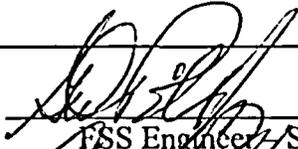
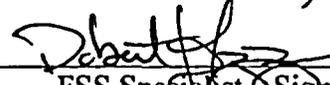
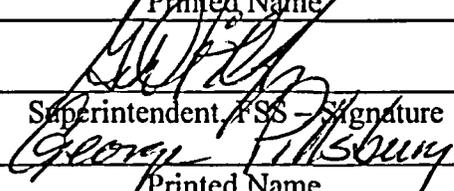
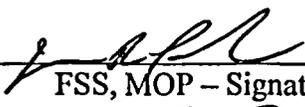


**MAINE YANKEE
FINAL STATUS SURVEY RELEASE RECORD
FD-0700 FIRE PROTECTION (WATER)
SURVEY UNIT 1**

Prepared By:	 FSS Engineer - Signature <u>George Pillsbury</u> Printed Name	Date: <u>2/7/05</u>
Reviewed By:	 FSS Specialist - Signature <u>R. Tozzie</u> Printed Name	Date: <u>2/7/05</u>
Reviewed By:	<u>D. Anderson</u> Independent Review - Signature <u>D. ANDERSON</u> Printed Name	Date: <u>2/10/05</u>
Approved By:	 Superintendent, FSS - Signature <u>George Pillsbury</u> Printed Name	Date: <u>2/10/05</u>
Approved By:	 FSS, MOP - Signature <u>JAMES R. PARKER</u> Printed Name	Date: <u>2/17/05</u>

**MAINE YANKEE
FINAL STATUS SURVEY RELEASE RECORD
FD-0700 FIRE PROTECTION (WATER)
SURVEY UNIT 1**

A. SURVEY UNIT DESCRIPTION

Survey Unit FD-0700 Survey Unit 1, Fire Protection (Water), consists of the 12" diameter ring header that provided water to the fire protection system within the Protected Area of the site. Survey Unit 1 is located within grid coordinates 407,300 to 408,300 N and 623,600 to 624,300 E using the Maine State Coordinate System (West Zone), NAD 1927.

The survey unit area is shown in relation to other major site structures in map FD 0700-1 SITE and FD0700-1 REF. All maps referenced in this release record are provided in Attachment 1, unless otherwise noted. The survey unit total internal surface area is approximately 961 m².

B. SURVEY UNIT DESIGN INFORMATION

The Fire Protection pipes are generally located 6 to 10 feet below grade. Due to personnel safety concerns, sections of the piping system were removed from the excavations such that the pipes could be surveyed in a safe location. A total of five pipe sections, each approximately 2 meters long, were removed from the system. Refer to map FD0700-01 REF for locations where pipe sections were obtained. Refer to maps FD0700-1a through -1e for the actual lengths of the pipe segments.

The area was designated a Class 3 buried pipe survey unit per the LTP (Table 5-1E). The survey unit design parameters are shown in Table 1. Given a relative shift of 3.0, it was determined that 14 direct measurements were required for the Sign Test, however the LTP required 30 direct measurements for FD-0700. Measurement locations are illustrated on maps FD 0700-1f through -1j. All direct measurements consisted of one-minute beta counts obtained at the required locations.

Scan grids were each approximately 1 m² as indicated on survey maps FD 0700-1a through -1e. A 1% to 10% scan coverage of the area was required. The scan grids provided a total scan area of approximately 10 m², exceeding the 1% requirement. The survey instruments used, their MDCs, and alarm setpoints are provided in Attachment 2. The scan MDC was less than the investigation level thereby providing high confidence that areas of elevated activity would be identified.

Background values were established for the scan measurements based on local scaler values taken in the area where the surveys were performed. These background values were used to establish scan alarm setpoints and to confirm the scan MDCs used were appropriate.

TABLE 1**SURVEY UNIT DESIGN PARAMETERS**

Survey Unit	Design Criteria	Basis
Area	961 m ²	No limit for Class 3 Area
Number of Direct Measurements Required	30	Based on Att. 5A of the LTP. Type I = Type II= 0.05
Sample Area	N/A	Class 3 Area
Sample Grid Spacing	N/A	Class 3 Area
Scan Grid Area	Approximately 1 m ²	Class 3 Area
Area Factor	N/A	Class 3 Area
Scan Survey Area	Approximately 10 m ²	Class 3 Area 1% - 10%
Background		
43-68 (scan)	774 dpm/100 cm ²	Ambient Background
Scan Investigation Level	0.5 DCGL plus Background	See Table 2-2
DCGL	9800 dpm/100 cm ²	LTP Revision 3 (Reference 2 and 3)
Design DCGL _{EMC}	N/A	Class 3 Area

C. SURVEY RESULTS

As required, 30 direct measurements were made and the results are presented in Table 2. All direct measurements were below the DCGL. No verified alarms were received during the pipe scans. Therefore, no investigations were required.

TABLE 2
DIRECT MEASUREMENTS

Sample Number	Gross (dpm/100 cm ²)	Net (dpm/100 cm ²)
FD-0700-01-P001	979	205
FD-0700-01-P002	850	76
FD-0700-01-P003	827	53
FD-0700-01-P004	860	86
FD-0700-01-P005	678	-96
FD-0700-01-P006	721	-53
FD-0700-01-P007	899	126
FD-0700-01-P008	780	7
FD-0700-01-P009	761	-13
FD-0700-01-P010	847	73
FD-0700-01-P011	579	-195
FD-0700-01-P012	678	-96
FD-0700-01-P013	989	215
FD-0700-01-P014	767	-7
FD-0700-01-P015	817	43
FD-0700-01-P016	807	33
FD-0700-01-P017	724	-50
FD-0700-01-P018	685	-89
FD-0700-01-P019	817	43
FD-0700-01-P020	708	-66
FD-0700-01-P021	688	-86
FD-0700-01-P022	906	132
FD-0700-01-P023	833	60
FD-0700-01-P024	853	79
FD-0700-01-P025	830	56
FD-0700-01-P026	754	-20
FD-0700-01-P027	701	-73
FD-0700-01-P028	896	122
FD-0700-01-P029	751	-23
FD-0700-01-P030	651	-122
Mean	788	14
Median	794	20
Standard Deviation	97	97
Range	579-989	-195-215

D. SURVEY UNIT INVESTIGATIONS PERFORMED AND RESULTS

The pipe scan identified no verified alarm locations.

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. Both the mean and median activities were less than the DCGL of 9800 dpm/100 cm². The maximum direct measurement result with background subtracted was less than 3% of the DCGL. No additional investigations or any reclassification was required.

For illustrative purposes, as indicated in LTP Section 5.9.3, a simplified general retrospective dose estimate can be calculated from the average net residual contamination level. The result is a net activity value of 14 dpm/100 cm². This would equate to an annual dose rate of 3.6E-6 mrem/y.¹ However, for purposes of demonstrating compliance with the radiological criteria for license termination and the enhanced State criteria, background activity is not subtracted from the direct measurement values.

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 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, the final sigma was less than the design value. In addition, the Sign Test and all release criteria were clearly satisfied.

The direct measurement total standard deviation at 103 dpm/100 cm² was less than the design sigma. As required by the LTP, 30 direct measurements were performed. Since this is greater than the relative shift-calculated N, there is no affect on the result.

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 9800 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.

¹ Annual dose rate = 14/9800 x 2.52E-3 mrem/y.

G. CHANGES IN INITIAL SURVEY UNIT ASSUMPTIONS ON THE 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 total standard deviation was less than the design sigma, therefore a sufficient number of sample measurements were taken.

H. LTP CHANGES SUBSEQUENT TO SURVEY UNIT FSS

The FSS of Survey Unit 1 was designed, performed and evaluated in late 2004 to early 2005. The design was performed to the criteria of the LTP, Revision 3 (Reference 4). No subsequent LTP changes with potential impact to this survey unit needed to be evaluated.

I. CONCLUSION

The FSS of this survey unit was designed based on the LTP designation as a Class 3 area. The survey design parameters are presented in Table 1. The required number of direct measurements was determined in accordance with the LTP. As presented in Table 2, all direct measurements were less than the DCGL of 9800 dpm/100 cm².

A Sign Test Summary analysis demonstrated that the Sign Test criteria were satisfied. The direct measurement sigma was less than that used for design, so 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 for evaluation.

It is concluded that FD-0700 Survey Unit 1 meets the release criteria of 10CFR20.1402 and the State of Maine enhanced criteria.

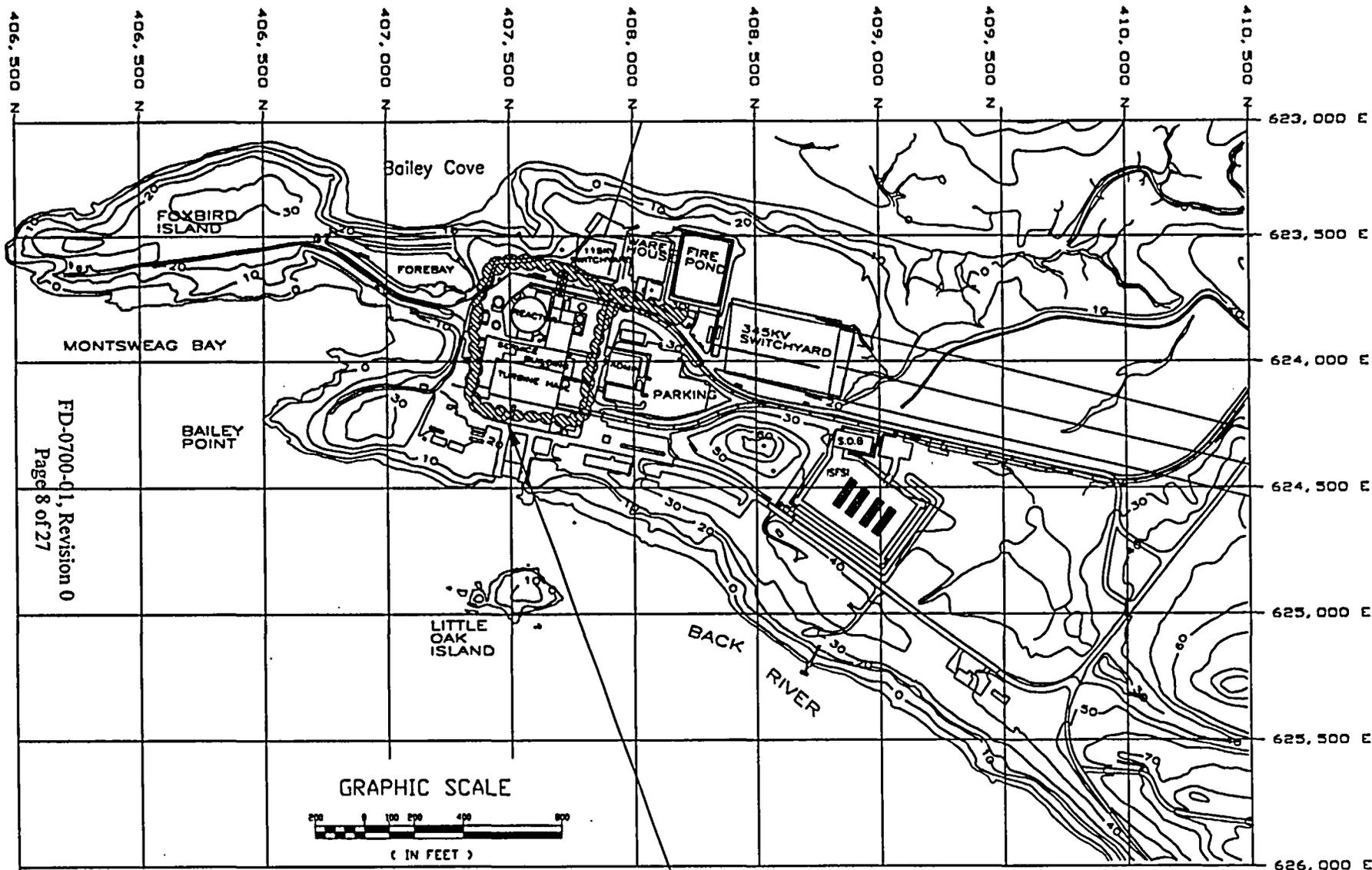
J. REFERENCES

1. Maine Yankee Engineering Calculation, EC-009-01
2. Maine Yankee License Termination Plan, Revision 3 Addenda
3. Maine Yankee letter to the NRC, MN-02-061, dated November 26, 2002
4. NRC letter to Maine Yankee, dated February 28, 2003, Approval of LTP Rev. 3 and Addenda
5. Approach for Dealing with Background Radioactivity for Maine Yankee Final Status Surveys, Attachment E to Maine Yankee Procedure PMP 6.7.8, FSS Data Processing and Reporting

