U.S. Environmental Protection Agency
Office of Policy, Economics and Innovation
Washington, D.C. 20460

State Innovation Grant Project Work Plan
19 July 2006

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

II. Applicant Information:

State Lead. Rhode Island Department of Environmental Management (RI DEM), Office of Technical & Customer Assistance (OTCA), 235 Promenade Street, Suite 330, Providence, Rhode Island 02908-5767. Contacts: Ronald N. Gagnon, P.E., OTCA Chief (ron.gagnon@dem.ri.gov; fax: 401/222-3810; phone: 401/222-4700 ext. 7500); Richard T. Enander, PhD, Supervising Scientist (richard.enander@dem.ri.gov; fax: 401/222-3810; phone: 401/222-4700 ext. 4411).

Project Partners. University of Rhode Island (URI) Department of Computer Science and Statistics (Prof. R. Choudary Hanumara, PhD, rch@cs.uri.edu; fax:401/874-4617; phone: 401/874-4388) and the Center for Pollution Prevention and Environmental Health (Eugene Park, PhD, park@egr.uri.edu; fax: 401/874-4689; phone: 401/874-4303); Florida Department of Environmental Protection (FDEP), 3900 Commonwealth Blvd. M.S. 49, Tallahassee, FL 32399 (Michael Redig, michael.redig@dep.state.fl.us; fax: 850/245-2128; phone: 850/245-2118); additional states in accordance with the research design plan outlined below.

III. Funding Requested:

$250,000	**Total funding requested from EPA**
$92,369	**Proposed state leverage funds**
$342,369	**Total project costs**

IV. Project Period.

1 January 2007	**Estimated project start date**
31 December 2009	**Project completion date**

V. Narrative.

A. Project Overview. The Rhode Island Department of Environmental Management will work with the Florida Department of Environmental Protection and EPA to assess whether an Environmental Results Program (ERP) approach to the Underground Storage Tank (UST) sector can be as effective, or more effective, than traditional enforcement programs in achieving regulatory compliance. The project will also compare the cost/benefits of each approach. The project will provide data to inform the upcoming EPA response to the Energy Policy Act of 2005 (the Energy Act) which calls for a broad study of "alternatives" to traditional enforcement. The RI/FL team's ability to conduct a specific comparative study is unique as Rhode Island is the only state with an active UST ERP, while Florida has one of the oldest and richest UST inspection/enforcement data bases in the country.

The study will be designed to accomplish additional specific goals. It will examine the transferability of ERP to other states as an alternative inspection/compliance program and will

provide critical data and data analysis to enhance other state's interest in implementing ERPs. The project should also allow follow-on state programs to benefit from lessons learned in RI and FL, and the ability to frame their results more effectively in the future. It will do so by creating a data base that leads to the identification of key ERP performance indicators and measurement of their subsequent effectiveness. Ultimately, the data base should build federal and state capacity to implement ERPs and compare results across states and regions.

B. Problem Statement. Noncompliance with underground storage tank requirements (often leading to groundwater contamination) is a national issue. This study is expected to provide critical data to states and EPA with the goal of improving UST sector-wide compliance and protecting groundwater resources. Groundwater contaminated with fuel and petroleum product constituents such as benzene (a known human carcinogen) and methyl tertiary butyl ether (MTBE), for example, has resulted in the impairment of potable water supplies for millions of people nationwide. Attempted remediation has cost more than $1 billion per year spent in state and federal funds.[1] In Rhode Island, for example, public water drawn from a well field used to service more than 4,000 people in the village of Pascoag was found to be contaminated with MTBE at levels an order of magnitude higher than the drinking water health advisory of 40 ppb.[2] Nationally, more than 418,000 underground storage tank (UST) releases were recorded as of 30 September 2001, while more than 260,000 contaminated sites have been investigated and cleaned up.[3] In Florida alone, for example, petroleum product releases from more than 28,000 facilities have threatened groundwater supplies used by 92 percent of the population. As a result Florida has enacted some of the most stringent UST rules in the country.[4]

To prevent leaks and protect groundwater resources, Rhode Island General Law 46-12-30.2(b) (RIGL) requires all underground storage tanks used for petroleum products and subject to registration to be inspected "at least once in each twenty four (24) month period." In response to this biennial requirement, RIDEM adopted the ERP approach—facility self-certification and random inspections. State UST inspections were also affected by the federal Energy Act, which requires that state environmental agencies inspect all USTs at least once every three years. Most states do not have enough inspectors to meet this requirement and have thus turned to alternate programs—3rd party inspectors/self-certification, for example—or have not inspected tanks at all. RIGL and the Energy Act assume that more inspections by state inspectors will improve compliance and prevent further leaks. Regulatory flexibility afforded by alternate programs such as the ERP approach would allow states to target their inspections at facilities that do not complete the self-certifications or provide inconsistent answers, generally the facilities that would not comply with the regulations, and spend fewer resources on facilities that properly complete the self-certifications and maintain compliance with the regulations.

