

Rancho Seco

Final Status Survey Summary Report

May 29, 2008

Clean Drain System "C" Holdup Tank Sump Cross Tie - Land

Survey Unit F8990098

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Dismantlement Superintendent, Radiological

FINAL STATUS SURVEY SUMMARY REPORT

Survey Unit:

F8990098, Clean Drain System "C" Holdup Tank Sump Cross Tie - Land

Survey Unit Description:

Operating History: This system provided an alternate pathway for delivering feed water to the steam generators. This system was reported to have been contaminated as a result of steam generator primary to secondary tube leaks. Operating records and the HSA document occurrences of radioactive contamination associated with this system piping.

Site Characterization: Direct measurements were made of the interior surfaces of the system piping which confirmed the presence of plant-derived radionuclides. Direct measurements of the interior showed a mean gross activity level of 368 dpm/100 cm² and a maximum value of 634 dpm/100 cm². Based on the classification procedure (DSIP-0020) and levels of gross activity reported and since the pipe ran through a contaminated soil area, the survey unit was classified as a Class 2.

HSA Events: HSA Report pg. 63.

Survey Unit Design Information:

The Survey Unit Design Parameters are presented in Table 1 below. The survey unit and measurement locations are depicted on the maps in Attachment 1. Direct measurement locations were determined using a random-start, fixed grid pattern and 100.3 m² were scanned for approximately 100% coverage. Soil samples were collected at each direct measurement location and analyzed by HPGe detector. The instrumentation used for the survey along with the MDC values are listed in Tables 2-1 and 2-2 in Attachment 2.

Table 1. Survey Unit Design Parameters

Survey Design Parameter	Value	Comment
Survey Area:	F899	Clean Drain System "C" Holdup Tank Sump Cross Tie - Land
Survey Unit:	0098	Open Land Area
Class:	2	LTP Table 5-4
SU Area (m²):	100.3	
Evaluator:	Gary Frank	
DCGL Cs137 surrogate (pCi/g):	51.2	
Area Factor:	N/A	Class 2
Design DCGL_{mc} (pCi/g):	N/A	Class 2
LBGR (pCi/g):	26.5	Adjusted
Design Sigma (pCi/g):	0.034	DTBD-06-001, Table 5-4D
Type I Error:	0.05	
Type II Error:	0.05	
Nuclide:	Cs137	
Sample Area (m²):	7.2	Class 2
Total Area Scanned (m²):	100.3	
Scan Coverage (%):	100%	Class 2
Z_{1-α}:	1.645	
Z_{1-β}:	1.645	
Sign P:	0.99865	
Calculated Relative Shift:	752.3	
Relative Shift Used:	3	Uses 3.0 if Rel Shift >3
N-Value:	11	
Design N-Value + 20%:	14	NUREG-1575 Table 5-5
Grid Spacing L:	2.7	Class 2

Survey Results:

A total of 14 direct measurements were made in F8990098. The results including mean, median, standard deviation and range are shown in Table 2. All of the direct measurements were less than the DCGL. Gamma scans were performed for discrete particle detection with results ranging from 7393 to 10864 cpm. Eight of the scan measurements indicated areas of elevated activity. Soil samples were collected and all were well below the DCGL_w.

Table 2. Direct Measurement Results
(all activity values in pCi/g)

Measurement ID	Cs137 MDA	Cs137 Activity	Uncertainty
Mean:		4.65E-02	
Median:		4.50E-02	
Standard Deviation:		7.81E-03	
Range:	3.42E-02 to 5.94E-02		
F8990098S0001SS	5.57E-02	< 5.57E-02	
F8990098S0002SS	5.07E-02	< 5.07E-02	
F8990098S0003SS	4.24E-02	< 4.24E-02	
F8990098S0004SS	3.42E-02	< 3.42E-02	
F8990098S0005SS	4.34E-02	< 4.34E-02	
F8990098S0006SS	4.66E-02	< 4.66E-02	
F8990098S0007SS	4.74E-02	< 4.74E-02	
F8990098S0008SS	5.73E-02	< 5.73E-02	
F8990098S0009SS	5.27E-02	< 5.27E-02	
F8990098S0010SS	4.02E-02	< 4.02E-02	
F8990098S0011SS	3.53E-02	< 3.53E-02	
F8990098S0012SS	4.26E-02	< 4.26E-02	
F8990098S0013SS	4.33E-02	< 4.33E-02	
F8990098S0014SS	5.94E-02	< 5.94E-02	

Survey Unit Data Assessment:

The survey design required 14 direct measurements for the Sign Test. The critical value and the results of the Sign Test are presented in Table 3. The sample mean and median values were less than the DCGL. The sample standard deviation was less than the design standard deviation so no additional samples were required.

