AVOID VERBAL ORDERS

DATE: February 21, 1996

TO: Paul Bengel, RMRS E/C/D, X2535

FROM: R.E. Madel, RMRS E/C/D, Proj Mgt, X7650

SUBJECT: UNDERGROUND STORAGE TANK PILOT PROJECT LESSONS LEARNED

SUBJECT
Transmittal of the Underground Storage Tank Pilot Project Lessons Learned paper.

DISCUSSION
The Pilot Project Lessons Learned paper has been prepared and reviewed by the following organizations:

RMRS -Engineering, Construction and Decommissioning;
-Technical Assurance; and
-Procurement

K-H -Project Management; and
-Regulatory Programs

This paper fulfills the action item requiring completion of the document.

RESPONSE REQUIREMENTS
No action is required. If you have questions concerning the paper, please call me.

R. Madel, Project Manager

REM:rem

Attachments:
As stated

cc:
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Underground Storage Tanks
Pilot Project Lessons Learned
Subcontract No. 361595GC4
by Robin E. Madel
Rocky Mountain Remediation Services
February 14, 1996

BACKGROUND

The Underground Storage Tank (UST) capital line item Pilot Project at the Rocky Flats Environmental Technology Site (RFETS) was completed through post-construction activities in November 1995. This paper addresses various lessons learned from the UST Pilot project. The lessons are being applied to the UST Main Project where appropriate.

The RFETS UST program was initiated, under Rockwell in 1989. The program was driven by Federal and State regulations mandating all USTs to become compliant with new Resource Conservation and Recovery Act (RCRA) spill protection, corrosion prevention and leak detection requirements. Initial efforts on the project included evaluating USTs at RFETS that were affected by the requirements and should be included in the project. Criteria for inclusion in the UST project included:

- USTs that contained petroleum products only (i.e. Diesel Fuel and Unleaded Fuel).
- USTs that were in service.
- USTs that required modifications to become compliant.

Twenty-two RFETS USTs were identified by EG&G for replacement or upgrade under the UST capital project by the December 1998 RCRA compliance deadline. Initial plans included, primarily, excavating the existing USTs and replacing them with new USTs. A scope, schedule and budget were prepared and pre-capital work began.

Initial documents included a National Environmental Policy Act (NEPA) Categorical Exclusion and a Conceptual Design Report (CDR) which outlined plans for removal and replacement of the USTs. Further evaluation was performed and an Enhanced CDR was produced which advocated the upgrade of six of the USTs and removal and replacement with Aboveground Storage Tanks (ASTs) or USTs of the rest of the tanks. Based on scope changes, a revised cost estimate was produced. (Each time a change of scope was requested, a new cost estimate was generated. To date, approximately 22 cost estimates have been produced for both the Pilot and Main Projects.)

In FY 93 the Department of Energy (DOE), Rocky Flats Field Office (RFFO) requested that a closer look be taken at replacing the USTs with Aboveground Storage Tanks (ASTs) to minimize future risks and liabilities associated with new USTs. The use of ASTs

was considered earlier, but had been rejected due to security concerns and the absence of AST regulations. The changing Site mission and Colorado's promulgation of AST regulations in October 1994 warranted revisiting this option. Each location was evaluated for the efficacy of replacing USTs with ASTs. With the exception of the Site Gas Station (Building 331) ASTs were found to be appropriate replacements.

In 1994, the DOE, in an effort to show rapid progress, requested that several tanks be separated from the group and completed on a "fast-track" or a "pilot" basis. Tank 2 (Building 124) and Tanks 9 and 13 (Building 443) were chosen as representative of the non-Protected Area (PA) and were designated the Pilot Project USTs. Based on the tanks chosen, a scope, schedule and budget were developed around excavating USTs and replacing them with new USTs. A Statement of Work (SOW) and Design Criteria (DC) were developed and disseminated for subcontractor bidding.

The procurement strategy included obtaining a fixed-price, Design/Build subcontractor. The intent of this strategy was to require the prime subcontractor to take responsibility for the entire project. Three companies replied to the Expression of Interest but only one company replied to the Request for Proposal. The project was negotiated for $413K and awarded in October 1994.

Several difficulties were experienced on the project. Because the successful subcontractor is a small business that was unfamiliar with conduct of business at Rocky Flats, the Design/Build concept was not entirely successful. In addition, RFETS project management, project engineering and procurement personnel changed so frequently that the lines of communication and authority became rather vague. Finally, management of RFETS changed from EG&G to the Kaiser-Hill team. Numerous roles, responsibilities and personnel changed, causing an abundance of problems for the project. The difficulties encountered in completing the Pilot Project are the main focus of the rest of this paper.

