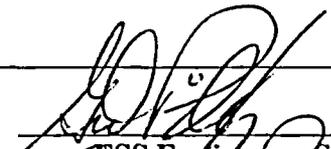
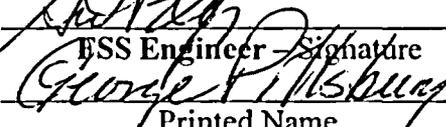
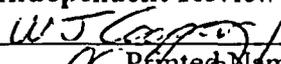
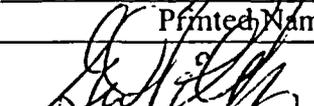
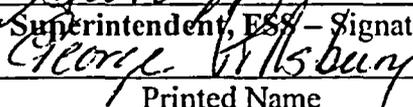
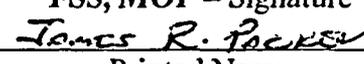


**MAINE YANKEE
FINAL STATUS SURVEY RELEASE RECORD
FR-2000 DIFFUSER
SURVEY UNIT 1**

Prepared By:	 _____ FSS Engineer – Signature  _____ George Pillsbury Printed Name	Date: <u>12/20/04</u>
Reviewed By:	<u>N/A</u> _____ FSS Specialist – Signature _____ Printed Name	Date: _____
Reviewed By:	 _____ Independent Review – Signature  _____ WJ Cooper Printed Name	Date: <u>12/20/04</u>
Approved By:	 _____ Superintendent, FSS – Signature  _____ George Pillsbury Printed Name	Date: <u>12/20/04</u>
Approved By:	 _____ FSS, MOP – Signature  _____ James R. Parker Printed Name	Date: <u>12/22/04</u>

**MAINE YANKEE
FINAL STATUS SURVEY RELEASE RECORD
FR-2000 DIFFUSER
SURVEY UNIT 1**

A. SURVEY UNIT DESCRIPTION

The diffuser consists of the two large diameter, buried pipes which conducted the circulating water from the Forebay to Back River. Two buried 9-foot diameter fiberglass pipes run the length of Foxbird Island then transition to the two submerged, multiport diffusers anchored to the floor of the river at a depth of approximately 20 feet. The diffuser inlet is located at Maine state grid coordinates 623,500 E and 406,750 N as shown on attached map FR 2000 SITE. The diffuser has an interior sediment-filled volume of 4,422 m³, an interior surface area of 6,680 m², and a combined length for the two pipes of 775 meters. The survey unit is a combination of the residual activity residing in the sediment and on the interior pipe surface. The diffuser details are shown on map diffuser.dgn in Attachment 1.

B. SURVEY UNIT DESIGN INFORMATION

While the other portions of the Forebay/Diffuser System (viz., the seal pit, Forebay floor, and Forebay dike walls) could be accessed for direct sampling or measurement, the diffuser pipes could only be accessed by underwater diver. Access was limited to the small access ports in the diffuser legs. There was no other opening or escape path which made the diffuser a very hazardous confined space.

The Maine Yankee License Termination Plan (Revision 3) described in detail the characterization survey results for the Forebay/diffuser. The residual radioactivity levels were extremely low and the anticipated dose to the resident farmer was calculated to be insignificant for this system when compared to the other contaminated media which were evaluated in the LTP. Because of the low dose significance and the large amount of survey data existing, a limited FSS plan was proposed for the Forebay/diffuser system based on the relative residual activity within any given portion. The survey unit was designated a Class 3 area.

During plant operation, circulating water flowed from the condensers to the seal pit, through the Forebay, and then into the diffuser prior to discharge into Back River. The pattern of water flow meant the highest concentrations of radioactivity discharged would be located in the seal pit, followed by the Forebay, with the diffuser seeing the very lowest activity. (Circulating water flows were in excess of 400,000 gpm when the plant was producing power. These flow rates kept the diffuser pipes scoured clean as reported by divers conducting maintenance inspections.) The characterization sample results as reported in Section 2 (Attachment 2B, Table 2B-5) of the LTP, confirm this pattern of deposition. The average activity of five sediment samples taken at the diffuser discharge were 0.1 pCi/g Co-60 and 0.1 pCi/g Cs-137. These samples were obtained in the proximity of the diffuser not inside it.

The LTP (Section 6.6.9) evaluated several Forebay/diffuser scenarios with possible dose consequences to the resident farmer. The limiting scenario was the basement excavation scenario in which the farmer removed soil from the Forebay dike walls in order to pour a foundation for his house.

