UMTRA-DOE/AL-050601

United States Department of Energy

Vicinity Properties Management and Implementation Manual

Final

March, 1988

Uranium Mill Tailings Remedial Action Project UMTRAP

UMTRA DOE/AL-050601
March, 1988
Control Copy 36
Revision D

URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT OFFICE

ALBUQUERQUE OPERATIONS OFFICE

U.S. DEPARTMENT OF ENERGY

ALBUQUERQUE, NEW MEXICO 87108

VICINITY PROPERTIES MANAGEMENT

AND

IMPLEMENTATION MANUAL

Approved by

W. John Arthur, III

W. John Arthur, III
UMTRA Project Office
U.S. Department of Energy

ABSTRACT

This document describes the Uranium Mill Tailings Remedial Action (UMTRA) Project policies and procedures for remedial action activities on vicinity properties. Descriptions of the inclusion process procedures, remedial action, health and safety, and quality assurance surveillance activities, cost controls, certification procedures, and supporting information management systems are provided.

This issue of the Vicinity Properties Management and Implementation Manual (VPMIM) incorporates all changes from Revisions A, B, and C. Additional changes were also made between August, 1986, and the date of issue. This document will be revised frequently.

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

Section

LIST OF FIGURES

LIST OF TABLES

1.0 INTRODUCTION

1.1 BACKGROUND

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 Engineering District and the U.S. Atomic Energy Commission. As these uranium ore bodies were depleted and the demand for processed uranium dropped, many of the mills were deactivated. Large quantities of processed ore residue, or tailings, from the milling operations were left behind. These uranium tailings still contain much of the radium (a radioactive element) available in the raw ore and are a source of low-level radiation.

Uranium milling processes followed conventional metallurgical industry practices of the time. Tailings were deposited either in ponds or stockpiles (depending upon the uranium extraction technique employed) adjacent to the mills, and were allowed to dry. Some of these dried piles were unprotected so that significant windblown losses of the solid residue occurred. Also, some piles were accessible to the public for withdrawal and, in some locations, the tailings were used as a sand substitute or backfill material in construction projects.

Later research on the health effects of all forms of low-level radiation exposure indicated that there is a potential health hazard associated with uranium mill tailings which was determined to be primarily from the potential inhalation of radium decay products (radon and its daughters).

As radiological criteria for allowable dosages became more stringent, the Federal, state, and tribal governments became more concerned about the radiological hazards associated with the inactive uranium mill tailings sites; in particular, the possible exposures caused by the earlier direct transfer of tailings materials to properties with habitable structures. These properties included residences, schools, hotels, hospitals, and commercial buildings, and are referred to as "vicinity properties."

In 1972, Congress passed Public Law 92-314 to provide funds for a state-Federal cooperative program for the cleanup of vicinity properties in Grand Junction, Colorado. In the same year, a second program was initiated by the Atomic Energy Commission in cooperation with the U.S. Environmental Protection Agency (EPA) to determine the preliminary radiological status and public health effects associated with inactive uranium mill tailings sites, and all associated vicinity properties.

In April 1978, legislation was proposed to Congress that established a program for performing remedial action to stabilize these uranium mill processing sites and to clean up and restore associated vicinity properties. On November 8, 1978, Public Law 95-604, the Uranium Mill Tailings Radiation Control Act of 1978, was passed. This act required the Federal government to perform remedial actions on inactive uranium mill tailings sites that had been used by the Federal government, and on each site's associated vicinity properties.

Responsibility for conducting remedial actions at 24 sites in one eastern and nine western states was delegated to the U.S. Department of Energy (DOE), Uranium Mill Tailings Remedial Action (UMTRA) Project Office located in Albuquerque, New Mexico. As outlined in individual cooperative agreements between the DOE and the affected states and Indian tribes, the Project Office is responsible for:

- Identifying the candidate vicinity properties.
- Determining the extent of contamination and eligibility for remedial action.
- Implementing remedial actions.
- Certifying that properties have been cleaned up in conformance with EPA standards.
- Coordinating with agencies or representatives from the state, tribal, and local governments, the U.S. Nuclear Regulatory Commission (NRC), and the DOE Division of Remedial Action Projects.

This task was to be accomplished, according to PL95-604, by March 7, 1990 (seven years from the 1983 effective date of the EPA Standards for Remedial Actions at Inactive Uranium Processing sites, 40 CFR Part 192). This date has been extended to September 30, 1993. The DOE is to perform remedial actions in accordance with the EPA Standards for Cleanup of Lands and Buildings Contaminated with Residual Radioactive Material from Inactive Uranium Processing Sites, 40 CFR 192.12, 192.20-23. A summary of these standards is provided in Table 1.1.

As a first step in the cleanup of UMTRA Project vicinity properties, aerial surveys were conducted between 1977 and 1983 under DOE contract to identify those areas around the tailings stockpiles which could possibly be contaminated (Section 2.2). Between 1970 and the present, the DOE also contracted for mobile ground surveys to further refine the estimates of locations and number of vicinity properties (Section 2.3). In addition, between 1972 and 1980, the EPA and the Colorado Department of Health conducted on-site surveys on individual candidate properties in Mesa County, Colorado.

These surveys by the DOE and others have indicated that 8156 properties with anomalous radioactive characteristics exist in the vicinity of those abandoned uranium mill tailings sites designated by the DOE pursuant to PL95-604. Properties with anomalous readings recorded by the EPA and NRC in the vicinity of a mill located in Edgemont, South Dakota, have also been included in the UMTRA Project pursuant to PL97-405, which amended PL95-604. A summary of the estimated number of vicinity properties, by property category and site, is presented in the UMTRA Project Schedule and Cost Estimate Report (UMTRA-DOE/AL-166). A map illustrating the regional locations of UMTRA Project vicinity properties is shown in Figure 1.1.

Table 1.1 EPA Standards

Part 192 - Health and Environmental Protection Standards for Uranium Mill Tailings

SUBPART B -- Standards for Cleanup of Land and Buildings Contaminated with Residual Radioactive Materials from Inactive Uranium Processing Sites

192.12 Standards

Remedial actions shall be conducted so as to provide reasonable assurance that, as a result of residual radioactive materials from any designated processing site:

(a) The concentration of radium-226 in land averaged over any area of 100 square meters shall not exceed the background level by more than--

(1) 5 pCi/g, averaged over the first 15 cm of soil below the surface, and

(2) 15 pCi/g, averaged over 15 cm thick layers of soil more than 15 cm below the surface.

(b) In any occupied or habitable building--

(1) The objective of remedial action shall be, and reasonable effort shall be made to achieve, an annual average (or equivalent) radon decay product concentration (including background) not to exceed 0.02 WL. In any case, the radon decay product concentration (including background) shall not exceed 0.03 WL, and

(2) The level of gamma radiation shall not exceed the background level by more than 20 microroentgens per hour.

SUBPART C -- Implementation (condensed)

192.20 Guidance for Implementation

Remedial action will be performed with the "concurrence of the Nuclear Regulatory Commission (NRC) and the full participation of any state that pays part of the cost" and in consultation as appropriate with other government agencies (including tribal nations).

192.21 Criteria for Applying Supplemental Standards

The implementing agencies may (and in the case of Subsection (f) shall) apply standards under Subsection 192.22 in lieu of the standards of Subparts A and B if they determine that any of the following circumstances exists:

(a) Remedial actions required to satisfy Subparts A or B would pose a clear and present risk of injury to workers or to members of the public, notwithstanding reasonable measures to avoid or reduce risk.

Part 192 - Health and Environmental Protection Standards for Uranium Mill Tailings

192.21 (Continued)

(b) Remedial actions to satisfy the cleanup standards for land, Subsection 192.12(a), or the acquisition of minimum materials required for control to satisfy Subsection 1292.02(b), would, notwithstanding reasonable measures to limit damage, directly produce environmental harm that is clearly excessive compared to the health benefits to persons living on or near the site, now or in the future. A clear excess of environmental harm is harm that is long-term, manifest, and grossly disproportionate to health benefits that may reasonably be anticipated.

(c) The estimated cost of remedial action to satisfy Subsection 192.12(a) at a "vicinity" site (described under Section 101(6)(B) of the Act) is unreasonably high relative to the long-term benefits, and the residual radioactive materials do not pose a clear present or future hazard. The likelihood that buildings will be erected or that people will spend long periods of time at such a vicinity site should be considered in evaluating this hazard. Remedial action will generally not be necessary where residual radioactive materials have been placed semi-permanently in a location where site-specific factors limit their hazard and from which they are costly or difficult to remove, or where only minor quantities of residual radioactive materials are involved. Examples are residual radioactive materials under hard surface public roads and sidewalks, around public sewer lines, or in fence post foundations. Supplemental standards should not be applied at such sites, however, if individuals are likely to be exposed for long periods of time to radiation from such materials at levels above those that would prevail under Subsection 192.12(a).

(d) The cost of a remedial action for cleanup of a building under Subsection 192.12(b) is clearly unreasonably high relative to the benefits. Factors that should be included in this judgement are the anticipated period of occupancy, the incremental radiation level that would be affected by the remedial action, the residual useful lifetime of the building, the potential for future construction at the site, and the applicability of less costly remedial methods than removal of residual radioactive materials.

(e) There is no known remedial action.

Table 1.1 EPA Standards (Concluded)

Part 192 - Health and Environmental Protection Standards for Uranium Mill Tailings

192.21 (Continued)

(f) Radionuclides other than radium-226 and its decay products are present in sufficient quantity and concentration to constitute a significant radiation hazard from residual radioactive materials.

192.22 Supplemental Standards

Federal agencies implementing Subparts A and B may in lieu thereof proceed pursuant to this section with respect to generic or individual situations meeting the eligibility requirements of Subsection 192.21.

(a) When one or more of the criteria of Subsection 192.21(a) through (e) applies, the implementing agencies shall select and perform remedial actions that come as close to meeting the otherwise applicable standard as is reasonable under the circumstances.

(b) When Subsection 192.21(f) applies, remedial actions shall, in addition to satisfying the standards of Subparts A and B, reduce other radioactivity to levels that are as low as reasonably achievable.

(c) The implementing agencies may make general determinations concerning remedial actions under this Section that will apply to all locations with specified characteristics, or they may make a determination for a specific location. When remedial actions are proposed under this Section for a specific location, the Department of Energy shall inform any private owners and occupants of the affected location and solicit their comments. The Department of Energy shall provide any such comments to the other implementing agencies. The Department of Energy shall also periodically inform the Environmental Protection Agency of both general and individual determinations under the provisions of this section.

192.23 Effective Date

Subparts A, B and C shall be effective March 7, 1983.

Ref: Federal Register, Volume 48, No. 3, January 5, 1983, 40 CFR Part 192 Environmental Protection Agency (EPA).

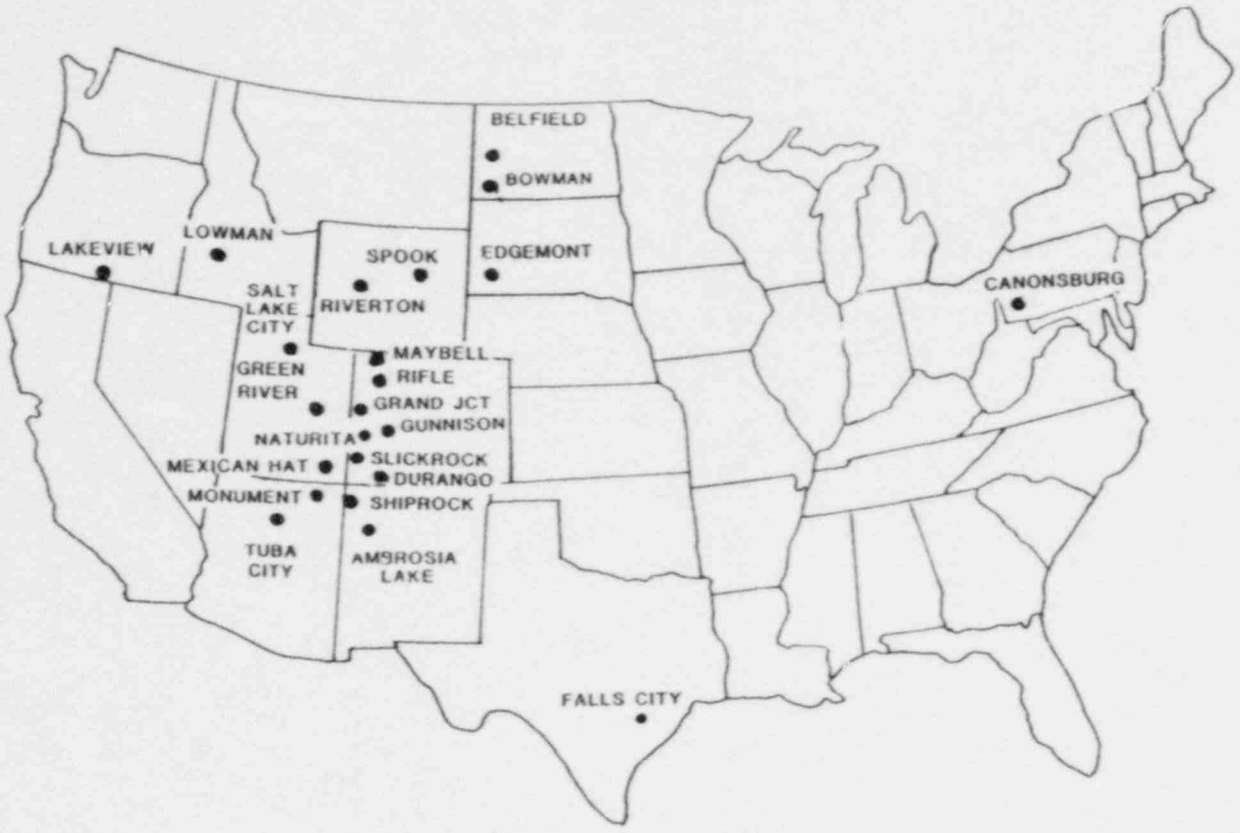


FIGURE 1.1 VICINITY PROPERTIES LOCATION MAP

1.2 VPMIM PURPOSE AND OBJECTIVES

The purpose of this manual is to describe UMTRA Project policies and guidelines for remedial action activities on vicinity properties.

The objective of the manual is to establish standard procedures for all vicinity property activities, and to present a uniform system of planning and scheduling which will promote effective management by the DOE and communication between the DOE, states, tribes, participating contractors, and the public. Specifically, the objectives of this manual are:

- To describe guidelines to the project participants for conducting the various vicinity property inclusion, engineering, remedial action, and certification tasks.
- To identify the roles of the various vicinity property participants and their responsibilities.
- To describe the Vicinity Property Data Management System (VPDMS) which the DOE and its contractors will use to assess status and radiological characteristics of individual properties.

This manual will be updated, as required. Significant changes to protocol and/or responsibilities will be provided to the states, tribes, and NRC for comment prior to final incorporation into the document.

1.3 PROJECT IMPLEMENTATION

The UMTRA Project includes responsibilities assigned to the Assistant Secretary for Nuclear Energy, some of which have been delegated to the Albuquerque Operations Office. The Albuquerque Operations office has established an UMTRA Project office in Albuquerque, New Mexico. It is the responsibility of the Project Office to administer and implement vicinity property remedial actions for the UMTRA Project according to the guidelines discussed in this manual. Guidelines for remedial action at the UMTRA Project processing sites are discussed in other UMTRA Project documents.

1.3.1 Vicinity properties responsibilities

The DOE is assisted in its vicinity property efforts by a Technical Assistance Contractor (TAC), two Remedial Action Contractors (RACs), the Inclusion Survey Contractor (ISC), and an Independent Verification Contractor (IVC). In addition, the states, Indian tribes, and NRC provide approvals and concurrence to the DOE at various stages of the vicinity property process. Details of the NRC concurrence requirements are outlined in the DOE/NRC MOU (Appendix H). The Project Office is also assisted in its effort by the DOE Headquarters and Grand Junction Project Office. Specifically, the Idaho Operations Office, through the Grand Junction Project Office, is administering RAC activities for Grand Junction and Edgemont vicinity property remedial actions and the

Technical Measurements Center (TMC) in support of all DOE remedial action programs. With respect to properties, the DOE is responsible for:

- o Overall project management and outline of support contractor's scopes of work.
- o Property designation.
- o Property inclusion.
- o Approval of Radiological and Engineering Assessments (REAs).
- o Approval of Remedial Action Agreements (RAAs)
- o Approval of remedial action designs.
- o Approval of Quality Assurance and Health and Safety Plans.
- o Property certification.
- o Coordinating communication and concurrence with affected states and Indian tribes.
- o Approval of all vicinity property plans, manuals, systems and activities including this manual.

The states and Indian tribes affected by the UMTRA Project are considered implementing agencies by virtue of their respective cooperative agreements. These agencies are responsible for:

- o Review of property REAs.
- o Execution of property owner RAAs.
- o Assistance in providing information to the local public and enhancing participation in the project as required.
- o Annotation of land records for certified properties.

In addition, the states and Indian tribes are encouraged to participate in the following activities:

- o Inclusion surveys.
- o REA surveys.
- o Remedial action designs.
- o RAA negotiations with property owners.
- o Health and safety.
- o Quality assurance.
- o Compliance verification.

The NRC, as an implementing agency with the DOE, is responsible for:

- o Concurring with the selection and performance of remedial action for vicinity properties.
  - For most properties, this concurrence is provided through concurrence in this manual and review of the associated NEPA document(s).
  - For "separate" properties (for definition, see Glossary), concurrence is provided through approval of the REA.
- o Input into the decision-making process, project planning, and document development.

The purpose of the TAC is to assist the DOE in the technical development planning and monitoring of the project remedial actions. Specifically, the TAC is responsible for the following UMTRA Project vicinity property activities:

- o Development and maintenance of the VPDMS and Vicinity Properties Master Schedule.
- o Overall coordination, monitoring, and status reporting.
- o Development and maintenance of this manual.
- o Review Inclusion Survey Reports and recommendations for inclusion/exclusion.
- o Review of selected REAs and submittal of comments to the DOE.
- o Random performance of radiological surveillances.
- o Review of Property Completion Reports and recommendations for property certification.
- o Review of RAC quality assurance program plans and preparation of Vicinity Property Audit Reports.
- o Review of RAC health and safety plans and procedures and preparation of Health and Safety Survey Reports.
- o Coordination of the vicinity properties public information and participation activities with other Project participants.

The TAC will interface on a daily basis with the RACs, ISC, IVC, states/tribes, and other participants in fulfilling the above responsibilities. Questions and issues beyond the TAC's level of responsibility/authority will be referred by the TAC to the Project Office.

The RAC function is to prepare detailed remedial action engineering designs for inactive mill site locations and to design and implement all vicinity property remedial actions. Specifically, the RAC is responsible for the following UMTRA Project vicinity property activities:

- o Develop REAs on each property.
- o Develop property remedial action cost and schedule estimates.
- o Prepare and assist in the execution of RAAs on each property.
- o Develop remedial action design, specifications, and bid packages.
- o Issue Requests for Proposals and Invitations for Bids on remedial action construction subcontracts.
- o Award remedial action construction subcontracts.
- o Manage remedial action construction and report progress to the Project Office.
- o Implement vicinity properties public information and participation activities.
- o Perform quality assurance and health and safety activities in accordance with the applicable UMTRA Project plans.
- o Verify compliance of remedial actions to EPA standards (40 CFR Part 192) and prepare Property Completion Reports.
- o Provide data inputs for the VPDMS and provide status reports as required.

The Inclusion Survey Contractor (ISC) is responsible for performing all radiological surveys and data analysis as required to include properties in the UMTRA Project. Specifically, the following activities are the responsibility of the ISC:

- o Conduct mobile identification surveys.
- o Execute right of entry agreements with property owners (consent forms).
- o Conduct Property Inclusion surveys.
- o Prepare inclusion reports and recommendations to the DOE.
- o Provide data inputs for the VPDMS and provide status reports as required.

The IVC is responsible for performing independent verification activities associated with the adequacy of the remedial actions performed in Grand Junction. These activities would be performed on 10 percent of the properties in Grand Junction. Specifically, the following activities are the responsibilities of the IVC:

- Radiological surveillance of properties during the remedial action prior to reconstruction.
- Review of the REAs and Completion Reports on randomly selected properties.

The TMC supports the environmental measurement requirements of the UMTRA Project. The technical support of the TMC to the UMTRA Project consists of:

- Providing and/or identifying calibration facilities and procedures.
- Standardization of field and laboratory measurements.
- Development of measurement procedures for field and laboratory use.
- Measurements comparison and data verification.
- Instrument evaluation.

The Vicinity Properties Role Identification Chart (Figure 1.2) illustrates the relationship of the UMTRA Project participants to the Project Office.

1.3.2 Vicinity property tasks

The UMTRA Project Office has established a sequential order of events for accomplishing remedial actions on vicinity properties. The procedures described herein are generic in nature and the sequence may change slightly depending upon the specific task or circumstance. A brief description of the established series of events is provided below. A detailed discussion of these tasks is presented in Sections 2.0 through 8.0. A flow diagram is presented in Figure 1.3.

Historical/baseline data use

Radiological data, collected between 1970 and the present, have been used to establish a record of each vicinity property's history of contamination. These records have been documented and are stored on a computer file within the VPDMS. These historical data are the basis for designating vicinity properties. "Designated" properties are those which have been identified by

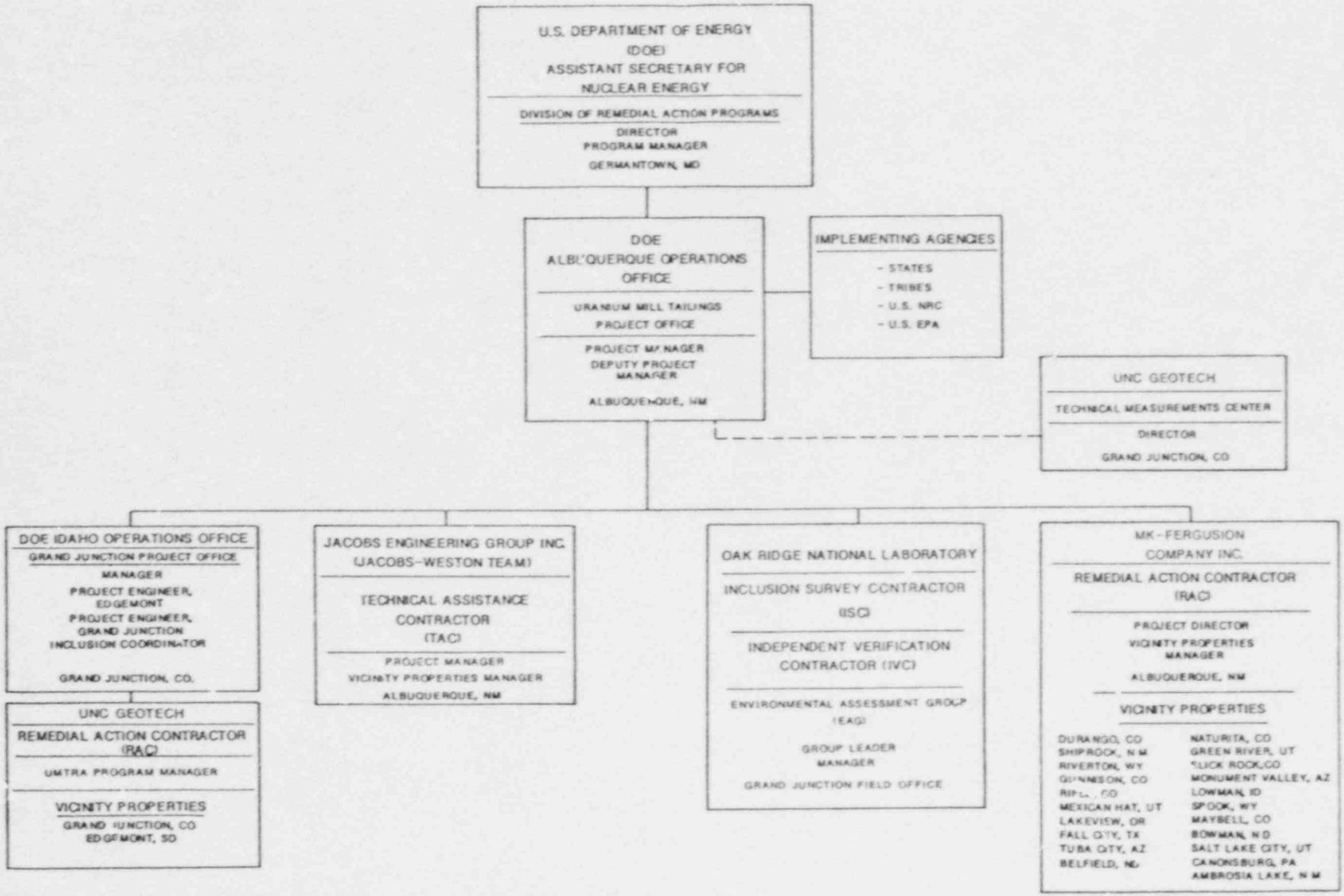
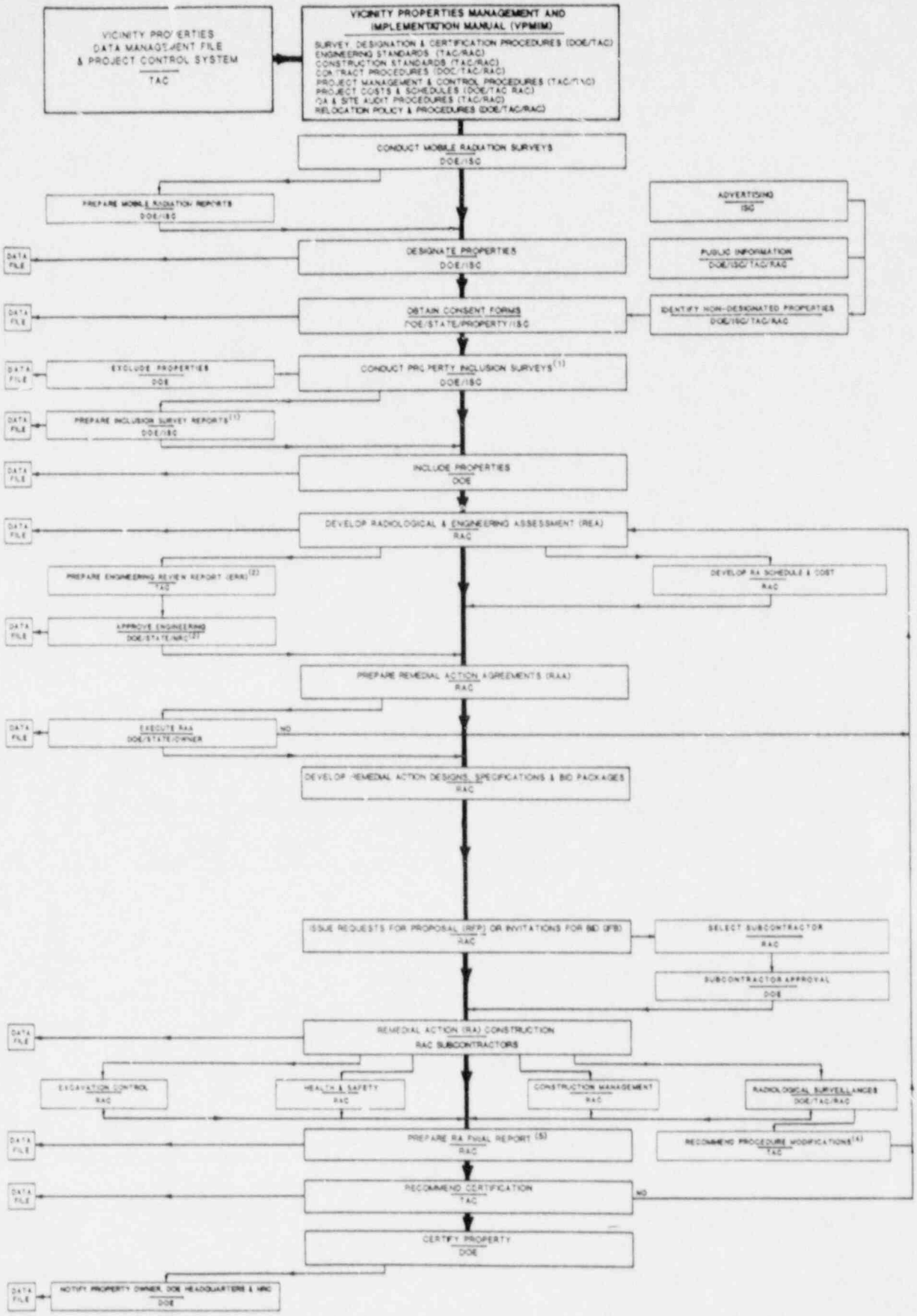


FIGURE 1.2
VICINITY PROPERTIES
ROLE IDENTIFICATION CHART



(1) DENOTES WORK CONDUCTED BY RADIATION SURVEY TEAMS

(2) FUNCTIONS VALID ONLY FOR EXCEPTIONALLY LARGE OR COMPLEX PROPERTY ACTIONS

(3) AUDITS WILL BE CONDUCTED ON A PERIODIC BASIS, AS REQUIRED

(4) FUNCTION ONLY VALID IF INITIAL RA DOES NOT ACHIEVE EPA CLEANUP STANDARDS (40 CFR 192)

(5) PREPARATION OF THESE REPORTS WILL INCLUDE RADIOLOGICAL MEASUREMENTS FOR VERIFICATION OF CONFORMANCE TO RFA CLEANUP STANDARDS (40 CFR 192)

FIGURE 1.3
VICINITY PROPERTIES FLOW DIAGRAM

baseline surveys as being contaminated to some degree by tailings and consequently are candidates for UMTRA Project inclusion. (For a detailed description of the designation process, see Appendix A, Inclusion Criteria and Procedures).

Site surveys and inclusion

Prior to beginning remedial action activities a vicinity property, that each property is evaluated to determine its eligibility for inclusion in the UMTRA Project. "Included" properties are those properties, both designated and undesignated, which have been found to be contaminated with residual radioactive contamination in excess of EPA standards. The inclusion evaluation consists of on-site radiological surveys, complemented with detailed evaluations of the baseline radiological information (Section 2.0). This survey information will be evaluated by the ISC and a recommendation will be made to the DOE for the inclusion or exclusion of each site. Once a decision regarding inclusion is made by the DOE, all pertinent property data are transferred to the RAC via the official location folder by the DOE or the TAC.

Site engineering and design

Once a property has been included, the REA will be developed by the RAC for that property. This assessment involves some or all of the following:

- Review of engineering surveys including as-built drawings, property records, and utility networks.
- On-site radiological surveys, including soil borings and samples if necessary.
- Design of the recommended remedial action options.
- Estimated volumes of contaminated materials.
- Costs of remedial action options.
- Relocation requirements and other costs.

The REA specifies a remedial action option and is transmitted by the RAC to the DOE. To assist the DOE, the TAC may also be required to review selected REAs. Following the review, the DOE, and state/tribe will render one of the following decisions: (1) approval; (2) approval with comments; or (3) disapproval. All applicable comments and concerns will be addressed by the RAC, and, if appropriate, incorporated into the REA. Additional concurrence must be obtained from the NRC for all "separate" properties. The DOE is then responsible for transmitting REAs to the state/tribe, and the NRC when necessary, following DOE approval. After an REA has received approval from all necessary agencies, the RAC will incorporate a description of the remedial action into the RAA.

The RAA will be generated by the RAC and submitted to the DOE with the REA. The DOE and state/tribe will indicate their concurrence with the Remedial Action Plan by signing the RAA and drawings, then returning the signed documents to the RAC. The RAC will forward the RAA to the property owner for his signature. Once approved by the property owner, and any tenants, the RAA will be transmitted to the state/tribe and the DOE for execution. Once finally executed, the detailed property remedial action design will be provided to the property owner prior to remedial action, if requested.

Once approved, the bid packages will be issued by the RAC to construction subcontractors for competitive bids.

Remedial action

The construction bid packages will be awarded in accordance with DOE-approved procurement procedures. Subcontractors will be required to perform the remedial action in a manner consistent with excavation control, health and safety, and restoration criteria outlined in this document (Section 4.0). The RAC will be responsible for incorporating this manual's procedures into bid documents to verify subcontractors' compliance with this manual and to ensure that the EPA standards are met. The RAC will also be responsible for vicinity property construction management and the implementation of approved UMTRA Project quality assurance procedures (Section 4.4).

Remedial action documentation and certification

Once remedial action is complete, the RAC will prepare a Completion Report. The principal intent of this report is to document that the remediated property meets the EPA standards. This report will be transmitted by the RAC for review by the DOE and TAC or IVC (see Section 5.0). The report will contain the results of radiological measurements taken after remedial action and a general summary of remedial action activities performed on that property. The DOE will certify a property's compliance with the EPA standards based upon a review of the information contained in the Completion Report and the TAC or IVC recommendation. Once a property is certified, the proper documentation will be prepared. For details of the certification procedures, see Addendum E1, Certification Plan, of Appendix E, Verification Procedures.

The state, TAC, or IVC will perform Effectiveness Audits on selected properties during various stages of remedial action. The Effectiveness Audits may involve field sampling and analysis. The purpose of these audits is to provide the DOE with an objective assessment of procedures employed by the RAC to verify conformance to EPA standards during remedial action (Section 5.2).

Federal Register notice of completion

As each site is certified and concurred on by the DOE, state, and NRC, the DOE will publish a notice of completion for the site and all associated vicinity properties in the Federal Register.

1.4 SUMMARY

As illustrated in the Flow Diagram (Figure 1.3) and in the preceding text, a number of distinct tasks will be performed by various project participants to ensure that remedial action on vicinity properties is accomplished in a manner which is consistent with UMTRA Project Office objectives and which is in compliance with EPA standards. The following sections of this manual further define the sequence of events for implementing vicinity property remedial action and outline, in detail, the responsibilities and reporting requirements of the principal project participants.

2.0 DESIGNATION AND INCLUSION

2.1 INTRODUCTION

The Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA), PL95-604, requires that the DOE "designate" for remedial action any eligible inactive uranium mill or processing sites together with any vicinity properties which are contaminated with residual radioactive materials derived from such sites. The DOE designated the processing sites within one year of passage of the UMTRCA, as required by the law. There are 24 DOE-designated processing sites. Vicinity properties associated with a Tennessee Valley Authority mill in Edgemont, South Dakota, were also included within the scope of the UMTRA Project by virtue of PL97-415, which amended the UMTRCA.

Under the UMTRCA, the DOE could designate vicinity properties after the one-year period prescribed for the designation of processing sites. However, as a result of litigation concerning, in part, the pace of such designations, the DOE expedited the designation schedule and re-defined the method of designation such that it is now a two-step process of "designation" and "inclusion."

The designation and inclusion process is discussed in the following section and illustrated in Figure 2.1.

2.2 PROPERTY IDENTIFICATION AND DESIGNATION

Vicinity property designation is the process by which potentially contaminated properties are identified and listed as candidates for remedial action as part of the UMTRA Project. Properties are identified from previously performed surveys and studies, notification from the property owner, and available historical information, which indicate that tailings may have been deposited at the property. The DOE designates those properties for which the presence of uranium mill tailings contamination is suspected. This designation procedure is implemented for the areas around each of the 24 processing sites and in Edgemont, South Dakota.

As groups of vicinity properties are designated, the DOE publishes an announcement in the Federal Register. The list of individual property locations is retained by the DOE. Requests by concerned individuals for information about designated properties are directed to the Project Office. The initial designation of 8156 properties was published on February 2, 1984, in the Federal Register (Vol. 49, No. 23, page 4127).

The ISC is responsible for surveying all properties that appear on the original designation list. The ISC may also survey other non-designated properties such as properties in the same parcel as designated properties, spillovers, and properties in complex commercial groups, and properties presented for survey by request of the property owner.

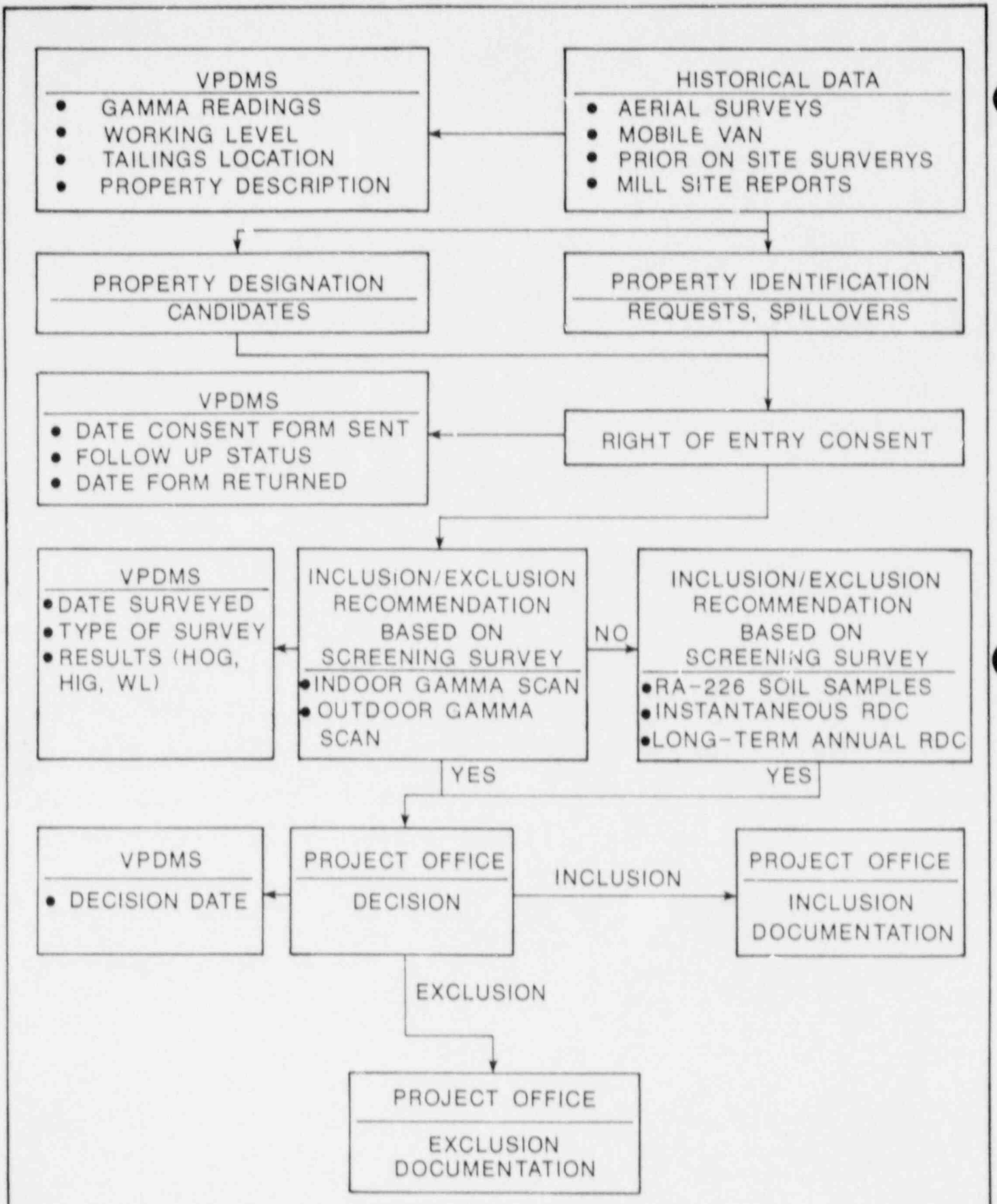


FIGURE 2.1
INCLUSION PROCESS FLOW DIAGRAM

When survey teams are in the field and are requested to survey properties by neighboring property owners, attempts should be made to honor these requests. To document these requests, a Consent Form should be completed by the owner. If the request cannot be fulfilled by the ISC without impacting milestone schedules, the ISC should notify the DOE. Direction for survey of these properties shall be provided by the Project Office. (The Project Office may choose to delegate the Grand Junction and Edgemont decisions to GJPO.)

Formal advertising by the ISC for survey requests will take place at all UMTRA Project sites. The responses to these ads should be directed to either the ISC or the DOE. The ISC should proceed immediately on all responses and advise the DOE regarding the number of requests and any impact the requests may have on the completion schedule. A "last and final" offer for survey of non-designated properties will be advertised in each geographical region one year prior to the inclusion cut-off date.. The inclusion cut-off date, as described below, will be cited as the last day that requests for survey will be honored. If survey requests are received after this date, the DOE will not consider these properties for inclusion in the UMTRA Project.

2.3 INCLUSION PROCESS

Vicinity property "inclusion" is the process by which residual radioactive material suspected to originate from the designated mill site, in excess of levels provided in the EPA standards, is identified and the property is declared eligible for remedial action. Properties which do not exceed the standard are excluded from remedial action.

The ISC will perform inclusion surveys and prepare reports to document survey results. These surveys will consist of sufficient radiological survey measurements and analyses performed for surveyed properties to provide data for the inclusion process.

Inclusion surveys generate the data necessary to include or exclude a property. As a result, properties are surveyed to varying degrees with more comprehensive survey procedures reserved for properties with marginal contamination. Data from the on-site surveys are compared to the EPA standards and the DOE includes those properties which exceed the standards. Owners of properties having been surveyed (and associated states and tribes) are notified of the inclusion/exclusion decision by mail. Examples of the inclusion and exclusion memos and letters are in Figures 2.3 to 2.6.

In some instances, property owners will allow only limited access to their property. If the inaccessible area is critical to the inclusion/exclusion decision, the survey will be immediately terminated. Full access to all critical areas will be requested again at a later date by the organization responsible for the survey. If access is again denied, the property will be handled as an owner refusal and a report will be prepared with the data (if any) which was gathered prior to the initial owner refusal.

Non-Construction Months Used for Calculation
of Vicinity Property Inclusion Cut-Off Dates

Site	Non-Construction Months
AMB	No idle months
BEL	Dec, Jan, Feb, Mar
BOW	Dec, Jan, Feb, Mar
CAN	VP inclusions are complete
DUR	Dec, Jan, Feb
EDG	Dec, Jan, Feb, Mar
FCT	No idle months
GRN	Dec, Jan, Feb
GUN	Dec, Jan, Feb
GRJ	Dec, Jan, Feb
HAT	No idle months
LKV	Dec, Jan, Feb, Mar
LOW	Dec, Jan, Feb, Mar
MAY	Dec, Jan, Feb
MON	No idle months
NAT	Dec, Jan, Feb
RFL	Dec, Jan, Feb
RVT	Dec, Jan, Feb, Mar
SHP	VP inclusions are complete
SLC	VP inclusions are complete
SPK	Dec, Jan, Feb, Mar
SRK	Dec, Jan, Feb
TUB	No idle months

Cut-off date is six months prior to the estimated site completion date (excluding idle non-construction months).

FIGURE 2.2
WINTER SHUTDOWN MONTHS

UMTRA:

Inclusion of Vicinity Property No. _____, Located at
(Street Address, City, State),
Into the Uranium Mill Tailings Remedial Action Program

Official Location Folder

In accordance with provisions of the Uranium Mill Tailings Radiation Control Act of 1978 (PL 95-604), the subject property has been evaluated against the Environmental Protection Agency Standards for Remedial Action at Inactive Uranium Processing Sites (40 CFR Part 192). This evaluation was accomplished by Oak Ridge National Laboratory, the DOE Inclusion Survey Contractor. DOE has reviewed these evaluation results, and has determined that residual radioactive materials in excess of the EPA Standards are present on the property. Thus, in accord with Section 102(e)(2) of the above-referenced Act, the subject property is hereby included in the Uranium Mill Tailings Remedial Action Project by the U.S. Department of Energy.

(Name of Inclusion Official)
(Title)
Uranium Mill Tailings Project Office

(RAC) _____, is authorized to perform remedial action as required to bring this property into conformance with the EPA Standards.

(Name of Contracting Officer)
(Title)
Uranium Mill Tailings Project Office

cc:
State Representative

FIGURE 2.3
FORM INCLUSION MEMO

UMTRA:

Exclusion of Vicinity Property No. _____, Located at
(Street, City, State), _____,
From the Uranium Mill Tailings Remedial Action Program

Official Location Folder

In accordance with provisions of the Uranium Mill Tailings Radiation Control Act of 1978 (PL 95-604), the subject property has been evaluated against the Environmental Protection Agency Standards for Remedial Action at Inactive Uranium Processing Sites (40 CFR Part 192). This evaluation was accomplished by Oak Ridge National Laboratory, the DOE Inclusion Survey Contractor. DOE has reviewed these evaluation results, and has determined that residual radioactive materials in excess of the EPA Standards are not present on the property. Thus, in accord with Section 102(e)(2) of the above-referenced Act, the subject property is hereby excluded from the Uranium Mill Tailings Remedial Action Project by the U.S. Department of Energy.

(Name of Inclusion Official)
(Title)
Uranium Mill Tailings Project Office

Attachment:
Survey Report

cc w/o attachment:
State Representative

FIGURE 2.4
FORM EXCLUSION MEMO

Property Identification
Number: _____
Address: _____
_____
_____

Property Owner
Street Address
City, State (Zip)

Dear _____:

Under the Uranium Mill Tailings Radiation Control Act of 1978, Public Law 95-604, the U.S. Department of Energy (DOE) is authorized to conduct remedial action at properties contaminated with residual radioactive material from the inactive uranium mill site in _____(city, state)_____.

Evaluation of your property identified above has revealed the presence of residual radioactive material in excess of standards established by the Environmental Protection Agency (EPA). Therefore, your property has been formally included by the DOE for remedial action in the Uranium Mill Tailings Remedial Action Project. The objective of the remedial action is to reduce radiation levels to below EPA standards. Generally, this will be done by removing the residual radioactive material from the property. It is the DOE policy to restore the property to as near its original condition as possible. The remedial action will be done at no expense to you.

Representatives of _____(contractor)_____, contractor to the DOE, will be contacting you to discuss planning of future activities including detailed data gathering, engineering, and remedial action construction. They will also give you information on the general location of tailings on your property. Although we cannot, at this time, give you specific schedules for future activities, your discussion with the _____(contractor)_____ personnel should provide a general idea of when additional work will be performed.

Should you have any questions regarding the project or your property, please write to me at the above address or call _____(name)_____ of my staff at _____(phone number)_____. Your cooperation in assisting us in the successful accomplishment of this work will be greatly appreciated.

Sincerely,

(Name of Contracting Officer)
(Title)

cc: Property File
State Representative
Tribe Representative

FIGURE 2.5
FORM INCLUSION NOTIFICATION LETTER

Property Identification
Number: _____
Address: _____
_____
_____

Property Owner
Street Address
City, State (Zip)

Dear _____:

Under the Uranium Mill Tailings Radiation Control Act of 1978, Public Law 95-604, the U.S. Department of Energy (DOE) is authorized to conduct remedial action at properties contaminated with residual radioactive material from the inactive uranium mill site in _____(city, state)_____.

Evaluation of your property identified above has not revealed the presence of residual radioactive material in excess of standards established by the Environmental Protection Agency. Therefore, the DOE has determined that your property does not require remedial action under the Uranium Mill Tailings Remedial Action Project.

Should you have any questions regarding your property or the Remedial Action Project, please write to me at the above address, or call _____(name)_____ of my staff at _____(phone number)_____. Your cooperation in granting us access to your property to conduct radiation surveys is greatly appreciated.

Sincerely,

(Name of Contracting Officer)
(Title)

cc: Property File
State Representative
Tribe Representative

FIGURE 2.6
FORM EXCLUSION NOTIFICATION LETTER

A detailed description of the inclusion procedure is described in Appendix A, Inclusion Criteria and Procedures. A brief synopsis of the inclusion process is provided in the following text and in Figure 2.1.

2.3.1 Data validation

Survey data are currently available from numerous studies performed in the vicinity of the processing sites. Sources of these data include:

- o Aerial surveys of the processing sites and the surrounding areas.
- o Mobile van surveys of the communities adjacent to the uranium processing sites.
- o Preliminary and detailed on-site surveys of candidate properties.
- o Operational reports from the processing sites, company reports, and property records which may document the use of tailings as construction material.

Pertinent, available vicinity property survey data such as high inside gamma levels, high outside gamma levels, and average RDC measurements are available in the VPDMS for use by the ISC.

All properties are scheduled for on-site inclusion surveys except those few properties where adequate historical information shows the presence of an includable deposit and the mobile gamma scanning van confirms the continued presence of such tailings. Properties where elevated radiation levels are validated by the mobile van and where previous survey data indicate that radiation levels exceed the EPA standards are recommended for inclusion.

2.3.2 On-site survey procedures

On-site surveys provide the additional data necessary to evaluate the designated properties which cannot be included by historical data. Gamma scanning measurements will be employed to expedite the overall process. When these measurements fail to provide adequate data for inclusion or exclusion of a property, extended measurements are performed (see Appendix A).

Right-of-entry

The party responsible for acquiring right-of-entry for on-site surveys is typically the ISC. In some situations, this responsibility may be shared by the respective state or tribal authority. In those situations where a property is included without entering the property boundary (i.e., mobile van validation) or where contamination from an adjacent surveyed property is ob-

served by the RAC, the RAC is responsible for acquiring the Consent Forms prior to conducting on-site surveys. The property owner is contacted by the ISC (or RAC, in those situations where the RAC can be responsible for acquiring Consent Form), in which the UMTRA Project is explained and the appropriate project participants are introduced. The first contact may be a phone conversation, a letter, or a property visit.

The ISC or RAC stipulates the need for a signed right-of-entry Consent Form before any site survey work can be accomplished, and identifies a contact within the state and the DOE if the property owner desires to learn more about the project or has specific questions. The ISC or RAC makes clear that right-of-entry is requested for the DOE, its representatives, and the state for inclusion surveys. The tenants of the property are also contacted at the discretion of the property owner, if the owner and the tenant are not the same party. If it is not feasible for the owner to notify the tenant, tenant consent can be obtained by the ISC or RAC at the owner's request.

The right-of-entry Consent Form outlines the rationale, approach, and authority for the inclusion and, if required, remedial action survey. Example consent documents for inclusion surveys or engineering surveys are shown in Appendix A, Inclusion Criteria and Procedures, for reference.

