REMEDIAL ACTION AT VICINITY PROPERTIES

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ABSTRACT

Pursuant to the Uranium Mill Tailings Radiation Control Act (UMTRCA) of 1978, the DOE has been delegated responsibility for the identification and cleanup of residual radioactive material at 24 inactive processing sites. This cleanup includes contaminated properties located outside the designated boundaries of the processing sites, and in Edgemont, South Dakota. On February 2, 1984, the DOE published a designation of 8,156 UMTRA Project vicinity properties.

Remedial action at these vicinity properties entails a number of chronological tasks which in some ways are much more complex than those steps which must be followed on the processing sites, especially in light of the high volume of remedial actions required. Prior to remedial action, each property must be surveyed to confirm that tailings (residual radioactive material) exist on the property and the contamination is in excess of EPA standards. Each property is then individually "included" in the UMTRA Project and remedial action is designed. Prior to performing remedial action, a number of parties must concur with the remedial action plan. These parties include the DOE, the state or tribe, the NRC, and the property owner. Once remedial action is initiated, excavation and health and safety practices must be carefully monitored. Upon completion of remedial action, each property is certified by the DOE as being in compliance with EPA standards[1].

This paper discusses some of the principal means of accomplishing UMTRA Project Vicinity Property remedial actions; how it has been done in the past and what lessons have been learned.

BACKGROUND AND INTRODUCTION

Hazardous Waste Source and Description

From the early 1940s through 1970, uranium ore from multiple sources in the United States was processed by private companies under contracts with the Manhattan Engineer District and the U.S. Atomic Energy Commission (AEC). As these sources were depleted and the demand for U_3O_8 dropped, many mills were deactivated, leaving behind large quantities of radioactive uranium tailings.

Since uranium milling processes followed conventional practices, these tailings were left unsecured and unprotected from the elements. Some tailings piles were accessible to the public and drawn from for use as a sand substitute or backfill material in construction projects. Unprotected piles were also susceptible to high winds and significant windblown spreading of the tailings consequently occurred.

Subsequential research on the health effects of low-level radiation exposure identified a potential health hazard associated with mill tailings; specifically, the potential inhalation of radon decay products. As radiological criteria for allowable dosages became more defined, Federal, state, and tribal governments become more concerned about the hazards associated with the tailings materials that had been transferred to structures in the vicinities of the abandoned processing sites. These properties included residences, schools, churches, and commercial properties, and are referred to as "vicinity properties."

Federal Legislation

In 1972, Congress passed legislation providing funds for the cleanup of vicinity properties in Grand Junction, Colorado. Also in 1972, a second program was initiated by the AEC to determine the preliminary radiological status and public health effects associated with all other inactive uranium processing sites and associated vicinity properties throughout the United States.

On November 8, 1978, Public Law 95-604, the Uranium Mill Tailings Radiation Control Act (UMTRCA) of 1978, was passed, requiring the Federal Government to perform remedial actions on inactive uranium mill sites which had been under contract to the Federal Government, and to clean up vicinity properties associated with these mill sites. This act also requires that the Environmental Protection Agency promulgate standards for cleanup of these tailings.

Responsibility for conducting remedial actions at the 24 eligible processing sites was delegated to the U.S. Department of Energy (DOE), Uranium Mill Tailings Remedial Action (UMTRA) Project Office (PO) located in Albuquerque, New Mexico. Individual cooperative agreements between the DOE and the affected states and Indian tribes outline the PO responsibilities as the following:

(1) Identification of candidate vicinity properties (designation). (2) Determination of the extent of contamination and eligibility for remedial action (inclusion). (3) Implementation of remedial action. (4) Verification that remediated properties have been cleaned up in compliance with the EPA standards (certification). (5) Coordination with agencies or representatives from involved or concerned organizations (e.g., states, and tribes).

