

# YANKEE ATOMIC ELECTRIC COMPANY

Telephone (413) 424-5261



49 Yankee Road, Rowe, Massachusetts 01367

May 5, 2005  
BYR 2005-046

Document Control Desk  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

References: 1. License No. DPR-3 (Docket No. 50-29)  
2. YAEC Submittal to USNRC, "Report of Continuing Hydrogeologic Investigations in 2004" (YA-REPT-00-010-05), dated April 14, 2005, BYR 2005-035

Subject: Errata for Report of Continuing Hydrogeologic Investigations in 2004 (YA-REPT-00-010-05)

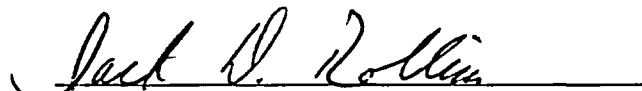
Subsequent to its submittal, Yankee Atomic Electric Company (YAEC) detected a minor error and some page omissions in the Reference 2 report. Accordingly, the following "corrected" sections of the report are enclosed, and should be used to replace the corresponding sections of the original submittal:

- Section 8.0, References (single page replaced)
- Appendix 1, Geologist's Logs for Monitoring Wells Drilled in 2004 (all pages replaced)

We apologize for any inconvenience these errata may have caused you; and ask that you please direct any related questions to Mr. Greg Babineau, Radiation Protection Manager, at (413) 424-2202.

Sincerely,

YANKEE ATOMIC ELECTRIC COMPANY

  
\_\_\_\_\_  
Jack D. Rollins  
Regulatory Affairs Manager

Enclosure

NM5501

cc: J. Hickman, NRC, Project Manager, NMSS  
S. Collins, NRC, Region I Administrator  
J. Kottan, Inspector, NRC Region I (w/o enclosure)  
M. Whalen, MA DPH  
D. Howland, MA DEP  
M. Rosenstein, EPA, Region 1  
W. Perlman, Executive Committee Chair, FRCOG  
T. W. Hutcheson, Chair, Franklin Regional Planning Board  
L. Dunlavy, Executive Director, FRCOG  
P. Sloan, Director of Planning & Development, FRCOG  
D. Katz, CAN  
J. Block, Esq.

## 8.0 References

Reference 1: YA-REPT-00-004-04; Hydrogeologic Report of 2003 Supplemental Investigation, March 15, 2004

Reference 2: DESD-TD-YR-02-001, Rev 1; Site Ground Water Data Collection for YNPS Decommissioning, Framatome ANP DE&S, February 2003

Reference 3: AP-8601, Rev 4; Ground and Well Water Monitoring Program for the Yankee Nuclear Power Station Site, October 2003

Reference 4: DP-9746; Use of Data Logging Pressure Transducers to Continuously Monitor Water Levels in Ground Water Monitoring Wells and Rainwise Rain Monitoring System

Reference 5: Massachusetts Department of Environmental Protection Publication WSC-310-91; Standard Reference for Monitoring Wells, Section 4.6, Decommissioning of Monitoring Wells, November 1993

Reference 6: AP-8125; Procedure for Permanent Closure of Ground Water Monitoring Wells at YNPS

Reference 7: DP-8602; Ground Water Monitoring Well Drilling and Completion

Reference 8: AP-8122; Subsurface Soil Sampling and Monitoring Well Installation

Reference 9: Geologic Map of the Rowe Quadrangle, Franklin and Berkshire Counties, Massachusetts, and Bennington and Windham Counties, Vermont, 1967, by A.H. Chidester, N.L. Hatch, Jr., P.H. Osberg, S.A. Norton, and J.H. Hartshorn, Map GQ-642, Department of the Interior, United States Geological Survey

Reference 10: DP-9745; Ground Water Level Measurement and Sample Collection in Observation Wells


Reference 11: YA-REPT-00-013-04; Interim Ground Water Monitoring Report for Yankee Nuclear Power Station, September 2004

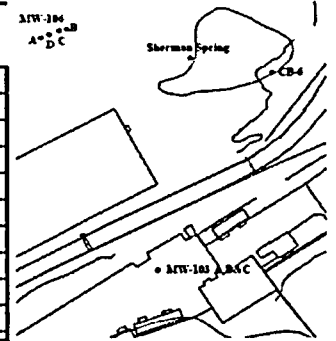
Reference 12: Yankee Nuclear Power Station Historical Site Assessment, Rev 1, September 30, 2004

Reference 13: Yankee Nuclear Power Station License Termination Plan, Rev 1, November 19, 2004

Reference 14: YA-REPT-00-014-05; Data Assessment Report on NORM in YNPS Ground Water






**Appendix 1 to YA-REPT-00-010-05**

<b>GEOLOGIST'S LOG for Well #: MW-106A</b>				Yankee Nuclear Power Station Rowe, Massachusetts	
Project:	Yankee Ground Water Investigation	Project Number:			
Client:	Yankee Atomic Electric Company	Logged by:	Dave Scott		
Drilling Co:	D.L. Maher	Driller:	Roy Buckenberger		
Date Started:	August 30, 2004	Date Finished:	August 30, 2004		
Location:	Rowe, Massachusetts	Drilling Method:	Rotasonic		
Screen Diam:	2 inches	Length:	10 feet	Slot Size:	0.010 inch
Casing Diam:	2 inches	Length:	12 feet	Type:	Schedule 40, 2-inch PVC
Boring Depth:	22 feet	Well Depth:	22 feet	Boring Diam.:	7 1/2 inches
Surface Elev.:	1089.2 feet MSL	MP:	Ground Surface	Depth to GW:	6.60 feet from PVC
On-Site GW Analyses:	None	Off-Site GW Analyses:	None	on October 31, 2004	



Depth	Well Log	Stratigraphy	Penetration	Recovery	Soil Core Description	Depth	FID Conc. (ppm) HS	Ground Water Sample No.*
1					<p style="text-align: center;">See log of MW-106B for description of sediment and ground water samples.</p> <p style="text-align: center;"><b>Well Construction Details</b></p> <p>0-1': Concrete and Flushmount Roadbox                      1-7.5': Portland Cement/Bentonite Grout                      7.5-9.5': Bentonite Chip Seal                      9.5-22': #0 Silica Sand Filter Pack                      0-12': Schedule 40, 2" Diameter PVC Riser                      12-22': Schedule 40, 2" Diameter, 0.010-Slot PVC Screen                      22': Bottom of Boring</p>			
2								
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Key to Well Construction

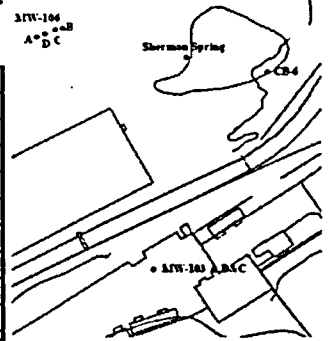
-  Sandpack
-  Well Screen
-  Cement/Bentonite Grout
-  Bentonite Seal
-  Concrete and Flushmount Roadbox

# GEOLOGIST'S LOG for Well #: MW-106B



Yankee Nuclear Power Station  
Rowe, Massachusetts

317W-106  
A<sup>+</sup> B<sup>+</sup>  
C



<b>Project:</b> Yankee Ground Water Investigation	<b>Project Number:</b>	
<b>Client:</b> Yankee Atomic Electric Company	<b>Logged by:</b> Dave Scott	
<b>Drilling Co:</b> D.L. Maher	<b>Driller:</b> Roy Buckenberger	
<b>Date Started:</b> August 12, 2004	<b>Date Finished:</b> August 27, 2004	
<b>Location:</b> Rowe, Massachusetts	<b>Drilling Method:</b> Rotasonic	
<b>Screen Diam:</b> 2 1/2 inches	<b>Length:</b> 10 feet	<b>Slot Size:</b> 0.010 inch
<b>Casing Diam:</b> 2 1/2 inches	<b>Length:</b> 251 feet	<b>Type:</b> Schedule 80, 2 1/2-inch PVC
<b>Boring Depth:</b> 265 feet	<b>Well Depth:</b> 261 feet	<b>Boring Diam.:</b> 5 1/2 inches
<b>Surface Elev.:</b> 1088.9 feet MSL	<b>MP:</b> Ground Surface	<b>Depth to GW:</b> 39.00 feet from PVC
<b>On-Site GW Analyses:</b> H-3, Co-60, Cs-134, Cs-137	<b>Off-Site GW Analyses:</b> VOCs by 8260B	<b>on October 31, 2004</b>

