

RECEIVED

NOV 15 1995

OSTI

**FINAL AUDIT REPORT OF
REMEDIAL ACTION CONSTRUCTION
AT THE UMTRA PROJECT
MEXICAN HAT, UTAH—MONUMENT
VALLEY, ARIZONA, SITES**

October 1995

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, makes 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.

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

MASTER

INTENDED FOR PUBLIC RELEASE

RECEIVED

NOV 13 1982

This report has been reproduced from the best available copy. Available in paper copy and microfiche

Number of pages in this report: 52

DOE and DOE contractors can obtain copies of this report from:

Office of Scientific and Technical Information
P.O. Box 62
Oak Ridge, TN 37831
(615) 576-8401

This report is publicly available from:

National Technical Information Service
Department of Commerce
5285 Port Royal Road
Springfield, VA 22161
(703) 487-4650

DISCLAIMER

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

**FINAL AUDIT REPORT OF REMEDIAL ACTION CONSTRUCTION
AT THE UMTRA PROJECT
MEXICAN HAT, UTAH—MONUMENT VALLEY, ARIZONA, SITES**

October 1995

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

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

EXECUTIVE SUMMARY

The final audit report for remedial action at the Mexican Hat, Utah, Monument Valley, Arizona, Uranium Mill Tailings Remedial Action (UMTRA) Project sites consists of a summary of the radiological surveillances/audits, quality assurance (QA) in-process surveillances, and QA remedial action close-out inspections performed by the U.S. Department of Energy (DOE) and the Technical Assistance Contractor (TAC); on-site construction reviews (OSCR) performed by the U.S. Nuclear Regulatory Commission (NRC); and a surveillance performed by the Navajo Nation.

Two radiological surveillances and four radiological audits were performed at the Mexican Hat-Monument Valley sites. The surveillances were performed on 27 to 30 March 1989 (DOE, 1989a) and 13 to 16 November 1989 (DOE, 1989b). The audits were performed on 3 to 7 May 1993 (DOE, 1993a); 23 to 26 August 1993 (DOE, 1993b); 29 to 31 March 1994 (DOE, 1994a), and 19 to 20 July 1994 (DOE, 1994b). The surveillances and audits resulted in 87 observations. Twenty-one of the observations raised DOE concerns that were resolved on the site or through subsequent corrective action. All outstanding issues were closed on 7 July 1995. The radiological surveillances and audits are discussed in Section 2.0 of this report.

Five QA in-process surveillances were performed at the Mexican Hat UMTRA Project site and four QA in-process surveillances were performed at the combined Mexican Hat-Monument Valley sites. The surveillances were performed on 27 to 28 March 1989 (DOE, 1989c), 25 to 26 July 1989 (DOE, 1989d), 23 October 1989 (DOE, 1989e), 20 to 21 March 1990 (DOE, 1990a), 29 to 30 March 1993 (DOE, 1993c), 5 to 7 October 1993 (DOE, 1993d), 22 to 24 March 1994 (DOE, 1994c), 18 to 19 May 1994 (DOE, 1994d), and 22 September 1994 (DOE, 1994e). The surveillances resulted in 119 observations. Two observations contained recommendations that required responses from the Remedial Action Contractor (RAC). Three observations contained a recommendation that required no response. All outstanding issues were closed on 29 November 1994. The QA in-process surveillances are discussed in Section 3.0 of this report.

The DOE/TAC Mexican Hat-Monument Valley, remedial action close-out inspections were performed on 17 to 18 January 1995 and 13 June 1995 (DOE, 1995). The inspections cited 16 items from the RAC punch list and 5 additional items raised by the DOE that needed completion before the inspection reports could be closed. Morrison Knudsen-Ferguson responded to the open items on 22 March 1995 and 15 September 1995. The DOE concurred with these responses and administratively closed the remedial action close-out inspections on 4 October 1995.

