

Rancho Seco
Final Status Survey Summary Report
October 29, 2008
HP Turbine Pedestal Drains
Survey Unit F8990074

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FINAL STATUS SURVEY SUMMARY REPORT

Survey Unit:

F8990074, HP Turbine Pedestal Drains

Survey Unit Description:

Operating History: This system collected clean water leakage and condensate from the turbine and routed it to the drain tank. This system was contaminated by radioactive system leakage into steam, feed and cooling water systems. 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 56,208 dpm/100 cm² and a maximum value of 680,000 dpm/100 cm². Based on the classification procedure (DSIP-0020) and levels of gross activity reported, the system was determined to be a Class 1 system.

HSA Events: ODR-800111, 871122.

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 spaced at 15cm intervals and 8 m² were scanned for 100% coverage. 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	HP Turbine Pedestal Drains Piping LTP Table 5-D
Survey Unit:	0074	
Class:	1	
SU Area (m²):	8	
Evaluator:	Erin L. Brown	
DCGL (dpm/100 cm²):	100000	Gross Activity DCGL
Area Factor:	1	Class 1
Design DCGL_{emc} (dpm/100 cm ²):	100000	Class 1
LBGR (dpm/100 cm²):	50000	Default = 50% DCGL
Design Sigma (dpm/100 cm²):	23464	
Type I Error:	0.05	
Type II Error:	0.05	
Predominant Nuclide:	Cs-137	
Sample Area (m²):	N/A	Embedded Pipe
Scan Area (m²):	8	
Scan Coverage (%):	100%	Class 1
Z_{1-α}:	1.645	
Z_{1-β}:	1.645	
Sign P:	0.97725	
Calculated Relative Shift:	2.2	
Relative Shift Used:	2.2	Uses 3.0 if Relative Shift is >3
N-Value:	12	
Design N-Value + 20%:	15	NUREG-1575 Table 5-5
Design Min Samples N:	15	Class 1
Grid Spacing L:	0.7	Class 1

Survey Results:

A total of 44 direct measurements were made in F8990074. The results including mean, median, standard deviation and range are shown in Table 2. All direct measurements were less than the DCGL. None of the measurements indicated areas of elevated activity. Survey activity ranged from 3531 to 6926 dpm/100 cm², based on the pipe detector efficiency.

Table 2. Direct Measurement Results

Measurement ID	Gross Activity (dpm/100 cm ²)
F8990074-M0001GI	5619
F8990074-M0002GI	5393
F8990074-M0003GI	5723
F8990074-M0004GI	6152
F8990074-M0005GI	6570
F8990074-M0006GI	6655
F8990074-M0007GI	6637
F8990074-M0008GI	6565
F8990074-M0009GI	6744
F8990074-M0010GI	6695
F8990074-M0011GI	6851
F8990074-M0012GI	6852
F8990074-M0013GI	6883
F8990074-M0014GI	6875
F8990074-M0015GI	6926
F8990074-M0016GI	6781
F8990074-M0017GI	6883
F8990074-M0018GI	6916
F8990074-M0019GI	6853
F8990074-M0020GI	6756
F8990074-M0021GI	6572
F8990074-M0022GI	3531
F8990074-M0023GI	3909
F8990074-M0024GI	3931
F8990074-M0025GI	4244
F8990074-M0026GI	4335
F8990074-M0027GI	4370
F8990074-M0028GI	4462
F8990074-M0029GI	4367
F8990074-M0030GI	4374
F8990074-M0031GI	4452
F8990074-M0032GI	4362
F8990074-M0033GI	4429
F8990074-M0034GI	4523
F8990074-M0035GI	4303
F8990074-M0036GI	3666
F8990074-M0037GI	3912
F8990074-M0038GI	3801
F8990074-M0039GI	3566
F8990074-M0040GI	3848

F8990074-M0043GI	6253
F8990074-M0044GI	5935
F8990074-M0045GI	5772
F8990074-M0046GI	5934
Mean:	5459
Median:	5747
Standard Deviation:	1246
Range:	3531 - 6926

Survey Unit Data Assessment:

The survey design required 44 direct measurements for the Sign Test. The critical value and the results of the Sign Test are presented in Table 4. 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 4. Data Assessment Results

Survey Results Parameter	Value	Comment	
Material Background Used (dpm/100 cm ²):	N/A	Average Ambient BKG = 0	
Ambient Background Used (dpm/100 cm ²):	N/A		
Actual Direct Measurements (N):	44		
Median (dpm/100 cm ²):	5747		
Mean (dpm/100 cm ²):	5459		
Direct Measurement Standard Deviation (dpm/100 cm ²):	1246		
Total Standard Deviation (dpm/100 cm ²):	1246		Based on samples and backgrounds.
Maximum (dpm/100 cm ²):	6926		Background Subtract Not Applied
Material Type:	N/A		
Sign Test Final N Value:	44		
S+ Value:	44		
Critical Value:	27		
Sufficient Samples Collected:	Yes		
Maximum Value < DCGL:	Yes		
Median Value < DCGL:	Yes		
Mean Value < DCGL:	Yes		
Maximum Value < DCGL_{mc}:	Yes	Class 1	
Total Standard Deviation <= Sigma:	Yes		
Pass the Sign Test?	Yes		
Reject the Null Hypothesis?	Yes		
Does the Survey Unit Pass All Criteria?	Yes		

Survey Unit Investigations and Results:

No investigations were required and no investigation results are reported.