PROJECT ORGANIZATION AND RESPONSIBILITIES

Contractor Responsibilities

The DOE is assisted in its vicinity property efforts by a Technical Assistance Contractor (TAC),

two Remedial Action Contractors (RACs), and an Inclusion Survey Contractor (ISC). In addition, the states, Indian Tribes, and Nuclear Regulatory Commission (NRC) provide approvals and concurrence to DOE at various stages of the remedial action process. The PO is also assisted in its efforts by the DOE Headquarters in Germantown, Maryland, and the Grand Junction Project Office (GJPO). A general Vicinity Property Organization Chart is provided in Fig. 1.

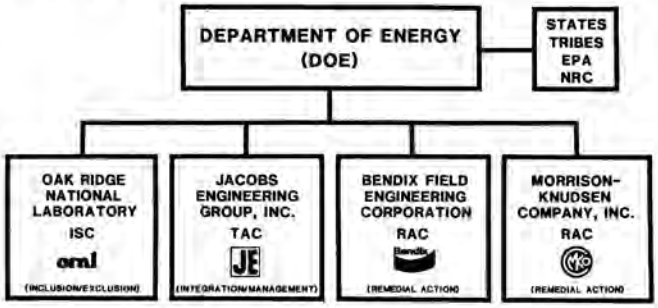

Fig. 1. Vicinity Property Organization Chart.

The purpose of the TAC is to assist the DOE in the technical development, planning, and monitoring of the UMTRA Project remedial actions. The TAC interfaces daily with the RACs, ISC, states, tribes, and other participants.

The ISC is responsible for performing all radiological surveys and data analysis as required to provide justification for inclusion of properties in the UMTRA Project.

The RAC's function is to prepare detailed remedial action engineering designs for inactive mill sites and vicinity properties and to implement all remedial actions.

The Bendix Technical Measurements Center (TMC) supports the environmental measurement requirements of the UMTRA Project. The technical support of the TMC to the UMTRA Project consists of instrument evaluation and calibration, along with field measurement procedure development.

The NRC, states, and tribes, as implementing agencies with the DOE, are responsible for concurrence with selected remedial action plans and development of project planning and documentation.

Project Schedule

Under the schedule outlined in PL95-604, the project's cleanup is to be complete by March, 1990 (seven years from the effective date of EPA standards). To accomplish this objective, a well-conceived and structured order of events must be established and applied to each vicinity property. This is particularly necessary considering the large volume of vicinity properties which have been identified as candidates for remedial action. Based on the duration of all required activities to be accomplished on each vicinity property, and budget constraints in fiscal years 1985 and 1986, a baseline schedule for the major categories of activity was constructed. The three major categories of activity are inclusion surveys, engineering, and remedial action. A graphic display of this baseline schedule is illustrated in Fig. 2.

As illustrated by this figure, the mandated project time frame imposes a very demanding task on the project participants. In 1987 and 1988 it is estimated that remedial action will start or finish five times every day of the construction season. This schedule requires tremendous discipline and project organization. A detailed schedule of vicinity property remedial action by site and by year is provided in the Project Schedule and Cost Estimate[2] (PSCE) report.

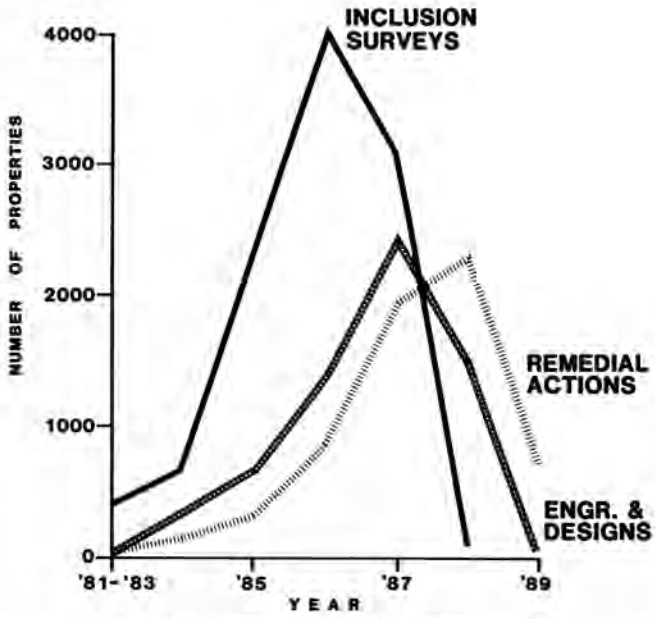

Fig. 2. Baseline Project Schedule.