Attachment 1
Survey Unit Maps

Survey Type: Characterization Turnover Final Status Survey

Survey Area Name: Underground Fire Protection Piping



FD-0700-01, Revision 0
Page 8 of 27

SURVEY AREA, FD 0700

Note: Grid based on Maine State Coordinate System
(West Zone) NAD 1927

Survey Type: Characterization Turnover Final Status Survey

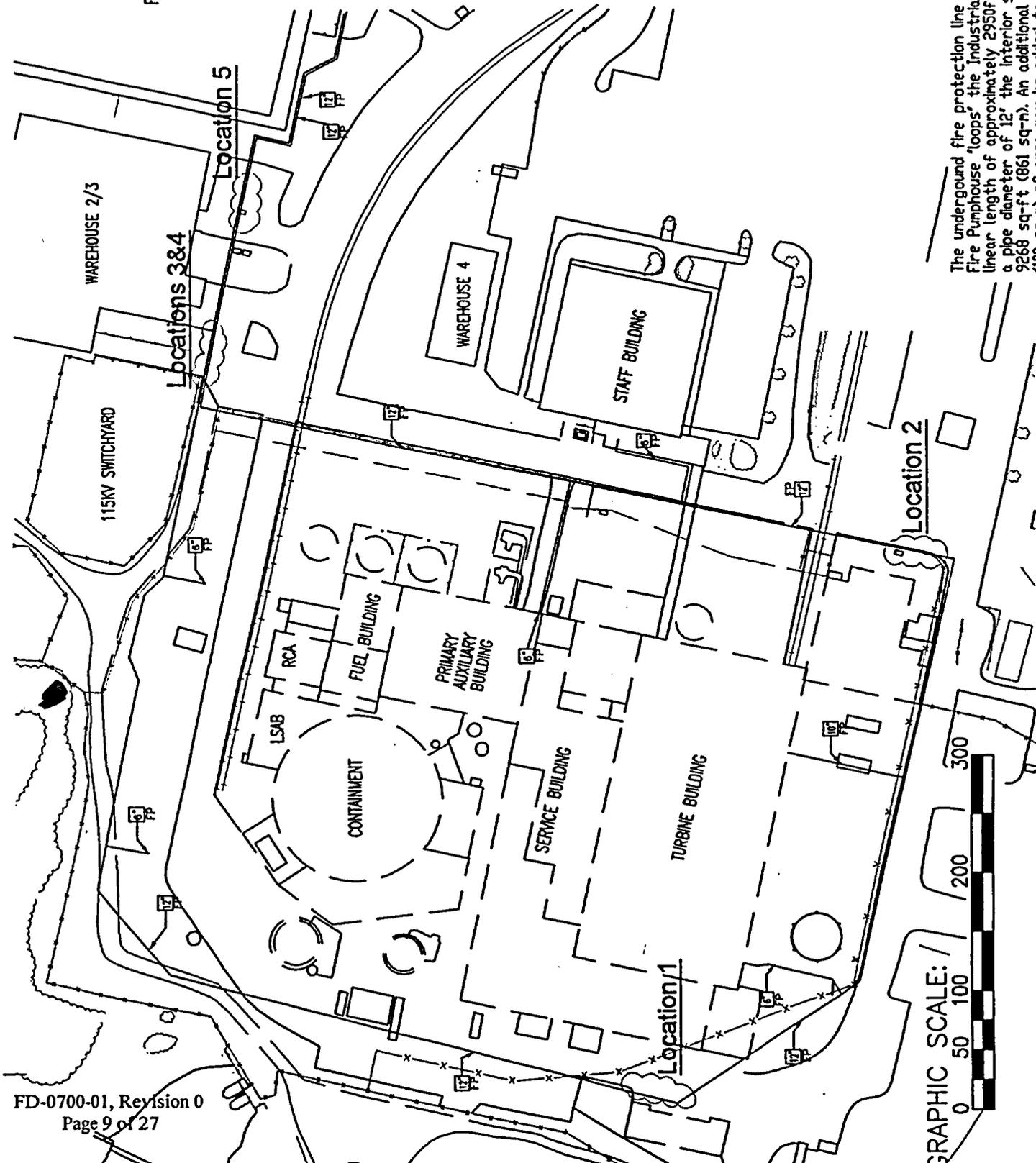
Survey Area Name: Underground Fire Protection Piping

Final Status Survey

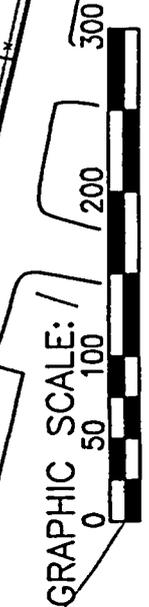
FD0700: Underground Fire Protection Piping Excavation Location Reference



FIRE POND



The underground fire protection line from the former Fire Pump house 'loops' the Industrial Area at a total linear length of approximately 2950ft (899m). Given a pipe diameter of 12" the interior surface area is 9268 sq-ft (861 sq-m). An additional 1075 sq-ft (100 sq-m) of area may be added to account for all branches, abandoned, capped, or otherwise.



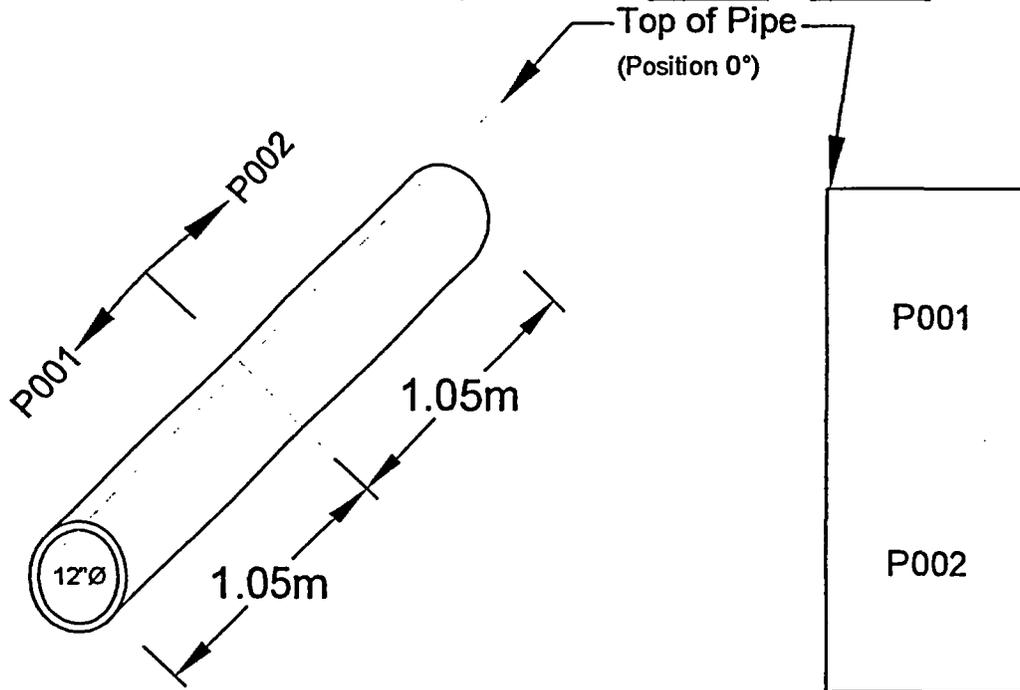
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Survey Area Name: Underground Fire Protection Piping

