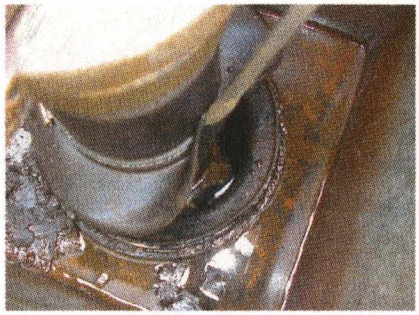
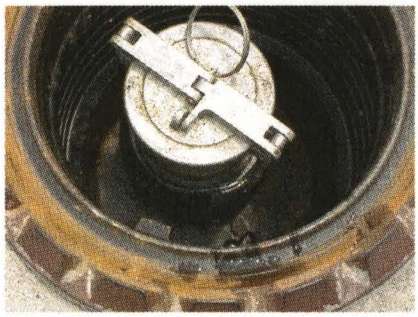
Preventing Leaking Spill Containment Basins and Reducing the Resulting Environmental Impact





A collaborative Certified Public Manager project between the Regulatory Section and the Compliance Section of SCDHEC's Underground Storage Tank Program

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I. Introduction

The South Carolina Department of Health and Environmental Control's (SCDHEC) Underground Storage Tank (UST) Program regulates USTs in accordance with guidelines set forth in the **South Carolina Underground Storage Tank Control Regulations (SCUSTCR)**. The UST Program has two primary divisions. These divisions are the Regulatory Compliance Division and the Assessment and Corrective Action Division. The Regulatory Compliance Division is composed of the Regulatory Assistance Section and the Regulatory Compliance Section. The Regulatory Assistance Section is in charge of issuing permits for new installations, managing data and billing information, coordinating closure activities, coordinating petroleum Brownfield projects, and reviewing technical reports for suspected releases. The Regulatory Compliance Section conducts routine compliance, installation, and closure inspections to ensure that UST owners and operators prevent releases, identify releases in a timely manner, and mitigate the impact to the environment. The Assessment and Corrective Action Division is tasked with directing and monitoring assessment and remediation activities at contaminated UST facilities. The purpose of this project is to reduce the number of spill containment basin failures and to find leaking spill containment basins in a timely manner to diminish environmental impact.

II. The Issue

Spill containment basins (Appendix A: Diagram 1) are containers designed to temporarily contain petroleum products spilled during the filling of USTs. To function properly, the basin must be liquid-tight. Containment basins range in capacity from 5 to

25 gallons. There are two different styles. One has a threaded base that screws onto a UST fill riser (Appendix A: Diagram 1) and the other is a slip-on model that is secured to the riser with a gasket and clamp-on system (Appendix A: Photograph 1). If spill containment basins are not properly installed and maintained, a release to the environment may occur (Appendix A: Photographs 2, 3, and 4).

Between August 1, 2002 and July 31, 2003, the Compliance Section conducted 4,083 routine compliance inspections. During those inspections, 29 facilities received notices of violation (NOV) for non-tight containment basins. This equates into roughly one percent of the facilities inspected. Because of these findings, the Compliance Section conducted training for the inspectors to increase awareness of containment basin failures and to identify failures through visual inspection. Following the training, the inspectors began looking for leaking spill containment basins during routine compliance inspections. Over the next 12-month period (August 1, 2003 – July 31, 2004), 137 out of 4,033 sites received NOVs for non-tight containment basins. This is roughly three percent of the facilities inspected, or triple the previous years failure rate. Since 2004, the percentage of non-tight containment basins discovered during inspections has remained at three percent (Appendix B: Figure 1 and Figure 2).

Looking further into this issue, the Program contacted both a multi-site tank owner and a leading authority in the testing of spill containment basins. The Pantry, Inc., which is a multi-site owner, conducted a self-audit and discovered that they replaced a total of 143 faulty spill containment basins over a two-year period (2003-2005). The faulty containment basins were identified through visual inspections at sixty of their 960 total facilities in six states throughout the southeast. This represents a 6% failure rate at

Pantry facilities. Crompco Corporation, a tank system-testing specialist, conducted a spill containment basin study. They used a vacuum test that is capable of finding leaks that cannot be identified during a simple visual inspection. During a 24-month period, Crompco tested 10,841 spill containment basins. Of those, 6,417 failed. This equates to a failure rate of 59%. These numbers are inclusive of 17 states (Maine to Florida) and the failure percentage is inclusive of all states.