PROBLEMS ENCOUNTERED/LESSONS LEARNED

Shortly after Pilot Project design began, the DOE requested that EG&G take a closer look at closure in place (by filling the tanks with foam) instead of excavation. Closure in place would minimize the risk of encountering unknowns during excavation and would be potentially less expensive. The promulgation of AST regulations required preparing a plan to replace the USTs with ASTs rather than USTs. A Stop Work Order was issued to the subcontractor and EG&G initiated re-scoping efforts. The SOW was rewritten and in January 1995 a new proposal was presented to EG&G by the subcontractor.

A final contract price was negotiated at a higher value than originally negotiated. The revised subcontract value of $424K was accepted in February 1995 and the subcontractor resumed design

work on the Pilot Project.

Because the subcontract was procured as a Design/Build, the traditional engineering stages of Title I, II and III were not implemented but were replaced with 50%, 90% and Final Designs followed by construction. The design portion of the project was completed with only minor issues. The designs were received and reviewed as scheduled. Appropriate building and engineering disciplines were involved with design reviews. Because two of the three tanks were classified as Vital Safety Systems (VSS) the appropriate safety reviews were completed.

Concurrent with design was completion of paperwork required for the subcontractor to begin field work. Documentation and design reviews included the following:

- Health & Safety Plan;
- Project Management Plan;
- Site Assessment/Sampling and Analysis Plan;
- Integrated Work Control Package (IWCP);
- Safety Evaluation Screen/Unresolved Safety Question Determination (SES/USQD).

The SES/USQD was prepared for the Pilot Project because, although Building 443 is not considered a Vital Safety System (VSS), the emergency generators supported by the USTs are considered VSS. The USQD was not required and the SES was performed quickly upon completion of final designs. The SES was not be completed until the final designs were approved on the Pilot Project; however, the Main Project SES/USQD will be initiated upon completion of the 90% designs, in anticipation of minimal changes between the 90% and final designs.

One IWCP was prepared because the Building 443 and 124 management and operations personnel were the same. A single IWCP facilitated receiving approval allowing construction to begin as scheduled. The IWCP planner and construction manager on the Main Project have suggested that only one IWCP be prepared. Separate operations approval sheets will be included indicating the building management and operations personnel approval to close out that particular portion of the IWCP. This will enable RMRS to request Conceptual Decision (CD) 4 for each tank as it is completed.

The majority of the documents were prepared by the subcontractor. Each document the subcontractor prepared required numerous revisions to be considered adequate. In addition to the revisions, the documents were not transmitted to EG&G by the subcontractor in a timely manner. EG&G provided guidance and made several attempts to assist the subcontractor with document preparation. At some point, in-house document preparation seemed more feasible instead of requiring constant revisions from the subcontractor.

The lack of success with documents pointed to a lack of project management capabilities on the part of the subcontractor. This was evidenced in completion of the regulatory requirements as well. The project had a moderately rigorous regulatory component in addition to the design, construction and project management components. Regulatory requirements during construction included the following; the AST Installation Permit Package, which included 90% designs for the new tanks; notification of change in service of USTs; and confirmation of release reporting.

The initial regulatory requirement was the transmittal of the AST installation plan. Both EG&G and the subcontractor neglected to prepare the package for submittal to the Department of Labor and Employment/Oil Inspection Section (DOLE/OIS) in a timely manner. This forced the EG&G and DOE, RFFO programmatic regulatory support personnel to scramble through completion and submittal of the paperwork at the last minute. The DOLE/OIS representative was very flexible in his approach to the project and agreed to meet with EG&G and DOE personnel to discuss the overall project and accept the paperwork required for the Pilot Project. The OIS representative made a difficult situation much simpler due to his flexibility.

With completion of designs, the regulatory paperwork and pre-construction documents were also completed. The construction portion of the project began as scheduled and occurred in two phases, first AST installation then UST closure.

AST installation included the following:

- bringing tanks and appurtenances onto the plantsite;
- arranging for facilities inspection to inspect and approve the VSS system components;
- installing the tank systems;
- testing the systems;
- transferring service from the USTs to the ASTs;
- training building personnel to operate the new systems.