The time estimated to complete this right-of-entry process is approximately six weeks, beginning with the transmittal of a Consent Form to the property owner. After initial contact with the property owner/tenant and prior to the signing of the right-of-entry agreement, a specified amount of follow-up by the responsible agency, RAC, or ISC may be required. For general guidance, the amount of effort expended to obtain a signed consent form is recommended to be limited to any combination of three documented phone calls, interviews, or letters. If a signed consent form is not received, the contractor will forward the request to the DOE for final action. See the procedure to handle owner refusals in Appendix E, Addendum E3.

Once a Consent Form is obtained, procedures outlined in Appendix A for identification, characterization, and inclusion of vicinity properties are followed.

Right-of-entry for "spillover contamination"

All properties containing contaminated materials must have sufficient data to include or exclude the property as described in Appendix A. If not pursued by the ISC at the time of the inclusion survey, the RAC shall be primarily responsible for acquiring right of entry for site surveys when spillover contamination is found.

If a spillover deposit on an adjacent property is encountered during the REA or RA stage, the following procedures apply: a) the RAC is responsible for contacting ISC to determine if the property has already been scheduled for survey or included; b) if the ISC survey data are sufficient to recommend inclusion, the data are forwarded to the DOE for expedient decision; c) if ORNL data are not available, the RAC is responsible for preparing a spillover recommendation to the DOE for expedient decision.

Spillover properties in Edgemont and Grand Junction will be assigned new property numbers by the state or TAC at the request of the GJPO, if a number does not already exist for that property. All remaining spillover properties will obtain new property numbers from the TAC. These numbers will be documented in memo form and sent to the ISC, TAC, RAC, DOE, and file.

When includable deposits are encountered under paved streets or along utility lines paralleling the street, the contractor is required to record the location of the deposit. These deposits will be incorporated under one number in a final request for inclusion with the application of supplemental standards. This list will be provided to the proper municipality by DOE.

2.3.3 Inclusion survey reports

Data from on-site surveys, which can be supported by mobile van validation survey results, are submitted in Inclusion Survey Reports in the Official Location Folder to the DOE by the Inclusion Survey Contractor.

Exclusion of media-generated or undesignated, uncontaminated properties may be recommended using the Condensed Exclusion Report. A sample report is presented in in Appendix A, Inclusion Criteria and Procedures.

The final decision for inclusion or exclusion will be made by the DOE after evaluating information in the Inclusion Survey Reports.

The property will be officially included or excluded by the DOE by means of a form memo (Figure 2.4). If a property is a spillover inclusion, the form letter in Figure 2.7 shall be used. A copy of this letter will be placed in the Official Location Folder. The Project Office will transfer the Official Location Folder of included properties to the RAC for action, and the Official Location Folder of excluded properties will be retained for archiving as directed by the Project Office.

Once a decision has been made, notification will be sent by the DOE to property owners and the states or tribes. Copies of the form letter for inclusion and exclusion are provided in Figures 2.5 and 2.6, respectively. If there is an urgent need for access, a schedule will be provided to the owner to outline cutoff

Vicinity Property No. _____
Address: _____
_____

Property Owner
Street Address
City, State (Zip)

Dear _____:

Under the Uranium Mill Tailings Radiation Control Act of 1978, Public Law 95-604, the Department of Energy (DOE) is authorized to conduct remedial action at properties contaminated with residual radioactive material from inactive uranium mill sites.

Evaluation of your property identified above has revealed the presence of residual radioactive material in excess of standards established by the Environmental Protection Agency (EPA) or contiguous with deposits on an adjacent included property. Therefore, your property has been formally included by DOE for remedial action in the Uranium Mill Tailings Remedial Action Project. The objective of the remedial action is to reduce radiation levels to below EPA standards. Generally, this will be done by removing the residual radioactive material from the property. It is DOE policy to restore the property to as near its original condition as possible. The remedial action will be done at no expense to you.

Representatives of (RAC), contractor to the DOE, will be contacting you to discuss planning of future activities including detailed data gathering, engineering, and remedial action construction. They will also give you information on the general location of tailings on your property. Although we cannot, at this time, give you specific schedules for future activities, your discussion with the (RAC), personnel should provide a general idea of when additional work will be performed.

Should you have any questions regarding the project or your property, please write to me at the above address, or call (name) of my staff at (phone number). Your cooperation in assisting us in the successful accomplishment of this work will be greatly appreciated.

Sincerely,

(Name of Contracting Officer)
(Title)

cc:
State Representative

FIGURE 2.7
FORM SPILLOVER INCLUSION LETTER

dates for signature on the Remedial Action Agreement and initiation of remedial action. These dates will be coordinated with the RAC prior to issuance of the letter.

Owners of excluded properties will be provided a copy of the survey report.

2.3.4 Inclusion cutoff dates

The inclusion cutoff dates were developed to facilitate the completion of vicinity property remedial action work prior to completion of the site remedial action. The cutoff dates were obtained by "backing out" six construction months from the IPMS schedule date for completion of the radon cover on the site. (See Figure 2.2 for a list of the sites and their associated winter shutdown months.) For those sites without a specific radon cover completion date, a date six months prior to completion of site remedial action was used. The list will be revised and reissued as necessary to accommodate changes that may occur in the site schedules. The ISC advertised inclusion cutoff date will be a site-specific date set prior to the DOE date in order to curtail last minute consent acquisitions, radiological surveys and the subsequent inclusion reports.

3.0 ASSESSMENTS, DESIGN, AND SCHEDULING

3.1 INTRODUCTION

Properties which have been included for remedial action will be assessed from a radiological and engineering viewpoint so that the extent of contamination and cost of remedial action is addressed prior to the initiation of remedial action. Construction and engineering activities will be sequenced so that remedial action can be accomplished in a manner that allows efficient use of equipment and personnel.

This section describes the generic guidelines for developing Radiological Engineering Assessments (REAs), executing Remedial Action Agreements (RAAs), developing remedial action final design, and sequencing construction.

3.2 RADIOLOGICAL AND ENGINEERING ASSESSMENTS (REAs)

REA documents outline the areal and volumetric extent of contamination for a vicinity property and provide design for a remedial action approach alternative (or set of alternatives). The REA contains information derived from radiological site surveys and engineering fieldwork. The REA is developed by the RAC and is necessary to provide the DOE and states with a basis for deriving schedule and cost estimates; and for selecting remedial action options. A sample outline of an REA is provided in Appendix B, Radiological and Engineering Data Gathering. General guidelines are provided in the following text and in Figure 3.1.

3.2.1 Radiological assessment

An on-site radiological assessment provides the RAC with sufficient information to develop preliminary design for remedial action. The primary objectives of a radiological assessment for a vicinity property are:

- To further define the areal extent and depth of any tailings material that exceeds the EPA cleanup standards, 40 CFR Part 192.12. Preliminary estimates of volumes of contamination will be developed.
- To determine if the EPA Standard for gamma and radon daughter concentration limits is exceeded in occupied or habitable buildings (if this has not already been accomplished in the inclusion survey).
- To document the justification for applying EPA Supplemental Standards as a remedial action option, for portions of a property or the entire property if such an application of the Standards is necessary or otherwise appropriate.

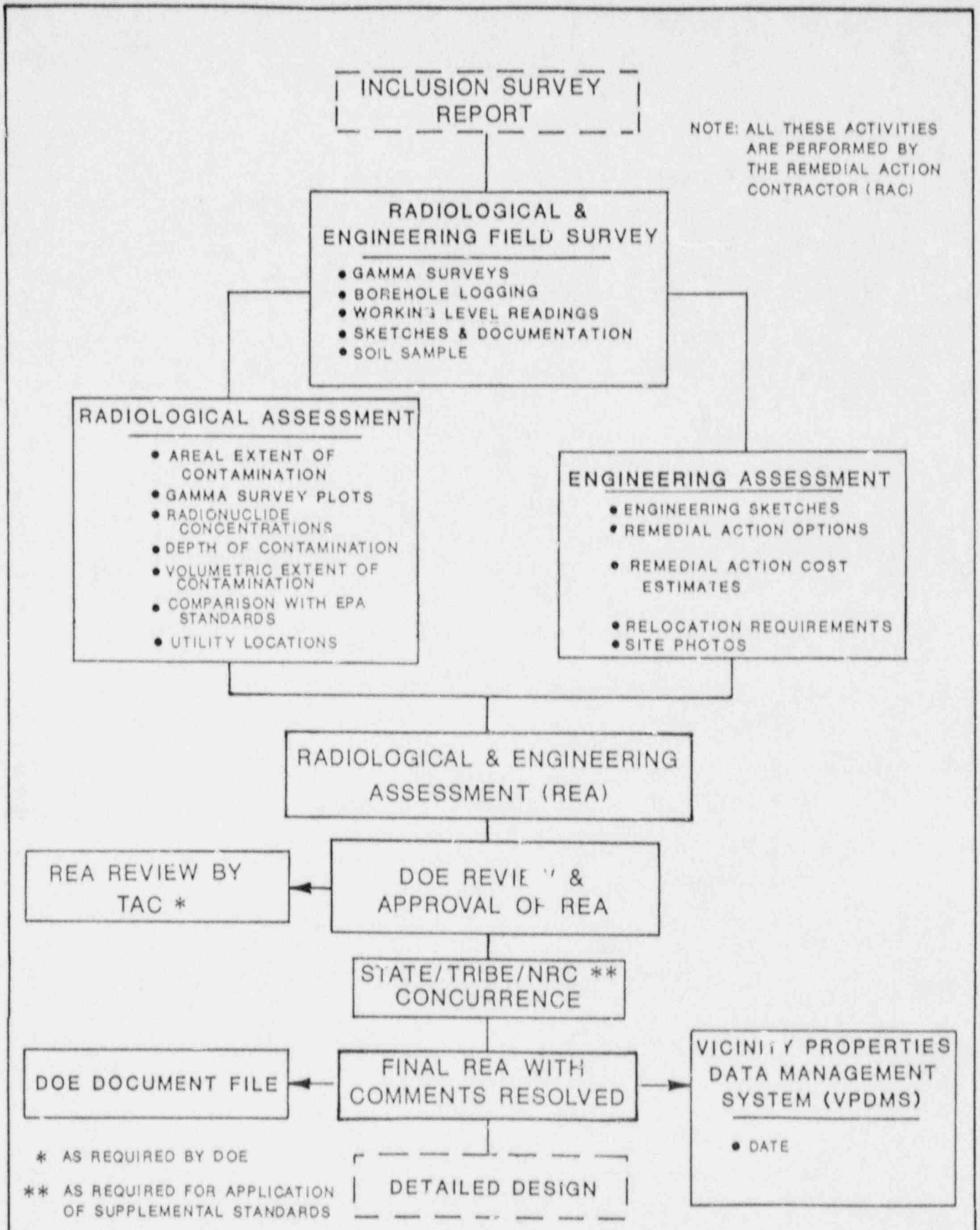


FIGURE 3.1
RADIOLOGICAL & ENGINEERING ASSESSMENT (REA)
FLOW DIAGRAM

The radiological assessment is performed by the RAC survey team. All required consents to survey are either satisfied by the right-of-entry Consent Form previously executed by the ISC for inclusion surveys or, if a Consent Form has expired or was not required for inclusion, by a Consent Form executed by the RAC.

The radiological assessment survey includes all fieldwork required to provide a basis for engineering and design for remedial action. The data provided in the inclusion survey report may be used by the RAC to assist in the radiological assessment survey. The radiological assessment may involve any of the following survey activities:

- o Gamma surveys of the property, both outdoors and within buildings.
- o Borehole logging of areas selected on the basis of the gamma survey or in otherwise suspected areas of fill, particularly along building foundations and in open land where above-background gamma levels are detected.
- o Radon daughter concentration measurements within occupied or habitable buildings.
- o Soil sample analysis to assess radionuclide concentrations.

3.2.2 Engineering assessment

In addition to completing the radiological assessment, the RAC performs an engineering assessment. Remedial action options are developed and evaluated as part of each engineering assessment when remedial action is determined to be difficult or costly.

The objectives of the engineering assessment are to:

- o Adequately identify significant technical and engineering considerations at specific vicinity property sites.
- o Perform a cost analysis to select a suitable and economical remedial action alternative that will satisfy the requirements of the EPA standards.
- o Develop the scope of the recommended remedial action alternative and cost estimate for this alternative.
- o Identify obvious industrial safety and health hazards that may require consideration in the special conditions section of the bid package.
- o Develop a detailed description of existing conditions at each site to ensure accuracy of restoration activities.

Typical information in the engineering assessment may also include utility locations (if available), legal property boundaries, and property photographs.

Remedial action may impact the daily operations of business at some commercial properties with interior contamination. The following cleanup options may be evaluated and presented in the REA for those cases.

Temporary business relocation

An evaluation of the relocation option should include the costs for: (1) moving the owner to the new location; (2) modifying the new location; (3) advertising the new location; (4) remediating and restoring the owner's property; and (5) moving the business back to the original location.

Total buy-out

An evaluation of the buy-out option should include: (1) the cost of purchasing the buildings, land, and fixed equipment; (2) cost associated with moving the owner to the new location; (3) remedial action and restoration costs; (4) resale value; and (5) real estate costs.

Not included in the buy-out are vehicles, inventory or non-fixed equipment. The value of the property will be determined by a licensed commercial appraiser, reviewed by the RAC, state and Project Office for accuracy, and forwarded to the state to initiate acquisition.

If an owner requests a price higher than the fair market value, the owner will be reminded that the Project cannot offer more than the fair market value plus other costs allowed by state and Federal law.

Building demolition - compensation to owner

An evaluation of the demolition option should include: (1) the depreciated cost of the buildings and fixed equipment less salvage value; (2) the costs associated with relocation and storing inventory not included in the appraisal; (3) the costs associated with building demolition, tailings removal, and restoration to grade; and (4) the costs associated with relocating the inventory back to the property.

In the demolition option, the owner retains the land and is responsible for coordinating the construction of the replacement building. The value of the buildings and fixed equipment will be determined by a licensed commercial appraiser, and reviewed by the RAC, state, and Project Office for accuracy. The amount and method of compensation is outlined in the RAA. As with the

buy-out option, the Project cannot offer more than the fair market value plus other costs allowed by the State and Federal law.

Building shutdown

An evaluation of this option should include: (1) the costs associated with lost revenue, determined by auditing revenue history over a comparable time period; (2) the costs associated with relocation and storing inventory; (3) the costs associated with remedial action and restoration; and (4) the costs associated with relocating the inventory back to the propert

Other appropriate options may be developed depending on the circumstances of the business. The preferred option will generally be the one that is least costly to the government and creates the least disruption to the business. Note that in no case will the owner receive a windfall profit.

3.2.3 Use of supplemental standards

The application of supplemental standards, as a form of remedial action, will be recommended by the RAC if the radiological and engineering assessments indicate a need for such an application. This recommendation will be made in the REA if it is determined that supplemental standards may be applied before the REA is issued. The REA will be clearly marked and identified with "Supplemental Standards" and shall contain a Justification Checklist that includes a discussion of the relevant items required by the respective criteria selected. These items should include, but not be limited to, the following: (1) annual gamma exposure rate; (2) annual worker's/residents exposure rate; (3) reference table of cost breakdowns; and (4) summary justification statement. (A Justification Checklist is provided in Addendum B2, of Appendix B, Radiological and Engineering Data Gathering.) If the application of supplemental standards is not deemed appropriate until remedial action has begun, the RAC should receive verbal authorization from the DOE, followed by a formal letter request that includes the Justification Checklist. The DOE Project Office will receive the application for Supplemental Standards prior to distribution to implementing agencies. A guideline to the use of these standards is provided in the following text.

The application of supplemental standards is permitted by 40 CFR Part 192.22 for situations where application of the control or cleanup standards would (1) pose a clear and present risk of injury to workers or the public notwithstanding reasonable measures to limit damage; (2) directly produce environmental harm that is clearly excessive compared to the health benefits to persons living on or near the site, now or in the future; (3) result in an estimated cost of remedial action which is unreasonably high relative to the long-term benefits, and the residual radioactive

materials do not pose a clear, present, or future hazard; or (4) result in an unreasonably high cost of cleaning up a building relative to the benefits. In addition, supplemental standards may be applied where there is no known course of remedial action.

In order to justify a request for the application of Supplemental Standards, the field personnel must fully characterize the deposit, as follows:

- o Deposit extent - Boreholes should be provided to document the extent of contamination (area and depth).
- o Activity level - Soil samples or instrument measurements calibrated to the equivalent Ra-226 are required to determine the activity level of the deposit.
- o Disposition - Explanation of the need for Supplemental Standards and applicable circumstances referenced.

Use of the EPA supplemental standards requires that when applying supplemental standards, remedial actions shall come as close to meeting the applicable control or cleanup standards as possible. Supplemental critieria for natural, depleted, or enriched uranium and thorium-232, as established by the NRC, were published in the Federal Register, Vol. 46, No. 205, p. 52061, October 23, 1981. These criteria are applied to concentrations averaged over 100-square-meter areas, in the same manner as the RA-226 criterion provided in the EPA standards. In cases where "...radionuclides other than radium-226 and its decay products are present in sufficient quantity and concentration to constitute a significant radiation hazard from residual radioactive materials," (40 CFR 192.21(f)), the remedial action must reduce such hazard to levels that are as low as reasonably achievable. If encountered, such radionuclides, with quantities and concentrations, must be documented in the Completion Report.

The implementing agencies are instructed in 40 CFR Part 192 to determine the applicability of supplemental standards. The EPA allows for two types of procedures for implementing supplemental standards. In the first procedure (property-specific analysis), the standards and the justification for proposing supplemental standards will be presented in writing to the property owner. The owner will be requested to comment within 14 days. In the second procedure (generic analysis), no additional procedural requirements are necessary other than to periodically inform the EPA of the application of supplemental standards.

The decision to develop generic cases for supplemental standards shall be based on the determination that leaving residual radioactive materials on any property has not resulted in an adverse impact on the occupants of the properties nor is it anticipated that these tailings will create health or environmental problems in the future (in accordance with 40 CFR Part 192.21 and Part 192.22). Situations that may warrant the need for generic cases for supplemental standards include:

- o Tailings have been placed around water, gas, or sewer lines under public thoroughfares or easements.

- o Tailings have been used as a constituent in concrete or asphalt.

- o Tailings have been used as a foundation base for public statues or monuments.

- o Tailings have been used as a base for hard-surface public roads or railroad berms.

- o Tailings have been placed in acceptable waste repositories.

- o Tailings exist in cemeteries.

Supplemental Standards may also be applied for trees rooted in residual radioactive materials that exceed EPA standards. If a tree is of substantial diameter and height, would be costly to be replace with a tree of comparable size and can only be removed with the owner's resistance, the RAC may apply for Supplemental Standards under Subparts b) and c) (environmental harm and high cost relative to long-term benefits, respectively). The application will be handled per standard procedures and reviewed on a case-by-case basis. At the time of this publication, no generic cases have been approved by all implementing agencies. All cases for Supplemental Standards are currently reviewed on a case-by-case basis.

The REA containing the recommendation for the application of Supplemental Standards will be reviewed by the concerned implementing agencies. The REA shall not be issued until the property owner's comments are obtained. If written response is not received within 14 days, the RAC will contact the owner to ascertain the owner's intent to supply comments. The RAC notification letter and property owner's comments shall be inserted in the REA as an appendix and referenced in Section 3.0 of the REA. The REA shall be transmitted to the state/tribe, the DOE, and the NRC for concurrence. NRC concurrence and DOE approval are necessary to invoke supplemental standards. A copy of the final REA will be sent to interested implementing agencies.

3.2.4 Reviews, approvals, and distribution

Once the radiological assessment and engineering assessment are complete, REAs are issued to the DOE, TAC (if requested by the DOE), NRC, and state/tribe. The DOE approval is required for all REAs. NRC approval is required only for REAs recommending Supplemental Standards. The REA includes site descriptions, results of radiological and engineering survey work, estimates of costs for remedial action alternatives, identification of the need for dislocation, reimbursement, a discussion of the recommended option, and a justification for application of supplemental stan-

dards, if appropriate. All REAs are identified by the DOE vicinity property number, as designated by either the TAC or the DOE-GJPO (See Appendix G, Vicinity Properties Data Management System, Section G.2). A typical table of contents and format outline for an REA report are provided in Appendix B, Radiological and Engineering Data Gathering. REAs for non-complex properties will be submitted in their final form, without a draft version. The DOE will review all REAs. The TAC will review selected REAs requested by the DOE. The TAC, DOE, and state/tribe comments will be obtained and incorporated in the construction documents as appropriate. Any comments and questions concerning the REA will be addressed by the RAC. For properties in Grand Junction and Edgemont, comments and responses will be incorporated into the folio. For all other properties, comments and resolutions will be attached to the REA.

In addition to fulfilling the DOE request to review selected REAs, the TAC will periodically survey REA survey activities performed at vicinity properties (excluding Grand Junction and Edgemont) by the RAC. These surveys will be performed following the responsibilities presented in Section 5.3.1 of this manual.

3.3 REMEDIAL ACTION AGREEMENT (RAA)

An RAA is a legal agreement entered into by the DOE, the state, and the owner of an included property. The agreement outlines the intent of PL95-604 and contains the following key provisions:

- o Right-of-Entry, Inspection, and Right to Restrict Access by the DOE and its contractors is authorized by the property owner.
- o Title to Residual Radioactive Materials transferred to the DOE.
- o Remedial Action as planned and agreed to.
- o Restoration of the property to a condition comparable to its condition immediately prior to the performance of any remedial action by the DOE contractors.
- o Release of Liability/Hold Harmless by the property owner for results of remedial action.
- o State of Government-Owned Property as remaining government property and the owner shall not be liable for loss of or damage to such property.
- o Permits and Licenses will be obtained by the state and the DOE.
- o Lessee/Sublessee Consent to be acquired by the property owner.
- o Binding Effect of the RAA transferred to subsequent owners.
- o Notice to Subsequent Purchasers of the property.

- o Covenant Against Contingent Fees: the owner may not employ any person or selling agency, other than bonafide employees maintained by the owner for purpose of securing business, to use the Agreement for profit.

- o Official Not to Benefit from performance of this work.

- o Health and Safety will be protected and secured.

- o Term and Termination of the agreement.

- o Appropriations and Expenditures made available by the Congress and state may affect the schedule and completion of the work.

- o Effective Date of agreement is latest date of execution by the state, DOE, or owner.

- o Owner Responsibility to submit written complaints regarding work within seven calendar days after completion of final Inspection and Approval.

- o DOE Responsibility to enforce warranties in connection with work performed.

The RAA is appended with a description of the remedial action plan based upon the selected remedial action option presented in the final REA. The owner will be provided with the location of the tailings on the property and an overview of the work required to remove the tailings. Final designs may be incorporated by reference in the Remedial Action Plan (RAP) appendix and copies provided to the owner. The RAA will be submitted with the REA to the DOE for approval and routing to the state/tribe. Upon approval, the RAC will forward the RAA to the property owner for signature. The DOE shall assign an agreement number to the RAA. For properties located in Grand Junction and Edgemont, the agreement number is assigned by the RAC.

A generic UMTRA Project RAA is provided in Appendix C, Remedial Action Agreement, and a flow diagram of the process is shown in Figure 3.2.

3.3.1 DOE intent

The RAA must be signed by the state, the DOE, and the vicinity property owner (and acknowledged by all tenants). Whenever possible, the RAA and final design for complex properties will be agreed on by the DOE and the state/tribe prior to submittal to the property owner. The agreements include all restoration and remedial action requirements (including owner/tenant dislocation and reimbursement requirements).

Typically, RAAs are executed using the forms prescribed in Appendix C with little or no negotiation. The DOE, in consultation with the state, may authorize its representatives to negotiate the contents of the RAA appendix. Unique or complicated

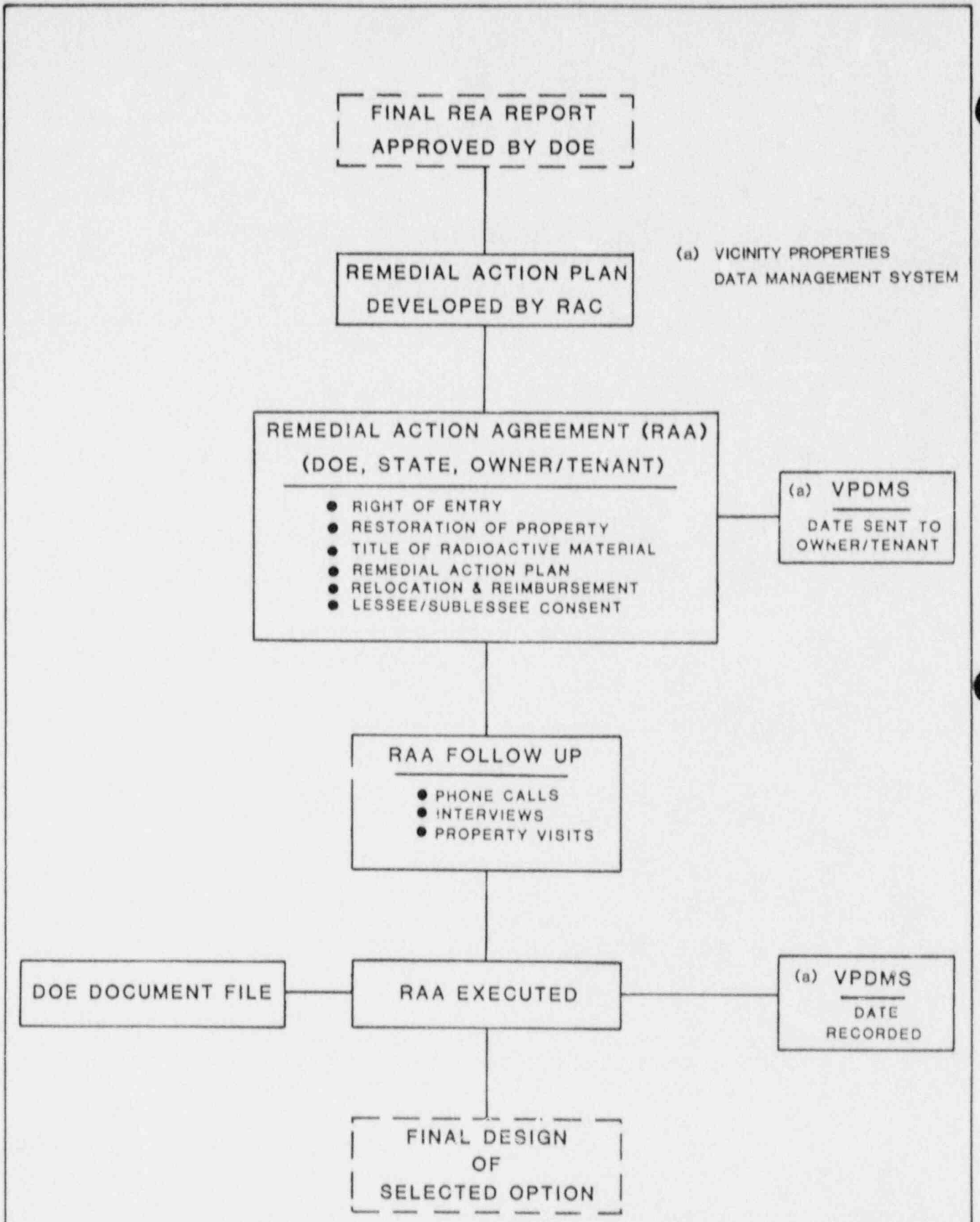


FIGURE 3.2
REMEDIAL ACTION AGREEMENT (RAA)
FLOW DIAGRAM

issues are negotiated by the DOE and state personnel with the owner. If execution of an agreement for a property is significantly delayed due to a property owner's disagreement with the DOE policy or other significant reasons, the delay is noted on the Agreement and the property is rescheduled for a later phase of the remedial action. If the Agreement continues to be delayed and threatens the RACs ability to complete remedial action prior to site closure, the property information is forwarded as an owner refusal as described in exhibit procedures for owner refusal.

3.3.2 Relocation and reimbursement

In a limited number of situations, performing remedial action and executing an RAA requires the relocation of property occupants and/or personal property. This relocation may be temporary or permanent, depending upon the nature of the remedial action required. In addition to relocation, remedial action may require monetary reimbursement to the property owner/occupant for costs or expenditures incurred by the owner/occupant as a consequence of remedial action. A relocation and reimbursement requirement on a property is identified in the REA and defined in the RAA.

The DOE provides relocation and reimbursement to property owners and/or tenants as necessary during the performance of remedial action. All relocation and reimbursement requirements are evaluated and approved by the DOE. In determining the relocation and reimbursement support to be provided by the DOE, each situation is evaluated against the guidelines described below.

These guideline criteria emphasize first the need for detailed evaluation of alternatives prior to a determination of a requirement for either relocation or reimbursement. Alternatives to relocation and reimbursement to be considered include, but are not limited to:

- Area phasing of construction to minimize disruption of home or business.
- Time phasing of construction to maximize off-hour remedial action activities.
- Delay of remedial action on a given property until a time when the need for relocation can be minimized or eliminated, weighed in relation to property priority.

The objective of these evaluations is to minimize the need for occupant relocation and associated costs.

Relocation

Relocation is allowed for a property occupant only if the approved remedial action will disrupt activities on the property to the extent that effective and safe utilization of the property, for business or residence, is not possible. The normal

inconvenience typically associated with remodeling activities is not considered as a basis for relocation.

Typical relocation costs to be paid by the DOE when necessary include: temporary housing, moving fees, per diem, extra utilities, and other miscellaneous costs incurred solely as a consequence of dislocation. In all cases, relocation will be temporary unless the subject property is acquired by the DOE.

Situations requiring relocation are identified in the REA. The recommendation includes a selection of one of the following options and an estimate of the associated costs.

Option 1: Relocation to furnished housing during remedial action. Under this option, the DOE or its representative supplies furnished housing. No allowance for food costs are made. Utility transfer costs are paid. All agreed-to costs are paid directly by the DOE or its representative.

Option 2: Relocation to living quarters of owner's or tenant's choice during remedial action. The owner or tenant pays the costs associated with this option and is reimbursed by the DOE. Reimbursements include the actual cost, or a reasonable rental rate normally paid in the area for housing, whichever is less. Telephone and utility transfer costs are also reimbursed. No allowance for food costs are made. Expense report forms are supplied by the DOE or its representative and submitted to the DOE on a monthly basis by the property owner or tenant.

Option 3: Relocation for brief periods (less than two weeks) to motel lodging. The owner or tenant pays for his/her costs and is reimbursed for lodging, phone (excluding long distance), and food costs. If money advances are required, a formal request form is submitted by the party being relocated at least two weeks prior to the move. Reimbursement rates for temporary relocation cover actual expenses, not to exceed the maximum rate as specified in the DOE Order 1500.20. Receipts shall be required. The maximum per diem rates as of October, 1984, are as follows:

Head of Household	Dependents	Dependents Under 12
$ 50.00	$ 33.33	$25.00

Expense report forms are supplied to the property owner or tenant by the DOE or its representative and are submitted to the DOE at the end of relocation activities.

Reimbursement

Reimbursement is allowed for those property owners or tenants who incur undue expenses or loss of business solely as a consequence of remedial action, and where relocation is either not prac-

tical or is more expensive than reimbursement. Normally these reimbursements are required only for commercial properties. These expenses may include, but are not limited to: utility costs, lease or mortgage payments, and other normal costs of doing business. Typically, the DOE will not reimburse property owners or tenants for business revenues which are projected to have been lost during remedial action. Reimbursement for loss of profits may be allowed in those situations where analysis indicates that this loss of profits represents the same cost to the owner as maintaining the business in an operating mode during the time of remedial action.

All relocation and reimbursement requirements are identified in each property's RAA. These requirements are approved by the DOE and states/tribes when appropriate. All expenses must be in accordance with the guidelines specified in this manual.

3.3.3 Property modifications

The RAC is responsible for preparing designs and RAAs that meet the requirements of the EPA standards, and for assuring restoration of the affected property to a condition comparable to its condition immediately prior to the performance of any remedial action. In some situations, the restoration of a property to its original condition is not possible or practical. In those situations, modifications to conventional restoration plans included in the RAA are permissible. The following general guidelines are provided regarding these types of modifications:

- Landscape, structure, furniture, and any other appurtenances to a vicinity property, which have been damaged or destroyed by remedial action will be replaced with material of equal value, quality, or use. In lieu of replacement, the owner may be compensated for such damage or destruction in amount equal to the DOE-estimated cost of replacement.

- A property owner is entitled to request and receive modifications to existing landscape, structure, furniture, or appurtenances as long as the cost of engineering and construction required to provide the modification is equal to or less than the cost of restoring the property to its original condition. These arrangements are discouraged.

- Portions of structures or utilities having code violations and directly affected by remedial action will be restored so that code deficiencies are corrected. This includes replacing utilities deteriorated by tailings material.

All modifications to normal restoration activities are approved by the DOE prior to inclusion in the RAA and formal agreement with the property owner. Any modifications to the approved RAP described in the Agreement must be approved by the DOE and implementing agencies.

3.4 REMEDIAL ACTION FINAL DESIGN

Following approval of the final REA, the RAC will prepare bid packages including detailed design drawings, technical specifications, and contract requirements. For complex properties with more than two options and expected high design costs, the RAA and final design package must be fully agreed upon between the DOE and the state/tribe prior to submittal to the property owner. A single bid package may include the drawings and specifications for several vicinity properties. A discussion of general guidelines for developing bid packages is provided in the following sections and illustrated in Figure 3.3. Detailed guidance on this procedure is provided in Appendix D, Bid Package Preparation Procedures.

3.4.1 Design drawings and contract specifications

Design drawings

Design drawings are those drawings required to describe in detail the original condition of the property and the proposed remedial action. Design drawings are a part of each bid package. The following information is developed by the RAC for each property:

- Existence and depth of contamination.
- Excavation plan including utilities (if applicable).
- Interior demolition plan (if applicable).
- Restoration plan (interior and exterior).

The number of drawings required to illustrate this information varies with the size and complexity of each property's remedial action requirements.

Each drawing is provided with both a signature and title block. The block has a designated space for the RAC and the DOE signatures, and for an approval date. All drawings identify the subject property by the DOE identification number. Names and addresses may be used on design drawings or bid packages; however, distribution of such information should be limited to Project contractors and subcontractors.

As part of the bid package preparation effort, the RAC develops engineering cost estimates.

Contract specifications

Contract specifications for vicinity property remedial actions include contract provisions and bid documents that provide requirements for compliance with Federal, DOE, state, tribal, and local regulations, and all approved UMTRA Project Plans, including this manual. Contract requirements are a part of each bid package.

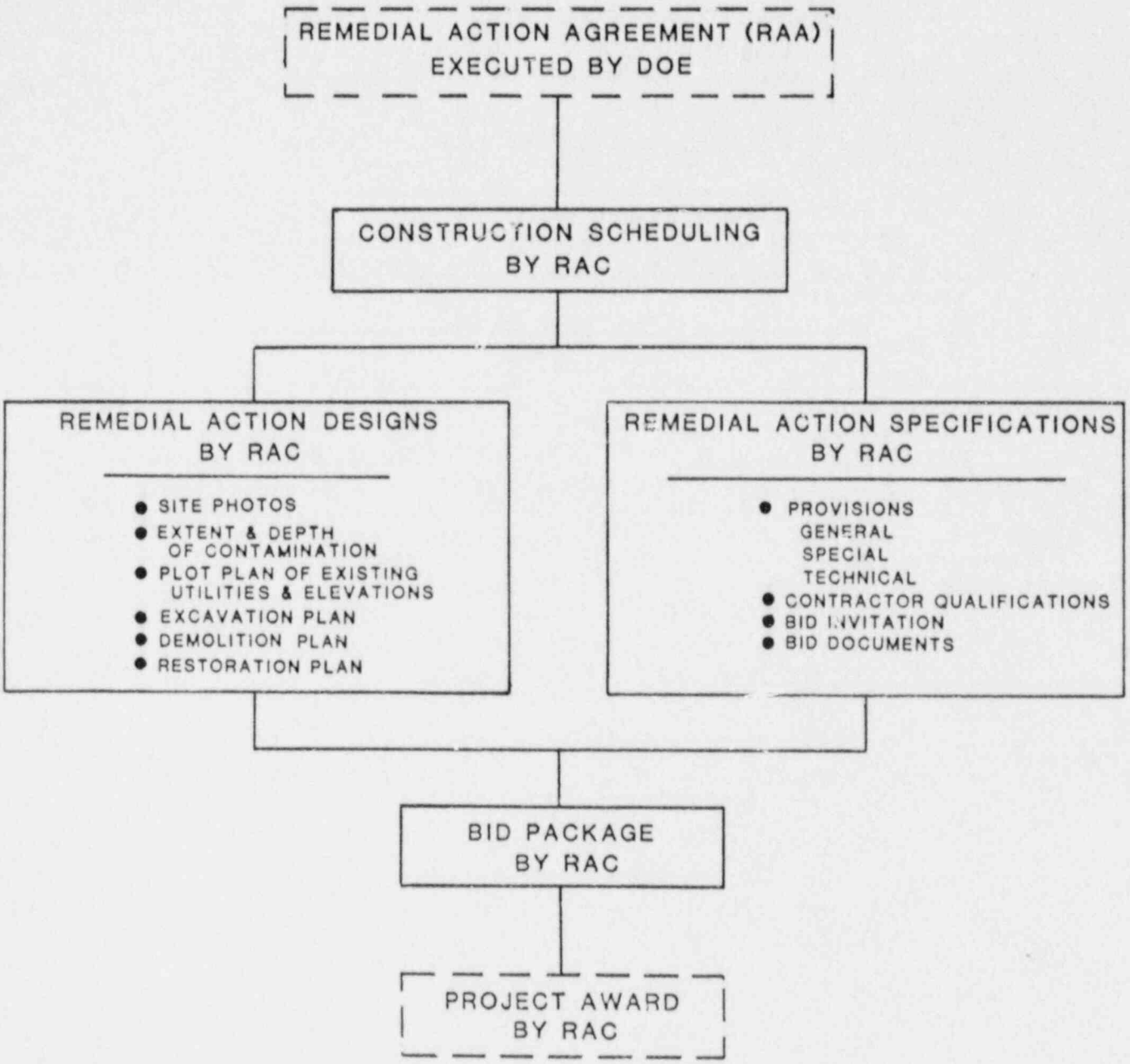


FIGURE 3.3
REMEDIAL ACTION FINAL DESIGN
FLOW DIAGRAM

3.4.2 Bid package

The remedial action technical specifications are combined with the final design drawings for a property, or a group of properties, and submitted by the RAC to the DOE for approval. The combined set of materials makes up a complete design package. Each design package identifies the vicinity properties by the DOE identification number. Upon concurrence, final bid packages will be issued by the RAC for bids.

3.5 SCHEDULING AND SEQUENCING

The RAC develops engineering design and construction schedules. Schedules are reviewed by the DOE with assistance from the TAC. The objective is to establish remedial action schedules in the most cost-effective manner possible.

Where possible, properties within a given block or neighborhood may be grouped together by the RAC for execution of fieldwork. To accomplish this, the VPDMS and other data sources may be used to screen included properties on the basis of location. This approach can permit the RAC to plan and schedule remedial action in an efficient manner and to use the subcontractor's work force and equipment safely and expeditiously. The ISC schedules inclusion surveys based upon guidance received from the DOE, and as required to maintain a volume of available properties for the RAC's REA development.

The TAC performs effectiveness audits on selected properties during all phases of the remedial action and following property restoration. The schedules for these audits are developed by the TAC and approved by the DOE. The TAC assists the DOE to assure proper integration of the RAC and ISC activities with the Project's overall activities. The TAC is also responsible for notifying the DOE and assisting in monitoring contractor's progress against approved schedules and milestones. The Centralized Data Base (CDB) and the IPMS are developed by the TAC to accomplish the schedule integration activity. Periodic Master Schedule forecasts are completed by the RAC, TAC, and ISC. These forecasts are input to the TAC and reported to the DOE and contractors so that progress and problems with the overall Project schedule can be identified by the DOE and all contractors.

4.0 REMEDIAL ACTION

4.1 INTRODUCTION

Remedial action on UMTRA Project vicinity properties will be conducted in a manner that is cost effective and timely. All procurements are conducted in accordance with approved DOE procurement procedures. All remedial action work is managed and audited to ensure that the health and safety of workers and the public is not adversely affected during remedial action. All property decontamination activities are monitored to ensure that completed remedial actions conform to the EPA standards.

4.2 CONTRACTING

The RAC is responsible for all contracting efforts. A flow diagram illustrating the tasks involved in vicinity properties contracting is presented in Figure 4.1.

Bid packages are prepared and distributed by the RAC. The RAC should attempt to group properties into one bid package, if the size and complexity of the projects permit.

The bid package provided to subcontractors shall include:

- o Instructions for submitting bids.
- o Designs, drawings, and specifications for the remedial action.
- o Draft contract for performance of remedial action including general and special conditions.

The RAC may conduct a site tour of the properties intended for remedial action prior to a bid opening. During the tour, subcontractors are free to ask questions and request clarification concerning the proposed remedial action. A DOE representative may also attend the inspection tour.

Bid opening and subcontract award

The RAC shall open all bids on the date specified in the bid documents.

The RAC analyzes the submitted bids, selects a subcontractor for each bid package, and submits its award recommendation to the DOE for consent or approval, based on the RAC's approved procurement procedures. (Remedial actions performed at sites located on lands belonging to Indian tribes shall make full use of any qualified members of Indian tribes resident in the vicinity of any such sites. The provisions of the applicable Cooperative Agreements shall be considered. On Navajo and Hopi lands, Navajo and Hopi subcontractors will have preference in this selection.) A subcontract is then prepared for execution by the RAC and the construction subcontractor. Bid evaluations, prepared by the RAC, are provided to the states or tribes by the DOE, if requested.

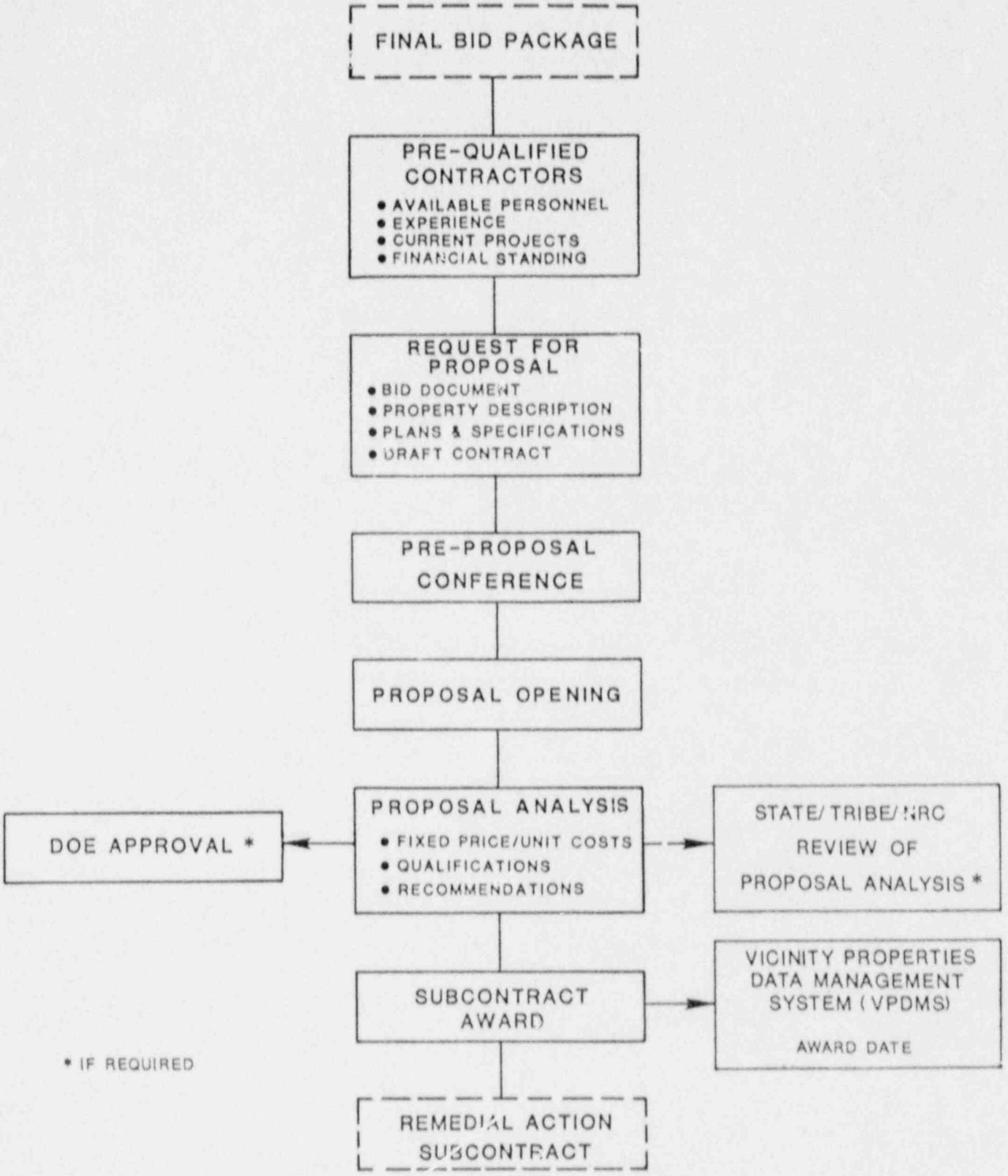


FIGURE 4.1
REMEDIAL ACTION CONTRACTING
FLOW DIAGRAM

A subcontract is awarded by the RAC to the selected construction subcontractor to perform the specified remedial action project. This subcontract may involve work at a single property or a group of properties. Competitively awarded firm-fixed price subcontractors shall be used to the maximum extent possible. The contract for remedial action is in the form of a lump sum bid for specified work, utilizing unit prices for variable items such as excavation and backfill. Significant variance from competitively awarded firm-fixed price subcontracts require the advance written approval of the Contracting Officer.

4.3 CONSTRUCTION MANAGEMENT

This section is intended to describe the construction management controls required to ensure that UMTRA Project remedial actions are carried out in accordance with Project standards and requirements. A flow diagram of generic tasks required to accomplish vicinity properties construction management is presented in Figure 4.2. Remedial action will take place, as needed, in the area encompassed by all boundaries assumed by the property owner up to the curb line.

4.3.1 Remedial action

Outdoor and indoor remedial action will be required to reduce radium in soil concentrations on working level readings to the levels acceptable by the EPA. However, when applied in the field, many interpretations of the EPA standards evolve. Therefore, the following general guidelines are provided to assist in structural remedial action:

- When excavating away from structures, all tailings present in includable deposits must be removed.

- When working (within 10 ft) around or underneath structures and around underground utilities routed to structures, the aforementioned logic is also applied. However, if contaminated materials are discovered that do not exceed the EPA soil standards of 5 pCi/g and 15 pCi/g above background but do exceed normal background levels, consideration may be given to removing these materials. This is recommended to assure that completed remedial actions performed underneath or around structures meet the EPA indoor radon daughter concentration (RDC) standard. It is more costly to perform additional remedial action on properties not meeting the RDC standard after the first remedial action than to remove additional small quantities of contaminated materials to assure compliance during the first remedial action.

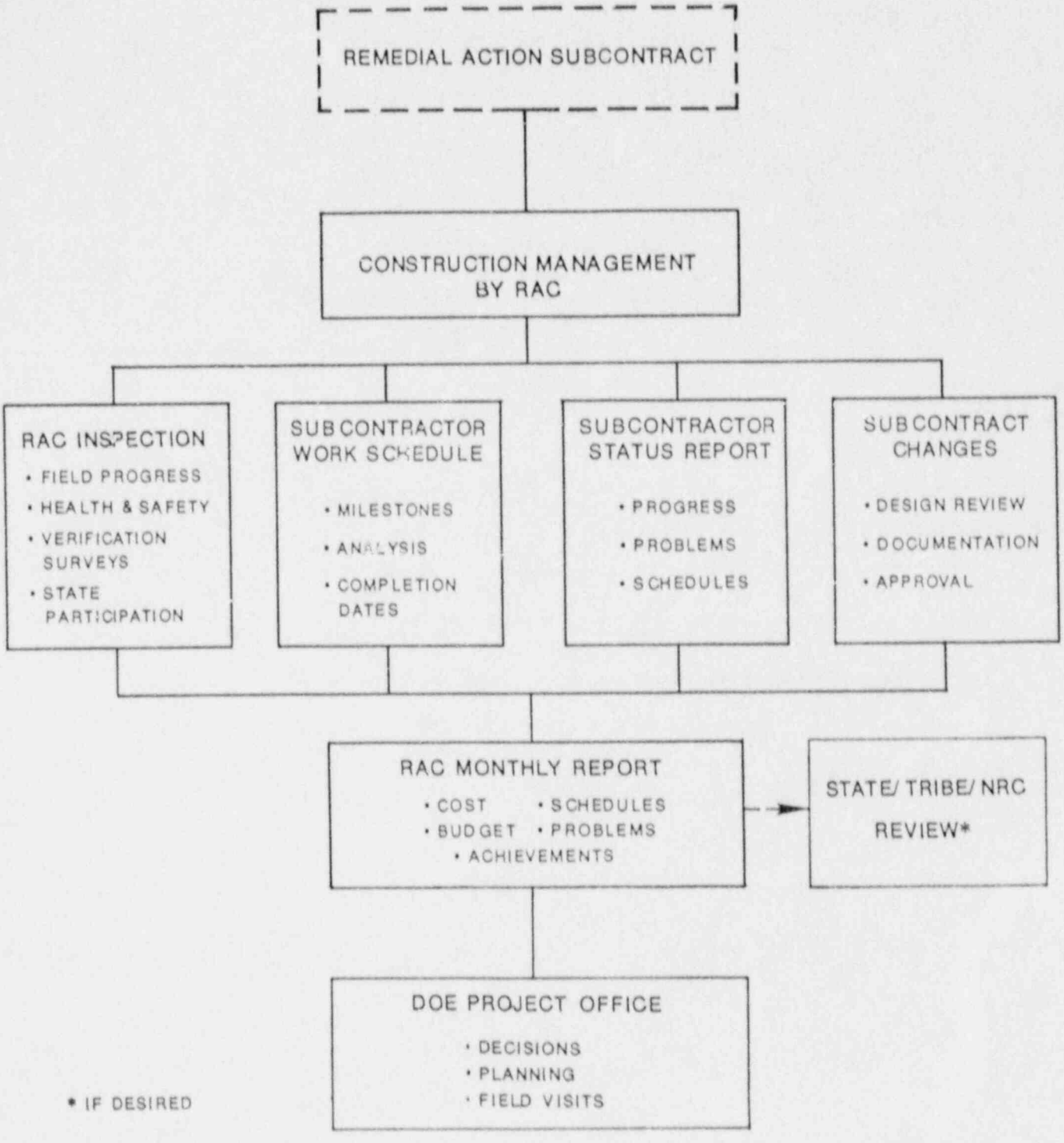


FIGURE 4.2
CONSTRUCTION MANAGEMENT
FLOW DIAGRAM

- o For open lands with significantly large buried deposits with Ra-226 concentrations between 5 and 15 pCi/g, consideration may be given to removing the material. A site-specific evaluation should be made considering such factors as local land use and building practices, as well as the extent and Ra-226 concentration of the deposit.

