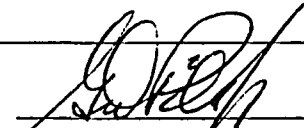
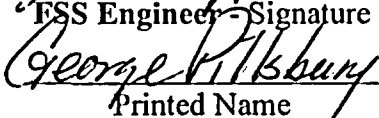


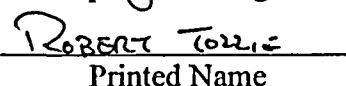
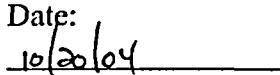
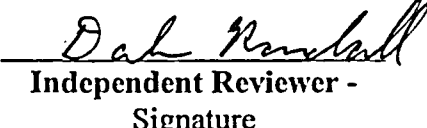
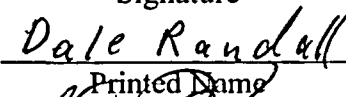
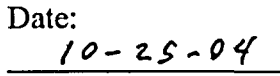
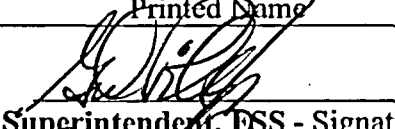
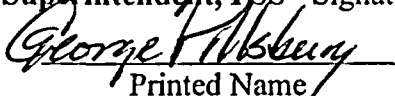


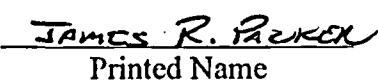



MAINE YANKEE
 FINAL STATUS SURVEY RELEASE RECORD
 FB-3000 SEWAGE TREATMENT PLANT
 SURVEY UNIT 1

Prepared By:	 FSS Engineer - Signature  Printed Name	Date: 
Reviewed By:	 FSS Specialist - Signature  Printed Name	Date: 
Reviewed By:	 Independent Reviewer - Signature  Printed Name	Date: 
Approved By:	 Superintendent, FSS - Signature  Printed Name	Date: 
Approved By:	 FSS, MOP - Signature  Printed Name	Date: 

**MAINE YANKEE
FINAL STATUS SURVEY RELEASE RECORD
FB-3000 SEWAGE TREATMENT PLANT
SURVEY UNIT 1**

A. SURVEY UNIT DESCRIPTION

FB-3000, the Sewage Treatment Plant (STP), is a concrete, below-grade structure that is located on the east side of Bailey Point adjacent to and north of the former Circ Water Pump House at Maine State Grid Coordinates 624400 E and 407630 N (See map FB-3000-001, Attachment 1). The structure contained waste holding and treatment tanks and equipment which were used to treat sanitary waste before Maine Yankee connected to the Wiscasset municipal treatment facility. The survey area consists of a single survey unit. Survey Unit 1 consists of the concrete walls (up to grade 17 feet) and floor and comprises a surface area of approximately 226 m². The survey area was located outside of the plant's radiologically restricted area (RA).

B. SURVEY UNIT DESIGN INFORMATION

FB-3000 Survey Unit 1 was designated a Class 3 survey unit per the Maine Yankee Area Classification Basis Document. Prior to 1985, the STP processed all of the site sanitary waste. Up until the early 1980s sewer drains from the RA were directed to the STP. Evaluation of HSA and characterization data resulted in the Class 3 determination.

The survey unit design parameters are summarized in Table 1. Given a relative shift of 3.0, it was determined that 14 direct sample points were required for the Sign Test. Measurement locations were randomly generated for Survey Unit 1 and are shown on map FB-3000-003 (Attachment 1). Once the direct readings were completed, removable contamination samples were obtained at each measurement location.

A 1% to 10% scan coverage of the area was required.¹ Scan grids were typically 1 m² areas around the direct measurement locations plus an additional 9 m² in and around the sump as shown on map FB-3000-004 (Attachment 1). The total scan area was approximately 23 m², thus meeting the upper scan coverage requirement of 10%.

The survey instruments used, their scan MDC values, and alarm setpoints are provided in Attachment 2. As shown in Attachment 2, the scan MDC is less than the investigation level, which provides a high confidence level (95%) that an elevated area would be detected by scanning.

Background values were established, for each particular instrument probe application based on ambient background values in the survey unit and previously established material backgrounds. These background values, listed in Table 1, were used to establish net activity for direct measurements and to confirm the scan MDCs used were appropriate.