Project Budget

The cost for vicinity property remedial action is estimated each year and documented in the UMTRA Project PSCE report. This report is updated annually to include the cost experience gained each year. The most recent estimate indicates that the total cost of vicinity property remedial action will be approximately $200 million. For perspective, this cost can be broken down into three categories: engineering, remedial action, and management. The large majority, approximately 75 percent, of vicinity property costs are attributed to remedial action. An ongoing effort is being made by all project participants to streamline the individual processes and increase overall cost effectiveness.

Remedial Action Process

The vicinity property remedial action process is intricate and complex. Properties must be identified, included, engineered, and cleaned up. Once a property is cleaned up, verification that EPA standards have been met must be established. A generic property schedule is provided in Fig. 3 to illustrate the steps of the process and the relative time required to accomplish each chronological task. This general description of the remedial action process, combined with the understanding of the project's schedule requirements, gives the reader some appreciation of the process' complexity.

A very detailed outline of the remedial action process was developed and is published in the Vicinity Properties Management and Implementation Manual[3] (VPMIM). This Project document serves as guidance to all project participants on the specifics

of how various aspects of the process *should be* implemented. The VPMIM is updated semiannually to incorporate experience gained in the field. A summary discussion of the UMTRA Project vicinity properties process is provided in the following sections of this report.

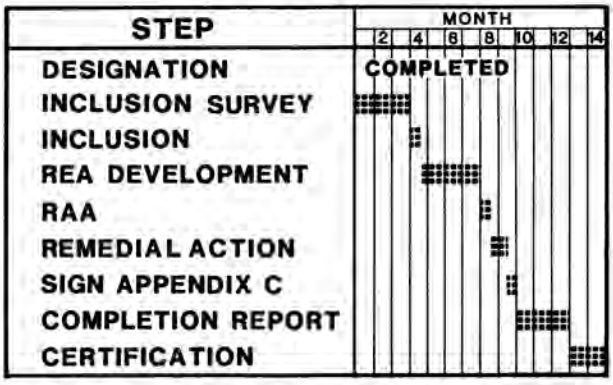

Fig. 3. Generic Vicinity Property Schedule.

PROPERTY ELIGIBILITY

Property Identification

As the first step in the cleanup of UMTRA Project vicinity properties, aerial surveys were conducted between 1977 and 1983 under DOE contracts to identify areas, around uranium tailings stockpiles, which could possibly be contaminated. Mobile ground surveys were also performed to further define the location and quantity of these vicinity properties. In addition, between 1972 and 1980, on-site surveys were conducted by various agencies on individual properties.

The data from these surveys have indicated that 8,156 properties, with anomalous radioactive characteristics, exist in the vicinity of those 24 abandoned uranium mill tailings sites designated by the UMTRCA.

Designation

Vicinity property "designation" is the process by which information from past aerial, mobile van, and on-site surveys is used to identify and list candidates for UMTRA Project remedial action. The DOE designates those properties for which uranium mill tailings contamination is suspected. This designation procedure has been implemented for areas around the 24 UMTRA Project processing sites, and in Edgemont, South Dakota, where vicinity properties associated with a mill owned by the Tennessee Valley Authority exist. The initial designation of 8,156 vicinity properties was published in the Federal Register on February 2, 1984[4].

Property Inclusion--Definition and Purpose

Prior to beginning remedial action activities, each property must be evaluated to determine its eligibility for inclusion in the UMTRA Project. "Included" properties are those properties at which the existence of residual radioactive contamination in excess of EPA standards has been confirmed. The inclusion evaluation usually involves on-site radiological surveys; however, mobile radiation surveys have been used in some cases. The survey information is evaluated by the ISC and a recommendation is made to the DOE for inclusion or exclusion.