The following guidelines are provided to reduce the number of cases in which working level readings are still elevated after remedial action to levels above EPA standards due to remaining tailings.

- o Perforated piping systems (i.e., subfloor vents) may be engineered and installed under floors that are removed as part of interior tailings removal. Use of a partial or full system is based upon good engineering judgment.

- o These subfloor vent systems are capped just above the finished floor level. During the collection of verification or certification measurements, if elevated radon measurements are found to still exist, the vent may be uncapped and extended through the roof to vent out the excess radon. If radon levels are acceptable, the vent should remain capped.

The purpose of these systems is to vent the radon out through the roof of the structure rather than let the underfloor radon infiltrate into the structure. Installation of the system described above should reduce the number of structures requiring reworking after remedial action is completed.

In those instances where it appears that the elevated working levels are not due to remaining tailings, a series of activities are performed to document the absence of tailings.

In instances where hazardous materials (materials determined hazardous by the EPA and/or state/tribal agencies' guidelines) are evident, the source of the materials will be identified. The UMTRA Project will accept responsibility for only those hazardous materials purchased or used while under government contract for the processing uranium. The Project will prepare cleanup and disposal options, and coordinate the effort with appropriate Federal/state/tribal agencies. During removal of the waste, all EPA, Occupation Safety and Health Administration (OSHA), and/or local guidance for worker protection will be implemented.

If known waste containing residual radioactive materials comingled with non-radioactive hazardous material or "mixed wastes" is located on vicinity properties, early notification should be provided to the UMTRA Project Office regarding the type, quantity and interim storage options. This is required in order to allow proper notification and coordination with the states/tribes and NRC on the permanent disposal at the site. Mixed waste cleanup is conducted using the EPA standards for radium in soils for the radioactive component. The hazardous

waste components are cleaned up to requirements negotiated with EPA, state/tribe and NRC if appropriate. The mixed wastes will be disposed of at the UMTRA disposal site.

Disposal costs incurred by the DOE for hazardous waste determined not to be UMTRA Project responsibility will be submitted to the Department of Justice (DOJ) along with the justification and rationale for this determination. The DOJ will review this information for possible legal action against appropriate private parties.

The guidance in this manual cannot cover all remedial action situations. For further assistance on specific applications of the EPA standards, contact the UMTRA Project Manager.

4.3.2 Remedial action control

Various methods of maintaining control of remedial action activities are employed by the RAC. The level of control is commensurate with the size and complexity of each activity. These methods may include but are not limited to those listed below.

- Subcontractor training. The RAC may train subcontractors in remedial action excavation control. The subcontractor should undergo such training and pass a comprehensive field test before the RAC can delegate authority of this excavation control task to the subcontractor during actual UMTRA Project remedial action.

- Daily observations. A RAC representative may make daily visits to each active vicinity property. During this visit the RAC representative reviews the progress, quality, and substance of the work; investigates and identifies observed, suspected, or potential health and safety problems; and assists the subcontractor in verifying the removal of tailings material through radiation monitoring during critical times of tailings removal. All observations shall be documented in a permanently-bound log book.

- Schedules. The remedial action contract may require the construction subcontractor to submit a work schedule to the RAC. Depending on the size and complexity of the remedial action, the work schedule varies in detail. The schedule can be broken down by major activities and indicates the start and completion dates for these activities. The schedule is updated on a regular basis throughout the project and is available for DOE review.

- Subcontractor status report to RAC. The subcontractor may submit weekly site status reports to the RAC. The level of report complexity varies with the control level of the project. Required items include, but are not limited to: work accomplished, completed milestones, O

problems encountered, scheduled work for next report period, the percentage of work scheduled for completion, and the percentage of work actually completed.

- Changes to the work. Changes to the work may require modification of approved drawings or specifications included in bid packages. These changes are required to handle unforeseen field conditions affecting the remedial action, and additional related work requested by affected vicinity property owner(s).

  Any proposed changes in remedial action design which are identified by the subcontractor during the implementation (construction) phase of remedial action are reviewed and approved by the RAC prior to implementation. Review and approval of potential design changes are performed to assure that changes are consistent with conditions of the RAA. Potential design changes identified in the field are brought to the attention of the RAC within 24 hours.

  All design changes are fully documented in writing. The DOE and state/tribe concurrence is required if changed conditions warrant a modification to the RAA. Non-emergency changes are prepared in writing by either the construction contractor or the on-site RAC resident engineer. Emergency changes are documented immediately, followed by a formal request providing full detail of the change. All changes are processed in accordance with approved contracting procedures.

- RAC status report to the Project Office. The RAC will submit monthly management reports to the Project Office including a summary of the vicinity property work accomplished. These reports include discussions of activities for vicinity properties at each processing site location in terms of costs, schedule, and budget. These reports are available for review by the DOE Division of Remedial Action Projects, states, tribes, and the NRC. In addition, the RAC has available for review a bound daily log book summarizing daily inspection activities.

4.4 HEALTH AND SAFETY

The UMTRA Project Environmental, Health, and Safety Plan (EH&SP), as revised, (UMTRA-DOE/AL 150224.0006) provides guidance for the assessment, control, and inspection functions necessary to ensure that the environment, the remedial action workers, and the general public are protected from the hazards associated with the removal and transportation of uranium mill tailings from vicinity properties. The RAC is responsible for implementing a health and safety program prior to initiation of remedial action, to assure the DOE that conditions specified in the UMTRA Project EH&SP are complied with during remedial action.

The TAC is responsible for periodically reviewing the RAC's development and implementation of health and safety procedures, and for reporting the results to the DOE. The responsibility of this function for Grand Junction and Edgemont lies with GJPO. A flow diagram indicating the components of the vicinity property health and safety program is provided in Figure 4.3.

4.5 EXCAVATION CONTROL

As excavation proceeds, trained field personnel monitor the levels of contamination in the excavation area by means of a hand-held scintillometer or by measuring the radium content of soil samples using the Opposed Crystal System (OCS). The cut-face and bottom of the excavation pits are scanned with a hand-held gamma scintillometer to estimate when contamination exceeding the applicable EPA standards has been removed. Observed anomalies are investigated for deposits that exceed the EPA standards and soil samples from these areas are analyzed using the OCS. The RAC is responsible for removing 100-percent of all residual radioactive materials in excess of the EPA radium in soil standards. It is not acceptable, during any stage of remedial action, to re-average either portions of deposits or small deposits which exist on the property. Verification soil samples are then taken in the excavated areas, with results compared to the exclusion criteria which appear in Appendix A, Inclusion Criteria and Procedures.

If the standards (i.e., EPA standards of 5 pCi/g above background in 15 cm surface layer and 15 pCi/g above background for 15 cm layers below the 15 cm surface layer) are not exceeded, the excavation will be backfilled with surveyed (clean) backfill material. Further details on this verification procedure are provided in Appendix E, Verification Procedures.

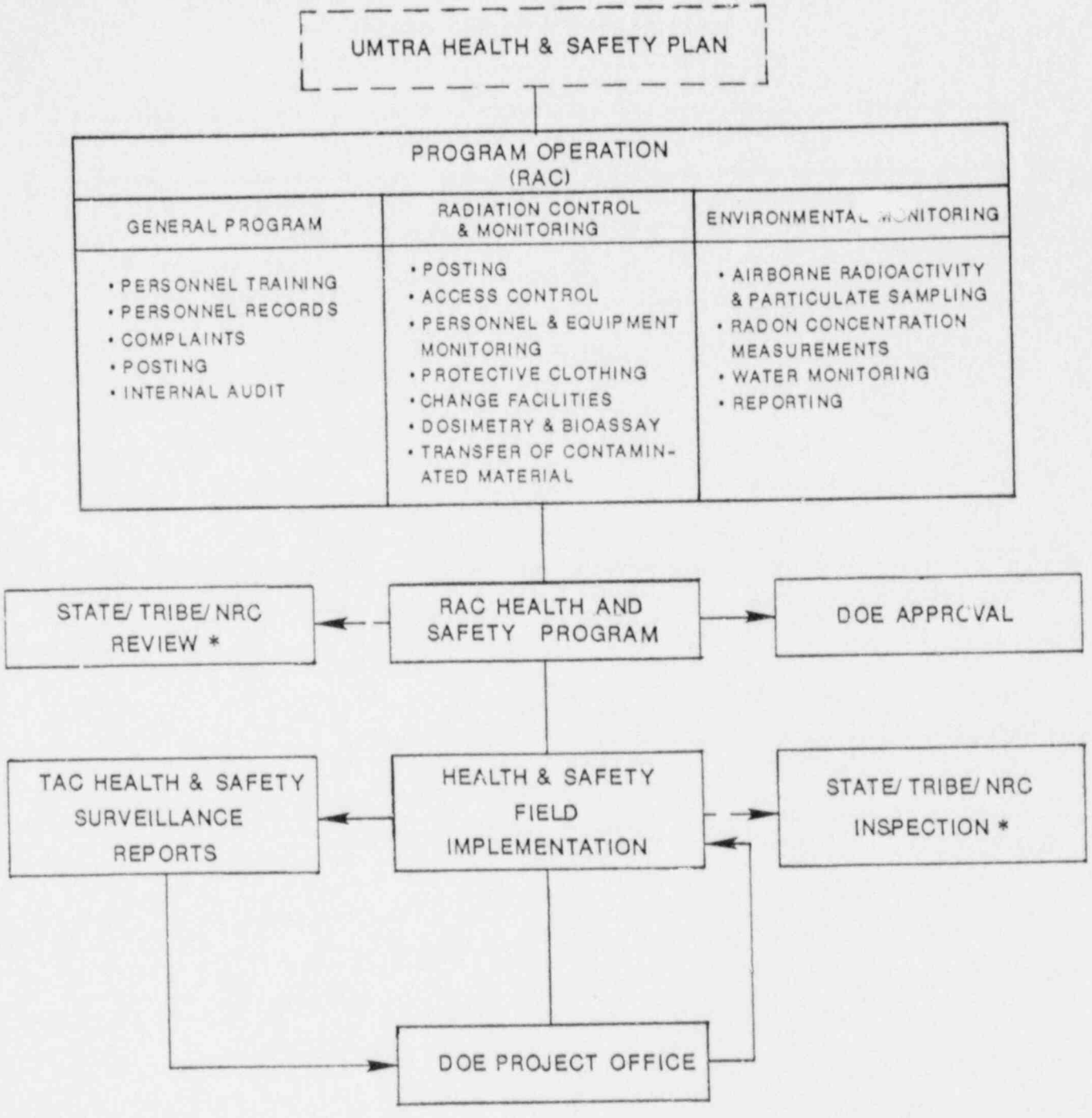


FIGURE 4.3
HEALTH AND SAFETY PROGRAM
FLOW DIAGRAM

5.0 REMEDIAL ACTION CLOSEOUT AND DOCUMENTATION

5.1 INTRODUCTION

Field inspections and analyses are performed after the completion of remedial action to determine the effectiveness of the remedial action, and to demonstrate that the radiation levels at vicinity properties do not exceed the relevant EPA standards. Reports are required to document the findings of these inspections and analyses.

The following sections and Figure 5.1 describe the generic guidelines for the RAC to verify compliance with EPA standards, and for the TAC to determine the effectiveness of remedial action.

5.2 VERIFICATION PROCESS

The compliance verification process requires measurements and assessments by the RAC on all properties and by the IVC on the Grand Junction properties, to demonstrate that the applicable EPA standards for remedial action have been met. Radiation levels are documented after excavation and before the property is reconstructed. Detailed procedures for making these measurements are provided in Appendix E, Verification Procedures. Compliance with two sets of performance requirements must be satisfied to demonstrate compliance. The first set of requirements are those engendered in the Remedial Action Agreement with the property owner, describing the physical condition of the property upon restoration and the owner's relocation requirements. The second set of performance requirements is the EPA standards for Cleanup of Land and Buildings Contaminated with Residual Radioactive Materials from Inactive Uranium Processing Sites (40 CFR Part 192, Subpart B).

Both sets of measurements are the responsibility of the RAC or its subcontractors. Results of both verification exercises shall be documented by the RAC in Completion Reports for each property.

5.2.1 Remedial Action Agreement verification

After the completion of the remedial action, the RAC prepares a Completion Report describing the radiological condition of the property. This report discusses the pre-remedial action radiological condition of the property with respect to the post-remedial action radiological condition. The inspection should indicate that the property has been returned to its original physical condition. The owner/tenant may be requested to sign a statement indicating satisfaction with the physical condition of the property (this statement is then attached to the original RAA). In Grand Junction and Edgemont, the statement is not used.

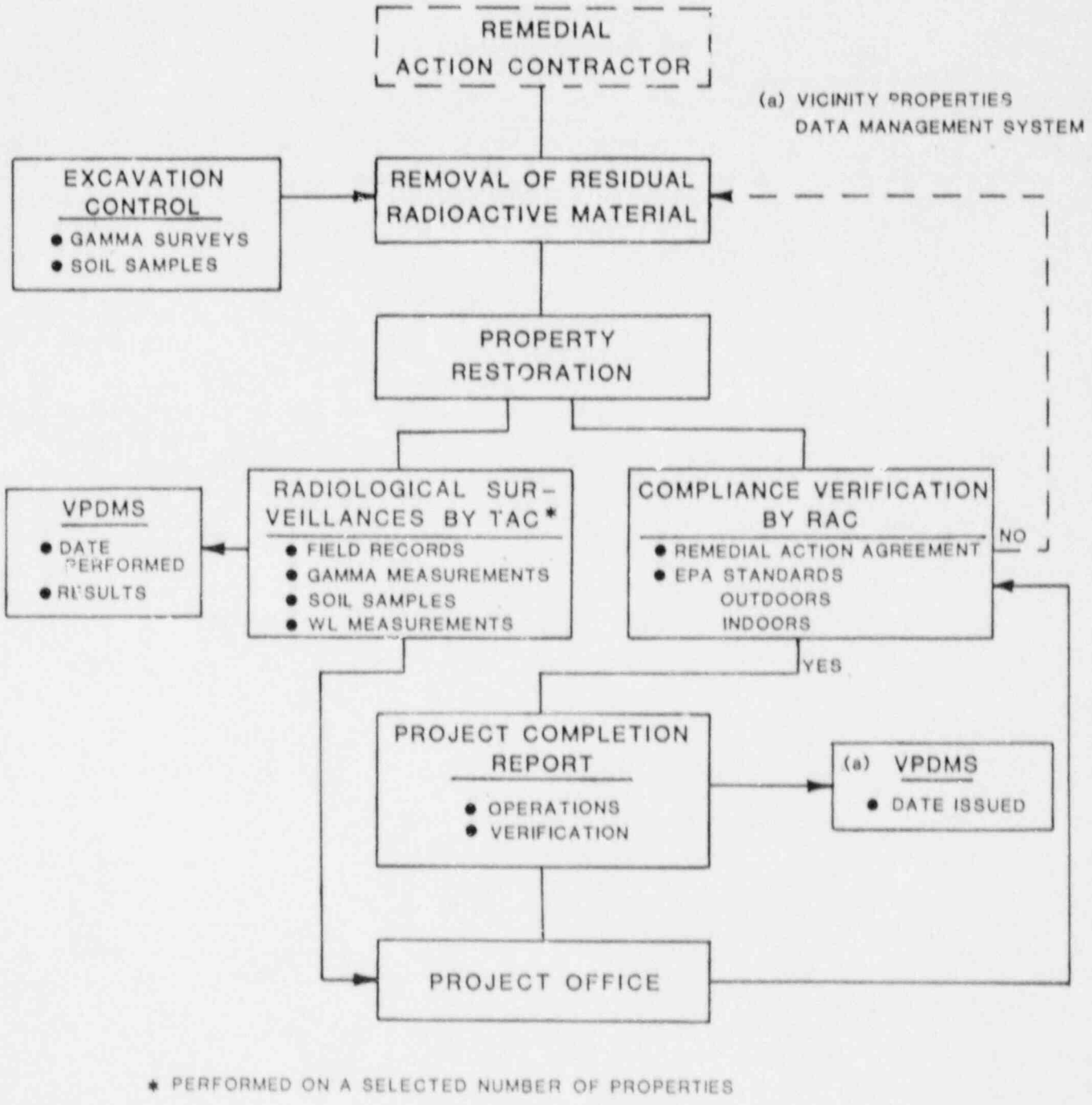


FIGURE 5.1
REMEDIAL ACTION PROJECT CLOSEOUT AND DOCUMENTATION FLOW DIAGRAM

If the inspection reveals discrepancies between pre- and post-remedial action physical conditions, beyond those agreed to in the RAA and documented in pre-remedial action photographs, the subcontractor is directed by the RAC to make necessary repairs within a given time frame. Upon satisfactory completion of this repair, the owner may again be requested to sign a statement indicating satisfaction with the property condition, except in Grand Junction and Edgemont where the statement is not used.

For properties in Grand Junction and Edgemont, construction completion is defined as the final walk-through with the property owner and construction contractor. This completes the RAA verification process.

5.2.2 EPA standards verification

Once excavation is complete surveys are made to verify compliance with the EPA standards. These surveys are performed by the RAC on all properties and by the IVC on the Grand Junction properties. The RAC or IVC either perform the surveys side-by-side or IVC does a paper review, as dictated by the DOE. Details of the standards verification survey are provided in Appendix E, Verification Procedures. A summary of the standards verification follows.

- Standards verification outdoors. Prior to backfilling excavations, the bottom and sides of the excavation are first surveyed with a hand-held scintillometer. Elevated gamma levels at the sides and bottom of excavations will be further investigated for indications of additional contamination. Soil samples are taken in all remediated areas where anomalous readings occur. Composite soil samples are taken from the bottom of the excavation and samples will be analyzed for Ra-226 concentrations in the field. A certain percentage of these samples (approximately five percent) are split by the RAC and sent to an outside laboratory for quality assurance analyses. All samples are archived until the property is certified. Archiving shall be at the respective processing sites in accordance with DOE-approved procedures. The results of soil analyses, averaged over a 100 square meter area are compared to the EPA Standards to verify the success of the remedial action work. Once verification is complete, backfilling of the excavation is conducted.

- Standards verification in occupied or habitable buildings. A tiered analysis system is used to verify compliance with the indoor EPA standards. Measurements are made and compared to indoor standards for gamma levels and radon daughter concentrations only when remedial action has been performed indoors or within 10 feet of a habitable structure when no previous measurements were made or when previous measurements did not meet the standards. A detailed description of this procedure is provided in Appendix E, Verification Procedures.

5.3 RADIOLOGICAL SURVEILLANCES

The TAC periodically surveys remedial actions performed at vicinity properties prior to reconstruction to check the accuracy of radiological measurements included in the RAC's Property Completion Reports. Audit results are provided to the Project Office for review, and action if necessary. This task is also performed periodically at vicinity properties where the RAC is performing REA field surveys and the ISC is performing inclusion surveys.

5.3.1 Responsibilities

At the request of the DOE, a team is provided by the state/tribe or TAC to review verification records and to perform on-site measurements and collect samples using procedures and methods similar to those used by the RAC. Analyses of split samples collected by the RAC are performed to assure accuracy of analytical methods. These audits are conducted on selected vicinity properties during remedial action and follow the detailed procedures provided in Appendix F, Effectiveness Audit Procedures. Properties are selected for these audits based on differing physical and radiological conditions.

Data from Radiological Surveillances are used to provide statistically significant assurance that remedial actions are being conducted effectively and to supplement certification data, if required.

A Vicinity Property Audit Report (VPAR) is submitted by the TAC either UMTRA Project Office or the GJPO following each audit. The VPAR includes information from the radiological surveillance discussed here and from the construction Quality Assurance Audit discussed in Section 7.0. The reports contain the results of measurements and sample analyses, and an assessment of the quality of radiological measurements. The percentage of properties audited vary each year and is partially dependent upon the results of past audits.

The VPARs are available for review by the DOE Division of Remedial Action Projects, states, tribes, and NRC.

5.4 VICINITY PROPERTY COMPLETION REPORTS

The RAC shall transmit all Property Completion Reports to the UMTRA Project Office or GJPO for certification evaluation. The Completion Reports are reviewed for adequacy and compliance with the EPA standards. The Completion Report includes an Operations Summary and a Verification Summary for each property included in the project. A generic Vicinity Property Completion Report format is provided in Addendum E1 of Appendix E, Verification Procedures.

5.4.1 Operations summary

The Operations Summary documents the remedial action undertaken. It gives a summary description of the work performed at the site including the expected and actual amounts of material removed. It also identifies the construction subcontractor and the completion date of remedial action.

5.4.2 Verification summary

The Verification Summary documents the effectiveness of remedial action and demonstrates that the property is in compliance with the applicable EPA standards. This section includes the results of each property's pre-remedial and post-remedial action measurements. In addition, the location, concentration, and volume of any contamination in excess of EPA standards left on a property is documented in this section of the report. For properties that exceed the radon working level standard because of natural background, soil samples are taken, analyzed, and results included in the completion reports to verify whether tailings or natural material are causing the elevated working levels. Reporting of all radiological data in these reports are in the same units of measurement stipulated by the EPA Standards for cleanup of vicinity properties.

5.5 CERTIFICATION

Certification is the process by which the UMTRA Project Office or GJPO uses field data and determines that remedial action has been performed at a vicinity property in compliance with the EPA standards. Excavation control and verification data from the RAC and radiological surveillance data by the state, IVC, or TAC are evaluated to determine if there is reasonable assurance that contamination does not exceed limits provided in 40 CFR Part 192.12. A more detailed explanation of the certification process appears in Addendum E1, Certification Plan, of Appendix E, Verification Procedures.

5.5.1 Certification notices and property record documentation

If a property is certifiable, a certification letter, Figure E1.2.6 of Addendum E1, Appendix E, Verification Procedures), is prepared by the TAC and transmitted to the UMTRA Project Office for signature and transmittal. For properties in Edgemont and Grand Junction, the GJPO prepares and issues the certification letter. The letter will be sent to the property owner with a copy to the RAC and state or tribe representative.

The UMTRA Project Office must comply with property record documentation requirements stipulated in Public Law 95-604, Section 104. Specifically, the following requirement applies:

"In the case of each processing site designated under this title other than a site designated on Indian land, the State shall take such action as may be necessary, and pursuant to regulations of the Secretary under this subsection, to assure that any person who purchases such a processing site after the removal of radioactive materials from such site shall be notified in an appropriate manner prior to such purchase, of the nature and extent of residual radioactive materials removed from the site, including notice of the date when such action took place, and the condition of such site after such action. If the state is the owner of such site, the state shall so notify any prospective purchaser before entering into a contract, option, or other arrangement to sell or otherwise dispose of such site. The Secretary shall issue appropriate rules and regulations to require notice in the local land records of the residual radioactive materials which were located at any processing site and notice of the nature and extent of residual radioactive materials removed from the site, including notice of the date when such action took place."

As required by Public Law 95-604, Section 104, the following procedure is used for the annotation of public land records. The state or tribe will record in the local land record office the cleanup of any contamination on a property upon receipt of the certification letter or Completion Report, as noted in each states annotation procedures. This may be accomplished by placing a copy of the letter in the land record files and noting on the legal description that the Completion Report exists and is available for review. The Procedures for Annotation of Land Records are found in Addendum E2 of Appendix E, Verification Procedures. Note that finalization and implementation shall not take place until the DOE rule for Vicinity Property Annotation is issued as final.

5.6 DOCUMENT TRANSFER AND ARCHIVE

Once a property is certified and the warranty period has expired, document archiving may proceed. The procedures for archiving are presented in the UMTRA Project Control System Criteria Manual (see Section 6.3). The portfolio includes the property's Consent Form, Inclusion/ Exclusion Report, DOE Inclusion/Exclusion Decision, property owner notification letters, REA, RAA, detailed design, Completion Report, certification notice, and any other relevant correspondence or notes on the property. The files are archived in accordance with the DOE retention requirements. These records are available for review by the NRC, states, and tribes upon request. The procedures for this archiving are presented in the UMTRA Project Control System Criteria Manual.

6.0 PROJECT CONTROLS AND DATA MANAGEMENT

6.1 INTRODUCTION

Vicinity property activities are performed and administered by implementing agencies located in various regions of the country. The UMTRA Project Office is responsible for ensuring that the vicinity property activities are conducted by the various Project participants in a consistent and effective manner, and for developing a system for recording information and tracking the progress of activities on individual vicinity properties. To fulfill this responsibility a system has been implemented which employs computerized project controls, the UMTRA Project VPDMS. The system has been designed to provide storage, manipulation, and reporting functions on vicinity property remedial action. The TAC is responsible for maintaining the VPDMS system and for incorporating data inputs from the ISC, RAC, DOE, Project Office, the states/tribes, and the TAC itself.

In addition, the Project Document Control System (PDCS) has been established by the Project Office to serve as the central document control center for filing and archiving various pieces of information on each vicinity property. All Project documents and selected vicinity property reports are transmitted to, and filed in, this system throughout the duration of the Project. The TAC is responsible for the implementation and maintenance of this system.

The VPDMS provides information on each vicinity property and summary information on groups of properties associated with the individual processing sites. Reports are generated and submitted to the DOE, states, tribes, and other appropriate project participants. The system may also be used to plan vicinity property remedial action activities, to estimate budgets and expenditures, and to provide a flow of information between the various project participants.

6.2 VPDMS DESCRIPTION

6.2.1 General

The VPDMS is managed and controlled from the UMTRA Project Office in Albuquerque, New Mexico. The system has the capability to store and manipulate four basic categories of information:

- Property radiological and engineering assessments.
- Contractor schedules and progress.
- Costs associated with engineering and remedial action.
- Owner/tenant information.

Property assessment information consists of radiological measurements made before remedial action, an identification of the tailings location and property occupancy, and an assessment of the type of remedial action required.

Task schedules and progress are assessed by recording dates of completion for the milestone activities on each property. These milestones include Consent Forms, site surveys, property inclusions, REAs, RAAs, remedial action contract awards, remedial action construction, Completion Reports, and property certification.

Costs recorded include those associated with four categories: Engineering and Management (including development of REAs, detailed design of the approved remedial action option and technical and management support); Remedial Action (including construction, health physics observations, and construction monitoring during remedial action); construction management (includes health physics, field personnel, and administrative costs); and the original bid amount of the construction contract. Further details regarding the composition of the VPDMS can be found in Appendix G, Vicinity Properties Data Management System.

6.2.2 System inputs

All pertinent information is provided by the Project participants responsible for the respective actions. All activities reported to the VPDMS are reported to the TAC no more than 30 days after the occurrence of the activity. Cost data for remedial action are reported immediately upon completion of the Completion Report. A summary of the input requirements for the VPDMS is presented in Figure 6.1.

Actual completion dates are logged by the RAC, the ISC, the TAC, and the states/tribes, and are reported to the VPDMS on a monthly basis by means of electronic data transfer or data entry sheets. A blank VPDMS data entry sheet is presented in Appendix G for reference. The TAC is responsible for providing all input formats and coordinating all data entry activities with the project participants to ensure accurate and effective data processing. Entry of data into the VPDMS is conducted by TAC personnel in the Albuquerque, New Mexico, Project Office.

6.2.3 System outputs

Pre-formatted reports are generated from the VPDMS on a monthly basis. These reports are designed to provide a summary of data to satisfy the Project Office's information requirements. The report formats are illustrated and discussed in Appendix G. In addition to these reports, the VPDMS is capable of sorting, selecting, and listing the properties and associated data in various formats.

6.2.4 Data use

The VPDMS reports are produced by the TAC and delivered to the Project Office for action as required. The reports are

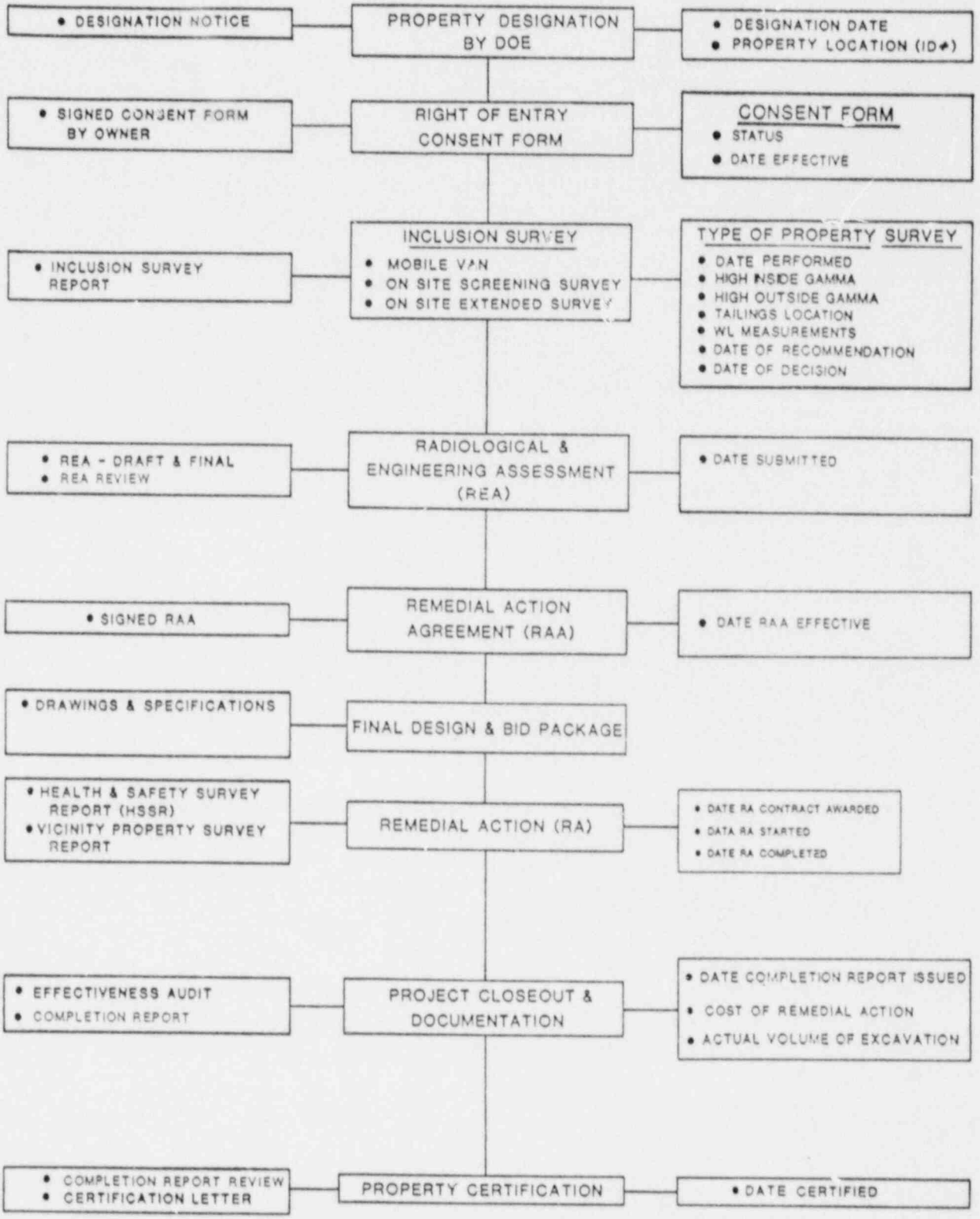


FIGURE 6.1

PROJECT CONTROLS & DATA MANAGEMENT FLOW DIAGRAM

subsequently distributed to the UMTRA Project participants and states/tribes as requested or as the Project Office determines appropriate. Other information that may be useful to the various project participants can be produced by the TAC on an as-needed basis.

Information generated by the VPDMS is used by the Project participants and states/tribes to keep abreast of project status, to facilitate progress, and to respond to public concerns on a property-specific basis. Care should be taken by all parties receiving the VPDMS outputs to limit circulation of information regarding property ownership and location. This information is for use by Project participants, states/tribes, and subcontractors only.

6.3 PDCS DESCRIPTION

The UMTRA PDCS provides a centralized repository for project information and an effective means of retrieving information as the need arises. The system has been developed and is maintained by the TAC. The system capabilities include:

- Document acquisition that ensures all project-related records enter the system files.
- Computerized retrieval of system documentation using multiple search and cross-referencing parameters.
- Filing and storage practices that protect project records from loss or damage.
- Library and reference service.
- Microfilm generation and retrieval capabilities.

The PDCS is fully described in the UMTRA Project Document Control System Manual, which further describes the practices used for acquiring, tracking, controlling, retrieving, and retiring all records and documents relevant to the management, support, and performance of the UMTRA Project. All data input requirements relative to vicinity property activities are illustrated in Figure 6.1.

7.0 QUALITY ASSURANCE (QA)

7.1 INTRODUCTION

The UMTRA Project requires implementation of the current UMTRA Quality Assurance Plan (UMTRA DOE/AL-185) on all vicinity property remedial action activities. The RAC develops a Quality Assurance Program Plan (QAPP) and submits this plan to the DOE for approval. The purpose of the QAPP is to assure the Project Office that all vicinity property activities are documented and performed in accordance with approved UMTRA Project Plans. The QAPP describes the means the RAC employs for maintaining records, performing inspections, testing, and reporting to the Project Office. All contractor QAPPs are available for review by the DOE Division of Remedial Action Projects, states, tribes, and NRC.

Vicinity properties QA overview assistance is provided to the Project Office by the TAC. This function involves assisting in the review of the RAC QAPP, advising the Project Office in matters of QA, and performing periodic audits of individual RAC activities. The purpose of the QA overview function is to provide the PO with objective evidence that vicinity property remedial actions are being conducted in accordance with the intent of the UMTRA QA Plan.

A brief description of guidelines for vicinity property QA activities is provided in the following text. These activities are summarized in Figure 7.1.

7.2 INSPECTIONS AND LOGS

The RAC will include quality assurance information in its daily construction logs. These logs will be developed in the appropriate format and maintained by the RAC at the site. The logs must provide complete and factual evidence that required inspections and tests have been performed. The information documented includes but is not limited to:

- Nature of deficiencies requiring corrections.
- Corrective actions taken or to be taken.

Health physics information is documented daily as required in an appropriate format, not in the construction log.

As part of these logs, the RAC will include a statement that all materials, tests, and monitoring activities are in compliance with UMTRA Project plans and contract plans and specifications, except as noted.

7.3 RECORDS

The RAC is responsible for the generation, retention, and retrieval of legible records which provide objective evidence of conformance to the specified quality assurance requirements of the vicinity property QAPP.

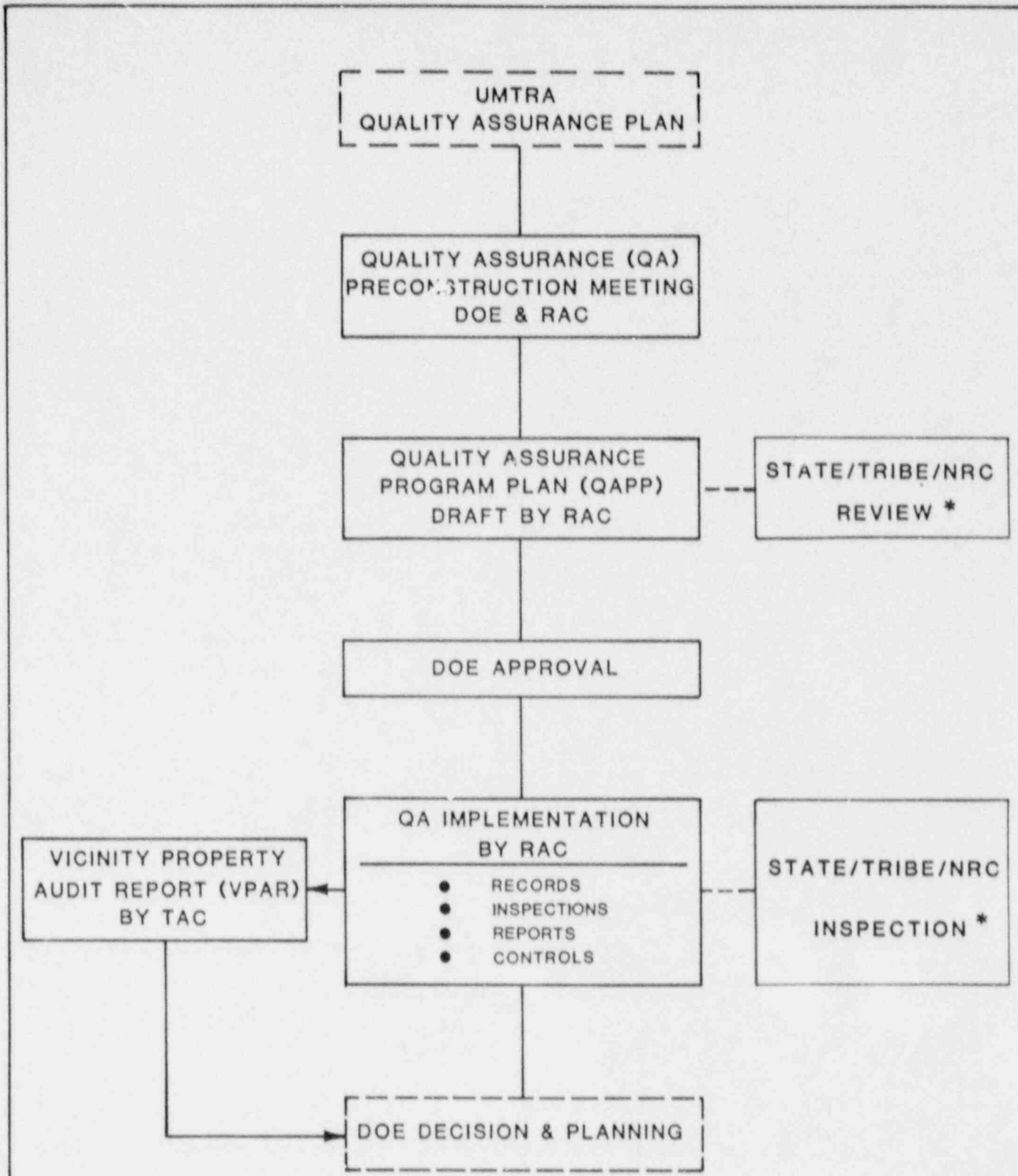


FIGURE 7.1
QUALITY ASSURANCE
FLOW DIAGRAM

These records will be completed, signed, and dated by authorized personnel. The records will include but are not limited to:

- o Soil compaction test reports.
- o Equipment and instrument calibration records.
- o Soil test reports.
- o Access control log.
- o Test and inspection reports.
- o Dosimetry measurement records.
- o Concrete cylinder test reports and charts.
- o Field radiological measurement logs.
- o Concrete placement reports.
- o Personnel records
- o As-built drawings.
- o Approved specifications.

If during the course of the remedial action at vicinity properties records become lost or damaged and if replacement or restoration is not practical, action will be taken by the RAC to ensure the quality of redocumentation.

7.4 QA AUDITS

Audits are periodically conducted by the Project Office and the TAC to verify that the procedures, equipment, and systems called for in the respective QAPPs are being implemented by the RAC and ISC. In addition, Radiological Surveillances are conducted on a selective basis by the TAC to assure that methods used in remedial action are acceptable and to assure that EPA Standards have been conformed to (see Section 5.4). Records and procedures are inspected during this audit exercise. Duplicate measurements and samples may also be taken. The results of the audits are documented by the TAC and are transmitted to the Project Office in Vicinity Property Audit Reports (VPARs). Contractors must prepare a written response to all observations and findings within 60 days of receipt of the audit documentation.

All VPARs are available for review by the DOE Division of Remedial Action Project, states, tribes, RAC, and NRC.

8.0 PUBLIC INFORMATION

8.1 INTRODUCTION

To promote public understanding of the UMTRA Project, information is disseminated in a timely manner. All appropriate information is supplied to Federal, state, and local officials, the media, special interest groups, and the general public. All UMTRA Project participants, both Federal and contractor employees, follow the established procedures and methods for public information on all aspects of the project.

UMTRA Project publications regarding public information and participation are available through the DOE-AL, Office of Public Affairs. Because of the nature of vicinity properties, the majority of which are private residences and commercial businesses, the DOE has instituted a policy of strict confidentiality regarding the names and addresses of property owners. Under no circumstances is this information to be released without prior approval of the UMTRA Project Office.

However, one of the major objectives of the UMTRA Project is to encourage as much public participation in the decision-making process as possible. In order to accomplish this objective the DOE, contractor, and all people involved with the program must be made aware of the necessity to answer questions concerning the project accurately and promptly. UMTRA Project information is not classified and an open information policy is followed.

8.2 POLICY

The UMTRA Project operates under an open information policy in accordance with the DOE policy, the Freedom of Information Act, the Privacy Act, and the Uranium Mill Tailings Radiation Control Act of 1978. All questions about the project, subject to the following guidelines, should be answered accurately and promptly.

8.2.1 Field employees

Vicinity property remedial actions are an ongoing concern throughout the duration of the UMTRA Project. Project employees in the field are highly visible to the public and may be approached at any time by members of the press or interested citizens with questions regarding their activities.

All field employees receive a briefing from their supervisor explaining the DOE policy and guidelines with appropriate information on sensitive areas in their portion of the project, the proper method of referral to supervisors, and the method of obtaining or assisting others to obtain information on the project.

The DOE provides sufficient quantities of generic fact sheets and site-specific fact sheets to the vicinity property contractor for distribution to all interested parties. Field management personnel have a sufficient quantity of these fact sheets readily available for any person who has questions or is interested in the Project. Supervisors should have a copy of the "Public Information Plan," UMTRA-DOE/AL-184, and the "Public Participation Plan," UMTRA-DOE/AL-10.

8.2.2 Guidelines

Questions should be answered factually and in a straight forward manner subject to the following exceptions:

- If the question concerns procurement, information should not be released containing proprietary data or plans with respect to the evaluation of bids and proposals. Refer these questions to the DOE UMTRA Project Office, (505) 844-3941.

- In the case of inquiries concerning the location, purchase, or use of properties in a given vicinity, no release of names or addresses of owners should be given without prior authorization from the DOE UMTRA Project Office.

- Questions concerning the removal of tailings from one site to another should be answered only with approved statements. Answers should stress that the state, tribe, NRC, and the DOE must agree on the site, that environmental documentation must be prepared prior to remedial action, and that the public has or had the opportunity to participate in the decision-making process by attending meetings and by submitting written comments. Also, all remedial actions under the UMTRA Project must meet EPA standards.

- Questions concerning the DOE policy should be referred to the DOE Albuquerque Operations Office, Office of Public Affairs, (505) 844-6938, between the hours of 8am and 4pm Mountain Time.

Copies of the fact sheets should be given to any person who has a question or is interested in the Project.

Members of the news media should, if possible, be referred to the DOE Albuquerque Operations Office, Office of Public Affairs. Personal views about the project, other projects, or the agency should not be expressed.

Requests to present programs on the community level should be coordinated in advance with the DOE Office of Public Affairs. Appropriate printed materials should be used in conjunction with presentations.

8.2.3 Staff contact

Each contractor will designate a staff contact to coordinate information dissemination activities. The designated staff contact will be readily available to handle all specific inquiries and public functions that may occur and will be well versed in all aspects of vicinity property remedial action procedures.

8.2.4 Site tours

From time to time, Federal, state, and local officials, and project personnel will tour vicinity property sites during remedial action and after remedial action is completed. Tours will be conducted as required so as to keep officials fully apprised of project status and the effort being expended to perform remedial action at the vicinity property sites.

8.2.5 Community action

Project participants, with the DOE approval, will be encouraged to speak or give presentations at the community level. Church groups, civic organizations, or neighborhood clubs in the general area of the vicinity properties will be especially interested in remedial action schedules and procedures. In addition, personal briefings for local officials and community leaders will be held as required regarding the progress of vicinity property remedial action.

8.2.6 Owner information

Project participants should provide answers to questions regarding the status or condition of a specific vicinity property to only the property owner, the property owner's designated representative, or other project participants. All requests by property owners should be coordinated through the DOE.

8.3 SCOPE

This guidance applies to all UMTRA Project participants, both Federal and contractor employees, funded by the DOE. It also may apply to participating state and local agencies, either by agreement or as a statement of policy by the DOE regarding public participation in the project.

BIBLIOGRAPHY

ARIX, 1983. "Procedures Manual for the Grand Junction Remedial Action Program," prepared for the Colorado Department of Health, Radiation Control Division, and the U.S. Department of Energy, August.

BFEC (Bendix Field Engineering Corporation), 1983. Surface Gamma-Ray Protocol for Small Parcels on Open Lands, [GJ/TMC-06(83)], prepared by Bendix Field Engineering Corporation for the U.S. Department of Energy, Grand Junction Area Office, Grand Junction, Colorado.

BFEC (Bendix Field Engineering Corporation), 1983. Evaluation of Methods for the Estimation of Indoor Radon Daughter Concentrations for Remedial Action Programs, [GJ/TMC-04(83)], prepared by Bendix Field Engineering Corporation for the U.S. Department of Energy, Grand Junction Area Office, Grand Junction, Colorado.

BFEC (Bendix Field Engineering Corporation), 1983. Procedures Manual for the Estimation of Average Indoor Radon Daughter Concentrations by the Radon Progeny Integrating Sampling Unit (RPISU) Method, [GJ/ TMC-12(83)], prepared by Bendix Field Engineering Corporation for the U.S. Department of Energy, Grand Junction Area Office, Grand Junction, Colorado.

BFEC (Bendix Field Engineering Corporation), 1983. "Procedures Manual for Radiological Support Operations at Grand Junction Vicinity Properties." [GJ-07], prepared by Bendix Field Engineering Corp., Grand Junction, Colorado for the U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.

BFEC (Bendix Field Engineering Corporation), 1983. Protocol for the Estimation of Average Indoor Radon Daughter Concentrations, [GJ/TMC-09(83)], prepared by Bendix Field Engineering Corporation for the U.S. Department of Energy, Grand Junction Area Office, Grand Junction, Colorado.

Bureau of Radiological Health, 1970. Radiological Health Handbook, compiled and edited by the Bureau of Radiological Health for the U.S. Department of Health, Education, and Welfare, Rockville, Maryland, (Stock No. 017-011-00043-0).

DOE (U.S. Department of Energy), 1983. Project Plan Uranium Mill Tailings Remedial Action (UMTRA) Project, [UMTRA-DOE/ALO-167], prepared by the U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.

DOE (U.S. Department of Health), 1983. Remedial Action Plan for Stabilization of the Inactive Uranium Mill Tailings Site at Canonsburg, Pennsylvania, [DOE/AL-140], prepared by the U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.

DOE (U.S. Department of Energy), 1983. UMTRA Project Quality Assurance Plan, Issue B, [UMTRA DOE/AL-185], prepared by the U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.

DOE (U.S. Department of Energy), 1982. Annual Status Report on the Uranium Mill Tailings Remedial Action (UMTRA) Program, [DOE/NE-0025/1], prepared by the U.S. Department of Energy, Assistant Secretary of Nuclear Energy, Office of Terminal Waste Disposal and Remedial Action, Washington, D.C.

JEG (Jacobs Engineering Group Inc.), 1983. UMTRA Project Health and Safety Plan, [DOE-ALO-6], revised by Technical Assistance Contractor for the U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.

JEG (Jacobs Engineering Group Inc.), 1983. UMTRA Project Schedule and Cost Estimates Report, [DOE/AL-166], revised by Technical Assistance Contractor for the U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.

Jobst, Joel E., 1983. "Aerial Radiological Surveys of the Area Surrounding the Vitro Mill Site, Salt Lake City, Utah," [NE-U-010], prepared by Joel E. Jobst of Energy Measurements Group of EG&G, Las Vegas, Nevada for the U.S. Department of Energy, Las Vegas, Nevada.

NLO (National Lead of Ohio), 1982. "Project Management Plan - Remedial Action, Vicinity Properties, Canonsburg, Pennsylvania," [NLO - 012 EV Special], prepared by Decontamination and Decommissioning Division NLO, Inc., Cincinnati, Ohio, for the U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico, under Contract DE-AC05-76OR-01156.

ORNL (Oak Ridge National Laboratory), 1982. A Mobile Gamma Ray Scanning System for Detecting Radiation Anomalies Associated with Ra-226 Bearing Materials, [ORNL/TM-8475], prepared by Oak Ridge National Laboratory, Oak Ridge, Tennessee, for the U.S. Department of Energy, Washington, D.C.

ORNL (Oak Ridge National Laboratory), 1981. State Background Radiation Levels: Results of Measurements Taken During 1975-1979, [ORNL/TM-7343], prepared by Oak Ridge National Laboratory, Oak Ridge, Tennessee, for the U.S. Department of Energy, Washington, D.C.

PNL (Pacific Northwest Laboratory), 1983. "A Summary Description of Health Procedures Used in Estimating Health Effects at Vicinity Properties," prepared by Pacific Northwest Laboratory, Richland, Washington, for the U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico, under Contract DE-AC06-76RLO-1830.

PNL (Pacific Northwest Laboratories), 1983. Radiological Surveys of Properties Contaminated by Residual Radioactive Materials from Uranium Processing Sites, [NUREG-CR-2954, PNL-4264], prepared by Pacific Northwest Laboratories (PNL), Richland, Washington, for the U.S. Nuclear Regulatory Commission, Washington, D.C. (NRC FIN B2216).