Table 3. Data Assessment Results

Survey Results Parameter	Value	Comment
Actual Direct Measurements (N):	14	
Median (pCi/g):	4.50E-02	
Mean (pCi/g):	4.65E-02	
Standard Deviation (pCi/g):	7.81E-03	
Maximum (pCi/g):	5.94E-02	
Sign Test Final N Value:	14	
S+ Value:	14	
Critical Value:	10	
Sufficient Samples Collected:	Yes	
Maximum Value < DCGL:	Yes	
Median Value < DCGL:	Yes	
Mean Value < DCGL:	Yes	
Maximum Value < DCGL_{mc}:	N/A	Class 2
Standard Deviation <= Sigma:	Yes	
Pass the Sign Test?	Yes	
Reject the Null Hypothesis?	Yes	
The survey unit passes all conditions?	Yes	

Survey Unit Investigations and Results:

Eight investigations (scan grids 1, 2, 3, 4, 5, 7, 9, and 11) were required for particle scan measurements and none of the soil samples showed activity above fallout levels of Cs-137.

ALARA Statement:

As stated in Chapter 4 of the LTP, as long as the residual activity within the survey unit is less than the DCGL, the ALARA criterion has been met.

Changes in Initial Survey Unit Assumptions:

The survey unit was designed as a Class 2 land survey and the sample results are consistent with that classification. The variability of the survey results was less than the characterization data used for survey design. Eight potential areas of elevated activity were detected and evaluated as shown in Attachment 3.

Conclusion:

The FSS of this survey unit was properly designed as a Class 2 survey based on Table 5-4 of the LTP. The required number of direct measurements was made and the scan coverage met the requirement of Table 5-6 of the LTP. All of the direct measurements were less than the DCGL. Investigations were required and evaluated as shown in Attachment 3.

The direct measurement data support rejection of the null hypothesis, providing high confidence that the survey unit satisfied the release criteria and that the data quality objectives were met.

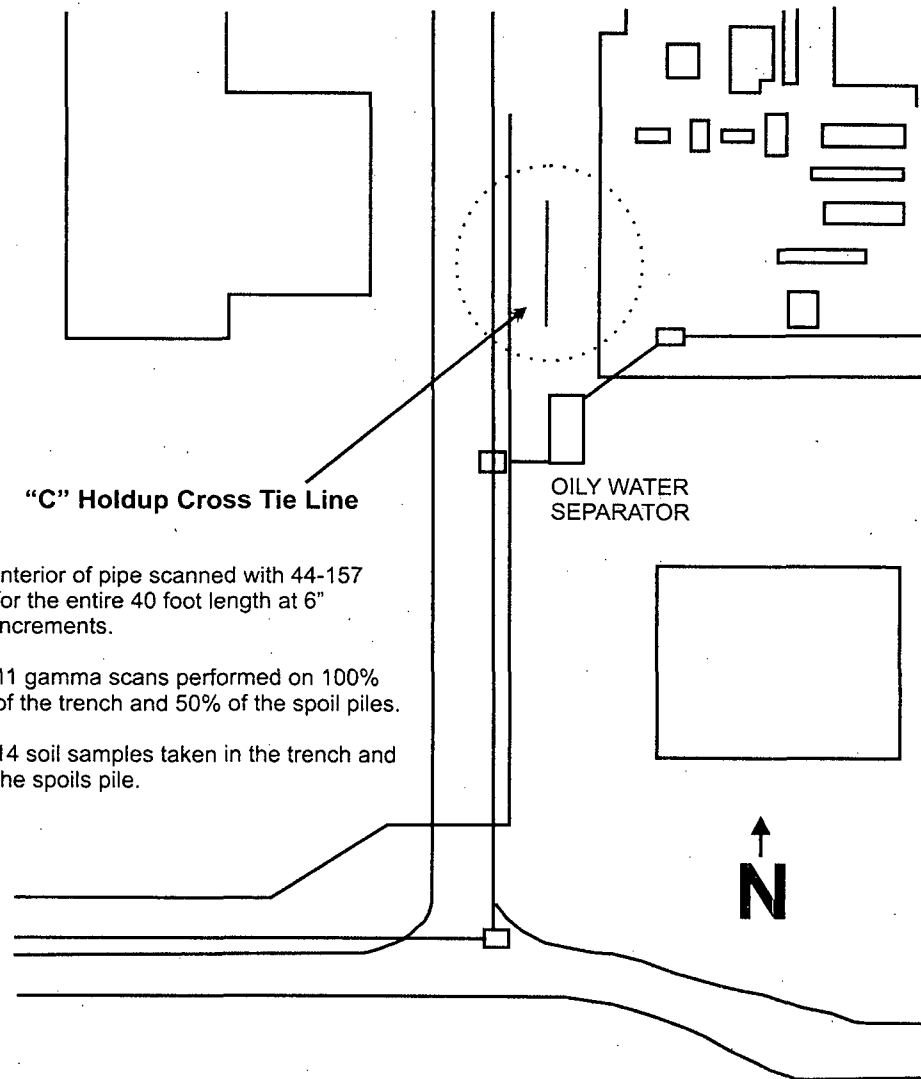
It is concluded that survey unit F8990098 meets the release criteria of 10CFR20.1402.