Figure 4 illustrates the basic steps of the inclusion process and the responsibilities of each party involved.

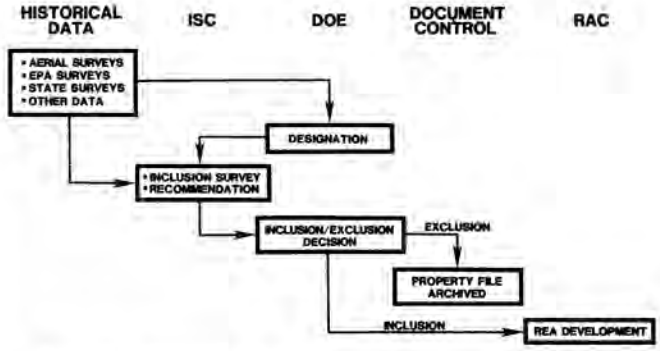

Fig. 4. Property Designation and Inclusion Process.

Preliminary radiological data developed by the EPA and others are first referenced by the ISC to assist in making an inclusion determination, if possible. Should additional data be required, the ISC arranges for an additional on-site survey to acquire supplemental measurements. Prior to the initiation of any inclusion survey work, the ISC must obtain consent from the property owner to access the property. Should a property be included without entering the property by using historical radiological data (i.e., mobile van validation or spillover identification), an ISC survey is not required. In those cases, the RAC is responsible for obtaining the right-of-entry agreement from the property owner before engineering on the property can be completed.

Once consent to survey a property is received from the property owner, the ISC will conduct a survey to identify residual radioactive material in excess of the EPA standards. A standard survey procedure is employed consisting of a surface gamma scan indoors and outdoors. Soil sample and analysis, and Working Level (WL) measurements, are conducted only if required. The ISC's survey procedure is designed to optimize time and to provide for extended measurements only as they are required.

Critical data generated by these surveys could include: maximum radiation exposure levels recorded outside and inside any habitable structures, radon daughter concentrations in the air (indoors only), and soil radium-226 content in suspected contaminated areas. Many times it is also necessary to drill boreholes into outdoor soils or structure foundations to determine the extent of contamination. These data are forwarded by the ISC to the DOE for their inclusion/exclusion determination.

Once a vicinity property has been officially included by the DOE, the official location folder for the property is transferred to the RAC with a notice-to-proceed with engineering design development and the remedial action. Properties found not to be eligible for remedial action are excluded and the location folder is archived for the remainder of the project.

PREPARATION FOR REMEDIAL ACTION

Purpose

Properties which have been included in the UMTRA Project for remedial action are further assessed from a radiological and engineering viewpoint by the RACs

so that preliminary design for a remedial action alternative, or set of alternatives, can be generated. The Radiological and Engineering Assessment (REA) defines the areal extent and depth of any tailings material which exceeds the EPA cleanup standards in 40 CFR 192.12. An REA is developed by the RAC and is submitted to the DOE, states/tribes, and NRC so that schedule, cost estimates, and remedial action options can be approved.

Once a property's REA is approved, the property owner enters into an agreement with the DOE which outlines the remedial action plan for his property. This is called a Remedial Action Agreement (RAA). The REA and RAA processes are discussed below in further detail. A flow chart illustrating this process is provided in Fig. 5.

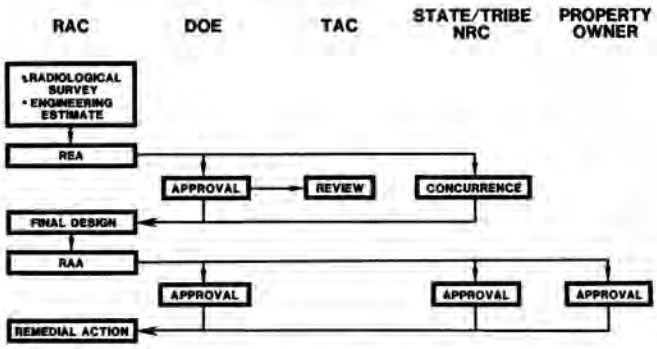

Fig. 5. Engineering and Design Process.