However, the Energy Act also requires EPA to study alternatives to inspections and submit a report to Congress within four years of its enactment. The purpose of this research project is to determine whether the ERP model can achieve equal or superior environmental

[1] US EPA. Cleaning Up Underground Storage Tank System Releases. Available: http://www.epa.gov/swerust1/cat/index.htm
[2] RIDEM. Pascoag Water District Environmental Response Plan. Available: http://www.dem.ri.gov/programs/benviron/waste/Pascoag/erp.pdf.
[3] US EPA. ibid.
[4] FLDEP. Storage Tank Regulation. Available: http://www.dep.state.fl.us/waste/categories/pss/default.htm

performance when compared to the traditional facility-by-facility UST inspection programs required by state and federal law.

C. Technical Approach.

1. **Goals and Objectives.** As stated, this study will evaluate ERP as an alternative compliance strategy pursuant to Rhode Island General Law 46-12-30.2(b). Specifically, the grant project will:
   - **i.** Evaluate industry performance (compliance rates/leak prevention) under ERP for federally regulated facilities.
   - **ii.** Determine the applicability of ERP to the RI state regulated tank universe.
   - **iii.** Identify and statistically evaluate key variables associated with facility noncompliance.
   - **iv.** Compare cost data and results obtained from ERP and traditional facility-by-facility inspection models.
   - **v.** Provide data and information to inform RI tank management policy decision makers and the upcoming EPA study mandated by Congress under the Energy Act.

The project team will use a number of standard statistical techniques to evaluate industry performance in Rhode Island under the ERP model. For example, the Fisher exact test and Bonferroni correction will be used to test whether significant improvements in compliance occurred as a result of applying ERP to the federally regulated tank sector in Rhode Island. Regression analysis will also be used to identify significant variables associated with facility noncompliance under both the traditional and ERP enforcement scenarios. The potential of the ERP model and its components as compliance/enforcement enhancement tools will be evaluated for use at the state and federal levels. Cost data and performance results (ERP vs. traditional enforcement) for each approach will also be compared and evaluated. Ultimately, interstate comparison data, statistical findings and lessons learned will be summarized and presented in the form of a final project report and case study. Study data and information will be presented to inform Rhode Island tank management policy decision making and the upcoming EPA Energy Policy Act study. Additional objectives for the project are to encourage the use of best management practices, promote lasting change and improvement in environmental performance, and develop a model framework that can be transferred to other states.

2. Logic Model. Logic models "describe the causal relationships among program elements and the problem to be solved" (Bend and Mandolia, State Innovation Grants Workshop, May 2006). The logic model for the Rhode Island ERP study is shown on page 4 under the heading "Program/Project Description Worksheet I." As stated, the overall goal of the study is to determine whether the Environmental Results Program model can serve as an effective alternative for the facility-by-facility underground storage tank inspection approach currently used by states and mandated by the Energy Policy Act of 2005. As shown, the project consists of two major parts: 1) a RI UST ERP performance measurement component, and 2) an interstate comparative evaluation study. Major elements under each category heading—resources, activities, outputs, customers reached and outcomes—are listed as bullets. A key distinction between the two parts of the study can be seen in terms of project partners: the UST ERP performance measurement component will rely primarily on RI partners (including two RIDEM enforcement divisions and the URI Departments of Computer Science & Statistics and Center for Pollution Prevention) whereas the interstate comparative evaluation component will bring in external stakeholders such as Florida and possibly Texas. Key project outputs will include the

Program/Project Description Worksheet I

Program/Project Mission or Goal: Conduct a study to determine whether the Environmental Results Program model can serve as an effective alternative to the traditional UST inspection approach currently used by states and mandated by the Energy Policy Act of 2005.