SCO (Southern Science Office), 1982. "Procedures Manual for the ORNL Remedial Action Survey and Certification Activities (RASCA) Programs," [ORNL/TM-8600], prepared by Southern Science Office of Black and Veatch, Dunedin, Florida, for Oak Ridge National Laboratory, Oak Ridge, Tennessee, under Contract W-7405-ENG-26 with the U.S. Department of Energy.

GLOSSARY

aerial radiological surveys	Surveys conducted by means of a specially equipped helicopter or plane to detect elevated gamma levels at land surface.
aliquot	A representative sample of a larger quantity.
alpha particle	A helium nucleus consisting of two protons and two neutrons with a double positive charge emitted by certain radionuclides.
archived samples	Environmental samples (sediment and soil) stored by DOE or its contractors for future retrieval or final disposal.
audit	An activity to determine through investigation the adequacy of, and adherence to, established procedures, instructions, specifications, codes, and other applicable contractual and procedural requirements, and the effectiveness of implementation.
background radiation	Levels of radiation, or concentrations of radionuclides which are typical of an undisturbed area, or area not effected by residual radioactive material.
bid package	The compilation of vicinity property design drawings and specifications, developed by the RAC for remedial action bids.
beta particle	An elementary particle emitted from a nucleus during radioactive decay, with a single electrical charge and a mass equal to that of an electron.
biased sample	A sample taken from a selected or specific location where radiation levels or other site characteristics are found to be abnormal.
calibration	The activity of measuring, determining, or verifying a particular instruments' accuracy in relation to a predetermined standard or reference.
certification	The final judgement of DOE, indicating that a vicinity property has been cleaned up in accordance with EPA standards.
Completion Report	A report submitted by the RAC to DOE, summarizing operations and radiological work on each vicinity property.
complex property	Any vicinity property that has more than two remedial actions presented in the Radiological and Engineering Assessment.
curie	The unit of radioactivity of any nuclide, defined as precisely equal to 3.7×10^{10} disintegrations per second.

daughter product(s)	A nuclide resulting from radioactive disintegration of a radionuclide, formed either directly or as a result of successive transformations in a radioactive series; it may be either radioactive or stable.
decontamination	The reduction of radioactive contamination from an area to a predetermined level set by a standards-setting body, such as the EPA, by removing the contaminated material.
designation	The formal procedure for listing a property as a candidate for inclusion in the UMTRA Project.
dose	A general term denoting the quantity of radiation or energy absorbed, usually by a person; for special purposes, it must be qualified; if unqualified, it refers to absorbed dose.
Engineering Assessments	The engineering work required to develop the vicinity property Radiological and Engineering Assessment.
engineering plans	Engineering design drawings required to prepare bid packages for vicinity property remedial action.
EPA Standards	Health and Environmental Protection Standards for Uranium Mill Tailings; Subparts A, B & C; 40 CFR Part 192.
exclusion	The elimination of a property from cleanup consideration under the UMTRA Project.
external radiation	Radiation from a source outside the body.
gamma radiation	High energy electromagnetic radiation emitted from some radioactive nuclides. The energy levels are specified for different radionuclides.
gamma-ray logging	The process for determining the radioactivity profile of an augered hole by gamma radiation measurements.
gamma-ray scan	To measure the gamma radiation level of surfaces using a portable gamma scintillation survey meter.
gamma scintillometer	A crystal detector which emits light in proportion to the intensity of a gamma-ray field. The light is converted to an electric current by a photomultiplier tube.
grid	A network of parallel horizontal and vertical lines forming squares on a map which may be overlaid on a property parcel for the purpose of identification of exact locations.
grid block	A square defined by two adjacent vertical and two horizontal grid lines.
grid point	The intersection of horizontal and vertical grid lines and/or intersection of a grid line and the perimeter of a structure.

half-life, radioactive	The time it takes for one-half (50 percent) of the atoms present in a specific radionuclide to disintegrate into its daughters.
health physics	A term for that branch of radiological science dealing with the protection of man from harmful effects of ionizing radiation.
hot spot	A surface area exhibiting above-average radiation levels.
implementing agencies	The agencies responsible for implementing the EPA standards. These agencies include the U.S. DOE, U.S. NRC, affected states and Indian tribes, and/or the Secretary of the Interior.
inclusion	The determination that a property warrants cleanup as part of the UMTRA Project.
Inclusion Survey Contractor	The contractor selected by the DOE to provide data and recommendations regarding vicinity property inclusion or exclusion.
Independent Verification Contractor	The contractor selected by the DOE to provide remedial action verification data for a specified vicinity property.
inspection	A phase of quality control which, by means of examination, observation, or measurement, determines the conformance of materials, supplies, components, parts, appurtenances, systems, processes, or structures to predetermined requirements.
internal radiation	Radiation from a source within the body (as a result of deposition of radionuclides in body tissue).
ionizing radiation	Any radiation displacing electrons from atoms or molecules, thereby producing ions. Examples: alpha, beta, and gamma radiation.
isotope	One of several different nuclides having the same number of protons in their nuclei, and hence having the same atomic number, but differing in the number of neutrons, and therefore in the mass number. Virtually identical chemical properties exist between isotopes of a particular element.
lower limit of detection	Lowest level of system response which can be statistically differentiated from background.
low-level radiation	Radiation that is of such intensity that it poses a minimal health hazard.
micro	A prefix meaning one millionth (x 1/1,000,000 or 10^{-6}).
milli	A prefix meaning one thousandth (x 1/1000 or 10^{-3}).

mobile surveys	Surveys conducted by means of a specially equipped van to detect elevated gamma levels.
non-complex property	Any vicinity property that has only two remedial action options presented in the Radiological and Engineering Assessment.
"normal" property	Any included vicinity property that cannot be categorized as "separate."
nuclide	A general term referring to any nuclear species of the chemical elements capable of existing for a measurable time.
permissible dose	That dose of ionizing radiation that is considered acceptable by standards-setting bodies such as the EPA. Also, the dose of radiation that may be received by an individual within a specified period with the expectation of no substantially harmful result.
picocurie	A measure of radioactivity equal to 10^{-12} curies (one trillionth curie).
post-remedial action survey	A survey performed to verify that radiological contamination has been reduced to the level specified by the EPA standards.
preliminary survey (screening survey)	A radiological survey conducted on a site to determine whether the site warrants a more comprehensive radiological survey to determine the presence of residual radioactive materials and the relationship of that contamination to EPA standards.
progeny	Descendants; used to mean the product of radioactive decay of an element; a nuclide remaining after radioactive decay.
Quality Assurance	Those planned and systematic actions necessary to provide adequate confidence that an item or a facility will perform satisfactorily in service, including those actions which provide a means of controlling, calibrating, and measuring the characteristics of an item or process to established requirements.
rad	The standard unit of absorbed dose, equal to energy absorption of 100 ergs per gram (0.01 joule per kilogram).
radiation	The emission and propagation of energy through matter or space by means of electromagnetic disturbances which display both wave-like and particle-like behavior; in this context, the "particles" are known as photons. Also, refers to the energy so propagated. The term has been extended to include streams of fast-moving particles (alpha and beta particles, free neutrons, cosmic radiation, and the like). Nuclear radiation is that which is emitted from atomic nuclei in various nuclear reactions, including alpha, beta, and gamma radiation and neutrons.

radiation monitoring	Continuous or periodic determination of the amount of radiation present in a given area.
radioactive waste	Equipment and materials (from nuclear operations) that are radioactive and for which there is no further use. Wastes are generally classified as high level (having radioactivity concentrations of hundreds to thousands of curies per gallon or cubic foot), low level (in the range of 1 microcurie per gallon or cubic foot), or intermediate (between these extremes).
radioisotope	A radioactive isotope. An unstable isotope of an element that decays or disintegrates spontaneously, emitting radiation. More than 1300 natural and artificial radioisotopes have been identified.
radiological assessment	An evaluation of the radiological survey work required to develop the vicinity property Radiological and Engineering Assessment.
Radiological Surveillance	Surveillance conducted by the TAC on vicinity properties to verify conformance of remedial action to EPA Standards.
radiological survey	The process of measuring the various radiation levels associated with a specified site and the proper documentation and evaluation of the data.
radionuclide	A radioactive species of atom that exists for a measurable length of time. Individual radionuclides are distinguished by their atomic weight and atomic number.
radium-226	A radioactive daughter product of uranium-238. Radium is present in all uranium bearing ores; it has a half-life of 1620 years.
radon-222	The gaseous radioactive daughter product of radium-226; it has a half-life of 3.8 days.
radon-daughter	One of several radioactive daughter products of radon-222. All are solids.
radon flux	The number of radon atoms migrating across a unit area within a specified time.
rem	The special unit of dose equivalent which expresses the effective absorbed dose calculated for all radiations on a common scale. It is defined as the product of the absorbed dose in rads and certain modifying factors.
remedial action	The construction activities required to clean up residual radioactive contamination on vicinity properties.

residual radioactive material	Radioactive waste in the form of tailings resulting from the processing of ores for the extraction of uranium and other valuable constituents of the ores; and other waste at a processing site which relates to such processing, including any residual stock of unprocessed ores or low-grade materials.
restricted use	A designation following remedial action that requires some control on the activities at a site containing radioactive material.
roentgen	The unit of exposure, equal to 2.58×10^{-4} coulomb per kilogram of air.
screening survey	(See preliminary survey).
"separate" properties	Those properties where DOE proposes to use supplemental standards; designate, include, or remediate after NRC has concurred on site certification; or use a disposal site other than that used for the residual radioactive materials at an UMTRA Project processing site.
soil boring	Subsurface soil sampling technique used on vicinity properties to evaluate Ra-226 concentration in subsurface soils.
specifications	Those RAC engineering bid invitations and provisions required to complete bid packages for vicinity property remedial action.
spillover property	Any property that is identified as contaminated by radioactive materials contiguous with an includable deposit from one or more adjacent surveyed properties.
standard	The result of a particular standardization effort approved by a recognized authority.
subcontractor	A manufacturer or organization that receives a contract from a prime contractor for a portion of the work on a project.
subsurface soil sample	Soil sample taken greater than six inches below the soil surface level.
supplemental standards	Subpart C of the EPA Standards; allowing flexibility in the application of Subparts A & B.
surface soil sample	Soil sample taken from the first six inches of surface soil.
survey meter	Any portable radiation detection instrument especially adapted for surveying or inspecting an area to establish the existence of radioactive material.
survey plan	A radiological survey plan for determining the radiological characteristics of a specific site.

systematic sample/ measurement	Samples/measurements taken under a definite method or plan.
tailings	As defined in Public Law 95-604, Section 101(8), the term "tailings" means the remaining portion of a metal-bearing ore after some or all of such metal, such as uranium, has been extracted.
U_3O_8	The chemical formula applied to express the natural uranium content of uranium mill tailings in the UMTRA Project; also used to show uranium content in water solutions.
unrestricted use	Any use without restraint on ownership, occupancy, or land development.
uranium	A radioactive element with the atomic number 92 and, as found in natural ores, an average atomic weight of approximately 238. The two principal natural isotopes are uranium-235 (0.7 percent by weight of natural uranium) and uranium-238 (99.3 percent by weight of natural uranium). Natural uranium also includes a minute amount of uranium-234. Uranium is a basic raw material of nuclear energy.
uranium-238	A naturally-occurring radioisotope with a half life of 4.5 billion years; it is the parent of uranium-234, thorium-230, radium-226, radon-222, and others.
uranium mill tailings site	A site utilized in the handling, processing, and/or storage of uranium ores and their residues.
UMTRA Project	Uranium Mill Tailings Remedial Action Project.
verification	A documented act of confirming, substantiating and assuring that an activity or condition has been implemented in conformance with the specified requirements.
vicinity properties	Those properties, either public or private in the vicinity of the UMTRA Project inactive mill sites, that are believed to be contaminated by residual radioactive material, and may have been designated under Section 102(a)(1) of the Uranium Mill Tailings Radiation Control Act of 1978 (PL95-604).
working level (WL)	Any combination of short-lived Rn-222 progeny in one liter of of air such that the ultimate emission of alpha particle energy is 1.3×10^5 MeV. It is a measure of radon daughter concentration (RDC).
x-rays	Electromagnetic radiation having wavelengths shorter than those of visible or ultraviolet light and originating from electron energy level transfers outside the nucleus of an atom. X-rays are undistinguishable from gamma rays of similar energy except by an acknowledgement of the source.

LIST OF ACRONYMS

AEC	U.S. Atomic Energy Commission
AL	The Albuquerque Operations Office of the U.S. Department of Energy located in Albuquerque, New Mexico
ALARA	As low as reasonably achievable
ANSI	American National Standards Institute
BPRR	Bid Package Review Report developed by the TAC on UMTRA Project vicinity properties
CDH	The Colorado Department of Health
DOT	U.S. Department of Transportation
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
FUSRAP	Formerly Utilized Sites Remedial Action Program
GJPO	Grand Junction Project Office
GJRAP	Grand Junction Remedial Action Program
HLW	High-Level Waste
ISC	Inclusion Survey Contractor
IPMS	Integrated Project Management System
IVC	Independent Verification Contractor
LLD	Lower limit of detection
LLW	Low-Level Waste
NEPA	National Environmental Policy Act
NRC	U.S. Nuclear Regulatory Commission
ORNL	Oak Ridge National Laboratory
ORO	Oak Ridge Operations Office
OSHA	Occupational Safety and Health Administration
PADER	Pennsylvania Department of Environmental Resources
PDCS	Project Document Control System
PIC	Pressurized Ion Chamber

PO	The UMTRA Project Office, located in Albuquerque, New Mexico
RS	Radiological Services
QA	Quality assurance activities conducted by the RAC and TAC on vicinity property remedial action
QAPP	Quality Assurance Program Plan
RAA	Remedial Action Agreement executed between the DOE and the individual vicinity property owner
RAC	The Remedial Action Contractor to DOE on the UMTRA Project vicinity properties (Morrison-Knudsen, Inc.; NLO, Inc.; UNC Geotech; Ford, Bacon, & Davis, Inc.)
Ra-226	Radium-226
RDC	Radon Daughter Concentration
RAA	Remedial Action Agreement
RDC	Radon Daughter Concentration
REA	Radiological and Engineering Assessment developed by the RAC on UMTRA Project vicinity properties
R&R	Relocation and reimbursement costs associated with vicinity property remedial action
TAC	Technical Assistance Contractor to DOE on the UMTRA Project (Jacobs Engineering Group Inc., Roy F. Weston, Inc.. and Sergent, Hauskins & Beckwith)
UDH	Utah Department of Health
UMTRCA	The Uranium Mill Tailings Radiation Control Act of 1978, Public Law 95-604 (PL95-604)
UMTRA	Uranium Mill Tailings Remedial Action
VPDMS	Vicinity Property Data Management System
VPMIM	Vicinity Properties Management and Implementation Manual
WL	Working Level is a measure of radon daughter product concentration; any combination of short-lived radon decay products in one liter of air that will result in the ultimate emission of alpha particles with a total energy of 130,000 Mev

ABBREVIATIONS

m - milli, 10^{-3}

\- micro, 10^{-6}

n - nano, 10^{-9}

k - kilo, 10^{3}

M - mega, 10^{6}

p - pico, 10^{-12}

Alpha	
Beta	β
Centigrade	C
Counts per minute	cpm
Cubic feet	ft^3
Cubic meters	m^3
Curie	Ci
Disintegrations per minute	dpm
Electron volt	eV
Feet	ft
Gamma	
Gram	g
Hectare	Ha
Hour	h
Inches	in
Liter	l
Meter	m
Metric ton	MT
Minute	min
Roentgen	R
Second	s
Year	y

Uranium-238 decay series[a]

Parent[c]	Half-Life	Major mode of decay
Uran[illegible]	4.51×10^9 years	alpha
Th[illegible]	24.1 days	beta, gamma
Protac[illegible]4m	1.17 minutes	beta, gamma
Uranium-[illegible]4	2.47×10^5 years	alpha
Thorium-230	8.0×10^4 years	alpha
Radium-226	1,602 years	alpha
Radon-222	3.823 days	alpha
Polonium-218[b]	3.05 minutes	alpha
Lead-214[b]	26.8 minutes	beta, gamma
Bismuth-214[b]	19.7 minutes	beta, gamma
Polonium-214[b]	164 microsec	alpha
Lead-210	21 years	beta
Bismuth-210	5.01 days	beta
Polonium-210	138.4 days	alpha
Lead-206	stable	none

[a]Data taken from Radiological Health Handbook, January 1970.

[b] Short-lived radon daughters.

[c]Only principle decay paths are shown.

APPENDIX A

INCLUSION CRITERIA AND PROCEDURES

TABLE OF CONTENTS

LIST OF FIGURES

A.1 INTRODUCTION

Initial guidance for the Inclusion Process is provided in the "Summary Protocol, UMTRA Project Vicinity Properties, Identification - Characterization - Inclusion" (Addendum A1). That document describes the activities which are essential to identify and characterize vicinity properties so that they may be considered for remedial action as part of the UMTRA Project. In order to minimize the cost and effort required to achieve that goal, the Summary Protocol also prescribes a specific sequence in which to conduct survey activities and conditions under which survey activities may be terminated.

This appendix is intended to supplement Addendum A1 by providing detailed procedures for use in performing on-site inclusion surveys and post-survey reporting of radiologic data and the inclusion/exclusion recommendation. Section A.2 describes activities leading up to the inclusion survey; Section A.3 describes acceptable methods and instrumentation for on-site surveys; and Section A.4 provides criteria for evaluating survey data. Section A.5 describes methods for calculations and shows the forms used for post-survey procedures to convey the inclusion/exclusion recommendation decision to the DOE. The procedures described in these sections, when applied in concurrence with guidance in the Summary Protocol, will provide an efficient means of determining a vicinity property's eligibility for inclusion in the UMTRA Project.

A.2 PRE-SURVEY ACTIVITIES

The flow chart in Figure A.2.1 shows the sequence of activities from property designation to the ISC's inclusion/exclusion recommendation transfer to the DOE Project Office.

Initially, vicinity properties were identified as candidates for inclusion surveys in the UMTRA Project from results of: (1) aerial, mobile, and earlier on-site radiological surveys, and (2) information from knowledgeable sources. Additional properties are identified based on requests from property owners, responses from advertising, and data obtained by Inclusion Survey Contractor (ISC) investigation of properties adjacent to surveyed properties that are determined to contain a "spillover" tailings deposit.

Once a vicinity property is identified, a consent for access is obtained. When the location of the property, owner, and tenancy are confirmed, a Consent Form (Addendum A2) must be signed by the owner. Tenant notification is at the discretion of the owner. After the signed Consent Form is returned, a "location folder" is generated and submitted to the Document Control Department. The folder is formally tracked and all appropriate data are archived electronically.

A drawing of the property is produced and then the property is assigned to a specific ISC field team. Arrangements to conduct a radiological survey then made with the property owner or appropriate party.

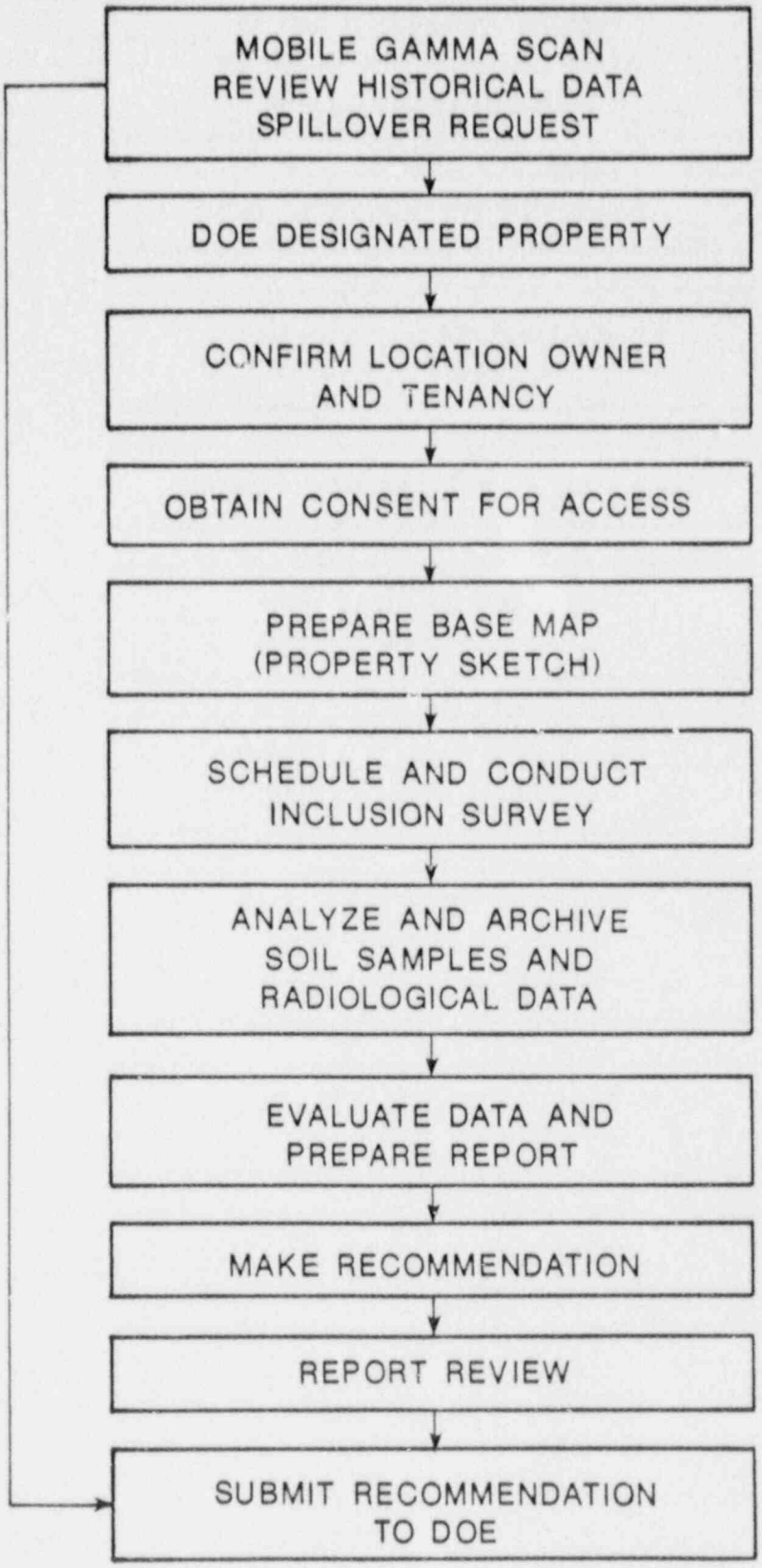


FIGURE A.2.1
SEQUENCE OF ACTIVITIES

A.3 ON-SITE SURVEY PROCEDURES

The extent of an inclusion survey is guided by a decision matrix designed to minimize the effort necessary to make a defensible inclusion/exclusion recommendation. Figure A.3.1 summarizes the various levels of activity on the property required to determine the recommendation. An outdoor gamma scan is initiated. An includable deposit is any region of contamination exceeding any appropriate criteria. Once an includable deposit is found, the IVC is finished and the survey stops. If any room of a building averages more than 20 microR/h above background a recommendation of inclusion can be made and the survey is complete. Outdoors, detection of any 100-square-meter area averaging greater than 25 microR/h above background determines an inclusion recommendation and the survey is complete.

Exclusion can be recommended if all Net Estimated Area-Weighted Average (NEAWA) gamma exposure rates are less than the background gamma level plus 20 percent (or one standard deviation, if calculable) and if a surbsurface soil sample taken at the HDG of the deposit shows no increase in contamination levels with depth. NEAWA is a calculated value averaging a field measurement over a defined area. If regions of gamma exposure rates are between background plus 20 percent and 25 microR/h outdoors (20 microR/h indoors) above background extended measurements are required.

Extended measurements may consist of soil or concrete sampling, indoor radon daughter concentration (RDC) measurements, or gamma spectrometry. Soil and concrete samples are taken first and used in conjunction with gamma spectrometry, if appropriate. RDC measurements are taken when all other extended measurements have been exhausted or if indoor gamma is greater than or equal to 20 percent above background.

When soil or concrete sampling is necessary, the inclusion/exclusion criteria are stated in terms of pCi/g for surface (0- to 15-cm) and subsurface (subsequent 15-cm) soil layers. If the net area-weighted Ra-226 concentrations in soil or concrete samples exceed 5/15 pCi/g above background averaged over a 100-square-meter area for surface/subsurface samples inclusion is justified. Exclusion is recommended if the net area-weighted average Ra-226 concentrations are less than or equal to 5/15 pCi/g for surface/subsurface samples, respectively.

If RDC measurements are required, the inclusion/exclusion criteria are in terms of working levels (WLs). An annual average RDC value of less than or equal to 0.02 WL or instantaneous RDC levels (grab samples) of less than or equal to 0.01 WL, will result in an exclusion recommendation. An inclusion recommendation results from an annual average concentration of >0.02 WL or >0.04 WL from grab samples. When grab RDC measurements are inconclusive (between 0.01 and 0.04 WL), annual average measurements are required using Track-Etch detectors or other approved methods. Historical RDC data may be used for an inclusion recommendation only.

The ISC is responsible for surveying properties to the borders. In addition, the ISC surveys to the curbline, if applicable. Any contamination detected under the street or along utility lines that run parallel to the street will be documented by the ISC.

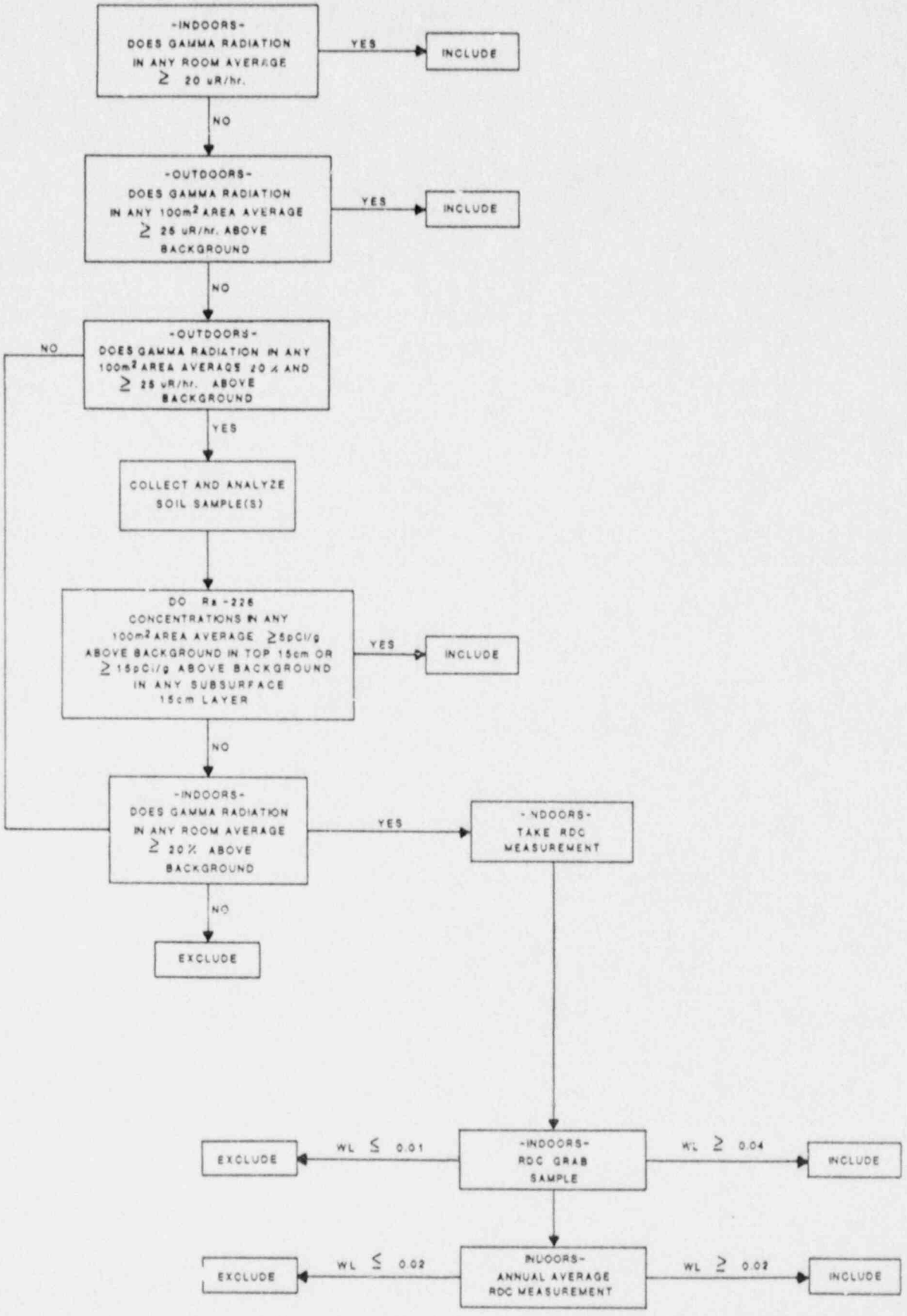


FIGURE A.3.1
GUIDELINES OF RADIOLOGIC INCLUSION SURVEYS

A.3.1 INDOOR GAMMA SCANNING MEASUREMENTS

For purposes of UMTRA Project consistency, a habitable building interior is defined as all air space bounded by a permanent floor and a roof. The habitable interior includes all structures adjoining or contiguous to the primary structure (carports, breezeways, screened porches, or garages). In addition, habitable interiors will encompass such spaces as detached garages, workshops, and potentially habitable air spaces not contiguous to the primary structure containing a permanent floor. To ensure consistent application of the indoor criteria, a unified definition of a room size is required. A "room-sized" area is defined as being 9.3 square meters (of a reasonable shape) or the actual room size, whichever is smaller. Vertical areas of interior walls will be considered to determine whether RDC measurements will be taken. For structures where RDC measurements are impractical, soil samples may be used. The Ra-226 values are compared to the surface soil criteria (5 pCi/g plus background for any 15-cm interval) and area-weighted over 100 square meters for all depths of sampling.

Every room in the lowest habitable level of each building (and other rooms as necessary) is completely gamma scanned using a portable gamma scintillometer. During the scan, the gamma survey probe is moved slowly, side-to-side, and kept as close to the floor and accessible to the wall surfaces as possible. Any significant changes in gamma radiation levels above background, indicated either by visual changes in the instrument rate meter or audible changes in the pitch of the instrument headphones, are noted as being anomalous. The locations of anomalous readings are recorded on field data sheets (Addenda A3 and A4) and on the map.

If the net estimated area-weighted average gamma exposure rate in any one room exceeds the inclusion criteria of greater than or equal to 20 microR/h above the background level, the property is recommended for inclusion. Those properties for which indoor screening measurements fall between the background radiation level plus 20 percent and the inclusion criteria, and which are not includable on outdoor criteria, require extended measurements.

A.3.2 OUTDOOR GAMMA SCANNING MEASUREMENTS

Gamma scanning is a process by which the gamma radiation detector is used to methodically cover the ground surface while changes are observed in the gamma exposure rates. During gamma scanning, the gamma radiation survey probe is moved slowly from side-to-side, and kept as close to the ground surface as possible. The data are recorded on field data sheets (Addenda A3 and A4). Any significant changes, indicated either by visual changes in the instrument rate meter or in the pitch of audio responses in the instrument headphones, are noted as being anomalous. The range of gamma exposure rate levels observed is documented on the field sheets and locations of anomalous areas are noted on the map. Point sources should be carefully documented including a description of the suspected source (i.e., brick, ore, etc.).

Regions where anomalies exist are investigated further by a more detailed radiological survey to determine the extent of contamination. During the screening measurements, the relationship of contamination to the inclusion criterion (this criterion is based on a correlation of Ra-226 and Rn-222 threshold values; see Addendum A1) is established by obtaining area-weighted average gamma values.

If necessary, the ISC survey team can establish a reproducible grid to characterize a contaminated deposit. To verify the average gamma exposure rates, one meter or smaller intervals are used for properties located in residential or otherwise developed areas. Alternate grid spacing is allowed in windblown, large, or otherwise remote areas if the extent of contamination can be adequately assessed for inclusion purposes. Grid spacing is left to the discretion of the team leader as dictated by the circumstances.

Inclusion is recommended for a property with any 100-square-meter area that has a net estimated area-weighted average gamma exposure rate greater than or equal to the outdoor inclusion guideline of 25 microR/h above background. However, properties may be included when surface expression is less than 25 microR/h above background due to shielding effects of concrete or asphalt cover if the presence of tailings is evident. A shielding factor of two is used.

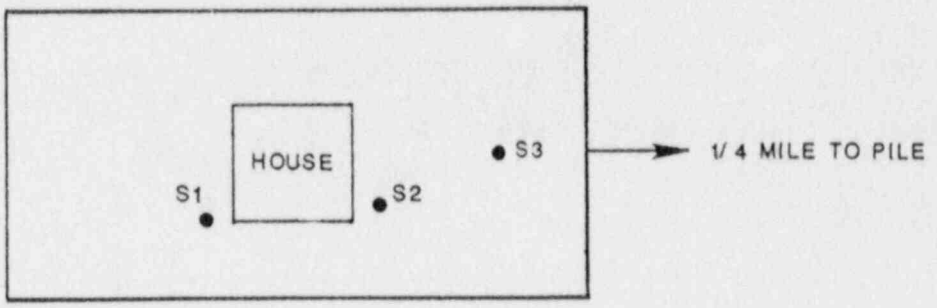
If the net area-weighted gamma levels of all remaining areas are less than 20 percent plus the mean background for the region, the property may be recommended for exclusion, if subsurface soils samples taken at the HOG indicate no increase of contamination levels with depth. Extended measurements are required for properties with net average gamma values between the inclusion and exclusion levels. The background exposure rate for the property is used except in regions of elevated rates where a regional background level is used.

A.3.3 OUTDOOR EXTENDED MEASUREMENTS

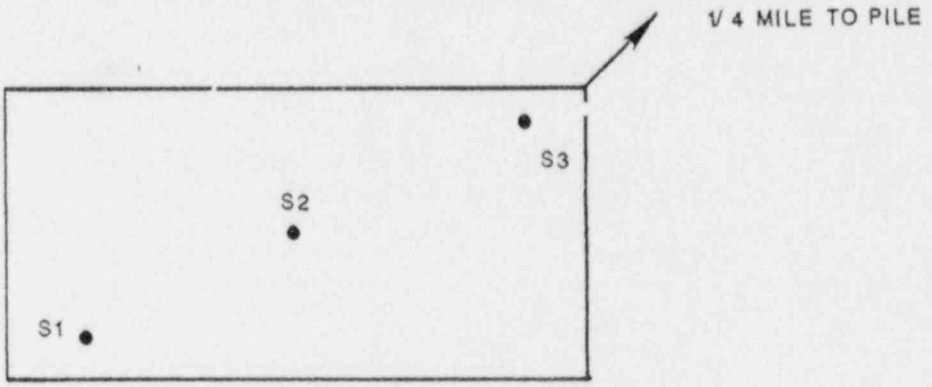
When outdoor gamma exposure rates fall between the background level plus 20 percent and 25 microR/h above background, soil sampling is necessary to assess the deposit. Sampling locations are determined after obtaining the high outdoor gamma (HOG) exposure rate of the deposit. Normally, one sample is taken at the HOG and one sample is taken at the highest value at least one-meter away from the HOG in any direction. The two are analyzed separately and mathematically composited. A gamma scintillometer measurement must be taken on the surface and recorded on the field data sheets (Addendum A5) prior to sampling. A gamma scintillometer measurement is taken at each subsequent depth after each sample is taken. If the gamma measurement increases in counts per minute (CPM) by more than 30 percent in the sample hole (to account for hole geometry), sampling at subsequent depths must continue until measurements stabilize or until the absence of evidence of tailings by visual inspection. When deemed useful, samples may be taken at grid intersections in areas where anomalies have been detected.

Different sampling strategies are appropriate for certain situations. Figure A.3.2 shows various windblown sampling locations in rela-

WINDBLOWN SAMPLE COLLECTED
FROM A SMALL PROPERTY



WINDBLOWN SAMPLES COLLECTED
FROM A LARGE PROPERTY



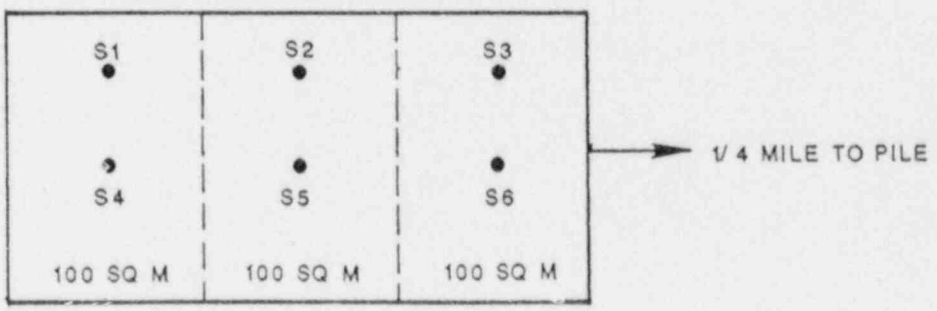


FIGURE A.3.2
METHODS OF LOCATING
WINDBLOWN SAMPLES

tion to a tailings pile. To represent windblown contamination, samples are taken away from the pile in several locations. One or two samples at elevated readings at the team leader's discretion may represent any 100-square-meter area. Driplines and areas next to structures obstructing the wind direction should always be considered for sampling. If two samples are taken, they need not be averaged together. Samples from different 100-square meter areas are not averaged together as the character of the deposit is likely to change over distance. For purposes of confirming surface windblown contamination, windblown samples are taken from 0- to 5-cm and 5- to 15-cm depths analyzed separately, and composited mathematically.

If tailings are suspected within a concrete structure, a sample may be taken by hand or with a drill. If deemed necessary, concrete drill coring may be employed to obtain concrete or soil samples when conventional sampling methods do not readily render desired samples. Two samples are taken for each 100-square-meter contaminated area with an elevated exposure rate, and results are calculated in the same manner as conventional soil sampling.

The Ra-226/Th-232 ratio may be determined to help confirm the presence of tailings. The ratio is determined by a Portable Gamma Spectrometer. A DOE approved method will be used to determine a cutoff ratio based on the instrument and wind setting. A Ra-226/Th-232 ratio of greater than the calculated ratio indicates excess Ra-226 and the possibility of tailings. A ratio of less than the calculated ratio indicates the absence of tailings.

To determine the radium content in relationship to the EPA soils criteria, the net estimated area-weighted Ra-226 concentration is determined. The general technique calculation is as follows:

$$C_{AW} = \sum_{i=1}^{n} \frac{CiAiDi}{(100)(0.15)}$$

where

n = total number of samples within a single 100 m^2 area

i = sample number

C_{AW} = area-weighted Ra-226 concentration in pCi/g.

Ci = net Ra-226 concentration in pCi/g = [Ci = (analysis - background)].

Ai = area of region in square meters (must be <100).

Di = thickness of sample in meters (<15 cm).

100 = threshold area in square meters.

0.15 = thickness of layers.

For areas greater than 100 square meters, the laboratory analysis Ra-226 value is used for the deposit definition value. A technique known as the Total Activity Formula will no longer be utilized.

A.3.4 INDOOR EXTENDED MEASUREMENTS

For properties where the results of indoor gamma screening measurements are between inclusion and exclusion criteria indoor radon daughter concentration (RDC) measurements are performed for the habitable structure. The EPA standard for indoor RDCs is stated in terms of an annual average; therefore, a one-year monitoring period is implied. Long-term RDC measurements are normally required to provide an estimate of the annual average using Alpha-Track detectors or other approved methods. Historical data may be used only for inclusion purposes by the ISC.

Due to its reliability and cost effectiveness, the preferred method for RDC determination is the Alpha-Track detector method. The method consists of placing three Alpha-Track radon daughter detection cups together in the contaminated structure. The cups are placed as close as possible to the area with the highest gamma radiation, which is usually in the lowest habitable level of the structure. The detectors are placed between four to six feet high and located in the most natural air flow possible. They are placed away from vents, doorways, windows, and other possible drafts, avoiding any concrete or masonry walls. All associated information is recorded on the Extended Measurements Form (Addendum A6). The detectors remain in the structure for one year. After the exposed detectors are retrieved, they are returned to the manufacturer for analysis.

If necessary, it may be desirable to perform grab sampling, provided that the data have been correlated with annual average measurements from Radon Progeny Integrating Sampling Units (RPISUs) (Langner et al., 1983; Young et al., 1983). To correlate grab sample results with annual average values, a separate set of evaluation criteria is required for both outdoor areas and room-sized indoor area. These criteria are provided in Section A.3. The Eberline WLM-1 is an approved instrument to be used in indoor WL measurements for grab sample use.

Standard conditions required prior to grab sampling for RDC measurements in any structure are as follows:

- Recent outside measurements of Rn-222 concentrations have not exceeded 2 pCi/l.
- Wind speeds in the area have not exceeded 10 mph for the preceding four hours.
- Doors, windows, and openings in the structure have been closed for the preceding 12 hours.

- o Ventilation systems that introduce outside air into the structure have not operated during the preceding 12 hours. (The decision to activate passive subfloor ventilation systems will be left to the discretion of the RAC based on conversations with the owner/tenant.)

Samples are collected at least 18 inches above the floor from the lowest habitable area in the structure, or the location of the highest expected RDC. Samples are analyzed by the Modified Kusnetz method, or any method with comparable sensitivity and accuracy of measurement. The analyses are compared to the criteria in Section A.3.

RPISUs or other approved methods may also be used to measure RDCs during one-week periods, each separated by four to eight weeks, to provide data for a full year. Six samples are collected and analyzed unless interim results indicate with mathematical certainty that the standard will or will not be met. Final measurements may be omitted if the outcome is ascertained with fewer samples. (For more detail, please reference RPISU Paper.)

As with RDC grab sampling measurements, RPISU samples will be collected at the lowest habitable location in the structure or other locations suspected of demonstrating the greatest RDC.

The ISC may use other sampling methods and analytical techniques providing the following criteria are met:

- o The accuracy and precision of the new method are equal to, or better than, that of the RPISU method. For radon concentration measurements, an equilibrium factor of 0.5 should be used to convert results to RDCs unless a measured factor is available.

- o The new method is approved by an advisory panel consisting of members appointed by the DOE Project Office.

The annual average RDC measurement is the final step in the inclusion survey process. All properties shall be included or excluded by this or previously described techniques.

A.3.5 PROCEDURES TO HANDLE SPILLOVER PROPERTIES

The ISC is responsible for documenting includable deposits. If a includable deposit is contiguous with residual radioactive materials on adjacent properties, each property is recommended for inclusion based on the includability of the entire deposit. The property encompassing the majority of the deposit is the "parent" property to the remaining "spillover" properties. The exception to this rule are as follows: (1) if the deposit is below the street, only the portion of the deposit on the vicinity property should be used to characterize the includability of the property; and 2) for includable deposits which are encountered beneath roads or along utility lines that parallel the street, the ISC is required to record the location. The includable deposits under streets and along utility lines will be incorporated under one number in a final request for inclusion with the application of supplemental standards. The DOE will provide this list to state and city.

A.3.6 RECOMMENDATION PROCEDURES

Pertinent inclusion/exclusion recommendation calculations (see Sections A.3.3 and A.3.4) are performed prior to completion of the radiological survey report. The format of the calculations record is provided in the Soil Analysis Worksheet and the Gamma Analysis Worksheet (Addenda A7 and A8, respectively). Once the necessary calculations have been performed and recorded, the report skeleton (Addendum A9) is completed. The report skeleton contains a Significance of Findings providing a brief discussion of radiological results, any idiosyncracies, and the inclusion/exclusion criteria used as a basis of recommendation. The report skeleton also contains radiological property and a photo typifying the property.

A Letter of Recommendation (Addendum A10), which is an official notification to the DOE indicating the ISC recommendation, and a Vicinity Properties Summary and Evaluation Recommendations (Addendum A11) summarizing the radiological survey data are sent to the DOE. The Vicinity Properties Data Management System (VPDMS) Input Sheet (Addendum A12) is used for data entry at the UMTRA Project Office. An ISC Condensed Exclusion Report (Addendum A13) is available for properties that do not appear on the UMTRA Project designation list but are investigated as a result of a DOE-solicited advertising campaign and contain no contamination (except for point sources).

REFERENCES FOR APPENDIX A

Langner et al. (G.H. Langner, J.C. Pacer, V.G. Johnson, and M.A. Gillings), 1983. Evaluation of Methods for the Estimation of Indoor Radon Daughter Concentrations for Remedial Action Programs, GJ/TMC-04(83) prepared by Bendix Field Engineering Corporation, Grand Junction, Colorado, for the U.S. Department of Energy, Nuclear Energy Programs, Division of Remedial Action Projects, Grand Junction Area Office, Grand Junction, Colorado.

Langner, et al., Abbribrated RPISU

Young et al. (J.A. Young, P.O. Jackson, and V.W. Thomas), 1983. Radiological Surveys of Properties Contaminated by Residual Radioactive Materials from Uranium Processing Sites, NUREG/CR-2954, PNL-4264, prepared by Bateile Pacific Northwest Laboratory, Richland, Washington, for the U.S. Nuclear Regulatory Commission, Washington, D.C.

ADDENDUM A1

SUMMARY PROTOCOL, UMTRA PROJECT VICINITY PROPERTIES, IDENTIFICATION - CHARACTERIZATION - INCLUSION

Summary Protocol
UMTRAP Vicinity Properties
Identification—Characterization—Inclusion

September 1983

Prepared by
U.S. DEPARTMENT OF ENERGY
Division of Remedial Action Projects
Assistant Secretary for Nuclear Energy

CONTENTS

SUMMARY PROTOCOL
UMTRAP VICINITY PROPERTIES
IDENTIFICATION--CHARACTERIZATION--INCLUSION

I. INTRODUCTION

This Summary Protocol was prepared to reflect, in general terms, those activities considered essential to the identification of properties in the vicinity of the designated inactive uranium mill tailings sites suspected of containing residual radioactive material; the radiological characterization of each property necessary to define the extent of contamination; and the analysis/evaluation of survey results against criteria established by or based on EPA Standards for Remedial Action at Inactive Processing Sites (40 CFR 192) to support elimination or inclusion of such properties in the remedial action program. The overall intent of this protocol is to minimize the extent of radiological survey efforts required to determine if a property should be included in the Uranium Mill Tailings Remedial Action Program (UMTRAP) or eliminated from further consideration for remedial action, thus, relegating the more detailed radiological characterization work on properties included for remedial action to the engineering phase of the program. In further support of efficiency and economy of operations, action levels have been established to facilitate inclusion of contaminated properties in the remedial action program with minimum application of radiological survey resources. Throughout the survey process, the professional judgment of radiological survey personnel will be called upon to make an initial determination as to the extent of survey activities required. Detailed procedures for gamma radiation surveys, air and soil sampling, and other activities required to assess the radiological status of a vicinity property will be provided in approved protocols and procedures developed specifically for these activities.

II. SUMMARY PROTOCOL

The following narrative explains the activities shown on the chart, Attachment 1, and is presented in four categories: Initial Identification;

Designation; On-Site Survey Activities and Final Analysis; and the Review/Decision Process for inclusion of properties for remedial action. The basic approach is to minimize the amount of survey work required to make a sound determination of whether to include or eliminate a site from the remedial action program. In the chart (Attachment 1), the survey activity becomes more complex or comprehensive proceeding from left to right. Action levels are presented in the flow diagram to indicate radiation levels that qualify a property for immediate inclusion in the remedial action program or require more extensive radiological survey to justify inclusion. The final decision to include a property for remedial action will be made by an authorized DOE staff member based on the data and recommendations presented by the radiological survey contractor. The preparation of clear and accurate documentation upon which to base the final recommendation is critical to the decisionmaking process, as well as for providing an audit trail of the activities and data leading to decisions to include properties for remedial action or eliminate properties from further consideration.

A. Initial Identification

Initial identification of a property that may require remedial action is made on the basis of three sources of information:

- The aerial radiological survey,
- The mobile gamma radiation survey, and
- Historical information obtained from the results of early (1970 to 1975) mobile and on-site surveys.

1. Aerial Radiological Surveys

These surveys are a relatively efficient means of developing isodose contours (isopleths) of gamma radiation fields over large land areas and are particularly useful in identifying areas of elevated gamma radiation away from the processing/tailings pile sites. Aerial radiological detection systems average the

radiation levels produced by gamma-emitting radionuclides over an area of several acres. These detection systems are capable of identifying specific radionuclides causing radiological anomalies. However, because of averaging, airborne detection systems, as compared to ground-based measuring systems, tend to underestimate the magnitude of localized sources. Results of the surveys, including isopleths, are documented in site-specific aerial survey reports. Areas of elevated gamma radiation identified from the aerial survey reports must be further investigated by mobile (van mounted) radiological survey equipment or by on-site survey to identify the specific location of the anomaly or anomalies.

2. Mobile Gamma Radiation Surveys

Surveys are used both to locate new sources of radioactivity and to confirm the presence of previously recorded radioactive anomalies. The mobile (van mounted) system's capabilities include the ability to measure and record discrete energy levels characteristic of certain radionuclides. However, the typical distance from the radiation source and the effect of obstacles between the source and detector limit the application of the initial output of the system to identification and location of radioactive anomalies only. Mobile Gamma Survey Reports are prepared by the contractor to document the results and to provide the required data for specifying future surveys or, in cases in which the mobile survey is simply confirming the continued presence of the contamination on a property previously subjected to an on-site survey, to support forwarding such properties to the final analysis and recommendation step of the protocol.

3. Historical Information

This type of information includes data collected during previous mobile or on-site surveys as well as information or records that describe activities conducted during the period when the designated processing site was active.

At some processing sites there are few or no historical records relating to vicinity property contamination or results of previous on-site surveys that can be

used in conjunction with recent data. In these cases, aerial and mobile gamma radiation surveys must be relied on for the initial identification of vicinity properties.

