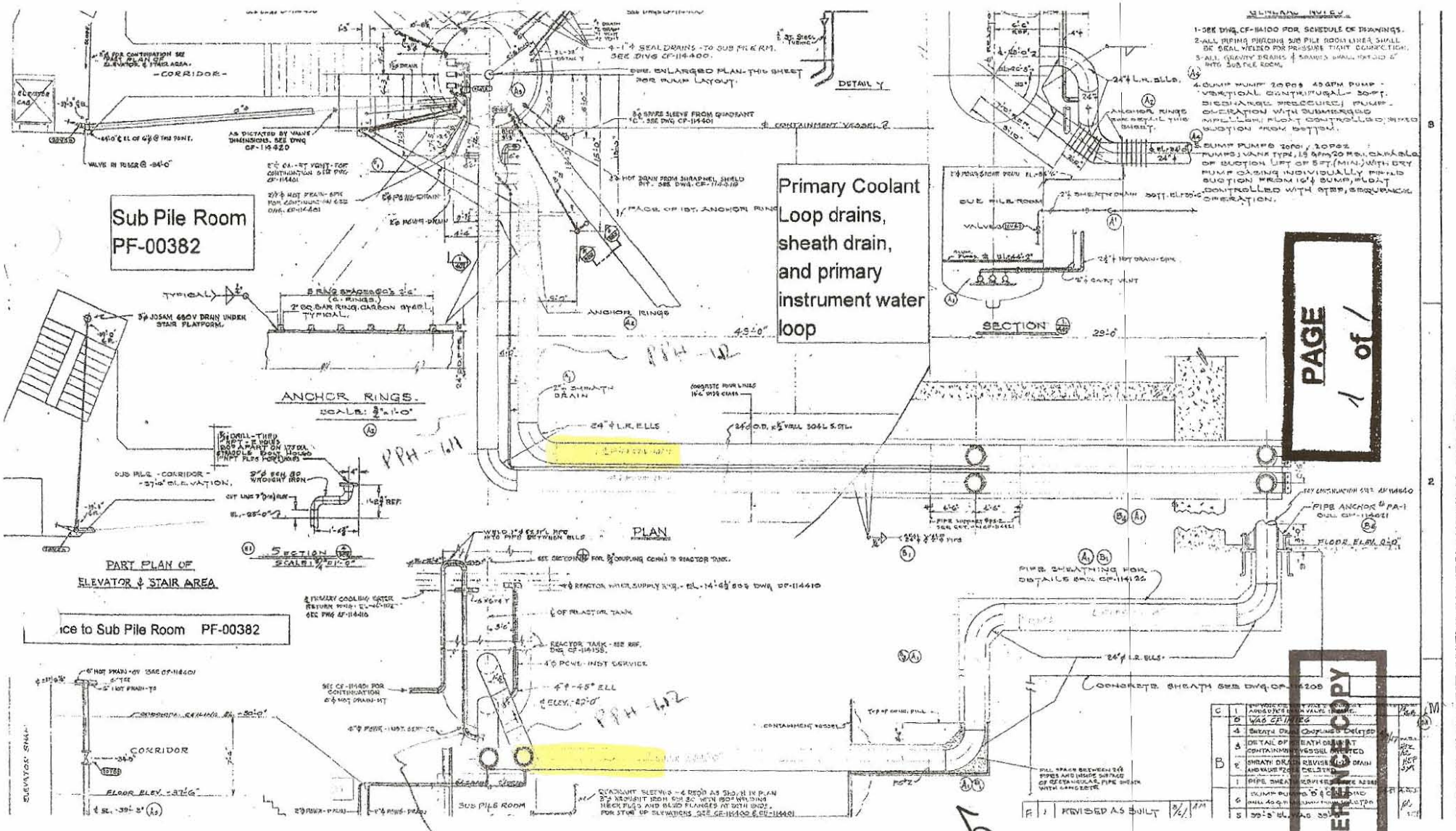

Sub Pile Room
PF-00382
Primary Coolant Loop drains, sheath drain, and primary instrument water loop
PAGE 1 of 1
ANCHOR RINGS.
SCALE: 3/8"=1'-0"
PART PLAN OF ELEVATOR & STAIR AREA
SECTION
PLAN
SECTION
Ice to Sub Pile Room PF-00382
CORRIDOR
SUB PILE ROOM
REFERENCE COPY
1.12
3-29-07