			Outcomes			
Resources & Partners	**Activities**	**Outputs**	**Customer Reached**	**Short Term**	**Intermediate Term**	**Long-Term**
▪ 1-2 OTCA staff FTEs (RI) ▪ 1-2 UST Staff FTEs (RI) ▪ 2 URI Professors ▪ 1-2 URI students ▪ EPA-NE/HQ partners ▪ $250,000 EPA-HQ grant ▪ Pen tablets for field inspections/DEM computer repository ▪ RI workbook & outreach materials ▪ <1 FTE per control state partner ▪ Data base/information resources	▪ Conduct baseline + post-ERP inspections- (RI match) ▪ Data entry automation/evaluation ▪ Collect historical inspection, site, economic, geographic data (RI regression analysis) ▪ Conduct statistical analysis (descriptive,Fisher, Bonferroni, regression analysis) ▪ DEM surveys and selects control state(s) ▪ DEM develops data collection guidelines for state partners ▪ States provide facility inspection/ program & economic data ▪ Data evaluation ▪ ERP model- interstate comp-arative analysis	▪ 1st national UST ERP model demonstration ▪ Measurement data presentation (e.g., no. of inspections, violations, RTC plans) ▪ Regression/state comparative model ▪ Interim progress reports to EPA ▪ Periodic internal/external evaluation meetings ▪ Comparative study results published ▪ Final report on feasibility of UST ERP w/ statistical model	▪ EPA/national UST enforcement and assistance programs ▪ US Congress ▪ RI UST stakeholder group ▪ Individual UST sector facilities ▪ RI DEM management and program staff ▪ Partner/other state UST enforcement and assistance programs ▪ ASTSWMO, Industry Associations, HQ/Region I OUST	▪ Improvement in knowledge and understanding of UST and ERP requirements among facility participants (RI) ▪ Improvement in knowledge and understanding of UST ERP model among state partners ▪ Improvement in understanding of ERP benefits among RI UST program staff ▪ Comparative analysis	▪ Improved practice and behavior among UST ERP participants (e.g., increased compliance, fewer leaks/releases) ▪ Results inform management decisions ▪ Change in how EPA-OUST conducts business ▪ Change in how partner and other states conduct business ▪ Revised Energy Act legislation allowing ERP	▪ Improved environmental quality through reduction in the number of product/chemical releases ▪ Equal or improved facility compliance (e.g., fewer violations found during random audits) using ERP model ▪ Fewer resources expended w/o loss of compliance ▪ ERP model serves as an alternate inspection tool ▪ Establishment of lasting partnerships between RI and participating states ▪ ERP model or model "components" serve as inspection enhancement tools for partner states

External Influences: U.S. Energy Act requirements

generation of measurement data from Rhode Island as the first national UST ERP model demonstration project, interim progress reports, interstate comparative study results, statistical model(s) based on regression analysis targeted to variables affecting noncompliance, and a final report and case study on the feasibility of using the ERP model for UST compliance.

3. Key Activities and Milestones.

♦ **Current Situation and Need.** RIDEM proposes to undertake a study that compares ERP as an "alternate inspection approach" to the conventional facility-by-facility inspection approach currently in use by states. The study design follows the "comparative/historical approach" described in the draft "White Paper: Considerations in Studying the Efficacy of the Environmental Results Program (ERP) Approach for Underground Storage Tanks (USTs)" prepared by The Cadmus Group, Inc. for the US EPA.[5] . Noncompliance with underground storage tank requirements (often leading to groundwater contamination) is a national issue and this study is expected to provide critical data to states and EPA with the goal of improving UST sector-wide compliance and protecting groundwater resources.

Nationally, Rhode Island is the first state to have developed a mandatory ERP for the underground storage tank sector. Beginning in 2003, with the support and active involvement of EPA New England (Region 1) and based on our success with the voluntary auto body certification program, RIDEM undertook as series of stakeholder meetings to launch its statewide UST ERP. The stakeholder process ultimately resulted in the development of the 2004 "Environmental Results Program Compliance Certification Checklist and Forms Booklet For Underground Storage Tank Facilities" and "Environmental Results Program Certification Workbook For Underground Storage Tank Facilities" (meeting notes, checklist and workbook available at: http://www.dem.ri.gov/programs/benviron/assist/usterp/index.htm). During this time and before the ERP program was formally launched, enforcement staff from RI DEM's Office of Waste Management conducted 100 randomly selected baseline inspections from a universe of approximately 600 federally regulated facilities. In January 2005, the mandatory self-certification program was kicked-off with workbooks and checklists mailed to all facilities in the state. Facilities were given six months time interval to complete and submit checklists and Return-to-Compliance (RTC) plans.[6] To facilitate program participation, six "UST Compliance Certification Training Workshops" were held at various locations throughout the state in February and March.

