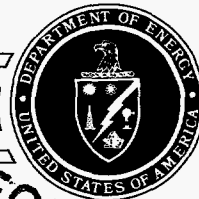


United States Department of Energy



RECEIVED  
DEC 02 1998  
OSTI

# LONG-TERM SURVEILLANCE PLAN FOR THE GREEN RIVER, UTAH DISPOSAL SITE

JULY 1998

*OST*

**MASTER**

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED



Uranium Mill Tailings Remedial Action Project

DOE/AL/62350-89  
REV. 2

**LONG-TERM SURVEILLANCE PLAN  
FOR THE GREEN RIVER, UTAH  
DISPOSAL SITE**

**JULY 1998**

**Prepared for  
U.S. Department of Energy  
UMTRA Project Team  
Environmental Restoration Division  
Albuquerque, New Mexico**

**Prepared by  
Jacobs Engineering Group Inc.  
Albuquerque, New Mexico**

## **DISCLAIMER**

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, make any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

## **DISCLAIMER**

**Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.**

## LIST OF ACRONYMS AND ABBREVIATIONS

<u>Acronym</u>	<u>Definition</u>
ac	acre
• C	degrees Celsius
cm	centimeter
D <sup>50</sup>	median diameter
DOE	U.S. Department of Energy
DQO	data quality objective
EA	environmental assessment
EPA	U.S. Environmental Protection Agency
• F	degrees Fahrenheit
ft	foot
GJO	Grand Junction Office
ha	hectare
in	inch
km	kilometer
LTSP	long-term surveillance plan
m	meter
mm	millimeter
m <sup>3</sup>	cubic meter
mi	mile
MCL	maximum concentration limit
mg/L	milligrams per liter
MSL	mean sea level
NRC	U.S. Nuclear Regulatory Commission
NWS	National Weather Service
POC	point of compliance
QA	quality assurance
QC	quality control
RAP	remedial action plan
RRM	residual radioactive material
SOP	standard operating procedure
TDS	total dissolved solids
TEGD	Technical Enforcement Guidance Document
UMTRA	Uranium Mill Tailings Remedial Action
UMTRCA	Uranium Mill Tailings Radiation Control Act
UPDCC	UMTRA Project Document Control Center
USGS	U.S. Geological Survey
WSMR	White Sands Missile Range
yd	yard
yd <sup>3</sup>	cubic yard

**CHANGE HISTORY**

<b>Document version</b>	<b>Date</b>	<b>Pages/comments</b>
Rev. 0, Ver. 1	11/04/93	Initial version.
Rev. 1, Ver. 1	06/16/94	Extensively revised. Response to NRC comments.
Rev. 1, Ver. 2	07/12/94	Extensively revised.
Rev. 1, Ver. 3	07/21/94	Section 5.0 extensively revised.
Rev. 1, Ver. 3	08/03/94	Revised pages 2-3, 5-1, and 5-13. Revised Figure 5.3. Renumbered Tables 5.1 and 5.2, updated callouts and front matter, and reprinted Section 5.0.
Rev. 1, Ver. 4	05/11/98	Revised Section 5.0 to reflect RAP Modification No. 2 changes to ground water compliance strategy and monitoring requirements.
Rev. 2, Ver. 0	07/07/98	Response to NRC comments

## 1.0 INTRODUCTION

The long-term surveillance plan (LTSP) for the Green River, Utah, Uranium Mill Tailings Remedial Action (UMTRA) Project disposal site describes the surveillance activities for the Green River disposal cell. The U.S. Department of Energy (DOE) will carry out these activities to ensure that the disposal cell continues to function as designed. This final LTSP was prepared as a requirement for acceptance under the U.S. Nuclear Regulatory Commission (NRC) general license for custody and long-term care of residual radioactive materials (RRM). This LTSP documents whether the land and interests are owned by the United States or an Indian tribe and details how the long-term care of the disposal site will be carried out. The Green River, Utah, LTSP is based on the DOE's *Guidance for Implementing the UMTRA Project Long-term Surveillance Program* (DOE, 1992a).

### 1.1 BACKGROUND

Title I of the *Uranium Mill Tailings Radiation Control Act* (UMTRCA) of 1978 (42 USC §7901 *et seq.*) authorized the DOE to perform remedial action at 24 inactive uranium mill tailings sites to reduce the potential effect on public health from unstabilized RRM in and around the uranium mill tailings. The Green River, Utah, uranium processing site in Grand County was one of the 24 sites identified for remediation in the UMTRCA. Effective May 15, 1980, the DOE and the state of Utah entered into a cooperative agreement under the UMTRCA, establishing the terms and conditions of the remedial action (DOE Cooperative Agreement No. DE-FC04-81AL16309) (DOE, 1991; 1988). Remedial action began in November 1988 and was completed in September 1989. The RRM (tailings) and other contaminated materials at the Green River designated processing site were stabilized on the site in a permanent disposal facility about 600 feet (ft) (180 meters [m]) southeast of the uranium processing site. The NRC has concurred with the DOE's determination that remedial action at the Green River site is complete. Attachment 1 contains NRC concurrence and licensing documentation.

The tailings and other contaminated materials are consolidated in a below-grade area; it contains approximately 382,000 yd<sup>3</sup> (291,000 m<sup>3</sup>) of compacted tailings. The resulting disposal cell is contoured to have 20-percent (5 horizontal to 1 vertical) sideslopes. To ensure compliance with U.S. Environmental Protection Agency (EPA) standards (40 CFR Part 192), the tailings and contaminated materials are covered with 3 ft (0.9 m) of compacted earth (radon/infiltration barrier) to inhibit the emanation of radon and the infiltration of water. The topslope and sideslopes of the disposal cell are covered with a 0.5-ft (0.2-m)-thick layer of sand and gravel and a 1-ft (0.3-m)-thick layer of rock to protect the radon/infiltration barrier from erosion. These layers also protect against penetration by animals and prevent human intrusion.

The stabilized disposal cell covers approximately 5 acres (ac) (2 hectares [ha]) and is approximately 530 by 450 ft (160 by 140 m) along the sides. After remedial action, the area of the existing tailings pile was backfilled, graded to

promote surface drainage, and revegetated. All other areas disturbed at the site by remedial action have been backfilled and graded to promote surface drainage.