Depth	Well Log	Stratigraphy	Penetration	Recovery	Soil Core Description	Depth	FID Conc. (ppm) HS	Ground Water Sample No.*
1		Stratified Drift	5'	4'	0-2': Sand, brown, fine to coarse, and dark brown organic silt, little medium to coarse subrounded gravel, unsorted, medium dense, damp.	0 to 5'	0.0	
2					2-2.5': Sand, gray, fine, well sorted, medium dense, damp.			
3					2.5-5': Sand and gravel, brown to orange (in oxidized zones), fine to coarse, angular, little silt, unsorted, medium dense, damp.			
4								
5								
6					6-7': Albite gneiss boulder			
7								
8			10'	7'	7-11': Silt, gray-brown, with fine to medium sand and subangular gravel, unsorted, moderately dense, damp.	5-15'	0.0	
9								
10								
11								
12								
13					11-12': Schist boulder, oxidized orange, severely weathered, loose, mostly sand.			
14					12-13': Same as 7-11', with 4" cobble at 13'.			
15					13-15': Sand and gravel, brown, fine to coarse, subround, little silt, unsorted, loose, wet.			
16					15-17': Same as above, with 4" cobble at 17'.			
17								
18			10'	7'	17-20': Silt, brown, with fine to coarse subround gravel, little sand, unsorted, dense, moist; increasing clay content with depth. One fist-sized cobble.	15-25'	0.0	GW-1 H-3=650 pCi/L
19								
20								
21								
22								
23					22-25': Till consisting of silt, olive, with fine to coarse angular gravel, little sand, trace clay, unsorted, very dense, damp. Advanced 10" drill casing to 25' and pressure grouted with bentonite slurry to seal off aquifer.			
24		Till						
25								
26			5'	3'	See next page.	25-30'	0.0	

**NOTES:**

\*Results of on-site radiological screening <MDL unless otherwise noted

Key to Well Construction

- Sandpack
- Well Screen
- Cement/Bentonite Grout
- Bentonite Seal
- Concrete and Flusumount Roadbox

GEOLOGIST'S LOG for Well No.:


MW-106B



Yankee Nuclear Power Station, Rowe, MA


Depth	Well Log	Stratigraphy	Penetration	Recovery	Soil Core Description	Depth	FID Conc. (ppm) HS	Ground Water Sample No.*		
27	[Hatched Well Log Column]	Till	5'	3'	Till consisting of silt, olive, clay and fine to coarse angular gravel, trace sand, unsorted, very dense, damp.	25-30'	0.0			
28										
29										
30										
31										
32					5'	2'	Till consisting of silt, olive, clay and fine to coarse angular gravel, trace sand, unsorted, very dense, damp.	30-35'	0.0	
33										
34										
35										
36										
37					5'	5'	Till consisting of silt, olive, clay and fine to coarse angular gravel, trace sand, unsorted, very dense, damp.	35-40'	0.0	
38										
39										
40										
41			3'	3'	Same as above, with few fist-sized cobbles.	40-43'	0.0			
42										
43										
44			2'	2'	Same as above, with few fist-sized cobbles.	43-45'	0.0			
45										
46										
47			4'	3'	Same as above, with few fist-sized cobbles.	45-49'	0.0			
48										
49										
50			2'	2'	Till consisting of silt, olive, clay and fine to coarse angular gravel, trace sand, few fist-sized cobbles, unsorted, extremely dense, dry.	49-51'	0.0			
51										
52										
53			4'	3'	Till consisting of silt, olive, clay and fine to coarse angular gravel, trace sand, few fist-sized cobbles, unsorted, extremely dense, dry.	51-55'	0.0			
54										
55										
56										
57			4'	3.5'	Till consisting of silt, olive, clay and fine to coarse angular gravel, trace sand, few fist-sized cobbles, unsorted, extremely dense, dry.	55-59'	0.0			
58										
59										
60										
61			3'	3'	Till consisting of silt, olive, clay and fine to coarse angular gravel, trace sand, few fist-sized cobbles, unsorted, extremely dense, dry. One talc fragment.	59-62'	0.0			
62										
63										
64			3'	3'	Till consisting of silt, olive, clay and fine to coarse angular gravel, trace sand, few fist-sized cobbles, unsorted, extremely dense, dry.	62-65'	0.0			
65										
66			2'	2'	See next page.	65-67'	0.0			

\*Results of on-site radiological screening <MDL unless otherwise noted

GEOLOGIST'S LOG for Well No.: MW-106B					 Yankee Nuclear Power Station, Rowe, MA		Page 3 of 8	
Depth	Well Log	Stratigraphy	Penetration	Recovery	Soil Core Description	Depth	FID Conc. (ppm) HS	Ground Water Sample No.*
67		Till	2'	2'	Same as above.	65-67'	0.0	
68			2'	2'	Till consisting of silt, olive, clay and fine to coarse angular gravel, trace sand, few fist-sized cobbles, unsorted, extremely dense, dry.	67-69'	0.0	
69			3'	3'	Same as above. Two-inch seam of silt, clay and fine sand at 71.5 feet.	69-72'	0.0	
70								
71			3'	3'	Till consisting of silt, olive, clay and fine to coarse angular gravel, trace sand, few fist-sized cobbles, unsorted, extremely dense, dry.	72-75'	0.0	
72								
73			5'	5'	75-77': Same as above, with increasing clay content and finer-grained gravel. 77-80': Laminated silty clay, olive, with 2 to 5-mm very fine sand lamellae at ~2 to 5-cm intervals, more sand at bottom; very stiff, damp.	75-80'	0.0	
74								
75		3'	3'	Till consisting of silty clay, olive, with fine subangular gravel, little medium to coarse gravel, trace fine to medium sand, unsorted, very stiff, damp.	80-83'	0.0		
76								
77		Boulder	2'	2'	83-83.5': Same as above 83.5-85': Albite gneiss boulder	83-85'	0.0	
78			1'	1'	Same albite gneiss boulder	85-86'	0.0	
79			1	1'	86-86.5': Same albite gneiss boulder.	86-87'	0.0	
80		Till	3'	3'	86.5-89': Sand, fine to medium, well sorted, loose, saturated. 20 feet of rods are wet. 89-90': Albite gneiss boulder.	87-90'	0.0	GW-2 H-3<300 pCi/L
81					3'	3'	90-91.5': Same as 80-83'. 91.5-92.5': Sand, f. to m., little silt, loose, saturated. 92.5-93': Albite gneiss boulder.	
82			2'	2'			Till consisting of silt, olive, clay and fine to coarse angular gravel, trace sand, few fist-sized cobbles, unsorted, very dense, damp.	
83		Till	8'	8'	Advanced 7 1/4" drill casing to 95' and pressure grouted with bentonite slurry to seal off aquifer above. 95-103': Till consisting of clay, olive, silt and fine to medium subangular gravel, some coarse gravel and fist-sized cobbles, trace sand, unsorted, very stiff, moist.	95-103'	0.0	
84								
85		Glaciolacustrine Sequence	7'	7'	Laminated silt and clay, olive, some fine to medium subangular gravel in bottom 6", stiff, damp, very plastic.	103-110'	0.0	
86								
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\*Results of on-site radiological screening &lt;MDL unless otherwise noted



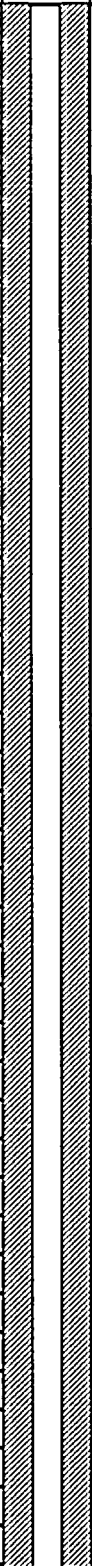
GEOLOGIST'S LOG for Well No.:		MW-106B		 Yankee Nuclear Power Station, Rowe, MA		Page 4 of 8		
Depth	Well Log	Stratigraphy	Penetration	Recovery	Soil Core Description	Depth	FID Conc. (ppm) HS	Ground Water Sample No.*
107		Glaciolacustrine Sequence	7'	7'	Laminated silt and clay, olive, some fine to medium subangular gravel in bottom 6", stiff, damp, very plastic.	103-110'	0.0	GW-3 H-3<300 pCi/L
108			5'	5'	Same as above, (disturbed); rate of drilling slowed at 111', apparently because we were pushing a boulder. Retrieved no sample on the first attempt and reentered the hole to recover the sample.	110-115'	0	
109								
110								
111								
112		8'	8'	Laminated silt and clay, olive, with 1-mm lamellae of gray, very fine, micaceous sand; trace medium to coarse gravel; more gravel at bottom 6", wet.	115-123'	0.0		
113								
114								
115								
116		5'	5'	Collected sample in 5' long by 3½" diameter translucent Lexan liner. Material is same as above. Advanced 7½" drill casing to 125' and pressure grouted with bentonite slurry to seal off aquifer.	123-128'	0.0		
117								
118								
119								
120		7'	4'	128-130': Same laminated silty clay, olive, trace fist-sized cobbles. 130-131': Sand, fine, with silt, olive, firm, saturated. 131-132': Same as 128-130'. 132-135': Sample dropped out: probable sand, saturated (4 rods wet). Advanced 7½" drill casing to 135'.	128-135'	0.0	GW-4 H-3<300 pCi/L	
121								
122								
123								
124		Till ?	2'	2'	Clayey silt, olive, with fine to medium subangular gravel, few fist-sized cobbles, unsorted, dense, moist.	135-137'	0.0	
125								
126								
127		Boulder	2'	0.5'	Albite gneiss boulder.	137-139'	0.0	
128								
129		Till ?	2'	2'	Clayey silt, olive, with fine to medium subangular gravel, few fist-sized cobbles, unsorted, dense, moist.	139-141'	0.0	
130								
131		Glaciolacustrine Sequence	14'	8'	No recovery on first attempt: heaving sand - 30' heaved into the casing. Reentered the hole to retrieve sample: Sand, very fine, micaceous, and silt, olive, trace coarse gravel, loose, saturated. 6" hard zone at 153'.	141-155'	0	GW-5 H-3<300 pCi/L
132								
133								
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144								
145								
146								