For many processing sites, however, extensive historical data are available. This is particularly true for those sites in the Colorado Plateau region, especially Grand Junction, Colorado. The information obtained from these sources of data can serve as a baseline for initial planning of survey requirements in the vicinity of a particular site. However, where historical radiological survey data are available, these data were recorded over a period of 10 to 15 years and may not reflect the current radiological status or physical configuration or use of the property surveyed. Thus, aerial and mobile gamma radiation surveys or on-site surveys may be appropriate to confirm the continued presence of previously recorded anomalies and to identify any new radioactive anomalies that might have resulted from further transport or migration of radionuclides.

For sites where historical data are available, the utility of the more recent mobile survey data used in conjunction with historical data is demonstrated in the following scenarios:

- Confirmation by mobile gamma radiation survey of the continued presence of above-standard radioactive contamination documented in previous on-site surveys will, in many instances, provide sufficient current evidence that a property should be included for remedial action without further investigation. If the available survey data indicate that indoor gamma radiation levels exceed 20 μR/h above background,* if measurements made inside habitable structures clearly demonstrated that radon progeny concentrations average greater than 0.02 working level (W.L.), or if outside gamma radiation levels (not attributable to a point source) exceed 25 μR/h above background* when averaged over

*Background levels will be calculated from measurements made at a minimum of 30 representative locations within the region surrounding a designated processing site, taking into account any subregions where unusually high or low background levels may exist. Such measurements will not be made in the vicinity of known radioactive contamination. From these data, a mean background level and a standard deviation of the mean are calculated for use in establishing action levels for both indoor and outdoor on-site surveys within the region. For purposes of this protocol, the value of the standard deviation may not exceed 30 percent of the mean background level.

an area of 100 m^2, the property may be forwarded for final analysis and recommendation to consider it for inclusion in the remedial action program. Otherwise, further on-site radiological surveys will be required to justify inclusion. It should be noted, however, that in most cases historical data describing radioactive contamination on open land will not have been recorded in sufficient detail to permit evaluation of the 100 m^2 criterion.

- Properties on which newly discovered radiological anomalies are found during the mobile survey will be subjected to an on-site radiological survey to confirm and locate the anomaly(ies) and determine whether the radioactive contamination exceeds the EPA standards and the property should be included for remedial action.

- Previously recorded anomalies not confirmed by the mobile survey will require an on-site investigation to verify that the previously recorded anomalies are no longer present. It is anticipated that, in many such instances, the contamination will have been removed. This will either be confirmed by the records of the on-going DOE/state remedial action program, or an on-site gamma survey will be required to check the adequacy of cleanup activities that may have been accomplished by other parties.

In general, the activities described as the identification process make maximum use of historical and current radiological data. The use of historical data, including input from the community regarding possible use of tailings offsite, in conjunction with the results of current aerial and mobile gamma radiation surveys, will provide a reasonable level of confidence that most anomalies of concern within a given area will be identified. In some cases, where the results of previous on-site surveys are available, the combined data will provide sufficient information on which to base a decision to include a site in the remedial action program without additional on-site survey work. The ability to make such determinations are dependent largely on the type and detail of historical data available. Ultimately, all sites identified during this phase fall into one of two categories:

- Those that can be considered for inclusion without further investigation, based upon adequately documented on-site surveys performed in the past, and

- Those that require additional radiological data on which to base a decision as to inclusion in or elimination from the program.

As can be seen from the attached chart, sites in the first category above by-pass the on-site survey and are evaluated in the final analysis phase by the DOE Project Office to determine if inclusion is appropriate. Sites in the second category are scheduled for on-site survey activities.

B. Designation of Vicinity Properties

The introduction of this activity is required by a June 24, 1983, U.S. District of Columbia Court Order which requires that all UMTRAP vicinity properties be designated by September 30, 1984. The major portion of this activity is currently scheduled for completion by the end of fiscal year 1983. Vicinity property designations will be based on currently available information that indicates a property may be contaminated with material that can reasonably be judged to have come from a designated processing site. Interpretations of reasonableness for this determination will be liberal to ensure that all properties potentially contaminated with residual radioactive material from a designated processing site will be designated. Properties suspected of containing residual radioactive material from a designated processing site that are identified after the ordered date (September 30, 1984) will also be considered for inclusion in the remedial action program.

C. On-Site Survey and Final Analysis

On-site survey activities are to be restricted to those necessary to provide sufficient data to forward the property for final analysis with a recommendation as to inclusion in or elimination from the remedial action program. The primary purpose of the on-site survey is to determine if remedial action criteria are exceeded. If it is apparent from surface measurements (on-site gamma survey) that these criteria are exceeded, the property will be included in the remedial action program without further survey effort. The more comprehensive survey necessary to define the extent of the tailings deposit and required for the engineering design of the remedial action will be deferred until that stage of the program. However, if contamination is identified but surface measurements are not adequate to determine if the site exceeds the criteria, the survey effort is extended. The extended survey will more clearly characterize the vertical

extent of the contamination and may involve additional survey techniques. As shown in the accompanying chart, on-site survey activities are subdivided into an on-site gamma radiation survey and, where needed, the more extensive survey. Although shown separately for purposes of this protocol, the on-site survey should be completed during a single visit to the site whenever possible. Furthermore, in the interest of efficiency and economy of operations, it is envisioned that the on-site survey will begin outdoors so that those properties that can be included on the basis of outdoor measurements alone will not require an indoor survey during the inclusion process.

The decision to subject the property to a more extensive radiological survey or to forward it to the final analysis phase of the protocol is a judgment made by the radiological survey team. Sound judgments by the radiological survey tear are important to the success of this approach to the survey process and require the presence of a well-qualified and experienced survey team leader. In addition to determining radiation levels, the survey effort should provide a reasonable assurance that the radioactive material present was derived from a designated processing site. Again, this effort should be minimized. In many cases, the contamination will consist of bodies of essentially undiluted tailings that can be visually identified. Detailed chemical analysis should only be performed when the survey team cannot make a reasonable judgment either visually or through some simple method.

1. On-Site Gamma Survey

The on-site gamma survey involves a systematic gamma radiation scan of the property and more extensive biased measurements in areas of elevated gamma radiation levels where needed. Gamma surveys are conducted both indoors and outdoors as follows.

a. Indoors

The indoor gamma survey involves a systematic surface scan of the floors and walls, and center floor and wall measurements for each room.

These data are evaluated and, if indoor gamma levels averaged over any room exceed 20 μR/h above mean background as defined in Section A.3, the property can be forwarded for final analysis and recommendation for inclusion in the remedial action program without further survey effort. Radiation levels lower than 20 μR/h are not sufficient by themselves to provide the required level of confidence that EPA criteria are exceeded inside the structure. If the data indicate gamma levels are above mean background plus one standard deviation of the mean, but below 20 μR/h above mean background, a more extensive survey will be conducted. Structures with gamma radiation levels below mean background plus one standard deviation of the mean should be recommended for elimination from the program, unless gamma radiation levels measured outside the structure are cause for inclusion of the property for remedial action.

Experience has shown that naturally occurring radionuclides in building materials can cause elevated gamma radiation levels that exceed typical background in a structure. Measured gamma levels well in excess of background, attributed solely to building materials, are not uncommon. Therefore, survey teams should be alert to such conditions to preclude the inclusion of properties where the natural radioactive constituents in building materials and other radionuclides in natural occurrence are responsible for elevated levels of radioactivity.

b. Outdoors

The outdoor gamma survey involves systematic surface gamma scans over the entire property. If radioactive contamination is present, the gamma survey data obtained must be sufficient to define the surficial extent of the contamination and to provide a base for averaging the gamma levels over an area of 100 m^2. No subsurface measurements are made as part of this survey.

Properties are considered for inclusion without further survey effort if gamma levels averaged over 100 m^2 exceed 25 μR/h above mean background as defined in Section A.3. The correlation between this action level and the EPA radium-concentration-in-soil standard is illustrated in Attachment 2 and is based

on the analyses referenced in this protocol (see References). More extensive surveys are conducted if the levels are between mean background plus one standard deviation of the mean and 25 μR/h above mean background, provided, in the judgment of the survey team, the elevated gamma levels are attributable to mill tailings or other residual material derived from the associated processing site. Exposure rates attributable to localized natural phenomena such as construction materials or mineral outcroppings are not cause for inclusion of a property for remedial action. Properties with outdoor gamma radiation levels below mean background plus one standard deviation of the mean should be recommended for elimination from the program, unless radioactive contamination inside a structure is cause for inclusion of the property for remedial action. However, before recommending elimination of a property from the program based upon outdoor surface gamma measurements, survey teams should consider the possibility that any slightly elevated gamma fields showing up in the survey could indicate the presence of buried tailings deposits. In such instances, in-situ measurements and/or the more extensive survey may be appropriate before recommending a property for elimination from the program.

2. More Extensive Survey Activities

The more extensive survey is conducted only when the gamma survey indicates more data are needed to make a determination as to whether or not EPA standards are exceeded and if the site should be included or eliminated from the program. When conducted, the extended survey will be limited to only those measurements needed to make such a determination. For example, soil sampling and radiochemical analyses will be considered only when eligibility for inclusion cannot be determined on the basis of simpler measurements such as gamma logging.

a. Indoors

Field experience indicates that activities identified in the preceding paragraphs describing gamma radiation surveys will, in most cases, provide sufficient data to determine eligibility for inclusion in the remedial action

program. However, conditions may be such that gamma levels inside or outside structures are borderline, when compared to action levels, thus requiring additional biased measurements and sampling to more clearly define anomalies identified during the gamma survey. In such cases, the survey may be extended to include one or more of the following:

- Alpha measurements (fixed and removable) of floors, walls, and in some instances, ceilings to identify contamination in or on building materials and to determine if more extensive radon measurements are required;
- Sampling of building material to define the source of contamination and to determine mill tailings involvement; or
- Radon or radon progeny monitoring to determine if EPA standards are exceeded.

If, as a result of these measurements, structures having indoor gamma levels of 20 μR/h or more above mean background due to mill tailings involvement, or if radon progeny concentrations greater than 0.02 W.L. are detected, they will be forwarded for final analysis and recommendation for inclusion; other sites will be recommended for elimination from the remedial action program, provided outdoor data do not warrant inclusion of the property for remedial action.

b. Outdoors

The primary purpose of these surveys is the determination of radium concentrations in soil attributable to mill tailings, either at the surface or in buried deposits, and the evaluation of these concentrations against the EPA standard. Surface soil sampling or in-situ gamma measurements may be required to ascertain and assess the extent of the contamination. If gamma fields suggest the possibility of subsurface contamination, drilling and gamma logging or, where specifically necessary, subsurface sampling will also be performed. Any gamma measurements or soil samples taken during the extended survey should provide enough data to define the areal extent of the contamination and permit evaluation against EPA's averaging criteria. However, the survey should entail only the effort necessary to support a recommendation for inclusion or elimination.

If the survey data indicate (either through gamma measurements or soil analysis) that Radium-226 in the soil exceeds background concentrations by more than 5 pCi/g for the top 15-cm layer or 15 pCi/g for subsequent 15-cm layers, averaged over 100 m^2, the property will be considered for inclusion. As an alternative, if it can be established that the radium concentration in any 15-m^3 subsurface volume exceeds 15 pCi/g, the property may also be considered for inclusion. Properties with radium concentrations below these levels should be recommended for elimination from the program provided indoor data do not warrant inclusion of the property for remedial action.

3. Report Preparation

The preparation of a report documenting all the survey work performed on a site will be required. This report will be the major input for the review, recommendation, and final determination to include or eliminate a property and will serve as the initial input for the engineering work if remedial action is found necessary. As a minimum, the report should include:

- Photograph and map or sketch of the physical layout of the property;
- A brief narrative description of the property;
- A radiological characterization of the property, including inside and outside gamma maps supported by data recorded on site and the results of any subsequent analyses, which reflects all radioactive anomalies encountered on the property;
- A statement indicating a judgment as to whether the contamination on the property was derived from the associated uranium processing site, and the basis for this judgment;
- A comparison of the results of the survey against appropriate standards;
- Recommendations of the survey team regarding eligibility or ineligibility of the property for remedial action; and
- A description of property use and occupancy and a qualitative discussion of potential health impacts to use in determining priorities for remedial action.

In making the recommendation as to the inclusion of the site, the contractor will review and analyze all data collected, including previous survey data and other pertinent materials. These data will be used to make a comparison of site conditions with the criteria identified herein, resulting in a recommendation as to inclusion or elimination of a site from the remedial action program. This report must include a clear statement of the basis for the recommendation.

Where appropriate, consideration will be given to compliance with the EPA Standard, Subpart C--Implementation, particularly Section 192.21, Criteria for Applying Supplemental Standards, which requires consideration of health impacts and long-term benefits gained by remedial action when the residual radioactive materials do not pose a clear present or future hazard. Factors to be considered in the application of supplemental standards are enumerated in Subpart C of the standards.

This analysis must be detailed enough to substantiate and justify the resulting recommendation for including the site in or eliminating it from the program, particularly if recommendations include the application of Supplemental Standards. The overall contractor report, including survey data, analysis, and recommendations, will serve as the basis for the final DOE review and decision; for consultation with the Nuclear Regulatory Commission regarding the application of Supplemental Standards; for notifying the state and local authorities and the property owner; and for providing a permanent record of these activities and findings.

D. Inclusion of Properties for Remedial Action

The final decision to include a property in the UMTRA program or eliminate it from further consideration rests with the Department of Energy (DOE) and will not be delegated to any contractor or individual outside the DOE staff. The decision to include properties for remedial action will be based upon a thorough review of the data presented and recommendations made by the radiological survey contractor, a thorough knowledge of EPA standards and the mandates of P.L. 95-604, and the overall objectives of the Uranium Mill Tailings Remedial

Action Program. The application of Supplemental Standards will be subject to DOE Headquarters approval, which will include consultation with the Nuclear Regulatory Commission.

The UMTRA Project Manager, or his designee, will be responsible for the following:

- Including vicinity properties for remedial action;
- Assigning priorities (high, medium, or low) to properties included for remedial action based upon the radiological condition and potential health effects;
- Providing to affected states notification of the results of the inclusion process;
- Notifying the owners of all vicinity properties which have been surveyed of the results of the inclusion process; and
- Obtaining DOE Headquarters approval, which will include consultation with the Nuclear Regulatory Commission, in the application of supplemental standards.

REFERENCES

1. Letter, Barry A. Berven, ORNL, to John E. Baublitz, DOE, dated August 4, 1983, Relationship of Radium Concentration and In Situ Gamma Exposure Rate.

2. Letter, R. Krishnan, Jacobs, to James A. Morley, DOE-AL, dated August 9, 1983, Technical Basis for Gamma-Ray Screening Inclusion Survey, Contract No. DE-AC04-82AL14086.

3. Letter, Sam Marutzky, Bendix, to Donald H. Groelsema, DOE, dated August 15, 1983, Relationship of Radium Concentration in Soils and In Situ Gamma Exposure Rate.

ATTACHMENT 1

CHART

UMTRAP Summary Protocol

Vicinity Property Inclusion for Remedial Action

(PL 95-604)

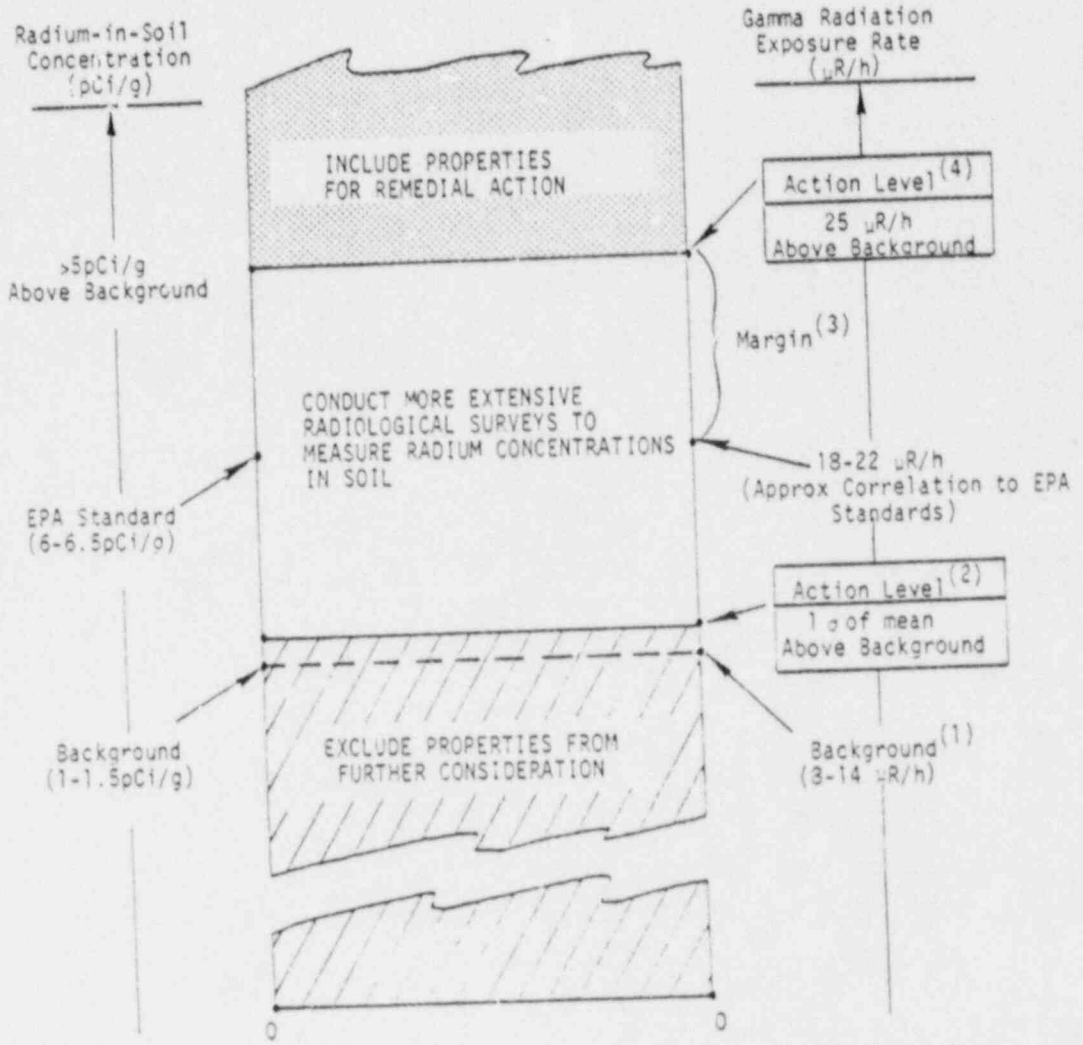
ATTACHMENT 2

CORRELATION DIAGRAM

Radium-in-Soil Concentration to Gamma Radiation Levels

CORRELATION DIAGRAM

Radium-in-Soil Concentrations to Gamma Radiation Levels



NOTES: (1) Background is defined as the mean background level calculated from measurements made at a minimum of 30 representative locations within the approximate region of interest, taking into account subregions where uniformly high or low background levels may exist. Such measurements will not be made in the vicinity of known radioactive contamination. A standard deviation of the mean (σ) will also be calculated for use in establishing action levels (defined below) within the region. The value of the standard deviation of the mean may not exceed 30% of the mean background level.

(2) Action level below which properties are considered for elimination from further consideration based upon measured gamma radiation exposure rate. This action level is defined as mean background plus one standard deviation of the mean calculated as defined in Note (1) above.

(3) Margin above the corresponding EPA standard that is required to ensure properties included for remedial action based upon gamma radiation exposure rates exceed the EPA standard for radium concentration in soil and will require remedial action. This margin was selected to accommodate potential errors in field measurements such as calibration errors, errors in reading field instruments, and variations in the physical environment, particularly moisture content in soil. (See References)

(4) Action level above which properties (open land) are considered for inclusion as a part of the remedial action to be conducted at the designated processing (tailings pile) site.

ADDENDUM A2

CONSENT FOR ACCESS TO CONDUCT SURVEYS AND

ENGINEERING STUDIES

CONSENT FOR ACCESS TO CONDUCT SURVEYS
AND ENGINEERING STUDIES

*VICINITY PROPERTY NO.:
PROPERTY ADDRESS:
*PROPERTY PARCEL NUMBER OR DESCRIPTION:

I (We) acknowledge that I (we) own the property described above, and grant permission to employees, contractor and subcontractor personnel, and other representatives of the U.S. Department of Energy (DOE) and the State of Colorado to enter upon the property at a reasonable time during the next 36 months to conduct radiation surveys to determine the nature and extent of any radioactive material that may be present. In addition, permission is given to perform engineering assessments, if necessary, to evaluate the measures that might be taken, as well as to evaluate the extent of the work required and the cost.

I (We) understand the DOE's and the State's responsibility for any damage or disturbance to my (our) property caused by the survey and engineering activities shall be any backfilling, seeding, sodding, landscaping, rebuilding or repair of the property required to restore it to a condition comparable to its apparent physical condition immediately prior to entry upon the property.

I (We) understand that the DOE and the State are not obligated to perform remedial action upon the property. I (We) understand that no remedial action shall be performed until the DOE, the State, and the property owner have entered into a separate written agreement setting forth the terms, condition, and plans for remedial action.

I (We) understand that the DOE and the State have the right to disclose to the public, in the form of technical data and reports, the results of its data gathering on the above-described property.

[ ] I grant access for the conduct of surveys and engineering studies as provided in the consent for access.

_____ _____
Signature of Owner(s) Date

[ ] I have decided not to participate in the UMTRA Project.

_____ _____
Signature of Owner(s) Date

OWNER DATA:

NAME _____

STREET _____

CITY, STATE _____

HOME PHONE (____)_____

BUSINESS PHONE (____)_____

TENANT DATA:

NAME _____

HOME PHONE (____)_____

BUSINESS PHONE (____)_____

COMMENTS: _____

_____

* TO BE COMPLETED BY PROJECT PARTICIPANTS

ADDENDUM A3

SURVEY SITE INFORMATION FORM

OAK RIDGE NATIONAL LABORATORY
SURVEY SITE INFORMATION

SITE # _____
SURVEY DATE _____

OWNER DATA:

NAME: _____
ADDRESS: _____
_____
PHONE: _____

LOCATION: _____
_____
TENANT: _____
PHONE: _____

LAND USE

RESIDENTIAL ____: SINGLE FAMILY ____
MULTI- FAMILY ____

COMMERCIAL ____: RETAIL STORE ____
OFFICE ____
MANUFACTURE ____
MOTEL, HOTEL ____

PUBLIC BLDG ____: SCHOOL ____
CHURCH ____

VACANT LOT ____
OPEN LAND ____

OTHER _____
_____

DESCRIPTION _____
_____

NUMBER OF STRUCTURES: ____
TYPE OF CONSTRUCTION: (# of levels, frame/masonry, basement/crawl space/slab on grade, etc.)

BLDG #1: _____

BLDG #2: _____

BLDG #3: _____

BLDG #4: _____

PHOTOGRAPH(S): FILM ROLL # _____

	Compass Direction		Description
FRAME # _____	LOOKING: _____	at	_____
FRAME # _____	LOOKING: _____	at	_____
FRAME # _____	LOOKING: _____	at	_____
FRAME # _____	LOOKING: _____	at	_____

SPILLOVER: NO ____ YES ____

ADJACENT PROPERTIES: _____
_____

ADDENDUM A4

RADIOLOGICAL SCREENING SUMMARY FORM

OAK RIDGE NATIONAL LABORATORY
RADIOLOGICAL SCREENING SUMMARY

SITE NUMBER: _____
SURVEY DATE: _____

SURVEY TEAM: _____ _____ _____
_____ _____ _____

SURVEY INSTRUMENTS USED FOR CALCULATION

gamma-rate meter #_____
PIC #_____

uR/h CONVERSION FORMULA USED
_____ uR/h = 1.69 K+ 3.45
_____ other uR/h

DIRECT CONVERSION
_____cpm/uR/h (see below)

LOCATION	PIC(uR/h)	(cpm x 1000) GAMMA-RATE METER - 6"	CONVERSION (cpm/uR/h)
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

BACKGROUND GAMMA-SCAN RANGE

OUTDOOR
_____ to _____ cpm x 1000
_____ to _____ uR/h

INDOOR
_____ to _____ cpm x 1000
_____ to _____ uR/h

INDOOR SCAN RANGE:

REGION										
1:	_____ kcpm	_____ uR/h	average:	_____ kcpm	_____ uR/h	Area	_____sq m
2:	_____ kcpm	_____ uR/h	average:	_____ kcpm	_____ uR/h	Area	_____sq m
3:	_____ kcpm	_____ uR/h	average:	_____ kcpm	_____ uR/h	Area	_____sq m

Non-Point source HIG: _____ kcpm _____uR/h Location _____
Point source HIG: _____ kcpm _____uR/h Location _____

Comments:_____
_____
_____

OUTDOOR SCAN RANGE

REGION										
A:	_____ kcpm	_____ uR/h	average:	_____ kcpm	_____ uR/h	Area	_____sq m
B:	_____ kcpm	_____ uR/h	average:	_____ kcpm	_____ uR/h	Area	_____sq m
C:	_____ kcpm	_____ uR/h	average:	_____ kcpm	_____ uR/h	Area	_____sq m
D:	_____ kcpm	_____ uR/h	average:	_____ kcpm	_____ uR/h	Area	_____sq m
E:	_____ kcpm	_____ uR/h	average:	_____ kcpm	_____ uR/h	Area	_____sq m

Non-Point source HOG: _____ kcpm _____uR/h Location _____
Point source HOG: _____ kcpm _____uR/h Location _____

Comments:_____
_____
_____

PROPERTY RECOMMENDED FOR: EXCLUSION ____ INCLUSION ____ (see add'l data sheets)
SOIL ANALYSIS REQUIRED FOR DETERMINATION: YES ____ NO ____
INDOOR EXTENDED MEASUREMENTS REQUIRED : YES ____ NO ____
PERSONNEL & EQUIPMENT INSPECTED & DECONTAMINATED: YES ____ NO ____

ADDENDUM A5

SOIL SAMPLING DATA FORM

OAK RIDGE NATIONAL LABORATORY
SOIL SAMPLING DATA FORM

LOCATION # ____________
SURVEY DATE ____________

	VISIBLE TAILINGS	SAMPLE NUMBER	DEPTH (m)	GAMMA kcpm	GAMMA uR/h	Ra 226 pCi/g

SAMPLE LOCATION: ______________________________

VISIBLE ORE ____ yes ____ no
BACKGROUND SAMPLE ____ yes ____ no
AREA REPRESENTED ____________ sq m
OTHER DESCRIPTION

	VISIBLE TAILINGS	SAMPLE NUMBER	DEPTH (m)	GAMMA kcpm	GAMMA uR/h	Ra 226 pCi/g
	______	______	SURFACE	______	______	______
	______	______	______	______	______	______
	______	______	______	______	______	______
	______	______	______	______	______	______

SAMPLE LOCATION: ______________________________

VISIBLE ORE ____ yes ____ no
BACKGROUND SAMPLE ____ yes ____ no
AREA REPRESENTED ____________ sq m
OTHER DESCRIPTION

	VISIBLE TAILINGS	SAMPLE NUMBER	DEPTH (m)	GAMMA kcpm	GAMMA uR/h	Ra 226 pCi/g
	______	______	SURFACE	______	______	______
	______	______	______	______	______	______
	______	______	______	______	______	______
	______	______	______	______	______	______

SAMPLE LOCATION: ______________________________

VISIBLE ORE ____ yes ____ no
BACKGROUND SAMPLE ____ yes ____ no
AREA REPRESENTED ____________ sq m
OTHER DESCRIPTION

	VISIBLE TAILINGS	SAMPLE NUMBER	DEPTH (m)	GAMMA kcpm	GAMMA uR/h	Ra 226 pCi/g
	______	______	SURFACE	______	______	______
	______	______	______	______	______	______
	______	______	______	______	______	______
	______	______	______	______	______	______

SAMPLE LOCATION: ______________________________

VISIBLE ORE ____ yes ____ no
BACKGROUND SAMPLE ____ yes ____ no
AREA REPRESENTED ____________ sq m
OTHER DESCRIPTION

	VISIBLE TAILINGS	SAMPLE NUMBER	DEPTH (m)	GAMMA kcpm	GAMMA uR/h	Ra 226 pCi/g
	______	______	SURFACE	______	______	______
	______	______	______	______	______	______
	______	______	______	______	______	______
	______	______	______	______	______	______

ADDENDUM A6

EXTENDED MEASUREMENTS FORM

EXTENDED MEASUREMENTS DATA FORM

DATE:	EXPOSURE RATES:
LOCATION NO.	Kcpm:
ADDRESS:	uR/h:
SOURCE CODE:	GAMMA SPEC DATA: / TIME INTERVALS / AVERAGE
SOURCE CODE DEFINITION AND SAMPLE LOCATION:	TOTAL COUNTS:
SAMPLE NUMBER:	K COUNTS:
SAMPLE DEPTH INTERVAL:	Ra COUNTS:
REMARKS:	Th COUNTS:
	Ra/Th COUNTS:

DATE:	EXPOSURE RATES:
LOCATION NO.	Kcpm:
ADDRESS:	uR/h:
SOURCE CODE:	GAMMA SPEC DATA: / TIME INTERVALS / AVERAGE
SOURCE CODE DEFINITION AND SAMPLE LOCATION:	TOTAL COUNTS:
SAMPLE NUMBER:	K COUNTS:
SAMPLE DEPTH INTERVAL:	Ra COUNTS:
REMARKS:	Th COUNTS:
	Ra/Th COUNTS:

ADDENDUM A7

GAMMA ANALYSIS WORKSHEET

GAMMA ANALYSIS WORKSHEET

LOCATION NO. _____

REG	RANGE uR/h	FIELD AVG uR/h	GAMMA SHIELD cpmX2	GAMMA SHIELD uR/h	SLAB THICK (cm)	REP AREA (m)	BKG AVG uR/h	FORMULA	NET AVG uR/h	NET CRITERIA uR/h	20% OF BGD AVG	EXCEEDS INCLUSION CRITERIA YES	EXCEEDS INCLUSION CRITERIA NO	< 20% BGK AVG YES	< 20% BGK AVG NO	REMARKS
OUTDOOR																
INDOOR																

ADDENDUM A8

SCIL ANALYSIS WORKSHEET

SOIL ANALYSIS WORKSHEET

LOCATION NO. ___________

SAMPLE NUMBERS	REGION SAMPLED	(LAB) RA 226 CONC. pCi/g SMPL #1	SMPL #2	AVG RA-226 CONC. pCi/g	BKG RA-226 CONC. pCi/g	REP AREA (m)	SOIL SAMPLE THICKNESS IN (m)	FORMULA	NET RA-226 CONC. pCi/g	NET CRITERIA pCi/g	REMARKS

ADDENDUM AS

REPORT OF INCLUSION SURVEY

Location Number (_____)

HEALTH AND SAFETY RESEARCH DIVISION

REPORT OF INCLUSION SURVEY AT LOCATION _____
(address)_____ _____
_____

Investigation Team

B. A. Berven - RASA Program Manager
C. A. Little - RASA/UMTRA Project Director
_____ - Survey Team Leader

(Author's name)_____

(_____) 1987

WORK PERFORMED AS PART OF THE
RADIOLOGICAL SURVEY ACTIVITIES PROGRAM

Prepared by the
OAK RIDGE NATIONAL LABORATORY
Grand Junction Office
Grand Junction, Colorado 81502
operated by
MARTIN MARIETTA ENERGY SYSTEMS, INC.
for the
U.S. DEPARTMENT OF ENERGY
under Contract No. DE-AC-5-840R21400

Revised (9/87)

Location Number (_____)

REPORT OF INCLUSION SURVEY AT LOCATION _____
(address)_____
_____

INTRODUCTION

An inclusion radiological survey of location _____ was conducted on (survdate) _____19_____ by Oak Ridge National Laboratory. This property consists of a _____. This survey was conducted using methods as defined in the Vicinity Properties Management and Implementation Manual, UMTRA-DOE/AL-050601 (August 1986) and the RASA UMTRA Procedures Manual (July 1986). General location information is provided in Table 1, radiological survey results are given in **Table 2 and 3**, and supporting graphics are provided in **Figure 1 or 1a and 1b**. A view of the property is provided in Figure 2. All measurements are gross readings; background has not been subtracted. If presented, radon daughter concentrations result from radon measurements which were converted to working levels, assuming a 50% equilibrium factor.

(Insert for Direct Conversion)
The conversion formula used is $y = x/CF$, where "y" equals the exposure rate in μR/h, "x" equals the scintillometer measurements in kcpm, and "CF" equals the conversions factor determined in the field through a direct correlation between PIC and scintillometer measurements in kcpm/μR/h. For this property, CF equals ._____for uncontaminated regions, ._____for contaminated regions, and ._____for indoor/other regions.

(or Insert for Conversion Equation):
The conversion formula used is $y = mx + b$, where "y" equals the exposure rate in μR/h, "x" equals scintillometer measurement in kcpm, and "m" and "b" are predetermined constants. On this property, "m" equals _____ and "b" equals _____.

SIGNIFICANCE OF FINDINGS

_____

_____

_____

_____

_____.

Revised (9/87)

Location Number _____

Revised (9/87)

Location Number _____

RECOMMENDATION

RECOMMENDED FOR: Inclusion
RECOMMENDED FOR: Exclusion

RECOMMENDATION BASIS: Outdoor gamma is >25 μR/h above background averaged over 100 m^2

RECOMMENDATION BASIS: Outdoor gamma is <background plus the acceptable difference or 20% averaged over 100 m^2

RECOMMENDATION BASIS: ^{226}Ra is >5 pCi/g above background in surface 15 cm soil layer averaged over 100 m^2

RECOMMENDATION BASIS: ^{226}Ra is <5 pCi/g above background in surface 15 cm soil layer averaged over 100 m^2

RECOMMENDATION BASIS: ^{226}Ra is >15 pCi/g above background in subsurface 15 cm soil layer averaged over 100 m^2

RECOMMENDATION BASIS: ^{226}Ra is <15 pCi/g above background in subsurface 15 cm soil layer averaged over 100 m^2

RECOMMENDATION BASIS: Spillover from includable deposit on an adjoining property

RECOMMENDATION BASIS: Indoor gamma is >20 μR/h above background averaged in any room

RECOMMENDATION BASIS: Indoor gamma is < the acceptable difference or 20% above background in all rooms

RECOMMENDATION BASIS: Grab sample radon daughter concentration is >0.04 WL

RECOMMENDATION BASIS: Grab sample radon daughter concentration is >0.01 WL

RECOMMENDATION BASIS: Annual average radon daughter concentration is >0.02 WL

RECOMMENDATION BASIS: Annual average radon daughter concentration is <0.02 WL

Revised (9/87)

Location Number _____

Table 1. Location Information

Property Information

LOCATION: _____

_____

OCCUPANT/TENANT: _____

TELEPHONE: ( ) _____ (H)

( ) _____ (B)

PROPERTY CLASSIFICATION _____

TOTAL AREA OF PROPERTY _____ m^2

STRUCTURES ON PROPERTY _____

_____

_____

Owner Information

OWNER: _____

ADDRESS: _____

_____

TELEPHONE: ( ) _____ (H)

( ) _____ (B)

Revised (9/87)

Location Number: _____

Table 2. Radiological Screening Survey Results

Outdoor Screening Data

BACKGROUND EXPOSURE RATE: _____ μR/h

BACKGROUND + 20%: _____ μR/h

BACKGROUND EXPOSURE RATE RANGE: _____ μR/h

EXPOSURE RATE RANGE IN CONTAMINATED REGIONS:
A: _____ μR/h
B: _____ μR/h
C: _____ μR/h

HIGHEST OUTDOOR GAMMA (HOG) IN CONTAMINATED REGION: _____ μR/h

LOCATION OF HOG: Region _____

POINT SOURCE *: _____ μR/h

ESTIMATED AREA OF OUTDOOR CONTAMINATION BY REGION:
A: _____ m^2
B: _____ m^2
C: _____ m^2

NET ESTIMATED AREA-WEIGHTED AVERAGE BY REGION**:
A: _____ μR/h
B: _____ μR/h
C: _____ μR/h

*Point source measurements are discussed in "Significance of Findings" section.

**Formula used: $$G_{AW} = \frac{\sum_{i=1}^{n} G_i A_i}{100}$$

where:
G_{AW} = the area-weighted exposure rate in [μR/h]
G_i = net average exposure rate in [μR/h]
($G_i = G_{Gross} - G_{Background}$)
A_i = area of region involved in [m^2] and,
100 = threshold area in [m^2]

Revised (9/87)

Location Number: _____

Table 2. Radiological Screening Survey Results (Continued)

Indoor Screening Data

STRUCTURE DESCRIPTION OR NUMBER: _____

BACKGROUND EXPOSURE RATE: _____ μR/h

BACKGROUND + 20%: _____ μR/h

BACKGROUND EXPOSURE RATE RANGE: _____ μR/h

EXPOSURE RATE RANGE IN CONTAMINATED REGIONS:
1: _____ μR/h
2: _____ μR/h
3: _____ μR/h

HIGHEST INDOOR GAMMA (HIG) IN CONTAMINATED REGION: _____ μR/h

LOCATION OF HIG: Region_____

POINT SOURCE*: _____ μR/h

ESTIMATED AREA OF INDOOR CONTAMINATION BY REGION:
1: _____ m^2
2: _____ m^2
3: _____ m^2

NET ESTIMATED AREA-WEIGHTED AVERAGE BY REGION/ROOM**:
1: _____ μR/h
2: _____ μR/h
3: _____ μR/h

*Point source measurements are discussed in "Significance of Findings" section.

**Formula used: $x = \frac{\sum_{i=1}^{n} G_i A_i}{9.3}$

where:

x = area-weighted gamma exposure rate [μR/h]

G_i = net gamma exposure rate in [μR/h]

A_i = area of deposit in [m^2]

9.3 = threshold area in [m^2]

Revised (9/87)

Location Number: _____

Table 3. Extended Survey Results

Outdoor Extended Data

Soil Sample Summary

Soil Sample Number	Region Sampled	Sample Depth (cm)	^{226}Ra Concentration (pCi/g) (Canalysis)	Representative (biased) Sampling Area m^2	Net Estimated Area-Weighted Average* (pCi/g, CAW)

$$*\text{Formula used } CAW = \frac{\sum_{i=1}^{n} CiAiDi}{(100)\ (.15)}$$

where= C_{AW} = area-weighted ^{226}Ra concentration in [pCi/g]

C_i = net ^{226}Ra concentration in [pCi/g] and

($C_i = C_{analysis} - C_{background}$)

A_i = area of region that sample represents in [m^2]

D_i = thickness of sample in [m]

100 = threshold area in [m^2], and

.15 = threshold thickness in [m]

Revised (9/87)

Location Number: _____

Table 3. Extended Survey Results (continued)

Indoor Extended Data

Radon Monitoring Summary

Region	Room	Date	RDC (WL)	Annual Average RDC (WL)**

** Formula used: $WL = \frac{(WLR)\ (Rn)}{100}$

where: WL = Working Level
WLR = .5 (WL ratio as per VPMIM assuming 50% equilibrium)
Rn = Average ^{222}Rn concentration in pCi/l as reported by vendor.

**Annual average (WL) determined by: Oak Ridge National Laboratory - Terradex Track Etch^{R} Type SF Air Monitors

Revised (9/87)

Figure 1. Location _____, _____.

Figure 2. Location _____, looking _____ at front of property.

Revised (9/87)

ADDENDUM A10

LETTER OF RECOMMENDATION

ADDENDUM A11

VICINITY PROPERTIES SUMMARY EVALUATION AND RECOMMENDATION

DOE or GJPO
Address
City, State

Dear :

Radiation levels at the property identified below appear [ ] to [ ] not to exceed the U. S. Environmental Protection Agency (EPA) Standards as specified in 40 CFR 192.

This evaluation is based on [ ] indoor [ ] outdoor screening measurement criteria, [ ] indoor [ ] outdoor extended measurement criteria of the U. S. Department of Energy Vicinity Property Management and Implementation Manual (UMTRA-DOE/AL-050601), Appendix A, and/or [ ] other criteria stated below.

Other:

_____

_____

_____

This recommendation is based upon the Inclusion Survey Contractor's Assessment of the [ ] Ra-226 concentration in the soil [ ] indoor radon daughter concentration [ ] indoor gamma exposure rate at this property.

Therefore, this property is recommended for [ ] inclusion in [ ] exclusion from the Uranium Mill Tailings Remedial Action Project.

Sincerely,

Inclusion Survey Contractor

Location Number: _____

Location Address: _____

_____

Property Owner: _____

Owner Address: _____

_____

Tenant Name: _____

Location Number _____

VICINITY PROPERTY SUMMARY EVALUATION AND RECOMMENDATION

1. SUMMARY EVALUATION

1.1 OUTDOOR MEASUREMENTS

	Inclusion Survey Contractor (ISC)			U. S. Department of Energy (DOE)		
	Yes	No	Not Taken*	Yes	No	Not Taken*
Gamma is >25 μR/h above background averaged over 100 m^2	[]	[]	[]	[]	[]	[]
Gamma is < the acceptable difference or 20% above background averaged over 100 m^2	[]	[]	[]	[]	[]	[]
^{226}Ra is >5 pCi/g above background in top 15 cm layer averaged over 100 m^2	[]	[]	[]	[]	[]	[]
^{226}Ra is >15 pCi/g above background in any subsurface 15 cm layer averaged over 100 m^2	[]	[]	[]	[]	[]	[]
Total activity of deposit(s) exceeds the total activity criterion	[]	[]	[]	[]	[]	[]

Location Number _____

1.2 INDOOR MEASUREMENTS

	Inclusion Survey Contractor (ISC)			U. S. Department of Energy (DOE)		
	Yes	No	Not Taken*	Yes	No	Not Taken*
Gamma is >20 μR/h above background averaged in any room	[]	[]	[]	[]	[]	[]
Gamma is < the acceptable difference or 20% above background in all rooms	[]	[]	[]	[]	[]	[]
Grab sample radon daughter concentration is >0.04 WL	[]	[]	[]	[]	[]	[]
Grab sample radon daughter concentration is <0.01 WL	[]	[]	[]	[]	[]	[]
Annual average radon daughter concentration is >0.02 WL	[]	[]	[]	[]	[]	[]
Annual average radon daughter concentration is <0.02 WL	[]	[]	[]	[]	[]	[]

Other: _____

_____

_____

_____

_____

*Data were not taken because:

[ ] Data were not required to derive inclusion/exclusion recommendation.
[ ] This is a dovetail property.
[ ] Property owner did not authorize access for interior sampling.

(Revised 5/87)

Location Number _____

2. INCLUSION SURVEY CONTRACTOR RECOMMENDATION

Based on the ISC's evaluation, I recommend this property for [] inclusion in [] exclusion from the Uranium Mill Tailings Remedial Action Project.

_____ _____

C. A. Little, Ph.D.
Inclusion Survey Contractor

Date

(Revised 5/87)

Location Number _____

3. TAC/DOE EVALUATION

Based on the TAC/DOE evaluation, [ ] this property is recommended for inclusion, [ ] this property is recommended for exclusion, [ ] additional data is required to support a determination.

_____ _____

TAC Evaluator Date

_____ _____

DOE Evaluator Date

ADDITIONAL DATA REQUIRED:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Location Number _____

3.2 ISC'S RESPONSE TO THE TAC/DOE REQUEST FOR ADDITIONAL DATA:

Based on the TAC/DOE review of this evaluation, including the further information provided by the ISC in Section 3.2 above, this property should be an [ ] inclusion [ ] exclusion.

TAC Evaluator _____ Date _____

DOE Evaluator _____ Date _____

ADDENDUM A12

VPDMS INPUT SHEET

VPDMS INPUT SHEET - ORNL

LOCATION ID _____ - CLASS ____

CONSENT FORM DATA:
Sign Date:. . . __/__/__
Status: . . . . __

SURVEY DATA:
HIG-Src: . . . _____-__
HOG-Src: . . . _____-__
RDC-Src-Typ: . _.___-__-__

Tailings location code: . . ____

PROPERTY INFORMATION [ ] Check if owner address same as property address

Tenant/Desc: _____

Address : _____

City, St, Zip : _____ _____ _____

OWNER INFORMATION

Name : _____

Address : _____

City, St, Zip : _____ _____ _____

CONSENT FORM STATUS CODES:
A = Access approved
L = Limited access approved
D = Access denied

TAILINGS LOCATION CODES:
0 = None
1 = Structural
2 = Exterior
3 = Structural & exterior
4 = Windblown
5 = Spillover
6 = Unknown

RDC TYPE CODES:
A = Full-time (1yr.) integrated sample
B = Part-time (<1yr.) integrated sample
C = Multiple grab sample
D = Single grab sample

HIG/HOG/RDC SOURCE CODES:
P = Preliminary survey
I = Inclusion survey
R = REA survey
D = Access denied
X = Reading not reported or taken
N = Code not applicable

ADDENDUM A13

ISC CONDENSED EXCLUSION REPORT

OAK RIDGE NATIONAL LABORATORY

OPERATED BY MARTIN MARIETTA ENERGY SYSTEMS, INC.

GRAND JUNCTION OFFICE
P. O. BOX 2567
GRAND JUNCTION, COLORADO 81502

Location Number: _____
Location Address: _____
_____
Date of Issue: (Month/Year) _____
Survey Date: _____

ISC CONDENSED EXCLUSION REPORT
ORNL Health and Safety Research Division
Work performed as part of the Radiological Activities Program

This radiological survey was conducted using methods as defined in the Vicinity Properties Management and Implementation Manual, UMTRA-DOE/AL-050601 (August 1986) and the RASA/UMTRA Procedures Manual (July 1986). This property is recommended for exclusion from further consideration by the UMTRA project based on: 1) Outdoor gamma is less than background plus the acceptable difference or 20% averaged over 100 m^2, and 2) Indoor gamma is less than the acceptable difference or 20% above background in all rooms.

Supporting graphics, views and data are as follows:

-Owner Information-
Owner Name(s): _____
Owner Address: _____
_____

-Outdoor Screening Data-
Exposure Rate Range(s) _____ µR/h
Background Exposure Rate + 20%: _____ µR/h
High Outdoor Gamma (HOG): _____ µR/h
Point Source(*): _____ µR/h

-Indoor Screening Data-
Exposure Rate Range(s): _____ µR/h
Background Exposure Rate + 20%: _____ µR/h
High Indoor Gamma (HIG): _____ µR/h
Point Source(*): _____ µR/h

Soil Sample Number	Sample Depth (cm)	^{226}Ra Concentration (pCi/g)	Sample Area m^2	Net Estimated Area-weighted (pCi/g)

Comments: _____
_____

_____ _____
Inclusion Survey Contractor DOE Evaluator

Revised (5/87)

Figure 1. Location _____, _____.

Figure 2. Location _____, looking _____ at front of property.

Revised (5/87)

APPENDIX B

RADIOLOGICAL AND ENGINEERING DATA GATHERING

INTRODUCTION

Provided in this Appendix is Addendum B1, Radiological and Engineering Assessment (REA), Typical Format and Outline. This outline is to be used only as a reference document; actual REAs should contain similar data but are not required to follow this outline verbatim.

Addendum B2 presents a copy of the Justification Checklist for Application of Supplemental Standards. If the need for Supplemental Standards is determined prior to the issuance of the REA, this checklist is to be incorporated into the REA. If the need for Supplemental Standards is discovered during remedial action, the checklist may be issued alone.

ADDENDUM B1

RADIOLOGICAL AND ENGINEERING ASSESSMENT
TYPICAL FORMAT AND OUTLINE

THE RADIOLOGICAL AND ENGINEERING ASSESSMENT

FOR

(NAME) PROPERTY

(#)

(DATE)

PREPARED FOR

URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT OFFICE

UNITED STATES DEPARTMENT OF ENERGY

PREPARED BY

VPMIM, March 1988

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

B1.1 EXECUTIVE SUMMARY

B1.1.1 GENERAL DESCRIPTION

- o Description of RAC.
- o Property location.
- o Sources of survey data.

B1.1.2 EVALUATION AND RECOMMENDATION

- o Residual radioactive material involvement.
- o Option recommended.
- o Estimated Costs.
- o Design and remedial action schedule.

B1.2 ENGINEERING FIELD SURVEY

B1.2.1 PROPERTY DESCRIPTION

- Property use and occupancy.
- Legal description.
- Bordering properties (north, south, east, west).

B1.2.2 EXISTING FACILITIES AND STRUCTURES

- Building locations, construction, and size.
- Open areas (location, size, and use).
- Locations of electric, gas, sewer, water, and telephone utility lines (if involved in the removal of residual radioactive materials).
- Building conditions if required to evaluate remedial action options.
- Photographs of property.

Figure B1.2.1 Vicinity map.
Figure B1.2.2 Existing facilities and structures.

NOTE: Additional drawings and photographs may be added depending upon the complexity of the property.

Figure B1.2.1 Vicinity map

Figure B1.2.2 Existing facilities and structures
(Property photos as necessary)

B1.3 RADIOLOGICAL SURVEY AND ASSESSMENT

B1.3.1 GAMMA EXPOSURE RATE SURVEY

- o Survey method (equipment, grid sizes, height of measurement).
- o Outdoor findings (microR/hr).
- o Indoor findings (microR/hr).

B1.3.2 RADIUM SAMPLES AND BOREHOLE SURVEYS

- o Survey method (equipment, samples).
- o Outdoor findings (pCi/g).
- o Indoor findings (pCi/g).

B1.3.3 RADON/RADON DECAY-PRODUCT CONCENTRATIONS

- o Survey method (sample types, conditions).
- o Indoor findings (WL).

B1.3.4 EXTENT OF CONTAMINATION

- o Locations of contamination (assumptions).
- o Estimated volumes of contamination.

NOTE: Inclusion survey results should be in this section, if useful.

Figure B1.3.1 Gamma exposure rates.

Figure B1.3.2 Borehole and radon/radon decay-product sampling locations.

Figure B1.3.3 Estimated extent of contamination.

Table B1.3.1 Borehole log activity and radium-in-soil measurements at property #_____.

Table B1.3.2 Summary of indoor radon and radon daughter concentration measurements at property # _____.

