State Innovation Grant Project
Rhode Island Department of Environmental Management (DEM)
Progress Report #6
April 1, 2008 to June 30, 2008

Project Title: Underground Storage Tanks—Alternative Inspection Programs and the U.S. Energy Policy Act of 2005

Part 1 – Synopsis of Accomplishments. The major activities that took place during the reporting period included meetings/conference calls, updating of facility and tank baseline data, tabulation of *5-year* (not 10-year, see below for explanation) historical compliance data, two ongoing linear regression analyses of 2004 baseline data, and ongoing interstate indicator comparative analysis. DEM and URI project participants met frequently and several conference calls with FL UST program personnel took place. Information for the post-certification analysis is being gathered as 81 of the 100 randomly-selected facilities were inspected and data are being tabulated in Excel. Relative to the original work plan schedule and the key tasks associated with this reporting period, progress is summarized below. In addition, other activities not part of the original work plan but relevant to the goals of the project are ongoing and explained further in Part 2 (regression analyses of baseline data and economic analysis).

Task	Original Completion Date	Status	Comments
Statistical analysis of RIDEM UST ERP data	June 1, 2008	Ongoing	Baseline facility- and tank-level data analysis ongoing. Wald, adjusted Wald, and cluster confidence interval calculations ongoing. Total of 96 measurable and performance trend indicators identified (see attached file). Post-certification data gathering almost complete (81 of 100).
Tabulate RIDEM 5-yr historical compliance data	Dec. 31, 2007	Completed	Changed period from 10 years to 5 years since only data from 2001 to 2005 was deemed available and usable.
Start regression analysis of historical data	Jan. 1 2008 (start)	Ongoing	Regression analysis of historical data ongoing but effort expanded to include analysis of baseline data, both at the tank and facility-levels (see attached reports).
Design data collection template/criteria for partner states	Nov. 1, 2007	Completed for FL, ongoing with NH	Conference calls with Florida to develop approach and format for data gathering. Discussions with NH ongoing,
Send out data collection template/criteria to partner states	Jan. 1, 2008	Completed for FL, on going with NH	Florida provided with table of formatted performance indicator data to begin analysis of FL data.
Begin Interstate Comparative Analysis	July 1, 2008 (start)	Ongoing	Using table provided, Florida has commenced data collection and grouping.

Part 2 – Narrative Discussion.

- *Statistical Analysis of ERP Data* - Further analysis and refinement of the baseline data have resulted in the identification of 60 measurable facility and tank-level indicators and 36 performance trend indicators (96 total, see attached Excel file "USTBaselineIndicator"). Any indicator that displays a compliance proportion of 0.95 or less is considered a potentially measurable indicator whereas those indicators that were calculated to be over 0.95 are categorized as performance trend indicators, to be monitored for continued compliance. Additional statistical work (Wald, adjusted Wald, cluster analysis) is being conducted relative to confidence interval calculations. The analysis of data at both the facility and tank-levels goes beyond the scope of work presented in DEM's original proposal and workplan, but is being performed to further support the validity of ERP when compared against a traditional inspection program as noted below.

  Of the 100 randomly selected post-certification inspections, 81 were completed by DEM's Office of Waste Management as of June 30, 2008. URI is inputting the results of the post-certification inspections into a similar template used for the baseline data set; data are being double checked for accuracy. Once the full set of post-certification inspections is completed, data can be organized and formatted to begin the performance measurement step of the analysis.

- *Rhode Island Historical Compliance Data* - It was originally believed that a 10-year history of RI compliance data existed from the Offices of Waste Management and Compliance & Inspection. However, in this reporting period, it was determined that accurate and usable data existed only from 2001, so the length of the time period has been modified from 10 years to 5 years (2001-2005). All data have been tabulated and can be found in 2 attachments, "5-YearHistData" and "5-YearHistData(Summary)". Regression analysis of the historical data should be started in the next reporting cycle.