\*Results of on-site radiological screening &lt;MDL unless otherwise noted


GEOLOGIST'S LOG for Well No.: MW-106B						Yankee Nuclear Power Station, Rowe, MA		Page 5 of 8				
Depth	Well Log	Stratigraphy	Penetration	Recovery	Soil Core Description	Depth	FID Conc. (ppm) HS	Ground Water Sample No.*				
147		Glaciolacustrine Sequence	14'	8'	No recovery on first attempt: heaving sand - 30' heaved into the casing. Reentered the hole to retrieve sample: Sand, very fine, micaceous, and silt, olive, trace coarse gravel, loose, saturated. 6" hard zone at 153'. Advanced 7½" drill casing to 155' and pressure grouted with bentonite slurry to seal off aquifer above.	141-155'	0.0	GW-5 H-3<300 pCi/L				
148												
149												
150												
151			10'	10'	155-158.5': Sand, olive, fine, with fine to coarse subround gravel, some silt, unsorted, medium dense, saturated.	155-165'	0.0					
152												
153												
154												
155												
156												
157												
158												
159												
160					158.5-163.5': Sand, olive, fine to coarse, with fine to coarse subround gravel, some silt, unsorted, medium dense, saturated.							
161												
162												
163												
164					163.5-165': Laminated silty clay, olive, very stiff, damp. One 1-mm very fine gray sand lamella.							
165												
166			10'	10'	Advanced 7½" drill casing to 165' and pressure grouted with bentonite slurry to seal off aquifer. 165-172': No recovery on first attempt; 120' of rods are wet. Reentered the hole to retrieve sample: 10' of sand heaved into the casing. Sample description: Sand, brown, medium to very coarse, and fine to medium gravel; little silt, loose, saturated.	165-175'	0.0	GW-6 H-3<300 pCi/L				
167												
168												
169												
170												
171					172-173': Silt, olive, stiff, saturated.							
172												
173												
174					173-175': Sand, brown, fine, little silt, medium dense, saturated.							
175												
176			10'	10'	Advanced 5½" drill casing to 175'. Did not pressure grout because there is no confining unit to key into. 175-185': Laminated sand, very fine, and silt, olive, some clay, stiff, saturated.	175-185'	0.0					
177												
178												
179												
180												
181												
182												
183												
184												
185			10'	10'	See next page.	185-195'	0.0					
186												


\*Results of on-site radiological screening &lt;MDL unless otherwise noted

**GEOLOGIST'S LOG for Well No.: MW-106B**  **Yankee Nuclear Power Station, Rowe, MA** **Page 6 of 8**


Depth	Well Log	Stratigraphy	Penetration	Recovery	Soil Core Description	Depth	FID Conc. (ppm) HS	Ground Water Sample No.*
187		Glaciolacustrine Sequence	10'	10'	Laminated sand, very fine, and silt, olive, some clay, stiff, saturated.	185-195'	0.0	
188								
189								
190								
191								
192								
193								
194								
195								
196			10'	10'	195-199': Clay, olive, some silt, medium soft, moist.	195-205'	0.0	
197								
198								
199								
200								
201								
202								
203								
204								
205			20'	20'	205-211': Laminated silt with clay, olive, trace very fine sand, stiff, moist.	205-225'	0.0	
206								
207								
208								
209								
210								
211								
212								
213								
214								
215								
216								
217								
218								
219								
220								
221								
222								
223								
224								
225	8'	6'	See next page.	225-233'	0.0			
226								

\*Results of on-site radiological screening <MDL unless otherwise noted

**GEOLOGIST'S LOG for Well No.:** MW-106B  Yankee Nuclear Power Station, Rowe, MA **Page 7 of 8**

Depth	Well Log	Stratigraphy	Penetration	Recovery	Soil Core Description	Depth	FID Conc. (ppm) HS	Ground Water Sample No.
227		Glaciolacustrine Sequence	8'	6'	Advanced 5½" drill casing to 225' and pressure grouted with bentonite slurry to seal off aquifers above. 225-230': Laminated silt with clay, olive, some very fine sand, stiff, moist.	225-233'	0.0	
228					230-232': Same as above, little fine gravel.			
229					232-233': Gravel, f. to c., angular; some silt and clay, loose, wet. 6" albite gneiss cobble at bottom.			
230		Bedrock	12'	9'	Albite gneiss bedrock, coarse grained, foliation (bands of quartz) dips at 30°. One 6.5'-stick and one 2.5'-stick of core recovered from the 233-242' interval (only one fracture). Interval from 242-245' very broken up - only coarse gravel-sized fragments recovered (several natural fractures).	233-245'	0.0	
231								
232								
233								
234								
235								
236								
237								
238								
239								
240								
241	10'				7'			Albite gneiss bedrock, coarse granular texture; rich in biotite and muscovite; few small garnets; quartz stringers form foliation dipping 30°; ¼" albite grains; 3.4' solid stick of core from 248.8' to 252.2'; natural break at 254' with silt in-filling.
242								
243								
244								
245								
246								
247								
248								
249								
250								
251	10'	10.6'	Same albite gneiss as above. Natural break at 260'. Collected GW-7 from well, after sand pack and bentonite seal were placed.	255-265'	0			
252								
253								
254								
255								
256								
257								
258								
259								
260								
261								
262								
263								
264								
265					End of boring at 265'.			
266								

\*Results of on-Site radiological screening <MDL unless otherwise noted

DRILLING LOG for Well No.:	MW-106B	 Yankee Nuclear Power Station, Rowe, MA	Page 8 of 8
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Depth	Well Log	Stratigraphy	Penetration	Recovery	Soil Core Description	Depth	FID Conc. (ppm) HS	Ground Water Sample No.*
<p><b><u>Well Construction Details</u></b></p> <p>0-1': Concrete and Flushmount Roadbox            1-230': Portland Cement/Bentonite Grout            230-249': Bentonite Chip Seal            249-265': #0 Silica Sand Filter Pack            0-251': Schedule 80, 2½" Diameter PVC Riser            251-261': Schedule 80, 2½" Diameter, 0.010-Slot PVC Screen            265': Bottom of Boring</p>								

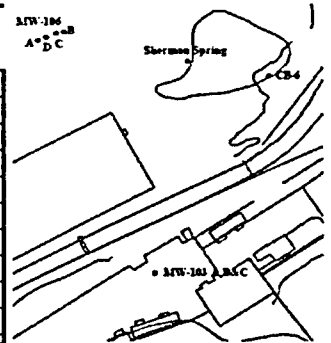
\*Results of on-site radiological screening &lt;MDL unless otherwise noted

# GEOLOGIST'S LOG for Well #: MW-106C



Yankee Nuclear Power Station  
Rowe, Massachusetts

MW-106  
A-D-C




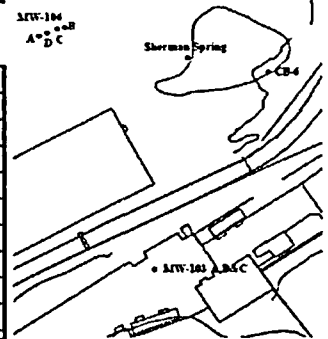
Project:	Yankee Ground Water Investigation	Project Number:	
Client:	Yankee Atomic Electric Company	Logged by:	Dave Scott
Drilling Co:	D.L. Maher	Driller:	Roy Buckenberger
Date Started:	August 30, 2004	Date Finished:	September 8, 2004
Location:	Rowe, Massachusetts	Drilling Method:	Rotosonic
Screen Diam:	2 inches	Length:	5 feet
Casing Diam:	2 inches	Length:	90 feet
Boring Depth:	95 feet	Well Depth:	95 feet
Surface Elev.:	1089.0 feet MSL	MP:	Ground Surface
On-Site GW Analyses:	None	Off-Site GW Analyses:	None
		Slot Size:	0.010 inch
		Type:	Schedule 40, 2-inch PVC
		Boring Diam.:	5 1/2 inches
		Depth to GW:	38.90 feet from PVC
			on October 31, 2004