In response to the number of spill containment basin failures, we made an inquiry to a leading spill containment basin manufacturer. The manufacturer stated that the current useful life expectancy of a properly installed spill containment basin is approximately five to eight years. Since 1988, all newly installed tank systems are required to have spill containment basins at installation. Additionally, USTs that were installed before 1988 were required to retrofit with spill containment basins by December 22, 1998. According to Department records, there are approximately 9,000 spill containment basins currently in use that are exceeding their useful life expectancy. At this time, the **SCUSTCR** does not require testing at installation or during the operational life of a UST system. In support of the Agency's mission to promote and protect human health and the environment, these issues need to be addressed.

III. The Issues

There are two significant issues. The issues include the contamination related to releases from non-tight spill containment basins and the cost of assessing and remediating the associated releases. There is potential for both soil and groundwater contamination. One gallon of fuel leaking per week from a leaking spill containment basin can result in

up to 195 tons of contaminated soil in one year. Additionally, one gallon of gasoline can contaminate 1,000,000 gallons of water. This contamination can be very costly to remediate. As of August 11, 2005, the average cost to assess the severity of the contamination related to a single release in South Carolina is $24,522. If the release requires remedial action, the average cost of cleanup in South Carolina is $124,682. Currently, costs for corrective action measures are shared between the state of South Carolina and the UST owner and operator.

In 1988, the State Underground Petroleum Environmental Response Bank (SUPERB) Act was established. The SUPERB Act authorized the creation of a fund generated from a half-a-cent per-gallon gasoline tax from annual UST registration fees paid by tank owners. This fund provides up to one million dollars for site rehabilitation activities at facilities with qualified USTs. UST owners and operators are required to satisfy a $25,000 deductible per release before the SUPERB fund can be accessed. Based on the average cost of $124,682 to remediate a release, the cost to the owner would be $25,000, and the impact to the SUPERB account would be $99,682. Additionally, Crompco found that environmental clean up costs from a faulty spill containment basin averaged $250,000 per site across 17 states.

In 2004, the UST Program found that 50% of all known source releases in South Carolina were attributed to non-tight spill containment basins (Appendix C, Figure 1). In 2005, this percentage increased by 21% to 71% (Appendix C, Figure 2). Based on average costs of release remediation in South Carolina and data collected by Crompco and the South Carolina UST Program, it is inherently advantageous to periodically test spill containment basins and replace them as needed. This is necessary to prevent

releases, detect releases early, and mitigate contamination as quickly as possible. Based on these findings, we recommend process, policy, and regulatory changes.

IV. Recommendations

We propose that changes be made to the compliance inspection process. Modifications to the compliance inspection process will include gathering information regarding non-tight spill containment basins. The inspection checklist will need to be revised to include space to record the manufacturer, model, and type of failure information. This data will be used to support regulatory changes. Also, the phase inspection process will be amended to include inspection of spill containment basin tightness testing during new installations.

In addition to process changes, policy changes are needed. Recommendations for policy changes include adding the requirement for spill containment basin testing during installation. This will include a hydrostatic or pneumatic tightness test of the spill containment basin. Moreover, the permit to install application should be revised to include manufacturer and model information.

Finally, a regulatory change is suggested. Currently, the **SCUSTCR** require that UST systems be equipped with spill containment basins. The regulations state "owners and operators must ensure that releases due to spilling and overfilling do not occur …"("Underground Storage Tank Control Regulation," 1997). Specifically, the regulations stipulate that owners and operators must use "spill prevention equipment that will prevent release of product to the environment when the transfer hose is detached from the fill pipe" ("Underground Storage Tank Control Regulation," 1997). We suggest

amending existing regulations. The amendments should include requirements for operating and maintaining spill containment basins. The amendments should also include requirements to keep spill containment basins empty of liquids, conduct periodic inspections of containment basins to remove any debris, and check for loose gaskets, cracks, or other indications of spill containment failure. Periodic testing should be added to confirm that spill containment basins are liquid-tight. Crompco Corporation provided a cost/benefit analysis that indicated that testing spill containment basins typically costs between $400 and $600 per site. The installation of new spill containment basins costs between $900 and $1500 per spill bucket. To offset this cost to the owner, the proposed regulatory change should allow for owners and operators to conduct their own periodic testing within Department guidelines. Finally, criteria for repairs to spill containment basins should be included. This change would require that after a spill containment basin is repaired or replaced, it be pneumatically or hydrostatically tested to ensure that it is liquid-tight.