- *Regression Analysis* - In the last reporting period, a first year URI graduate student in computer science and statistics began to develop a data set (which includes baseline data and new data collected from follow-up field visits/telephone calls to all 96 baseline facilities) for multivariate regression analysis. The purpose of this analysis is to identify key variables that influenced compliance status at baseline, if possible. Though this activity was not identified as a deliverable in the EPA grant proposal, investigators felt that this analysis could provide useful information in support of the project. Unfortunately, the student who originally began this effort is no longer at URI (left graduate school to enter the workforce), but two new graduate students have been hired and are continuing the data collection and analysis efforts; together, they have worked on two different regression analyses, one on baseline tank level data and the other on baseline facility-level data. Two summary reports are attached that describe the results. The modeling process presented in the attachments will be continued for the purpose of finding a better fit as R**2 was rather low (we therefore did not pickup many significant variables). This will include the addition of several interaction terms.

- *Partner States* - Work with partner states to compare compliance rates for indicators is continuing. Through communications via conference calls with Roberta Dusky of FL DEP, an approach was developed to extract the needed information from Florida's database. The baseline indicator table developed by DEM was also forwarded to FL to assist in the comparative analysis. While regulations are similar in both states, there are many differences in formatting where specific regulations are not presented exactly the same. For example, one checklist item in FL's inspection sheet may cover several detailed questions in RI's checklist, so some type of reordering is necessary to line up the analogous indicators properly. Initial analysis of the FL data indicate that out of 19,200 inspections, approximately 7,000 facilities were found to have some sort of non-

compliance issue with a total of 19,200 violations. However, another major barrier to collecting the required UST data is that the FL database contains both UST and AST (above-ground storage tank) inspection results. Roberta is in the process of sorting and filtering to separate UST data from AST data. For the reasons mentioned above, more time than originally anticipated is needed to set up an analogous matrix. In any case, the comparative analysis has begun and is following the projected timeline (July 1, 2008 start date).

Work with New Hampshire is ongoing as information has been obtained and is under review. The same baseline indicator table developed this reporting period and sent to FL has also been forwarded to NH in hopes of setting up a similar comparative analysis. DEM also had discussions with Virginia regarding their FY2004 UST database (Oct. 1-2003 to Sep. 30, 2004) which contains data on 923 inspections, but found that direct comparative analysis would be difficult as data are presented in 5 broad aggregated categories (Registration, Overfill Protection, Spill Protection, Release Prevention, and Corrosion Protection) with 3 general descriptors (Full compliance, Minimal compliance, and Noncompliance) which limits its usefulness. Further, DEM has queried the possibility of obtaining UST baseline data from Vermont with Mike Crow. Similar difficulty with Vermont's data (EBPI data are aggregated into broad categories) exists, though it appears possible to disaggregate the data into a form that may be useful to the overall comparative analysis step of the project.

- *Economic Analysis* – While not a primary task of this proposed project, a first order economic evaluation was performed in previous reporting periods to compare the costs of ERP versus the traditional inspection approach for the RI UST program. Even though it can be shown that ERP can cost less to administer than the required approach set forth by the Energy Act (each facility inspected at least every 3 years), ERP must be as effective as or more effective than the standard protocol to be deemed acceptable. A paper is currently being written for journal publication (1st page of a rough draft is attached for information purposes only).

Part 3 – Projection of Activities, Accomplishments, and Major Expenditures for Next Quarter Report. All of the post-certification inspections should be completed by the end of the next reporting period and data incorporated into the ongoing statistical analyses. Regression analysis for the 5-year compliance data should also be well underway. Much of the direct comparative indicator analysis with FL should be completed during the next reporting period, subject to FL work schedule. Communication via conference calls and/or a visit to NH will take place to work on indicator comparisons between RI ERP and NH's traditional inspection programs. The economic analysis paper will also be more complete and possibly ready for publication. There will be no unusual expenditures expected for the next reporting period. Project staff will be attending the upcoming Second Annual National States Environmental Results Program (ERP) Consortium Meeting to discuss preliminary findings.

Part 4 – Financial Report.

Confidential business information removed by EPA.

Attachments:

1. Excel file – UST Baseline Indicator List
2. Report – Tank Level Regression Analysis of Baseline Data
3. Report – Facility Level Regression Analysis of Baseline Data
4. Excel File – 5-year RI Historical Compliance Data (complete set)
5. Excel File – 5-year RI Historical Compliance Data (summary table)
6. Report – 1st page of Economic Analysis Paper