Depth	Well Log	Stratigraphy	Penetration	Recovery	Soil Core Description	Depth	FID Conc. (ppm) HS	Ground Water Sample No. *
72					<p>See log of MW-106B for description of sediments and ground water samples</p> <p><b>Well Construction Details</b></p> <p>0-1': Concrete and Flushmount Roadbox                      1-80': Portland Cement/Bentonite Grout                      80-86.5': Bentonite Chip Seal                      86.5-95': #0 Silica Sand Filter Pack                      0-90': Schedule 40, 2" Diameter PVC Riser                      90-95': Schedule 40, 2" Diameter, 0.010-Slot PVC Screen                      95': Bottom of Boring                      0-25': 8" Steel Casing Cement/Bentonite Grouted in Place</p>			
73								
74								
75								
76								
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78								
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80								
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87								
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92								
93								
94								
95								
96								
97								

Key to Well Construction






- Sandpack
- Well Screen
- Cement/Bentonite Grout
- Bentonite Seal
- Concrete and Flushmount Roadbox

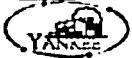
<b>GEOLOGIST'S LOG for Well #: MW-106D</b>				Yankee Nuclear Power Station Rowe, Massachusetts	
Project:	Yankee Ground Water Investigation	Project Number:			
Client:	Yankee Atomic Electric Company	Logged by:	Dave Scott		
Drilling Co:	D.L. Maher	Driller:	Roy Buckenberger		
Date Started:	September 8, 2004	Date Finished:	September 14, 2004		
Location:	Rowe, Massachusetts	Drilling Method:	Rotasonic		
Screen Diam:	2½ inches	Length:	10 feet	Slot Size:	0.010 inch
Casing Diam:	2½ inches	Length:	144 feet	Type:	Schedule 80, 2½-inch PVC
Boring Depth:	155 feet	Well Depth:	154 feet	Boring Diam.:	5½ inches
Surface Elev.:	1089.1 feet MSL	MP:	Ground Surface	Depth to GW:	43.70 feet from PVC
On-Site GW Analyses:	None	Off-Site GW Analyses:	None	on October 31, 2004	

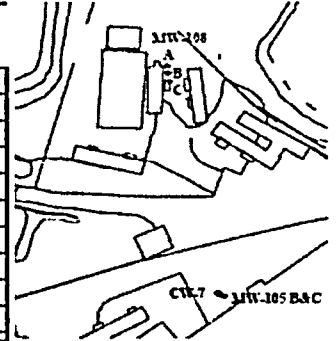


Depth	Well Log	Stratigraphy	Penetration	Recovery	Soil Core Description	Depth	FID Conc. (ppm) HS	Ground Water Sample No.*
130								
131								
132								
133					See log of MW-106B for description of sediments and ground water samples			
134								
135								
136								
137								
138								
139								
1402								
141								
142								
<b>Well Construction Details</b>								
					0-1': Concrete and Flushmount Roadbox			
					1-132': Portland Cement/Bentonite Grout			
					132-142': Bentonite Chip Seal			
					142-155': #0 Silica Sand Filter Pack			
					0-144': Schedule 80, 2½" Diameter PVC Riser			
					144-154': Schedule 80, 2½" Diameter, 0.010-Slot PVC Screen			
					155': Bottom of Boring			
					0-25': 8" Steel Casing Cement/Bentonite Grouted in Place			

Key to Well Construction

-  Sandpack
-  Well Screen
-  Cement/Bentonite Grout
-  Bentonite Seal
-  Concrete and Flushmount Roadbox

<b>GEOLOGIST'S LOG for Well #: MW-108A</b>				Yankee Nuclear Power Station Rowe, Massachusetts
Project:	Yankee Ground Water Investigation	Project Number:		
Client:	Yankee Atomic Electric Company	Logged by:	Dave Scott	
Drilling Co:	D.L. Maher	Driller:	Roy Buckenberger	
Date Started:	July 16, 2004	Date Finished:	July 16, 2004	
Location:	Rowe, Massachusetts	Drilling Method:	Rotasonic	
Screen Diam:	2 inches	Length:	10 feet	Slot Size: 0.010 inch
Casing Diam:	2 inches	Length:	15 feet	Type: Schedule 40, 2-inch PVC
Boring Depth:	25 feet	Well Depth:	25 feet	Boring Diam.: 5 1/2 inches
Surface Elev.:	1118.4 feet MSL	MP:	Ground Surface	Depth to GW: 12.31 feet from PVC
On-Site GW Analyses:	None	Off-Site GW Analyses:	None	on October 31, 2004



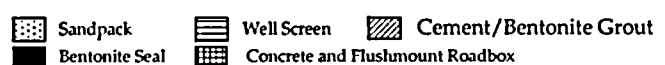
Depth	Well Log	Stratigraphy	Penetration	Recovery	Soil Core Description	Depth	FID Conc. (ppm) HS	Ground Water Sample No.*
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

See log of MW-108B for description of sediment and ground water samples.

**Well Construction Details:**

- 0-1': Concrete and Flushmount Roadbox
- 1'-6.1': Portland Cement/Bentonite Grout
- 6.1'-10': Bentonite Chip Seal
- 10'-25': #0 Silica Sand Filter Pack
- 0-15': Schedule 40 2" PVC Riser
- 15'-25': Schedule 40 2" PVC, 0.010-Slot Screen
- 25': Bottom of Boring

**Key to Well Construction**

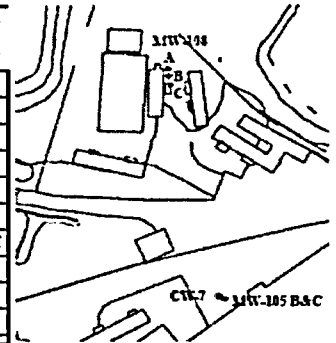




# GEOLOGIST'S LOG for Well #: MW-108B



Yankee Nuclear Power Station  
Rowe, Massachusetts



Project:	Yankee Ground Water Investigation	Project Number:	
Client:	Yankee Atomic Electric Company	Logged by:	Dave Scott
Drilling Co:	D.L. Maher	Driller:	Roy Buckenberger
Date Started:	July 8, 2004	Date Finished:	July 15, 2004
Location:	Rowe, Massachusetts	Drilling Method:	Rotosonic
Screen Diam:	2 1/2 inches	Length:	10 feet
Casing Diam:	2 1/2 inches	Slot Size:	0.010 inch
Boring Depth:	215 feet	Type:	Schedule 80, 2 1/2-inch PVC
Surface Elev.:	1118.5 feet MSL	Well Depth:	215 feet
On-Site GW Analyses:	H-3, Co-60, Cs-134, Cs-137	Boring Diam.:	5 1/2 inches
		MP:	Ground Surface
		Depth to GW:	53.43 feet from PVC
		Off-Site GW Analyses:	VOCs by 8260B on October 31, 2004


Depth	Well Log	Stratigraphy	Penetration	Recovery	Soil Core Description	Depth	FID Conc. (ppm) HS	Ground Water Sample No.*			
1		Fill	5'	4'	Fill consisting of sand, brown, fine to medium, and fine to coarse subround gravel, some cobbles, some silt, unsorted, loose, dry.	0-5'	0.0	GW-1 H-3<300 pCi/L			
2						2'	2'		Sand, brown, fine to coarse, little medium to coarse gravel, some silt, unsorted, loose, wet at 7'.	5-7'	0.0
3			3'	3'	Sand, brown, fine, some silt, trace fine gravel, rounded, unsorted, loose, wet.					7-10'	0.0
4						5'	4'		Sand, brown to gray-green, fine and gravel, fine to coarse, some silt, unsorted, medium dense, wet.	10-15'	0.0
5		3'	3'	Silt, dark brown, organic and sand, very fine, trace fine to medium subangular gravel, unsorted, loose, wet.	15-18'					100	
6					2'					2'	Same as above, but gray-green.
7		Till	5'	5'		20-21': Sand, brown, med. to very coarse and gravel, f. to c., rounded, trace silt, unsorted, medium dense, wet. 21-24': Silt, gray-brown and sand, very fine, some subangular fine to medium gravel, few cobbles, unsorted, dense, moist. 24-25': Till: silt, brown, some f. to c. sand, subangular f. to c. gravel, few cobbles, unsorted, very dense, dry.	20-25'		0.0		
8					1'		1'		Same as 24-25'.	25-26'	0.0
9											