The highest activity Forebay samples were collected from the seal pit floor or the Forebay floor area adjacent to the seal pit (average values of 19 pCi/g with maximum activity of 445 pCi/g). Samples taken from the Forebay, including the sediment trapped among the rip-rap, showed an average of almost 20 pCi/g Co-60 activity with maximum values up to 93 pCi/g. The annual dose contribution was determined to be less than, and bounded by, the surface soil dose of 5.63 mrem/y (LTP Section 6.6.9). In addition, the Forebay was isolated from the diffuser by inserting the stop-logs prior to beginning Forebay remediation to prevent migration of activity from the Forebay to the diffuser.

The diffuser survey plan consisted of collecting several core samples from the diffuser pipes and analyzing them for interior surface activity. In addition, an attempt would be made to collect sediment samples from both the north and south pipe legs if at all possible to do in a safe manner. The number of samples collected was a function of what could be safely obtained rather than a MARSSIM designed Class 3 survey. Likewise, the samples were collected at safely accessible locations rather than at randomly determined locations or at fixed grid points. As a result, thirteen pipe samples were obtained and two sediment samples were collected for analysis. No scan type surveys could be performed under these circumstances. However given the very low activity levels, there was little or no risk of any significant elevated areas.

TABLE 1
SURVEY UNIT DESIGN PARAMETERS

Survey unit	Design Criteria	Basis
Area	6,680 m ²	Interior surface area
Number of Direct Measurements Required	N/A	Reported results for 13 pipe samples and 2 sediment samples
Sample Area	N/A	Sample locations were determined by divers
Sample Grid Spacing	N/A	
Scan Grid Area	N/A	No scans performed-area inaccessible
Area Factor	N/A	No scans performed-area inaccessible
Scan Survey Area	N/A	No scans performed-area inaccessible
Background		No scans performed-area inaccessible
Scan Investigation Level	N/A	No scans performed-area inaccessible
DCGL ¹	4.78 pCi/g Co-60 18.7 pCi/g Cs-137	Based on 10 mrem/y / 0.078 mrem/y for 0.15 pCi/g Cs-137 Based on 10 mrem/y / 2.3 mrem/y for 1.1 pCi/g Co-60.
Design DCGL _{EMC}	N/A	

¹ Retrospective DCGL based Table 2A results and sediment dose derived in Reference 2.

C. SURVEY RESULTS

When the diffuser samples and coupons were obtained, circulating water flow had been terminated and the divers reported that the diffuser was rapidly being backfilled with marine sediment from the bay to the point where future access was questionable and unsafe. The mean activity of the final, accessible sediment samples collected was 1.13 pCi/g Co-60 and 1.49E-1 pCi/g Cs-137 with no HTDs observed. The standard deviation of the diffuser interior sediment samples (Table 2A) was 0.04 pCi/g for Cs-137 and 0.33 pCi/g for Co-60. Thirteen coupons of diffuser pipe material were removed by the divers (11 samples from the north and south discharge legs and one each from the north and south inlet pipes) and analyzed for residual contamination (Table 2B). The coupons averaged 0.144 pCi/g Co-60 with no positively detected Cs-137 residual activity. The standard deviation of the pipe activity was 0.041 pCi/g for Co-60.

TABLE 2A
SEDIMENTS SAMPLES

Sample Number	Co-60 (pCi/g)	Cs-137 (pCi/g)
North Leg	8.63E-1 + 4.50E-2	1.88E-1 + 9.50E-3
South Leg	1.36E0 + 9.13E-2	1.12E-1 + 4.91E-2
Mean	1.13E0	1.50E-1
Median	1.13E0	1.50E-1
Standard Deviation	3.31E-1	3.94E-2
Range	8.93E-1 to 1.36E0	1.67E-1 to 1.12E-1

TABLE 2B
DIFFUSER PIPE SAMPLES

Soil Sample Number	Co-60 (pCi/g)
S-001N	< 1.64E-1
S-001S	1.42E-1 + 6.24E-2
S-006N	2.04E-1 + 9.63E-2
S-006S	1.39E-1 + 5.62E-2
S-010S	1.81E-1 + 5.94E-2
S-013N	< 2.11E-1
S-013S	1.22E-1 + 4.66E-2
S-016N	< 8.81E-2
S-016S	< 1.12E-1
S-019N	< 1.16E-1
S-019S	1.84E-1 + 4.84E-2
S-Dif N	9.83E-2 + 3.85E-2
S-Dif S	1.17E-1 + 3.20E-2
Mean	1.44E-1
Median	1.39E-1
Standard Deviation	4.05E-2
Range	8.81E-2 to 2.11E-1

Cs-137 was analyzed at an MDA of $\leq 2E-1$ pCi/g with no positive detects.