Audits such as NRC OSCRs and a Navajo Nation surveillance also were performed at the Mexican Hat-Monument Valley sites. NRC OSCRs were performed at the Mexican Hat-Monument Valley sites on 2 September 1993 (NRC, 1993a), 27 October 1993 (NRC, 1993b), and 18 May 1994 (NRC, 1994). The OSCRs resulted in 10 observations. All issues for NRC OSCRs were closed on 5 July 1994. The Navajo Nation surveillance was performed at the Mexican Hat-Monument Valley sites on 17 to 19 August 1988 (Navajo

Nation, 1988). The Navajo Nation's surveillance resulted in 6 observations. All issues for the Navajo Nation's surveillance were closed on 6 June 1989.

To summarize, a total of 227 observations were noted during DOE/TAC audit and surveillance activities. A total of 16 observations were made at the NRC OSCRs and the Navajo Nation surveillance. Follow-up to responses required from the RAC for the DOE/TAC surveillance and audit observations and NRC OSCRs indicated all issues related to the Mexican Hat-Monument Valley sites were resolved and closed to the satisfaction of the DOE.

All audit and surveillance observations and recommendations have been closed out to the DOE's satisfaction. Therefore, this final audit report segment of the site certification process is complete.

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
1.0 INTRODUCTION.....	1-1
1.1 Radiological surveillances/audits	1-1
1.2 Quality assurance in-process surveillances	1-1
1.3 Remedial action close-out inspection	1-1
1.4 Other quality assurance audits/surveillances.....	1-3
1.5 Audit procedures.....	1-3
1.6 General standards	1-3
2.0 RADIOLOGICAL SURVEILLANCES/AUDITS	2-1
2.1 Surveillance/audit objectives	2-1
2.2 Surveillance/audit results	2-2
2.3 Summary and conclusions.....	2-14
3.0 QUALITY ASSURANCE IN-PROCESS SURVEILLANCES	3-1
3.1 Surveillance objectives	3-1
3.2 Surveillance results	3-1
3.2.1 Surveillance S115	3-1
3.2.2 Surveillance S128	3-2
3.2.3 Surveillance S138	3-2
3.2.4 Surveillance S149	3-2
3.2.5 Surveillance S224	3-2
3.2.6 Surveillance QS93058	3-3
3.2.7 Surveillance QS94124	3-3
3.2.8 Surveillance QS94126	3-4
3.2.9 Surveillance QS94137	3-4
3.3 Summary and conclusions.....	3-5
4.0 REMEDIAL ACTION CLOSE-OUT INSPECTION.....	4-1
4.1 Remedial action close-out inspection objectives.....	4-1
4.2 Remedial action close-out inspection results.....	4-1
4.3 Summary and conclusions for the 17 to 18 January close-out inspection	4-5
4.4 Second remedial action close-out inspection, Mexican Hat-Monument Valley UMTRA sites	4-5
4.5 Summary and conclusion of the remedial action close-out inspection of 13 June 1995	4-7
5.0 OTHER AUDITS AND CONSTRUCTION REVIEWS.....	5-1
5.1 On-site construction review objectives	5-1
5.2 On-site construction reviews	5-1
5.3 NRC on-site construction review results	5-1
5.4 Navajo Nation surveillance	5-4
5.5 Summary and conclusions.....	5-5

TABLE OF CONTENTS (Concluded)

<u>Section</u>	<u>Page</u>
6.0 SUMMARY AND CONCLUSIONS	6-1
7.0 LIST OF CONTRIBUTORS.....	7-1
8.0 REFERENCES	8-1