¹ LTP Table 5-3

TABLE 1**SURVEY UNIT DESIGN PARAMETERS**

Survey Unit	Design Criteria	Basis
Area	226 m ²	No limit for Class 3 Area
Number of Direct Measurements Required	14	Based on adjusted LBGR of 14,844 dpm/100 cm ² , sigma ² of 1052 dpm/100 cm ² , and relative shift of 3.0 Type I = Type II = 0.05
Sample Area	N/A	Class 3 Area
Sample Grid Spacing	N/A	Class 3 Area
Scan Grid Area	1 m ² (a 2 m area around the sump was also scanned)	Class 3 Area
Area Factor	N/A	Class 3 Area
Scan Survey Area	23 m ²	Class 3 Area 1% - 10%
Background		
43-68 Direct and Scan (flat surfaces)	2,411 dpm/100 cm ²	Ambient plus Material Material Background from EC-039-01 (Reference 1)
Scan Investigation Level	0.5 DCGL (See Table 2-2)	EC-009-01 (Reference 5)
DCGL	18,000 dpm/100 cm ²	LTP Revision 2 for concrete surfaces
Design DCGL _{EMC}	N/A	Class 3 Area

C. SURVEY RESULTS

Fourteen direct concrete measurements were taken with the results provided in Table 2. All direct measurements were less than the DCGL. Removable contamination measurements were all less than the MDA values.

No scan alarms were received; therefore, no investigations were required.

² LTP Attachment 2B and MY Calculation EC-032-01 (Reference 6)

TABLE 2**DIRECT MEASUREMENTS**

Sample Number	Gross Activity (dpm/100 cm ²)	Net Activity* (dpm/100 cm ²)
FB3000-1-C001	1673	-739
FB3000-1-C002	2234	-177
FB3000-1-C003	2173	-238
FB3000-1-C004	2118	-293
FB3000-1-C005	2143	-269
FB3000-1-C006	2100	-311
FB3000-1-C007	2509	98
FB3000-1-C008	2418	6
FB3000-1-C009	2369	-43
FB3000-1-C010	2650	238
FB3000-1-C011	2411	0
FB3000-1-C012	2497	85
FB3000-1-C013	2564	153
FB3000-1-C014	2289	-122
Mean	2296	-115
Median	2329	-82
Standard Deviation	251	251
Range	1673 – 2650	-739 – 238

*Table 1 background value subtracted

D. SURVEY UNIT INVESTIGATIONS PERFORMED AND RESULTS

None required.

E. SURVEY UNIT DATA ASSESSMENT

An analysis of the direct sample measurement results, including the mean, median, standard deviation, and sample result range, are provided in Table 2. Without subtracting background, all direct measurement results were below the DCGL. The maximum direct sample result with background subtracted was equivalent to 238 dpm/100 cm².

When adjusted for background, the mean residual contamination level is -115 dpm/100 cm². This would be equivalent to an annual dose rate of 0.0 mrem/y.

F. ADDITIONAL DATA EVALUATION

Attachment 4 provides additional data evaluation associated with this Survey Unit, including relevant statistical information. Based on survey unit direct measurement data, this attachment provides the Sign Test Summary, Quantile Plot, Histogram, and Retrospective Power Curve.

1. The Sign Test Summary provides an overall summary of design input (Table 1) and resulting calculated values used to determine the required number (N) of direct measurements (per LTP Section 5.4.2). The Sign Test Summary is a separate statistical analysis that also calculates the mean, median, and standard deviation of the direct measurements.

The critical value and the result of the Sign Test are provided in the Sign Test Summary table, as well as a listing of the key release criteria. As is shown in the table, all of the key release criteria were clearly satisfied for the FSS of this survey unit.

2. The Quantile Plot was generated from direct measurement data listed in Table 2. The data set and plot are consistent with expectations for a Class 3 survey unit. All of the measurements are well below the DCGL of 18,000 dpm/100 cm².
3. A Histogram Plot was also developed based on the direct measurement values. This plot shows that the direct data were essentially a normal distribution with no outliers.
4. A Retrospective Power Curve was constructed, based on FSS results. The curve shows that this survey unit having a mean residual activity at a small fraction of the DCGL has a high probability (“power”) of meeting the release criteria. Thus, it can be concluded that 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.