NOTES:


\*Results of on-site radiological screening <MDL unless otherwise noted

Key to Well Construction



- Sandpack
- Well Screen
- Cement/Bentonite Grout
- Bentonite Seal
- Concrete and Flushmount Roadbox

GEOLOGIST'S LOG for Well No.:		MW-108B		 Yankee Nuclear Power Station, Rowe, MA		Page 2 of 6				
Depth	Well Log	Stratigraphy	Penetration	Recovery	Soil Core Description	Depth	FID Conc. (ppm) HS	Ground Water Sample No.*		
27		Till	3'	3'	Advanced 8" permanent steel casing to 26' and cement grouted to seal off aquifer above. 26-29': Silt, olive brown and very fine sand, some angular decomposed schist-m. to c. gravel-sized, unsorted, very dense, dry. Very tough drilling.	26-29'	0.0			
28										
29										
30					3'	2'	29-30': Same as above.			
31							30-32': Albite gneiss boulder; pulverized by drill, with up to cobble-sized fragments, dry.	29-32'	0.0	
32										
33					3'	3'	Silt, olive brown and fine sand, some angular fine to medium gravel, trace coarse gravel, unsorted, very dense, dry.	32-35'	0.0	
34										
35										
36					3'	3'	35-36.5': Same as above, but moist; slightly more sandy.			
37							36.5-38': Same as 32-35', dry.	35-38'	0.0	
38										
39					3'	3'	Silt, olive brown with very fine sand and fine to coarse angular gravel, few angular quartz cobbles and garnetiferous schist fragments, unsorted, very dense, dry.	38-41'	0.0	
40										
41										
42					4'	4'	Same as above. No recovery on the first attempt. Reentered the hole to retrieve the sample. As a result, the sample was highly disturbed.	41-45'	0.0	
43										
44										
45										
46			4'	4'	45-48': Silt, olive and fine sand, some fine to coarse angular gravel, unsorted, very dense, damp.					
47					48-49': Same as above; slightly more sand at top and wet, but only damp at bottom.	45-49'	0.0			
48										
49										
50			2'	2'	Silt, olive, with very fine sand, some fine to medium subangular gravel, unsorted, very dense, damp.	49-51'	0.0			
51										
52			2'	2'	Same as above, but dry with few chlorite schist and albite gneiss cobbles.	51-53'	0.0			
53										
54			2'	2'	53-54.5': Albite gneiss boulder.					
55					54.5-55': Same as 49-51', dry.	53-55'	0.0			
56										
57			3'	3'	Same as 51-53', damp.	55-58'	0.0			
58										
59			2'	2'	Same as 49-51', dry.	58-60'	0.0			
60										
61			3'	3'	60-61.5': Same as above, damp; one 2" medium sand lense in middle, wet.					
62					61.5-63': Sand, fine with silt, olive, unsorted, loose, saturated. Bottom 3" in top of albite gneiss boulder.	60-63'	0.0	GW-2 H-3<300 pCi/L		
63										
64		Boulder	1.5	0.5	Albite gneiss boulder.	63-64.5'	0.0			
65			10.5	0.5	Advanced 5 1/2" drill casing to 65'. See next page.	64.5-75'	0.0			
66										


\*Results of on-site radiological screening &lt;MDL unless otherwise noted

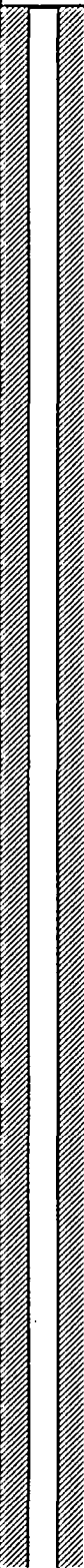
GEOLOGIST'S LOG for Well No.:		MW-108B		 Yankee Nuclear Power Station, Rowe, MA		Page 3 of 6		
Depth	Well Log	Stratigraphy	Penetration	Recovery	Soil Core Description	Depth	FID Conc. (ppm) HS	Ground Water Sample No.*
67								
68								
69								
70			10.5'	0.5'	Cored with water because we thought we were in bedrock. Broke through the boulder at 66'; all fine-grained material was washed from the sample below the boulder by the coring water. Only subround cobbles of albite gneiss, garnet gneiss and marble remained in the sample. The coring water return was very silty and gray-green; not gray as if we had been cutting through the albite gneiss bedrock.	64.5-75'	0.0	
71								
72								
73								
74								
75								
76								
77			5'	7'	Two feet in top of sampler is wash from 65-75': medium to very coarse sand and medium to coarse subround gravel. 75-80': Silt, olive green and clay, with fine angular gravel, some medium gravel, unsorted, very dense, damp. Few cobbles in bottom 1 foot of sample.	75-80'	0.0	
78								
79								
80								
81								
82			5'	5'	Advanced 7½" drill casing to 79' and pressure grouted with bentonite slurry to seal off aquifer above. 80-85': Extremely dense till consisting of silt, olive, little clay and fine to coarse angular gravel, some fine sand, unsorted, dry. Gravel is comprised of granite gneiss and chlorite schist.	80-85'	0.0	
83								
84								
85								
86		Till						
87			5'	5'	Same as above.	85-90'	0.0	
88								
89								
90								
91								
92			5'	5'	Same as above.	90-95'	0.0	
93								
94								
95								
96								
97			5'	5'	Silt, olive, with fine angular gravel, little medium to coarse gravel, trace clay, unsorted, very dense, dry. Faint bedding near bottom defined by 1-2mm light gray clay lamellae at 5-10 cm intervals within gravelly silt matrix.	95-100'	0.0	
98								
99								
100								
101								
102			5'	5'	Same as above, no layering. Top of sample is wet but water is probably what was trapped above a grout plug between the 5½" and 7½" drill casings, which was released when the 5½" casing was advanced after the 95-100' sample was collected. Although the water is probably not from the formation, we will sample it anyway, as a precaution.	100-105'	0.0	GW-3 H-3<300 pCi/L
103								
104								
105								
106			5'	5'	105-106': Albite gneiss boulder.	105-110'	0.0	

\*Results of on-site radiological screening <MDL unless otherwise noted


GEOLOGIST'S LOG for Well No.:		MW-108B		 Yankee Nuclear Power Station, Rowe, MA		Page 4 of 6		
Depth	Well Log	Stratigraphy	Penetration	Recovery	Soil Core Description	Depth	FID Conc. (ppm) HS	Ground Water Sample No.*
107		Till	5'	5'	Advanced 5½" drill casing to 105' and pressure grouted with bentonite slurry to seal off possible aquifer above. 106-110': Silt, olive, with clay and fine angular gravel, little coarse gravel, unsorted, very dense, damp.	105-110'	0.0	
108								
109			5'	5'	Clay, olive, with fine angular gravel, trace coarse subangular garnet schist gravel, one talc clast, unsorted, unlayered, hard, damp. This interval drilled easier than above.	110-115'	0.0	
110								
111								
112			10'	10'	Clay, olive, with fine angular gravel. Few 1-2 mm very fine gray sand lamellae at 124' and one 1" very coarse brown sand layer with small cobbles at 115'.	115-125'	0.0	
113								
114								
115								
116								
117	7'	7'	Silt, olive, with clay and fine to coarse angular gravel, unsorted, very dense, no layering, damp. 4" schist cobble at bottom.	125-132'	0.0			
118								
119								
120	3'	3'	Same as above, some gneiss and schist cobbles.	132-135'	0.0			
121								
122	3'	3'	Silt, olive, and fine to coarse angular gravel, trace clay, unsorted, very dense, dry; 4" anorthosite cobble at bottom.	135-138'	0.0			
123								
124	7'	7'	Same as above. No imbrication of gravel.	138-145'	0.0			
125								
126								
127								
128	4'	3'	145-147': Same as above.	145-149'	0.0			
129								
130								
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141								
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143								
144								
145								
146								