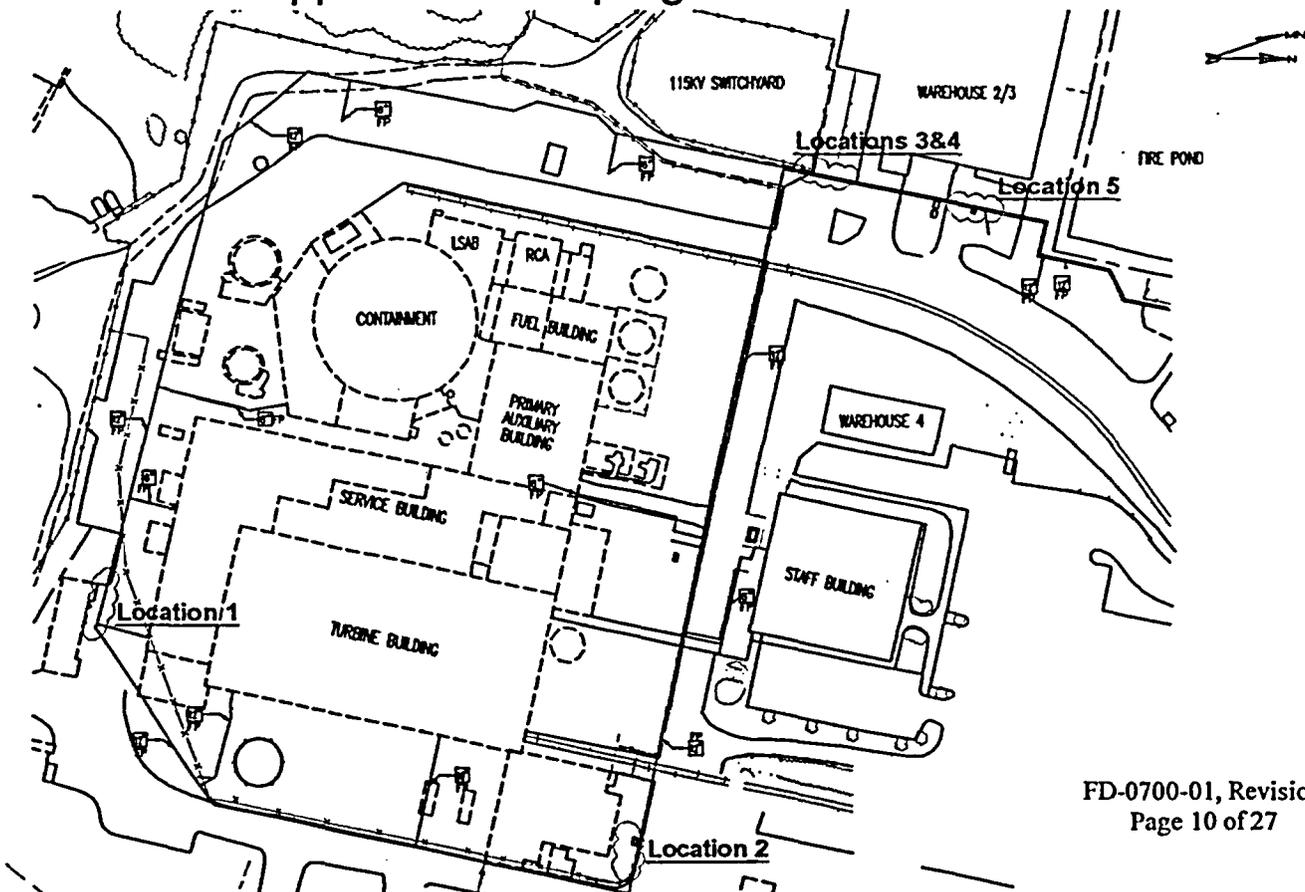
Final Status Survey

FD0700 Underground Fire Protection Piping, Location 1

Survey Scans P001 - P002



Approximate Piping Section Location



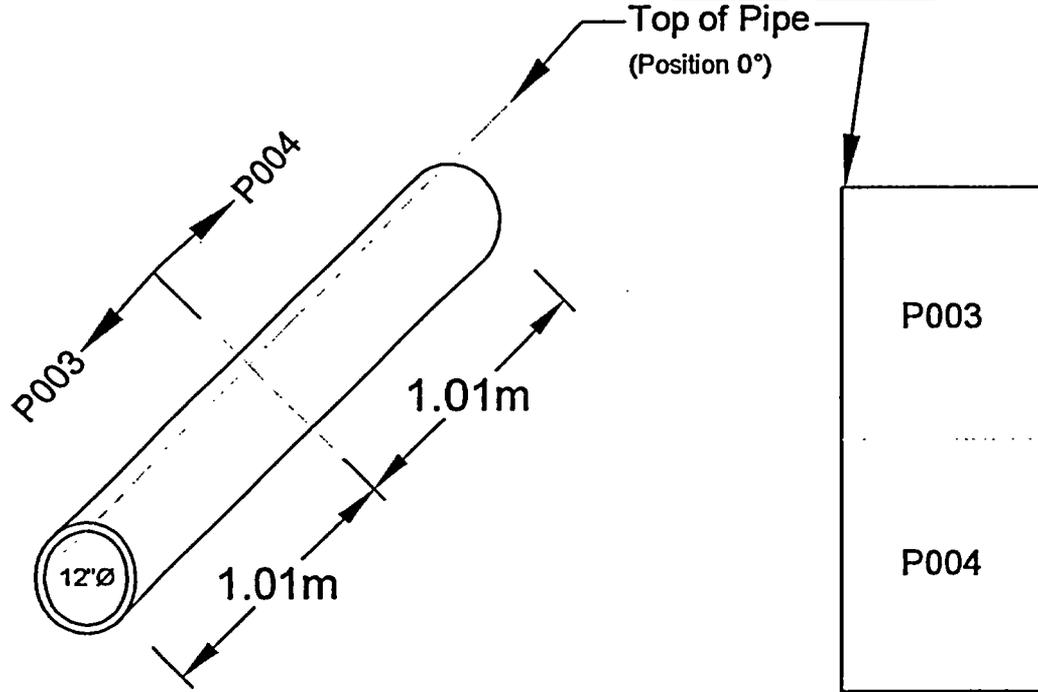
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Survey Area Name: Underground Fire Protection Piping

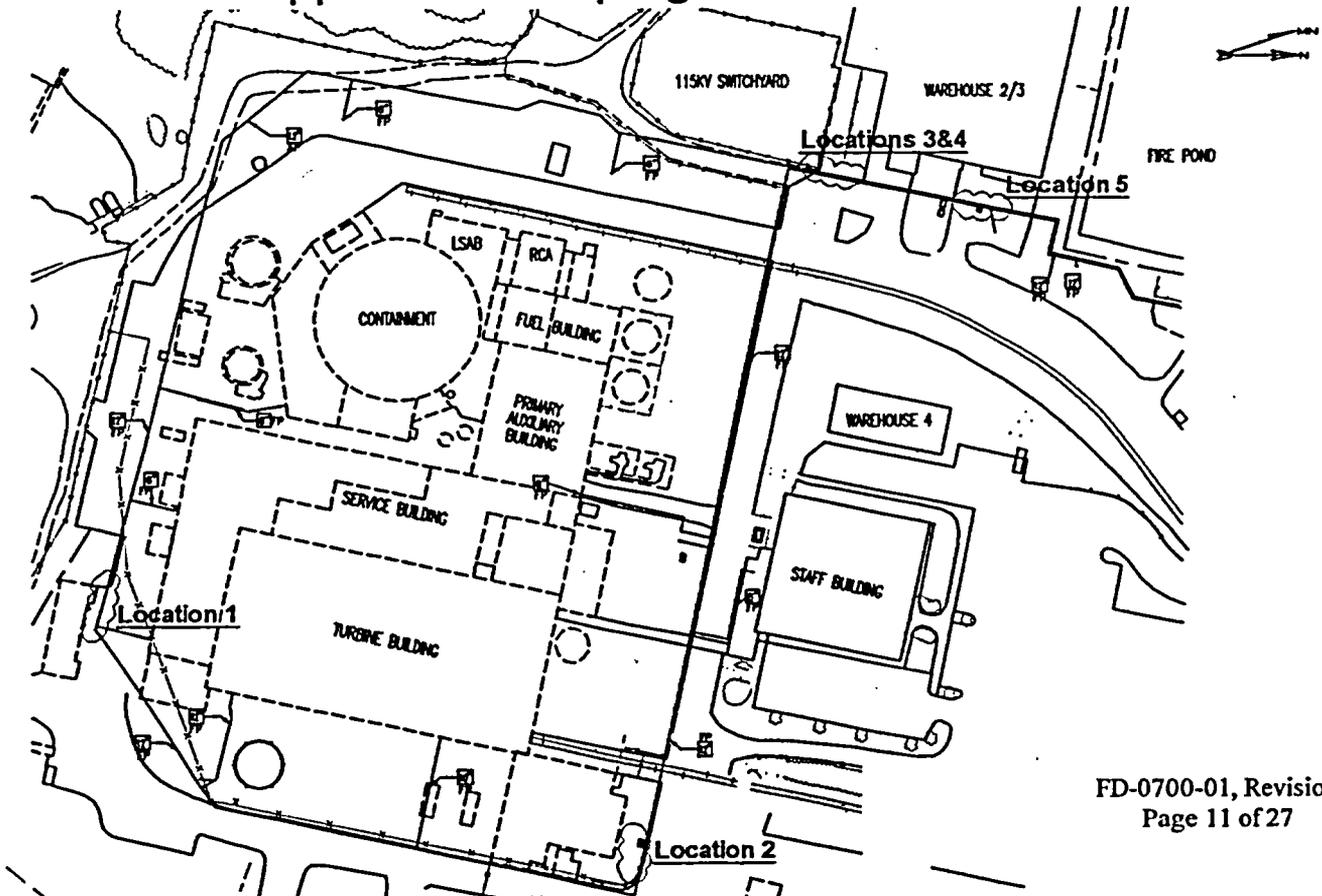
Final Status Survey

FD0700 Underground Fire Protection Piping, Location 2

Survey Scans P003- P004



Approximate Piping Section Location



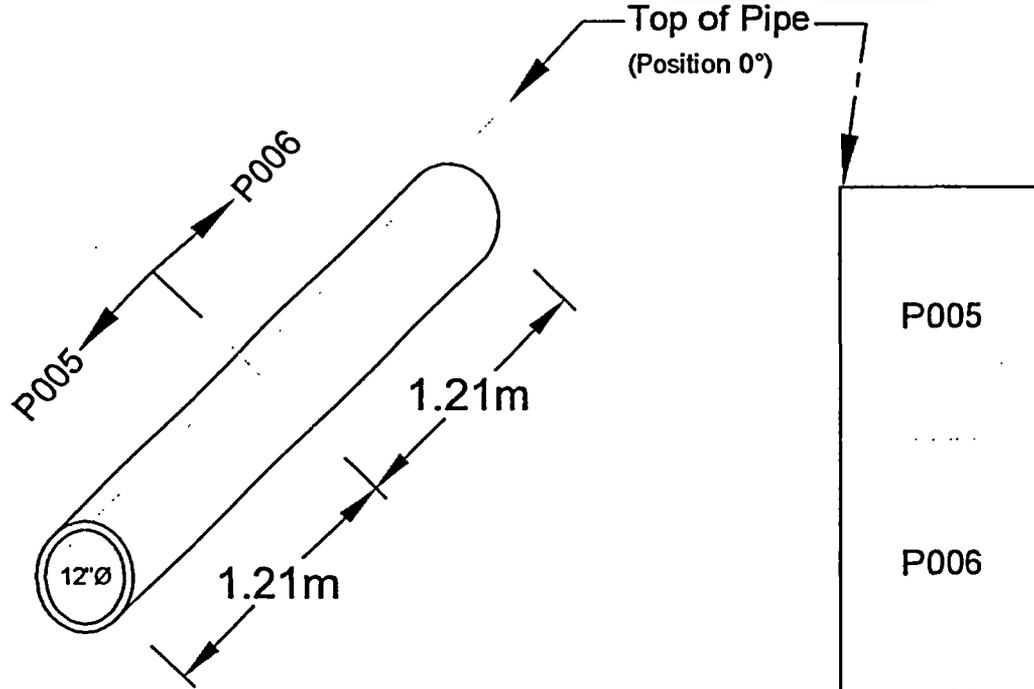
Survey Type: Characterization Turnover Final Status Survey