As mentioned in Section B, removable contamination samples were obtained at each (direct) measurement location. In that this survey unit involved a (backfilled) basement and not a standing building, the removable contamination measurements were not applicable to release decisions for the survey unit. However, the samples were obtained and evaluated, indicating alpha activity less than the MDA values (i.e., < 3.4 dpm/100 cm²) and the maximum beta activity less than the MDA of 28 dpm/100 cm². Thus, in comparison with the mean survey unit net activity (Table 2), the removable contamination sampling effort indicated no loose surface activity. In addition, samples of the STP sump water were analyzed by gamma spectroscopy to environmental LLDs with no detectable plant-derived radioactivity found.

G. CHANGES IN INITIAL SURVEY UNIT ASSUMPTIONS ON EXTENT OF RESIDUAL ACTIVITY

The survey was designed as a Class 3 area; the FSS results were consistent with that classification. The direct measurement sample standard deviation was less than the design sigma. Thus, no additional measurements were required.

H. LTP CHANGES SUBSEQUENT TO SURVEY UNIT FSS

The FSS of Survey Unit 1 was designed, performed and evaluated in late 2001. The design was performed to the criteria of the LTP, Revision 2 (Reference 2). Subsequent LTP changes with potential impact to this survey unit were evaluated:

1. Establishment of a scan MDC for gas filled detectors (LTP Revision 3, Table 5-4b, Reference 4).

This LTP change was evaluated and found to have no impact on results or conclusions of the FSS for FB-3000 Survey Unit 1.

I. CONCLUSION

The FSS of this survey unit was designed based on the designation as a Class 3 area. The survey design parameters are presented in Table 1. The required number of direct measurements was determined for the Sign Test in accordance with the LTP. As presented in Table 2, all beta direct measurements were less than the DCGL of 18,000 dpm/100 cm².

A Sign Test Summary analysis demonstrated that the Sign Test criteria were satisfied. The direct measurement sigma was determined to be less than that used for design, thus indicating that a sufficient number of samples was taken.

The Retrospective Power Curve shown in Attachment 4 confirmed that sufficient samples were taken to support rejection of the null hypothesis, providing high confidence that the survey unit satisfied the release criteria and the data quality objectives were met. Attachment 4 also revealed that direct measurement data represented essentially a normal distribution, with variance consistent with expectations for a Class 3 survey unit.

The scan survey design for this survey unit was developed in accordance with the LTP with significant aspects of the design discussed in Section B and Table 1. Scanning resulted in no verified alarms; therefore, no investigations were required.

In addition, while not part of the release decision criteria, removable contamination sampling did not identify loose surface contamination above the MDA.