Figure B1.3.1 Gamma exposure rates

Figure B1.3.2 Estimated extent of contamination, borehole and radon/radon daughter sampling locations

Table B1.3.1 Summary of indoor gamma exposure rate[a] measurements at property #_____

Measurement[b] location	No. of measurement locations	Range at one meter above surface (microR/h)	Mean at one meter above surface (microR/hr)	Range at surface (microR/h)	Mean at surface (microR/h)
Room 1					
Room 2					
Room 3					

[a] All values are above background levels.

[b] Exposure rates shown in Figure B1.3.1.
Room locations shown in Figure B1.3.2.

Table B1.3.2 Summary of indoor radcn and radon daughter concentration measurements at property #_____

Measurement[a] location	Radon air concentration ± 1 sigma (pCi/l)	Radon daughter concentration ± 1 sigma (WL)
Room 1		
Room 2		
Room 3		

[a]Locations shown in Figure B1.3.2.

Table B1.3.3 Borehole log activity and soil sample measurements[a] at property # _____

LOG ACTIVITY

Borehole[b] number	Depth 0-15cm Ra-226 concentration	Depth 15-30cm Ra-226 concentration	Depth 30-45cm Ra-226 concentration	Depth 45-60cm Ra-226 concentration	Estimated depth of interface (meters)
B1					
B2					
B3					

SOIL SAMPLE MEASUREMENTS

Borehole[b] number	Depth (cm)	Ra-226 concentration
B1		
B2		
B3		

[a] All values are above background.
[b] Locations shown in Figure B1.3.3.

B1.4 REMEDIAL ACTION OPTIONS

All options shall be described and each description shall include:

- o Demolition and restoration requirements.
- o Relocation and reimbursement requirements (where applicable).
- o Cost implications (labor, materials, and equipment costs by activity).

B1.4.1 EVALUATION OF OPTIONS AND RECOMMENDATION

- o Cost analysis.
- o Health benefit assessment.
- o Owner preference.
- o Legal or other complications.

Table B1.4.1 Remedial action options cost comparison table (if more than one option is available).

Table B1.4.1 Remedial action options cost comparison table

Activity	Estimated cost ($000) Option 1	Option 2	Option 3
1. Relocate owner (_____ manhours @$_____/hr)	10.0	---	10.0
2. Install temporary on-site facility (_____ ft^2 @$_____/$ft^2$)	---	6.0	---
3. Rent temporary facility (lump sum)	5.0	---	---
4. Remove water heater & pipes (_____ manhours @$_____/hr)	2.5	2.5	3.5
5. Remove concrete floor (_____ yd^3 @$_____/$yd^3$)	8.5	8.5	10.0
6. Excavate contaminated material (_____ yd^3 @$_____/$yd^3$)	15.5	15.5	17.0
7. Backfill (_____ yd^3 @$_____/$yd^3$)	16.0	16.0	20.0
8. Replace floor (_____ yd^3 @$_____/$yd^3$)	20.0	20.0	20.0
9. Replace interior furnishings (_____ manhours @$_____/hr)	3.0	3.0	6.0
10. Reinstall water heater & pipes (_____ manhours @$_____/hr)	3.0	3.0	4.0
11. Return owner to property (_____ manhours @$_____/hr)	10.0	---	---
12. Contingency	8.0	6.0	8.0
TOTAL:	101.50	80.5	98.5

ADDENDUM B2

JUSTIFICATION CHECKLIST FOR

APPLICATION OF SUPPLEMENTAL STANDARDS

JUSTIFICATION CHECKLIST FOR APPLICATION
OF SUPPLEMENTAL STANDARDS

Property Number _____

Application of Supplemental Standards (SS) is in accordance with 40 CFR Part 192.22 Subpart (x) (check appropriate Subpart)

_____ a) risk injury to worker/public

_____ b) environmental harm

_____ c) high cost relative to long-term benefits

_____ d) high cost of cleaning up building relative to benefits

_____ e) no known remedial action

_____ f) radionuclides other than Ra-226 exist

Brief Condition Description and Justification:

JUSTIFICATION CHECKLIST FOR APPLICATION
OF SUPPLEMENTAL STANDARDS (Concluded)

Additional cost w/o application of supplemental standards = _____ (further breakdown provided in Table 4.3 of the REA)

This is a _____ % increase over estimated RA cost for preferred option.

Yes	No	If Supplemental Standards are applied:
		1. Open land?
		2. Occupied building?
		3. If yes to No. 2, is contaminated area beneath or within 10 feet of building?
		4. Anticipated change of land use within next 5 years?
		5. If yes to No. 4, then will land use produce health risk?
		6. Is contamination in habitable area?
		7. Have owner's comments been solicited? (Attach comments or record of teleconference.)

Estimated volume of contaminated material to remain = _____ (cy).

Contaminated area to remain = _____ (sy).

Range and average gamma for contaminated areas = _____, _____ (uR/h) [at 3 feet above surface].

Range and average Ra-226 in soil in contaminated area = _____, _____ (pCi/g).

If tailings are below or within 10 feet of the structure, Radon Daughter Concentration = _____ (WL).

APPENDIX C

REMEDIAL ACTION AGREEMENT

INTRODUCTION

Addendum C1 is a typical Remedial Action Agreement. Included with this agreement are the Vicinity Property Map and Legal Description and the Vicinity Property Remedial Action Plan. The plan explains the sequence of events required to complete remedial action at the property, including additional measurements required to certify the property.

ADDENDUM C1

TYPICAL REMEDIAL ACTION AGREEMENT

VICINITY PROPERTY
REMEDIAL ACTION AGREEMENT

THIS AGREEMENT, by and among the UNITED STATES OF AMERICA (hereinafter referred to as the "Government"), represented by the United States Department of Energy (hereinafter referred to as "DOE"), the STATE OF _____ (hereinafter referred to as the "State"), represented by the _____ (hereinafter referred to as the "_____") and _____ (hereinafter referred to as the "Owner").

WITNESSETH THAT:

WHEREAS, pursuant to Title I of the Uranium Mill Tailings Radiation Control Act of 1978, Public Law 95-604 (hereinafter referred to as the "Act"), the Government, represented by DOE, and the State have entered into a cooperative agreement (hereinafter referred to as "Cooperative Agreement") in order to implement a jointly-conducted program of assessment and remedial action at that certain DOE-designated processing site in _____, known as _____ _____, together with associated vicinity properties; and

WHEREAS, the Owner owns and controls a parcel of real property (hereinafter referred to as the "Vicinity Property") described in the map attached hereto as Appendix A; and

WHEREAS, DOE has designated the Vicinity Property for remedial action and the Owner has agreed to such remedial action under the terms set forth below;

NOW THEREFORE, it is agreed that:

1. Right-of-Entry, Inspection and Right to Restrict Access

   a. The owner owns and controls the Vicinity Property and hereby grants to the State and to DOE, their authorized representatives, contractors and subcontractors, without payment of any land use charge: (a) right-of-entry in, across, and over the Vicinity Property to perform remedial action on the Vicinity Property and to take soil samples, perform radiologic surveys, and to perform or take any other reasonable action consistent with the expeditious performance and evaluation of such remedial action; and (b) the right to restrict access to, and post appropriate warning signs on, such parts of the Vicinity Property as may be necessary in order to facilitate remedial action and protect the health and assure the safety of the public, PROVIDED, that such rights are subject to existing easements for public roads and highways, public utilities, railroads, and pipelines.

   b. The Owner further grants to the State and to the Government, including DOE, the U.S. Nuclear Regulatory Commission (NRC), the Environmental Protection Agency, and their authorized representatives the right to periodically enter the Vicinity Property at any time in order to inspect the Vicinity Property for the purpose of carrying out this Agreement and enforcing the Act and any rules and regulations promulgated under the Act.

2. Title to Residual Radioactive Materials. The Owner hereby grants to DOE all right, title, and interest in all residual radioactive materials, equipment, vegetation, improvements, and other property permanently removed from the Vicinity Property by the State or DOE, their authorized representatives, agents, contractors, and subcontractors in performing remedial action upon the Vicinity Property.

3. Remedial Action. The remedial action to be performed shall be that which is described in the Vicinity Property Remedial Action Plan attached hereto as Appendix B and incorporated herein by reference, subject to such changes deemed necessary by the State and DOE during the performance of such remedial action. The Owner shall be informed of all such changes. The remedial action contemplated herein shall be performed by the DOE, its authorized representatives, agents, contractors, and subcontractors. The Owner shall not be held liable or have a duty to pay for any of the remedial action work performed hereunder by DOE, its authorized representatives, contractors and subcontractors.

4. Restoration. DOE shall be responsible for loss or destruction of or damage to the Owner's real and personal property caused by the activities of DOE, its authorized representatives, contractors and subcontractors, in exercising any of the rights granted in this Agreement, PROVIDED, that such responsibility shall be limited to restoration of such real and personal property to a condition reasonably comparable to its condition immediately prior to the performance of any remedial action by techniques of backfilling, seeding, sodding, landscaping, rebuilding, repair, or replacement indicated in the Vicinity Property Remedial Action Plan (Appendix B), and such other methods as may be agreed to by the State, DOE, and the Owner during the course of remedial action under this Agreement. PROVIDED FURTHER, that to the extent that latent or patent defects or out-of-code conditions exist on the Vicinity Property, and to the extent that said defects or conditions were either pre-existing or were not the subject or result of the remedial action, DOE shall not be responsible for the correction of, or any costs associated with the correction of, such defects or conditions except to the extent DOE, in its sole discretion, determines that the correction of such defects or conditions would facilitate the performance of remedial action on the Vicinity Property.

   The parties acknowledge that use of the phrase "condition reasonably comparable to its condition immediately prior to the performance of remedial action" indicates that the work performed by the DOE through its contractors or subcontractors may include the use of alternate materials or variations due to the use of new materials.

5. Release of Liability/Hold Harmless. Subject to the provision of Paragraph 4, Restoration, the Owner, on behalf of himself, his heirs, successors, and assigns, hereby: (1) releases the State and the Government from and holds the State and Government harmless against any liability or claim thereof by the Owner on behalf of the Owner, his heirs, successors, or

assigns arising out of the performance of any remedial action on the Vicinity Property; and (2) releases contractors and subcontractors of the Government and holds contractors and subcontractors of the Government harmless against any liability or claim thereof by the Owner on behalf of the Owner, his heirs, successors, or assigns arising out of the performance of any remedial action on the Vicinity Property, if the Government, by virtue of its contractual relationship, would be ultimately financially responsible for such liability or claim. For purposes of this Agreement the term "subcontractors" includes all tiers of subcontracts.

6. State or Government-Owned Property. Except for title to personal property brought to the Vicinity Property by the DOE or the State in order to restore the Vicinity Property pursuant to the Vicinity Property Remedial Action Plan (Appendix B) or Paragraph 4, Restoration, title to all personal property brought to the Vicinity Property by the State or the Government, or their authorized representatives, contractors, or subcontractors during the term of this Agreement shall remain in the State or the Government, as appropriate, and such title shall not be affected by incorporation or attachment thereof to any property not owned by the State or the Government, nor shall personal property, or any part thereof, become a fixture or lose its identity by reason of affixation to any realty. The Owner shall not be liable for any loss of or damage to such State or Government personal property or for expenses incidental to such loss or damage, except that the Owner shall be responsible for any such loss or damage (including expenses incidental thereto) which results from the willful misconduct or lack of good faith of the Owner.

7. Permits and Licenses. The State and DOE, their authorized representatives, contractors, and subcontractors shall obtain all necessary permits or licenses and abide by all applicable Government, State, and local laws, regulations, and ordinances.

8. Lessee/Sublease Consent. If the Vicinity Property is subject to any leases or subleases, the Owner shall obtain the consent of the lessees and sublessees, as appropriate, to enter into this Agreement. Such consent shall be evidenced by the signatures of the lessees and sublessees in the space provided on the Lessee/Sublessee Consent Page of the Agreement. Such consent shall constitute the unconditional agreement by each lessee or sublessee, with all terms and conditions of this Agreement, including but not limited to: the terms and conditions regarding right-of-entry and inspection, right to restrict access, transfer of title to residual radioactive materials and other property permanently removed from the Vicinity Property, title to State or Government-owned property, notice t subsequent purchasers, term and termination, and appropriations; Appendix A and Appendix B. By such consent each lessee or sublessee, on behalf of himself, his heirs, successors and assigns, hereby: (1) releases the State and the Government from and holds the State and Government harmless against any liability or claim thereof by the lessee or sublessee on behalf of the lessee or sublessee, his heirs, successors, or assigns arising out of the

performance of any remedial action on the Vicinity Property; and (2) releases contractors and subcontractors of the Government and holds contractors and subcontractors of the Government harmless against any liability or claim thereof by the lessee or sublessee on behalf of the lessee or sublessee, his heirs, successors or assigns arising out of the performance of any remedial action on the Vicinity Property, if the Government by virtue of its contractual relationship, would be ultimately financially responsible for such liability or claim. For purposes of this Agreement the term "subcontractors" includes all tiers of subcontracts.

9. Binding Effect. The provisions of this Agreement shall be binding upon and shall inure to the benefit of the successors and assigns of the Owner. Except to the extent lessees and sublessees have consented to this Agreement pursuant to Paragraph 8, Lessee/Sublessee Consent, the Owner shall: (1) notify the State Site Representative or the Contracting Officer as designated in the signature block below if the Vicinity Property is or at any time during the term of this Agreement should become leased, sold, or otherwise transferred to a party other than the Owner; and (2) give written notice to any purchaser, lessee, or transferee of the applicability of the rights of the State and the Government contained in this Agreement when such purchase, lease, or transfer takes place during the term of this Agreement.

10. Notice to Subsequent Purchasers. The State shall take such action as may be necessary, pursuant to DOE regulations and with the informed consent of the Owner by virtue of his or her execution of this Agreement, to assure that any person who purchases the Vicinity Property shall be notified, through the public land records, prior to the purchase, of the nature and extent of residual radioactive materials removed from the Vicinity Property, including the condition of the Vicinity Property after such action.

11. Covenant Against Contingent Fees. The Owner warrants that no person or selling agency has been employed or retained to solicit or secure this Agreement upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, except bona fide employees or bona fide established commercial or selling agencies maintained by the Owner for the purpose of securing business. For breach or violation of this warranty, DOE and the State shall have the right to annul this Agreement without liability or its discretion to recover from the Owner the full amount of such commission, percentage, brokerage, or contingent fee.

12. Officials Not to Benefit. No member of or delegate to Congress or resident commissioner shall be admitted to any share or part of this Agreement, or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this Agreement if made with a corporation for its general benefit.

13. Health and Safety. The State and the DOE, their authorized representatives, contractors, and subcontractors shall use their best efforts to protect the health and assure the safety of the public during performance of remedial action under this Agreement.

14. Term and Termination

a. The term of this Agreement shall commence on the effective date hereof and shall continue, unless sooner terminated hereunder, until the remedial action upon the Vicinity Property is completed and certification by DOE, through radiological measurements deemed appropriate by DOE, that the Vicinity Property meets the applicable radiation standards promulgated by the U.S. Environmental Protection Agency (40 CFR Part 192) for the protection of the public health, safety, and environment.

b. The State and DOE may terminate this Agreement at any time and for any reason and such termination shall be affected by delivery by the State or DOE, or both, to the Owner of a Notice of Termination specifying the reason for the termination and the date upon which such termination becomes effective, PROVIDED, that this Agreement shall not be so terminated until such time as the State and DOE restore the Vicinity Property to a condition comparable to its condition immediately prior to the performance of any remedial action thereon under this Agreement.

15. Appropriations and Expenditures. To the extent that provisions of this Agreement call for the expenditure of appropriated funds in fiscal years subsequent to the current fiscal year, such provisions shall be subject to the availability of funds, appropriated by both Congress and the State, which may be legally expended for such purposes.

16. Effective Date. The effective date of this Agreement shall be the date of execution by the State of _____, the DOE, and the Owner, whichever date is the latest.

17. Owner Responsibility. With respect to the work performed under this Agreement, except as to hidden or latent defects, the Owner shall have a period of seven (7) calendar days after completion of the Final Inspection and Approval to submit a written objection to the DOE designating those portions of the completed work which the Owner believes are not in compliance with this Agreement. Resolution of the written objection or failure to submit a timely written objection shall be conclusively deemed as a waiver of defects in the performance of the work, except for latent or hidden defects. The effective date for any and all warranties that DOE may enforce for the benefit of the Owner under Paragraph 18 hereof shall be the date of the Final Inspection and Approval.

18. DOE Responsibility. The Government, for the benefit of the Owner, shall use its best efforts to enforce any warranties, expressed or implied, which the Government or its prime contractors are entitled to in connection with the work performed under this Agreement caused by omission of materials, defective materials, poor, or improper workmanship.

19. Appendices. The following Appendices are attached to and made a part of this Agreement.

Appendix A - Vicinity Property Map and Legal Description
Appendix B - Vicinity Property Remedial Action Plan

IN WITNESS WHEREOF, the parties hereto have executed this Agreement in several counterparts.

THE STATE OF _____

By: _____

Date: _____

OWNER: _____

By: _____

_____
(Title)

_____
(Company)

Date: _____

THE UNITED STATES OF AMERICA
U.S. DEPARTMENT OF ENERGY

By: _____

Date: _____

OWNER: _____

By: _____

_____
(Title)

_____
(Company)

Date: _____

LESSEE/SUBLESSEE CONSENT PAGE

THE FOLLOWING LESSEES AND SUBLESSEES OF THE VICINITY PROPERTY HAVE CONSENTED TO THIS AGREEMENT AFTER READING AND ACKNOWLEDGING ALL TERMS AND CONDITIONS OF THIS AGREEMENT.

NAME	INTEREST:
1. _____ (Print or Type Name)	_____ (Lessee or Sublessee)
_____ (Signature)	_____ (Street Address)
	_____ (City, State, and Zip Code)
2. _____ (Print or Type Name)	_____ (Lessee or Sublessee)
_____ (Signature)	_____ (Street Address)
	_____ (City, State, and Zip Code)
3. _____ (Print or Type Name)	_____ (Lessee or Sublessee)
_____ (Signature)	_____ (Street Address)
	_____ (City, State, and Zip Code)

APPENDIX A

VICINITY PROPERTY MAP

AND

LEGAL DESCRIPTION

Description of Premises:

Street Address:

Tax Schedule Number:

Legal Description:

Vicinity Property Map: Refer to the following drawing(s) attached to this Agreement and incorporated herein by reference:

APPENDIX B

VICINITY PROPERTY
REMEDIAL ACTION PLAN

Surveys have shown that low-level radioactive contamination exists on the Vicinity Property. In order to meet the general health and environmental standards promulgated by the U.S. Environmental Protection Agency (EPA) in 40 CFR Part 192, it will be necessary to remove residual radioactive material and, as may be required, such plantings and property improvements on the Vicinity Property within the shaded area as shown in Appendix A.

Following removal of residual radioactive and other contaminated material and verification by the DOE that the Vicinity Property meets the EPA standards, the Vicinity Property will be restored as reasonably practical to its condition as of the start of the remedial action. Best efforts will be made to minimize disruptions and inconveniences to the Owner.

The following sequence of remedial action operations is anticipated for this Vicinity Property:

- Radiologic measurements to precisely establish and mark contamination limits to guide the excavation.

- Photography of existing property conditions for verification during restoration work.

- Removal of personal property items from the affected areas for storage by owner or by DOE in an uncontaminated area during the remedial action.

- Installation of a temporary safety/security fence around the excavation site where required.

- Removal and disposal as required from the affected areas are shown in the following: Drawing No.:

- Excavation of contaminated soil from the affected areas. Dust control measures will be used during excavation and loading in order to minimize airborne contamination as well as dust. Continuous radiological monitoring of the excavated surface will be performed in order to determine when sufficient material has been removed. Covered dump trucks will be used to transport the residual radioactive and other contaminated materials from the Vicinity Property to the tailings repository. Underpinning of building foundations will be performed where necessary due to excavation.

- Prior to or during the course of remedial action at the Vicinity Property, DOE and the State may determine that any resident of the Vicinity Property is entitled to dislocation assistance payments. Such dislocation assistance payments in support of said residents removing themselves from the Vicinity Property during all or part of the remedial

action activities thereon may be used for temporary sleeping accommodations, meals, and other daily living expenses at a location other than the Vicinity Property. Entitlement of these dislocation assistance payments will be in accordance with the following schedule:

- Per diem as follows:

- The structure will remain occupied during the remedial action. The DOE will use its best efforts to assure safe access to the building at all times while the decontamination is in progress.

o Radiologic sampling and analysis of the site will be performed by DOE in order to certify that uranium mill tailings or other residual radioactive material have been removed from the Vicinity Property in accordance with the EPA standards.

o Restoration of any utility service lines disturbed during remedial action and inspection to assure that they function properly as well as meet local code requirements.

o Backfilling of the affected areas to their original grades prior to the start of fixture replacement and landscaping where required.

o Re-establishment of interior and exterior concrete work, such as _____ _____, which were removed by the remedial decontamination.

o Importing and finish grading of a minimum of sixteen (16) inches of topsoil in those areas to be landscaped.

o Landscaping of the property to a condition as closely resembling the conditions prior to beginning remedial action as possible. Lawns will be replaced with sod.

o Re-establishment of any permanent fencing removed during cleanup work.

o Return or replacement of property items removed during the course of remedial action.

o Removal of temporary safety/security fencing, if installed.

o Final inspection and approval (Owner will be included).

During and/or following the restoration of the property, indoor air sampling may be required in all habitable structures before the property can be considered for certification.

Two sampling methods are used to determine RDCs. Grab samples are taken first. If the results are acceptable, no further testing is required. If grab samples fail to meet the standards, detectors are placed in the structures for one year. At the end of the year, the detectors are processed and the results are obtained. If the results are not satisfactory, further exploratory survey is required to confirm that the high readings are not from uranium mill tailings.

Grab sampling measurements are required to monitor the radon daughter concentration (RDC) in the structure. A high RDC indicates the possibility that tailings may be present in or below the structure. RDCs form from the breakdown of the uranium mill tailings. Grab sampling entails the collection of multiple five-minute air grab samples. The measurement will be scheduled at a mutually convenient time for the homeowner. A convenient time will be delineated per the following criteria:

- The house will be closed 12 hours prior to sampling. This will involve closing all external openings (i.e., windows and doors). Further, it will include the deactivation of ventilation systems that introduce outside air.

- Wind speeds must be less than 10 mph for four hours preceding the sampling.

- Sampling will take place Monday through Friday, between the hours of 8:00 a.m. and 4:30 p.m.

In the event the RDC measurement exceeds an administrative limit of 0.01 working level and/or at the discretion of the Health Physics Site Manager, additional grab samples may be collected and/or Track-Etch Type SF detectors will be installed and monitored for a period of one year.

A Track-Etch detector is a small cup (1-1/4" round x 1" long) containing a section of plastic that is sensitive to radon gas. The detectors are hung inside a home at a location chosen by the worker and agreed upon by the resident. Radon gas in the home passes through filter on the front of the cup, and the plastic strip measures the average level of radon in the home. Typically, detectors are placed in the lowest part of the home, since radon gas enters from the earth and is at maximum concentration in lower rooms or the basement. Detectors are usually left in place for one year, at which time an appointment will be made to return and collect them. The detectors are then sent to the manufacturer to determine average radon levels seen the the home. If a home does not meet the EPA standards based on this measurement, additional inspections and other actions may be required.

APPENDIX D

BID PACKAGE PREPARATION PROCEDURES

TABLE OF CONTENTS

D.1 ENGINEERING PROCEDURES

D.1.1 REVIEW OF RADIOLOGICAL AND ENGINEERING ASSESSMENTS

The initial step in engineering for remedial action final design is to conduct a review of the information developed during the Radiological and Engineering Assessment, and any guidance from DOE pertaining to the assessment. If not already performed, all appropriate documentation shall be revised as necessary to reflect an agreement between the DOE and the vicinity property remedial action contractor on the final design basis for remedial actions.

This review shall also define requirements for, and necessary detail of, any additional information such as topographic surveys, radiological measurements, additional detail on building or foundation plans, and assessments of building code deficiencies.

D.1.2 DESIGN DEVELOPMENT

Following the collection and review of all necessary data, design development work shall be initiated using the approved assessment for guidance. Any supplemental design criteria required shall be identified at this time.

Drawings, layouts, and any supporting calculations are normally developed at this time.

A thorough check of all applicable codes, regulations, and laws should be made. All design interpretations received shall be supported by written documentation.

A description of drawing and specification preparation procedures is provided in subsequent sections of this appendix.

D.1.3 DESIGN CALCULATIONS

Design calculations, except for computer printouts, shall be performed on standard computation paper. Computation records shall contain the following information:

- Reference to drawings, other calculations, design data, and other sources such as textbooks, engineering manuals, and vendors' catalogs, by title, date, and page number.
- Assumptions used and the basis for their use.
- Complete explanations and sketches as required to facilitate review without misinterpretations.
- Conclusions derived from the computation work.

D.2 DRAWING PREPARATION PROCEDURES

D.2.1 GENERAL

Drawing format, size, and identification shall be as approved by the DOE.

D.2.2 DRAWING CONTENT

Each set of drawings may include a title sheet, vicinity map, site plan, index of sheets, and adequate information to prepare for the desired remedial action. The amount of information and the number of drawings required will vary with the size and complexity of each property.

By discipline the drawings may include, reflect, or indicate the following information:

Civil design

- Limits of contract activity.
- Storage and utility areas for use of the contractors.
- Registered survey of property, if appropriate.
- Established benchmark(s).
- Property lines and easements, if appropriate.
- Existing and new grade contours, including finish grades near buildings.
- Location and layouts of all utilities (plus possible access to these facilities for construction).
- Soil boring data, if appropriate.
- Location, type, size, elevation and other details for all retaining walls, fences, and other site improvements affected by remedial action.
- Correlation of detail, especially with utility, foundation, and landscaping drawings, if appropriate.
- Paving and surfacing information including details which indicate type and thickness of concrete or bituminous paving and aggregates, surface finish, reinforcing, reinforcing dowels, joint details, joint layouts, curb details, sidewalk details, outdoor steps and railing details, and all other paving-related details.

- Utility details including details for pipe trenching, bedding and backfill, inlets, catch basins, cleanouts, manholes, meters, meter boxes, distribution and valve boxes, pits, septic tanks, leaching fields, headwalls, fire protection, water piping anchor and thrust block details, pipe guards, and all other utility-related details.

- Existing trees and landscaping and new landscaping details, including details of sodded, seeded, and planted areas, and installation details for sprinkler systems, if appropriate.

- Miscellaneous site details including details of fencing, large-scale layouts of site areas, and other miscellaneous details, where appropriate.

Foundation and structural

- New and existing foundation materials and systems, including, as appropriate, foundation or basement walls and footings, bank support or shoring, underpinning, and subdrainage.

- Location and depth of foundation support of adjacent structures if shoring or underpinning work is anticipated.

- All foundation concrete work shall be shown and both typical and special details provided especially where these items affect the anticipated construction sequence. The dimensions of all concrete shall be provided together with the location and spacing of reinforcing in either graphic or schedule format.

- Foundation plans shall be correlated with mechanical and electrical plans or specifications. All pits and trenches shall be shown and dimensioned on the foundation plan(s). These dimensions must be carefully correlated with those given on other plans, as appropriate.

- Openings or sleeves for all pipe and ducts passing through the footings, grade beams, and below grade interior or exterior walls shall be shown.

- Miscellaneous details such as damp-proofing and waterproofing shall be included on foundation plans.

- Structural plans, where required, shall show building lines, existing structural framing, and any modifications to implement the proposed work such as jack support details and needle beam.

- Safety requirements shall be referenced on drawings and correlated with appropriate specifications and contract special condition requirements.

Architectural, mechanical and electrical

Architectural, mechanical (including plumbing and HVAC), and electrical drawings are only to be prepared when required to adequately describe the remedial action activities. Wherever possible such work will be described in specification requirements and requested of the remedial action construction contractor as furnished shop drawings.

D.2.3 DRAWING CHECKS AND APPROVALS

All drawings shall be checked and signed-off by the engineer or designer, drafter, checker, and person authorized for RAC approval. A space shall be provided in the title block for DOE approval signature.

D.3 SPECIFICATION PREPARATION PROCEDURE

D.3.1 GENERAL

Specification format shall be consistent with the guidelines developed by the Construction Specifications Institute (CSI) or any further guidance provided by the Project Office. CSI-based guide specifications may be used to develop the necessary remedial action specifications. Project Office guide specifications and formats shall be used in any cases where the format conflicts with CSI format.

D.3.2 SPECIFICATION CONTENT

Construction specifications shall be prepared as performance specifications for all construction activities in sufficient detail to identify tne requirements for the control of the quality of construction materials, installed products, and workmanship.

Individual specifications shall include the following information as appropriate:

- o Quality control.
- o Optional materials or methods where applicable.
- o Required guarantee.
- o Detailed descriptions of required products.
- o Acceptable manufacturers, where applicable.
- o Required physical properties.
- o Required performance.
- o Type and grade of finish, where applicable.
- o Fabrication or installation method, where required to obtain required performance.

Information contained in the specifications shall supplement information shown on the drawings without repeating it. Material and Equipment Specifications shall be prepared in sufficient detail to ensure required quality and performance characteristics. All specifications shall be prepared to support and expedite competitive activities.

D.4 CONSTRUCTION COST ESTIMATE PROCEDURES

A construction cost estimate shall be prepared for each property. The estimate will include a summary, work sheets, and basis for the estimate.

D.4.1 CONSTRUCTION COST ESTIMATE SUMMARY

The Construction Cost Estimate Summary shall consist of a schedule of quantities and unit prices showing quantity, unit cost, and total cost for each estimate line item and the total cost for each property.

D.4.2 WORK SHEETS

Estimate work sheets shall show details of calculations of costs for each line item. Each item shall be comprised of one or more construction operations. An operation is a subdivision of the work which encompasses a specific construction activity for which a meaningful unit price can be established.

Items listed on the work sheet shall conform to the items of material and work identified in the design documents.

Work sheets shall show Labor, Permanent Material, Construction Equipment, Supply and Subcontract costs for each operation and the Indirect Cost added to each estimate line item.

D.4.3 BASIS OF ESTIMATE

The basis of estimate shall be a brief narrative or table providing a description of the scope of work and definitions of the criteria and assumptions upon which the estimate is based.

D.5 FINAL DESIGN PACKAGE

Following RAC review of the drawings, technical specifications, and cost estimates for vicinity property remedial action designs, the documentation is assembled into a final design package and submitted to DOE for review, comment, and approval.

Final design packages consist of the following as a minimum:

- Drawings and plans.
- Technical specifications.
- Special conditions.
- Engineer's construction cost estimate and summary cost estimate.
- All supporting design calculations and design basis information shall be available upon request.

Packages shall be issued for DOE review under a letter of transmittal signed by the RAC.

APPENDIX E

VERIFICATION PROCEDURES

TABLE OF CONTENTS

E.1 INTRODUCTION

Verification surveys are intended to provide data which document radiological conditions prior to backfilling and possibly after excavations have been backfilled. Verification measurements will be similar to those performed during pre-remedial action assessments (inclusion surveys and radiological and engineering assessments). The same types of instrument and measurement techniques used for the Radiological Engineering Assessment (REA) survey will be used. Appendix A, Inclusion Criteria and Procedures, describes the appropriate measurement procedures.

E.2 PRE-RESTORATION GAMMA SURVEY AND SOIL SAMPLING

Prior to backfilling, a total gamma scan is performed over the excavated areas plus approximately ten feet around the excavation in order to detect any remaining gamma anomalies. Areas are scanned at near-surface height using calibrated microR meters or gamma scintillation meters, and the range of readings are recorded along with any anomalous readings. For properties located near a source of gamma radiation (e.g., tailings piles) making interpretation of microR meter readings difficult, in-situ soil assays such as delta measurements may be performed. A survey grid may be used to approximate the X and Y coordinates used for initial characterization of the area (inclusion or REA surveys).

Once gamma measurements indicate that the standards have been met verification samples will be taken. A composite sample is collected from each contiguous grid section at ten-foot intervals. Each composite represents an average over 100 square meters (± 20%). In addition, areas of less than 100 meters square are sampled at one aliquot per grid section and aliquots may be composited from several noncontiguous deposits to comprise a sample. Lower density sampling may be instituted on large areas with previous concurrence by the DOE.

Samples are analyzed for Ra-226 content and other radionuclides if such contamination is evident. The analytical method employed in the field may not have the accuracy necessary for assuring that the standards have been met. Therefore, a factor of conservatism should be applied when the data are used for determining when to backfill, to correct for potential inaccuracies due to moisture conditions, radon emanation fraction, background radionuclide concentrations, or other complicating circumstances.

The Independent Verification Contractor (IVC) will take soil samples (if this property is to undergo independent verification) for analysis and comparison results. The RAC's final soil samples from the excavated area will be prepared and analyzed for final radiological documentation that the property meets EPA standards. This data will be reported on the completion report. All soil samples must be archived by the RAC until the property is certified by the DOE. The RAC is allowed to recommend certification for properties where the Ra/Th ratio does not indicate the presence of tailings related materials. If this ratio is to be used, a site-specific study must be performed to establish an appropriate cutoff ratio.

Analytical results are compared to the EPA standards of 5 pCi/g above background Ra-226 if less than 15 cm of backfill are required, or 15 pCi/g above background if more than 15 cm of backfill will be used.

E.3 INDOOR GAMMA SURVEYS

Gamma scans will normally be performed in every room in the lowest habitable level of each building where remedial action was performed indoors or within ten-feet of the structure outdoors. In addition, gamma surveys must be performed in habitable structures with no previous measurements or with previous measurements above the standards. A calibrated microR meter will be used to perform a total scan of floors and walls, except in rooms larger than 2000 square feet which have been gridded during previous assessment surveys. In these large rooms, previous grids will be reproduced and instrument measurements will duplicate the previous survey.

Rooms in which measurements average less than 20 microR/hr above background are considered to have met the intent of the EPA standards. However, any single measurement in a room exceeding 20 microR/hr above background must be evaluated to ensure no large hidden deposit is left.

E.4 INDOOR RADON DAUGHTER CONCENTRATIONS

Locations at which indoor radon daughter concentrations were measured during pre-remedial action assessment surveys and found to exceed the inclusion criteria or EPA standards must be resurveyed following the completion of the remedial action. The extent of these measurements will be determined by the original extent of contamination and degree of remedial action employed on the property.

Sample collection and analyses may include but are not limited to either of the two methods described in Appendix A, Inclusion Criteria and Procedures: grab sampling, or measurement of an annual average using Radon Progeny Integrating Sampling Units or other approved methods as described in Section A.2.4 of Appendix A. Verification of successful remedial action using grab samples requires that results do not exceed 0.01 working level (WL). Annual averages must not exceed 0.03 WL.

WL measurements are required after remedial action at all vicinity properties that have habitable structures to document the final radon daughter concentration (RDC) only if: (1) previous WL measurements have not been taken; (2) previous WL measurements exceeded EPA standards; or (3) remedial action was performed in or around the structure. WL measurements may be taken at the discretion of the RAC.

In structures where physical constraints prevent the RAC from obtaining RDC measurements under standard conditions, soil sample and gamma survey criteria may be used instead.

Procedures to investigate elevated RDC measurements

For properties that exceed the radon daughter working level standards, the RAC, in accordance with the following procedures, shall include data in the Completion Report to verify whether tailings or natural materials are causing the elevated working levels. The following should be performed to obtain adequate supporting data.

For interior surveys:

- Surface gamma scans of all walls, floors and ceilings shall be performed with average results for each room or 9.3-square-meter area being documented.

- Samples of construction materials shall be taken where anomalies were found during the gamma scan (background plus 30 percent).

- Ra-226/Th-232 ratio determined by multi-channel analyzer (MCA) per three-inch by three-inch NaI system reading at anomalies shall be taken. Ra-226/Th-232 ratios shall be compared to site-specific cutoff ratios to determine whether or not uranium ore or tailings materials are involved.

- Boreholes shall be taken by the RAC and logged in basement floors or slab-on-grade where anomalies were found during the gamma scan (background plus 30 percent).

- A minimum of four boreholes shall be drilled per 2000 square feet of habitable structure, in basement floors or slab-on-grade, even if no anomalies are found during gamma scan.

- Subsurface penetrations in slab-on-grade or basement walls and floors should be checked via gamma readings and Rn measurements.

- Construction materials used in the structure -- concrete block, glazed, block, and the like -- should be documented.

- Areas where Rn could seep into a habitable structure -- earth floors, cracks in basement walls/floors, utility penetrations, and the like -- should be documented.

For exterior surveys:

- Gamma scans within 10 feet of habitable structures will be performed.

- Boreholes shall be drilled by the RAC and logged where anomalies were found during gamma scan (background plus 50 percent).

- A minimum of four boreholes shall be drilled by the RAC, four minimum within 10 feet of habitable structures, even if no anomalies are found during gamma scan.

- Depth of boreholes should exceed depth of foundations.

- Subsurface utility runs shall be investigated via boreholes or shovel holes.

- If the results of all the above surveys are negative, the RAC will recommend certification, however, the RAC will document that an elevated RDC exists.

If any of the above indicate the presence of mill tailings, additional remedial action will be performed and a grab sample taken for verification. If the grab sample indicates RDCs above the standards, the TAC, IVC, RAC, and the DOE should meet to discuss alternatives.

E.5 DOCUMENTATION

The documentation requirements for verification procedures are outlined in Addendum E1, Certification Plan. The Completion Report, Vicinity Property Completion Report Review Summary and Decision, and other associated letters are provided to serve as content guidelines and are not intended to be used verbatim.

ADDENDUM E1

CERTIFICATION PLAN

TABLE OF CONTENTS

LIST OF FIGURES

E1.1 INTRODUCTION

E1.1.1 Purpose

Certification is the process by which the U.S. Department of Energy (DOE) determines that remedial action has been completed at a vicinity property and that the applicable U.S. Environmental Protection Agency (EPA) standards have been met. This Plan delineates the responsibilities of the Uranium Mill Tailings Remedial Action Project Office (UMTRA PO), the Grand Junction Project Office (GJPO), and other entities involved in remedial action on vicinity properties.

E1.1.2 Responsibilities

The Remedial Action Contractor (RAC) is responsible for performing remedial action on properties included in the UMTRA Project. The remedial action process is designed to bring each individual vicinity property into compliance with the EPA standards for the UMTRA Project. These standards are found in 40 CFR Part 192.12. After remedial action has been completed, the RAC shall prepare a Completion Report (CR), (outlined in Addendum E2), with the appropriate data and either a recommendation for final certification or a recommendation for certification pending radon daughter concentration (RDC) measurements. Each Completion Report is developed based on the data requirements outlined elsewhere in the Vicinity Properties Management Implementation Manual (VPMIM). In the completion report, the RAC will use property descriptions that have been coordinated with the local land record office in order to expedite state annotation of land records. The property Completion Report shall be submitted to the DOE for a certification determination. Upon approval for certification, the DOE shall notify the appropriate parties.

The TAC or the IVC may perform independent third-party assessments of the remedial action work done on select properties to ensure that all the necessary residual radioactive materials have been removed to bring the property into compliance with the EPA standards. These independent assessments shall be documented and available for review with the Completion Report. It is anticipated that this surveillance activity shall be performed on a random basis at approximately 10 percent of the remediated vicinity properties.

The TAC or IVC (if the property is to undergo independent verification) is also responsible for reviewing Completion Reports, tracking Completion Reports, and providing recommendations to the DOE for certification. The TAC reviews Completion Reports as required by DOE for accuracy and compliance with the EPA standards. After the DOE makes its decision, the TAC prepares letters of certification for DOE signature and mailing to property owners for all sites, except Grand Junction and Edgemont where the GJPO is responsible for these activities.

As required by Section 3.2.3 of the Memorandum of Understanding between the DOE and the U.S. Nuclear Regulatory Commission (NRC),

the NRC shall review the Completion Report and other necessary documents on properties. The circumstances for which Supplemental Standards apply are outlined in Subpart C of the EPA Standards. Any concerns or questions of the NRC shall be addressed by the DOE. The concurrence of the NRC is required before a final certification can be made of properties where Supplemental Standards have been applied.

The DOE is responsible for reviewing the Completion Report and other available data. The GJPO is responsible for the certification of the vicinity properties in Grand Junction and Edgemont. Upon review of all information, the DOE shall render a decision as to whether a property shall be certified or not, and shall notify the appropriate parties as detailed in E1.2.6 below.

E1.2 CERTIFICATION PROCESS

This section provides the procedures to be followed by the various groups involved in the certification process. Figure E1.2.1 illustrates the basic certification process.

E1.2.1 Remedial action

The RAC and its subcontractors shall perform remedial action as required, on all included vicinity properties. The remedial action process involves the removal of residual radioactive materials from each vicinity property to bring the properties into compliance with the EPA standards. The remedial action will be performed in compliance with standards set forth in Section 4.0 of the text. During remedial action, the RAC shall collect data in conformance with the DOE-approved procedures and protocols, documenting the radiologic condition of each individual property. This data may include gamma-radiation exposure rates, Ra-226 concentrations in soils, and radon or radon daughter concentrations in habitable structures. The data shall provide an accurate picture of the radiologic conditions of each property before and after remedial action.

The TAC or IVC (for properties in Edgemont and Grand Junction) may perform independent, third-party assessments to assure the DOE that sufficient contaminated material is being removed to comply with EPA standards prior to backfilling an excavation. These independent assessments will occur on a random basis at up to ten percent of the vicinity properties at each project site as a quality assurance (QA) function.

E1.2.2 Post-remedial-action monitoring

The RAC shall document for the DOE the radiologic condition of each vicinity property included in the UMTRA Project after remedial action has been completed.

A certain amount of post-remedial action monitoring may be necessary to provide adequate documentation to verify that the property meets EPA standards. It is anticipated that this monitoring will be performed on any occupied or habitable structure on the property to ensure that radon daughter concentrations, measured in annual average working levels, comply with EPA standards. Such monitoring may require up to one year to complete. If the monitoring shows that radon-daughter levels exceed the EPA standards, the RAC and implementing agencies shall investigate all necessary alternatives to bring the property into compliance with the standards.

E1.2.3 Property completion report

Upon conclusion of remedial action, the RAC shall prepare a Completion Report on each individual vicinity property or each authorized group of properties. The Completion Report shall be in the

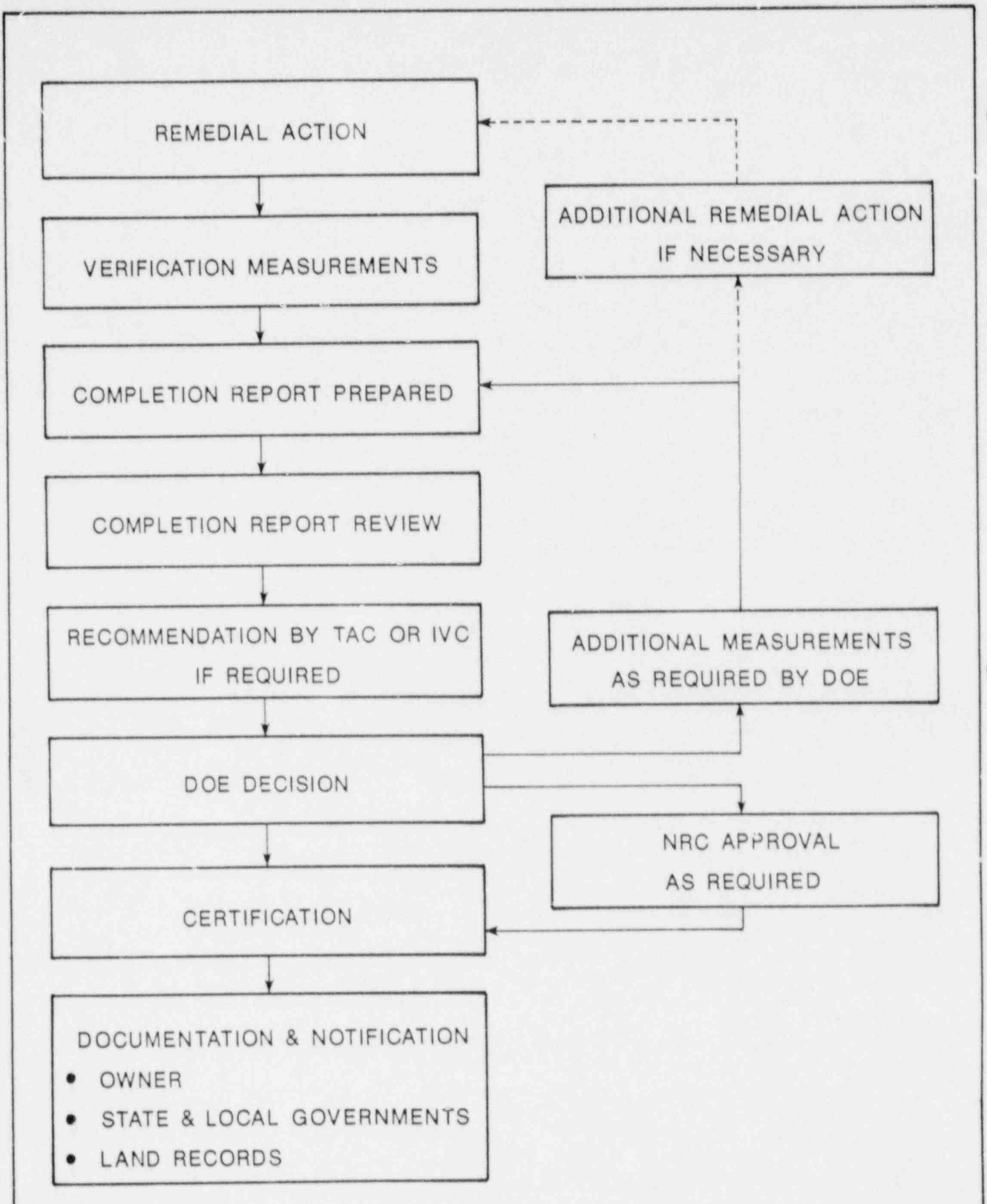


FIGURE E1.2.1
CERTIFICATION PROCESS FLOW DIAGRAM

format approved by the DOE (Addendum E2, Completion Report). The Completion Report shall include an Operations Summary which documents the nature and extent of the residual radioactive materials removed from the property and the date the remedial action was completed as well as a Verification Summary which documents the radiologic conditions on the property prior to remedial action and the radiologic condition of the property after remedial action has been performed.

In addition, the Completion Report shall identify the legal owners of the property, the RAC, and the construction subcontractor who performed the removal of the contaminated material, and shall provide a recommendation as to whether the property should be certified by the DOE. The Completion Report shall be signed by the RAC Project Manager and then be submitted to the DOE for review and approval.

Completion Reports for properties which received independent verification will be reviewed by the IVC and will receive an appropriate recommendation from them. The TAC will review Completion Reports for other properties at all sites except Grand Junction and Edgemont. Completion Reports for properties in Grand Junction and Edgemont will be reviewed by GJPO. The Certification Summary (Figure E1.2.2) shall be prepared by a preliminary reviewer prior to evaluation by the DOE. This summary shall briefly itemize the EPA standards and criteria used to assess the property for certification. The reviewer will complete the required portion of the summary and submit it with the Completion Reports to the DOE.

E1.2.4 Certification Review

The DOE shall review the Completion Report, Certification Summary, and other applicable data. The DOE shall examine the Completion Report, complete the applicable portion of the Certification Summary, and either concur with the recommendation made by the reviewer or decide that additional information is needed. If the DOE requires additional data to make a decision, the DOE shall notify the RAC and specify the additional information needed to make a determination (Figure E1.2.3).

If additional measurements and possibly remedial action are warranted, the owner will be notified by the DOE of the need for additional access (Figure E1.2.4). In cases where certification is dependent on data from previously-installed alpha track devices the owner will not be notified.

Where EPA Supplemental Standards have been applied to a specific vicinity property, it will be necessary to have the concurrence of the NRC in order to certify the property. Once the DOE has determined that a property is eligible for certification, the DOE shall be responsible for forwarding the necessary documentation to the NRC for review and concurrence (Figure E1.2.5). The NRC shall notify the DOE of its decision. If the NRC determines that more data are needed to make its decision, the DOE shall obtain additional data and resolve outstanding issues with the NRC.

Location No.: _____ Date: _____

The data presented in the property portfolio indicate:

	REVIEWER EVALUATION			DOE EVALUATION		
	Yes	No	N/A	Yes	No	N/A
1. The Ra-226 concentration in the top 15 cm of soil averages < 5 pCi/g above background over 100 m^2 in-situ [] lab [].	[]	[]	[]	[]	[]	[]
2. The Ra-226 concentration in any 15 cm layer of soil below the top 15 cm surface layer averages < 15 pCi/g above background over 100 m^2 in-situ [] lab [].	[]	[]	[]	[]	[]	[]
3. The indoor gamma readings are < 20 uR/hr above background in every habitable room.	[]	[]	[]	[]	[]	[]
4. The radon daughter concentration in any habitable room is < 0.02 working levels, or at most 0.03 working levels.	[]	[]	[]	[]	[]	[]
5. Supplemental standards were applied in accordance with EPA standards 192.21.	[]	[]	[]	[]	[]	[]

Reviewer's Recommendation: [] certification, [] additional measurements, [] additional remedial action.

_____ _____
Reviewer (Organization)

_____
Date

DOE Decision: [] certify, [] additional measurements, [] additional remedial action.

_____
Project Officer/Certification Official
UMTRA Project Office/GJPO

_____ _____
Date

FIGURE E1.2.2
VICINITY PROPERTY CERTIFICATION AND DECISION

(RAC)
(RAC Address)

Dear (Name) :

Enclosed is the (TAC Vicinity Property Completion Report Review Summary/ GJPO Preliminary Summary) (RAC) Completion Report for the following (Site) Vicinity Property:

Additional measurements are required prior to consideration for final cleanup to EPA standards per the attached review. It is requested that these data be submitted under a new recommendation for either additional remedial action or certification.

Your assistance in this matter is appreciated. Should you have any questions, contact (Project Officer/Certification Official) of the (UMTRA PO/GJPO).