Survey Area Name: Underground Fire Protection Piping

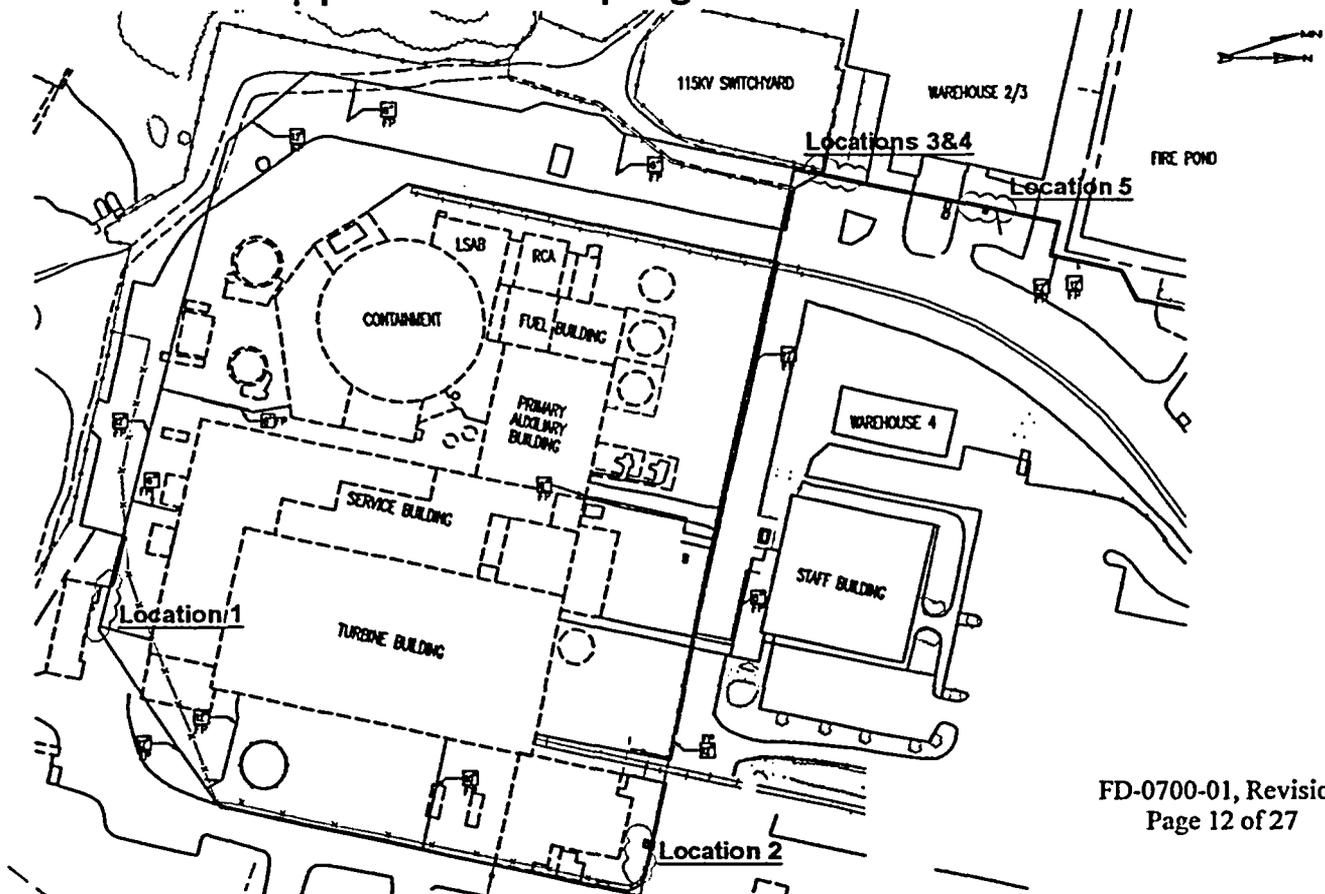
Final Status Survey

FD0700 Underground Fire Protection Piping, Location 3

Survey Scans P005- P006

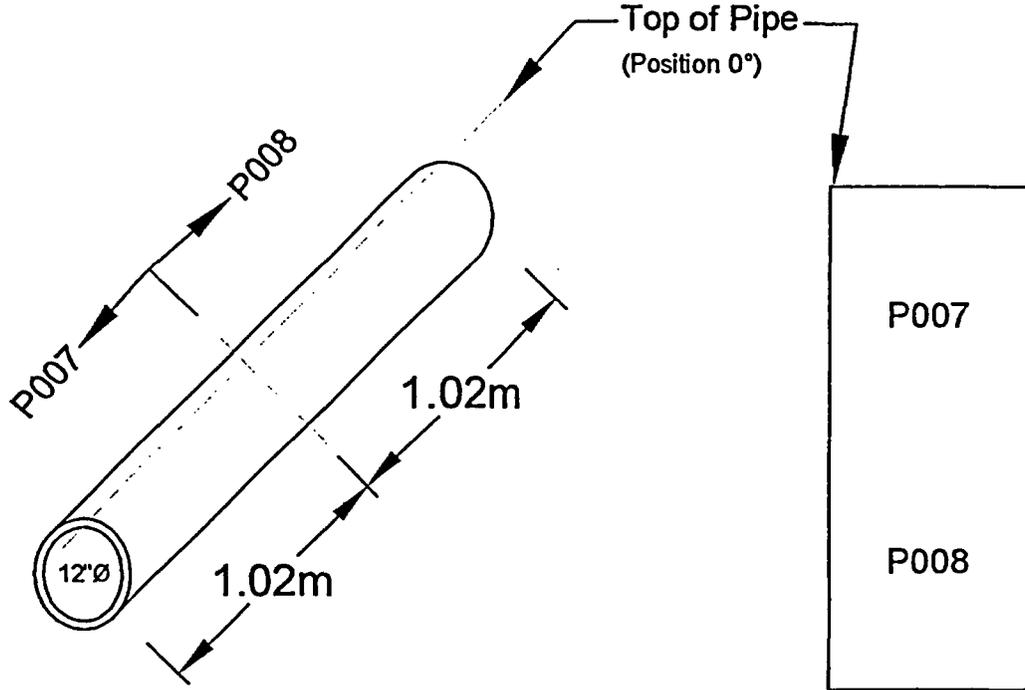


Approximate Piping Section Location

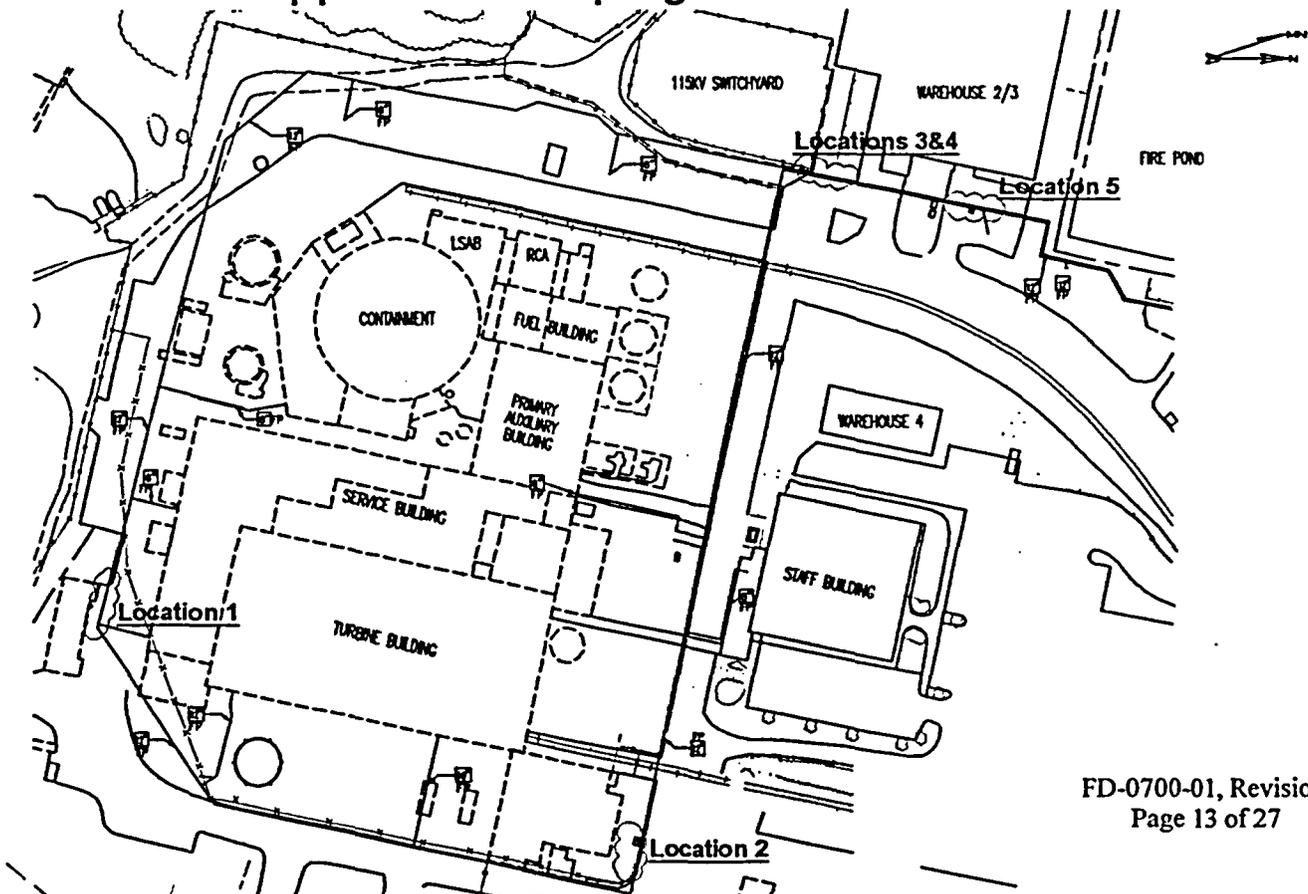


Survey Type: Characterization Turnover Final Status Survey | Survey Area Name: Underground Fire Protection Piping

Final Status Survey FD0700 Underground Fire Protection Piping, Location 4 Survey Scans P007- P008



Approximate Piping Section Location



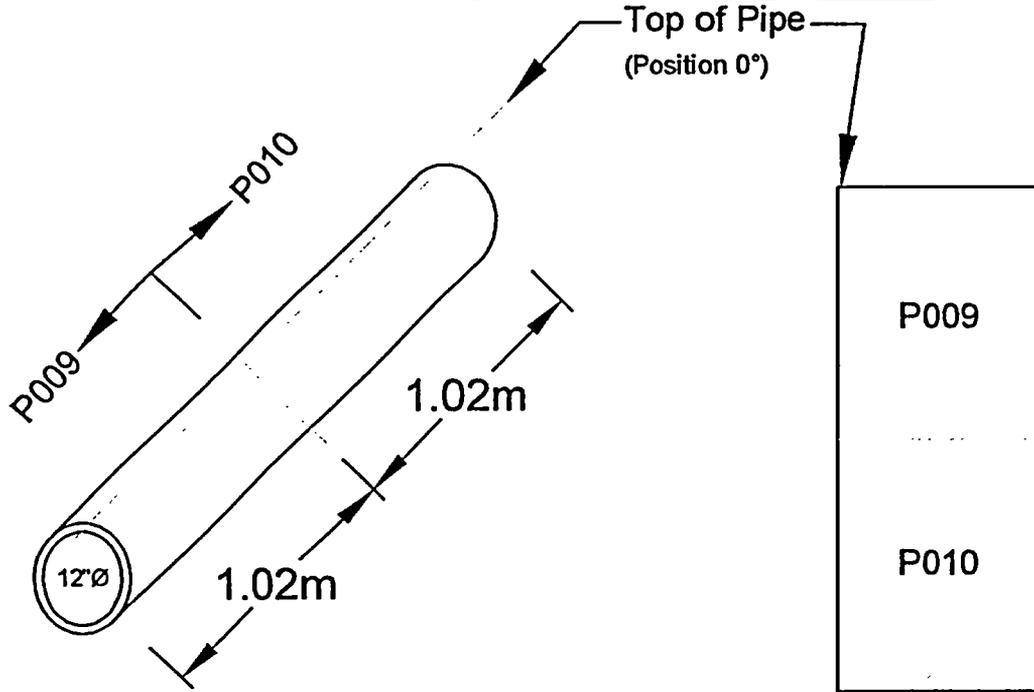
Survey Type: Characterization Turnover Final Status Survey