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[5] UST ERP White Paper (1.5) 16 August 2005. Michael Crow and Richard Krop, the Cadmus Group, Inc. Option 4: Comparative/Historical Approach. "EPA would study a State that has already embarked upon its ERP approach (i.e., Rhode Island), and compare its results to results from other "control" states (1) for the same time period during which the ERP approach was undertaken, and (2) during and after the implementation of a tri-annual inspection regimen. *Advantages.* Can use existing data, and may be the easiest study approach to implement. High likelihood of successful ERP completion. May allow for review of a large number of control states. If ERP can continue into subsequent cycles while control states are implementing tri-annual regimen, data collection can occur during the same time frame in the treatment state and the control states. If ERP does not continue into a subsequent ERP cycle, better enables the treatment state to proceed to meet its statutory obligations. *Disadvantages.* Although perhaps the easiest study approach to implement, perhaps the most complex analytically. Does not control for differences across states, although regression analysis and careful selection of control states could temper this issue. ERP data collection approach pre-determined, and historical data from states is pre-determined and most likely not based upon random samples. Cross-state data may not be precisely comparable.

[6] RTC plans are corrective action statements that indicate the amount of additional time needed (but not greater than a specified limit) to come into compliance with any single regulatory requirement.

While the checklist and workbook were being developed, RIDEM also worked on automating the UST inspection program (i.e., eliminating the paper data collection/storage process) in an effort to improve overall program efficiency while saving an estimated $200,000. The UST automation process included conversion of field inspection checklists into an electronic form (accessible on tablet personal computers used during facility audits), up-loading capability for digital photos, and centralized data storage and retrieval for software-assisted statistical analysis—the system's logical architecture was designed to operate using Microsoft's Office InfoPath®2003 (for tablet PC field data collection), SharePoint®Portal Server 2003 (document management repository), and SQL Server™2000. For more information on RIDEM's automation/streamlining process, go to the Microsoft Case Study at: http://www.microsoft.com/resources/casestudies/ CaseStudy.asp?casestudyid=16986&PF=yes

Florida was selected as an early partner for the interstate comparison component of the study due to its success with the traditional approach to UST regulation and availability of statewide UST historical inspection data dating back to 1983. According to the FDEP, counties perform approximately 25,000 compliance inspections (or 95 percent of the entire regulated tank universe) each year; as of January 2004, a total of about 400,000 inspections had been completed since 1983 and showed significant improvements in compliance rates. Because FDEP inspects such a large proportion of facilities every year, it should offer somewhat of a "look into the future" of UST regulation under the Energy Act's current requirements, and serve as an excellent control for the study. Other states such as Texas may be added to the study subject to data availability and the ability to contribute time and resources to the project.

♦ **Objectives and Public Benefits.** The goal of the study is to determine if fewer state inspections, combined with facility self-certified inspections (the ERP method) will produce equal or better compliance than the Act's facility-by-facility inspection criteria. That is, can ERP produce equal or better compliance results at equal or less cost to the American public than a traditional facility-by-facility inspection program. In addition to the statistical analysis of RIDEM UST ERP data, the proposed study will develop a regression model that tests compliance rates of the traditional inspection method. Regression analysis will be used to test a number of independent variables to determine if they are significant in improving compliance rates. The number and types of inspections, along with the time it takes the inspections to achieve compliance, will be tested to determine if they play a significant role in compliance rates. Thus the study should answer a critical question: can ERP achieve similar compliance rates in a short time frame (2-3 year cycle) compared to a traditional enforcement program over a longer period (20+ years). A cost/benefit analysis of each inspection method will also be conducted to further evaluate these programs.

The study will compare outputs under each method (e.g. number of inspections, number of violations) to determine if better outcomes are achieved through the Environmental Results Program. For example, the study will determine if ERP produces a better understanding of UST regulations and results in more compliant tanks with fewer leaks and releases. Public benefits include more efficient government programs and improved environmental quality through reduction in the number of product/chemical releases due to application of the ERP model to UST sectors (additional benefits are detailed in c. below).