LIST OF TABLES

<u>Table</u>	<u>Page</u>
1.1 Summary of audits and surveillances	1-2

LIST OF ACRONYMS

<u>Acronym</u>	<u>Definition</u>
BLM	Bureau of Land Management
D.B.I.J.V	Dine Bi Ghan Industrial Joint Venture
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
ERD	Environmental Restoration Division
HP	health physics
LTSP	long-term surveillance plan
MK-EGG	Morrison Knudsen-Environmental Government Group
MK-F	Morrison Knudsen-Ferguson
NRC	U.S. Nuclear Regulatory Commission
OCS	opposed crystal system
OSCR	on-site construction review
PID	project interface document
QA	quality assurance
QAPP	quality assurance program plan
QC	quality control
Ra-226	radium-226
RAC	Remedial Action Contractor
RAIP	remedial action inspection plan
RAP	remedial action plan
TAC	Technical Assistance Contractor
Th-232	thorium-232
TLD	thermoluminescent dosimeter
UMTRA	Uranium Mill Tailings Remedial Action
VP	vicinity property

1.0 INTRODUCTION

This final audit report provides an independent assessment by the U.S. Department of Energy (DOE) and Technical Assistance Contractor (TAC) of remedial action compliance with approved plans, specifications, standards, and 40 CFR Part 192. This report refers to remedial action activities performed at the Mexican Hat, Utah—Monument Valley, Arizona, Uranium Mill Tailings Remedial Action (UMTRA) Project sites. Remedial action construction at the Mexican Hat-Monument Valley sites was directed by the Remedial Action Contractor (RAC).

1.1 RADIOLOGICAL SURVEILLANCES/AUDITS

The TAC performed radiological surveillances and audits for the DOE at the Mexican Hat-Monument Valley sites to provide an independent assessment that the quality of remedial action work was sufficient to ensure that the U.S. Environmental Protection Agency (EPA) standards and other site-specific health physics (HP) requirements were met. Radiological surveillances and audits complemented quality assurance (QA) surveillances, and provided assurance that the remedial action tasks were accomplished in compliance with relevant specifications and standards. Radiological surveillances and audits were performed at a frequency of one to two times per construction season. The results of the surveillances, audits, and follow-up actions are documented in Section 2.0. Table 1.1 summarizes the surveillances.

1.2 QUALITY ASSURANCE IN-PROCESS SURVEILLANCES

QA in-process surveillances were performed at the Mexican Hat-Monument Valley sites by the TAC QA Department, under the direction of the DOE. The purpose of the QA in-process surveillances was to verify that the procedures and systems required by the respective QA programs were implemented during remedial action. The QA in-process surveillances were performed at the average frequency of one to two times per construction season. Section 3.0 documents results of the QA in-process surveillances and follow-up actions at the Mexican Hat-Monument Valley sites. Table 1.1 summarizes the QA in-process surveillances.

1.3 REMEDIAL ACTION CLOSE-OUT INSPECTION

The remedial action close-out inspection was performed by the Quality Departments of the DOE and TAC at the Mexican Hat-Monument Valley sites after remedial action was complete. The inspection was performed to verify that the site was constructed in compliance with the approved remedial action plan (RAP), construction plans and UMTRA Project specifications. The results of the remedial action close-out inspection are documented in Section 4.0 and summarized in Table 1.1.

Table 1.1 Summary of audits and surveillances

Type/Date of activity	Number of observations	Date closed
DOE/TAC radiological surveillances/audits		
27-30 March 1989	13	6 November 1989
13-16 November 1989	12	23 March 1990
3-7 May 1993	7	7 July 1995
23-26 August 1993	14	7 July 1995
29-31 March 1994	34	28 December 1994
19-20 July 1994	7	28 December 1994
DOE/TAC QA in-process surveillances		
27-28 March 1989	10	5 May 1989
25-26 July 1989	8	28 August 1989
23 October 1989	8	10 November 1989
20-21 March 1990	7	13 April 1990
29-30 March 1993	17	5 May 1993
5-7 October 1993	14	8 November 1993
22-24 March 1994	17	15 July 1994
18-19 May 1994	19	16 June 1994
22 September 1994	19	29 November 1994
DOE/TAC remedial action close-out inspections		
17-18 January 1995	16	4 October 1995
13 June 1995	5	4 October 1995
Other audits/surveillances		
NRC OSCR - 2 September 1993	3	17 November 1993
NRC OSCR - 27 October 1993	3	23 December 1993
NRC OSCR - 18 May 1994	4	5 July 1994
Navajo Nation 17-19 August 1988	6	6 June 1989

NRC – U.S. Nuclear Regulatory Commission.
 OSCR – on-site construction review.