Survey Area Name: Underground Fire Protection Piping

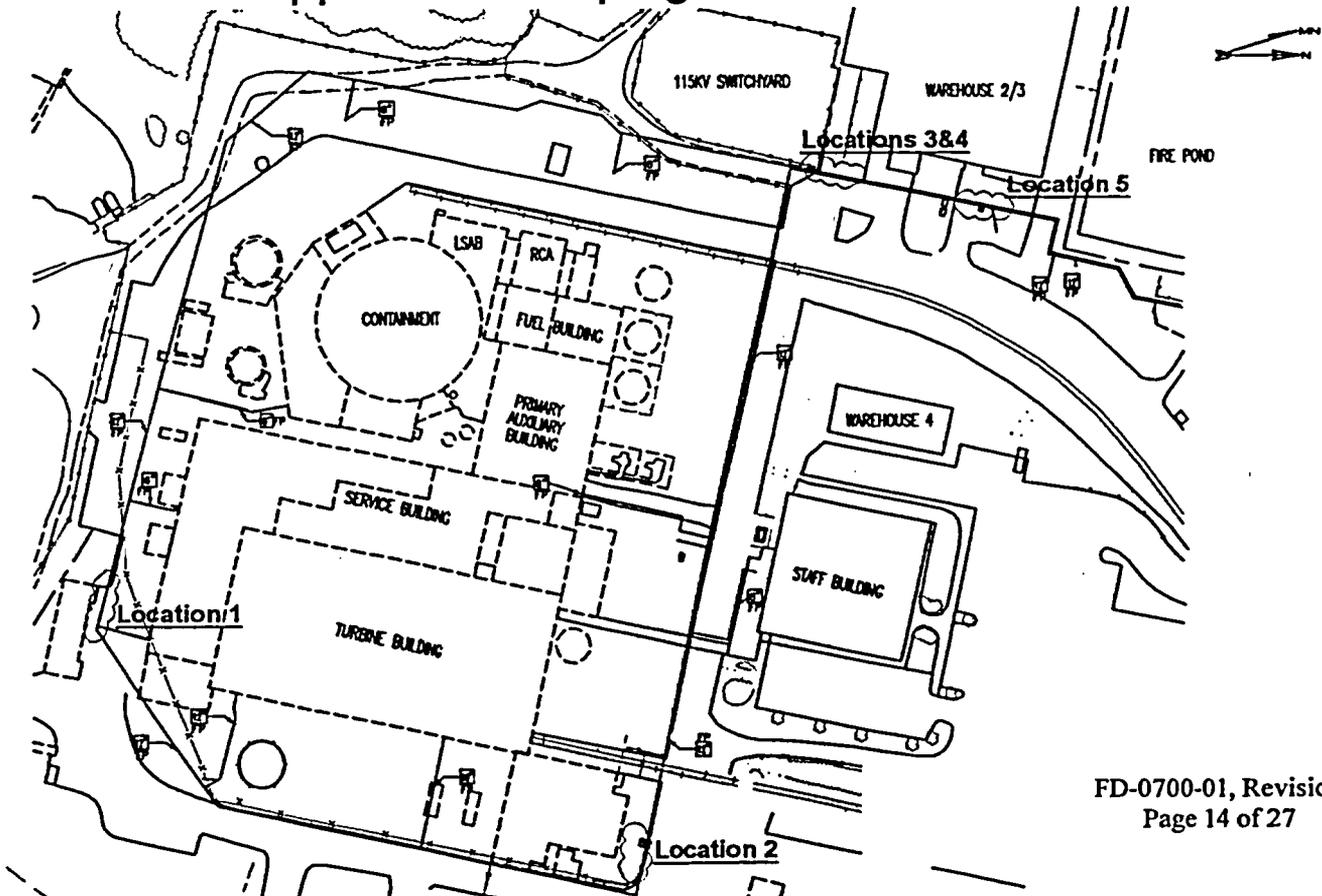
Final Status Survey

FD0700 Underground Fire Protection Piping, Location 5

Survey Scans P009- P010



Approximate Piping Section Location

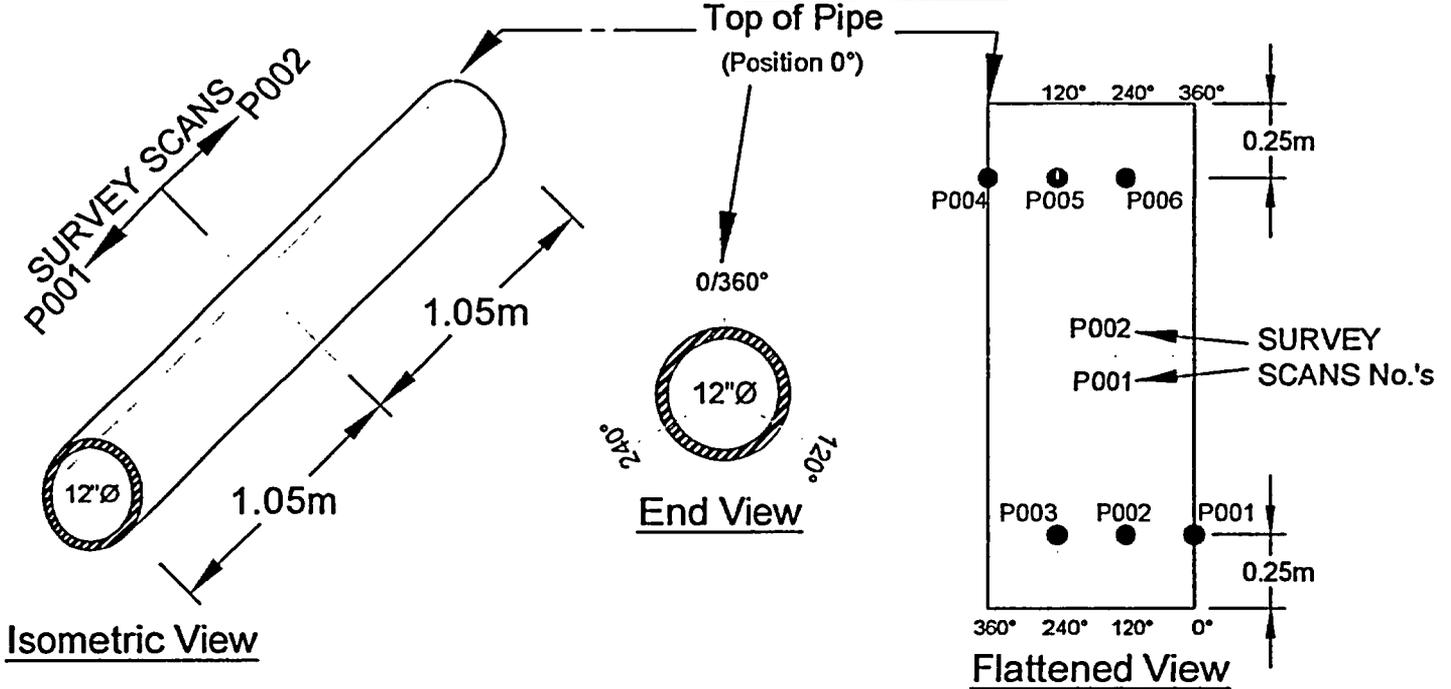


Survey Type: Characterization Turnover Final Status Survey

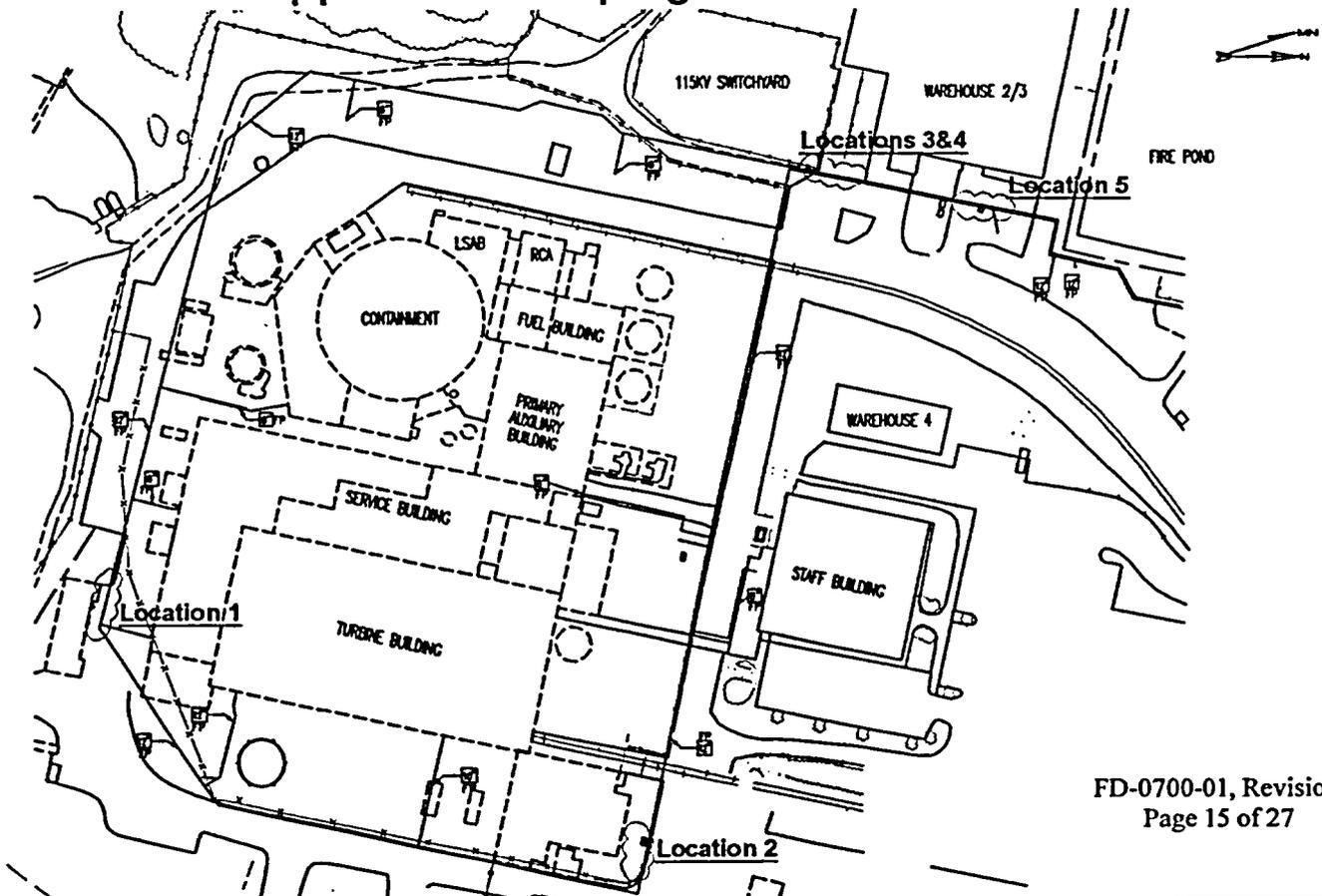
Survey Area Name: Underground Fire Protection Piping