D. SURVEY UNIT INVESTIGATIONS PERFORMED AND RESULTS

There were no scan surveys and no investigations performed.

E. SURVEY UNIT DATA ASSESSMENT

The annual dose rate for the diffuser was determined to be 2.4 mrem/y (Reference 2) with more than 99% of the dose resulting from the entrained sediment activity. DCGLs are estimated (see Table 1) to be 4.8 pCi/g Co-60 and 18.7 pCi/g Cs-137. Mean activities in the diffuser are less than 25% of these derived DCGLs.

The diffuser pipes remain closed at the Forebay end by the stop logs and Forebay backfill material and are believed to be nearly completely filled with sediment throughout the submerged portions which precludes access by an underwater intruder. Further entry into the diffuser pipes is not practical and poses a safety hazard to divers attempting such an entry. Consideration was given to removal of the underwater portions of the diffuser pipes but the plan was discounted due to the potential environmental impact of the release of large quantities of marine sediment and the high cost of the underwater demolition work.

F. ADDITIONAL DATA EVALUATION

Because this survey was not designed to the MARSSIM criteria, there is no Sign Test or other statistical evaluation associated with this survey.

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

At the time of License Termination Plan preparation, no actual samples had been collected from inside the diffuser. Samples had been taken around the discharge of the diffuser. The diffuser was classified as a Class 3 area based on its being part of the liquid effluent discharge pathway without any sample data to substantiate its classification. Since that time considerable sample data has been collected in the Forebay and the diffuser. The results of the subsequent surveys have been incorporated into the LTP (Reference 1).

The diffuser sediment mean residual activity levels have been determined to be approximately 25% of the derived DCGL value and could result in annual dose rates of less than 2.4 mrem. The residual diffuser pipe surface activity levels have been determined to be approximately 1% of the total pipe activity and could contribute less than 0.03 mrem per year to the resident farmer if released and deposited on Bailey Cove along with the sediment. Based on sample results and expected dose contributions, further measurements and/or remediation of the diffuser are unwarranted and pose both a personnel safety and an environmental concern.

H. CONCLUSION

As stated in Section 6.6.9 of Revision 3 of the LTP, "since the dose is negligible and the activity would likely be contained in the diffuser for sufficient time for substantial decay of dose significant nuclides, any further survey measurements of the diffuser will be limited". The dose contribution of the diffuser has been calculated to less than 25% of the annual dose limit to the resident farmer when extremely conservative dose pathways and existing sample data are considered. Furthermore, the Table 2A and Table 2B sample results confirm the decision not to perform diffuser removal or remediation. FR-2000 meets the release criteria of 10CFR20.1402 and the State of Maine enhanced criteria.