\*Results of on-site radiological screening &lt;MDL unless otherwise noted

**GEOLOGIST'S LOG for Well No.:** MW-108B  Yankee Nuclear Power Station, Rowe, MA **Page 5 of 6**

Depth	Well Log	Stratigraphy	Penetration	Recovery	Soil Core Description	Depth	FID Conc. (ppm) HS	Ground Water Sample No.*	
147		Till	4'	3'	147-149': Albite gneiss boulder (mostly pulverized by drill).	145-149'	0.0		
148		Boulder							
149		Till	6'	0.75	Cored with water, believing we were in bedrock. Broke through the boulder at 150'. All fine-grained material below the boulder was washed from the sample by the coring water. Only subround cobbles of gneiss and schist remained in the sample. The coring water return was very silty and gray-green; not gray as if we had been cutting through the albite gneiss bedrock.	149-155'	0.0		
150									
151									
152									
153		8'	8'	2'	4.5'	Top 2.5' of sample is slough: very coarse sand and gravel from which the fines were washed while coring 149-155'. 155-157': Same silt and f. to c. angular gravel as above.	155-157'		0.0
154									
155		Glaciolacustrine Sequence	Silt, olive, some clay, with fine to medium angular gravel, trace cobbles, unsorted, very dense, damp. Few fine sand lamellae (1-2 mm) at 163-164'; moist in sandy zone, remaining sample damp to dry. After sitting overnight, the hole had 80' of water. The water-bearing zone is likely 163-164', or possibly a sand that was washed out while coring 149-155'. After collecting ground water sample GW-4, advanced 5 1/2" drill casing to 165' and pressure grouted with bentonite slurry to seal off aquifer.	5'	3'	165-166': albite gneiss boulder. 166-170': Cored with water from 165-170', believing we were on bedrock. Broke through the boulder at 166'. Most fine-grained material below the boulder was washed from the sample by the coring water. Only subrounded cobbles of gneiss and quartzite remained, with thumbnail-sized clumps of olive clay.	165-170'		0.0
156									
157									
158									
159									
160									
161									
162									
163	8'	8'	8'	8'	170-174': Sand, fine to medium, trace silt, olive, loose, saturated. Upon reentering the hole to advance, the sand had heaved 20'. 174-175': Sand, f. to m. and silt, olive, dense, moist. 175-178': Silt, olive, with fine angular gravel, little medium to coarse gravel, trace clay, unsorted, very dense, dry. After collecting ground water sample GW-5, advanced 5 1/2" drill casing to 175' and pressure grouted with bentonite slurry to seal off aquifer.	170-178'	0.0		
164									
165	7'	5.5'	7'	5.5'	Sand, very fine, with silt, olive, little clay, well sorted, medium dense, saturated. 40' of rods are wet. Upon reentering the hole, sand had heaved 25' into the casing, which was at 175'.	178-185'	0.0		
166									
167	4'	4'	4'	4'	See next page.	185-189'	0.0		
168									
169									
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171									
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179									
180									
181									
182									
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184									
185									
186									

\*Results of on-site radiological screening <MDL unless otherwise noted


**GEOLOGIST'S LOG for Well No.: MW-108B**  Yankee Nuclear Power Station, Rowe, MA **Page 6 of 6**

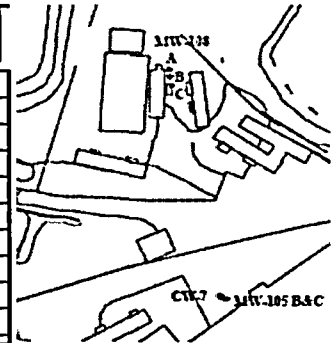
Depth	Well Log	Stratigraphy	Penetration	Recovery	Soil Core Description	Depth	FID Conc. (ppm) HS	Ground Water Sample No.*
187-188		Glaciolacustrine Sequence	4'	4'	Same as above, some medium to coarse sand at 185-186'. Faint 1-2 mm lamellae visible. On rock at bottom of sampler.	185-189'	0.0	
189-194		Boulder	6'	6'	189-194': Albite gneiss boulder.	189-195'	0.0	
194-195		Glaciolacustrine Sequence			194-195': Same very fine sand as at 178-185'.			
195-205		Bedrock	10	6'	195-196': Same as above.  196-205': Albite gneiss bedrock, coarse grained, with 1/4" albite megacrystals. Several machine breaks, but at least 3 natural fractures with iron staining at 201', 202.5' and 203.5'. Bottom 6" of sample very quartz rich.	195-205'	0.0	
205-215			10'	8.5'	Albite gneiss bedrock. Iron-stained (natural) fractures at 206.5', 209.5' and 211.5'. Collected ground water sample GW-6 after completing well and purging approximately 80 gallons of water.	205-215'	0.0	GW-6 H-3<300 pCi/L

**Well Construction Details:**

- 0-1': Concrete and Flushmount Roadbox
- 1'-197.5': Portland Cement/Bentonite Grout
- 197.5'-202.5': Bentonite Chip Seal
- 202.5'-215': #0 Silica Sand Filter Pack
- 0-205': Schedule 80 2.5" PVC Riser
- 205'-215': Schedule 80 2.5" PVC, 0.010-Slot Screen
- 215': Bottom of Boring
- 0-26': 8" Steel Casing Cement/Bentonite-Grouted in Place






\*Results of on-site radiological screening <MDL unless otherwise noted

<b>GEOLOGIST'S LOG for Well #: MW-108C</b>			Yankee Nuclear Power Station Rowe, Massachusetts
Project:	Yankee Ground Water Investigation	Project Number:	
Client:	Yankee Atomic Electric Company	Logged by:	Dave Scott
Drilling Co:	D.L. Maher	Driller:	Bill Zamow (6/23-6/25), Roy Buckenberger (6/28-7/7)
Date Started:	June 23, 2004	Date Finished:	July 7, 2004
Location:	Rowe, Massachusetts	Drilling Method:	Rotosonic
Screen Diam:	2 inches	Length:	5 feet
Casing Diam:	2 inches	Length:	60 feet
Boring Depth:	170 feet (see note below)	Well Depth:	65 feet
Surface Elev.:	1118.7 feet MSL	MP:	Ground Surface
On-Site GW Analyses:	None	Off-Site GW Analyses:	None
		Slot Size:	0.010 inch
		Type:	Schedule 40, 2-inch PVC
		Boring Diam.:	7 7/8 inches
		Depth to GW:	14.20 feet from PVC
			on October 31, 2004



Depth	Well Log	Stratigraphy	Penetration	Recovery	Soil Core Description	Depth	FID Conc. (ppm) HS	Ground Water Sample No.*
46					See log of MW-108B for description of sediment and ground water samples.			
47								
48								
49								
50								
51								
52								
53								
54								
55								
56					<p align="center"><b>Well Construction Details:</b></p> <p>0-1': Concrete and Flushmount Roadbox</p> <p>1'-51': Portland Cement/Bentonite Grout</p> <p>51'-57': Bentonite Chip Seal</p> <p>57'-67': #0 Silica Sand Filter Pack</p> <p>0-60': Schedule 40 2" PVC Riser</p> <p>60'-65': Schedule 40 2" PVC, 0.010-Slot Screen</p> <p>170': Bottom of Boring (filled to 67' with bentonite chips)</p> <p>0-26': 8" Steel Casing Cement/Bentonite-Grouted in Place</p>			
57								
58								
59								
60								
61								
62								
63								
64								
65								
66								
67								
68								
69								
70								
71								

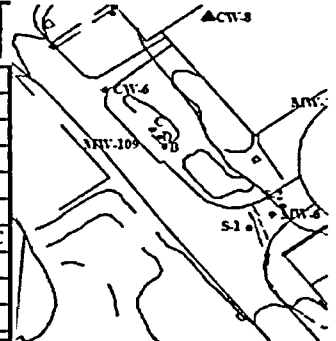
Key to Well Construction

-  Sandpack
-  Well Screen
-  Cement/Bentonite Grout
-  Bentonite Seal
-  Concrete and Flushmount Roadbox

# GEOLOGIST'S LOG for Well #: MW-109B



Yankee Nuclear Power Station  
Rowe, Massachusetts

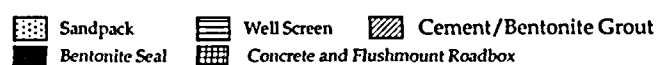


Project:	Yankee Ground Water Investigation	Project Number:	
Client:	Yankee Atomic Electric Company	Logged by:	Dave Scott (0-20') and Mike Ravella (20-190')
Drilling Co:	D.L. Maher	Driller:	Roy Buckenberger
Date Started:	July 20, 2004	Date Finished:	August 2, 2004
Location:	Rowe, Massachusetts	Drilling Method:	Rotosonic
Screen Diam:	2 1/2 inches	Length:	10 feet
Casing Diam:	2 1/2 inches	Length:	180 feet
Boring Depth:	190 feet	Well Depth:	190 feet
Surface Elev.:	1124.6 feet MSL	MP:	Ground Surface
On-Site GW Analyses:	H-3, Co-60, Cs-134, Cs-137	Off-Site GW Analyses:	VOCs by 8260B on October 31, 2004
		Slot Size:	0.010 inch
		Type:	Schedule 80, 2 1/2-inch PVC
		Boring Diam.:	5 1/2 inches
		Depth to GW:	28.70 feet from PVC