Unlike RIDEM's voluntary ERP initiatives (for the auto body, exterior lead paint contractors, and auto salvage sectors), the UST ERP is a mandatory program that has accumulated 10 years of electronic historical enforcement/compliance data (i.e., traditional UST

inspection data). Baseline data for the proposed study resides in RIDEM's regulatory Offices of Compliance and Inspection (historical compliance data) and Waste Management (UST ERP baseline and post-implementation facility inspection data). Using these data, and as described above, Rhode Island and partner states will assess whether an alternative certification-inspection model—the Environmental Results Program—can be just as or more effective in achieving regulatory compliance as traditional enforcement programs, explore the extent to which a link can be made between facility inspections and O&M compliance, and compare the cost/benefit of each program. The data and information produced will then be available to inform state and federal policy making. The schedule for key activities is shown below.

Project Schedule with Compliance Dates.

Task/Milestone*	Completion Date
Draft work plan submission	19-Jul-06
Draft QA plan submission	18-Sep-06
Work plan/QA plan approval	*
Grant funds available/URI contract in place	1-Jan-07
Begin project scoping and interstate study design	1-Jan-07
Complete preliminary project scoping and study design	31-Mar-07
Begin statistical analysis (Fisher, Bonf.) of RIDEM UST ERP data	1-Jun-07
Select partner states/counties	30-Jun-07
Tabulate/summarize RIDEM 10-yr historical compliance data	31-Dec-07
Start regression analysis of historical compliance data	1-Jan-08
Design data collection template/criteria for partner states	1-Nov-07
Send out data collection template/criteria to partner states	1-Jan-08
Complete statistical analysis (Fisher, Bonf.) of RIDEM UST ERP data	1-Jun-08
Receive tabulated 10-yr+ historical compliance data partner states	30-Jun-08
Begin interstate comparative analysis	1-Jul-08
Complete interstate comparative and regression analysis	1-Jun-09
Draft final report on ERP study and comparative analysis submitted for review	30-Sep-09
Draft detailed case-study report to EPA for review	30-Sep-09
EPA review of final report and case-study complete	15-Nov-09
Revised final report and case-study submitted to EPA at project closure	31-Dec-09

*45 days post-submission
**Quarterly reports submitted throughout 3-yr study period.

Included in the project schedule are dates for activities that must be completed before the research project can formally begin in January 2007—specifically, EPA work plan and Quality Assurance (QA) plan approval, grant funds availability and URI contract in place to access faculty and graduate student support. Once grant funds have been committed, project scoping and study design can begin with project partners which will include URI, EPA, and RIDEM technical assistance and enforcement staff. It is anticipated that by June '07, the statistical analysis of RIDEM UST ERP data can begin. Activities included in this task are: organization and tabulation of all baseline audits (100 audits) and post-ERP implementation audits (75-100 random audits) data; tally compliance data and calculate proportions for each potential compliance improvement indicator (~130 indicators should be available); calculation of compliance rate proportions, Fisher p-values and Bonferroni correction for multiple comparison

using software written for Rhode Island's UST program; tabulation of all RTC plan data—screening out invalid submittals; and the organization, tabulation and analysis (descriptive statistics) of RTCs by category. Facility baseline inspections were completed in the summer of 2004 and all self-certification forms and return-to-compliance plans were due 31 June 2005, well before the Energy Policy Act was signed into law on 8 August 2005. Bias from this source, therefore, should not be a significant issue in the study design even for post-ERP random inspection—the results of which can be checked against data provided on the signed self-certification forms.

RIDEM will work with EPA to determine which states in addition to Florida should be approached for inclusion in the study. RIDEM will develop data collection criteria/template to be used by partner states to help organize and coordinate data gathering activities. This study will use a contained (control) population comparative approach per the UST ERP White Paper (footnote 5 above). For Florida and other partner states, the research team must identify control counties for inclusion in the study matched by demographics, time period, etc. in order to allow for appropriate comparisons. Florida's UST inspection program should provide sufficient data for a comparative evaluation even though inspections are conducted on a county by county (not statewide) basis. i.e., a sufficient number of key variables should exist at the inspector checklist and/or facility operations levels. Cost estimates to carry out traditional enforcement inspections and follow-up for sample populations must be obtained for analysis.

As discussed above, a major part of the study will be the development of a regression model that tests compliance rates of the two inspection methods. Regression analysis will be used to test a number of independent variables to determine if they significantly improve compliance rates. At the conclusion of the study, a final report and case study will be drafted (subject to review and approval by EPA) for publication and dissemination.