## 1.2 LICENSING PROCESS

The NRC has developed regulations (10 CFR §40.27) issuing a general license for the long-term care of DOE UMTRA Project (Title I) disposal sites, including the Green River disposal site. The license is available only to the DOE (or any successor federal agency designated by the President of the United States) and has no termination date. The purpose of this general license is to ensure that the UMTRA Project disposal sites will be cared for in a manner that protects public health and safety and the environment. The license takes effect at a site after the NRC concurs that remedial action is complete at that site (i.e., accepts the site-specific completion report and certification summary) and formally accepts a site-specific LTSP that meets the requirements of 10 CFR §40.27. The site-specific completion report documents the site as-built conditions. The DOE prepares a certification summary memorandum certifying satisfaction of approved remedial action plan (RAP) provisions and compliance with EPA standards. The DOE compiles the final completion report, final audit report, and certification summary into the certification report and submits it to the NRC for concurrence (DOE, 1993). Because the Green River processing site uranium mill tailings were stabilized on the site, the site will be licensed in two steps: surface remediation and ground water compliance.

The DOE will conduct long-term surveillance activities at the Green River disposal site unless the President of the United States designates another federal agency to perform these activities. The DOE UMTRA Project Office will conduct interim surveillance activities at the disposal site until the NRC issues Phase I of the license. At that time, the long-term surveillance and maintenance activities will be transferred to the DOE Grand Junction Office (GJO).

## 1.3 ACQUISITION

The state of Utah acquired 103.5 ac (42 ha) of land from Umetco Minerals Corporation. The final disposal site is located within the boundaries of the state-owned land. The fee simple title obtained from Umetco conveys all reservations of oil, gas, and mineral rights owned or leased. The area encompassed by the final site boundaries is 25.27 ac (10.2 ha).

Attachment 2 contains land ownership documentation. It includes two legal land descriptions: the final site boundary, which defines the area transferred to the United States of America, and the boundary of the state-owned land. Both boundaries are labeled on the disposal site map in Plate 1.

The title documentation is included in the Green River permanent site file and in Attachment 2. The DOE, or another federal agency that the President of the United States may designate, has perpetual custody of the Green River disposal site and the permanent right of entry to undertake any monitoring, maintenance,



and emergency measures necessary to protect public health and safety and the environment.

The NRC and the state of Utah concurred with the DOE's RAP (DOE, 1991 and 1998) under the requirements of the final EPA standards in 40 CFR Part 192 (Attachment 1). The remedial actions were described and evaluated in an environmental assessment (EA) (DOE, 1988) prepared by the DOE. Ground water compliance activities (under 40 CFR 192 (Subpart B)) at the processing site will be implemented at a later date.

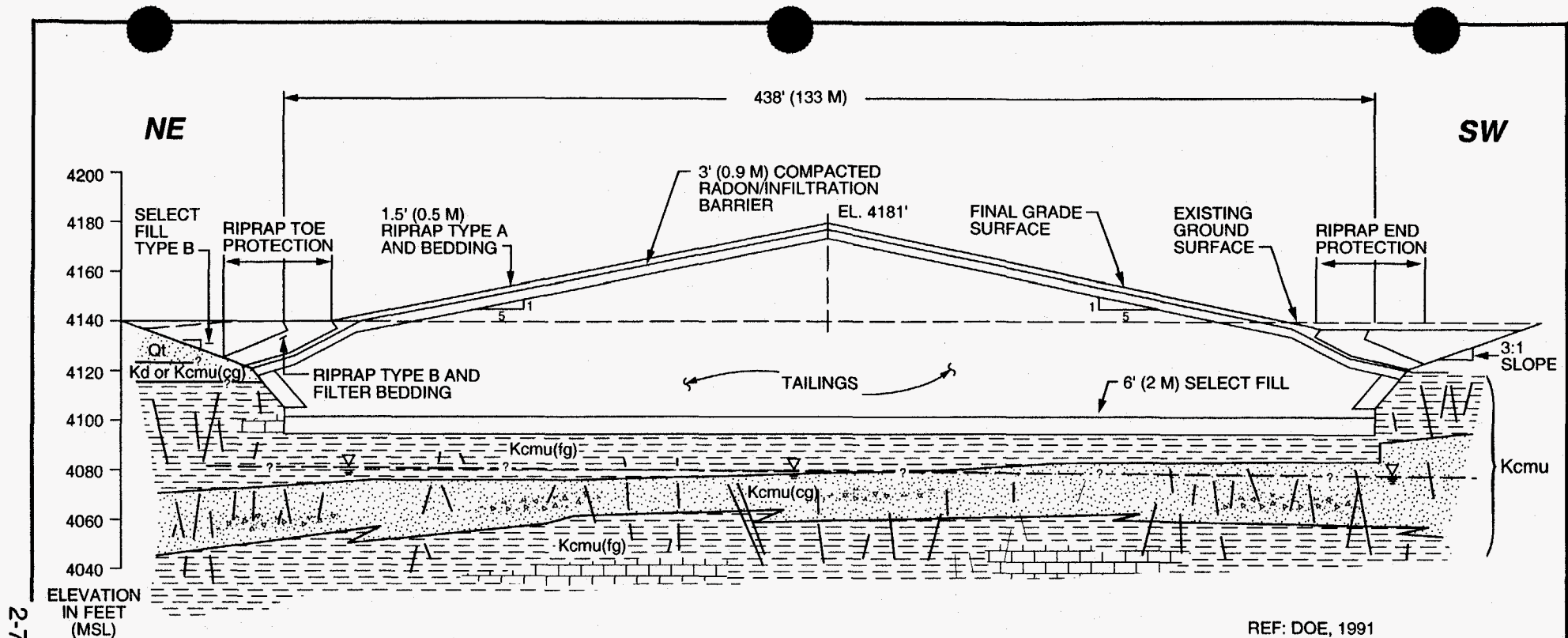
The NRC has concurred with the completion of surface remedial action (Attachment 1).

#### 1.4 LONG-TERM SURVEILLANCE PLAN

This document describes the long-term surveillance program to be implemented at the Green River disposal site to ensure that the disposal cell continues to perform as designed. The plan is based on the DOE's *Guidance for Implementing the UMTRA Project Long-term Surveillance Program* (DOE, 1992a).