Attachment 1

Maps

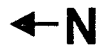
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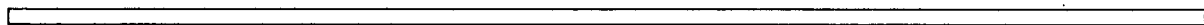


F8990098-M1

Clean Drain System
 "C" Holdup Tank
 Sump Cross Tie
 Gamma Scans and Soil Samples



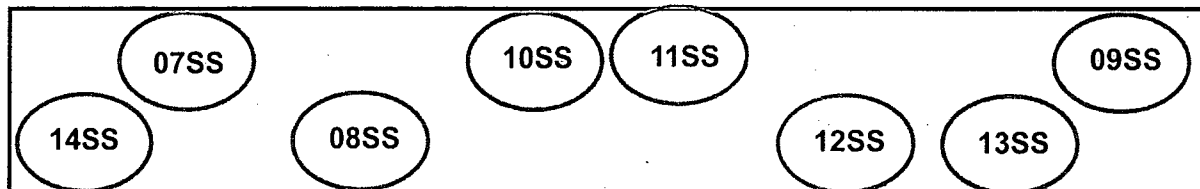
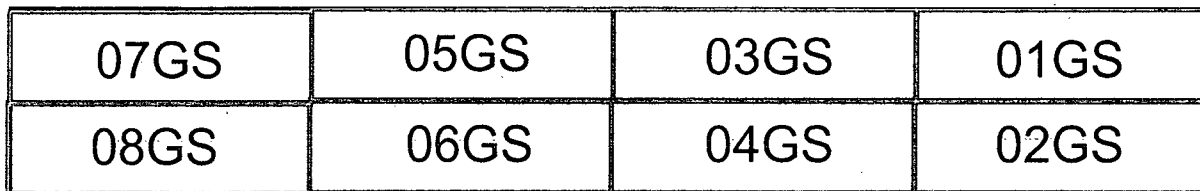
40' Pipe 6" in diameter



Spoils Pile



Trench



F8990098-M2

Attachment 2

Instrumentation

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Table 2-1. Survey Unit Instrumentation

Instrument	Detector Model No.	Detector Serial No.	MDC
HPGe	N/A	05047773	Soil – 0.034 pCi/g Cs-137
2350-1	44-10	211672	5.2 pCi/g

Table 2-2. Investigation Criteria and DCGL

Instrument	Parameter	Value
HPGe	Investigation Criteria - Scan	Soil – 25.6 pCi/g Cs-137 Soil – 6.3 pCi/g Co-60
All	DCGL _w	51.2 Cs-137 12.6 Co-60

Attachment 3

Investigation

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Table 3-1 Survey Unit Investigation

<i>Grid</i>	<i>Investigation Level (cpm)</i>	<i>Initial Value (cpm)</i>	<i>Investigation Result (pCi/g)</i>	<i>Elevated Area (m²)</i>	<i>Area Factor</i>	<i>DCGL (pCi/g)</i>	<i>Investigation Result (pCi/g)</i>	<i>DCGL_{emc} Unity Fraction</i>
01	7706	10389	0.0527	N/A	N/A	51.2	<DCGL	N/A
02	7706	9799	0.0433	N/A	N/A	51.2	<DCGL	N/A
03	7706	10193	0.0353	N/A	N/A	51.2	<DCGL	N/A
04	7706	10864	0.0426	N/A	N/A	51.2	<DCGL	N/A
05	7706	9474	0.0402	N/A	N/A	51.2	<DCGL	N/A
07	7706	7727	0.0474	N/A	N/A	51.2	<DCGL	N/A
09	7706	7809	0.0557	N/A	N/A	51.2	<DCGL	N/A
11	7706	7870	0.0466	N/A	N/A	51.2	<DCGL	N/A
Survey Unit Remainder						DCGL = 51.2	SU Mean = 0.0465	0.0009
EMC Unity Sum								N/A

The investigation level was determined from measurements on the surface of the ground at the RHUT trench.

The area was determined to be a Class 2 and as such nothing was expected above the DCGL_w. Grids were scanned for the highest reading. Two soil samples were obtained in the spoils pile (Grids 9, 10, 11) for the purposes of the investigation the higher value is used for investigation purposes.

Attachment 4

Data Assessment

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