♦ **Environmental Outcomes.** *Performance Measurement.* Intra- and interstate comparisons will allow for a comparative (quantitative) assessment of enforcement approaches: cost/benefit, performance improvements, leak detection, and facility compliance, for example. Nationally, Rhode Island is the first state to apply the ERP model to the regulation of underground storage tanks. This mandatory program requires approximately 600 facilities to self-certify to compliance standards (UST, Stage I and Stage II) using a comprehensive checklist developed by EPA, RI DEM and a large group of external stakeholders over the course of many months. To date, 100 baseline inspections have been conducted—data from these audits will provide the necessary information on which to quantitatively assess future improvements in performance and administrative/programmatic efficiencies attributable to the ERP approach. By comparison, the State of Florida maintains one of the oldest and richest databases in the country for a traditional UST enforcement program. Based on an initial survey, several counties (e.g., Broward, Duval, Hillsborough or West Palm) appear to be potential candidates for control purposes. Additional states/counties will be considered during the study in order to allow for a robust qualitative and quantitative assessment of programs. In any event, the data base and data analysis models will be designed so that information from newly participating states can easily be incorporated into the study.

Expected outcomes, including improvements in management and regulatory processes, are shown in the logic model presented above. Improvements in the benefits, knowledge and understanding of the ERP model among research partners and customers (including EPA/national UST enforcement and assistance programs, US Congress, RI UST sector facilities,

RIDEM offices and partner state programs) are expected. The anticipated major long-term environmental outcome that is anticipated is improved environmental quality through a reduction in the number of product/chemical releases.

Short and Long-term Results. Short-term results will include the development of statistical comparisons (RI & Florida), completion of post-ERP implementation audits in RI (not funded using EPA grant dollars), analysis and presentation of measurement data, and the dissemination of findings to other states via meetings, reports, and a web page link that will be added to OTCA existing "Underground Storage Tank Environmental Results program" web site at http://www.dem.ri.gov/programs/benviron/assist/usterp/index.htm. Beyond year three, it is anticipated that DEM will have gained substantial knowledge and experience concerning the application of the ERP model in this industry sector. Information and "lessons learned" will continue to be shared with EPA and states well beyond the life of this project.

Outputs and Study Goal. The study will compare outputs under each method (e.g. number of inspections, number of violations, number of return to compliance plans) to determine if better outcomes are achieved through the Environmental Results Program. For example, the study will determine if ERP produces a better understanding of UST regulations, improves facility compliance, and results in more compliant tanks with fewer leaks and releases. The goal of the study is to determine if fewer state inspections, combined with facility self-certified inspections (the ERP method) will produce equal or better outcomes when compared to the Energy Act's required inspection criteria.

Results and Threshold Criteria. Based on the success of ERP in other sectors, it is anticipated that results from the study will advance EPA's goals for ERP. It will do so by building a national ERP constituency among States and achieving economies of scale through the implementation of multiple state projects regulating in a common business sector. All states operate a federally mandated UST program. However, many states are now reluctant to use ERP to regulate this sector due to the constraints imposed by the Energy Act. Our hypothesis is that ERP provides equal or better protection than facility by facility inspection methods. If so, then results from the study should provide convincing data that ERP is a worthwhile alternative compliance program.

The project proposal meets the three threshold criteria: the study 1) consists of activities authorized under Subtitle I of RCRA and includes a learning component (comparative analysis concerning the efficacy of the ERP approach), demonstrates the applicability of ERP to the UST sector, and conducts research into a hypothesized improved model for regulatory compliance; 2) will determine if ERP can equal or exceed a traditional enforcement program's ability to prevent leaks from USTs and includes a multi-media prevention and pollution control approach (e.g., groundwater protection, volatile release prevention through vapor recovery); and 3) will not exceed the funding limits for this grant program. It is expected that the data and information contained in progress reports will assist EPA in meeting its obligations under Subtitle B, Sec. 1523 (b) of the Act "STUDY OF ALTERNATIVE INSPECTION PROGRAMS."

♦ **Transferability.** Rhode Island anticipates that the proposed project will show "broad, strategic innovation" in an important industry sector by demonstrating efficiencies and the national implications of an alternative inspection program for USTs. Our vision for this project is to generate new data that can be useful to states and EPA on a national scale. Methods to document project outputs and outcomes include analytic and descriptive statistics, as well as, qualitative measures of general program performance. As data become available, program and

industry progress reports will be developed and publicly posted on the RIDEM website http://www.dem.ri.gov/programs/benviron/assist/usterp/index.htm available to the public.