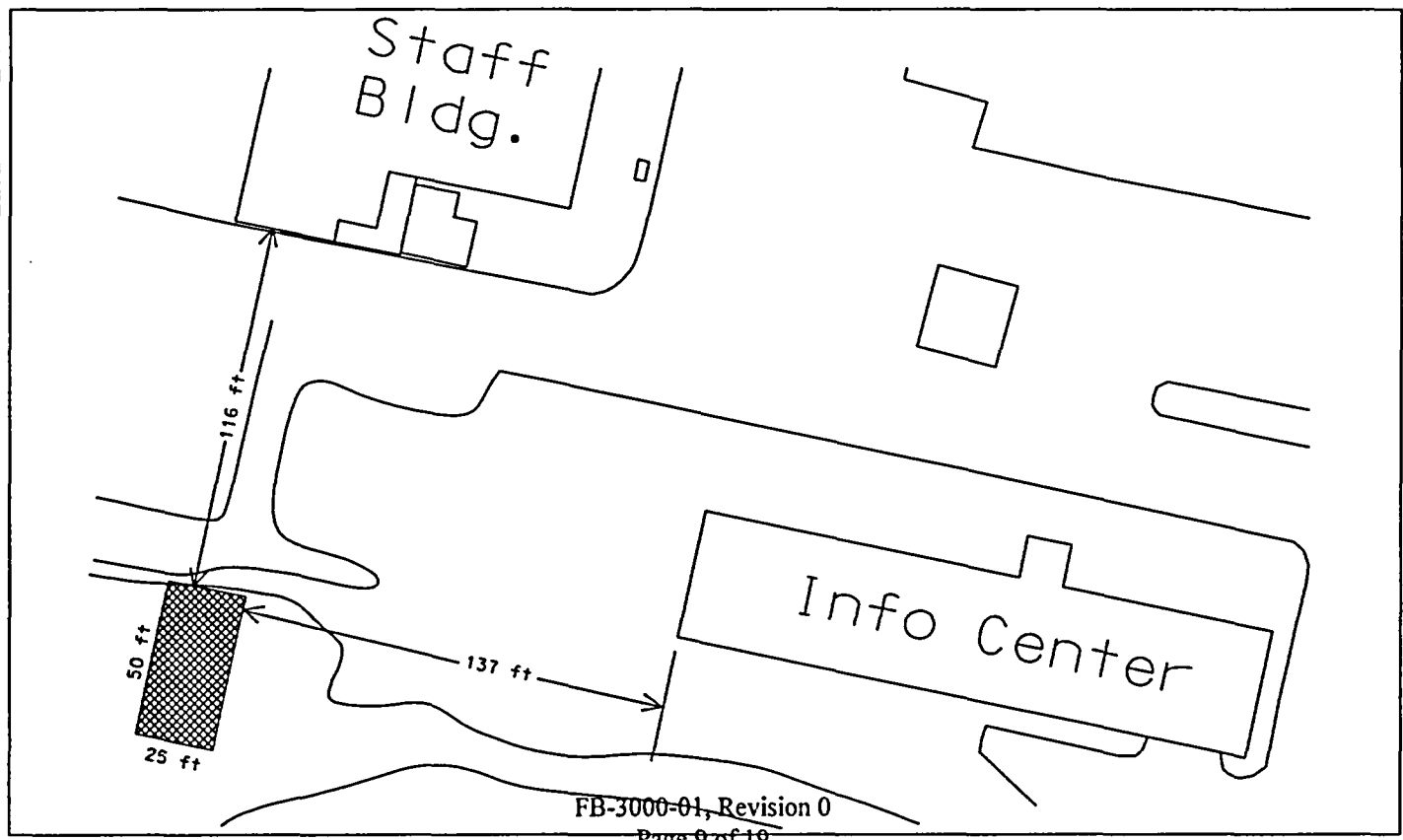
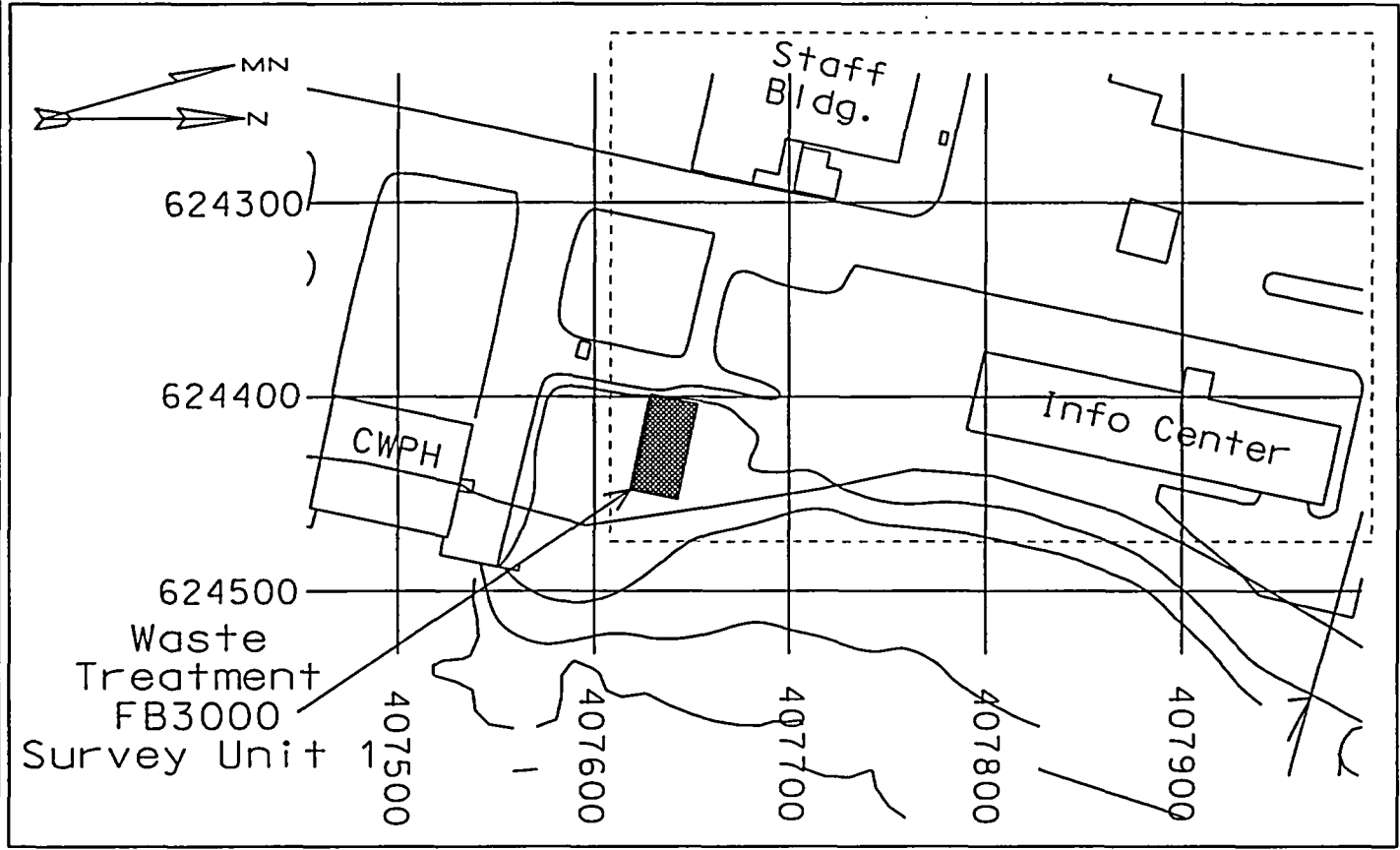
It is concluded that FB-3000, Survey Unit 1, met the release criteria of 10CFR20.1402 and the State of Maine enhanced criteria.