V. Implementation

The recommendations should be implemented in several phases. The first phase will focus on gathering specific information to help identify if spill containment basin failures are prevalent in certain makes and models. This phase will be initiated on May 1, 2006. Prior to the commencement of this stage of the project, expectations for the project will be communicated and training will be provided. Inspectors will be trained on what to look for during phase inspections as well as routine compliance inspections. The inspectors will learn how to identify containment basins by manufacturer and model.

Additional information and training will be provided to the inspectors as necessary. During the inspector meeting on March 7, 2006, the Regulatory Compliance staff will be briefed on the scope of the project, and the spill containment basin information and revised checklists will be distributed and reviewed. During the inspector meeting on April 4, 2006, the staff will visit Southern Pump and Tank Company to look at various types of spill containment basins and discuss potential sources of failure and how to identify them. Beginning May 1, 2006, the field inspectors will begin collecting the manufacturer, model, and cause of failure information for spill containment basins as they are identified.

At this point, the permitting process will begin requesting spill containment basin manufacturer and model information on the application for permit to install. An addendum will be added to the Permit to Install package that is given to contractors and owners that provides information explaining the addition to the application. The changes to the permit to gather this information will occur prior to May 1, 2006. This segment of the project will last until September 1, 2006. The data will then be evaluated to determine what extent policy and regulatory changes need to occur. The findings will be shared with the regulated community, contractors, and other state's UST Programs.

If data supports the need for policy and regulatory changes, the second stage of the project will begin in September 2006. At this point, recommended regulatory changes should be identified and proposed. We anticipate regulatory changes to support the Energy Policy Act of 2005.The Program will continue to track the performance of specific types of spill containment basins for failure rates. As appropriate, the Program

will disallow the installation of spill containment basins that have been identified to have a high failure rate.

To make sure that the process change is a success, extensive outreach and training will need to be done. To date, a number of newsletter articles have been published in the **UST News**, a newsletter published quarterly by the UST Program and distributed to UST owners and operators, contractors, and members of South Carolina's legislators. The articles identified the importance of proper spill containment basin maintenance, as well as possible causes of spill containment basin failures. In light of the proposed changes, additional correspondence with tank owners, operators, and contractors is needed. The Program will use additional newsletter articles along with targeted mail-outs describing the proposed changes, the reason for the changes, and the new compliance requirements.

VI. Evaluation Method

During the first 12-months following the initiation of the project, Chuck Hightower and Robin Mack will gather and monitor the spill containment basin data from inspections. Releases attributed to spill containment basin failure will also be monitored. The permitting coordinator will ensure that spill containment basin information is being submitted with the application for a permit to install. At the end of the 4-month period, the compiled data will be compared to existing data and evaluated.

VII. Conclusion

Our mission is to promote and protect human health and the environment. Current data shows that there is a need for increased emphasis on the operation and maintenance of spill containment basins. Information that will be gathered during the

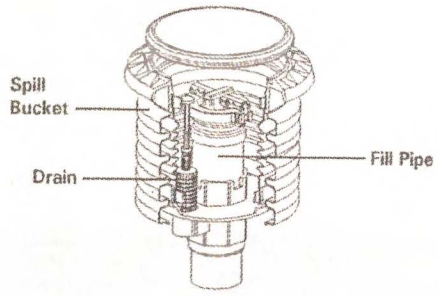
first phase of the project will aid in identifying the predominant cause of spill containment basin failure, as well as the relationship between the cause of failure and the model of the basin, if any. Using that information, the UST Program will be able to make policy, process, and regulatory changes that should reduce the number of releases associated with spill containment basin failure. Once the data is evaluated, it will be determined what additional processes and policies, if any, should be modified. We feel that this will lead to fewer releases to the environment and create a significant cost savings for UST owners and operators, as well as the state of South Carolina (Appendix D: Figure 1).