This LTSP meets the requirements of 10 CFR §40.27 by addressing the following:

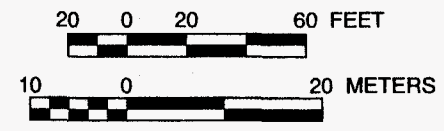
- Site description and ownership.
- Description of final site conditions.
- Site inspection procedures and personnel.
- Custodial maintenance and corrective action programs.
- Record keeping and reporting.
- Quality assurance monitoring activities.
- Emergency response.



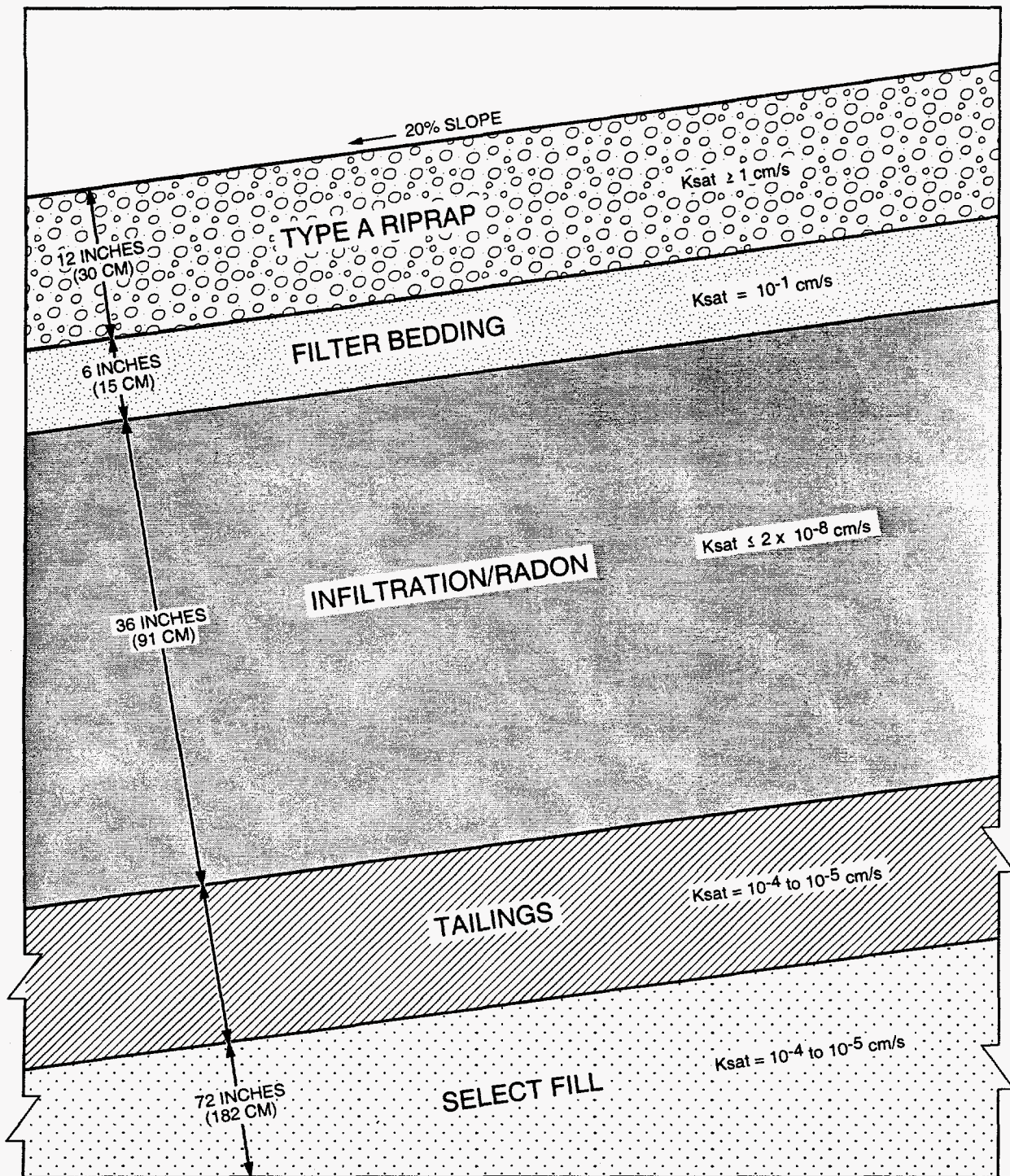
REF: DOE, 1991

**LEGEND**

FORMATION	MATERIAL	ROCK TYPE	
Qt	TERRACE ALLUVIUM	SOILS	
Kd	DAKOTA SANDSTONE		
Kcmu(fg)	CEDAR MOUNTAIN FORMATION - UNNAMED MEMBER (FINE-GRAINED MIDDLE HYDROSTRATIGRAPHIC UNIT)	BEDROCK	<ul style="list-style-type: none"> <li> SANDSTONE OR SILTSTONE</li> <li> SHALE OR MUDSTONE</li> <li> LIMESTONE</li> <li> CONGLOMERATE</li> </ul>
FRACTURES			
POTENTIOMETRIC SURFACE			



**FIGURE 2.3**  
**DIAGRAMMATIC CROSS SECTION OF DISPOSAL CELL AND FOUNDATION**  
**GREEN RIVER, UTAH, DISPOSAL SITE**



SCHEMATIC - NOT TO SCALE

LEGEND

$K_{sat}$  SATURATED HYDRAULIC CONDUCTIVITY  
 cm/s CENTIMETERS PER SECOND

**FIGURE 2.4**  
**DISPOSAL CELL COVER SYSTEM**  
**GREEN RIVER, UTAH, DISPOSAL SITE**

EPA standards require that a corrective action program to restore the disposal cell to design requirements must be implemented within 18 months if initial cell performance is not in compliance with the EPA ground water protection standards (40 CFR §192.04). The NRC regulations in Appendix A of 10 CFR Part 40 specify that the DOE will notify the NRC before implementing any significant action that may be required. The DOE will prepare and submit a corrective action plan to the NRC for review and approval. A copy of this plan also will be transmitted to the state of Utah. The corrective action plan may include indirect monitoring to demonstrate the effectiveness of the corrective action. The DOE will implement corrective action when NRC approval has been granted.