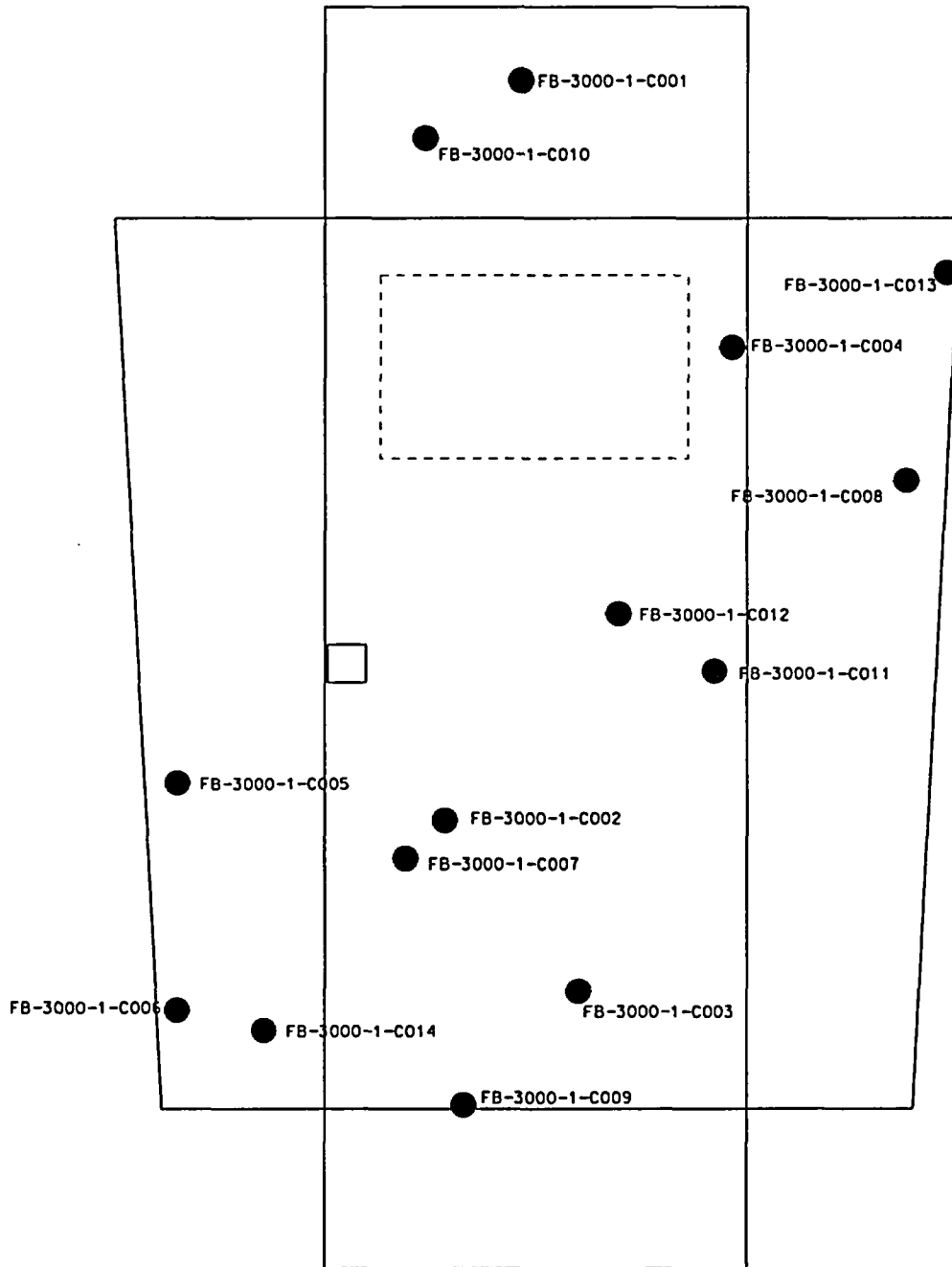
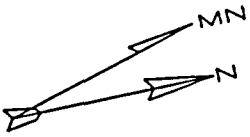
J. REFERENCES