References

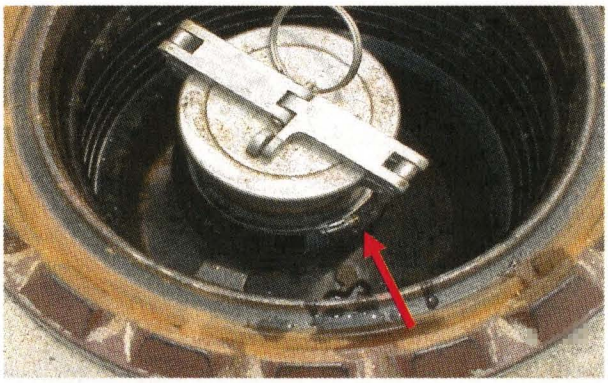
Underground Storage Tank Control Regulations, R.61-92, Part280: Section 44-2-50 (1997).

Appendix A

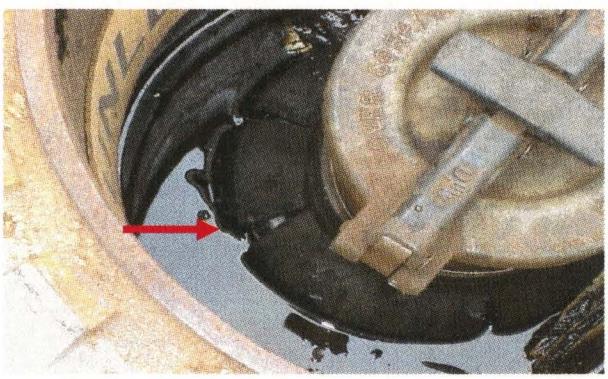
Diagram 1: Spill containment basin design

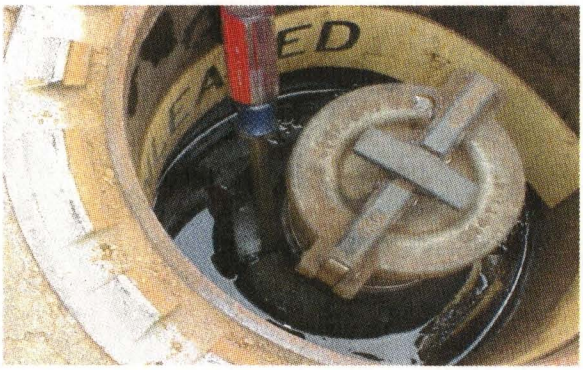


Photograph 1: Properly installed and functioning spill containment basin



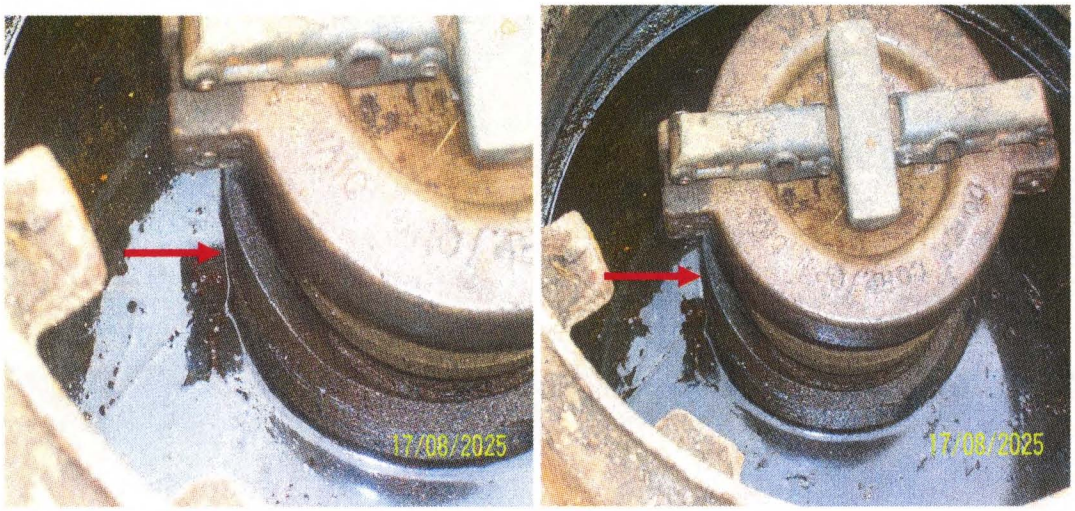
Photograph 2: Slip-on spill containment basin with a cracked collar