Sincerely,

(COR's Name, Title)
(UMTRA PO/GJPO)

Enclosure

cc:
State Representative

bcc w/o enclosure:
Certification Folder
VPDMS, JEG

FIGURE E1.2.3
REQUEST FOR ADDITIONAL MEASUREMENTS AND/OR REMEDIAL ACTION

Location No. _____
Address: _____
_____

(Property Owner)
(Owner's Address)

Dear (Owner's Name) :

Under the Uranium Mill Tailings Radiation Control Act of 1978, Public Law 95-604, the U.S. Department of Energy (DOE) performed remedial action at your property contaminated with residual radioactive material from an inactive uranium mill site. Prior to the certifying that the property is in compliance with EPA standards, additional radiation measurements and/or remedial action may be necessary.

Representatives of (RAC), contractor to the DOE, will be contacting you to discuss planning of future activities which are consistent with the remedial action agreement you previously signed. Your discussions with (RAC) personnel should provide a general idea of when the additional measurements and/or remedial action will be performed.

Should you have any questions regarding the project or your property, please write to me at the above address, or call (Project Officer/Certification Official) of my staff at (phone number). Your cooperation in assisting us in the accomplishment of this work will be appreciated.

Sincerely,

_____
(Manager's Name, Title)
(UMTRA PO/GJPO)

cc:
State Representative

bcc:
VP Manager (TAC)
VP Manager (RAC)
Project Officer/Certification Official (DOE)
NRC
Property File

FIGURE E1.2.4
OWNER NOTIFICATION OF NEED FOR ADDITIONAL MEASUREMENTS

Location No. _____
Address: _____
_____

(Name)
U.S. Nuclear Regulatory Commission
Uranium Recovery Field Office
P. O. Box 25325
Denver, Colorado 80225

Dear (Name):

In accordance with Public Law 95-604, EPA Regulations 40 CFR Part 192, and the Memorandum of Understanding between DOE and NRC (GM04-85AL26037), two copies of the Vicinity Property Completion Report for the above property are submitted for NRC certification concurrence.

_____
DOE Project Officer/Certification Official

cc:
State Representative

bcc:
Property File

FIGURE E1.2.5
NRC CONCURRENCE LETTER

Based on the NRC's evaluation, this property:

[ ] should be certified.
[ ] needs additional data to make the certification decision.

Additional Data Required: _____

_____

_____

_____

_____ _____
NRC Designated Official Date

_____

DOE Response to Data Request: _____

_____

_____

_____

_____ _____
DOE Project Officer/Certification Official Date

_____

Based on NRC's evaluation of the additional data, the NRC:

[ ] Concurs in the certification of this property.

_____ _____
NRC Designated Official Date

FIGURE E1.2.5 (CONCLUDED)
NRC CONCURRENCE LETTER

E1.2.5 Certification decision

A DOE-designated Project Officer/Certification Official shall review the Completion Report, Certification Summary, and all available data prior to making a decision. Certification assures that all available data indicate EPA standards have been met. Upon a finding that the property's reported condition complies with the EPA standards and the reports are in good order, the Project Officer/Certification Official shall sign the Certification Summary and recommend that the property be certified. Based on this recommendation, the DOE shall render a written determination certifying a property as meeting the EPA standards. In those instances where an NRC concurring opinion is necessary, a final decision shall not be made until the NRC has issued its concurrence.

Upon finding a property to qualify for certification, the DOE shall sign the Notification of Certification letter (Figure E1.2.6). The Completion Report, completed Certification Summary, Record of Decision from the NRC if Supplemental Standards were applied, and the signed Notification of Certification letter shall be distributed by the DOE.

E1.2.6 Notification and documentation

The DOE shall provide notification of certification in the following manner. The current property owner of record will receive a Notification of Certification letter. Copies will be distributed as noted on the Figure E1.2.6 carbon copy listing

The details of the archiving procedure will be outlined in the UMTRA Project Document Control System Manual to be issued by the DOE.

The state shall be responsible for annotating the land records of each certified vicinity property. Annotation shall be in compliance with regulations promulgated by the DOE and with appropriate state regulations. The state shall proceed with this process upon receipt of its copies of the certification letter and completion report. This requirement is not applicable to vicinity properties on Indian lands.

Vicinity Property No. _____
Address: _____
_____

(Property Owner)
(Owner's Address)

Dear (Owner's Name):

Under the Uranium Mill Tailings Radiation Control Act of 1978, Public Law 95-604, the U.S. Department of Energy (DOE), with ten percent funding provided by the state, has completed remedial action at the property address listed above. Review of the available data indicates that your property has been cleared of residual radioactive contamination to the extent required by the U.S. Environmental Protection Agency (EPA) standards (40 CFR Part 192). Therefore, the DOE certifies that your property is in compliance with the EPA standards.

The current status of your property will be recorded by the state on the appropriate property records, per requirements of Public Law 95-604. Records of UMTRA Project vicinity properties are archived with the state and the DOE.

Should you have any questions regarding the project or your property, please call (Project Officer/Certification Official) of my staff at (phone number) or your (State Radiological Health Office). Your cooperation in the successful accomplishment of this work has been greatly appreciated.

Sincerely,

_____
(Manager's Name, Title)
(UMTRA PO/GJPO)

cc:
State Representative

bcc:
VP Manager (RAC)
VP Manager (TAC)
NRC
Property File

FIGURE E1.2.6
OWNER NOTIFICATION OF CERTIFICATION

BIBLIOGRAPHY FOR ADDENDUM E1

PL95-604 (Public Law 95-604), 1978. Uranium Mill Tailings Radiation Control Act of 1978, 42 USC 7901, November 8, 1978, 95th Congress of the United States of America, Washington, D.C.

DOE-NRC MOU (Memorandum of Understanding between the U.S. Department of Energy and the U.S. Nuclear Regulatory Commission), 1985. DOE GM04-85AL26037, prepared by the U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.

Federal Register, Volume 48, No. 3, January 5, 1983, 40 CFR Part 192, U.S. Environmental Protection Agency.

ADDENDUM E2

SAMPLE COMPLETION REPORT

TABLE OF CONTENTS

VICINITY PROPERTY

COMPLETION REPORT

AT

VICINITY PROPERTY NUMBER: (AA99999-AA)

(ADDRESS)

(REPORT DATE)

FOR

URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT
U. S. DEPARTMENT OF ENERGY
ALBUQUERQUE, NEW MEXICO

BY

(RAC)

(RAC PM SIGNATURE)
PROJECT MANAGER

(RAC) has been granted authorization to perform remedial action under the Uranium Mill Tailings Radiation Control Act of 1978, Public Law 95-604. Remedial action was done in accordance with the EPA Standards for Cleanup of Lands and Buildings Contaminated with Residual Radioactive Material from Inactive Uranium Processing Sites, 40 CFR Part 192.12 and Part 192.20-23.

VPMIM, March 1988

E2.1.3 SUMMARY OF REMEDIAL ACTION

DOE ID No.: GJ-

Mesa County Tax Parcel No.: , confirmed

Legal Description:

City of Grand Junction, County of Mesa, State of Colorado

Property Address:

Grand Junction, Colorado {zip}

Property Owner:

Grand Junction, Colorado {zip}

Property Category:

Inclusion Survey Contractor:

Inclusion Notification Date:

Remedial Action Contractor: UNC Geotech

REA Completed:

Construction Subcontractor:

Preconstruction Conference Record:

Notice of Final Completion Inspection:

Volume of Material Removed: Exterior: cu yd
Interior: cu yd

Area Cleaned Up: m^2

Property Completion Report Submitted:

E2.1 SUMMARY

Property Number: ( )

Property Address: ( )

Property Owner: (Name)
(Address)

Property Category: (Single residence, commercial, etc.)

Remedial Action Contractor:

Construction Subcontractor(s): (Name(s))
(Subcontract number)

Radiologic Contractor:

REA Approved: (Date)

Remedial Action Started: (Date)

Remedial Action Completed (Appendix C Signed): (Date)

Volume of Material Removed: Indoor: (cubic yards)
Outdoor: (cubic yards)

Disposal Site[a]

[a]If other than processing site, an explanation is required.

E2.2 OPERATION SUMMARY

E2.2.1 ABSTRACT OF REMEDIAL ACTION PLAN

(Brief description of areas excavated, items removed and replaced).

E2.2.2 PREVIOUSLY UNIDENTIFIED CONTAMINATION

(Brief description of uranium mill tailings contamination and areas excavated that were not in the REA).

E2.2.3 UNANTICIPATED ITEMS DURING REMEDIAL ACTION

(Brief description of unplanned events occurring during the remedial action activities including any additional work that affected the costs or schedule).

E2.2.4 APPLICATION OF SUPPLEMENTAL STANDARDS (IF APPLICABLE)

(Brief description of any areas where Supplemental Standards were applied, including the reason for using Supplemental Standards. The date of NRC and state/tribe concurrence should be given. The volume, location, and activity of any contamination left on the property should be given).

E2.2.5 WARRANTY WORK (IF APPLICABLE

(Brief description of nature of work and related data. The date should be given).

E2.3 VERIFICATION SUMMARY

E2.3.1 RADIOLOGICAL SURVEY DATA

All survey data were acquired according to approved procedures.

Pre-remedial action surveys

The results of the survey defining the contaminated areas requiring remedial action are presented in Figures E2.3.1 and E2.3.2; reference the REA dated _____ for individual measurement results.

Pre-restoration survey

Exterior (if applicable)

After removal of contamination and prior to backfilling, a gamma scan was completed by (RAC). The exposure-rate values ranged from (uR/h) to (uR/h), and averaged (uR/h). These data are presented in Figure E2.3.3. (Additional soil samples were collected and analyzed for Ra-226 concentration. Sample locations appear on Figure E2.3.3, with Ra-226 concentration values in Table E2.3.1). These results confirm that exterior contamination has been reduced to levels below the EPA standards for radium in soil.

Interior (if applicable)

Following the excavation of contaminated material, a gamma scan (and soil samples analyzed for Ra-226 concentration) indicated that property no. (AA99999-AA) met the cleanup criteria of the U.S. EPA. These data are provided in Figure E2.3.4 and Table E2.3.1.

Radon daughter concentration (RDC) measurements were made in (number) locations according to procedure (RAC procedure no.). These locations are shown on Figure E2.3.4 and results in Table E2.3.1. These results confirm that indoor radon daughter concentrations have been reduced to levels below the EPA standards.

E2.3.2 RECOMMENDATION FOR CERTIFICATION

(Brief description of results compared against EPA standards).

Figure E2.3.1 Pre-remedial action exterior radiological assessment (combine with Figure E2.3.2 if possible)

- o Property boundary.
- o Structures and landscape.
- o Utilities.
- o Gamma exposure rate grid point measurements (above an approved threshold value).
- o Soil sample locations[a] (if applicable).
- o Borehole locations[a] (if applicable).
- o Extent of contamination.

[a]Soil sample and borehole results located on Table E2.3.1.

Figure E2.3.2 Pre-remedial action interior radiological assessment (if applicable)

- o Structure outline.
- o Room outlines.
- o RDC sample locations.[a]
- o Borehole locations.[a]
- o Gamma exposure rates.
- o Basement and second story (if applicable).

[a]RDC sample and borehole results located on Table E2.3.1.

Figure E2.3.3 Post-excavation exterior radiological survey results (combine with Figure E2.3.4 if possible)

- o Property boundary.
- o Structures and landscape.
- o Utilities.
- o Verification gamma measurements.
- o Soil sample locations (if applicable).[a]
- o Extent of contamination removed.
- o Remaining contamination (if Supplemental Standards were implemented).

[a]Soil sample results located on Table E2.3.1.

Table E2.3.1 Pre-excavation and post-excavation soil sample, delta, and RDC results

Sampling Location	Ra-226 (pCi/g)		RDC (WL)	
	Pre-RA[a]	Post-RA[a]	Pre-RA[a]	Post-RA[a]
Exterior				
Interior				

[a]Footnotes should indicate the type of measurement.

Figure E2.3.4 Post-excavation interior radiological survey (if applicable)

- o Structure outline.
- o Room outlines.
- o Verification gamma measurements (room-by-room average).
- o RDC/Track-etch locations.[a]
- o Basement and second story (if applicable).
- o Remaining contamination (if Supplemental Standards were implemented).

[a]WL measurements are in Table E2.3.1.

E2.4 REFERENCES FOR ADDENDUM E2
(as required)

- Inclusion Survey Reports.
- REA.
- RAC Procedures.
- VPMIM.
- EPA Standards.

Vicinity Property No. (AA99999-AA)

ATTACHMENTS

TO ADDENDUM E2

REMEDIAL ACTION STATISTICS

Vicinity Property No. (AA99999-AA)

MATERIAL QUANTITIES

Description	Estimate Vol.	Actual Vol.	Variance Vol.	Footnote if applicable
Exterior excavation	$(yd)^3$	$(yd)^3$	$(yd)^3$	1
Interior excavation	$(yd)^3$	$(yd)^3$	$(yd)^3$	2
Exterior backfill	$(yd)^3$	$(yd)^3$	$(yd)^3$	3
Interior backfill	$(yd)^3$	$(yd)^3$	$(yd)^3$	4
Replacement concrete	$(yd)^3$	$(yd)^3$	$(yd)^3$	5
Topsoil	$(yd)^3$	$(yd)^3$	$(yd)^3$	6
Sod	$(yd)^3$	$(yd)^3$	$(yd)^3$	7
Etc.	$(yd)^3$	$(yd)^3$	$(yd)^3$	8

The footnote for each item will be explained after the table.

Variances should be explained in footnotes.

Vicinity Property No. (AA99999-AA)

REPRODUCIBLE AS-BUILT DRAWINGS
(as required)

VPMIM, March 1988

Vicinity Property No. (AA99999-AA)

SPECIFICATIONS AND CALCULATIONS
(as required)

ADDENDUM E3

ANNOTATION OF LAND RECORDS

TABLE OF CONTENTS

LIST OF FIGURES

E3.1 PURPOSE

In accordance with provisions established in the Uranium Mill Tailings Radiation Control Act of 1978 (PL95-604), Section 104, the following has been established to assure that future purchasers of remediated properties will be notified of:

- The nature and extent of radioactive materials removed from the property.
- The date such work was performed.
- The condition of the property following remedial action.

E3.2 PROCEDURES

The course of action for annotation of land records is as follows:

- Issuance of the Completion Report by the Remedial Action Contractor (RAC).
- Review and approval of the Completion Report by the U.S. Department of Energy (DOE).
- Within 30 days of certification, the DOE will forward final close-out documents to the state. This will be accomplished through transmitting the letters by certified mail/return receipt requested.
- Within 30 days of receipt of final close-out documents, the state will annotate of the property deed.
- Concurrent with annotation, the state will notify the DOE that annotation has occurred.

The above requirements satisfy the intent of the DOE legislation and assure that coordination with the affected state has been accomplished. In addition, as work at each site is completed (i.e., all properties are excluded, certified, or closed-out), a complete list of vicinity properties will be sent to the state/tribe as a final transmittal to document the status of all properties.

The procedures by which land records will be annotated will be drafted by each state and submitted to the DOE for review and approval. The finalization and implementation of annotation procedures shall not take place until the DOE Rule for Vicinity Property Annotation is issued in its final form. An example of a request for annotation proposed by the Commonwealth of Pennsylvania is in Figure E3.2.1.

The state will be informed of all properties at which owners refused participation. If the land has been remediated and then the owner refuses to continue participation in the program, the state must document the refusal on the land record. The state is required to annotate the land record if any remediation has occurred. It is at the discretion of the state to determine whether refusals on nonremediated properties are to be documented on the land record. The action by the state regarding these properties should be included in each state-proposed annotation plan.

Recorder of Deeds
Washington County
Washington, PA 15301

Re: Property at

Dear Sir:

Pursuant to the Uranium Mill Tailings Radiation Control Act of 1978, Public Law 95-604 (Nov. 8, 1978), the U.S. Department of Energy and the Commonwealth of Pennsylvania executed Cooperative Agreement No. DE-FC04-82AL19487 to carry out a remedial action program at a former uranium processing site in Canonsburg, PA, including any associated vicinity properties, in order to stabilize and control any residual radioactivity in a safe and environmentally sound manner.

Remedial action has been performed and completed at the above referenced property and improvements, and this property meets the applicable radiation protection standards promulgated by the U.S. Environmental Protection Agency (40 CFR 192).

Remedial action was carried out in accordance with the plan contained in Vicinity Property Agreement No. DE-R004-83A122497 (CA-__/VP-__). Copies of the plan as well as the completion report certifying that the property meets the EPA standards may be obtained by writing to the UMTRA Project, Department of Energy, Albuquerque Operations Office, P.O. Box 5400, Albuquerque, NM 87115.

By execution of the vicinity property agreement, the current owner of the property has consented to permit the Commonwealth to assure that any person who purchases the property after the completion of remedial action shall be informed of such action through the pubic land records. Consequently, we are requesting that a copy of this letter be attached to the deed for the above referenced property.

Thank you for your cooperation in this matter. If you have any questions, do not hesitate to contact me at the above address or Mr. James G. Yusko, Western Area Health Physicist, Highland Building, 121 South Highland Avenue, Pittsburgh, PA 15206.

Very truly yours,

Thomas M. Gerusky, Director

cc: Property Owner
DOE

FIGURE E3.2.1
EXAMPLE OF A REQUEST FOR ANNOTATION

E3.3 EXCEPTIONS

In the case of Indian lands, tribes will be exempt from the annotation requirement since lands are held by the tribe in common and will not be subject to ownership by individuals. Nevertheless, the tribes will be provided a list of all remediated properties.

ADDENDUM E4

PROCEDURE TO HANDLE OWNER REFUSALS

TABLE OF CONTENTS

LIST OF FIGURES

E4.1 PURPOSE

ne purpose of this addendum is to outline the procedures necessary to expedite the remedial action process at all vicinity properties and to close out and document those properties at which the owners refuse participation.

E4.2 REFUSAL STAGES

There are three distinct stages of owner refusal as follows:

Stage 1 - After designation/identification prior to ISC survey

Stage 2 - After ISC survey and inclusion prior to RAA signing

Stage 3 - After remedial action prior to certification

The initial action following owner refusal will be similar in all cases. This action is described in Section E4.3.1. The action taken for each stage after final refusal to participate in the Project will be addressed in Section E4.3.2.

E4.3 PROCEDURES

E4.3.1 INITIAL ACTION -- ALL STAGES

For general guidance, the amount of effort expended to obtain access to a property, or any portion of a property is limited to any combination of three documented contacts (i.e., phone calls, interviews, or letters). These three contacts are to be completed within 60 calendar days of the first attempted contact. Each contact with the property owner is included in the property file. During the contacts, the following items are presented by the DOE contractor to the property owner.

- o A current schedule of vicinity property activities in the area and emphasis that a refusal at any stage of the project could affect the final cleanup of the property.

- o A statement that if, at a later date, the owner chooses to participate in the project, remedial action may no longer be feasible.

- o A list of potential health effects associated with long-term exposure to the radon gas emitted from mill tailings deposits.

The DOE contractor discussions with the property owner must be limited to these three items. A more aggressive approach will be handled only by the DOE. Once an owner consent form is signed by the owner and noted as a refusal, the contractor shall forward the documentation to the DOE. The DOE contractor may also forward to the DOE documentation regarding the verbal refusal of an owner who is in strong opposition to continued attempts by the DOE contractor to obtain a signed refusal. Prior to forwarding this documentation, the DOE contractor is responsible for presenting the Project's intent and the consequences of refusal to the property owner. If, after three attempts by the DOE contractor, the owner refuses to sign the consent form and to allow access to the property, the DOE will be notified. The contractor will prepare a Record of Contact (Figure E4.3.1) form to document each discussion with the property owner; copies of this completed form will be forwarded to the DOE. The DOE will then make additional attempts to obtain owner cooperation. This discussion will also be documented on a Record of Contact which will be sent to the UMTRA Project Office Document Control Center and included in the property file. If this attempt fails, the DOE shall prepare a final notification to the property owner. The attached letters (Figures E4.3.2, E4.3.3, and E4.3.4) serve as examples of various letters that may be used as final notification. Each letter should be tailored as closely as possible to the situation being addressed. The letter will be sent by certified mail/return receipt requested to assure owner receipt. The letter will be adapted to address the stage of the owner refusal. Included in the letter are the following items:

- o A list of all previous contacts, including dates, participants, and outcome of visit or conversation.

_____

Vicinity Property Number

RECORD OF CONTACT WITH OWNER

DATE _____ PHONE CALL OR VISIT _____

PARTICIPANTS _____

_____

_____

_____

BRIEF DESCRIPTION OF ITEMS DISCUSSED:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

OUTCOME:

_____

_____

_____

_____

_____

_____

Recorded by Date

FIGURE E4.3.1
RECORD OF CONTACT WITH OWNER

Owner Name
Owner Address
City, State, Zip Code

Dear Property Owner:

The U.S. Department of Energy (DOE), in cooperation with the State, is currently performing remedial actions at certain residences, open lands, and commercial structures in the (City, State) areas that have been determined to contain uranium mill tailings derived from the inactive uranium mill site in (City). Remedial actions are those actions deemed necessary by DOE and the State to excavate and remove uranium mill tailings and otherwise clean up a property so that radiation levels do not exceed the standards promulgated by the U.S. Environmental Protection Agency (EPA), 40 CFR Part 192.

Previous aerial and mobile radiation measurements and historical records indicate that uranium mill tailings may be present on your property, and therefore remedial action may be required. In order to make such a determination, the DOE has contracted (ISC) to take on-site radiation measurements. If the measurements confirm levels in excess of the standards set by the EPA, then the DOE will include your property as eligible for remedial action. Further, (RAC), will perform radiological and engineering surveys in order to define the remedial action required. Subsequently, the DOE will notify you and provide for your execution a Remedial Action Agreement identifying the nature and extent of tailings contamination and the remedial measures to be affected. However, should the measurements by (ISC) indicate no tailings contamination in excess of the EPA standards, the DOE will notify you and no further action will be taken by the DOE with respect to your property.

As you can see, we have a pressing need for access to your property. On (number) previous contacts, as shown on the attachment, you indicated that you choose not to participate in the UMTRA Project. In as much as this cleanup program is voluntary in nature, the DOE will take no action with respect to your property. Nevertheless, I feel it is incumbent on me to bring to your attention four items for consideration.

First, I have enclosed a copy of a brief analysis of the potential health effects of uranium mill tailings and the associated decay chain.

Second, it is our understanding that under a recent Colorado State class law, the owner-seller of a property may be held liable in tort if he or she fails to disclose to prospective purchasers a known latent defect, such as the presence of uranium mill tailings. Although no such law is currently in effect for (State), similar

FIGURE E4.3.2
STAGE 1 REFUSAL

laws may be established. While you may have no plans to sell your property, it is possible that any tailings contamination could have implications with respect to any future sale.

Third, any remedial action required on your property will be performed at no expense to you. We have initiated remedial action in the (City) area and we would be glad to share information regarding the nature of those remedial actions.

Fourth and finally, we anticipate completion of our remedial action activities in (City) by (Month, Year). In order to meet that schedule we need to initiate remedial action on all suspect properties, such as yours, immediately. Once our project is complete, responsibility for cleanup of mill tailings at properties which have not been cleaned up may rest with the owners of affected properties. At this time, we cannot predict whether license or management requirements will be imposed by the State or the Nuclear Regulatory Commission. Please note that the State will be provided information concerning the radiological status of your property for action that they deem appropriate which may include the annotation of land records.

In light of these items, I request that you reconsider participation in the UMTRA Project. I have enclosed for your signature a Record of Final Decision which would authorize the DOE contractors to access your property as necessary to ensure compliance with the EPA Standards. I would appreciate your prompt review and execution of the form and the return of the same to my office in the enclosed postage-paid pre-addressed envelope.

If you have any questions or concerns regarding the UMTRA Project or your property, please call _____ of my staff at (___) ___-____.

Sincerely,

_____
(Project Manager)
(UMTRA Project Office/GJPO

Enclosures (3)
Record of Contact
Health Effects
Record of Final Decision

cc w/o enclosures:
Project Manager, ICS
VP Manager, UMTRA
VP Manager, RAC
VP Manager, TAC

FIGURE E4.3.2 (CONCLUDED)
STAGE 1 REFUSAL

Owner Name
Owner Address
City, State, Zip Code

Dear Property Owner:

The U.S. Department of Energy (DOE), in cooperation with the State, is currently performing remedial actions at certain residences, open lands, and commercial structures in the (City, State) area which have been determined to contain uranium mill tailings derived from the inactive uranium mill site in (City). Remedial actions are those actions deemed necessary by the DOE and the State to excavate and remove uranium mill tailings and otherwise clean up a property so that radiation levels do not exceed the standards promulgated by the U.S. Environmental Protection Agency (EPA), 40 CFR Part 192.

As you can see, we have a pressing need for access to your property. On (number) previous contacts, as shown on the attachment, you indicated that you choose not to participate in the UMTRA Project. In as much as this cleanup program is voluntary in nature, the DOE will take no action with respect to your property. Nevertheless, I feel it is incumbent on me to bring to your attention four items for consideration.

First, I have enclosed a copy of a brief analysis of the potential health effects of uranium mill tailings and the associated decay chain.

Second, it is our understanding that under a recent Colorado State class law, the owner-seller of a property may be held liable in tort if he or she fails to disclose to prospective purchasers a known latent defect, such as the presence of uranium mill tailings. Although no such law is currently in effect for (State), similar laws may be established. While you may have no plans to sell your property, it is possible that any tailings contamination could have implications with respect to any future sale.

Third, any remedial action required on your property will be performed at no expense to you. We have initiated remedial action in the (City) area and we would be glad to share information regarding the nature of those remedial actions.

Fourth and finally, we anticipate completion of our remedial action activities in (City) by (Month, Year). In order to meet that schedule we need to initiate remedial action on all suspect properties, such as yours, immediately. Once our project is complete, responsibility for cleanup of mill tailings at properties which have not been cleaned up may rest with the owners of affected properties. At this time, we cannot predict whether license or management requirements will be imposed by the State or the Nuclear Regulatory Commission.

FIGURE E4.3.3
STAGE 2 REFUSAL

Please note that the State will be provided information concerning the radiological status of your property for action that they deem appropriate which may include the annotation of land records.

In light of these items, I request that you reconsider participation in the UMTRA Project. I have enclosed for your signature a Record of Final Decision which would authorize the DOE contractors to access your property as necessary to ensure compliance with the EPA Standards. I would appreciate your prompt review and execution of the form and the return of the same to my office in the enclosed postage-paid pre-addressed envelope.

If you have any questions or concerns regarding the UMTRA Project or your property, please call (name) of my staff at (number).

Sincerely,

(Project Manager)
(UMTRA Project Office/GJPO)

Enclosures (3)
Record of Contact
Health Effects
Record of Final Decision

cc w/o enclosures:
VP Manager, UMTRA
VP Manager, RAC
VP Manager, TAC

FIGURE E4.3.3 (CONCLUDED)
STAGE 2 REFUSAL

Owner Name
Owner Address
City, State, Zip Code

Dear Property Owner:

The U.S. Department of Energy (DOE), in cooperation with the State, is currently performing remedial actions at certain residences, open lands, and commercial structures in the (City, State) area which have been determined to contain uranium mill tailings derived from the inactive uranium mill site in (City). Remedial actions are those actions deemed necessary by the DOE and the State to excavate and remove uranium mill tailings and otherwise clean up a property so that radiation levels do not exceed the standards promulgated by the U.S. Environmental Protection Agency (EPA), 40 CFR Part 192.

Until access is granted to your property to take final measurements, your property cannot be certified as being cleared of tailings material. This condition will be annotated on your deed, notifying potential property owners that the property may still contain radioactive tailings material.

As you can see, we have a pressing need for access to your property. On (number) previous contacts, as shown on the attachment, you indicated that you choose not to participate in the UMTRA Project. In as much as this cleanup program is voluntary in nature, the DOE will take no action with respect to your property. Nevertheless, I feel it is incumbent on me to bring to your attention four items for consideration.

First, I have enclosed a copy of a brief analysis of the potential health effects of uranium mill tailings and the associated decay chain.

Second, it is our understanding that under a recent Colorado State class law, the owner-seller of a property may be held liable in tort if he or she fails to disclose to prospective purchasers a known latent defect, such as the presence of uranium mill tailings. Although no such law is currently in effect for (State), similar laws may be established. While you may have no plans to sell your property, it is possible that any tailings contamination could have implications with respect to any future sale.

Third, we anticipate completion of our remedial action activities in (City) by (Month, Year). In order to meet that schedule we need to initiate remedial action on all suspect properties, such as yours, immediately. Once our project is complete, responsibility for cleanup of mill tailings at properties which have not been cleaned up may rest

FIGURE E4.3.4
STAGE 3 REFUSAL

with the owners of affected properties. At this time, we cannot predict whether license or management requirements will be imposed by the State or the Nuclear Regulatory Commission. Please note that the State may be provided information concerning the radiological status of your property for action that they deem appropriate which may include the annotation of land records.

Fourth and finally, you have signed a legally binding Remedial Action Agreement amongst yourself, the (State), and the DOE on (Date). Section 14, Subpart (a) specifically states that "the term of this agreement shall continue . . . until the remedial action upon the Vicinity Property is completed and certification by DOE, through radiologic measurement deemed appropriate by DOE, that the Vicinity Property meets the applicable radiation standards...." The DOE is under statutory responsibility to withhold the terms of this agreement, therefore compliance may be pursued through the State or U.S. Attorney Generals office.

In light of these items, I request that you reconsider participation in the UMTRA Project. I have enclosed for your signature a Record of Final Decision which would authorize DOE contractors to access your property as necessary to ensure compliance with EPA Standards. I would appreciate your prompt review and execution of the form and the return of the same to my office in the enclosed postage-paid pre-addressed envelope.

If you have any questions or concerns regarding the UMTRA Project or your property, please call (Name) of my staff at (Phone).

Sincerely,

_____
(Project Manager)
(UMTRA Project Office/GJPO

Enclosures (3)
Record of Contact
Health Effects
Record of Final Decision

cc w/o enclosures:
VP Manager, UMTRA
VP Manager, RAC
VP Manager, TAC

FIGURE E4.3.4 (CONCLUDED)
STAGE 3 REFUSAL

- Notification to the owner that the letter serves as final contact by the DOE and its contractors.

- Notification that an owner refusal or failure to respond to the letter by a given date will constitute a final refusal of participation in the UMTRA Project.

- Reiteration of the possible health effects of long-term exposure to radon gas (Figure E4.3.5).

- Presentation of the possible legal responsibilities that may be incurred by the owner upon refusal.

- Notification of the final action that the DOE will take following final owner refusal (Section E4.3.2).

The owner will be provided a Record of Final Decision (Figure E4.3.6) in which he may reconsider refusal. If no response is received by the proposed date (60 days from issuance), a refusal will be assumed and the DOE will notify the contractor to proceed with final action.

E4.3.2 FINAL ACTION

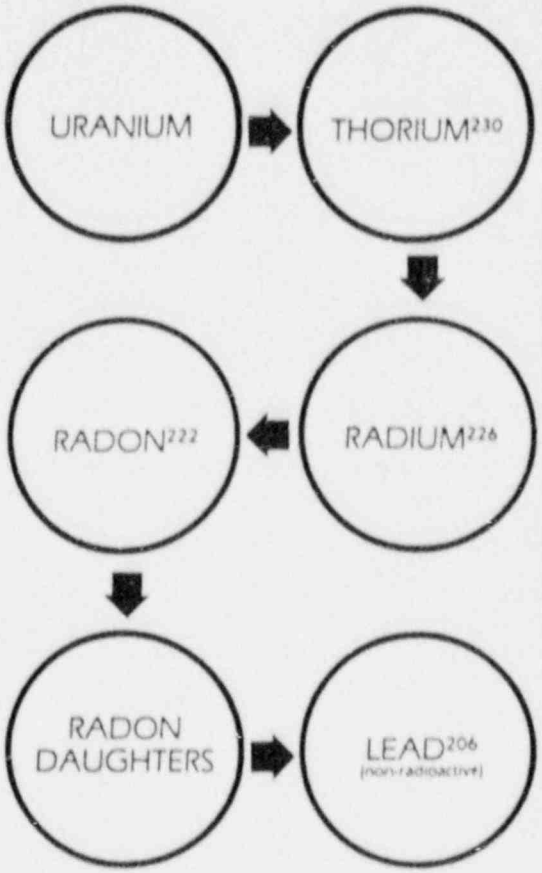
Stage 1 - After Designation/Identification

If an owner refuses to allow the Inclusion Survey Contractor (ISC) onto the property to perform an Inclusion Survey and the Initial Action has no impact, the ISC will prepare an Inclusion Survey Report with all available information (i.e., van scan information) to indicate the possible existence of tailings on the property. The owner refusal will be documented in the body of the report. An official location folder will be prepared and forwarded to the DOE. The DOE will attempt to obtain consent through initial action procedures. If consent is obtained, the folder and consent form will be returned to the ISC for action. If the owner still refuses participation, a close-out memo (Figure E4.3.7) will be sent to the file to indicate that the property cannot be included or excluded due to owner refusal. In addition, the State will be notified that the property may still contain uranium mill tailings.

Stage 2 - After ISC Survey and Inclusion

If an owner refuses to allow the RAC onto the property to perform an initial Radiological and Engineering Assessment and the Initial Action has no impact, the RAC will prepare a Completion Report (CR) with all available information (i.e., inclusion survey data) to indicate the location of tailings. The owner refusal will be documented in the body of the report. The CR will be processed as a standard CR and reviewed by the DOE. The DOE will attempt to obtain consent through initial action procedures. If obtained, the consent form will be returned to the RAC for action. If the owner still refuses participation and since the property is not eligible for certification, a close-out memo will be sent to the file to indicate that the property

WHY SHOULD I BE CONCERNED ?



The tailings used in vicinity properties may present a potential long-term hazard principally because they emit small amounts of radon. Radon is a colorless, odorless, tasteless radioactive gas formed by the radioactive decay of radium, an element found with uranium in the ore. Radon decays in turn to form non-gaseous daughter products that are also radioactive. Radon daughter products can attach themselves to smoke and dust particles and lodge themselves in the lungs, where their radioactive decay could cause damage to the lung tissue.

In many rocks and minerals, radon and its daughter products are a source of natural radiation to which everyone is exposed. A varying amount of radiation is present everywhere at all times, and this level is called the natural "background radiation." However, radon is more readily released from tailings because they have been finely crushed and contain radium in higher concentrations.

Levels of human exposure to radon and other radioactive substances in vicinity properties are quite low. Nevertheless, there is concern that even low levels of radiation may pose health hazards to those who might be exposed over long periods of time, particularly in enclosed areas. The U.S. **Environmental Protection Agency (EPA)** has established exposure levels which apply to the vicinity properties and are based on internationally recognized safety standards.

FIGURE E4.3.5
HEALTH EFFECTS

Vicinity Property Number: _____

RECORD OF FINAL DECISION

Please check the appropriate box:

[ ] YES, I grant permission for access to complete any necessary measurements or remedial action required to bring the property in compliance with EPA Standards.

[ ] NO, I no longer wish to participate in the UMTRA Project.

_____
Signature of Owner(s)

PLEASE NOTE: If no response is post-marked within 10 days after your receipt of this certified letter, a final refusal will be assumed.

FIGURE E4.3.6
RECORD OF FINAL DECISION

UMTRA

Close-Out of Vicinity Property No. XX-000
Address.
Uranium Mill Tailings Remedial Action Program

Offi al Location Folder

In accorda e with provisions of the Uranium Mill Tailings Radiation Control Act of 1978 (PL95-604), the subject property has been identified by the DOE as being eligible for consideration in the Uranium Mill Tailings Remedial Action Program. Due to owner refusal, noted on the attached Record of Final Decision, this property cannot be

a. [ ] excluded because evidence is not available to verify the absence of residual radioactive contamination in excess of the Environmental Protection Agency Standards for Remedial Action at Inactive Uranium Processing Sites (40 CFR Part 192) or

b. [ ] certified as having been cleared of resi al radioactive contamination to the extent required by the Environmental Protection Agency Standards for Remedial Action at Inactive Uranium Processing Sites (40 CFR Part 192).

Therefore, the DOE is closing out this property, thereby removing the property from the UMTRA Project.

_____
(Project Manager)
Uranium Mill Tailings Project Office

cc:
State Representative

bcc:
Inclus' . xc on or Ce ification Official, UMTRA PO/GJPO
VP Manager
VP Mana e
VP Manage
Property

FIGURE E4.3.7
CLOSE-O T MEMO

cannot be remediated or subsequently certified due to owner refusal. In addition, the State will be notified that the property may still contain uranium mill tailings.

Stage 3 - After Remedial Action

If an owner refuses to allow the RAC back onto the property to take final indoor verification measurements and the Initial Action has no impact, the RAC will prepare a CR with all available information. The owner refusal will be documented in the body of the report. The CR will be processed as a standard CR and reviewed by the DOE. The DOE will attempt to obtain consent through initial action procedures. If obtained, the consent form will be returned to the RAC for action. If the owner still refuses participation and since the property is not eligible for certification, a close-out memo will be sent to the file to indicate that the property cannot be certified due to owner refusal. In addition, the state will be notified that the property may still contain mill tailings. It will then be the responsibility of the state to annotate the land records as required by Public Law 95-604, Section 104.

E4.4 ANNOTATION OF LAND RECORDS

Public Law 95-604 requires that potential future owners of a remediated property be notified of the condition of the property. Annotation of the land record by the state will allow potential owners to know the nature and extent of radioactive materials removed from the property, the date the work was performed, and the condition of the property after remedial action. This requirement is not applicable to those properties that were not remediated. Although not required by public law, the State will be provided the status of all properties. The State may wish to annotate the land records of those properties that were not remediated due to owner refusal. This would effectively notify future owners of possible uranium mill tailings contamination on the property. See procedure on "Annotation of Land Records," Addendum E3, for further discussion.

APPENDIX F

RADIOLOGICAL SURVEILLANCE PROCEDURES

TABLE OF CONTENTS

F.1 INTRODUCTION

The goal of any radiological survey performed at a vicinity property is to accurately characterize the radiological condition of the property as compared to the remedial action standards. The Inclusion Surveys and Engineering Assessment Surveys are conducted to characterize the condition of the contaminated property; the Verification Surveys to characterize the property after remedial actions are completed. Radiological Surveillances are intended to provide a means by which the Project Office can evaluate the ISC and RAC survey plans and measurement techniques at vicinity properties. Radiological Surveillances will normally include:

- o Survey plan evaluation.
- o Measurement technique evaluation.
- o Duplicate radiological measurements.
- o Documentation evaluation.

Audits will be conducted by the TAC and IVC at selected vicinity properties. Properties are selected to provide a sampling of different physical and radiological conditions. That is, Radiological Surveillances will be performed at properties which represent populated areas as well as remote areas, borderline contamination as well as pure tailings, buried tailings deposits as well as windblown deposits, and open lands as well as structures. The intent is to perform Radiological Surveillances on up to ten percent of all vicinity properties at which remedial actions occur.

F.2 SURVEY PLAN EVALUATION

Survey plans generated by the RAC which designate grid sizes and measurement locations are evaluated during each audit to assure an ability to measure criteria given in the EPA Standards. The following aspects of each plan are evaluated.

Grid size. Outdoor grids are evaluated for the following:

- Grid spacing should be no larger than 10-foot centers, except in remote, open land areas, unless instrumentation is used which can "view a larger area." Grid sizes should not be smaller than three-foot centers.

- Grid spacing and sampling intensities for large areas of windblown contamination vary according to the extent of contamination, and will be approved by the appropriate implementing agencies. This survey plan duplicates the procedures previously used at the property for assessment surveys and verification surveys.

Measurement location selection. For measurements where grids are not required, measurement locations are evaluated as follows:

- Indoor gamma scans are performed over all floor surfaces and accessible portions of walls.

- Radon daughter samples are collected in the location of highest expected radon daughter concentration (RDC).

- Biased sampling may be required in contaminated areas for additional characterization.

Sampling scheme.

- Samples must be representative of the area from which they are taken.

- A sufficient quantity of samples must be analyzed to assure statistical accuracy in estimating average soil concentrations.

F.3 MEASUREMENT TECHNIQUE EVALUATION

Adequate measurement procedures and correct instrument selection ensure accurate measurement of radiation and contamination levels. Evaluation of measurement techniques includes the following.

Instruments are evaluated to ensure that:

- The correct parameter is measured.
- The sensitivity is sufficient to measure the desired levels of radiation.
- Calibrations and operational checks are adequate.

Measurement procedures are evaluated to ensure that measurement results are comparable to the EPA Standards. The following aspects of the procedures are evaluated:

- Soil measurements indicate Ra-226 concentrations, unless other radionuclides are present in greater concentrations than Ra-226.
- Concentrations of Ra-226 in soil and indoor gamma levels are measured above background.
- Indoor radon daughter concentrations include background.
- Indoor radon daughter concentrations are related to an annual average.
- Soil Ra-226 concentrations are averaged over an area of 100 m^2 for 15-cm layers, or an equivalent volume of soil.

Procedures must be included which prevent cross-contamination of samples.

F.4 DUPLICATE RADIOLOGICAL MEASUREMENTS

Radiological measurements and analytical results are evaluated for accuracy using the following duplicate measurement techniques:

- o Analysis of sample splits stored by the RAC.
- o Duplication of field measurements by the auditors.
- o Replication of sample collection and analysis by the auditors in a limited, independent verification survey.

A minimum of 10 percent of the measurements and analyses performed at a property being audited are checked during a Radiological Surveillance. Sample splits and duplicate measurements are taken prior to excavation and prior to backfilling, observing that procedures are being followed.

Procedures used in the field are observed and evaluated to assure implementation of the survey plan and the correct measurement technique.

F.5 DOCUMENTATION EVALUATION

The RAC is required to provide documentation of site radiological work from all phases of the remedial action. Procedures, activities, sample collection, and analytical results are recorded and kept on file by the RAC. The following aspects of documentation, at a minimum, are inspected during Radiological Surveillances:

- Survey plans and procedures are implemented in the field as approved in appropriate documents.
- Samples are labelled when collected with pertinent information such as collection date, sample location and depth, sample type, and analysis required.
- Analytical data are recorded as measurements are taken in the field or as analyses are performed. Standardized forms are used whenever possible.
- Calculations are shown on forms or in data books, to allow evaluation of the method and the result.

APPENDIX G

VICINITY PROPERTIES DATA MANAGEMENT SYSTEM

TABLE OF CONTENTS

G.1 GENERAL

The vicinity properties portion of the UMTRA Project is comprised of various factors which, when combined, generate a complex basis for management.

These factors include:

- Over 8000 individual candidate properties.
- 21 different site locations in 11 different states.
- Multi-year time frame.
- Established procedures for inclusion, engineering, owner consent, remedial action, and certification.
- Requirements for State, DOE, and NRC concurrence on milestone activities.
- Requirements for active Project data and archival of permanent records.

In addition to these factors which have been specifically delineated as Project requirements, there is an inherent need in the Project for the UMTRA Project Manager to be capable of maintaining order and direction in the execution of the multi-year time frame. This need dictates a subsequent requirement for a system which can recall property characterizations and can report cost, schedule, and status information on each property in a timely and efficient manner. The system must be capable of traversing across the various areas of responsibility held by the DOE, state, tribe, RACs, TAC, and Inclusion Survey Contractor to provide overall activity summaries on each property and as associated with each processing site. In addition, since the Project's information is being generated by various project participants in the field and office, the system must be designed to accept input from these participants from the "satellite" Project locations.

With these requirements, a system for managing vicinity property cost, schedule, radiological, and engineering data has been designed. The system stores over nearly 30 fields of pertinent information on each property which has been considered a candidate for inclusion in the UMTRA Project. The system has the capability of sorting, selecting, and reporting various pieces of data by UMTRA Project property number or collectively, by sites. Data entry is accomplished through transmission of information from the RACs, TAC, and Inclusion Survey Contractor to the Project Office. Data reporting is accomplished in the Project Office with transmission of reports through the TAC to the interested Project participants. The system has been designed, programmed, and is being maintained by the TAC in Albuquerque, New Mexico.

G.2 VICINITY PROPERTY NUMBER ASSIGNMENTS

During previous years, vicinity properties have been assigned numbers by various contractors and agencies for purposes of identification and tracking. Over a period of time, modifications to the previously surveyed properties and revised property ownership have required the DOE to renumber certain properties prior to inclusion in the UMTRA Project, except in Grand Junction where the EPA/CHD numbers were adopted.

The official repository for vicinity property status, property ownership, tenant, and summary radiological information is the Vicinity Property Data Management System (VPDMS). This system should be used by all contractors and other participants as the reference document for vicinity property number assignments. The TAC has authority to assign all property numbers on the Project, except for those properties in Mesa County, Colorado. The Colorado Department of Health and DOE-Grand Junction Project Office have been given authority to provide property numbers in Mesa County. The guidelines for property number assignments are provided as follows:

- Property number assignments shall use previous property numbers assigned by DOE Headquarters, EPA, CDH, PNL, and others whenever practical.

- Separate property numbers shall be assigned to each property address or otherwise legally distinguishable parcel of land, whenever possible. The rationale for this guideline is to allow for a separate number assignment on each parcel of land which is now or is probably in the future under individual ownership and, subsequently, subject to individual Remedial Action Agreements.

- All new number assignments shall be made prior to inclusion wnen possible. Any spillover properties found in the field shall be identified by memorandum or inclusion report recommendation to the DOE, and included under separate DOE property identification number. Whenever possible the Inclusion Survey Contractor (ISC) should identify the need for reassignment of property numbers and include the recommended number reassignment in the Inclusion/Exclusion Recommendation Report.

- All new number assignments shall be documented through a vicinity properties note. Copies of this information should be provided to the DOE Project Office and the TAC for inclusion in the VPDMS.

- When property numbers which have been previously assigned are reassigned for the appropriate reason(s), the previously assigned numbers will be tracked by the ISC for the purpose of accountability. The TAC will also track all number assignments and will recall this information when requested. The property number used and reported by UMTRA Project contractors and agencies in future Project transmittals will be the newly assigned number.

- All DOE property identification numbers will be preceded by a two-letter site designation and followed by a two-letter property classification code (i.e., ED 00905-RS).

G.3 DATA ENTRY

The generation of data to be used is the responsibility of the project participants, namely: the Remedial Action Contractors (RAC), the Technical Assistance Contractor (TAC), and the Inclusion Survey Contractor (ISC). In limited situations where information is generated in the field by the state, tribe, and DOE, these participants are also responsible. Data contributors are required to provide the status of an activity in the month following the completion of the activity. Data are entered on Entry Sheets which have been designed to facilitate entry into the individual files. Automated development of these entry forms and input to the system is feasible. All information is transferred by mail or modem, if cost-effective, to the TAC in Albuquerque. The TAC has the overall management responsibility for data entry. A summary of the information requirements and the associated responsibilities for generating that information is presented in Figure 6.1 of this manual. Copies of the Vicinity Property Data Entry Sheets are provided in Addendum G2.

G.4 DATA REPORTING

The data stored in the VPDMS can be sorted, selected, and retrieved in a variety of ways depending upon the need. To maximize data retrieval usefulness and to minimize costs, the VPDMS has been preprogrammed to report all the information available in the files in four consistent formats. These formats have been designed for monitoring progress and assessing property characteristics and consequently are being used as a basis for all reports. These formats can be expanded or modified in many ways depending upon the needs. The reports are referred to as VPR2 through 5 and the contents are summarized below.

VPR2 Vicinity Properties Status Report

This report is designed to provide information which will assist in evaluating the status of milestone activities required on each property. The principal use of VPR2 is to document the current status of each individual property. For each property identified by UMTRA Project number the following information is tabulated:

- o Date designated.
- o Owner consent form (property access).
  - Date returned.
  - Status.
- o Inclusion.
  - Date survey completed.
  - Inclusion/exclusion recommendation and date.
  - Inclusion/exclusion decision and date.
- o Radiological and Engineering Assessment (REA).
  - Date submitted.
- o Remedial Action Agreement (RAA).
  - Date returned.
  - Status.
- o Remedial action.
  - Date started.
- o Property certification.
  - Date completion report issued.
  - Date certified.

VPR3 Vicinity Property Site Summary Report

This report is designed to provide information to assist in assessing the status of milestone activities by site. The principle use for VPR3 is in accounting for the number of activities that have been completed for each site. For each site this report tabulates the number of the following activities that have been recorded to date:

- o Consent forms.
  - Received.

- o Recommendations.
  - Inclusion.
  - Exclusion.

- o Inclusion/Exclusion.
  - Surveys completed.
  - Properties included.
  - Properties excluded.

- o REAs.
  - Submitted.

- o RAAs.
  - Issued.
  - Approved.

- o Remedial actions.
  - Started.
  - Completed.

- o Certification.
  - Completion reports delivered.
  - Properties certified.

VPR4 Vicinity Properties (VP) - Cost Report

This report is designed to provide information which shows the costs of categories of VP activities. The report is used principally to document statistical trends in costing by category and to assist the Project Office in forecasting future VP costs. For each site the VPR4 totals the actual costs spent for all VP activities, segregates the subtotal costs by category, and calculates the percent of the total VP cost that each subtotal category cost represents. The categories of cost are as follows:

- o Engineering Management
  - Plans and specifications.
  - REAs.

- o Health physics and construction monitoring.

- o Remedial action.

VPR5 Owner Tenant Report

This report is designed to present property location data along with owner address information. The report can be sorted by property number, street address or property description/owner. The following output is listed in the report:

- o Property identification number and location.
- o Property owner mailing address.
- o Type of property.