In preparing a corrective action plan, an update of the risk assessment may be performed to evaluate the potential impact to nearby populations or the environment. If the risk assessment demonstrates no potential harm to human health and the environment, the recommended corrective action may consist of "no action" except continued inspection of the disposal cell.

#### **5.4 DATA VALIDATION AND QUALITY ASSURANCE**

The UMTRA Project has established SOPs for monitor well installation and development, water and soil sampling, sample preservation and transport, field procedures, chain of custody samples for laboratory analysis, acquisition protocols, and validating and managing analytical data. All aspects of ground water monitoring are conducted in accordance with these procedures, which are updated regularly to reflect changes in industry standards, best management practices, and DOE and EPA guidance. The quality assurance procedures are consistent with the Resource Conservation and Recovery Act (RCRA) ground water monitoring technical enforcement guidance document (EPA, 1986) and the long-term surveillance and maintenance program QA plan (DOE, 1996b).

#### **5.5 REPORTING**

The DOE maintains and updates specific records and reports required to document long-term surveillance program activities at the Green River UMTRA Project site. The DOE will submit an annual report to the NRC documenting the results of the LTSP, as required by 10 CFR 27, Appendix A, Criterion 12. The DOE will keep all relevant and required records at an appropriate location. These documents will be available for review by the NRC and the public.

## 7.0 UNSCHEDULED INSPECTIONS

Unscheduled inspections arise from reports or information indicating that site integrity has been or may be compromised. The need for an unscheduled inspection may be triggered by any of the following:

- Findings from an annual or scheduled site inspection.
- Other site visits, such as for ground water sampling, special studies, corrective action, or other DOE activities.
- Reports from law enforcement agencies or the public.
- Reports from the Earthquake Early Warning Service or the National Weather Service (NWS).

### 7.1 FOLLOW-UP INSPECTIONS

Follow-up inspections are unscheduled inspections conducted to investigate and quantify specific site problems detected during a scheduled inspection, ground water sampling event, special study, or other DOE activity. They assess whether processes currently active on or near the site pose any future threat to the site if left unchecked and evaluate the need for custodial maintenance, repair, or corrective action.

Follow-up inspections should be made by technical specialists in the discipline appropriate to the problem that has been identified. For example, if erosion is the problem, the inspector(s) should be knowledgeable in evaluating erosion processes (such as a soils scientist or geomorphologist). If settlement or sliding is the problem, a geotechnical engineer would be the appropriate inspector.

The first step of the follow-up procedure is an on-site visit to determine the need for definitive tests or studies. Additional visits may be scheduled if more data are needed to draw conclusions and recommend corrective action.

After the follow-up inspection, the DOE will analyze the information gathered; assess the situation; prepare an inspection report describing the site conditions; and, if necessary, outline recommendations for further action. If maintenance, repair, or corrective action is warranted, the DOE will notify the NRC, the state of Utah, and adjacent residents as specified in Section 9.0.

### 7.2 CONTINGENCY INSPECTIONS

Contingency inspections are unscheduled inspections ordered by the DOE when it receives information indicating that site integrity has been or may be threatened. Examples of events that could trigger contingency inspections include reports of severe vandalism, intrusion by humans or livestock, severe rainstorms or floods, or unusual events such as tornadoes or earthquakes.

An assessment of each unusual event must be submitted to the NRC within 60 days of an initial report that damage or disruption has occurred at the disposal site (10 CFR Part 40). The state of Utah will receive a copy of this report. At a minimum, this report must include the following:

- A description of the problem.
- A preliminary assessment of the maintenance, repair, or corrective action required.
- Conclusions and recommendations.
- Assessment data, including field and inspection data, and photographs.
- Field inspector names and qualifications.

A copy of the report and all other data and documentation will be maintained in the Green River permanent site file. The annual report to the NRC will also include the results of these contingency inspection reports. If appropriate, the annual (or scheduled) Green River site inspection report will also contain the results of these inspections.

## 9.0 CORRECTIVE ACTION

If natural or unforeseen events threaten the stability of the disposal cell, a corrective action could include temporary emergency measures. In addition, the DOE would evaluate the factors that caused the problem to ensure that recurrence is minimized or avoided.

When a potential problem has been identified, the DOE will notify the NRC and the state of Utah and submit an inspection/preliminary assessment report to the NRC for review within 60 days. The preliminary assessment report will evaluate the problem and recommend the next step (e.g., immediate action or continued evaluation). After the NRC has reviewed the report and recommendations, the DOE will develop a corrective action plan for NRC approval. The DOE may combine the inspection and recommendation in one report, depending on the severity of the problem. Once the NRC approves the corrective action, the DOE will implement the plan. Figure 9.1 illustrates the general sequence of events in the corrective action process. Figure 9.2 identifies the key elements in the corrective action process.

NRC regulations do not stipulate a time frame for implementing corrective action. However, the EPA ground water regulations (40 CFR §192.04) require that a corrective action program be placed into operation no later than 18 months after an exceedance is confirmed at a disposal cell. Assessing the extent of the problem and developing a corrective action plan will not be considered initiation of the corrective action program. Section 9.0 of the UMTRA Project LTSP guidance document (DOE, 1992a) contains details on corrective action.