Final Status Survey

FD0700 Underground Fire Protection Piping, Location 1 Direct Points P001- P006



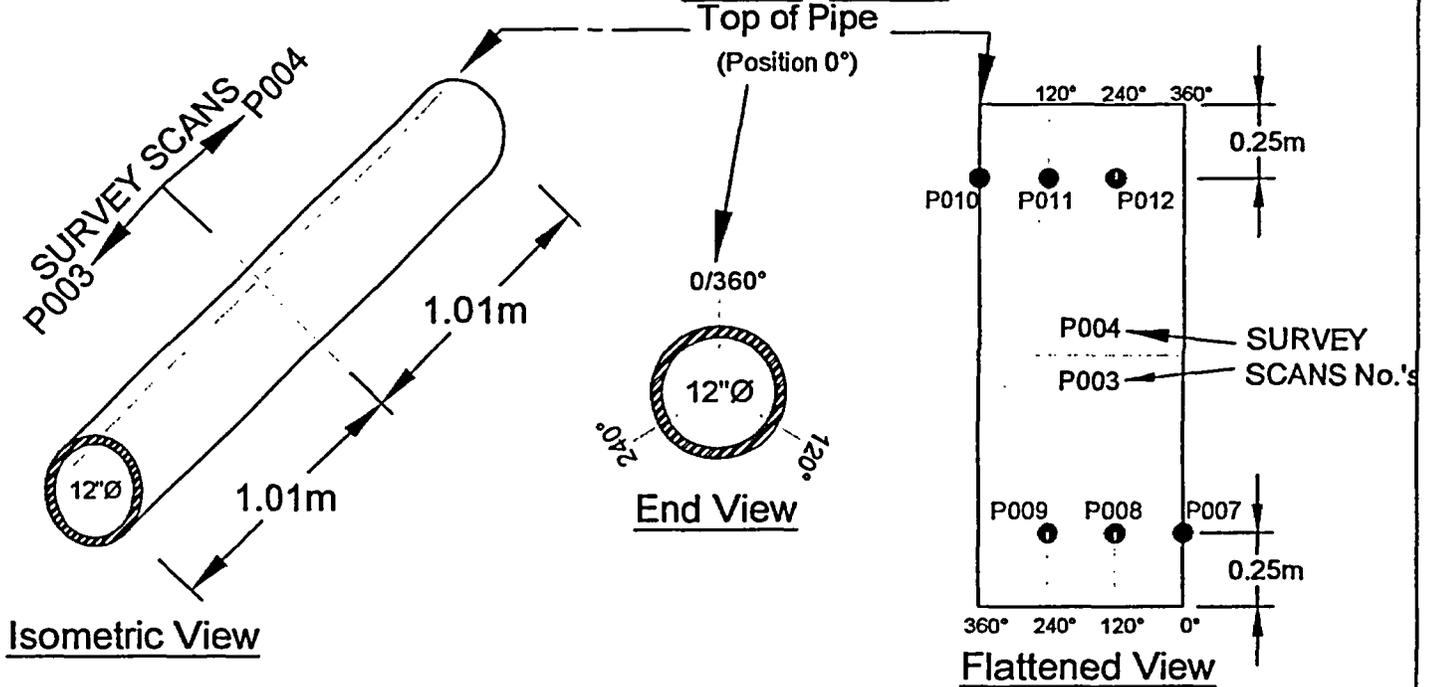
Approximate Piping Section Location



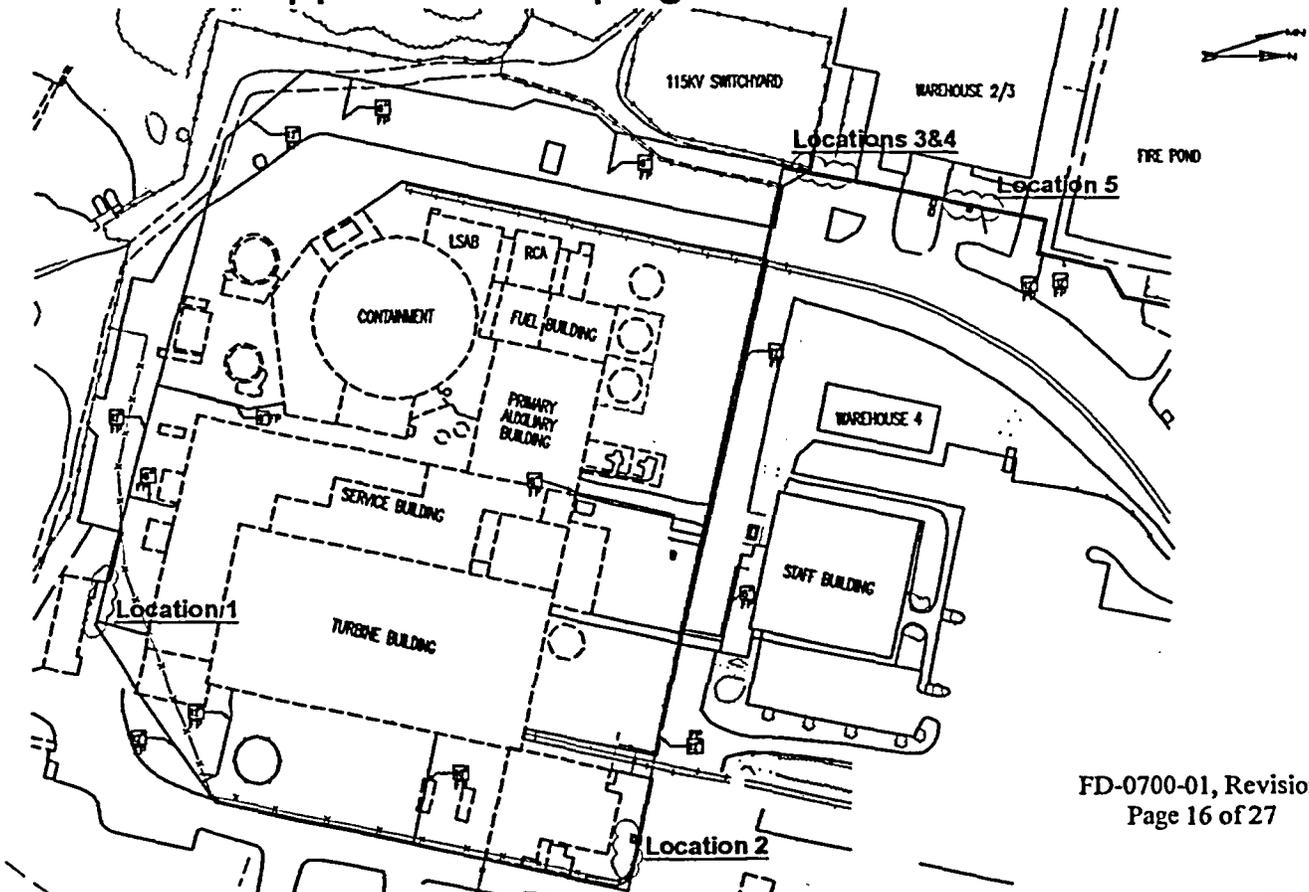
Survey Type: Characterization Turnover Final Status Survey Survey Area Name: Underground Fire Protection Piping

Final Status Survey

FD0700 Underground Fire Protection Piping, Location 2 Direct Points P007- P012



Approximate Piping Section Location



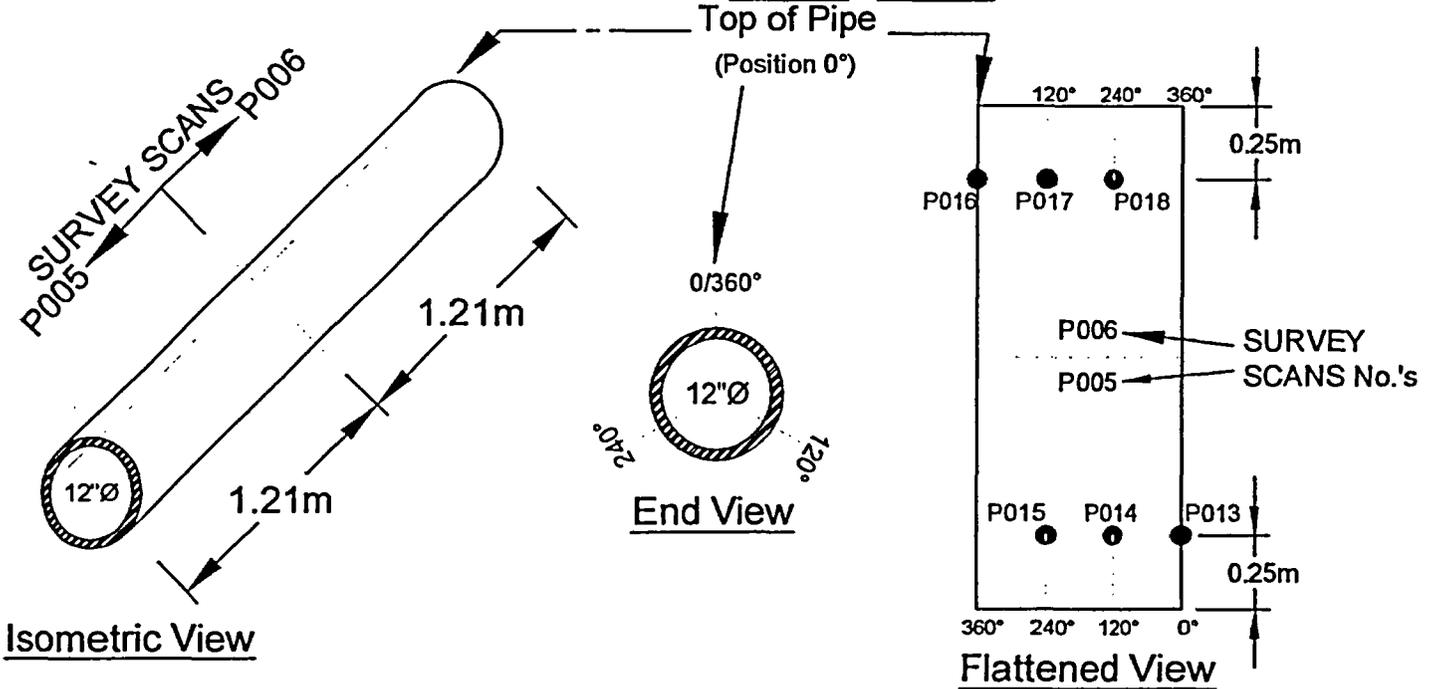
Survey Type: Characterization Turnover Final Status Survey