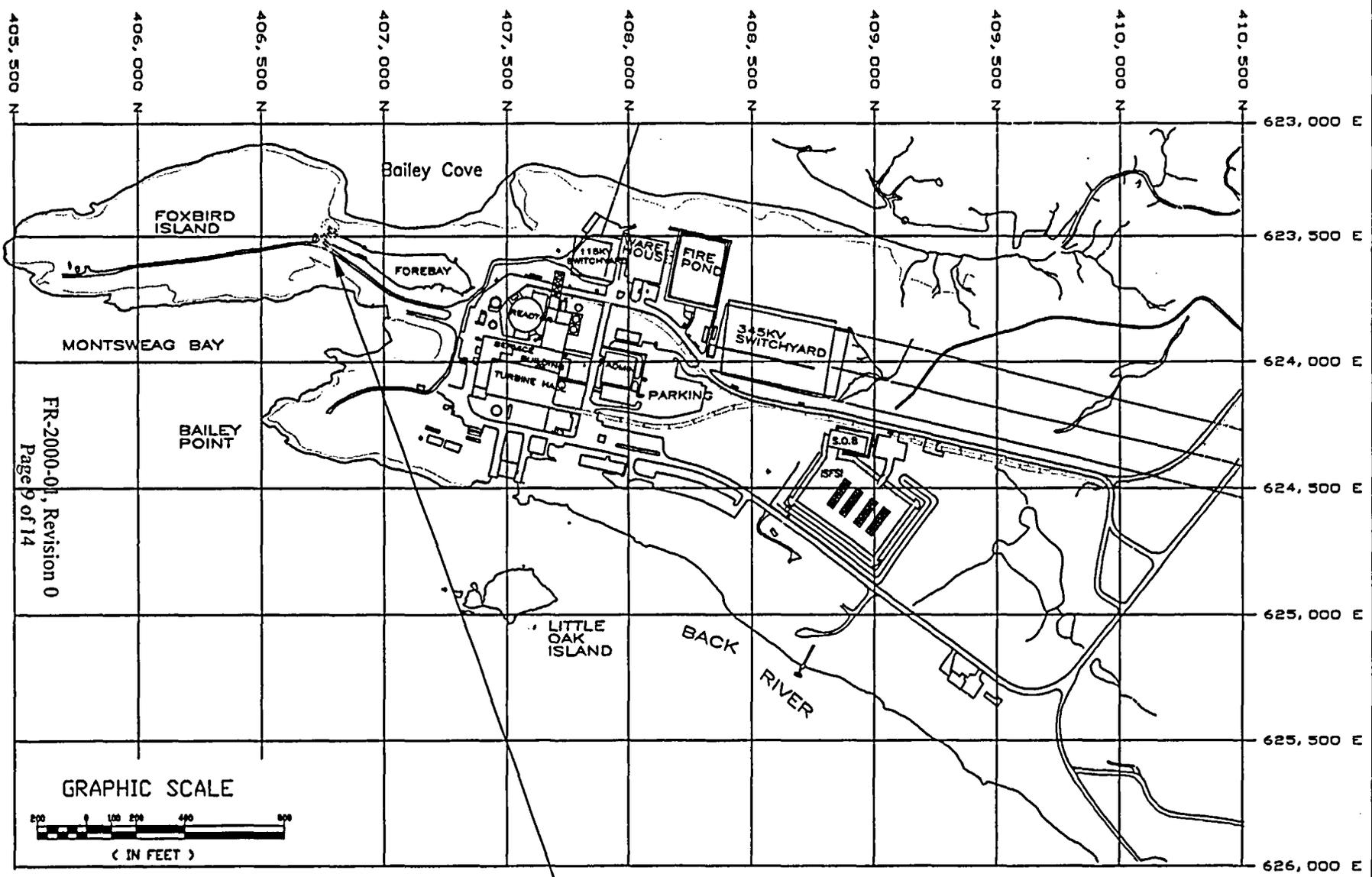
I. REFERENCES

1. Maine Yankee License Termination Plan, Revision 3, October 15, 2002
2. Maine Yankee Engineering Calculation EC-041-01, Revision 1