Historically, RIDEM has already assisted a number of states in understanding the application of ERP to various sectors. With this project, RIDEM will continue its assistance efforts by transferring experience and knowledge via publications, regional and national meetings, conference calls and presentations as requested. RIDEM is committed to helping other states and will serve as a mentor when needed. The project final report and detailed case study will be distributed to EPA and interested states and will be available on OTCA's web site for other interested parties.

♦ **Public Involvement.** As discussed above, beginning in 2003 and with the support and active involvement of EPA New England (Region 1), RIDEM undertook as series of stakeholder meetings to launch its statewide UST ERP (meeting notes available at: http://www.dem.ri.gov/programs/benviron/assist/usterp/index.htm). The stakeholder process involved several well attended meetings coupled with six workshops held at various locations throughout the state. In January 2005, the mandatory self-certification program was kicked-off with workbooks and checklists mailed to all facilities.

The primary stakeholders in this phase of the project, are RIDEM regulatory divisions (during and subsequent to UST ERP implementation), partner states and EPA (Region I and Headquarters). Industry/association members from the original stakeholder group will periodically receive summary information and data concerning the progress of the Rhode Island project. In addition, during the analytic phase of the research a draft model will be presented to a group of public stakeholders to ensure that all possible dependent variables are considered, that an appropriate range of independent variables is identified, and that costs are accurately addressed.

VI. Reporting Requirements. Quarterly report updates will be submitted as required by EPA guidance (template) and on a schedule to be established by EPA. A detailed follow-up case study will be prepared along with a final report at the end of the grant period. The case study report will include: summary of the project, reductions achieved if applicable, cost analysis, problems, successes, and lessons learned.

VII. Total Project Cost. $342,369 (including state leveraged funds).

VIII. Detailed Itemized Budget. Presented in Attachment I.

IX. Key Personnel. Attachment II contains short biographies on each of the key project participants. Since the research study is statistically-based and labor intensive in terms of data gathering/organization/analysis, RIDEM will be contracting with URI faculty/staff for assistance. In addition, we anticipate involving 1-3 university graduate students in various aspects of the research as the study progresses. All project personnel are qualified in their respective fields, have worked together on various environmental research/demonstration projects in the past (with the exception of FL) and bring unique perspectives to the UST alternative inspection investigation.

ATTACHMENT I

Detailed Itemized Budget.

State: Rhode Island
Agency: Department of Environmental Management
Project Title: Underground Storage Tanks—Alternative Inspection Programs and the Energy Policy Act of 2005

	Total Project Costs	**Proposed State Leverage Funds**	**EPA Funding**
Staff Salaries and Benefits			
RI DEM	$100,000	$50,000	$50,000
Travel (DEM, Florida) Training, conferences, Meetings	13,654		13,654
Supplies Computer/supplies	3,500		3,500
Subcontracts			
University of Rhode Island Center for Pollution Prevention Computer Science & Statistics	212,215	42,369*	169,846
Florida	5,000		5,000
Total Direct Costs	334,369	92,369	242,000
Indirect Costs (16% of DEM Salaries & Fringe)	8,000		8,000
TOTAL:	342,369	92,369	250,000

* Waived overhead difference on URI contract [44%-15.25%] (15.25% URI overhead to be used, normal overhead rate is 44%)

ATTACHMENT II
Key Project Personnel

Thomas E. Armstrong

Thomas E. Armstrong is a Principal Environmental Planner with the Rhode Island Department of Environmental Management (RIDEM), Office of Technical & Customer Assistance. He has been involved with the implementation of RIDEM's Auto Body Repair Facilities Certification Program, and planning and design of RIDEM's Exterior Lead Paint Removal Certification Program now being prepared for implementation. His other responsibilities in the office's Pollution Prevention Program include providing pollution prevention information and compliance assistance, assistance related to the Rhode Island Environmental Compliance Assistance Incentive Policy Act, managing the Department's Used Oil & Used Oil Filter Collection & Recycling program, and participation in organizational activities such as NEWMOA's Pollution Prevention Roundtable. Tom previously managed the Department's Household Hazardous Waste Program from 1995 through 2001. He worked on environmental planning and policy issues in the Office of Strategic Planning & Policy from 1996 through 2003. He has been an employee of RIDEM in various capacities since 1976. He received a Bachelor of Science degree in Forestry from the University of New Hampshire in 1975.