Survey Area Name: Underground Fire Protection Piping

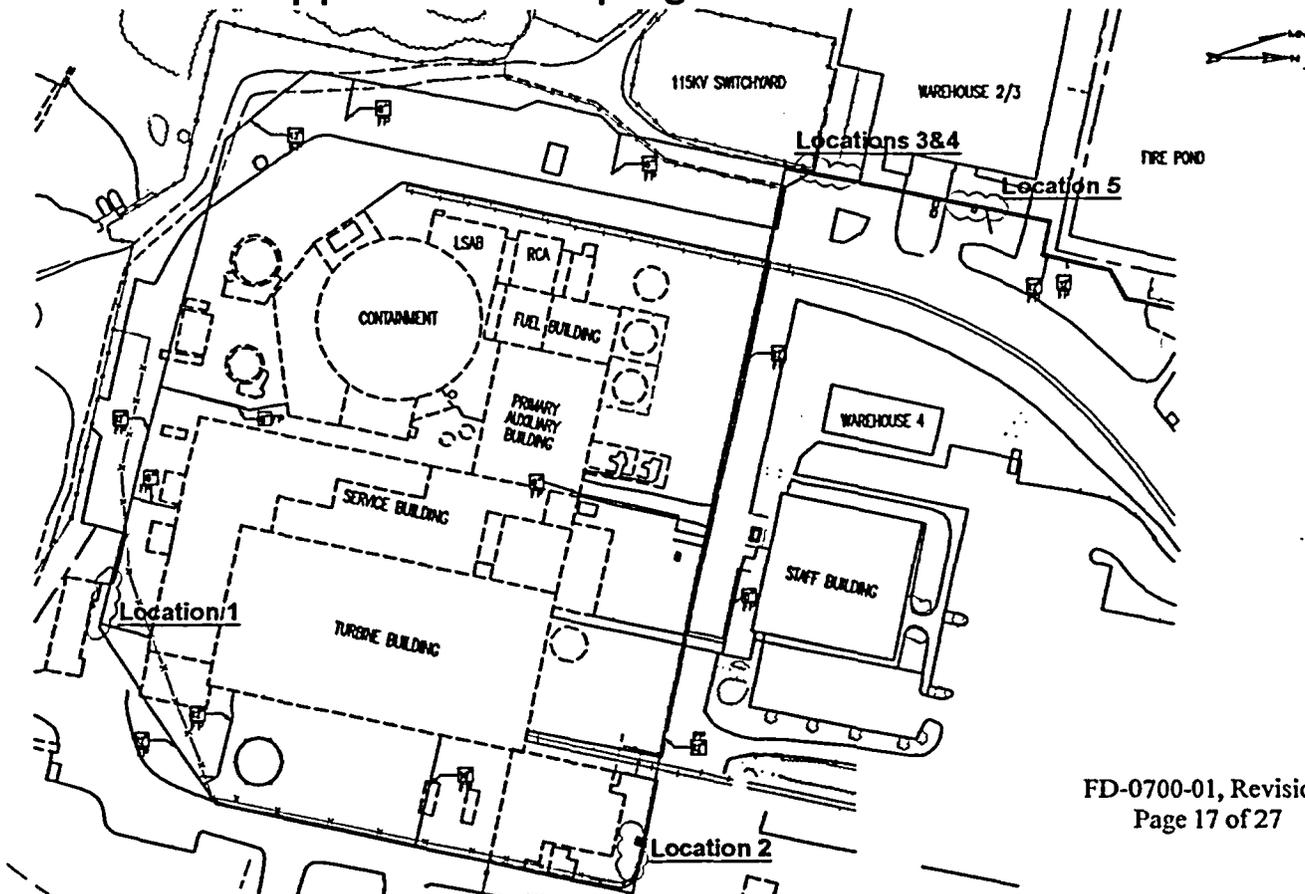
Final Status Survey

FD0700 Underground Fire Protection Piping, Location 3

Direct Points P013- P018



Approximate Piping Section Location



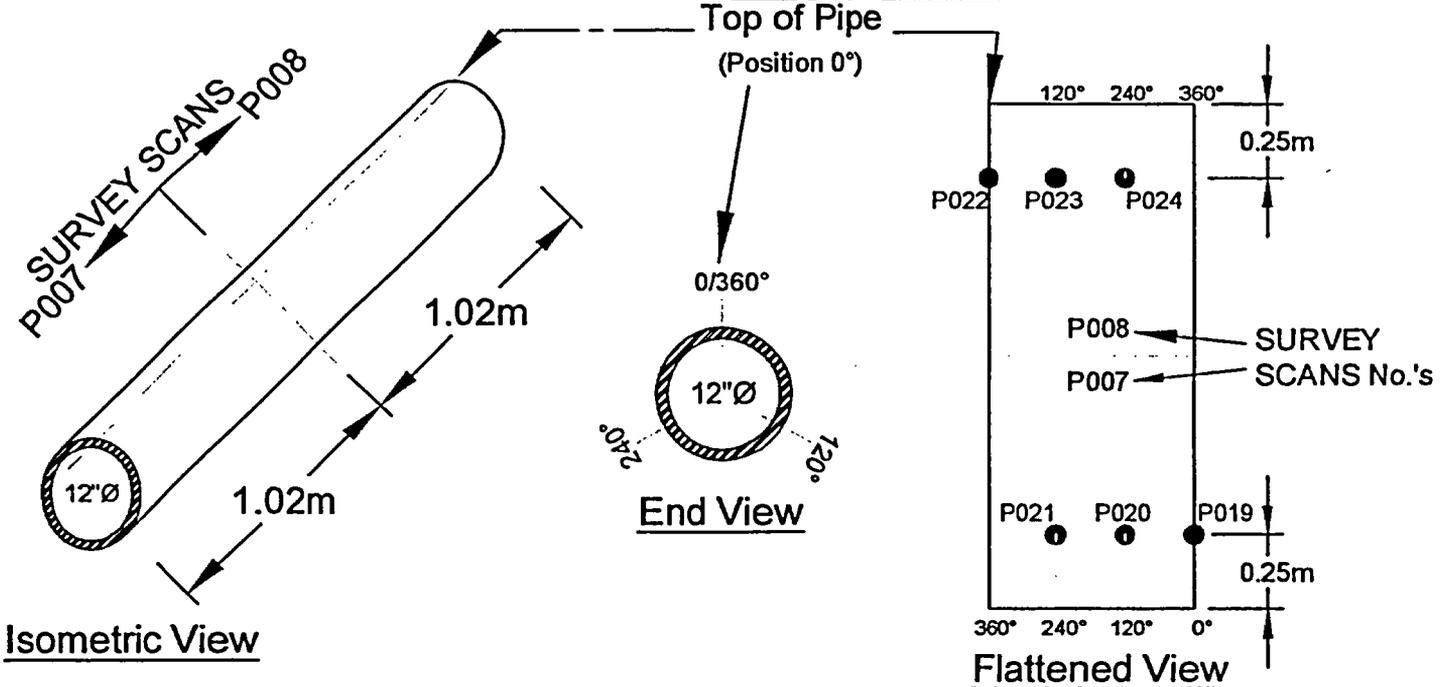
Survey Type: Characterization Turnover Final Status Survey