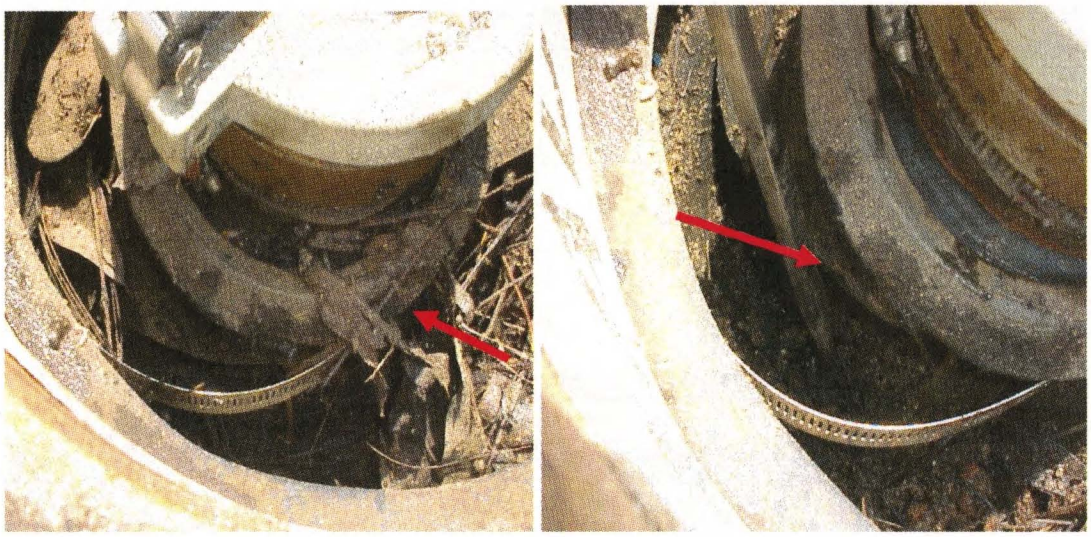


Appendix A (Continued)

Photograph 3: Slip-on spill containment basin with a loose gasket



Photograph 4: Slip-on spill containment basin with loose clamp and displaced gasket



Appendix B

Figure 1: Number of Inspections from August 1, 2002 to July 31, 2005

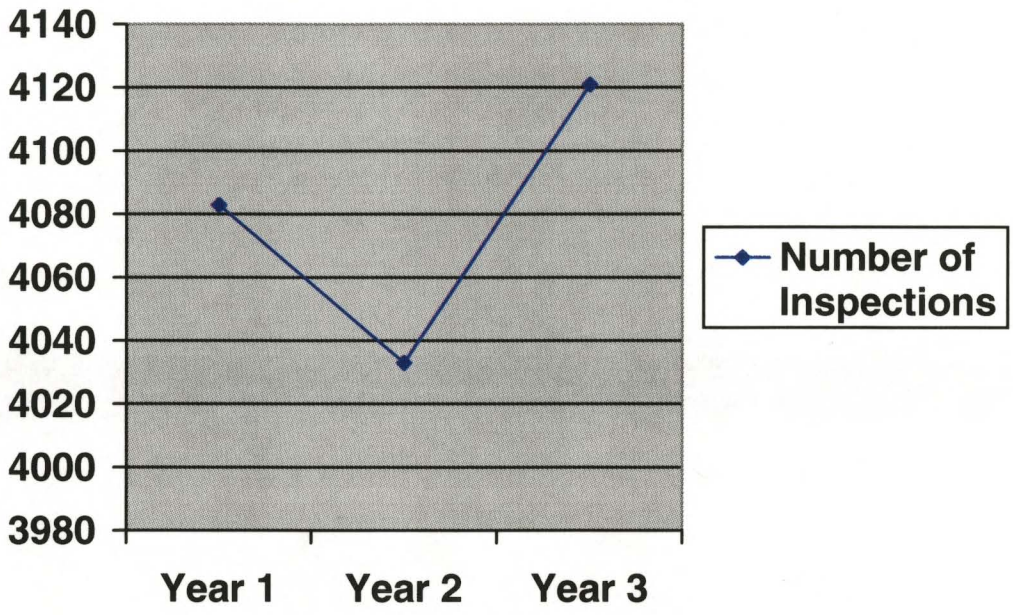
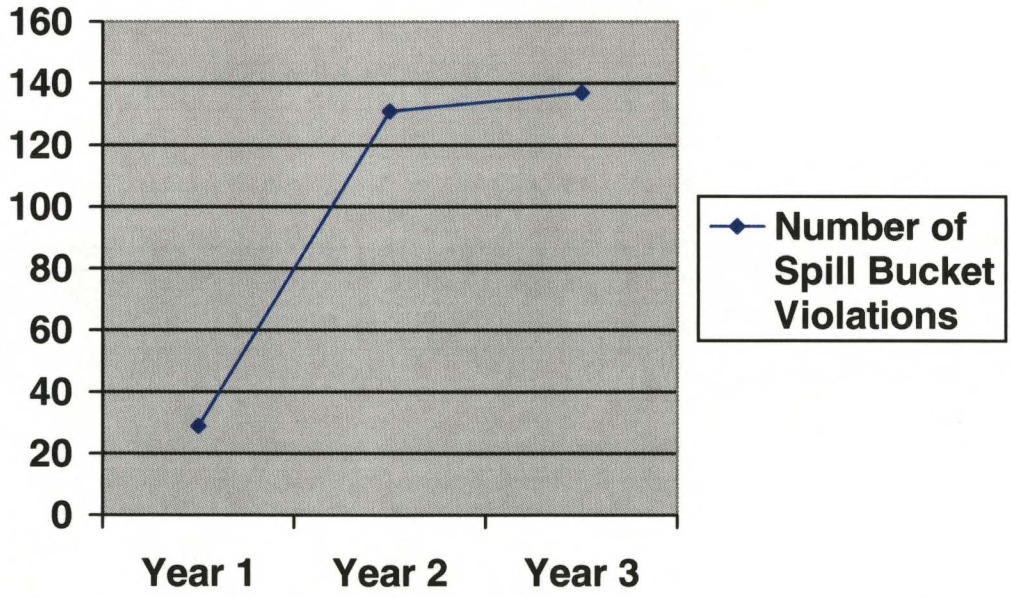