Radiological and Engineering Assessments

The data obtained during the inclusion survey, and reported by the ISC, are used as a baseline for the REA survey. The REA radiological assessment defines all tailings deposits on a property whereas the data generated by the ISC only characterizes that contamination required to include or exclude a property. The RAC generally performs a complete surface gamma scan of the property. Areas of suspected contamination are outlined on a map and further investigated with gridpoint gamma surveys and drill holes.

Generally, the RAC performs gamma survey measurements on the interior of a structure only if the inclusion survey has identified elevated readings or potential areas of contamination inside the structure. The areas of indoor contamination are defined by completely gamma scanning the room where contaminants exist. If elevated surface gamma readings are noted at the floor of a structure, holes are drilled through the floor, with permission from the property owner, and through the suspected deposit. A two-inch by two-inch NaI detector is lowered in the drill hole and six-inch incremental readings are taken. The depth of the deposit is estimated based on the readings taken in the hole. A detailed discussion of the analysis and interpretation of these readings is documented in the RAC Procedure Manuals[5,6].

If possible, all holes are drilled to a depth below the tailings deposit. However, drill hole depths can vary based on two conditions, the soil type, and the depth of contamination. For example, if drilling takes place in rocky soil with hand-held augers, the drill hole depth may not be sufficiently deep to penetrate the contamination but may be adequate to determine the depth to clean material.

The location of drill holes are generally drilled guided by surface gamma readings in an attempt to define the areal extent of the deposit as well as the depth. Holes are usually drilled both within suspected contamination areas and around the outer perimeter of these areas.

In areas where the down hole logs show no contamination but surface gamma scans still show elevated surface readings, "Delta" readings are taken to confirm that the surface readings are caused by shine from adjacent deposits.

In addition to drilling holes in areas of high gamma anomalies, holes may be drilled in suspected backfill areas. These suspected areas include building foundations, utility lines, and the like. This identifies buried tailings deposits which may otherwise be shielded by concrete foundations or clean fill. These suspect areas vary with each region and are dependent upon the RAC's knowledge of how tailings were used in that region's construction.

The radiological information is used by the RACs to estimate the areal and volumetric extent of contamination. From this determination, the RACs identify design requirements and cost estimates for remedial action. The total package of information is combined with drawings and is presented in an REA.

The REA includes not only a radiological assessment but also an assessment of the engineering conditions and considerations. The engineering assessment generally includes a legal description of the property, identification of utilities and their locations, any potential safety hazards that should be considered during remedial action, and a cost estimate for each considered option.

The cost estimates that are presented in the REA include quantities and unit costs for each work item. Unit costs are usually based on previous contracts for similar work, or on typical costs for that geographic location.

The REA is submitted to DOE, NRC, and the respective state or tribe for comment and approval. The RAC incorporates the comments from each respective organization into a final REA. On noncomplex properties, draft REAs are not required. The final REA is used as the basis for detail design and remedial action. At this stage the RAC interacts with the property owner to obtain his/her agreement on the proposed remedial action plan.

Remedial Action Agreements (RAA)

The RAC must obtain an RAA from each property owner whose property requires remedial action. An RAA is a legal agreement between DOE, the state, and the owner of an included property.

An RAA includes a description of the remedial action plan based on the selected option in the final REA. It also provides the property owner with a guarantee that the property will be restored to its original condition, a release of liability and, if required, provisions for dislocation and reimbursement cost. An RAA provides the DOE with an approval for remedial action and title to the residual radioactive materials. Once signed by the property owner, the RAA is owned by the state or tribe and

finally, the DOE. After the RAA is fully approved, the RAC may begin remedial action.