Richard Enander, PhD

Richard Enander, PhD is a Supervising Scientist and Pollution Prevention Manager with the Rhode Island Department of Environmental Management in Providence. Prior to his 17 years with the Department, Richard worked in environmental compliance for the Specialty Chemicals Group of Hoechst Celanese Corporation, a subsidiary of Hoechst AG, West Germany. His current work includes the delivery of technical and compliance assistance to industry, review of quantitative human health risk assessments, and the design and implementation of sector-wide initiatives for a number of industries. Richard is the author of a book and book chapter (CRC Press/McGraw-Hill) on hazardous waste tracking for generators and has published a number of articles on pollution prevention and human health risks in the peer-reviewed literature. He is on the editorial board of the Journal of Occupational and Environmental Hygiene (an international peer-reviewed journal of the American Industrial Hygiene Association and the American Conference of Industrial Hygienists). Richard received his PhD in Environmental Health from Tufts University.

Ronald Gagnon, PE, MBA

Ronald Gagnon currently serves as the Chief of the Office of Technical and Customer Assistance (OTCA) at the Rhode Island Department of Environmental Management. OTCA is a non-regulatory program that provides permitting assistance and coordination, pollution prevention assistance and small business assistance. Ron is a Professional Engineer with over 20 years of experience that includes both private practice and public sector employment. Previous positions over the last 17 years at DEM include Supervisor of the Solid Waste Program and Chief of the Waste Management Division. Ron received a Bachelor's Degree in Civil Engineering from the University of Notre Dame and a Master's Degree in Business Administration from the University of Rhode Island.

R.Choudary Hanumara, PhD

Prof. Hanumara has been a Faculty member at the University of Rhode Island since 1968 and has served as Section Head of the Statistics unit for 20+ years. His responsibilities include teaching graduate and undergraduate courses in statistics, the supervision of graduate student theses, the conduct of research, and the provision of statistical consultation to researchers on and off campus. Many of the courses offered in the statistics program were initiated Dr. Hanumara. Dr. Hanumara has supervised 31 M.S. theses, 4 PhD dissertations in statistics and served on 100+ thesis committees of students from many different areas. He has published in main stream statistical journals and in subject area journals. He also has provided statistical consultation to researchers in fisheries, business, pharmacy, medicine, environment, transportation, and other fields. Some of this work was grant supported. He has been recognized by the University for his contributions to graduate programs and by the American Statistical Association for his contributions to the Rhode Island Chapter. In general, his interests lie in statistical theory and applications.

Eugene Park, PhD

Eugene Park, PhD is an Associate Research Professor in the Chemical Engineering Department at the University of Rhode Island. He has also been Co-Director of the URI Center for Pollution Prevention since 1993. With undergraduate and Master's degrees from Dartmouth College, Park received his PhD from URI in 1993. Research interests include membrane separation and biological trickling filtration. He has been involved in many new environmental initiatives like ERP for auto body, lead paint removal contractors, and dry cleaners. The URI Center has provided technical assistance to over 400 RI businesses since 1989. Park received the EPA Individual Environment Merit Award in 1998. Since 1997, he has also been involved in international collaboration projects with Korea, Thailand, and Central America.

Michael X. Redig

Mr. Redig is an Environmental Manager for the Hazardous Waste Regulation program for the Florida Department of Environmental Protection. He was the project manager for the Compliance Certification Pilot Project (CAPP) which was Florida's implementation of an ERP based program. He now directs staff efforts for two derivative voluntary programs for the automotive repair and auto salvage sectors which are the CAAR and Greenyards programs respectively. For the past fourteen years he has been the statewide coordinator of the Enforcement and Compliance monitoring efforts to ensure program quality, consistency and efficiency in all districts and the Tallahassee office. He has been working in the Hazardous Waste Regulation Program since January of 1981 (25 years) performing various Compliance and Enforcement tasks for the agency. In the seven years prior to working for the Hazardous Waste Program, he held several positions with the enforcement section of the FDEP Northwest District in Pensacola, the US EPA Research Lab in Gulf Breeze and the Northwest District's field inspection office in Fort Walton Beach. Mr. Redig holds a BS degree from FSU and has done postgraduate studies at FSU and UWF in Biological sciences and the FSU Center for Professional Development in the Certified Public Manager program.