The subcontractor was not successful at controlling either the accurate accounting of equipment that was delivered to RFETS or the timely completion of modifications to the Bill of Materials to incorporate changes in materials. For example, the subcontractor initially used a different schedule re-bar than that specified in the designs at Building 124. A lack of communication existed between the construction subcontractor, the design subcontractor (under the direction of the subcontractor, the construction subcontractor), DynCorp facilities inspection, RMRS engineering, construction and project management. This caused delays in the timely completion of delivery and inspection of the new tank systems. Nevertheless, once the systems were on-site construction proceeded smoothly.

Initial site grading at the south side of Building 443 produced a small amount of asbestos in the soil. The subcontractor stopped

work immediately, samples were taken and analyzed and the subcontractor (a licensed asbestos abatement company) contained and disposed of the asbestos material appropriately.

The new tanks were installed using multiple subcontractors for concrete placement, electrical services and tank installation (all under the direction of the subcontractor). The subcontractor's construction manager was adept at completing construction both quickly and safely. The weekly walkdowns always indicated safe and successful implementation of the Health and Safety program at the site, in spite of the bottleneck of obstructions scattered about Building 443 due to building renovations. Upon completion of AST system installations, the Building personnel were trained on tank operation and monitoring and the USTs were taken off-line for closure.

UST closure consisted of the following:

- verifying transference of service;
- draining the USTs of product;
- cleaning and rinsing the USTs;
- draining and disposing of the UST rinsate and remaining product
- drilling boreholes for soil samples;
- analyzing and evaluating soil samples;
- managing drill cuttings;
- notifying DOLE/OIS of contaminant release;
- filling the tanks with foam;
- preparing closure reports and other relevant paperwork.

The subcontractor again performed well in their ability to perform tank cleaning and sampling in an effective and timely manner. The tanks were drained and cleaned in the same day utilizing a local subcontractor who removed both the diesel and soap and water rinsate. The solutions were rad screened then taken off-site to a facility that first uses an oil water separator to recover the diesel product, then treats the rinsate. Upon verification that the tanks were free and clean of product, a drill rig was mobilized to obtain soil samples.

Before construction began, the amount of soil sampling, the type of samples taken and the management of residual soils was the subject of much discussion. It is DOE's position that minimal sampling and soil management should be performed to minimize both the effort and costs associated with tank closure. The Environmental Restoration group felt that a more conservative approach was required. The RCRA programs representative attempted to arrange a compromise position that would fulfill the requirements of RFETS sampling and investigatively derived materials (IDM) requirements and minimize the costs required to characterize the site for tank closure.

The practices and procedures discussed were written into a memo and agreed upon by Project Management, RCRA Programs and ER. With completion of the first day of drilling it became apparent that

the agreement that was made contained numerous ambiguities and inappropriate actions, in the opinion of the project manager. The majority of the ambiguities centered around IDM management.

Several opinions and procedures exist surrounding what should be the final disposition of soil that is considered IDM but is generated from a construction project. To summarize, if soil samples are taken from an excavation made with a backhoe, the excess soil can be stockpiled, then if found to be "clean" upon completion of sampling, put back into the excavation. If the soil is generated using a drill rig, according to RFETS procedures and in agreement with the State of Colorado, the soil must be drummed and managed as waste, regardless of the outcome of sampling for characterization. Differing opinions exist as to whether the drummed soil should be stored as RCRA waste, CERCLA waste, or put into the Sanitary Landfill. The outcome of this project is that nine drums of "clean" soil are being held in storage because no decision could be reached to empty the drums into the Sanitary Landfill.

The main procedure cited for use in this project was the Field Operations Procedure FO.23, which addresses management of IDM and wastes. Another procedure, thought to be relevant and appropriate is a construction procedure, GT.24, which allows stockpiling of soils generated during construction projects. Procedure number FO.23 was listed in the IWCP as the appropriate procedure. During construction the project manager felt it was not the appropriate procedure to use, based on the requirements under GT.24, previous sampling conducted at Building 443 and process knowledge about the sites. The IWCP was changed and the change was initialled by both the project manager and the Building Environmental Coordinator who was also acting as the RCRA Waste Generator. There has been some discussion about whether the field change to the IWCP was "legal" and whether or not it violated Conduct of Operations; however, at this point the debate seems to be based more on opinion than on actual procedural violations. The procedures to be used on the Main Project is being modified and will be reviewed by the appropriate personnel to ensure full compliance with limited expense where possible.