Depth	Well Log	Stratigraphy	Penetration	Recovery	Soil Core Description	Depth	FID Conc. (ppm) HS	Ground Water Sample No.*			
1		Fill	4'	1'	Fill consisting of silt, brown and fine to coarse sand, some fine to coarse subangular gravel, one fist-sized cobble, unsorted, loose, dry.	0-4'	0.0				
2											
3				1'	1'	Boulder: rusty-weathering gneiss.	4-5'	0.0			
4				6'	6'	5-6': Same boulder; rusty-weathering gneiss.	5-11'	0.0	GW-1 H-3 < 300 pCi/L		
5						6-8': Fill, same as 0-4'; dark brown oxidized zone at 8'.					
6						8-11': Sand, fine to medium and rounded fine to coarse gravel, with brown silt, few cobbles, unsorted, loose, dry.					
7		Stratified Drift	1'	1'	Boulder: albite gneiss.	11-12'	0.0				
8					12-13.5': Same boulder.	12-15'	0.0				
9				3'	2.5'				13.5-15': Silt, brown and fine to coarse angular gravel, little fine to medium sand, unsorted, loose, wet.		
10		Till	5'	5'	Till consisting of silt, olive, some fine to coarse sand and fine to coarse subangular gravel, trace clay, unsorted, very dense, damp. Advanced permanent 8" steel casing to 20' and cement grouted.	15-20'	0.0				
11											
12				5'	4'	Grayish Brown (5YR3/2) Gravely Silt: mostly silt, some gravel, little clay, poorly sorted, hard, damp, poor plasticity. (Till).	20-25'	0.0			
13				4'	3.5'	See next page.	25-29'	0.0			

NOTES:  
\*Results of on-site radiological screening <MDL unless otherwise noted

Key to Well Construction






GEOLOGIST'S LOG for Well No.:		MW-109B		 Yankee Nuclear Power Station, Rowe, MA		Page	2 of 6	
Depth	Well Log	Stratigraphy	Penetration	Recovery	Soil Core Description	Depth	FID Conc. (ppm) HS	Ground Water Sample No.*
27		Till	4'	3.5'	25-26': Grayish Brown (5YR3/2) Clayey Silt: mostly silt, some clay, some gravel; moderately soft, moist, some plasticity.	25-29'	0.0	
28	26-28.5': Grayish Brown (5YR3/2) Gravelly Silt: mostly silt, some gravel, poorly sorted, hard, damp to dry, poor plasticity. (Till).							
29			6'	6'	Same as above, no laminations thus far to this depth. Higher clay content at 4'. (Till).	29-35'	0.0	
30								
31								
32			5'	5'	Grayish Brown (5YR3/2) Clayey Silt: mostly silt, some clay, some gravel, unsorted, hard, damp to dry, some plasticity. Note: higher clay content than above. (Till).	35-40'	0.0	
33								
34								
35			5'	5'	Grayish Olive (10Y4/2) Clayey Silt: mostly silt, some clay, little gravel, hard, dry, little plasticity. Note: 6" cobble at 43.5', less clay and mostly silt at 44'. (Till).	40-45'	0.0	
36								
37								
38		Till	8'	8'	Grayish Olive (10Y4/2) Fine Sandy Silt: mostly silt, some fine sand, little clay, some laminations, hard, damp to moist, low plasticity. Note: silty fine sand from 51-52', moist. Hole produces water, with water level about 47'. (Silt / Till).	45-53'	0.0	GW-2 H-3 < 300 pCi/L
39								
40								
41								
42								
43								
44								
45								
46		4'	2'	Grayish Olive (10Y4/2) Silt: mostly silt, little fine sand, little clay, firm, damp to dry, low plasticity. (Silt / Till).	53-57'	0.0		
47								
48								
49		3'	3'	57-58': Same as above, but medium soft, damp.	57-60'	0.0		
50	58-60': Grayish Brown (5YR3/2) Silt: mostly silt, little gravel, hard, dry, no plasticity. (Till).							
51		5'	5'	Advanced 7 1/2" drill casing to 60' and pressure grouted with bentonite slurry to seal off above aquifer.	60-65'	0.0		
52	60-65': Grayish Brown (5YR3/2) Gravelly Silt: mostly silt, some to little gravel, little clay, hard, dry, no plasticity. (Till).							
53		2'	2'	Same as above. (Till).	65-67'	0.0		
54								
55								
56								
57								
58								
59								
60								
61								
62								
63								
64								
65								
66								

\*Results of on-site radiological screening <MDL unless otherwise noted

**GEOLOGIST'S LOG for Well No.: MW-109B**  Yankee Nuclear Power Station, Rowe, MA **Page 3 of 6**

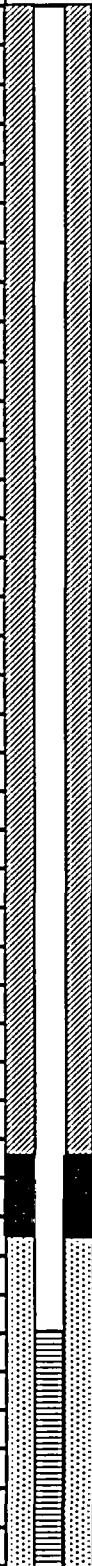
Depth	Well Log	Stratigraphy	Penetration	Recovery	Soil Core Description	Depth	FID Conc. (ppm) HS	Ground Water Sample No.*
67		Till	2'	2'	Same as above. (Till).	65-67'	0.0	
68			3'	3'	Same as above. (Till).	67-70'	0.0	
69								
70		Silty Sand	4'	4'	70-72': Same as above. (Till).	70-74'	0.0	
71					72-73': Grayish Brown (5YR3/2) Silty Sand: fine sand, some silt, little clay, unsorted, med. soft, moist. (Sand).			
72					73-74': Grayish Brown (5YR3/2) Clayey Silt: silt, some clay and gravel, very stiff, moist, poor plasticity. (Till).			
73		Till	6'	6'		74-80'	0.0	
74								
75								
76								
77				Grayish Brown (5YR3/2) Clayey Sandy Silt: mostly silt and clay, some fine sand and little gravel, poorly laminated, stiff, damp to moist, poor plasticity. (Till).				
78								
79								
80								
81								
82								
83								
84								
85								
86								
87								
88								
89								
90								
91	Silty Sand	10'	10'		90-100'	0.0		
92				90-93': Dark Yellowish Brown (10YR4/2) Silty Sand: mostly fine to coarse sand, little silt and little cobbles, poorly sorted, loose, wet. (Sand).				
93				93-97': Grayish Brown (5YR3/2) Silty Sand: mostly fine to coarse sand, little gravel and little clay, poorly sorted, medium dense, moist. (Sandy Till).				
94				97-98': Grayish Brown (5YR3/2) Clayey Silt: silt, some clay, little gravel, very stiff, moist, poor plasticity. (Clay Till).				
95	Clayey Silt			98-99': medium sand, some silt and little cobbles, poorly sorted, loose, wet.				
96				99-100': Same as 97-98'. (Clay Till).				
97	Silty Sand							
98								
99	Clayey Silt							
100								
101	Till	5'	5'		100-105'	0.0		
102				Grayish Brown (5YR3/2) Clayey Silt: silt, some clay, little gravel, very stiff, damp, poor plasticity. (Clay till).				
103				Advanced 7 1/2" drill casing to 105' and pressure grouted with bentonite slurry to seal off aquifer above.				
104								
105	Glaciolacustrine	5'	5'		105-110'	0.0		
106				See next page.				

\*Results of on-site radiological screening <MDL unless otherwise noted

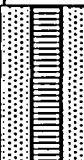
GEOLOGIST'S LOG for Well No.:		MW-108B		 Yankee Nuclear Power Station, Rowe, MA		Page 4 of 6		
Depth	Well Log	Stratigraphy	Penetration	Recovery	Soil Core Description	Depth	FID Conc. (ppm) HS	Ground Water Sample No.*
107		Till	5'	5'	Advanced 5½" drill casing to 105' and pressure grouted with bentonite slurry to seal off possible aquifer above. 106-110': Silt, olive, with clay and fine angular gravel, little coarse gravel, unsorted, very dense, damp.	105-110'	0.0	
108								
109								
110								
111			5'	5'	Clay, olive, with fine angular gravel, trace coarse subangular garnet schist gravel, one talc clast, unsorted, unlayered, hard, damp. This interval drilled easier than above.	110-115'	0.0	
112								
113								
114								
115								
116								
117								
118								
119		10'	10'	Clay, olive, with fine angular gravel. Few 1-2 mm very fine gray sand lamellae at 124' and one 1" very coarse brown sand layer with small cobbles at 115'.	115-125'	0.0		
120								
121								
122								
123								
124								
125								
126								
127		7'	7'	Silt, olive, with clay and fine to coarse angular gravel, unsorted, very dense, no layering, damp. 4" schist cobble at bottom.	125-132'	0.0		
128								
129								
130								
131								
132								
133		3'	3'	Same as above, some gneiss and schist cobbles.	132-135'	0.0		
134								
135								
136		3'	3'	Silt, olive, and fine to coarse angular gravel, trace clay, unsorted, very dense, dry; 4" anorthosite cobble at bottom.	135-138'	0.0		
137								
138								
139								
140								
141		7'	7'	Same as above. No imbrication of gravel.	138-145'	0.0		
142								
143								
144								
145		4'	3'	145-147': Same as above.	145-149'	0.0		
146								