1.4 OTHER QUALITY ASSURANCE AUDITS/SURVEILLANCES

Other audits or surveillances performed at the Mexican Hat-Monument Valley UMTRA Project sites include on-site construction reviews (OSCR) by the U.S. Nuclear Regulatory Commission (NRC) and a surveillance by the Navajo Nation. The results of the NRC OSCRs and the Navajo Nation surveillance are documented in Section 5.0 and summarized in Table 1.1.

1.5 AUDIT PROCEDURES

Criteria and procedures for performing UMTRA Project audits and surveillances are provided in the UMTRA Project audit/surveillance program plan (DOE, 1988).

1.6 GENERAL STANDARDS

In 1978, the U.S. Congress passed Public Law 95-604, the Uranium Mill Tailings Radiation Control Act (42 USC §7901 *et seq.*), declaring uranium mill tailings a potential health hazard to the public, and requiring that certain sites be designated for remedial action. The Mexican Hat-Monument Valley sites were included as 2 of 24 sites. The EPA was directed to promulgate radiological and nonradiological standards for decontamination of the sites. The DOE was authorized to initiate and manage the remedial actions. The NRC was charged with concurring in the remedial action before licensing the disposal sites. The standards that apply to all UMTRA Project sites, as promulgated by the EPA, are given in Subparts A and B of 40 CFR Part 192.

- The standards in Subpart A are directed at controlling the stabilization of radioactive materials at the designated disposal sites and are addressed by the engineering design specifications the DOE Environmental Restoration Division (ERD) developed for the disposal sites.
- The standards in Subpart B define the conditions under which a site may be considered adequately cleaned up.

The Mexican Hat-Monument Valley sites will be evaluated to determine if ground water restoration is required in accordance with Subpart B of the ground water protection standards (60 FR 2854). If it is determined to be necessary, ground water restoration will be accomplished under the UMTRA Ground Water Project.

2.0 RADIOLOGICAL SURVEILLANCES/AUDITS

The TAC performed two comprehensive site radiological surveillances and four comprehensive site audits for the DOE UMTRA Project at the Mexican Hat-Monument Valley UMTRA Project sites. These radiological surveillances/audits provided an independent assessment that the quality of remedial action work was sufficient to ensure compliance with EPA standards and DOE orders. The radiological surveillances/audits the TAC performed included, but were not limited to, a comprehensive review of the RAC's radiological/HP procedures, instrument calibration records, data management, personnel monitoring, and operational performance of the contractors and subcontractors responsible for HP remedial action work at the former uranium ore processing sites and the uranium tailings disposal cells.

2.1 SURVEILLANCE/AUDIT OBJECTIVES

The TAC radiological surveillance/audit program of 1994 has evolved significantly since the surveillances/audits were first performed in 1989. The surveillance/audit process involves a complete inventory of office and site radiological conditions and the findings, observations, and recommendations are used to identify site-specific and programmatic conditions. This information then is used to identify attributes and address deficiencies to improve the overall radiological controls at the site and other sites encountering similar situations.

The information used to determine compliance with applicable procedures and requirements was obtained by interviewing RAC field personnel, reviewing office activities, and touring field facilities. Reviewing applicable records and documentation provide additional verification of HP activities.