1. Maine Yankee Engineering Calculation, EC-039-01
2. Maine Yankee LTP, Revision 2, Maine Yankee letter to the NRC, MN-01-032, August 13, 2001
3. Approach for Dealing with Background Radioactivity for Maine Yankee Final Status Surveys, Attachment E to Maine Yankee Procedure, FSS Data Processing and Reporting, PMP 6.7.8
4. Maine Yankee License Termination Plan, Revision 3, Maine Yankee letter to the NRC, MN-02-048, dated October 15, 2002
5. Maine Yankee Engineering Calculation, EC-009-01
6. Maine Yankee Engineering Calculation, EC-032-01

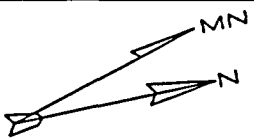
Attachment 1
Survey Unit Maps

Waste Treatment Building (Site Location)

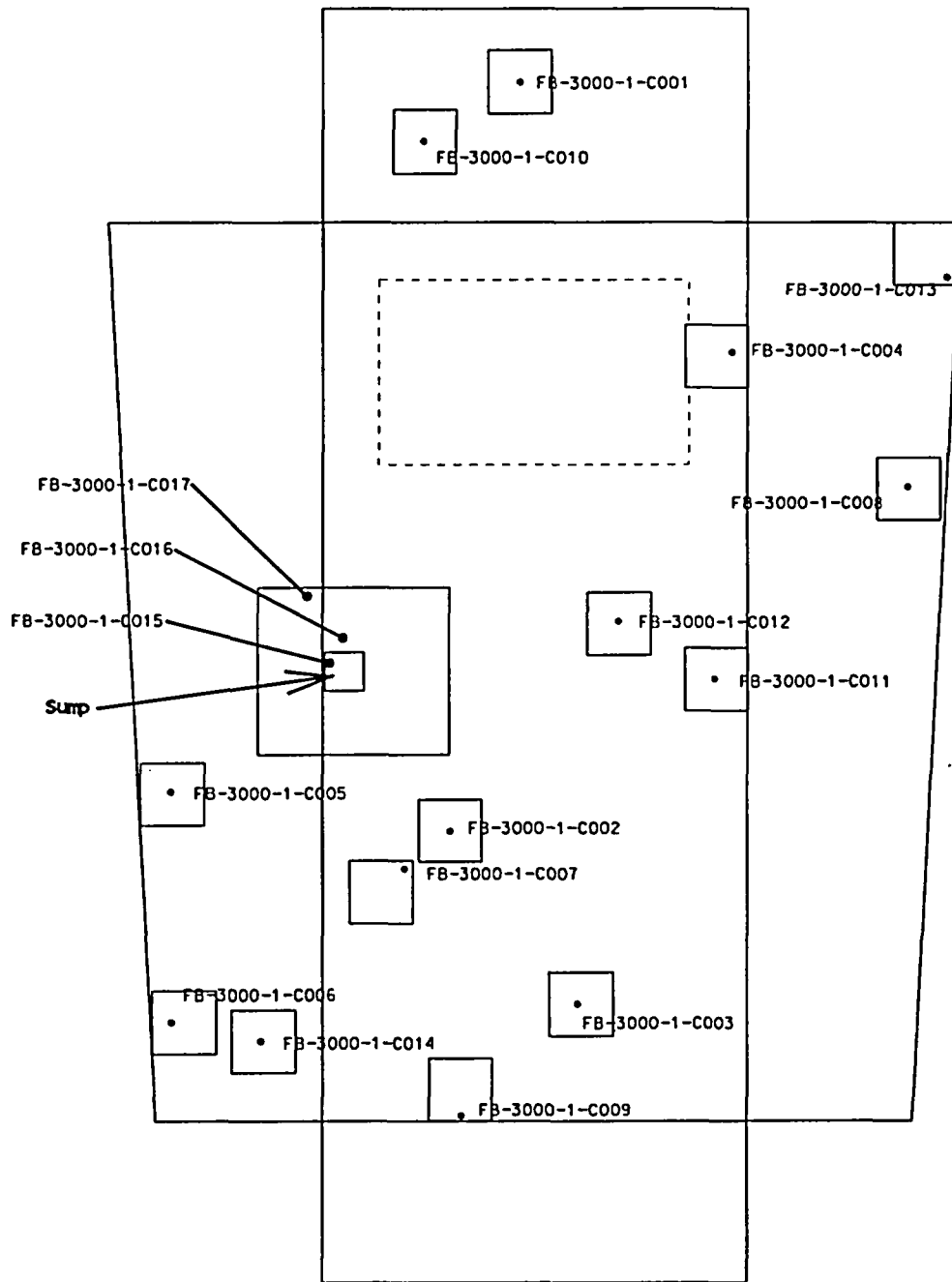




FB3000 Survey Unit 1
Direct Measurement Locations



FB3000 Survey Unit 1 Scan Grid Locations



Area around each of the 14 sample point locations is 1 meter by 1 meter. (14 square meters)

Area around sump is 1 meter up the wall, 1 meter from each (east/west) side edge of the sump, and two meters out from the wall. Scan area includes walls and floor of sump. (9.31 square meters) FB-3000-1-C015 = Sump FB-3000-1-C016= Floor FB-3000-1-C017=Wall

Attachment 2

Survey Unit Instrumentation

TABLE 2-1

INSTRUMENT INFORMATION

E-600 S/N	Probe S/N (type)
1643	148117 (43-68)

HPGe Detectors for Lab Analysis of Volumetric Samples

Detector Number	MDC (uCi/mL)
DET-3	~ 1E-8
FSS-2	~ 1E-8

TABLE 2-2

INSTRUMENT SCAN MDC AND COMPARISON WITH DCGL AND INVESTIGATION LEVEL

Detector	43-68 (Flat)	Comments
Scan MDC (dpm/100 cm ²)	1832	LTP Table 5-6
DCGL (dpm/100 cm ²)	18,000	Table 1
Investigation Level Alarm Setpoint (dpm/100 cm ²)	1340 c/m (8181)	~ 0.5 DCGL