REMEDIAL ACTION

Description

Remedial action is the culmination of the UMTRA Project vicinity property process. Although this stage represents, on the average, less than 10 percent of each property's schedule, it does represent nearly 75 percent of the cost. It is the point at which all the time devoted to qualifying, characterizing, and engineering the property's cleanup requirements pays off. It is certainly the most visible part of the vicinity property process and is the most gratifying for the DOE and cooperating agencies. Beyond remedial action the only step left in the vicinity property process is to certify the property's compliance with EPA standards, to provide formal notification to the property owner, and to notate the property's legal deed.

For purposes of this discussion remedial action involves: contracting, excavation, owner/tenant dislocation, restoration, health and safety, completion reporting, certification, and document transfer/archiving. The remedial action process is shown in Fig. 6 and is summarized in the following text.

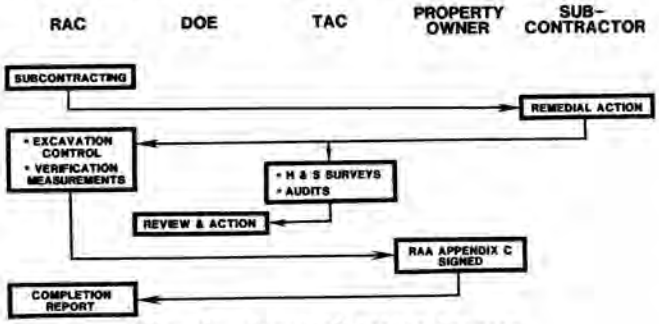

Fig. 6. Remedial Action Process.

Contracting

All remedial action on vicinity properties is subcontracted, by the Project's RACs, to construction subcontractors. The preference is to provide work to local subcontractors so that money can be fed into the local community's economy.

Bid packages illustrating construction requirements of approved designs are prepared and distributed to qualified bidders by the RAC. The bids are on a firm-fixed unit price basis unless exceptions are warranted. An attempt is made by the RACs to group properties in single bid packages. Groups are typically of the same property types located within the same geographic proximity. This type of bidding, particularly for noncomplex residential properties, has proved to be time- and cost-effective. Prior to bid opening, a tour of some of the vicinity properties in the package is typically conducted by the responsible RAC.

Award of the bid package is given to the qualified lowest bidder. Preference is given to small, disadvantaged, minority, and women-owned businesses. Upon award, the subcontractor submits a schedule to the responsible RAC so that excavation control and health and safety monitoring can be planned.

Owner/Tenant Dislocation

Certain conditions established in the RAA must be complied with prior to the start of construction. One such condition is the agreement for dislocation.

Occasionally, owners or tenants must be temporarily dislocated to housing other than their home or business. This is typically required only when extensive structural decontamination is performed; however, it could occur under any conditions which jeopardize the health and safety of the occupants. Based upon the RAA, occupants are dislocated at DOE's expense. A conservative per diem is allowed and storage of housing goods sometimes is permitted.

A less popular RAA condition involves reimbursement for losses incurred during remedial action. This condition is allowed under limited circumstances when commercial enterprises are involved. These cases are judged on an individual basis by the DOE and the state or tribe.

Excavation and Restoration

Once conditions of an RAA are met and the construction crews undergo health and safety training, the excavation of contaminated material can begin. Areas assessed in the REA for decontamination are staked by the RAC's excavation control representative. Access control to the area being excavated is established in accordance with health and safety requirements outlined in the VPMIM. These requirements vary, dependent primarily upon the volume and concentration of contaminated material being removed. Once access control has been established, the area of contamination is excavated to a minimum depth. Beyond the minimum established depth, the RAC controls excavation with hand-held gamma scintillometers until all material contaminated above EPA standards is removed. If interior (structural) decontamination is required, furnishings are removed and dust curtains may be set up. Floors and foundations above the area to be decontaminated are removed and the tailings excavated. Excavation is controlled in the same manner as for exterior excavation.