### 9.1 PROBLEM IDENTIFICATION

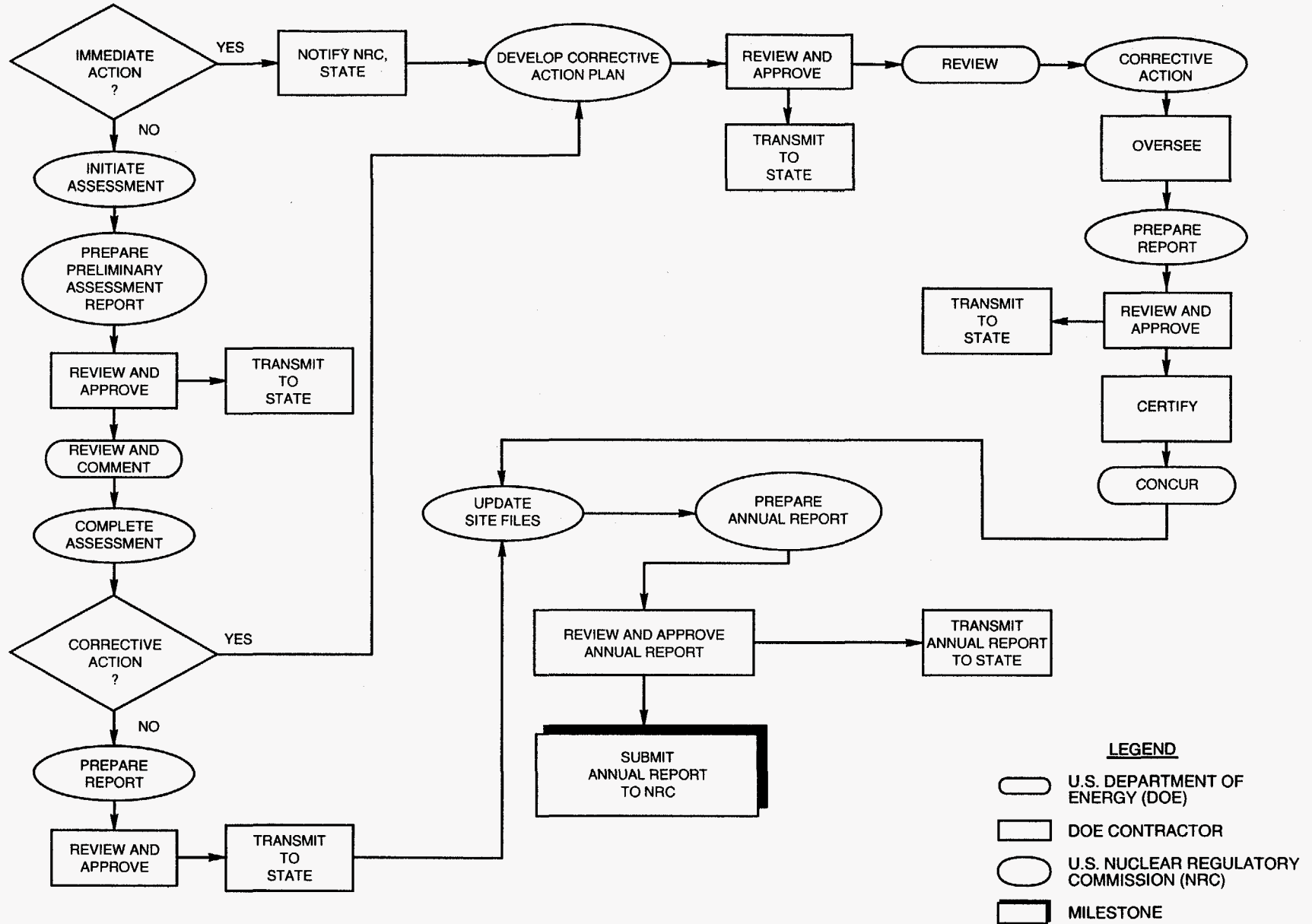
Site inspections by qualified inspectors and custodial maintenance are designed to identify problems at the developmental stage, eliminating the need for corrective action. However, extreme natural events, vandalism, or unanticipated events may create the need for additional data or evaluative monitoring to assess whether uncorrected problems would threaten disposal site integrity. An on-site inspection/preliminary assessment would include, but would not be limited to, the following:

- Quantifying the nature and extent of the problem.
- Reevaluating the engineering design parameters germane to the problem.
- Establishing a data collection and/or evaluative monitoring program to
- Quantify the magnitude of the problem.

### 9.2 CERTIFICATION AND REPORTING REQUIREMENTS

The DOE will prepare progress reports on each corrective action while it is under way or under evaluation. The NRC will be given a copy of each report, or the

PROBLEM INDICATING CORRECTIVE ACTION IDENTIFIED



**FIGURE 9.1**  
**CORRECTIVE ACTION**  
**UMTRA PROJECT LONG-TERM SURVEILLANCE PROGRAM**



### **NEED FOR CORRECTIVE ACTION IDENTIFIED**

- DOCUMENT AND REPORT PROBLEM TO NRC, STATE, AND TRIBES
- EVALUATE PROBLEM AND PROPOSE A SOLUTION
- DEVELOP CORRECTIVE ACTION PLAN AND NOTIFY NRC, STATE
- SELECT CONTRACTOR TO PERFORM CORRECTIVE ACTION
- ESTABLISH CONTRACTUAL CONDITIONS FOR PERFORMING CORRECTIVE ACTION AND GUARANTEE CORRECTIVE ACTION WILL BE PERFORMED IN ACCORDANCE WITH CONTRACTUAL AGREEMENTS AND DESIGN SPECIFICATIONS

### **IMPLEMENTATION**

- MONITOR PROGRESS OF CORRECTIVE ACTION
- VERIFY COMPLETION OF CORRECTIVE ACTION

### **CERTIFICATION**

- VERIFY CORRECTIVE ACTION AS DESIGNED CORRECTS THE PROBLEM
- ENSURE RECURRENCE OF PROBLEM IS MINIMIZED OR AVOIDED
- CERTIFY COMPLETION OF CORRECTIVE ACTION IN ACCORDANCE WITH 40 CFR PART 192 (1994)
- SUBMIT CERTIFICATION REPORT TO NRC

FROM DOE, 1992a

**FIGURE 9.2**  
**KEY ELEMENTS IN THE CORRECTIVE ACTION PROCESS**

report will be attached to the annual report. The NRC will be informed of all potential problems and solutions. All reports will be provided to the state of Utah.

After corrective action is complete, all work completed will be certified in accordance with EPA standards. The NRC will review this certification. A copy of the DOE certification statement will become part of the Green River permanent site file, as will all reports, data, and documentation generated during the corrective action.

## 10.0 RECORD KEEPING AND REPORTING REQUIREMENTS

The DOE will maintain the Green River permanent site file containing all information needed to prepare for and conduct site surveillance. Carefully compiled, complete, accurate reports of site surveillance activities will be maintained in accordance with archival procedures established in 41 CFR Part 101 and 36 CFR Parts 1220-1238 (Subchapter B - Records Management).