Radiological audits/surveillances have three distinct objectives: First, verify that remedial actions are meeting the EPA cleanup standards or other cleanup standards specified in the remedial action planning documents. Second, evaluate control methods the RAC uses to prevent overexcavation, which can increase quantities of material for disposal and potentially escalate remediation costs. Third, review the RAC's general data management methods and procedures, and provide a pathway for the exchange of ideas for technological improvements in the program. These three objectives are provided to the DOE ERD in the form of objective evidence (comments the auditors consider appropriate for documenting topics of concern to the DOE ERD and for noting improvements in techniques and procedures).

Findings and observations presented in a radiological surveillance/audit could include, but not be limited to the following criteria:

- Noncompliance with requirements of the site RAP, vicinity property (VP) management and implementation manual, engineering design, or UMTRA Project Team directives applicable to the site.

- Evidence that the existing radiological measurement methods may result in residual contamination levels that exceed established limits (underexcavation).
- Evidence that the existing radiological measurement methods may result in the removal of material that does not exceed contamination limits (overexcavation). The soil contamination limits are specified by EPA standards and include site-specific modifications agreed to by the NRC or mandated by DOE ERD directives for the UMTRA Project.
- Evidence that some aspects of the contractor's radiological survey plans and procedures, measurement techniques, or data management capabilities are insufficient to allow eventual certification of the site.
- Evidence that activities are not in compliance with applicable DOE orders.

Comments on proficiency, favorable comparisons, or developmental activities may be included as observations. Observations are comments considered appropriate by the auditors to document topics of concern to the DOE ERD, and to note improvements in techniques or procedures to noncritical areas.

Additional information regarding the radiological surveillance/audit activities and resolutions is provided below.

2.2 SURVEILLANCE/AUDIT RESULTS

The information below was obtained from the final surveillance/audit reports and supporting documentation. The closure of a finding or observation, if not obtained via a report or cover letter, was evaluated and closed based on documented information from the RAC, recommendation from members of the surveillance/audit team, and/or follow-up site surveillances/audits.

- 2.2.1** The TAC performed the first comprehensive site radiological surveillance (HAT-S01) for the DOE in Mexican Hat, Utah, on 27 to 30 March 1989 (DOE. 1989a). Representatives from the TAC included Jere Millard and Lindsey Hayes. The DOE was represented by Debbie Mann. RAC personnel included Tim Swisse (site manager), Phil Mohrman (HP manager), and Neil Kiely (laboratory supervisor). The Navajo Nation was represented by Ray Charley. This surveillance focused on reviews of RAC procedures, instrument calibration, verification activities, data management, and environmental/personnel monitoring. The RAC's soil sampling technique was observed and split soil samples from eleven 100-square meters (m^2) plots sampled west of the upper tailings pile area were provided to the TAC for independent evaluation and analysis for radium-226 (Ra-226) by gamma spectroscopy. The surveillance team concluded that the HP aspects of the Mexican Hat, Utah, remedial action program was well organized and performed effectively according to written procedures and documentation requirements. The following 3 programmatic and

10 site-specific observations were identified, none of which impacted the RAC's ability to ensure compliance with EPA standards:

Programmatic observations:

- HAT-S01-001 - There is no documentation for calibration source materials for the opposed crystal system (OCS).
- HAT-S01-002 - Results of many "less-than-detectable" soil samples are being recorded on data sheets as "MDA."
- HAT-S01-003 - RAC HP Procedure RAC-001 requires monthly air flow checks on all air particulate samplers. Specific calibration requirements for air samplers are not addressed properly.

Site-specific observations:

- HAT-S01-004 - Data filing and retrieval is well organized and all documentation requirements are being met accordingly.
- HAT-S01-005 - The Ra-226 soil analysis is being performed according to procedures and accuracy requirements specified by the UMTRA Project.
- HAT-S01-006 - Radiochemical analysis of soil samples is being performed for thorium-232 (Th-232).
- HAT-S01-007 - Leak tests are performed in an inappropriate place and apparently not on a regular basis.
- HAT-S01-008 - Instrument calibrations currently meet or exceed UMTRA Project standards.
- HAT-S01-009 - The flow rate of environmental air samplers is adjusted during the collection period using rotometer readings.
- HAT-S01-010 - Emanation fractions for tailings samples are currently not determined using the revised RAC-019 procedure.
- HAT-S01-011 - Soil verification sampling of remediated areas followed RAC procedures.
- HAT-S01-012 - RAC procedures do not require analyzing verification samples for Th-232.
- HAT-S01-013 - All measured air concentrations for environmental and occupational exposures are limited with respect to Th-230.