\*Results of on-site radiological screening <MDL unless otherwise noted

**GEOLOGIST'S LOG for Well No.:** MW-109B  Yankee Nuclear Power Station, Rowe, MA **Page 5 of 6**

Depth	Well Log	Stratigraphy	Penetration	Recovery	Soil Core Description	Depth	FID Conc. (ppm) HS	Ground Water Sample No.*		
147		Glaciolacustrine Sequence	10'	10'	145-147': Mostly silt, some fine sand, little gravel, not laminated, soft, damp, no plasticity.	145-155'	0.0	GW-5 H-3=880 pCi/L		
148					147-155': Grayish Brown (5YR3/2) Silt: mostly silt, little clay, not laminated, firm, damp, no plasticity.					
149			10'	10'	155-156': Grayish Brown (5YR3/2) silt: mostly silt, little clay, not laminated, firm, moist, poor plasticity.	155-165'	0.0			
150					156-157': Grayish Brown (5YR3/2) Sand: fine to medium sand, some silt, poorly sorted, loose, wet.					
151					157-158': Same as 155-156', but soft and wet.					
152					158-159': Same as 156-157'.					
153					159-164.5': Same as 155-156', but very little clay. Rods are wet.					
154									164.5-165': Same as 155-156', but very little clay and dry.	
155										165-171': Grayish Brown (5YR3/2) Silt: mostly silt, little to no clay, firm, not laminated, moist to wet, poor plasticity (Silt).
156										
157	174-175': Crushed weathered rock, dry (cobble or bedrock).									
158		175-190':								
159			Advanced 5½" drill casing to 175'. Cored competent rock from 175-190': biotitic albite gneiss. Natural fractures at 173' and 173.5' (iron staining on 173' fracture). Remaining fractures appear to be machine breaks. Missing 5' of sample is probably due to washed out fractured material. Collected GW-6 from well after sand pack and bentonite seal were placed.							
160				175-190'						
161	0.0									
162		GW-6 H-3<300 pCi/L								
163			Bedrock							
164				15'						
165	10'									
166		10'								
167			10'							
168				10'						
169	10'									
170		10'								
171			10'							
172				10'						
173	10'									
174		10'								
175			10'							
176				10'						
177	10'									
178		10'								
179			10'							
180				10'						
181	10'									
182		10'								
183			10'							
184				10'						
185	10'									
186		10'								

\*Results of on-site radiological screening <MDL unless otherwise noted

Depth	Well Log	Stratigraphy	Penetration	Recovery	Soil Core Description	Depth	FID Conc. (ppm) HS	Ground Water Sample No.
187 188 189 190		Bedrock	15'	10'	Cored competent rock from 175-190': biotitic albite gneiss. Natural fractures at 173' and 173.5' (iron staining on 173' fracture). Remaining fractures appear to be machine breaks. Missing 5' of sample is probably due to washed out fractured material.	175-190'	0.0	GW-6 H-3<300 pCi/L

**Well Construction Details:**

- 0-1': Concrete and Flushmount Roadbox
- 1'-175.5': Portland Cement/Bentonite Grout
- 175.5'-177.5': Bentonite Chip Seal
- 177.5'-190': #0 Silica Sand Filter Pack
- 0-180': Schedule 80 2.5" PVC Riser
- 180'-190': 0.010" Schedule 80 2.5" PVC Screen
- 190': Bottom of Boring
- 0-20': 8" Steel Casing Cement/Bentonite-Grouted in Place

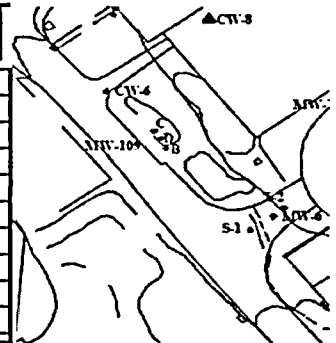
\*Results of on-Site radiological screening <MDL unless otherwise noted

# GEOLOGIST'S LOG for Well #: MW-109C



Yankee Nuclear Power Station  
Rowe, Massachusetts

Project:	Yankee Ground Water Investigation	Project Number:	
Client:	Yankee Atomic Electric Company	Logged by:	Dave Scott
Drilling Co:	D.L. Maher	Driller:	Roy Buckenberger
Date Started:	August 6, 2004	Date Finished:	August 9, 2004
Location:	Rowe, Massachusetts	Drilling Method:	Rotosonic
Screen Diam:	2 inches	Length:	5 feet
Casing Diam:	2 inches	Length:	49 feet
Boring Depth:	55 feet	Well Depth:	54 feet
Surface Elev.:	1124.2 feet MSL	MP:	Ground Surface
On-Site GW Analyses:	None	Off-Site GW Analyses:	None
		Slot Size:	0.010 inch
		Type:	Schedule 40, 2-inch PVC
		Boring Diam.:	5 1/4 inches
		Depth to GW:	15.28 feet from PVC
			on October 31, 2004



Depth	Well Log	Stratigraphy	Penetration	Recovery	Soil Core Description	Depth	FID Conc. (ppm) HS	Ground Water Sample No.*
31								
32								
33								
34								
35								
36								
37								
38								
39								
40								
41								
42								
43								
44								
45								
46								
47								
48								
49								
50								
51								
52								
53								
54								
55								
56								


See log of MW-109B for description of sediment and ground water samples.

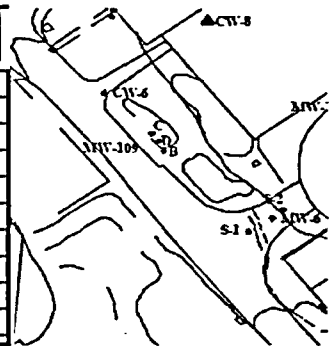
### Well Construction Details:

- 0-1': Concrete and Flushmount Roadbox
- 1'-42.5': Portland Cement/Bentonite Grout
- 42.5'-46.8': Bentonite Chip Seal
- 46.8'-55': #0 Silica Sand Filter Pack
- 0-49': Schedule 40 2" PVC Riser
- 49'-54': 0.010" Schedule 40 2" PVC Screen
- 55': Bottom of Boring

#### Key to Well Construction

- Sandpack
- Well Screen
- Cement/Bentonite Grout
- Bentonite Seal
- Concrete and Flushmount Roadbox

<b>GEOLOGIST'S LOG for Well #: MW-109D</b>				Yankee Nuclear Power Station Rowe, Massachusetts	
Project:	Yankee Ground Water Investigation	Project Number:		Logged by:	Dave Scott
Client:	Yankee Atomic Electric Company	Driller:	Roy Buckenberger	Date Started:	August 2, 2004
Drilling Co:	D.L. Maher	Drilling Method:	Rotosonic	Date Finished:	August 6, 2004
Location:	Rowe, Massachusetts	Length:	5 feet	Slot Size:	0.010 inch
Screen Diam:	2 inches	Length:	88.7 feet	Type:	Schedule 40, 2-inch PVC
Casing Diam:	2 inches	Well Depth:	93.7 feet	Boring Diam.:	5 1/2 inches
Boring Depth:	113 feet	MP:	Ground Surface	Depth to GW:	37.87 feet from PVC on October 31, 2004
Surface Elev.:	1124.2 feet MSL	Off-Site GW Analyses:	None		
On-Site GW Analyses:	None				



Depth	Well Log	Stratigraphy	Penetration	Recovery	Soil Core Description	Depth	FID Conc. (ppm) HS	Ground Water Sample No.*
77								
78								
79								
80								
81					See log of MW-109B for description of sediment and ground water samples.			
82								
83								
84								
85								
86								
87								
88								
89								
90								
91								
92								
93								
94								
95								
96								
97								
98								
99								
100								
101								
102								

**Well Construction Details:**

- 0-1': Concrete and Flushmount Roadbox
- 1'-83': Portland Cement/Bentonite Grout
- 83'-86': Bentonite Chip Seal
- 86'-96': #0 Silica Sand Filter Pack
- 0-88.7': Schedule 40 2" PVC Riser
- 88.7'-93.7': 0.010" Schedule 40 2" PVC Screen
- 113': Bottom of Boring (filled to 96 feet with bentonite chips)
- 0-21': 8" Steel Casing Cement/Bentonite-Grouted in Place

**Key to Well Construction**