As required by 10 CFR 40.27, the DOE will provide an annual report to the NRC documenting the results of the long-term surveillance program. Copies of the annual report will be provided to the state of Utah and will be added to the Green River permanent site file. The annual reports and supporting documentation in the permanent site files will accomplish the following:

- Document the history of disposal site performance.
- Demonstrate to the NRC that license provisions were met.
- Provide the DOE and the NRC with the information necessary to forecast future disposal site surveillance and monitoring needs.
- Provide information to the public to demonstrate that site integrity has been maintained.

### 10.1 RECORDS

The GJO will maintain the Green River permanent site file in Grand Junction, Colorado. All original deeds, custody agreements, and other property documents will be maintained in the DOE Facilities and Property Management Division, Albuquerque, New Mexico. Copies of these documents also will be maintained in GJO files.

Surveillance and maintenance documentation maintained at the GJO will exist as a record collection separate from the UPDCC. As such, the records will be handled in accordance with DOE Order 1324.2A, *Records Disposition*, to ensure proper handling, scheduling, and disposition of documents.

- All information will be available for NRC and public review. The Green River permanent site file will include the following:
  - Licensing documentation.
  - The site-specific LTSP.
  - Disposal site legal description, title, custody documentation and cooperative agreements.

- Interagency agreements, authorizations, and access agreements.
- Notification requests with the USGS, the Emery County Sheriff's Office, and the Grand County Sheriff's Department.
- Documentation of rights of entry.
- The Green River EA and finding of no significant impact.
- The disposal site characterization report and/or processing site characterization report.
- The final RAP and final design for construction.
- Pertinent design and construction documents and drawings.
- The site certification report (certification summary, completion report, and final audit report).
- As-built drawings.
- The site atlas (vicinity, topographic, and base maps).
- Baseline and aerial photographs.
- Ground water monitoring reports and records.
- Additional monitoring reports and records.
- Monitor well permits and well abandonment records.
- Annual reports to the NRC.
- Annual inspection reports and records.
- Follow-up or contingency inspection preliminary assessments, reports, and records.
- Custodial maintenance or repair reports and records.
- Corrective action plans, reports, and records.
- The QA program plan.

An index of the Green River permanent site file is provided in Attachment 3. The GJO will update the Green River permanent site file, as necessary, after the annual disposal site inspections are complete. Original UMTRA Project

records and files will be archived with the DOE GJO Grand Junction, Colorado.

## 10.2 REPORTS

The GJO will provide an annual report to the NRC, documenting the results of the annual site inspections and any other activities conducted in conjunction with the long-term surveillance program. Criterion 12 to Appendix A of 10 CFR Part 40 requires that the report be submitted within 90 days after the date of the last UMTRA Project site inspection for that calendar year.

The GJO also will submit reports to the NRC documenting follow-up or contingency inspections and any corrective action plans. If any unusual damage or disruption is discovered, Criterion 12 to Appendix A of 10 CFR Part 40 requires that all preliminary inspection reports be submitted within 60 days of the discovery.

The results of the ground water monitoring program will be reported annually to the NRC.

## 12.0 QUALITY ASSURANCE

The GJO is responsible for developing QA procedures specific to the UMTRA Project long-term surveillance program. The GJO QA Program Plan (DOE, 1996b) specifies the following requirements:

- Program planning.
- Program activities, including inspections, site maintenance, corrective action, and emergency response.
- Monitoring, if required.
- Personnel qualifications and training.
- Program surveillance and audits.
- Analytical QA.
- Analytical data validation.

All site inspections, monitoring data, records, photographs, maps, and other information related to the long-term surveillance program for the Green River disposal site are subject to formal and unannounced audits by the DOE UMTRA Project Office or the NRC. Specific QA criteria have already been developed for aerial photographs (DOE, 1996b).

## 14.0 REFERENCES

- Brookins, D.G., 1988. *Eh-pH Diagrams for Geochemistry*: Springer-Verlag, Heidelberg, 176 p.
- DOE (Department of Energy), 1998. *Modification No. 2 to the Remedial Action Plan and Site Design for Stabilization of the Inactive Uranium Mill Tailings Site at Green River, Utah*, March 1998, DOE/AL/62350-050510.GRNO, DOE UMTRA Project, DOE Environmental Restoration Division, Albuquerque, New Mexico.
- DOE (Department of Energy), 1996a. *Guidance for Implementing the Long-Term Surveillance Program for UMTRA Project Title I Disposal Sites*, February 1996, DOE/AL/62350-189, Rev. 0, DOE UMTRA Project, DOE Environmental Restoration Division, Albuquerque, New Mexico.
- DOE (U.S. Department of Energy), 1996b. *Long-Term Surveillance and Maintenance Program, Quality Assurance Program Plan, AC-2152, Rev. 0*, prepared by MACTEC Environmental Restoration Services, for the U.S. Department of Energy, Grand Junction Office, Grand Junction, Colorado.
- DOE (Department of Energy), 1994. *Baseline Risk Assessment of Ground Water Contamination at the Uranium Mill Tailings Site Near Green River, Utah*, September 1994, DOE/AL/62350-116, Rev. 0, DOE UMTRA Project, DOE Environmental Restoration Division, Albuquerque, New Mexico.
- DOE (U.S. Department of Energy), 1993. *Licensing Plan for UMTRA Project Disposal Sites*, final, September 1993, DOE/AL/62350-9F, prepared by the U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.
- DOE (U.S. Department of Energy), 1992a. *Guidance for Implementing the UMTRA Project Long-term Surveillance Program*, UMTRA-DOE/AL-350125.0000, Rev. 1, prepared by the U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.
- DOE (U.S. Department of Energy), 1992b. *Vegetation Growth Patterns on Six Rock-Covered UMTRA Project Disposal Cells*, UMTRA-DOE/AL-400677.0000, February 1992, prepared by the U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.
- DOE (U.S. Department of Energy), 1992c. *1991 Annual Prelicensing Inspection of the Green River, Utah, UMTRA Project Disposal Site*, DOE/ID/12584-98, prepared by the U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.
- DOE (U.S. Department of Energy), 1991. *Remedial Action Plan and Site Conceptual Design for Stabilization of the Inactive Uranium Mill Tailings Site at Green River, Utah*, UMTRA-DOE/AL-050510.GRNO, prepared by the U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.