Pipe Interior Radiological Survey Form

Date: 3-29-07 Time: 1510

Pipe ID#: 1.12 Pipe Diameter: 24" Access Point Area: PPH RM 4

Building: PPH Elevation: 0' System: PCW

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

Gross ✓ Co60 ____ Cs137 ____

Detector ID# / Sled ID# 188383 / LVSPCRLR24

Detector Cal Date: 9-5-06 Detector Cal Due Date: 9-5-07

Instrument: 2350-1 Instrument ID #: 203438

Instrument Cal Date: 9-5-06 Instrument Cal Due Date: 9-5-07

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

Background Value 180 cpm

$MDCR_{static}$ 49 cpm

Efficiency Factor for Pipe Diameter 0.0626 (from detector efficiency determination)

MDC_{static} 787 dpm/ 100 cm^2

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

Comments:

SCAN Eff => 0.0595, SCAN MDC => 8856

Technician Signature [signature]

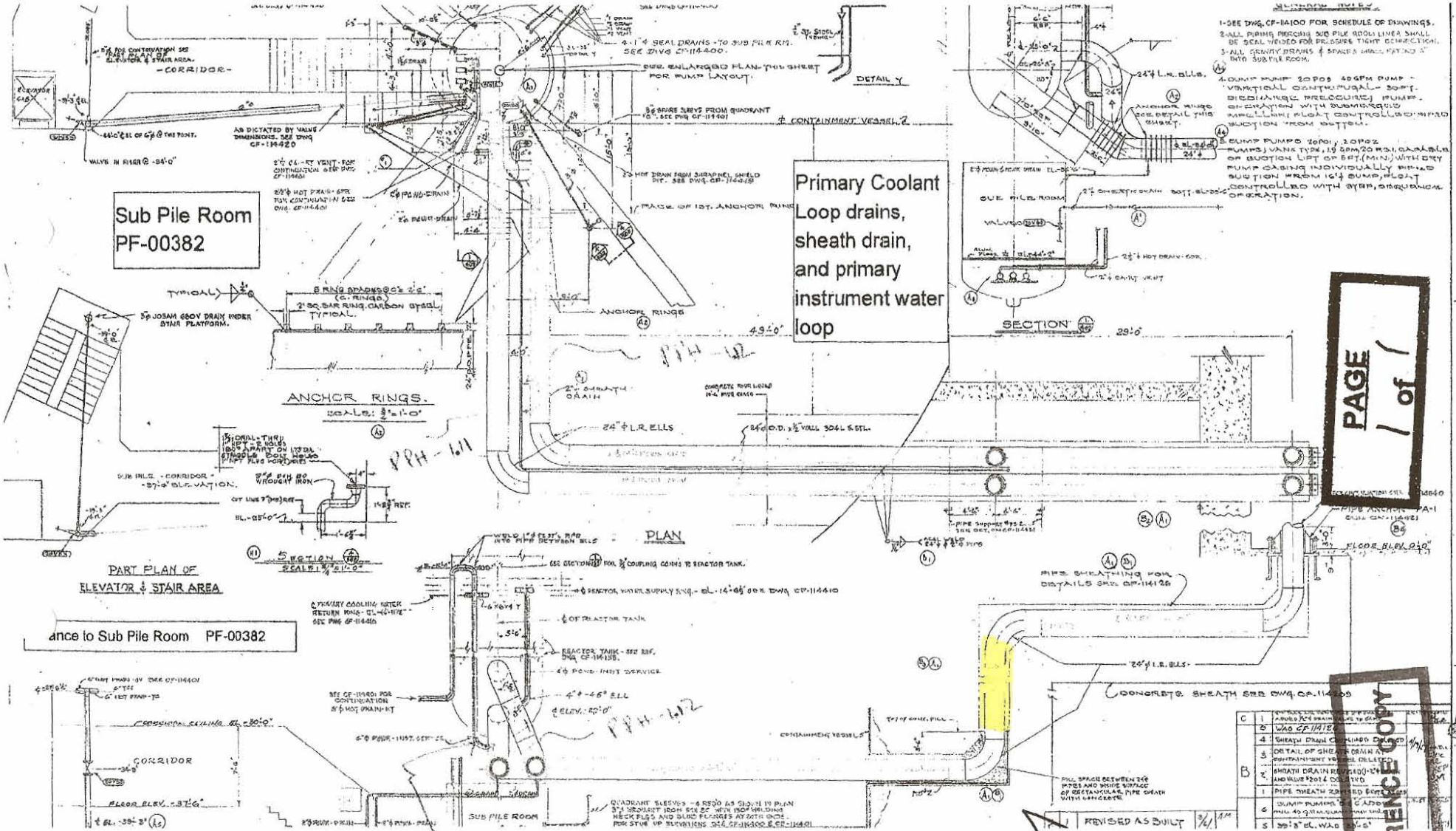
Pipe Interior Radiological Survey

Measurment ID #	Location in Pipe	Scan/Count Time (min/sec)	Gross Counts	Gross cpm	Net cpm	dpm/100cm²
1	55'	90s	14.2K	14.2K	n/a	n/a
2	54.5'		15.1K	15.1K	n/a	n/a
3	54'		13.9K	13.9K		
4	53.5'		13.7K	13.7K		
5	53'		15.1K	15.1K		
6	52.5'		15.2K	15.2K		
7	52'		14.4K	14.4K		
8	51.5'		14.7K	14.7K		
9	51'		14.2K	14.2K		
10	50.5'	↓	15.4K	15.4K	↓	↓

Pipe Interior Radiological Survey Form (Continuation Form)

Date: 3-29-07
Pipe ID#: 1.12 Pipe Diameter: 24" Access Point Area: PPH RM4
Building: PPH Elevation: 0' System: PCW