ADDENDUM G1

VPDMS FILE LAYOUTS AND DEFINITION

1. VPDMS FILE LAYOUTS

FILE 1: INCLUSION/EXCLUSION

	FIELD NAME	TYPE	WIDTH	DECIMALS	ORNL	MK-F	UNC	CDH	TAC	DOE
1.	SITECODE	C	2	-	X	X	X	X	X	X
2.	LOCNUM	C	5	-	X	X	X	X	X	X
3.	PROPCLASS	C	2	-	X	X	X	X		
4.	DESIGDATE	D	8	-						
5.	CFSIGNDATE	D	8	-	X	X	X	X	X	X
6.	CFSTATUS	C	1	-	X	X	X	X		
7.	RADSURDATE	D	8	-	[X]	X	X			
8.	HOGSOURCE	C	1	-	[X]	X	X			
9.	HOG	N	4	0	[X]	X	X			
10.	HIGSOURCE	C	1	-	[X]	X	X			
11.	HIG	N	4	0	[X]	X	X			
12.	RDCSOURCE	C	1	-	[X]	X	X			
13.	RDCTYPE	C	1	-	[X]	X	X			
14.	RDC	N	5	-	[X]	X	X			
15.	TAILLOC	C	1	-	[X]	X	X			
16.	RECDATE	D	8	-	X					X
17.	REC	C	2	-	X					X
18.	DECDATE	D	8	-					X	
19.	DEC	C	2	-						
20.	LASTUPDATE	D	8	-						

[ ] = Preliminary Data - will be revised through REA Survey

FILE 2: REMEDIAL ACTION

	FIELD NAME	TYPE	WIDTH	DECIMALS	ORNL	MK-F	UNC	CDH	TAC	DOE
1.	SITECODE	C	2	-		X	X	X	X	X
2.	LOCNUM	C	5	-		X	X	X	X	X
3.	REASUB	D	8	-		X	X			
4.	RAAAPROVE	D	8	-		X	X	X		
5.	SUPSTD	C	1	-		X	X	X		
6.	RASTART	D	8	-		X	X	X		
7.	RACOMPLT	D	8	-		X	X	X		
8.	COMPLTRPT	D	8	-		X	X	X		
9.	CERTDATE	D	8	-						X
10.	ACTINEXC	N	5	0		X	X	X		
11.	ACTEXEXC	N	5	0		X	X	X		
12.	EMCOST	N	6	1		X	X	X		
13.	RACOSTEST	N	6	1		X	X	X		
14.	RASUBCOST	N	6	1		X	X	X		
15.	CMCOST	N	6	1		X	X	X		
16.	LASTUPDATE	D	8	-					X	

TYPE LEGEND C=CHARACTER N=NUMERIC J=JULIAN DATE

FILE 3: OWNER/TENANT

	FIELD NAME	TYPE	WIDTH	DECIMALS	ORNL	MK-F	UNC	CDH	TAC	DOE
						*	*	*		
1.	SITECODE	C	2	-	X	X	X	X		
2.	LOCNUM	C	5	-	X	X	X	X		
3.	OTCODE	C	2	-	X	X	X	X		
4.	NAME	C	30	-	X	X	X	X		
5.	ADDRESS	C	40	-	X	X	X	X		
6.	CITY	C	15	-	X	X	X	X		
7.	STATE	C	2	-	X	X	X	X		
8.	ZIPCODE	C	5	-	X	X	X	X		
9.	HOMEPHONE	C	12	-	X	X	X	X		
10.	WORKPHONE	C	8	-	X	X	X	X		
11.	LASTUPDATE	D	8	-					X	

TYPE LEGEND C=CHARACTER N=NUMERIC J=JULIAN DATE

* MK-F, UNC and CDH need to submit O/T data only when additional or conflicting information is obtained.

2. VPDMS FIELD DEFINITIONS

FILE 1: INCLUSION/EXCLUSION

1. SITECODE: Site code:

AM= Ambrosia Lake	GJ= Grand Junction	NT= Naturita
BF= Belfield	GR= Green River	RF= Rifle
BO= Bowman	GU= Gunnison	RT= Riverton
CA= Canonsburg	LK= Lakeview	SH= Shiprock
DT= GJ Dovetails	LO= Lowman	SL= Salt Lake City
DU= Durango	MB= Maybell	SK= Spook
ED= Edgemont	MH= Mexican Hat	SR= Slick rock
FC= Falls City	MV= Monument Valley	TC= Tuba City

2. LOCNUM: DOE defined property location number: 00001 - 99999 or 0001A - 9999Z. It is unique within the site, but not within the database.

3. PROPCLASS: Property Classification:

RS= Single Family Residence	SC= School
RM= Multiple Family Residence (1-4)	CH= Church
AP= Apartment (> 4 families)	MR= Major Res.
HO= Hotel or Hospital	VL= Vacant Lot
CS= Commercial Structure	UK= Unknown
CC= Complex Commercial (>$350,000)	OT= Other

4. DESIGDATE: Date property designated as eligible for UMTRA.

5. CFSIGNDATE: Date consent form signed by owner. If date signed is not available, this is "Date Consent Form Returned" by owner.

6. CFSTATUS: Consent Form Status:

A= Access Agreed
D= Access Denied
L= Limited Access Agreed

7. RADSURDATE: Date of historical or inclusion radiologcial data.

8. HOGSOURCE: High Outside Gamma reading source classification:

P= Preliminary Survey	R= REA Survey
I= Inclusion Survey	X= Reading not taken or invalid

9. HOG: The High Outside Gamma reading in uR/h.

10. HIGSOURCE: High Inside Gamma reading source classification:

P= Preliminary Survey	D= Access Denied
I= Inclusion Survey	N= Not Applicable
R= REA Survey	X= Reading not taken or invalid

11. HIG: The High Inside Gamma reading in uR/h.

12. RDCSOURCE: Radon Daughter Concentration source classification:

P= Preliminary Survey	D= Access Denied
I= Inclusion Survey	N= Not Applicable
R= REA Survey	X= Reading not taken or invalid

13. RDCTYPE: Type of RDC measurement taken:

A= Full-time Integrated	D= Single Grab
B= Part-time Integrated	U= Unknown
C= Multiple Grab	

14. RDC: Gross RDC measured in working level units (WL).

15. TAILLOC: Tailings location code:

0= None	2= Exterior	4= Windblown
1= Structural	3= Structural & Exterior	5= Spillover
		6= Unknown

16. RECDATE: Date that the Inclusion Survey Contractor (ISC) makes an inclusion or exclusion recommendation to the DOE or GJPO.

17. REC: ISC Recommendation code:

IR= Inclusion Recommendation ER= Exclusion Recommendation

18. DECDATE: Date of DOE in/exclusion letter indicating in/exclusion decision.

19. DEC: DOE Decision code:

ID= Inclusion Decision ER= Exclusion Decsion

20. LASTUPDATE: Date this record was last updated.

2. VPDMS FIELD DEFINITIONS

FILE 2: REMEDIAL ACTION

1. SITECODE: Site code:

AM= Ambrosia Lake	GJ= Grand Junction	NT= Naturita
BF= Belfield	GR= Green River	RF= Rifle
BO= Bowman	GU= Gunnsion	RT= Riverton
CA= Canonsburg	LK= Lakeview	SH= Shiprock
DT= GJ Dovetails	LO= Lowman	SL= Salt Lake City
DU= Durango	MB= Maybell	SK= Spook
ED= Edgemont	MH= Mexican Hat	SR= Slick Rock
FC= Falls City	MV= Monument Valley	TC= Tuba City

2. LOCNUM: DOE-defined property location number: 00001 - 99999 or 0001 - 9999Z. Is is unique within the site, but not within the database.

3. REASUB: Date Radiological and Engineering Assessment (REA) submitted to DOE for approval.

4. RAAAPPROVE: Date Remedial Action Agreement (RAA) effective (all signatures).

5. SUPSTD: Supplemental Standards code:
Y= EPA Supplemental Standards apply
N= EPA Supplemental Standards do not apply

6. RASTART: Date construction subcontractor mobilizes to property.

7. RACOMPLT: Actual date remedial action subcontractor demobilizes.

8. COMPLTRPT: Date Completion Report is submitted to the DOE.

9. CERTDATE: Date DOE issues certification letter to the property owner.

10. ACTINEXC: Actual volume of interior excavation in cubic yards.

11. ACTEXEXC: Actual volume of exterior excavation in cubic yards.

12. RASUBCOST: Actual remedial action subcontract costs in thousand of dollars.

13. LASTUPDATE: Date this record was last updated.

FILE 3: OWNER/TENANT

1. SITECODE: Site code:

AM= Ambrosia Lake	GJ= Grand Junction	NT= Naturita
BF= Belfield	GR= Green River	RF= Rifle
BO= Bowman	GU= Gunnison	RT= Riverton
CA= Canonsburg	LK= Lakeview	SH= Shiprock
DT= GJ Dovetails	LO= Lowman	SL= Salt Lake City
DU= Durango	MB= Maybell	SK= Spook
ED= Edgemont	MH= Mexican Hat	SR= Slick rock
FC= Falls City	MV= Monument Valley	TC= Tuba City

2. LOCNUM: DOE defined property location number: 00001 - 99999 or 0001A - 9999Z. It is unique within the site, but not within the database.

3. OTCODE Owner/Tenant code consisting of one or two characters with th first character:

O= Owner	B= Both
T= Tenant	U= Unknown

The second character is a digit indicating multiple tenancy or ownership.

4. NAME Owners' or Tenants' last name, first name and middle intial.

5. ADDRESS Owners' or Tenants' street address or mailing address.

6. CITY Owners' or Tenants' city.

7. STATE Owners' or Tenants' two letter state code.

8. ZIPCODE Owners' or Tenants' 5 digit zipcode.

9. HOMEPHONE Owners' or Tenants' area code and home phone number.

10. WORKPHONE Owners' or Tenants' area code and work phone number.

11. LASTUPDATE Date this record was last updated.

ADDENDUM G2

VPDMS - DATA ENTRY SHEETS

VPDMS INPUT SHEET - PROPERTY TRACKING SHEET

LOCATION ID - CLASS

Designation Date: . __/__/__

CONSENT FORM DATA:
Sign Date:. . . __/__/__
Status: . . . . __

SURVEY DATA:
HIG-Src: . . . _____-__
HOG-Src: . . . _____-__
RDC-Src-Typ: . _.____-__-__

Tailings location code: . . ___

Recommendation date - Rec:. . __/__/__-__
Decision date - Dec:. . . . . __/__/__-__

REA Submittal date: . . . . . __/__/__

RAA Approval date:. . . . . __/__/__

RA Start date:. . . . . __/__/__
RA Completion date: . . . . . __/__/__

Completion Report date: __/__/__

ACTUAL EXCAVATION AMOUNTS (cu.yd.)
Interior:_____ Exterior:_____

Certification date: . . .__/__/__

COST DATA ($1000)
Bid Amnt: _____ Engrg: _____
RA cost: _____ Constr: _____

PROPERTY INFORMATION [ ] Check if owner address same as property address

Tenant/Desc: _____

Address : _____

City, St, Zip : _____ _____ _____

OWNER INFORMATION

Name : _____

Address : _____

City, St, Zip : _____ _____ _____

CONSENT FORM STATUS CODES:
A = Access approved
L = Limited access approved
D = Access denied

TAILINGS LOCATION CODES:
0 = None
1 = Structural
2 = Exterior
3 = Structural & exterior
4 = Windblown
5 = Spillover
6 = Unknown

RECOMMENDATION CODES:
IR = Include ER = Exclude

RDC TYPE CODES:
A = Full-time (1yr.) integrated sample
B = Part-time (<1yr.) integrated sample
C = Multiple grab sample
D = Single grab sample

HIG/HOG/RDC SOURCE CODES:
P = Preliminary survey
I = Inclusion survey
R = REA survey
D = Access denied
X = Reading not reported or taken
N = Code not applicable

DECISION CODES:
ID = Included ED = Excluded

VPDMS INPUT SHEET - MK-F

LOCATION ID - CLASS

CONSENT FORM DATA:
Sign Date:. . . __/__/__
Status: . . . . __

SURVEY DATA:
HIG-Src: . . . _____-__
HOG-Src: . . . _____-__
RDC-Src-Typ: . _-____-__-__

Tailings location code: . . ___

REA Submittal date: . . . . . __/__/__

RAA Approval date:. . . . . __/__/__

RA Start date:. . . . . __/__/__
RA Completion date: . . . . . __/__/__

Completion Report date: __/__/__

ACTUAL EXCAVATION AMOUNTS (cu.yd.)
Interior:____ Exterior:____

COST DATA ($1000)
Bid Amnt: ____ Engrg: ____
RA cost: ____ Constr: ____

PROPERTY INFORMATION [ ] Check if owner address same as property address

Tenant/Desc: _____

Address : _____

City, St, Zip : _____ _____ _____

OWNER INFORMATION

Name : _____

Address : _____

City, St, Zip : _____ _____ _____

CONSENT FORM STATUS CODES:
A = Access approved
L = Limited access approved
D = Access denied

TAILINGS LOCATION CODES:
0 = None
1 = Structural
2 = Exterior
3 = Structural & exterior
4 = Windblown
5 = Spillover
6 = Unknown

RDC TYPE CODES:
A = Full-time (1yr.) integrated sample
B = Part-time (<1yr.) integrated sample
C = Multiple grab sample
D = Single grab sample

HIG/HOG/RDC SOURCE CODES:
P = Preliminary survey
I = Inclusion survey
R = REA survey
D = Access denied
X = Reading not reported or taken
N = Code not applicable

VPDMS INPUT SHEET - CDH

LOCATION ID CLASS

RAA Approval date:. . . . . __/__/__

RA Start date:. . . . . __/__/__

RA Completion date: . . . . . __/__/__

Completion Report date: __/__/__

ACTUAL EXCAVATION AMOUNTS (cu.yd.)
Exterior:____

COST DATA ($1000)
Bid Amnt: ____ Engrg: ____
RA cost: ____ Constr: ____

PROPERTY INFORMATION [ ] Check if owner address same as property address

Tenant/Desc: _____

Address : _____

City, St, Zip : _____ _____ _____

OWNER INFORMATION

Name : _____

Address : _____

City, St, Zip : _____ _____ _____

VPDMS INPUT SHEET - ORNL

LOCATION ID _____ - ____ CLASS

CONSENT FORM DATA:
Sign Date:. . . __/__/__
Status: . . . . __

SURVEY DATA:
HIG-Src: . . . _____-__
HOG-Src: . . . _____-__
RDC-Src-Typ: . _.___-__-___

Tailings location code: . . ___

PROPERTY INFORMATION [ ] Check if owner address same as property address

Tenant/Desc: _____

Address : _____

City, St, Zip : _____ _____ _____

OWNER INFORMATION

Name : _____

Address : _____

City, St, Zip : _____ _____ _____

CONSENT FORM STATUS CODES:
A = Access approved
L = Limited access approved
D = Access denied

TAILINGS LOCATION CODES:
0 = None
1 = Structural
2 = Exterior
3 = Structural & exterior
4 = Windblown
5 = Spillover
6 = Unknown

RDC TYPE CODES:
A = Full-time (1yr.) integrated sample
B = Part-time (<1yr.) integrated sample
C = Multiple grab sample
D = Single grab sample

HIG/HOG/RDC SOURCE CODES:
P = Preliminary survey
I = Inclusion survey
R = REA survey
D = Access denied
X = Reading not reported or taken
N = Code not applicable

VPDMS INPUT SHEET - UNC

LOCATION ID CLASS

CONSENT FORM DATA:
Sign Date:. . . __/__/__
Status: . . . . __

SURVEY DATA:
HIG-Src: . . . _____-__
HOG-Src: . . . _____-__
RDC-Src-Typ: . _.____-__-__

Tailings location code: . . ___

REA Submittal date: . . . . . __/__/__

RAA Approval date:. . . . . __/__/__

RA Start date:. . . . . __/__/__
RA Completion date: . . . . . __/__/__

Completion Report date: __/__/__

ACTUAL EXCAVATION AMOUNTS (cu.yd.)
Interior:____ Exterior:____

COST DATA ($1000)
Bid Amnt: ____ Engrg: ____
RA cost: ____ Constr: ____

PROPERTY INFORMATION [ ] Check if owner address same as property address

Tenant/Desc: _____

Address : _____

City, St, Zip : _____ _____ _____ ___

OWNER INFORMATION

Name : _____

Address : _____

City, St, Zip : _____ _____ _____

TAILINGS LOCATION CODES:
0 = None
1 = Structural
2 = Exterior
3 = Structural & exterior
4 = Windblown
5 = Spillover
6 = Unknown

HIG/HOG/RDC SOURCE CODES:
P = Preliminary survey
I = Inclusion survey
R = REA survey
D = Access denied
X = Reading not reported or taken
N = Code not applicable

RDC TYPE CODES:
A = Full-time (1yr.) integrated sample
B = Part-time (<1yr.) integrated sample
C = Multiple grab sample
D = Single grab sample

APPENDIX H

DOE-NRC MOU

APPENDIX A

REVIEW AND CONCURRENCE PROCEDURES

1.0 REVIEW AND CONCURRENCE DOCUMENTS

These Procedures set forth coordination responsibilities, including the preparation and transmittal of documents, the review of such documents, the preparation of comments, and in some cases an indication of concurrence or non-concurrence with such documents. The Document Coordination Table, below, is intended to be a graphic identification of the document, the version of the document (e.g., draft, final), the number of copies to be transmitted, the purpose of the transmittal (i.e., for information, review and comment, concurrence), the response time, and the pertinent Section of the Procedures which provides for NRC-DOE coordination of the document. The response times shown are calendar days from receipt of the document.

DOCUMENT COORDINATION TABLE

PROCEDURES SECTION	UMTRAP DOCUMENT	PURPOSE OF TRANSMITTAL	RESPONSE TIME	# OF COPIES
3.1.1	Draft Comparative Analysis of Disposal Site Alternatives Report (CADSAR)	Review/Comment	30 days	9
	Final CADSAR	Review/Comment	30 days	9
3.1.2	Draft EA	Review/Comment	45 days	9
	Final EA	Information	N/A	9
	Preliminary Draft EIS	Review/Comment	45 days	9
	Draft EIS	Review/Comment	45 days	9
	Preliminary Final EIS	Review/Comment	30 days	9
	Final EIS	Information	N/A	9
	Notice of Intent	Information	N/A	2
	VP Environmental Report	Information	N/A	2
3.1.3	Draft RAP	Review/Comment	30-45 days	9
	Preliminary Design	Review/Comment	45 days	9
	Final RAP (including final design)	Concurrence	30-45 days	9
	RAP Modification	Concurrence	20-30 days	5
3.1.4	REA (Normal Cases)	Information	N/A	1
	REA (Supp. Stds., separate disposal site)	Concurrence	30-45 days	5
	Modification to VPMIM	Concurrence	30 days	4

PROCEDURES SECTION	UMTRAP DOCUMENT	PURPOSE OF TRANSMITTAL	RESPONSE TIME	# OF COPIES
3.2.1	Modifications to UMTRAP QA Plan	Information	N/A	2
	Remedial Action Inspection Plan	Concurrence	21 days	2
	NRC In-Process/On-Site Report Review	Resolution of Issues		2
3.2.2	Modifications to UMTRA Project EH&S Plan	Information	N/A	2
	Site-Specific EH&S Plan	Information	21 days	2
3.4	Certification Report-			
	-Processing Site, Disposal Site,	Concurrence	45 days	2
	-Separate VPs	Concurrence	30 days	2
	-Normal VPs	Information	N/A	1
3.5	Remilling Contract	Review/Comment	Reasonable Time	2
4.2	Prior Written Notice of Pre-RAP Processing Site Acquisition or Acquisition of VP	Concurrence	20 days	1
4.3	Prior Written Notice of State Sale/Retention of Processing Site/ VP	Concurrence	20 days	1
4.4	Indian Permits/Easements/ Rights of Way	Information	N/A	2
4.5	Prior Written Notice of State Transfer of Title to Disposal Site	Concurrence	Reasonable Time	1
5.2	Draft Licensing Support Documentation (including Site Surveillance and Maintenance)	Review/Comment	30 days	6
	Final Licensing Support Documentation	Concurrence	Reasonable Time	6

PROCEDURES SECTION	UMTRAP DOCUMENT	PURPOSE OF TRANSMITTAL	RESPONSE TIME	# OF COPIES
5.3	Modifications to Guidance for UMTRA Project Surveillance and Maintenance	Review/Comment	30 days	4
6.1	Draft Cooperative Agreement or Modification	Review/Comment	30 days	2
	Executed Cooperative Agreement or Modification	Concurrence	21 days	4
6.2	Annual Report to Congress	Consultation/ Separate Comments	Timely Response	2

2.0 DESIGNATION

2.1 Processing Sites - DOE, in consultation with NRC, has designated the processing sites included within the UMTRA Project. In connection with such designation, DOE assigned to each site a relative priority for carrying out remedial action at such site. The priorities are indicated in 44 FR 74892 (December 18, 1979).

2.2 Vicinity Properties - DOE, with the concurrence of NRC, developed a Summary Protocol for the Survey and Inclusion of Vicinity Properties (Summary Protocol) as guidance for designation and inclusion of vicinity properties. DOE will include designated properties within the scope of the UMTRA Project cleanup effort in accordance with the Summary Protocol.

3.0 REMEDIAL ACTIONS

3.1 Selection of Remedial Action - DOE has the primary responsibility for selecting remedial action under Title I of the UMTRCA. Selection of remedial action shall be with the concurrence of NRC and participating agencies. NRC concurrence shall be effected as provided herein.

3.1.1 Comparative Analysis of Disposal Site Alternatives Report (CADSAR) - During the early site characterization and analyses activities for each mill site and alternate disposal site(s), DOE shall prepare and submit to NRC a

draft and final CADSAR. The CADSAR shall include a technical evaluation of disposal sites regarding their suitability to assure compliance with the EPA Standards, a summary of the site characterization data collected to date, a description of the proposed conceptual design for the options deemed most favorable by DOE and other disposal options related data. Based on available information the NRC shall review the CADSAR and provide comments pertinent to significant technical deficiencies, site characterization planning, and any potential design issues that may need to be addressed in subsequent design documents.

3.1.2 Environmental Documents - The DOE, in selecting remedial action, will comply with the National Environmental Policy Act (NEPA), and will prepare and provide to NRC, for review and comment, copies of environmental documents for processing sites at various stages of development. NRC will review the environmental documents referenced in the Document Coordination Table and will notify DOE of any issues or concerns regarding the proposed remedial action and/or the assessment of the various alternatives being considered by DOE and which affect, or potentially affect, NRC concurrence with the pertinent Remedial Action Plan. NRC comments shall be provided either orally or in writing as such issues or concerns are identified by NRC. Formal written comments may be provided by NRC during the public comment period. DOE and NRC shall attempt to reconcile comments raised by NRC's review of environmental documents.

DOE and NRC acknowledge that NEPA compliance for vicinity properties may be accomplished by the environmental documents prepared for the associated processing site, in which case the procedures for review will be those outlined above. Otherwise, DOE shall submit the pertinent vicinity properties environmental assessment or report to NRC for information.

In the event DOE conducts scoping in connection with environmental documents, DOE shall provide NRC with an opportunity to participate in the scoping process, and shall provide to NRC thirty-day prior notice of any scoping meeting.

3.1.3 Remedial Action Plans - DOE shall prepare a Remedial Action Plan (RAP) for each processing site, except that DOE may prepare one RAP for: (a) the Old Rifle and New Rifle processing sites; (b) the Slick Rock North Continent and Slick Rock Union Carbide processing sites; and (c) the Mexican Hat and Monument Valley processing sites. DOE shall provide to NRC copies of the RAP in draft,

and final form and modifications. Additionally after release of the draft RAP and prior to the final RAP, DOE shall provide to NRC copies of the preliminary design for review and comment. With transmittal of preliminary design, DOE shall specify those sections upon which NRC review is requested. The final RAP shall include the final design.

NRC shall review the RAP, in draft and final form and modifications and provide comments to DOE. DOE and NRC shall attempt to reconcile any NRC comments in the course of DOE's preparation of a final RAP. In connection with any final RAP, NRC shall provide one of the following:

.1 Indicate in writing its concurrence with the selection of the remedial action by concurrence with the RAP. While NRC may provide comments to DOE on any section of the RAP, NRC concurrence is required only for those aspects which are pertinent to a determination as to whether the proposed remedial action complies with the EPA Standards and other applicable law, and is consistent with the purposes of Title I of the UMTRCA. Consequently, NRC concurrence is not required for sections of the RAP concerning: quality assurance, environmental health and safety, cost estimates; schedules; and public participation and information. NRC review of quality assurance and environmental health and safety procedures is addressed in Sections 3.2.1 and 3.2.2, respectively.

.2 Indicate in writing its conditional concurrence with the RAP. In such conditional concurrence NRC shall specifically identify any issues which prevent full concurrence. NRC shall separately advise DOE of the extent of any construction activities, which DOE proposes to pursue in advance of full NRC concurrence, which DOE may pursue without prejudice to NRC's conditional concurrence. DOE and NRC shall attempt to reconcile such issues in a timely manner; NRC may recommend technical approaches or methods to resolve such issues.

.3 Indicate in writing its non-concurrence, identifying which aspects of the remedial action are inadequate to meet the EPA Standards.

With respect to modifications to a RAP, including the final design, NRC concurrence is required only for those aspects which are pertinent to attaining compliance with the EPA standards. For all RAP modifications, DOE will provide NRC with a notification of proposed modification and an analysis of whether the modification directly affects meeting the EPA standards. For modifications requiring NRC concurrence, DOE may proceed with remedial actions at its own risk pending NRC concurrence. DOE and NRC shall attempt to reconcile any NRC comments as necessary to obtain NRC concurrence with modifications to the RAP. Upon concurrence by NRC and any other affected participating agency or agencies, the RAP, or any modification thereof, shall become an appendix to the cooperative agreement with such participating agency or agencies.

3.1.4 Radiological and Engineering Assessments - The VPMIM is an UMTRA management document which details the procedures for the inclusion of vicinity properties and the selection and performance of remedial actions at vicinity properties. The VPMIM, and modifications require NRC concurrence. DOE shall prepare a Radiological and Engineering Assessment (REA) and shall select remedial actions for each vicinity property or group of vicinity properties in accordance with the Vicinity Property Management and Implementation Manual (VPMIM). Upon NRC request, DOE shall provide copies of all normal REAs to NRC for information.

DOE and NRC presently contemplate that: remedial action at the majority of vicinity properties will consist of removal of residual radioactive materials such that the standards set forth in Subpart B of the EPA Standards are met; that long-term control of the residual radioactive materials removed will be accomplished in conjunction with the disposal of residual radioactive materials at the associated processing site in accordance with Subpart A of the EPA Standards; and that such long-term control will be the same as that presented in the RAP for the associated processing site, with which NRC concurs under Section 3.1.3 of these Procedures. Consequently NRC shall exercise a "separate" concurrence for vicinity properties only in those cases where: DOE proposes to use the supplemental standards set forth in Subpart C of the EPA Standards; DOE proposes to designate, include or perform remedial action at a vicinity property or group of vicinity properties after NRC has concurred with DOE's certification of the completion of remedial action at the disposal site; or DOE proposes to use a disposal site other than that used for the residual radioactive materials at an UMTRA processing site. In the case of the Edgemont, South Dakota vicinity properties, NRC has already concurred with DOE's use of the disposal site for decommission and decontamination of the mill site owned by the Tennessee Valley Authority (TVA) through its concurrence with DOE Interagency Agreement No. DE-AI04-84AL27241.

For cases of "separate" NRC concurrence as discussed above, DOE shall submit to NRC for its review and concurrence copies of a Radiological and Engineering Assessment (REA) for each vicinity property or group of vicinity properties. The REA shall include a radiological assessment of the vicinity property, design data for the proposed remedial action, and, where appropriate, DOE's rationale for application of supplemental standards. NRC shall review the REA and indicate concurrence with the recommended remedial action or provide comments to DOE. DOE and NRC shall attempt to reconcile any NRC comments prior to DOE initiation of remedial action at the subject vicinity property or properties.

3.2 Performance of Remedial Actions at Processing/Disposal Sites

3.2.1 Quality Assurance - Copies of the Project QA Plan have been provided by DOE to NRC for information purposes. DOE shall provide to NRC copies of any modifications to the Project QA Plan.

DOE shall implement a graded approach to QA during site remedial action activities as follows:

.1 DOE shall cause its prime remedial actions contractors to define quality assurance procedures in a site-specific Remedial Action Inspection Plan, which will contain, as a minimum, details regarding or provisions for: organizational structure; testing and inspection; qualifications and certificate of inspection of test personnel; quality assurance records control; control of measuring and test equipment; and nonconformance and corrective action. Prior to field implementation, DOE shall provide to NRC copies of the DOE-approved Remedial Action Inspection Plan for NRC concurrence.

.2 DOE shall perform in-process surveillance activities in order to: evaluate quality and compliance of the remedial actions with relevant design specifications and standards; assure accurate measurement of appropriate radiological and physical conditions; assessment of completion of remedial action; and readiness of the site for DOE certification.

.3 DOE will provide to NRC a monthly schedule of remedial action milestone completion dates. NRC may conduct on-site reviews of remedial action activities from time to time for the primary purposes of assuring that the DOE-prescribed system of quality assurance is in place and is functioning in a manner which assures compliance with the RAP and the EPA Standards. NRC on-site reviews will be performed in accordance with NRC Manual Chapter 2620. Secondary reasons for such on-site visits include surveillance of rip-rap and radon barrier source areas and unusual construction features and review of the design as-built. NRC shall provide notification to DOE at least 5 days in advance of any inspection to enable a DOE representative to be present. NRC inspectors shall be afforded the opportunity for a one-on-one discussion of site activities and records with site personnel. NRC and DOE shall attempt to immediately resolve any issues arising out of such inspection. NRC shall provide two copies of any report resulting from such inspection to the DOE Liaison upon NRC issuance of the report. DOE will notify the NRC Liaison of analyses and resolution of issues identified during NRC on-site reviews.

3.2.2 Environmental Health and Safety - DOE shall have overall responsibility for the health and safety of occupational workers and the general public during remedial actions at UMTRA Project sites. Copies of the UMTRA Project Environmental Health and Safety Plan have been provided by DOE to NRC. DOE shall provide to NRC copies of any modification to the UMTRA Project Environmental Health and Safety Plan. DOE shall cause its remedial action contractor(s) to prepare detailed and site-specific plans/procedures for implementing the UMTRA Project Environmental Health and Safety Plan. DOE shall provide to NRC copies of such DOE-approved plans/procedures for information.

3.3 Performance of Remedial Actions at Vicinity Properties - DOE shall perform on-site remedial action in connection with vicinity properties in accordance with the VPMIM. NRC concurrence with completion of remedial actions at vicinity properties shall be as provided for in Section 3.4 of these procedures.

3.4 Certification - DOE shall evidence completion of remedial actions by preparation of a certification report. DOE shall provide to NRC, for review and concurrence, copies of any such certification report prepared for a processing or disposal site, or a vicinity property requiring "separate" NRC concurrence as provided in Section 3.1.4 of these Procedures. NRC shall review the report and transmit comments to DOE. DOE and NRC shall attempt to reconcile any NRC comments; DOE shall provide a revised version of the certification report, if necessary, to NRC for concurrence. NRC concurrence with the certification report shall be considered by DOE and NRC as concurrence that remedial actions are completed. A certification report shall consist of a DOE determination of completion supported by:

a. A Final Completion Report containing but not limited to: a description of remedial action; a description of post remedial action conditions; as-built specifications and drawings; field test reports; and verification measurement results.

b. Final Audit Reports (including reports of in-process surveillances prepared by DOE and/its contractors).

c. DOE Certification Summary.

Upon NRC request, DOE shall provide to NRC information copies of certification reports for vicinity properties that do not require "separate" NRC concurrence as provided in Section 3.1.4 of these Procedures.

3.5 Remilling - Pursuant to Section 108(b) of the UMTRCA, DOE, with the concurrence of the NRC, may permit the remilling of residual radioactive materials at a processing site in conjunction with remedial action. DOE shall include any proposed remilling alternative in the Remedial Action

Plan for that site. NRC concurrence with such Remedial Action Plan shall be considered concurrence with DOE decision to permit remilling, provided that NRC shall also have the right to review and comment on any proposed agreement or contract, between DOE and the person selected to remill the residual radioactive materials, which sets forth the terms and conditions of remilling.

4.0 ACQUISITION AND DISPOSAL OF LANDS

4.1 Right of Entry - DOE shall assure that NRC has a permanent right of entry to inspect processing sites and disposal sites, including those on Indian lands, in furtherance of the provisions of Title I of the UMTRCA and to enforce the UMTRCA and any rules prescribed thereunder. DOE shall also assure that the NRC has a right to inspect any vicinity property, including any on Indian lands, for the same purposes during the course of remedial actions on that property. Any NRC entry onto a processing site, disposal site, or vicinity property shall be coordinated in advance by NRC with the DOE Liaison.

4.2 Acquisition

4.2.1 State Acquisition - NRC has a responsibility to make a concurrence decision under UMTRCA regarding DOE decisions to require State acquisition of processing sites, disposal sites, and vicinity properties. NRC concurrence with DOE acquisition decisions normally will be effectuated by its concurrence with the RAP. In those cases where acquisition will be initiated prior to DOE submittal to NRC of a RAP for concurrence, and in those cases where DOE decides that acquisition of a vicinity property is appropriate, then DOE shall provide to NRC written notice of its decision regarding acquisition and the rationale therefor and request NRC concurrence with such decision.

4.2.2 DOE Acquisition - From time to time DOE may, pursuant to Section 106 of the UMTRCA, initiate either of the following methods of direct federal acquisition of a processing site, disposal site, or vicinity property:

.1 Withdrawal of public lands pursuant to the Federal Land Policy and Management Act (FLPMA).

.2 Utilization of the U. S. Army Corps of Engineers (Corps) to acquire real estate by purchase, donation, or condemnation on behalf of DOE.

In the event of such direct federal acquisition, DOE shall provide to NRC information regarding the acquisition in the appropriate licensing submittal.

4.3 Sale of Sites - The parties acknowledge that in the case of any processing site or vicinity property to which DOE or an affected state acquire title and for which DOE and such state share the costs of acquisition under a cooperative agreement, the state may sell such site or property or retain such site or property for permanent use by the state solely for park, recreational, or other public purposes. DOE shall, prior to such sale or retention, provide to NRC written notice of the proposed sale or retention and request NRC concurrence with same.

4.4 Indian Lands - DOE shall provide to NRC information copies of any permit, easement, right-of-entry or other real estate agreement authorizing DOE to conduct remedial actions or maintenance, monitoring or emergency measures at disposal sites on Indian lands.

4.5 Transfer of Title - The parties acknowledge that title to any disposal site acquired by a state under a cooperative agreement with DOE, and all residual radioactive materials deposited at such disposal site, must be transferred to the Government upon completion of remedial action. DOE shall, prior to such transfer of title, provide to NRC written notice of the proposed transfer of title requesting NRC concurrence with same within a reasonable period of time. NRC shall respond to DOE within a reasonable period of time.

5.0 LONG-TERM MAINTENANCE OF DISPOSAL SITES

5.1 General - With the exception of the disposal site for residual radioactive materials removed from Edgemont, South Dakota vicinity properties, which is an NRC-licensed TVA-owned site, DOE shall assume custody of each disposal site which has been transferred to or otherwise acquired by the Government and perform monitoring, maintenance, and emergency measures necessary to protect public health, safety, and the environment and such other actions required by a license to be issued by NRC, until such time, if ever, as the President designates another federal agency to perform such monitoring, maintenance, and emergency measures.

5.2 License - Pursuant to Sections 104(f)(2) and 105(b) of the UMTRCA, NRC shall license the long-term monitoring, maintenance, and surveillance of a site after NRC concurrence with DOE's certification report.

In order to facilitate the licensing process, NRC shall prepare a licensing plan for UMTRA sites, which shall consist of: a description of the licensing process for UMTRA sites; milestones in the licensing process; and NRC and DOE responsibilities.

Based upon the NRC licensing plan, for each site DOE shall prepare and submit to NRC six copies of licensing support documentation (including the site surveillance and maintenance plan) for long-term maintenance of each disposal site. After NRC review and concurrence with this licensing support documentation, NRC shall issue a license to DOE or such other federal agency designated by the President to maintain the site according to the conditions of the licensing support documentation as approved by and subsequently amended by NRC.

5.3 Surveillance and Maintenance - Guidelines for the surveillance and maintenance portion of the license application shall be presented in a document titled Guidance for UMTRA Project Surveillance and Maintenance which describes the monitoring, maintenance, and emergency measures to be performed by DOE, or such other federal agency as designated by the President, in order to maintain design conditions as certified.

5.4 Sale or Lease of Minerals - Pursuant to Section 104(h) of the UMTRCA, the Secretary of the Interior may dispose of subsurface mineral rights, by sale or lease, in connection with any disposal site to which the Government takes title under Title I of the UMTRCA. Such sale or lease is subject to: concurrence by DOE and NRC; and issuance of a license or license modification by NRC which shall govern disturbance and restoration of the disposal site.

6.0 ADMINISTRATION

6.1 Cooperative Agreements

6.1.1 Concurrence - DOE shall provide to NRC, for review and comment, copies of a cooperative agreement, in draft form at the same time such draft or revised draft is provided to participating agencies. Upon execution of the cooperative agreement or modification thereof by the affected state or tribe, DOE shall transmit the agreement to NRC for review and concurrence; provided that modifications which merely increase the estimated costs of funds obligated in the cooperative agreement without revision to the RAP shall not require NRC concurrence.

6.1.2 Administration - The parties contemplate that DOE and NRC will interface with other participating agencies in the performance of this MOU. However, the appropriate DOE Contracting Officer shall be responsible for the administration of the cooperative agreements, including sole responsibility on behalf of the Government for the modification thereof or any change thereto affecting cost, schedule or performance thereunder. The Manager, UMTRA Project Office, shall be designated by DOE as the Contracting Officer's Representative (COR) for purposes of the administration of cooperative agreements. The COR shall be responsible for monitoring the technical compliance of each state or Indian tribe and managing the performance of DOE under the cooperative agreements. Each party shall attempt to keep the other informed regarding any interface with participating agencies which effects activities within the scope of this MOU.

6.2 Annual Report to Congress

Until January 1, 1986, except as such date is extended by Congress, DOE shall prepare an annual report to Congress on the status of the UMTRA Project as required by Section 114(a) of the UMTRCA. The report shall be prepared in consultation with NRC and shall contain any separate views, comments, or recommendations of the NRC. NRC shall provide a timely response to DOE's request for input to such report.

6.3 Documentation of UMTRAP

Pursuant to Section 114(e) of the UMTRCA, NRC, in cooperation with DOE, shall ensure that any relevant information, other than trade secrets and other proprietary information otherwise exempted from mandatory disclosure under any other provision of law, obtained from the conduct of remedial actions is documented systematically, and made publicly available conveniently for use. With regards to normal vicinity property documentation, DOE shall be NRC's agent in fulfilling requirements of Section 114(e) and shall provide NRC with periodic updates of location of document availability.

DOE GM04-85AL26037
DOE-NRC MOU
UMTRA Project
MOD: 1
DATE:

MEMORANDUM OF UNDERSTANDING
BETWEEN
THE U. S. DEPARTMENT OF ENERGY
AND
THE U. S. NUCLEAR REGULATORY COMMISSION

I. PARTIES

A. The parties to this Memorandum of Understanding (MOU) are the U. S. Department of Energy (DOE) and the U. S. Nuclear Regulatory Commission (NRC).

B. The DOE will administer and execute its responsibilities under this MOU through its Uranium Mill Tailings Remedial Actions (UMTRA) Project Office, Albuquerque Operations Office. The NRC will administer and execute its responsibilities under this MOU through its Office of Nuclear Material Safety and Safeguards (NMSS) or any other NRC element designated by NMSS.

II. PURPOSE AND AUTHORITY

Under authority of the Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA), Public Law 95-604 (42 U.S.C. 7901 et. seq.), as amended, the DOE and NRC have entered into this MOU in order to provide for an orderly process for executing their respective statutory responsibilities under Title I of the UMTRCA. It is contemplated that such process will minimize or eliminate unnecessary duplication of effort, will facilitate and expedite reviews and concurrences, and will promote the accomplishment of the objectives of Title I of the UMTRCA within the statutorily mandated schedule.

III. BACKGROUND

Title I of the UMTRCA authorizes the Department of Energy (DOE) to undertake remedial action at designated inactive uranium processing sites and associated vicinity properties containing uranium mill tailings and other residual radioactive materials derived from the inactive processing sites. The purpose of these remedial actions is to stabilize and control uranium mill tailings and other residual radioactive materials in a safe and environmentally sound manner.

The selection and performance of remedial actions undertaken by DOE pursuant to the UMTRCA are to be with the full participation of the affected states and Indian tribes and with the concurrence of the NRC. Such remedial actions are to be performed in accordance with standards established by the Environmental Protection Agency (EPA), 40 CFR 192, and consistent with applicable federal and state law.

This MOU delineates the concurrence procedures and areas of cooperation between the DOE and the NRC in the implementation of Title I of the UMTRCA. The UMTRA Project has a statutorily-imposed completion schedule of seven years from the date of promulgation of the EPA Standards. The EPA Standards were promulgated effective March 7, 1983.

Within DOE, program responsibility for carrying out Title I of UMTRCA is within the Division of Uranium Mill Tailings Projects, DOE Headquarters. Field responsibility has been delegated to the Albuquerque Operations Office, where the UMTRA Project Office has been established. Consequently, DOE will execute its responsibilities under Title I of the UMTRCA principally through the UMTRA Project Office. The DOE Liaison with NRC for purposes of implementing this MOU shall be the Manager, UMTRA Project Office.

Within NRC, the program responsibility for carrying out Title I of UMTRCA is within NMSS, NRC Headquarters. NRC will execute such responsibilities principally through the Low-Level Waste and Uranium Recovery Projects Branch (WMLU) in the Division of Waste Management or any other NRC element designated by NMSS. The NRC Liaison with DOE for purposes of this MOU shall be the Branch Chief, WMLU or such other person as he may delegate.

IV. DEFINITIONS

A. Except as otherwise defined in this Article, the definition of terms used in this MOU shall be the same as in Title I of the UMTRCA.

B. The following terms shall have the following meanings:

1. "Processing site" means any of the twenty-four inactive uranium mill sites: (1) designated by DOE, pursuant to Section 102(a) of the UMTRCA, for remedial action under the UMTRCA; and (2) listed in the notice of such designation published in the Federal Register at 44 FR74892 (December 18, 1979).

2. "Vicinity property" means any real property and improvement thereon which: (1) is in the vicinity of a processing site or in the vicinity of the uranium mill currently owned by the Tennessee Valley Authority (TVA) in Edgemont, South Dakota; (2) is determined by the DOE, in consultation with affected states or Indian tribes and the NRC, to be contaminated with residual radioactive materials derived from a processing site or the TVA mill in Edgemont, South Dakota; and (3) the DOE has designated and included, pursuant to Section 102(e) of the UMTRCA, within the scope of the UMTRA Project as eligible for remedial action under the UMTRA Project.

3. "Disposal site" means the site, which may include a processing site or vicinity property, used for the permanent disposition, stabilization and control of residual radioactive materials.

4. "EPA Standards" means the standards of general application promulgated by the EPA at 40 CFR 192, for the protection of the public health, safety and the environment from radiological and nonradiological hazards associated with residual radioactive materials. DOE and NRC interpret the EPA Standards to require specific analyses of and a determination of the need for groundwater protection or restoration in accordance with Subpart C, and to require the implementation of any such protection or restoration measures so determined to be needed. DOE and NRC additionally recognize that Subpart C of 40 CFR 192 has been remanded pending further EPA rulemaking. DOE and NRC agree to continue to use Subpart C of EPA Standards (as promulgated at 48 FR 45926, October 7, 1983) as guidance on an interim basis, and will make appropriate project changes when new rulemaking is completed.

5. "Designation" means the DOE action to formally identify a processing site or potential vicinity property as eligible for remedial action by DOE under Title I of the UMTRCA, on the basis of radiological surveys or assessments of historical data available.

6. "Inclusion" means the DOE actions of: confirming, on the basis of detailed surveys, that radiological conditions at a designated potential vicinity property exceed the concentrations or levels of contamination set forth in the EPA Standards; and formally including the property within the designation of the processing site as eligible for remedial action.

7. "Remedial action" means the stabilization and control of, decontamination and decommissioning of, and cleanup of processing sites and vicinity properties in accordance with the EPA Standards and consistent with applicable federal and state law.

8. "Remedial Action Plan" means the document, developed by DOE in order to obtain from the NRC (and the affected state or Indian tribe) concurrence with DOE's selection of remedial action and to document the basis for DOE's conclusion that the proposed remedial actions for a processing site or disposal site, or both, will meet the EPA Standards, and which includes at various stages of development: site characterization data; conceptual design; preliminary design; final design; the estimated costs of design, construction and any necessary land acquisitions;

the environmental, health and safety plan; the radiological support plan; the quality assurance plan; the remedial action schedule; the public participation and information plan; a discussion of the requisite permits and approvals; and any additional analyses and documentation necessary to demonstrate that the proposed remedial action is fully consistent and complies with the EPA Standards.

9. "Participating agency" means any state or Indian tribe party to a cooperative agreement with DOE under Title I of the UMTRCA.

10. "Cooperative agreement" means a contractual instrument executed by an affected state or Indian tribe and the DOE for the purpose of defining the DOE and state/tribe responsibilities in connection with remedial action, and which contains such terms and conditions as DOE deems appropriate and consistent with the purposes of the UMTRCA.

V. SCOPE OF COORDINATION

A. For the purposes of this MOU, NRC responsibilities under the UMTRCA are indicated below:

UMTRCA RESPONSIBILITY	UMTRCA SECTION	NRC ROLE
1. Designation		
Designation of processing sites and potential vicinity properties and determination of site boundaries.	102(a) 102(e)	Consultation with DOE.
2. Remedial Actions		
Selection and performance of remedial action at processing, disposal, and vicinity property sites.	108(a)	Concur in DOE selection and performance.
Determination that radioactive materials should be removed from processing sites.	104(b)(1)-State 105(b)-Tribe	Concur in DOE decision.
Allowing mineral recovery from residual radioactive materials.	108(b)	Concur in DOE decision to allow recovery.
Determination that remedial action is completed.	104(f)(1)	Concur in DOE determination.

3. Acquisition/Disposal of Lands

Acquisition/disposal of processing sites.	104(a),(e)	Concur in DOE decision to require state acquisition or to allow state sale/ retention or transfer of the acquired site.
Designation of DOE-controlled or Department of Interior (DOI) - administered lands as disposal sites.	104(b)(2)	Concur in DOE designation.

4. Long-Term Maintenance of Disposal Sites

Long-term maintenance, monitoring and emergency measures at disposal sites in such manner as will protect the public health, safety, and the environment.	104(f)(2) 105(b)	Issue license.
Sale or lease of subsurface mineral rights at licensed disposal sites.	104(h)	Concur, along with DOE, in DOI decision to sell or lease mineral rights.

5. Public Participation

Public participation in program, including designation, selection of remedial action, execution of cooperative agreements.	111	Encourage, together with DOE and EPA.

6. Administrative

Execution of cooperative agreements.	103(e)- 105(a)	Concur in each cooperative agreement between DOE and a state or tribe.
Preparation of annual report to Congress.	114(a)	Consultation with DOE.

Documentation of UMTRA Project.	114(e)	NRC action with DOE.

B. Appendix A, Review and Concurrence Procedures, sets forth the detailed procedures for DOE and NRC coordination in the implementation of Title I of the UMTRCA. Appendix A may be amended from time to time by the parties to accommodate the dynamic nature of the UMTRA Project. DOE agrees to use its best efforts to provide quality UMTRA Project coordination documents in a timely manner for NRC review, including all pertinent information or data concerning any DOE-proposed remedial action design, processing site, disposal site, or vicinity property. NRC agrees to use its best efforts to respond within the response times for action set forth in Appendix A. The UMTRA Processing Site Schedule, as it may be revised from time to time, shall serve as the baseline planning schedule for coordination of responsibilities under this MOU. DOE shall prepare and maintain a current detailed project schedule itemizing key remedial action activities and site-specific documentation to be submitted from DOE to NRC for the purpose of review, comment, and/or concurrence and shall provide monthly issuance of such schedules to NRC.

C. DOE and NRC agree that the principal focus of NRC coordination and concurrence under this MOU is to assure compliance with the EPA Standards in the DOE's selection of remedial action among reasonable remedial action alternatives and implementation of such remedial action.

VI. RESOLUTION OF INTERAGENCY CONFLICTS

A. Any required concurrence of NRC under this MOU shall be communicated to the DOE Liaison in writing. A decision to withhold concurrence shall be communicated to the DOE Liaison with a written rationale therefor. Concurrences shall not be unreasonably withheld or denied. Lack of compliance, or lack of sufficient demonstration of compliance, with the EPA Standards shall constitute reasonable grounds for withholding or denying concurrence in the selection or performance of remedial action. Informal communication during the review and concurrence process is to be encouraged, including notification by NRC to DOE at the earliest opportunity of issues which may preclude NRC concurrence and notification by DOE to NRC at the earliest opportunity of any significant changes to documents under review by NRC.

B. Any conflict arising under this MOU shall be resolved at the lowest possible level of agency decision making but shall be referred to successive levels of agency decision making until resolution is reached.

VII. EFFECTIVE DATE

This MOU shall take effect upon the latter date of execution by DOE and NRC.

VIII. TERM AND TERMINATION

The term of this MOU shall be from the effective date through whichever of the following two dates is the earlier date: (1) the date DOE and the NRC mutually agree in writing that the objectives of the remedial action program have been met and that all activities under this MOU, or any modification thereto, have been completed; or (2) March 7, 1990, or such other date as Congress shall establish as the date of termination of the Secretary's authority to perform remedial action or maintenance and surveillance under the UMTRCA.

IX. PROCUREMENT AND FUNDING

Each party shall be responsible for funding its performance under this MOU. Each party shall procure services, equipment, or supplies under its own regulations and shall be solely responsible for managing and directing its contractors' efforts.

X. PUBLIC INFORMATION COORDINATION

Consistent with the Freedom of Information Act (5 U.S.C. 552), timely release of information to the public regarding the coordination of UMTRCA activities under this MOU shall be conducted according to each agency's own standard operating procedure, with appropriate coordination between DOE and NRC.

XI. APPENDIX

The following appendix is attached to and made a part of this MOU:

Appendix A - Review and Concurrence Procedures.

XII. EXECUTION

The parties have executed this MOU in several counterparts.

DEPARTMENT OF ENERGY
John E. Baublitz
Deputy Director
Office of Remedial Action and Waste Technology

By: _____

Date: _____

NUCLEAR REGULATORY COMMISSION
Michael J. Bell
Deputy Director
Division of Waste Management, NMSS

By: _____

Date: _____