- DOE (U.S. Department of Energy), 1990. *Requirements for Quality Control of Analytical Data*, DOE/HWP-65/R1, Hazardous Waste Remedial Actions Program/Oak Ridge Operations Office, Oak Ridge, Tennessee.
- DOE (U.S. Department of Energy), 1989. *Regulatory Alternatives for Groundwater Compliance for the DOE's UMTRA Project*, "Alternate Concentration Limits, Supplemental Standards, and Institutional Controls for the Department of Energy's UMTRA Project," UMTRA-DOE/AL-400659.0000, March 1989, prepared by the U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.
- DOE (U.S. Department of Energy), 1988. *Environmental Assessment of Remedial Action at the Green River Uranium Mill Tailings Site, Green River, Utah*, DOE/EA-0343, prepared by the U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.
- EPA (U.S. Environmental Protection Agency), 1991. *Groundwater Protection Standards*, SAR 1166, Document GWSTDI.WP5, Office of Radiation Programs, Washington, D.C.
- EPA (U.S. Environmental Protection Agency), 1989. *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities* □ *Interim Final Guidance*, EPA/530-SW-89-026, Washington, D.C.
- EPA (U.S. Environmental Protection Agency), 1988a. *Guidance on Remedial Actions for Contaminated Ground Water at Superfund Sites*, EPA/540/G-88-003, OSWER Directive 9283.1-2, Washington, D.C.
- EPA (U.S. Environmental Protection Agency), 1988b. *Statement of Work for Organic Analysis*, Contract Laboratory Program, Statement of Work No. 288, Washington, D.C.
- EPA (U.S. Environmental Protection Agency), 1986. *RCRA Groundwater Monitoring Technical Enforcement Guidance Document (TEGD)*, OSWER Directive 9950.1, Washington, D.C.
- JEG (Jacobs Engineering Group Inc.), 1993. *UMTRA Technical Assistance Contractor Quality Assurance Program Plan*, DOE/AL/62350-56, Rev. 4, prepared by Jacobs Engineering Group Inc., Albuquerque, New Mexico, for the U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.
- JEG (Jacobs Engineering Group Inc.), n.d. *Albuquerque Operations Manual*, standard operating procedures, prepared by Jacobs Engineering Group Inc., Albuquerque, New Mexico, for the U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.
- Krauskopf, K.B., 1979. *Introduction to Geochemistry*: McGraw-Hill, New York, 617 p.



- Larone, J.B., and Shen, H.W., 1982. "Temporal and spatial variations of solute pickup during runoff generation in saline hillslopes": in Singh, V.P., ed., *International Symposium on Rainfall Runoff Modeling: Modeling Components of the Hydrologic Cycle*, Water Resource Publication, Littleton, CO.
- MK-F (MK-Ferguson), 1991. *Green River, Utah, Final Completion Report*, prepared by MK-Ferguson for the U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.
- NRC (U.S. Nuclear Regulatory Commission), 1990. *Final Technical Evaluation Report for the Proposed Remedial Action at the Green River Tailings Site, Green River, Utah*, Washington, D.C.
- Shacklette, H.T., Boerngen, J.G., and Keith, J.R., 1974. *Selenium, Fluorine, and Arsenic in Surficial Materials of the Conterminous United States*: U.S. Geological Survey Circular 692, Washington, D.C., 14 p.
- Stokes, W.L., 1944. *Morrison Formation and Related Deposits in and Adjacent to the Colorado Plateau*: Bulletin of the Geological Society of America, v. 55, p 951-992.
- Young, R.G., Million, I, and Hausen, D.M., 1960. *Geology of the Green River Mining District, Emery and Grand Counties, Utah*: U.S. Atomic Energy Commission Report RME-98 (revised), 89 p.

#### DOE ORDERS

- Order 1324.2A, *Records Disposition*, April 9, 1992, U.S. Department of Energy, Office of Information Resources Management, Washington, D.C.
- Order 5000.3B, *Occurrence Reporting and Processing of Operations Information*, February 22, 1993, U.S. Department of Energy, Albuquerque Operations Office, Albuquerque, New Mexico.
- Order 5400.1, *General Environmental Protection Program*, June 29, 1990, U.S. Department of Energy, Environmental Protection Division, Office of Environment, Safety and Health, Washington, D.C.
- Order 5480.1B, *Environment, Safety and Health (ES&H) Program for DOE Operations*, September 1986, U.S. Department of Energy, Safety Programs Division, Washington, D.C.
- Order 5700.6C, *Quality Assurance*, August 21, 1991, U.S. Department of Energy, Office of Nuclear Energy and Office of Environment, Safety, and Health, Washington, D.C.

### FEDERAL REGISTER

52 FR 36000, "Standards for Remedial Actions at Inactive Uranium Processing Sites; Proposed Rule," September 24, 1987.

55 FR 45591, "Custody and Long-Term Care of Uranium and Thorium Mill Tailings Disposal Sites," October 30, 1990.

### UNITED STATES CODE

42 USC §7901 et seq., *Uranium Mill Tailings Radiation Control Act*, November 8, 1978.

### U.S. CODE OF FEDERAL REGULATIONS

10 CFR Part 40, *Domestic Licensing of Source Material*, U.S. Nuclear Regulatory Commission.

36 CFR Parts 1220-1238, *National Archives and Records*, Subchapter B - Records Management, National Archives and Records Administration.

40 CFR Part 141 National Primary Drinking Water Regulations.

40 CFR Part 143. *National Secondary Drinking Water Regulations*.

40 CFR Part 192, *Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings*, U.S. Environmental Protection Agency.

40 CFR Part 264, *Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities*, U.S. Environmental Protection Agency.

41 CFR Part 101, *Federal Property Management Regulations*, General Services Administration.

## 15.0 LIST OF CONTRIBUTORS

The following individuals contributed to the preparation of this LTSP.

<b>Name</b>	<b>Contribution</b>
J. McBee	Site manager, document review
S. Cox	Site manager, document review
P. Martinez	Real estate specialist
J. Lommler	Engineering, ground water hydrology
D. Heydenburg	Ground water hydrology
L. LaVigne	Project Secretary

## REAL ESTATE DOCUMENTATION

### GENERAL

The Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA), as amended, required the Secretary of Energy to permanently acquire land needed to carry out the purposes of the UMTRCA. Pursuant to the Cooperative Agreement between the state of Utah and the DOE, the state acquired the Green River site. The site was acquired by the Utah Division of Environmental Health from Umetco Minerals Corporation. Upon completion of remedial action, the state of Utah conveyed title of the site to the United States of America.

