

## MY RCRA Long-term Groundwater Monitoring Program

By Stratex, LLC

### **Introduction**

Specific soils and sediments on the site have been found to be affected by Maine Yankee activities and a number of individual soil and sediment remedial activities have been undertaken as part of decommissioning. Some of the soil contamination has led to groundwater impact. In the vicinity of Warehouse 2/3, there is one small area of groundwater impact from Volatile Organic Compounds (VOCs) where federal Maximum Contaminant Levels (MCLs) and State of Maine Maximum Exposure Guidelines (MEGs) have been exceeded. There are isolated wells where MCLs for arsenic, lead, thallium, and heptachlor were exceeded. Over much of Bailey Point, Diesel Range Organics (DRO) concentrations in groundwater exceed the MEGs due to dispersed spillage or leakage of petroleum products on soil. Large portions of Bailey Point have MEG exceedances of naturally-occurring metals such as aluminum, boron, sodium, molybdenum, manganese, and iron. Although a few of these exceedances may be due to natural occurrence, most of the exceedances are either a direct or indirect result of Maine Yankee site activities.

The RCRA closure of the Maine Yankee site requires the identification of those portions of the site representing an unacceptable risk ( $>10^{-5}$  incremental cancer risk) from chemical exposure. A Corrective Measures Study (CMS) has been performed to evaluate alternative ways of reducing this risk. Most of the groundwater on the Maine Yankee site that exceeds MEGs is in low permeability clay-silt or in fractured bedrock. Furthermore, some of the chemicals that exceed MEGs are being continually generated (e.g., the manganese under the 345 kV lines due to filling of dredge spoils over a former saltmarsh). Therefore, most of the groundwater under Bailey Point that has been negatively affected by site activities is impossible to actively remediate through any reasonable means. Many of the contaminants, however, will be reduced over time by flushing from the system and normal biodegradation processes. The proposed groundwater monitoring is required to characterize the baseline conditions and then evaluate the changes, if any, in groundwater quality through time.

The long-term groundwater monitoring plan includes an initial three year period of quarterly groundwater sampling. This initial portion of the long-term monitoring plan would be used to establish baseline conditions. Following completion of the baseline program, sampling would be conducted three times per year (“tri-annual”) every five years. In years 29 and 30 of the monitoring program, all wells still in the program would be sampled three times each year.

### **General criteria for monitoring plan design:**

Groundwater monitoring data collected from March 2000 to April 2003 from RCRA monitoring wells (63 wells on Bailey Point) were reviewed in the development of this plan. Where multiple rounds suggested significant change from early results, more weight was given to later rounds. Only wells with contaminants occurring near or exceeding Project Action Limits (PALs) are included in the sampling list. Furthermore, not all wells with exceedances are included; only representative wells with higher concentrations were chosen for long-term sampling on the theory that once these wells with higher concentrations show declines below PALs, the wells with lesser concentrations will have also declined below PALs. Where a particular set of contaminants is common to a general area, but not every contaminant is elevated above a PAL in every well, all common contaminants will usually be measured in each sub-area. In a few instances no further monitoring is recommended for a single isolated parameter (e.g., pesticides detected in MW-401A, MW-312, and MW-315) that may slightly exceed a PAL, or the occurrence was isolated and not confirmed with later sampling. Well locations were selected to cover the general area of a specific area of groundwater contamination, with coverage weighted toward the downgradient portion of a contaminated area. Wells such as B-201 that are naturally brackish because of depth and shoreline location are not included.

### **Well Locations and Analytical Parameters:**

The locations of the 23 monitoring wells in the program are depicted in Figure G-1. For Monitoring Wells MW-401A and MW-401B, because of uncertainty over whether the labeling of these wells may have been reversed, both wells will be sampled for year 1 of the baseline program.

Table G-1 lists the chemical constituents to be analyzed for each monitoring well.

### **Monitoring Schedule:**

Quarterly groundwater monitoring shall occur during the baseline period (first three years) to establish seasonality. This is the minimum statistically acceptable sampling regime to establish a baseline for future comparison. Sampling shall occur in March, June, September, and December during the baseline period. Thereafter, sampling will occur three times per year every fifth year, with sampling to occur in April, August, and December. In years 29 and 30 of the program, sampling would occur three times in each year and the program would end at the end of 30 years.

### **Special Synoptic Groundwater Level Monitoring Program in First Year**

Because previously-abandoned monitoring wells must be re-installed, and because groundwater level conditions are expected to change on the site because of the decommissioning of the Containment Foundation Sump, during the first year of the monitoring program two sets of synoptic water levels will be taken at the 23 wells. The first set would be taken in September 2005 and the second set would be taken in April

2006. All RCRA wells not included in the long-term monitoring program would be properly abandoned.

### **Sampling Methods and Data Analysis:**

Sampling would be by low-flow methods in conformance with the QAPP (Stratex, 2001, as revised). **Bailing of wells will not be permitted.** During low flow sampling, field parameters will be measured as dictated by the QAPP to determine stability. Results would be subject to Tier II validation. **For wells MW-404, -405, -408, -409A, -422A, and -429, where Volatile Organic Compound testing is required, EPA Method 8260 must be used and all target analytes reported.** One equipment blank per day of sampling would be submitted. One duplicate sample per 10 analyses of each analyte will be run.

### **Reporting:**

All monitoring data must be submitted to the Department in the Department's environmental data deliverable (EDD) format after each sampling round. Annual reports, of four quarters of sampling each, must be submitted during the baseline period. At the end of the baseline period a full report including graphs and statistical trend analyses of the analytical results with comparisons to MCLs/MEGs must be submitted.

Following each subsequent year of tri-annual monitoring, an updated report must be submitted.

At the end of year 30 of the program, a report including monitoring results and a summary of the program must be submitted for the Department's review and approval prior to well abandonment.

Following the initial 3-year sampling and for each of the five year sampling intervals thereafter, Maine Yankee will make a recommendation to: 1) discontinue testing; 2) continue testing with the same program; 3) modify the program to change the parameter list and/or frequency of testing and the number of wells to be included in the testing. For those wells with continued sampling, an evaluation of the data and overall data history following each 5-year period of tri-annual sampling would be conducted, and recommendations would be made to drop parameters and wells as appropriate.

### **Program Modifications:**

Maine Yankee may request the deletion of selected parameters at any given well from the program under the following conditions:

- 1) If there are no exceedances of MCLs or MEGs for the last 8 consecutive quarters of the 3-year baseline period; or,
- 2) If there are no exceedances of MCLs or MEGs for 6 consecutive tri-annual sampling events; or,

3) If there are no exceedances of MCLs or MEGs in any of the tri-annual sampling events of two consecutive 5-year sampling episodes.

In the event that either well or both monitoring wells MW-401A and MW-401B show no exceedances of MEGs or MCLs after the completion of four quarters of sampling, Maine Yankee may request deletion of either or both wells from the program at the end of year 1 of the program.

Maine Yankee may request the deletion of any given well from the program in the event that all of the above conditions are met for all parameters defined for testing at any given well.

**Attachments:**

Table G-1—Bailey Point RCRA Groundwater Exceedance Summary and Long-term Monitoring Recommendations

Figure G-1—Proposed RCRA Groundwater Monitoring Well Locations

Attachment G-1—Rationale for Selection of Groundwater Monitoring Wells