In letters dated 6 November 1989 (from M. L. Matthews to J. G. Oldham, reference UMT/MKO/1189-294) and 1 December 1989 (from M. L. Matthews to J. G. Oldham), the DOE UMTRA Project Office deemed the corrective actions acceptable, thereby closing this surveillance.

2.2.2 The TAC performed the second comprehensive site radiological surveillance (HAT-S02) for the DOE in Mexican Hat-Monument Valley on 13 to 16 November 1989 (DOE, 1989b). Representatives from the TAC included Douglas E. Gonzales and Robert Murphy. RAC personnel participating in the surveillance included Tim Swisse (site manager), Phil Mohrman (HP manager), Neil Kiely (laboratory supervisor), Jules Bitsilly, Russell Betsuie, and Von Black. This surveillance focused on reviews of RAC procedures, instrument calibration, QA control, and data management/analysis. The auditors also observed the collection of verification soil samples from several 100-m² plots on the processing site. The surveillance team performed that the HP aspects of the Mexican Hat-Monument Valley remedial action program were well organized and performed effectively according to written procedures and documentation requirements. The 12 site-specific observations below were identified, none of which impacted the RAC's ability to ensure compliance with EPA standards.

- HAT-S02-001 - Documentation, data management, and archiving of samples are performed effectively.
- HAT-S02-002 - Ra-226 analyses are being performed appropriately.
- HAT-S02-003 - A few entries in the OCS logbook need explanation or correction.
- HAT-S02-004 - Leak testing of sealed verification samples is acceptable; however, the present process of selecting samples may not ensure the mechanism always operates properly.
- HAT-S02-005 - Cell emanation sampling follows procedures.
- HAT-S02-006 - The official verification map has the verified grids marked with a color code and sample identification.
- HAT-S02-007 - Verification sampling was observed to be adequate and in compliance with procedures.
- HAT-S02-008 - Calibration of excavation control survey instruments is performed in a site-specific and effective manner.
- HAT-S02-009 - Quality control (QC) samples are sent to an outside vendor and the results are correlated with the OCS results.

- HAT-S02-O10 - Field and laboratory instruments are routinely calibrated following applicable procedures.
- HAT-S02-O11 - The site correction factor for OCS results was updated at an appropriate frequency.
- HAT-S02-O12 - Th-232 contamination in potentially impacted areas should be thoroughly analyzed and documented.

In letters dated 23 March 1990 (from S. R. Hill to M. Matthews, reference JEGA/UMT/0390-0155) and 30 March 1990 (from M. L. Matthews to J. G. Oldham), the DOE deemed the corrective actions acceptable, thereby closing this surveillance.

2.2.3

The TAC performed the first comprehensive site radiological audit (HAT-A03) for the DOE at the Mexican Hat-Monument Valley sites on 3 to 7 May 1993 (DOE, 1993a). William R. James and Gerry Simiele represented the TAC. RAC personnel included Phil Mohrman, Jules Bitsilly, and Sean Pond. This audit focused on reviews of RAC procedures, instrument calibration, QA control, and data management/analysis. The audit team concluded that most radiological aspects of the Mexican Hat-Monument Valley remedial action programs were performed adequately. However, the findings identified inconsistencies in following procedures and meeting requirements for contamination control, and poor communication between the RAC and the DOE about variances from the published RAP. The following three site-specific findings and four site-specific observations were identified during the audit.