Attachment 3

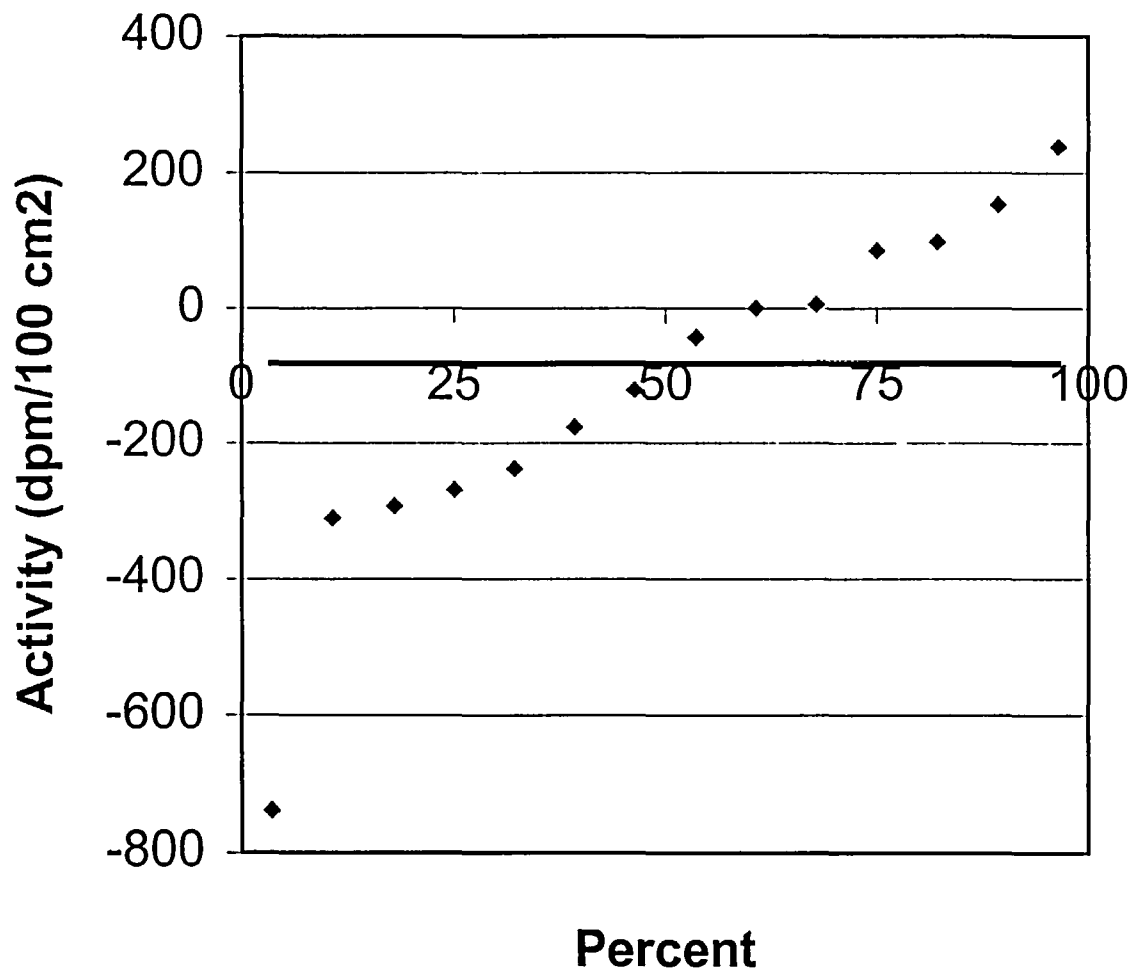
**Investigation Table
(None Required)**

Attachment 4
Statistical Data

Survey Package FB-3000 Unit 1 Surface Sign Test Summary

Evaluation Input Values		Comments
Survey Package:	FB-3000	Sewage Treatment Plant
Survey Unit:	01	
Evaluator:	GP	
DCGL _w :	18,000	
DCGL _{emc} :	18,000	
LBGR:	9,000	
Sigma:	1,052	
Type I error:	0.05	
Type II error:	0.05	
Total Instrument Efficiency:	13.0%	
Detector Area (cm ²):	126	
Material Type:	Concrete Unpainted	Choosing 'N/A' sets material background to "0"
Calculated Values		Comments
Z _{1-α} :	1.645	
Z _{1-β} :	1.645	
Sign p:	0.99865	
Calculated Relative Shift:	8.5	
Relative Shift Used:	3.0	Uses 3.0 if Relative Shift >3
N-Value:	11	
N-Value+20%:	14	
Static Data Values		Comments
Number of Samples:	14	
Median:	-82	
Mean:	-114	
Net Static Data Standard Deviation:	251	
Total Standard Deviation:	307	Sum of samples and all background
Maximum:	239	
Sign Test Results		Comments
Adjusted N Value:	14	
S+ Value:	14	
Critical Value:	10	
Criteria Satisfaction		Comments
Sufficient samples collected:	Pass	
Maximum value <DCGL _w :	Pass	
Median value <DCGL _w :	Pass	
Mean value <DCGL _w :	Pass	
Maximum value <DCGL _{emc} :	Pass	
Total Standard Deviation <=Sigma:	Pass	
Sign test results:	Pass	
Final Status		Comments
The survey unit passes all conditions:	Pass	

FB-3000 SU-1 Quantile Plot

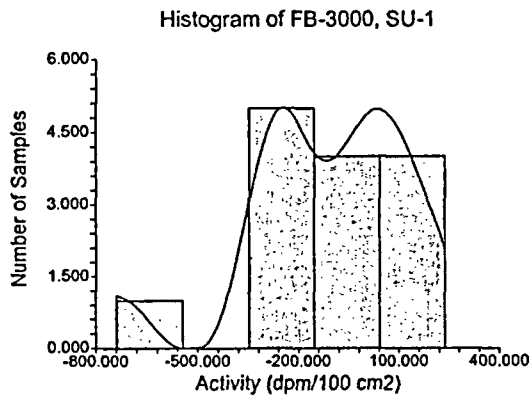


◆ Activity (dpm/100 cm2)
— Median (dpm/100 cm2)

One-Sample T-Test Report

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Variable C2

Plots Section



One-Sample T-Test Power Analysis

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Chart Section