Attachment 1
Survey Unit Maps

Survey Type: Characterization Turnover Final Status Survey

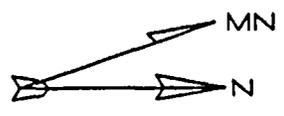
Survey Area Name: Diffuser Inlet

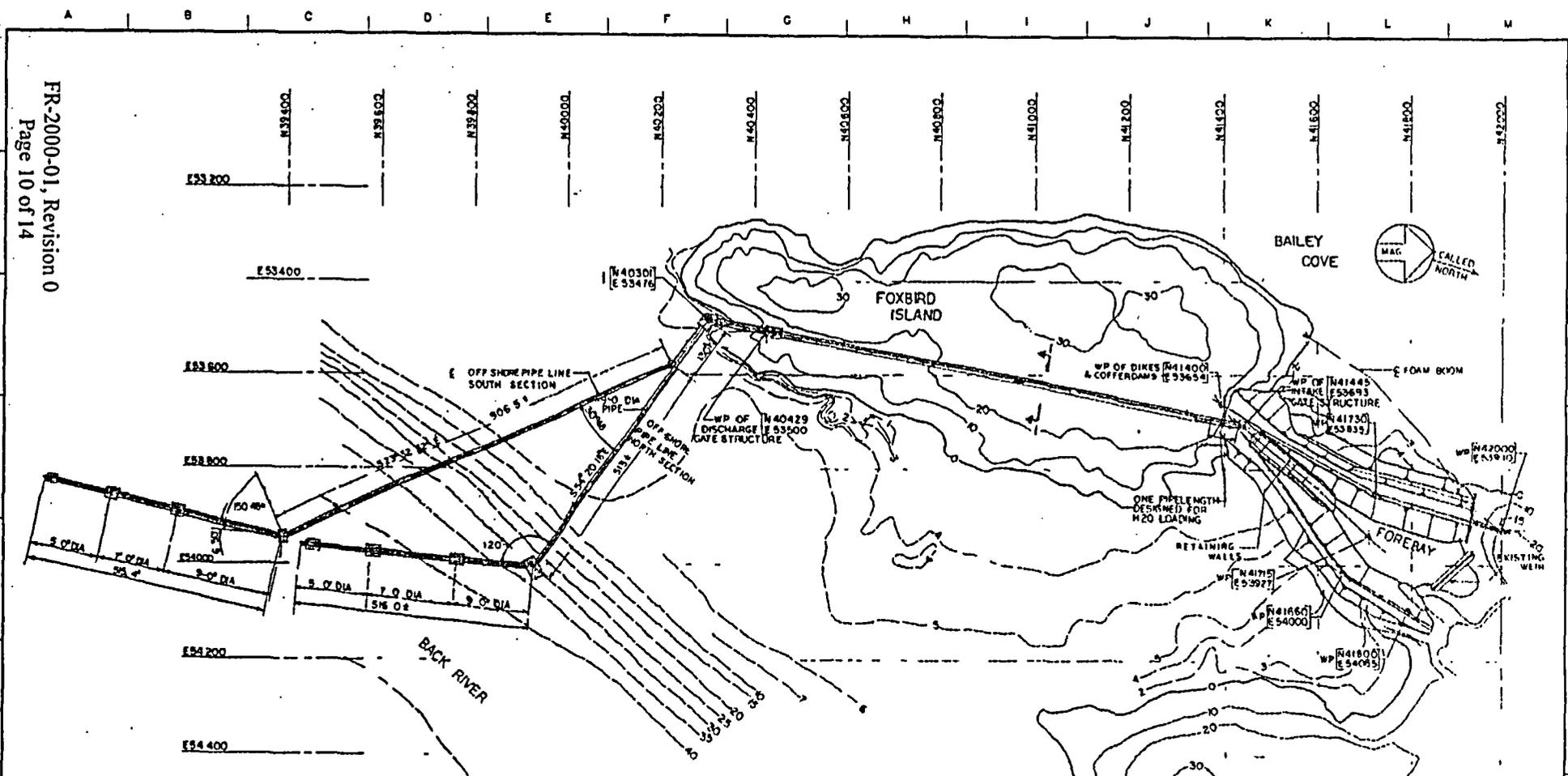


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DIFFUSER INLET
SURVEY AREA, FR2000

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



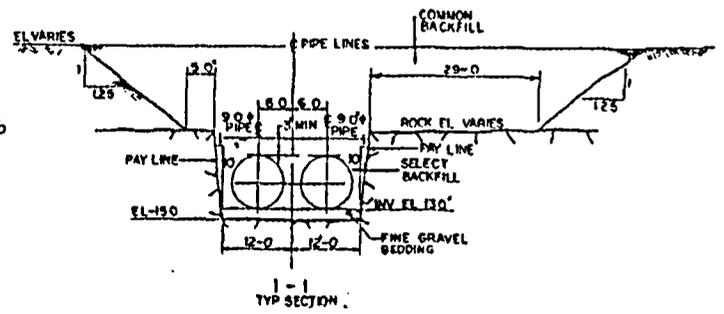


LEGEND
 — EARTH CONTOURS
 - - - MUD CONTOURS

NOTES
 1 SCALE 1"=100' UNLESS NOTED
 2 DATUM IS MEAN SEA LEVEL
 3 ALL ANGLES & DIMENSIONS SHOWN ON PLAN ARE IN A HORIZONTAL PLANE
 4 AZIMUTHS REFER TO PLANT COORDINATE SYSTEM

REFERENCE DWGS
 EXCAVATION FY-5A
 FOREBAY DIKES & COFFERDAMS FY-2A
 INTAKE RETAINING WALLS FY-1C
 INTAKE GATE STRUCTURE SH-42 FC-1A FC-1B
 DISCHARGE GATE STRUCTURE FC-2A
 ANCHOR DETAILS FY-1C FY 1D FY 1E
 PROFILE-OFFSHORE & DIFFUSER PIPES FY-1B
 PARKING & SPOILS AREA SH12 FY 4A GY-4B

PLOT PLAN



REFERENCE DWG
 - 12350-FY-1A

Circulatory Water System
 Diffuser Pipes
Maine Yankee
 REVISIONS AND SHEET INFORMATION
 DRAWN BY diffuser.dgn

DATE 12/14/00
 DRAWN BY LWW
 CHECKED BY ST (C) 000

Attachment 2
Survey Unit Instrumentation

TABLE 2

INSTRUMENT INFORMATION

HPGe Detectors for Lab Analysis of Volumetric Samples

Detector Number	MDC (pCi/g)
FSS-1	0.21
FSS-2	0.21

Attachment 3
Investigation Table
(No Investigations Required)

Attachment 4
Statistical Data
(None Required)