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 (i.e. the survey unit average activity is less than the DCGL and the EMC criterion has been met), the ALARA criterion has been met.

Changes in Initial Survey Unit Assumptions:

The survey unit was designed as a Class 1 structure 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. No potential areas of elevated activity were detected. Therefore the EMC criterion was met.

Conclusion:

The FSS of this survey unit was properly designed as a Class 1 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 the LTP for pipe surveys. No direct measurements exceeded the DCGL of 100000 dpm/100 cm². No investigations were required.

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.

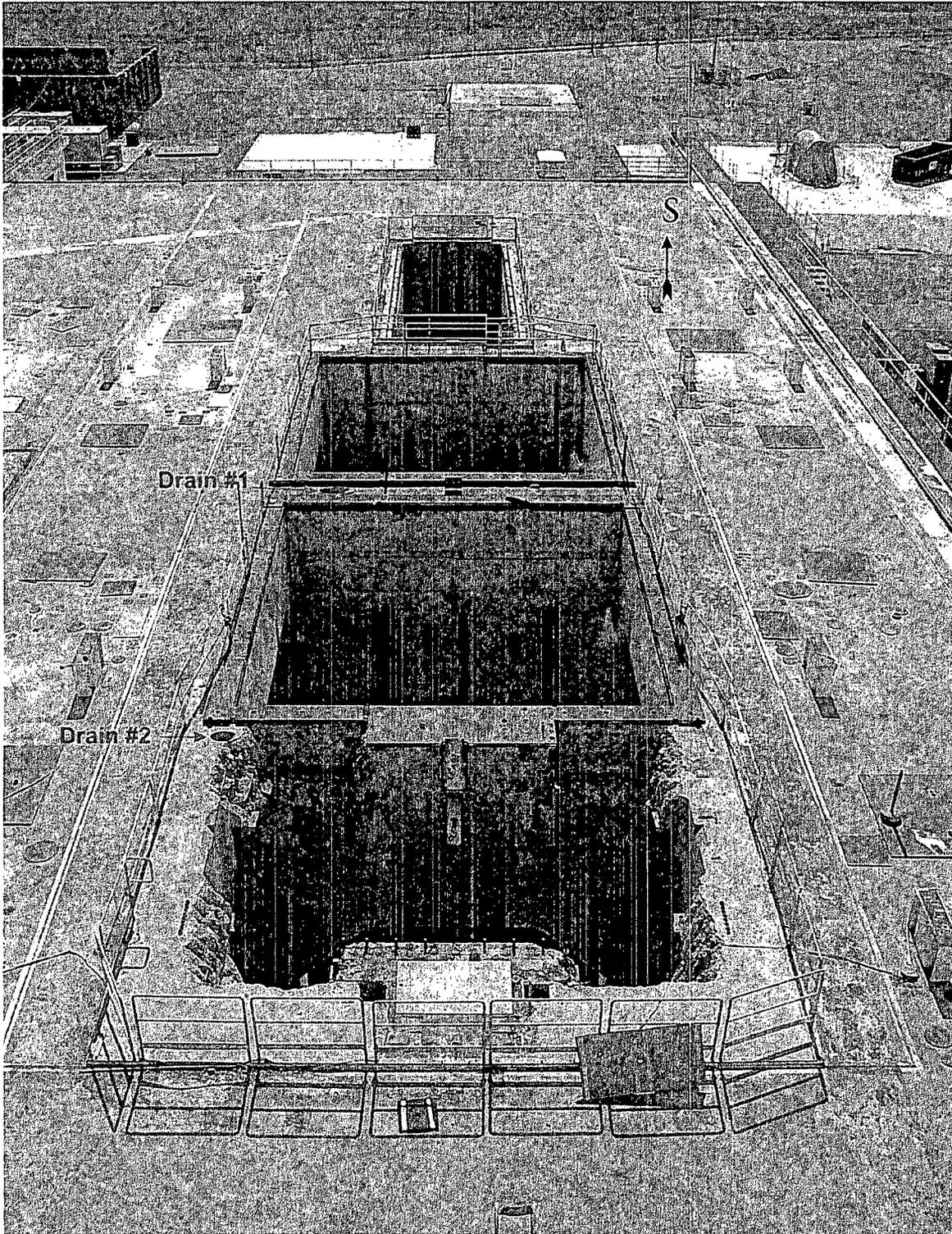
It is concluded that survey unit F8990074 meets the release criteria of 10CFR20.1402.