Upon completion of the drilling and sampling program, several conclusions were made. Soil surrounding two of the tanks contained concentrations of Total Petroleum Hydrocarbons (TPH) and/or Benzene, Toluene, Ethylene and Xylene (BTEX) components at concentrations slightly higher than detection limits but significantly less that the State of Colorado Action Levels. Although the concentrations were low, notification of DOLE/OIS was still required. The requirements are supposed to be made within 24 hours of detection of the release. Again both the subcontractor and (at this point) RMRS neglected to report the release detection to Kaiser-Hill and DOE in a timely enough manner that would allow DOE to notify the State of Colorado within 24 hours. Tank closure proceeded and eventually the State was notified of both the release detection and the change in

service of the USTs.

Additional requirements for tank closure included filling the tanks with an inert material and preparing closure reports. the subcontractor had originally arranged for a tank foaming subcontractor to fill the tanks with a polymer foam. The subcontractor arrived to fill the tanks with foam but realized when he got to the site that the foaming equipment was inadequate to complete the job. The subcontractor was sent away and the subcontractor searched for another subcontractor. Several weeks passed before another subcontractor was located and mobilized.

The subcontractor utilized was not experienced in applying foam to tanks, but rather was in the home insulation business. He had recently used the foam to fill mine portals and became involved in the Pilot Project as a way to enter the tank foaming business. The subcontractor provided a quick, easy application of the foam that was confirmed to have hardened properly. This foaming subcontractor was then recommended to the Main Project subcontractor who was able to negotiate a lower price per gallon of foam compared to the prices quoted by traditional tank foaming companies.

After foaming the tanks, the only remaining activity was preparing "approvable" closure reports that advocated "No Further Action" at the three tank sites. The subcontractor's lack of report preparation abilities again surfaced, in spite of several meetings conducted by RMRS intended to minimize modifications. The subcontractor submitted closure reports that lacked pertinent information and contained word processing errors and formatting problems. Three revisions were prepared before the reports were considered acceptable by RMRS and Kaiser-Hill. Due to the number of submittals required of the subcontractor, an extension on the date of transmittal to DOLE/OIS was requested and received. Ultimately, the reports were submitted one day ahead of the revised deadline.

The Kaiser-Hill lawyer reviewed the closure reports once RMRS considered them acceptable. The Kaiser-Hill lawyer made several suggestions which prompted discussions with OIS requesting minimized sampling requirements and increased action level concentrations. Approval of the closure reports and a decision regarding these requests is pending; however, the less stringent requirements will be applied to the Main Project upon receipt of approval by the OIS.

After receipt of the closure reports, RMRS and the subcontractor held a meeting to discuss the pros and cons of the project. The subcontractor's major complaint had to do with constantly changing Site staff and personnel associated with the project. The lines of communication and decision making were not clear, especially with the transition of the Site from an M&O to an Integrator. This confusion was especially felt in EG&G and Kaiser-Hill procurement activities.

Before the subcontract was novated to RMRS, there was essentially no procurement representation by Kaiser-Hill. This was significant because the subcontractor submitted several change requests that EG&G, Kaiser-Hill and RMRS did not get resolved in a timely manner. RFETS personnel gave notice to proceed and work was completed on the items covered in the change requests before the costs of the changes were negotiated.

Some confusion occurred over whether RMRS was obligated to pay the subcontractor for actual costs for changes that had not been previously negotiated or whether RMRS was only obligated to pay the cost proposed by the subcontractor prior to completing the work. Eventually the changes were negotiated, bringing the contract value up to $435K.

The delay in reassigning the subcontract to an RMRS administrator, while processing the change order, caused a delay in processing the subcontractor's payment applications. This type of delay is typically difficult for small businesses. All efforts will be made to avoid such a delay again with the subcontractor or with the Main Project subcontractor.

In summary, the EG&G/RMRS project manager could have taken a stronger lead in the project to assist the subcontractor through the learning curve; however, other responsibilities, such as procuring a subcontractor for the Main Project, took precedence. It is felt that the subcontractor learned quite a bit about conduct of projects at RFETS. Hopefully, the learning curve the subcontractor experiences in future projects will be shallower.

The outcome of the Pilot Project is expected to be Approval of the Closure Reports by the DOLE/OIS. Some of the knowledge gained in obtaining that approval has already been applied, where possible, to the Main Project. It is expected that the Main Project will proceed more smoothly due to the lessons learned from the Pilot Project. In that respect, as a Pilot, the project was a successful learning tool.