In addition to the RAC's excavation control the TAC performs occasional radiological surveillances. The surveillance includes duplicate sampling, field measurements, and analyses of soil samples. These surveillances provide DOE with a quality assurance mechanism and control of the RAC's field activities.

During remedial action, the workplace and local environment are monitored in accordance with the specific monitoring guidelines stipulated in the VPMIM. These guidelines are implemented at the discretion of the RAC's on-site health physicist. Along with formal training of the construction crews and access control, health and safety provisions could include posting, personnel and equipment monitoring, protective clothing, dosimetry, and air monitoring.

Once an excavation is complete, the excavated area is monitored and soil samples are usually taken to verify compliance with EPA standards. Clean material is used as backfill and the surface is restored to its original condition, through either placement of landscape or furnishings. The property owner is then asked to confirm that the property has been restored to his/her satisfaction. Upon confirmation of this fact the property owner signs

Appendix C of the RAA--the Owner Acceptance Form. Upon signature of the RAA, Appendix C, the RAC develops a Completion Report.

PROPERTY CERTIFICATION

Introduction

Field inspections and analyses are performed after completion of remedial action to determine the effectiveness of the action and to demonstrate that radiation levels at vicinity properties are within the required levels of the relevant EPA standards. Reports are required to document the findings of these inspections and analyses.

This chapter outlines the guidelines used by the DOE to certify that a vicinity property is in compliance with EPA standards. Figure 7 presents the flow and responsibilities of this process.

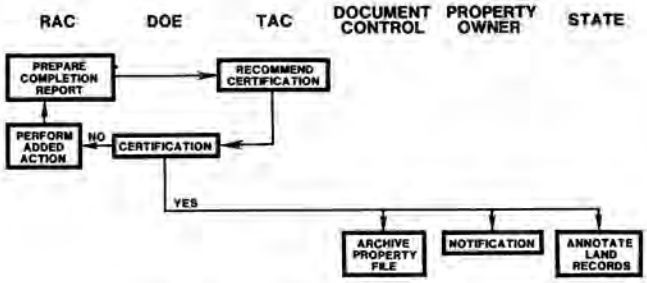

Fig. 7. Certification Process.

Completion Reports (CR)

The RAC prepares a CR on each vicinity property which has undergone remedial action. The CR contains two sets of information; an operations summary and a verification summary.

The operations summary documents the administrative portions of remedial action. This includes expenditure data (actual cost versus estimated cost) and volume data (expected excavation volumes versus actual). The remedial action schedule is also presented, with an explanation of any cost or schedule overruns.

The verification summary section documents the effectiveness of the remedial action, in relation to the EPA standards. This section includes the results of pre-remedial action measurements, which include the inclusion survey measurements, supplemented with data obtained during the REA survey. A graphical representation of these data is usually provided in the CR. The post-remedial action measurements, from the RAC's verification survey, are also presented in this section. If any contamination is left on the property, through the application of supplemental standards, the location, concentration, and volume of contamination is documented in this section of the report.

Certification

The CR is reviewed by the TAC and evaluated for completeness, accuracy, and for the property's compliance with the EPA standards. The TAC submits the CR review and any other pertinent data to the DOE with a recommendation. The recommendation can be for certification, certification upon completion and documentation of additional measurements, or certification upon completion and documentation of additional remedial action. All recommendations are made based upon the remedial action's compliance with the EPA standards.

The DOE evaluates the TAC recommendation, and all other documentation, and makes a certification decision. Upon certification, the DOE issues a letter of certification to the property owner, the TAC, RAC, the NRC, and state or tribe. The letter notifies the owner that his property is in compliance with EPA standards.

Upon certification the RAC forwards the property portfolio to the TAC for archiving in the Project Document Control System (PDCS). The DOE is also required by law (PL95-604, Section 104) to issue rules and regulations that require notice, in local land records, of the residual radioactive materials which were on the property, and notice of removal of these materials; including the date the remedial action took place. To date, the DOE has not developed these required regulations and, therefore, no property has been officially certified.