Survey Area Name: Underground Fire Protection Piping

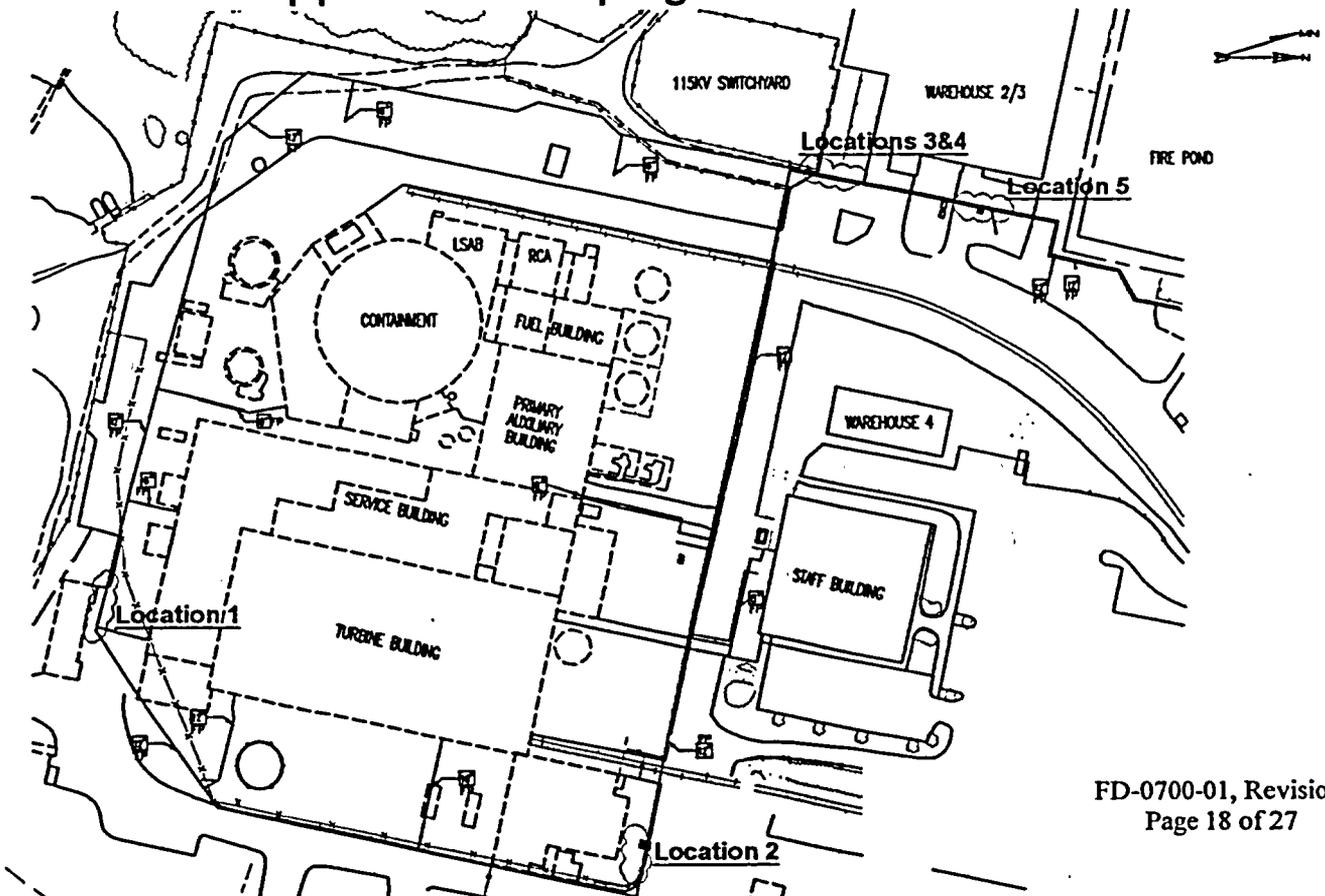
Final Status Survey

FD0700 Underground Fire Protection Piping, Location 4

Direct Points P019- P024



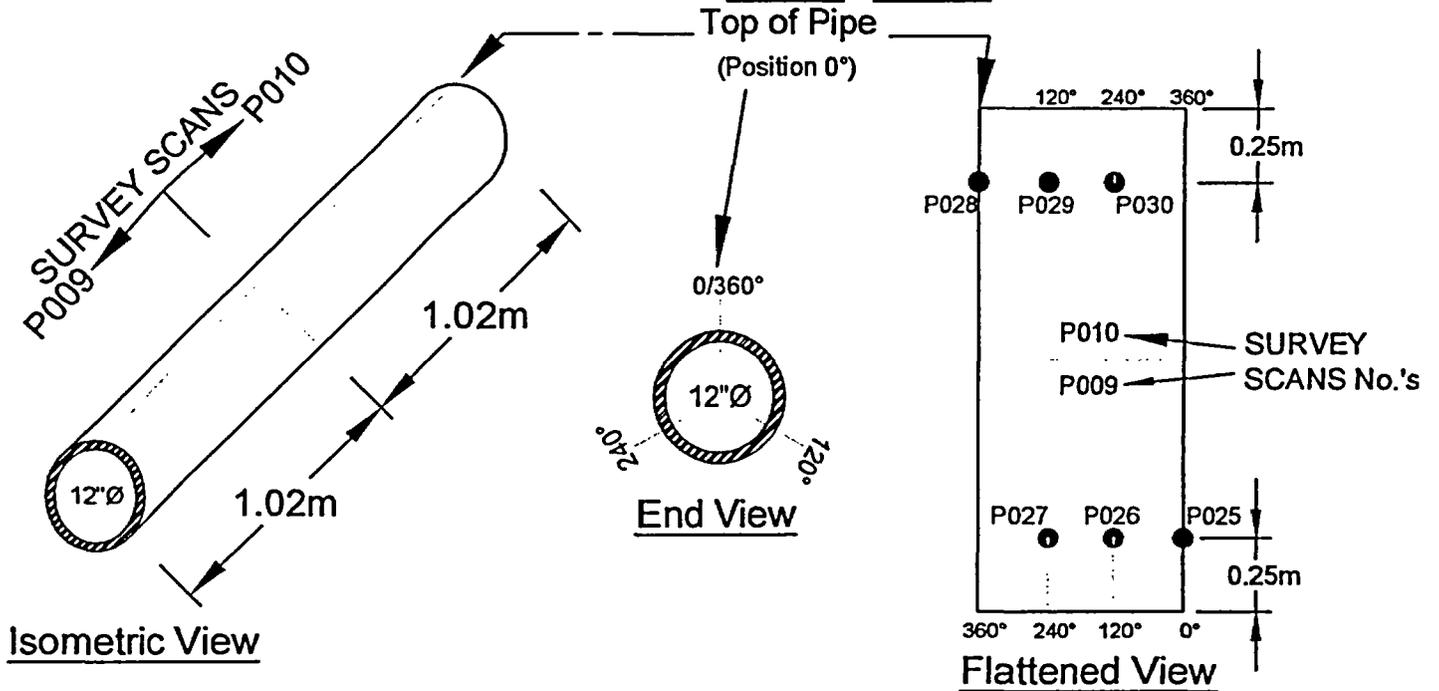
Approximate Piping Section Location



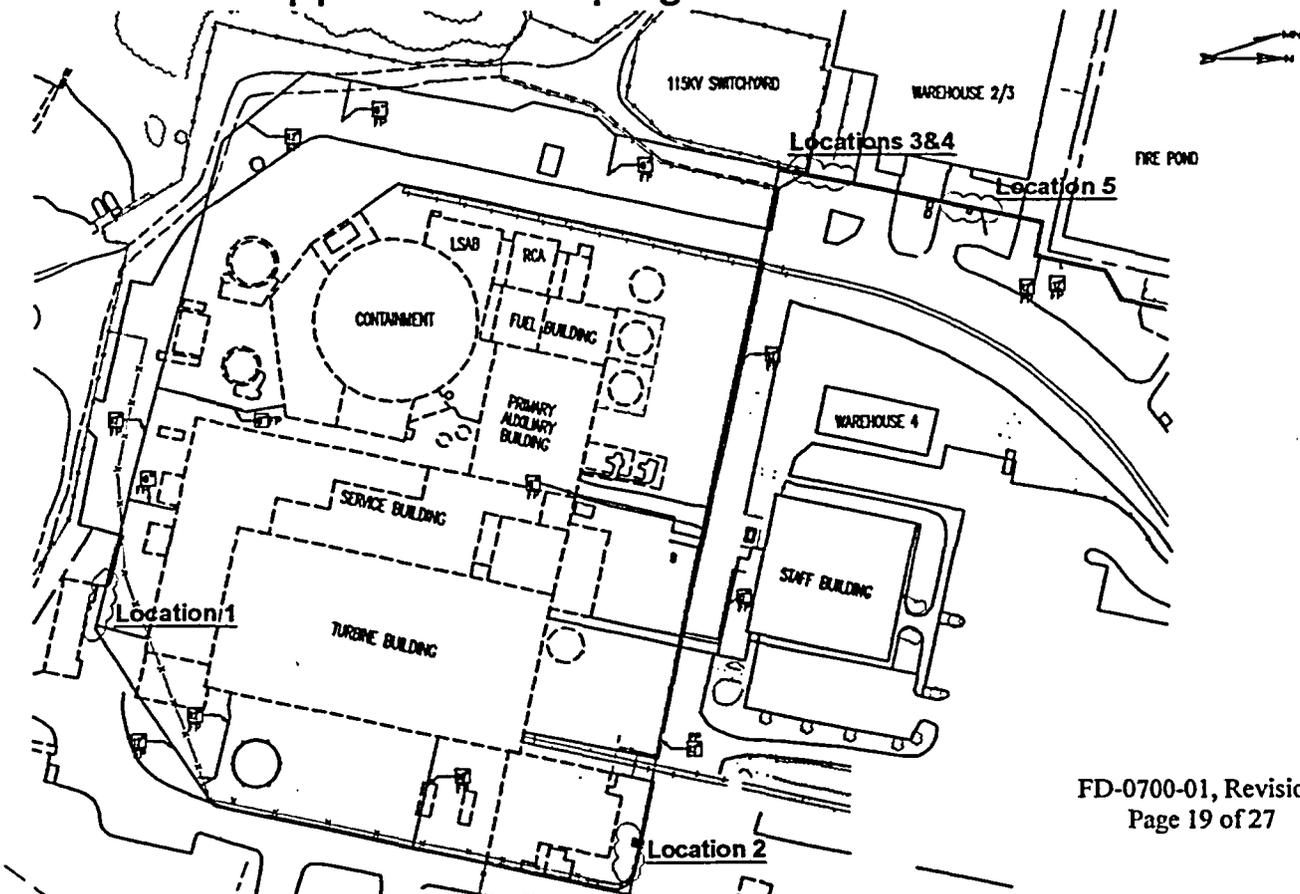
Survey Type: Characterization Turnover Final Status Survey

Survey Area Name: Underground Fire Protection Piping

Final Status Survey FD0700 Underground Fire Protection Piping, Location 5 Direct Points P025- P030



Approximate Piping Section Location



Attachment 2
Survey Unit Instrumentation

TABLE 2-1

INSTRUMENT INFORMATION

E-600 S/N	Probe S/N (type)
2489	177991 (43-68-5)
1645	148939 (43-68)

TABLE 2-2

**INSTRUMENT SCAN MDC, DCGL,
AND INVESTIGATION LEVEL**

Detector	43-68	Comments
Scan MDC (dpm/100 cm ²)	992	Design Scan MDC, LTP Table 5-6 (Reference 2), adjusted for pipe geometry and metal efficiency.*
DCGL (dpm/100 cm ²)	9800	Approved DCGL LTP Section 6.6.8 (Reference 2)
Investigation Level (Alarm Setpoint) (dpm/100 cm ²)	5675	0.5 DCGL plus Background, EC-009-01 (Reference 1)

* $1832 \text{ dpm}/100 \text{ cm}^2 \times (0.13/0.24) = 992 \text{ dpm}/100 \text{ cm}^2$

Attachment 3

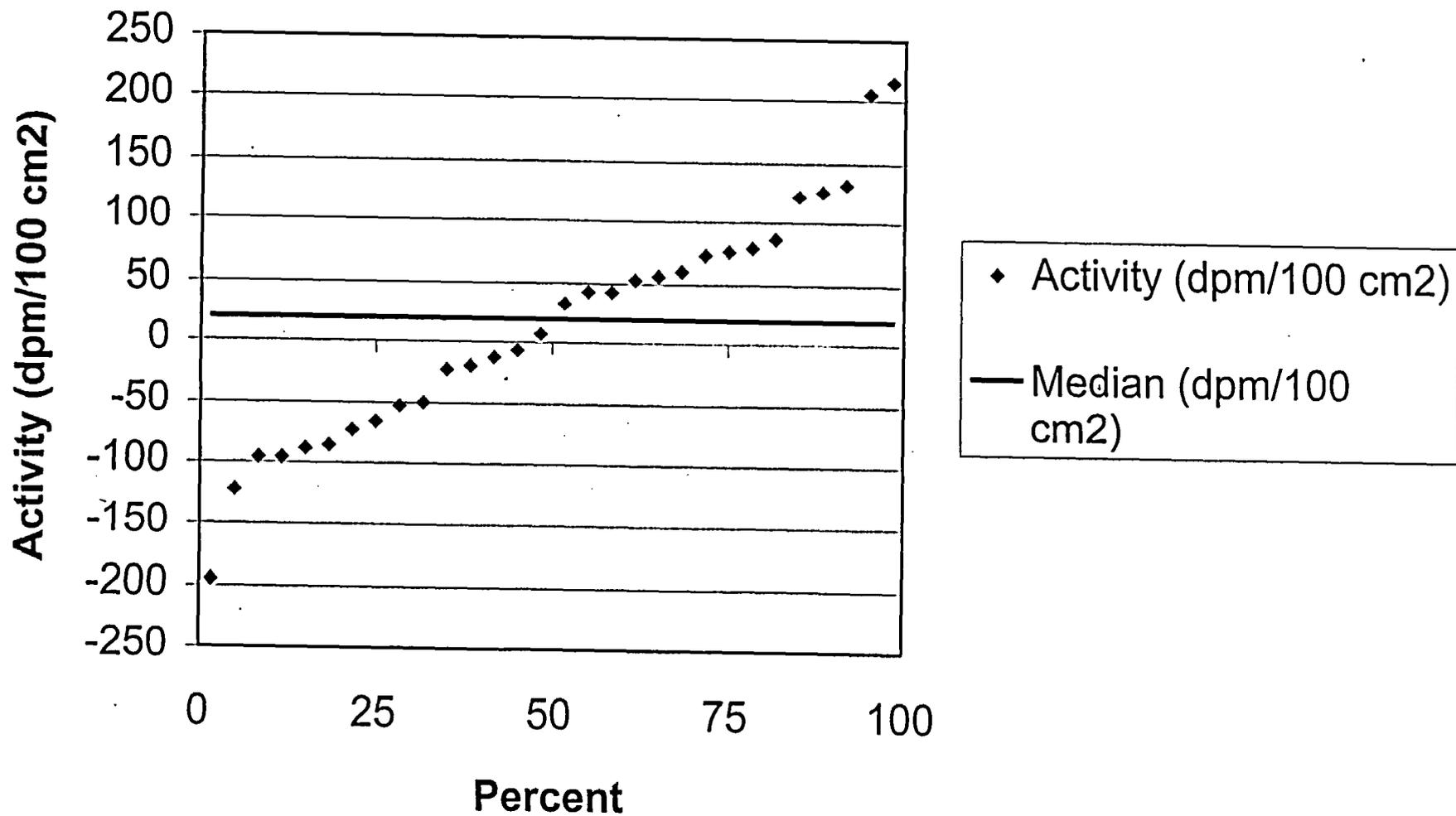
**Investigation Table
(No Investigations Required)**

Attachment 4
Statistical Data

Survey Package FD-0700 Unit 1 Surface Sign Test Summary

Evaluation Input Values		Comments
Survey Package:	FD-0700	Fire System Piping
Survey Unit:	01	
Evaluator:	GP	
DCGL _w :	9,800	
DCGL _{enc} :	N/A	
LBGR:	9,080	
Sigma:	240	From GTS Site Characterization Rpt.
Type I error:	0.05	
Type II error:	0.05	
Total Instrument Efficiency:	24.0%	metal pipe
Detector Area (cm ²):	126	
Material Type:	N/A	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:	3.0	
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:	30	
Median:	20	
Mean:	14	
Net Static Data Standard Deviation:	97	
Total Standard Deviation:	103	SRSS
Maximum:	215	
Sign Test Results		Comments
Adjusted N Value:	30	
S+ Value:	30	
Critical Value:	20	
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 _{enc} :	Pass	N/A for Class 3
Total Standard Deviation <=Sigma:	Pass	
Sign test results:	Pass	
Final Status		Comments
The survey unit passes all conditions:	Pass	The SU passes

FD-0700 SU-1 Quantile Plot



One-Sample T-Test Report

Page/Date/Time 2 2/7/05 5:45:51 AM
Database C:\Program Files\NCSS97\FD0700 SU-1.S0
Variable C2

Plots Section

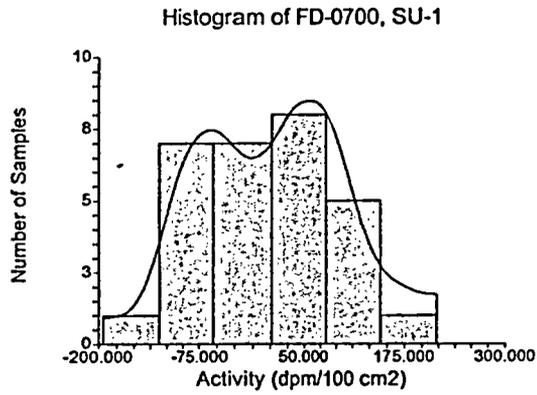


Chart Section