The acquisition associated with the Green River disposal site included surface and subsurface rights and all easements and rights-of-way appearing of record. The area encompassed by the final site boundary is 25.27 ac (10.2 ha).

### LEGAL DESCRIPTION OF FINAL SITE BOUNDARY

A parcel of land situated in the SE1/4 SE1/4 of Section 15 and in the NE1/4 of Section 22, Township 21 South, Range 16 East of the Salt Lake Base & Meridian (SLB&M), Grand County, Utah, being described as follows:

**BEGINNING AT A POINT** which is S32°37'09"W 296.82 feet from the NE corner of Section 22, T21S R16E, SLB&M, (being a found 6"X6" sandstone rock) and considering the East line of the SE1/4 of Section 15, T21S, R16E, SLB&M to bear N00°00'00"E and all other bearings contained herein to be relative thereto;

thence S41°35'50"W 1166.99 feet;

thence N47°18'14"W 126.13 feet to a found 1990 31/4" aluminum cap, stamped SM-1,

thence N47°18'14"W 233.28 feet to a found 1989 31/4" aluminum cap;

thence N76°10'38"W 552.07 feet to a found 1990 31/4" aluminum cap; stamped SM-2;

thence N00°00'39"W 182.13 feet to a found 1989 31/4" aluminum cap;

thence N51°27'10"E 377.19 feet to a found 1989 31/4" aluminum cap;

thence S79°03'39"E 157.85 feet to a found 1989 31/4" aluminum cap;

thence N42°54'38"E 95.40 feet to a found 1989 31/4" aluminum cap;

thence N01°58'54"E 145.17 feet to a found 1989 31/4" aluminum cap;

thence N50°20'54"E 493.71 feet to a found 1989 31/4" aluminum cap;

thence S82°32'39"E 463.73 feet to a found 1989 31/4" aluminum cap;

thence S48°20'01"E 291.16 feet to a found 1990 31/4" aluminum cap, stamped SM-3;

thence S48°20'01"E 61.46 feet;

thence S21°02'19"W 134.50 feet to the **POINT OF BEGINNING**, containing 25.27 acres as described.

**Filed:** October 28, 1996 at Entry No. 438175, Book 494 on Pages 22-23, Grand County Recorder's Office, 125 E. Center Moab, Utah 84532, Grand County, Utah.

## LEGAL DESCRIPTION OF STATE-OWNED PROPERTY

A parcel of land situated in parts of Sections 14, 15, and 22, Township 21 South, Range 16 East of the SLB&M, Grand County, Utah, being described as follows:

**BEGINNING AT A POINT** which is S32°37'09"W, 296.82 feet from the northeast corner of Section 22, T21S, R16E and running thence S41°35'50"W, 1310.46 feet; thence S90°00'00"W, 830.00 feet; thence N21°03'48"W, 1585.97 feet; thence N22°54'21"E, 770.78 feet; thence N77°45'28", 1084.67 feet; thence S82°56'32"E, 1058.02 feet; thence S9°27'44"E, 669.10 feet; thence S21°02'15"W, 696.42 feet to **POINT OF BEGINNING**.

This was established in 1988 as a "zone change request" for the project construction boundary, to Grand County, Utah (MK-F memorandum of 04 February 1988).

## PERPETUAL EASEMENT

The DOE, ACE, and U.S. Department of Army are finalizing a perpetual easement agreement. Once the agreement is executed, the ACE will record the document on the DOE's behalf at the local county recorder's office. At that time, the document recordation information will be incorporated into this attachment.

## REAL ESTATE FILES

Real estate correspondence and related documents are filed and maintained by the Department of Energy, Albuquerque Operations Office, P.O. Box 5400, Property Management Branch, Property and Administrative Services Division, Albuquerque, New Mexico, (505) 845-6450.

**ATTACHMENT 3**

**GREEN RIVER PERMANENT SITE FILE INDEX**

## GREEN RIVER PERMANENT SITE FILE INDEX

### LICENSING DOCUMENTATION

- A. Long-term surveillance plan (LTSP) (final)
- B. Prelicensing custodial care
- C. U.S. Nuclear Regulatory Commission acceptance of LTSP
- D. General license

### DOCUMENTATION OF DOE TITLE/CUSTODY

- A. Documentation:
  - State
  - Federal
  - Tribal
- B. Legal description
- C. Custodial care agreements

### NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) DOCUMENTATION

- A. Environmental impact statement/environmental assessment
- B. Record of decision/finding of no significant impact
- C. Additional NEPA documentation
- D. Mitigation action plan

### REMEDIAL ACTION DOCUMENTATION

- A. Disposal site characterization report
- B. Remedial action plan/remedial action selection report
  - Concurrence pages (signed)
- C. Draft/final technical evaluation report
- D. Final design for construction
- E. Additional design/construction documents/drawings
- F. Final closeout inspection report

G. Site certification report/package

- U.S. Department of Energy certification/summary
- Final completion report
- Final audit report
- Completion report review
- Certification pages (signed)

**AS-BUILT CONSTRUCTION**

- Drawings and maps

**PHOTOGRAPHS**

- A. Construction photographs
- B. Aerial photographs
- C. Closeout/inspection photographs
- D. Verification and orientation/initial prelicensing inspection photographs

**MONITORING DOCUMENTATION**

- A. Active monitoring wells
- B. Location of inactive (abandoned) monitor wells
- C. Monitoring station records
- D. Monitoring reports
- E. Programmatic procedures

**AGREEMENTS**

- A. Interagency
- B. Individual/private

**UPDCC SITE FILE INDEX**



### NOTICE

**Page(s) size did not permit electronic reproduction. Information may be purchased by the general public from the National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22161 (Area Code 703-487-4650). DOE and DOE contractors may purchase information by contacting DOE's Office of Scientific and Technical Information, P.O. Box 62, Oak Ridge, TN 37831, Attn: Information Services (Area Code 423-576-8401).**