CONCLUSION

The effective cleanup of low-level radioactive waste requires that a structured series of activities be conducted at each site, as described in the previous text. This is the same series of events which occurs on most classical engineering and construction projects. There is no doubt, however, that the process for cleanup of low-level radioactive waste from UMTRA Project vicinity properties is much more complex than classical engineering and construction projects, or than the project's processing site remedial actions. Some of the more obvious reasons for the complexity are enumerated below.

The remedial action requirements, both cost and schedule, are never precisely defined on vicinity properties until the remedial action is completed. The reasons for this are basically three:

- The use of tailings varies with each region and property.
- The contamination, once placed below the surface of a property, cannot be seen, smelled, or felt, and surface detection instrumentation is marginally effective at sensing contamination at a depth greater than six inches.
- Budget constraints limit the amount of subsurface radiological characterization which can be cost-effectively conducted on individual properties, prior to remedial action itself.

These factors impose a lack of real definition to the estimates of areal and volumetric extent of contamination in the REA. This lack of defined remedial action forces high-contingency planning and budgeting on each property, which is inefficient.

The process is further complicated from an administrative point of view for several reasons:

- There are between 4,000 and 8,000 individual properties which may need to be cleaned up. Remedial action negotiations must be held with each property owner individually. These individual construction projects are homes and businesses and they are very important to the individual owners; consequently, these

negotiations have the potential of becoming critical schedule constraints.

- The VP process is implemented by various contractors, each responsible for different aspects of the project. The flow of information from organization to organization, and to their various geographic locations, implies potential communication difficulties.

- The project is a cooperative process between the DOE, states, tribes, and NRC. Each organization must approve the individual REAs and RAAs before remedial action can start. This complicates scheduling and, again, has a potential for communication inefficiencies.

- The project life is seven years; to be completed by March, 1990. Extensions of this completion date would require a mandate by the U.S. Congress. The project schedule implies rapid acceleration and deceleration of contractor and subcontractor efforts and requires extremely efficient processing of information over the next four years.

- The budget for this project is committed annually by both the DOE (90 percent) and the states (10 percent). Funding for the project is uncertain beyond two-year forecasts. This diminishes the ability of project contractors to provide efficient long-range planning.

Although the project is only two years old, some very sophisticated and complex management protocol have been initiated and emplaced in the system to deal effectively with the requirements. The most notable of these include:

- A Vicinity Properties Management and Implementation Manual, representing a well-defined structured "cookbook" approach to all vicinity property work. The manual is reviewed and revised semiannually by all UMTRA Project participants.

- Quarterly technical workshops amongst contractors designed to share ideas and "lessons learned." Workshops result in procedural enhancements and VPMIM revisions.

- Well-defined and streamlined procedures for property characterization and engineering of remedial action.

- A centralized project management structure designed for proactive management and expeditious response by DOE and contractors.

- Boilerplate formats for all reports, designed to streamline production and review.

- Computer-aided engineering and design combined with network communication amongst all contractors and DOE allowing "over the line" transmission of radiological engineering and status data to a centralized information management system.

- Subcontracting which allows for cost-effective, rapid remedial action on a large number of properties simultaneously.

Along with development and implementation of these management tools, a significant amount of actual progress has been made in the area of remedial action: over 1000 radiological surveys have been conducted; 250 REAs completed; and 150 remedial actions completed. In fiscal years 1987 and 1988 this project is planned to start or complete remedial action on an average of five properties every day.

The administrative and operational constraints described in this paper are intrinsic to a remedial action process with this widespread an application. The potential for inefficiency is greater than in most classical site remedial actions.

The consequential challenge to accomplish the vicinity property objectives of the UMTRA Project is significant--almost overwhelming. However, the Project participants are prepared and very optimistic about the future. They feel confident that with the appropriate degree of contractor team effort, DOE management, and overall flexible planning the objectives of the UMTRA Project will be met.

ACKNOWLEDGEMENT

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