Attachment 1

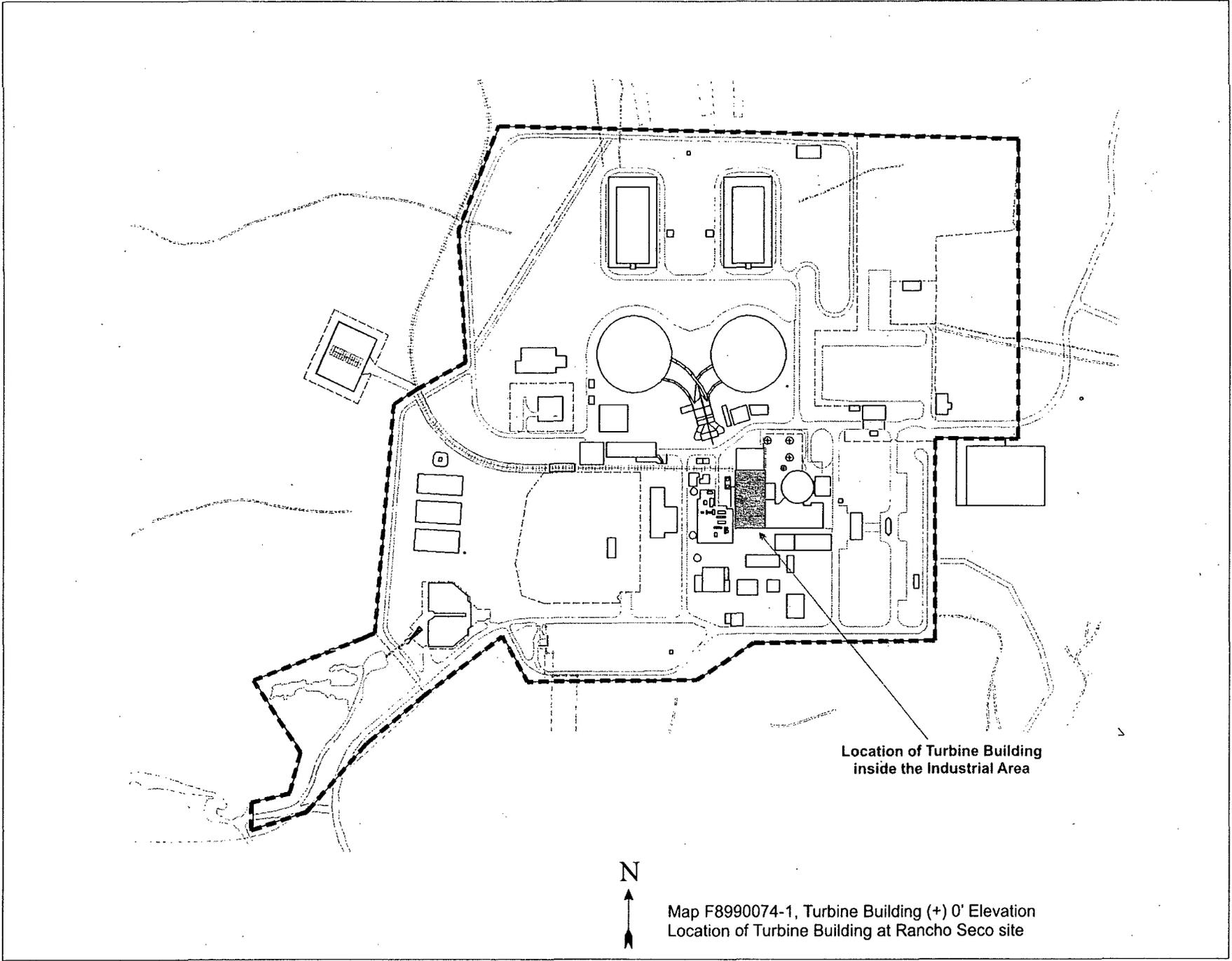
Maps

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Survey Unit F8990074



Map F8990074-2, HP Turbine Pedestal Drains
Hub (+ 0' El.) is at 40' El.



Location of Turbine Building
inside the Industrial Area



Map F8990074-1, Turbine Building (+) 0' Elevation
Location of Turbine Building at Rancho Seco site

Attachment 2
Instrumentation
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Table 2-1. Survey Unit Instrumentation

Instrument Model; Serial No.	Detector Model; Serial No.	MDC Static (dpm/100 cm²)	MDC Scan (dpm/100 cm²)
M2350; 142512	44-162; L206935	2590	N/A

Table 2-2. Investigation Criteria and DCGL

Parameter	Value (dpm/100 cm²)
Investigation Criteria - Direct	100000
Investigation Criteria - Scan	N/A
DCGL _w	100000
DCGL _{EMC}	100000

Attachment 3

Investigation

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(none required)

Attachment 4

Data Assessment

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