Figure 2: Number of Spill Bucket Violations



Appendix C

Figure 1: Release Percentages from Identified Sources in 2004

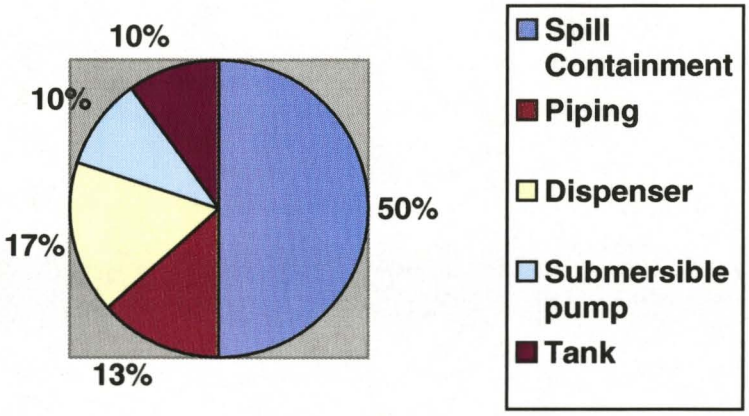
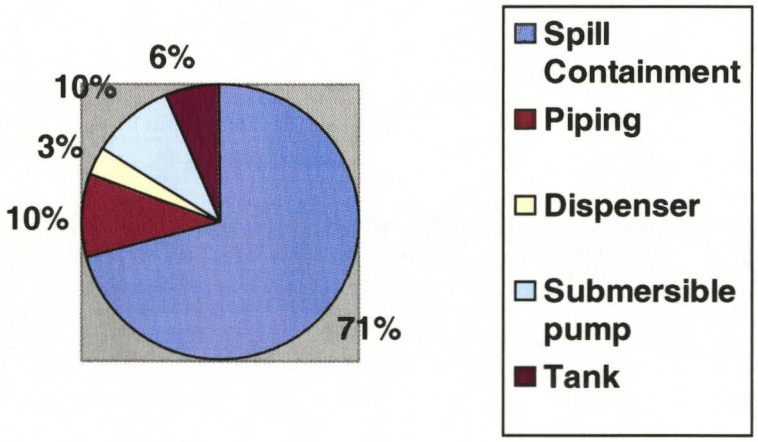


Figure 2: Release Percentages from Identified Sources in 2005



Appendix D

Figure 1: Estimated cost savings