Measurment ID #	Location in Pipe	Scan/Count Time (min/sec)	Gross Counts	Gross cpm	Net cpm	dpm/100cm^2
11	50'	90s	15.2K	15.2K	n/a	n/a
12	49.5'		14.9K	14.9K		
13	49'		16.3K	16.3K		
14	48.5'		16.7K	16.7K		
15	48'		15.5K	15.5K		
16	47.5'		14.4K	14.4K		
17	47'		13.3K	13.3K		
18	46.5'		15.7K	15.7K		
19	46'		15.8K	15.8K		
20	45.5'		14.9K	14.9K		
21	45'		15.8K	15.8K		
22	44.5'		16.6K	16.6K		
23	44'		16.4K	16.4K		
24	43.5'		16.1K	16.1K		
25	43'		15.3K	15.3K		
26	42.5'		14.9K	14.9K		
27	42'		17K	17K		
28	41.5'		22K	22K		
29	41'		22.2K	22.2K		
30	41' 90°	1.0M	231166	23166		
31	180°		20196	20196		
32	270°		22261	22261		
33	360°		19799	19799		
34	40.5'	90s	21K	21K		
35	40'		21.3K	21.3K		
36	39.5'		22.1K	22.1K		
37	39'		19.1K	19.1K		
				n/a		


Sub Pile Room
PF-00382
Primary Coolant Loop drains, sheath drain, and primary instrument water loop
PART PLAN OF ELEVATOR & STAIR AREA
ANCHOR RINGS.
SECTION
PLAN
CONCRETE SHEATH SEE DWG. CF-114209
PAGE 1 of 1
REFERENCE COPY
1-17
3-24-03

SECTION 7
ATTACHMENT 3
1 PAGE

DQA Check Sheet				
Design #	EP 1.12	Revision #	Original	
Survey Unit #	EP 1.12			

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 (***S+*** for Sign Test or W_r for WRS Test) ≥ the critical value?			X

Comments:

FSS/Characterization Engineer (print/sign)	G L Wood / for G L Wood	Date	2-18-08
FSS/ Characterization Manager (print/sign)	R. Case	Date	2/25/08

Form CS-09/2 Rev 0

SECTION 7
ATTACHMENT 4
1 DISC