- HAT-A03-F01 - The disposal sequence for contaminated materials was reviewed and found to be different from the required sequence described in the RAP.
- HAT-A03-F02 - Vehicles granted a restricted release are stored and maintained in an uncontrolled area that does not meet the requirements of RAC-RP-003 and DOE Order 5400.11.
- HAT-A03-F03 - Vehicles exiting the decontamination pad stop at an area outside of the controlled area, dripping potentially contaminated wash water.
- HAT-A03-O01 - Environmental air sampling stations were observed to be located near large buildings and/or trees that may cause nonrepresentative radioactive particulate sampling as discussed in DOE/EH-0173T, *Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance*.

- HAT-A03-O02 - Occupational radiological air sampling, analysis, and data generation were observed to be in compliance with procedures and the site HP monitoring plan.
- HAT-A03-O03 - The methods and facilities for collecting and preparing bioassay samples to be shipped for analysis by an off-site vendor were reviewed and determined to be excellent.
- HAT-A03-O04 - The site OCS Ra-226 analytical performance on blind QC samples met the accuracy requirement of ± 30 percent at the 95-percent confidence level for individual results and ± 10 percent for group data; however, an overall low bias of -9.8 percent was observed.

Because the RAC never received formal closure from the DOE regarding the status of this audit, a letter dated 7 July 1995 (from L. Ulland to R. Cornish), the TAC recommended the DOE officially notify the RAC that all previous observations and findings from the audit of 3 to 7 May 1993 should be considered closed.

2.2.4 The TAC performed the second comprehensive site radiological audit (HAT-A04) for the DOE at the Mexican Hat-Monument Valley sites on 23 to 26 August (DOE, 1993b). James M. Hylko and William R. James represented the TAC, and Robert E. Cornish represented the DOE ERD. RAC personnel included Phil Mohrman and Jules Bitsilly. This audit focused on a review of RAC radiological procedures and measurements in conjunction with environmental monitoring, measuring disposal cell radon emanation, excavation control and verification, radiological components of the RAP, instrumentation, equipment monitoring, and release criteria, postings, OCS operation; and animal intrusion. The audit team concluded that the radiological aspects of the Mexican Hat-Monument Valley remedial action programs were performed effectively according to written procedures and documentation requirements. The programmatic finding below and 10 site-specific observations, 1 programmatic observation, and 2 noteworthy practices were identified during the audit, none of which impacted the RAC's ability to ensure compliance with EPA standards.

Programmatic finding:

- HAT-A04-F01 - The interim change notice (ICN-01) for Procedure RAC-019, *Sampling and Testing for Site Cell Radiological Characterization During Construction*, Rev. 1, ICN-01, is inconsistent with the "Problem/Statement/Corrective Action" section and the corresponding edits in the revised text. RAC-019 still lists 20 feet (ft) (6.1 meters [m]) as a collection depth, instead of 16 ft (4.9 m) as indicated on the ICN cover sheet.

Site-specific observations:

- HAT-A04-001 - Various site activities, including environmental monitoring, bioassay requirements, sampling and testing for cell radiological characterization, excavation control methods, verification measurements, and a review of the RAP were performed in accordance with procedural requirements and DOE-approved protocols.
- HAT-A04-002 - The disposal cell radon emanation measurement procedure and data generation were reviewed and determined to be in compliance with Procedure RAC-019, *Sampling and Testing for Site Cell Radiological Characterization During Construction*, Rev. 1, ICN-01.
- HAT-A04-003 - Excavation control methods and data for correlating handheld survey measurements and Ra-226 concentrations in soil were observed and determined to be in compliance with Procedure RAC-OP-002, *Excavation Control*, Rev. 0.
- HAT-A04-004 - Verification measurements and data for solid rock areas were reviewed and determined to be in compliance with DOE-approved protocols identified in the 30 May 1989 letter from M. L. Matthews to J. G. Oldham and in Procedure OP-003-1, *Verification Soil Sampling*, Rev. 0, ICN-03.
- HAT-A04-005 - Requirements for controlling water runoff, dust generation, and tailings embankment (disposal cell) construction were reviewed with the site engineer and QC supervisor and determined to be in compliance with the RAP.
- HAT-A04-006 - Minor inconsistencies associated with completing the Morrison Knudsen-Ferguson (MK-F) shipping order; Attachment 6, Precision Test Report; duplication and filing of certificates of calibration; and maintenance of the inventory database were identified in accordance with Procedure RAC-IN-001, *UMTRA HP Instrumentation Program*, Rev. 0, ICN-02. These items were brought to the attention of and resolved by the HP technician and site HP supervisor. Additional items related to electronic calibration, performance requirements, high-voltage plateau determinations, acceptable count rate determinations, and QC were reviewed and done in compliance with procedural requirements.
- HAT-A04-007 - Records showed that the bucket of a front-end loader had been surveyed free of contamination, as required by Procedure RP-003-3, *Equipment Monitoring and Release Criteria*, Rev. 1, ICN-07.
- HAT-A04-008 - A radiological posting at the truck entrance to the Mexican Hat site was not in compliance with the requirements of Procedure

RP-003-1, *Access Control*, Rev. 0, ICN-06. The site HP supervisor is resolving this issue.

- HAT-A04-009 - Site OCS operations were observed to be in accordance with existing procedures. The Ra-226 analytical performance on blind QC samples demonstrated the ability to meet the accuracy requirements of ± 30 percent at the 95-percent confidence level for individual results and the ± 10 percent requirement for group data.
- HAT-A04-010 - Dogs from the surrounding community were observed crawling under a temporary fence and entering the Monument Valley water holding ponds in a radiological area. This was brought to the attention of site HP and health and safety personnel.

Noteworthy practices:

- HAT-A04-011 - Site HP personnel promoted proper contamination controls for the controlled area (e.g., wearing gloves and taping shut the tops of boots after tucking in pant legs).
- HAT-A04-012 - Daily source-check stickers, covering a 1-month period, were found on handheld survey instruments.

Programmatic observation:

- HAT-A04-013 - Minor inconsistencies associated with information in vendor-provided certificates of calibration, correcting for decay of certain isotopes, and discrepancies between procedural requirements and information on attachments were identified in accordance with Procedure RAC-IN-001, *UMTRA HP Instrumentation Program*, Rev. 0, ICN-02. These items were brought to the attention of and resolved by the HP technician and site HP supervisor.

Because the RAC had not received formal closure from the DOE regarding the status of this audit, a letter dated 7 July 1995 (from L. Ulland to R. Cornish), the TAC recommended that DOE officially notify the RAC that all previous observations and findings from the 23 to 26 August 1993 audit should be considered closed.

- 2.2.5** The TAC performed the third comprehensive site radiological audit (HAT-A05) for the DOE at the Mexican Hat-Monument Valley sites on 29 to 31 March 1994 (DOE, 1994a). James M. Hylko represented the TAC and Robert E. Cornish represented the DOE. RAC personnel included Phil Mohrman and Jules Bitsilly. This audit focused on the review of previous Mexican Hat—Monument Valley observations and findings; 40 CFR Part 61, Subpart T (NESHAP)/*Radon Flux Measurements* (OP-003-5, Rev. 1); and completing the following site-specific documents: *QA Records Administration, Maintenance, Transmittal, & Storage*

Guidelines (AD-005-1, Rev. 1, ICN-01); Verification Soil Sampling (OP-003-1, Rev. 1, ICN-01); Sealed Radioactive Source Accountability (RAC-RP-008, Rev. 1); Site Contamination Control (RAC-RP-003, Rev. 1), Access Control (RP-003-1, Rev. 1), Personnel Monitoring (RP-003-2, Rev. 2) and general HP requirements; Equipment Monitoring and Release Criteria (RP-003-3, Rev. 2); Contamination Monitoring in Uncontrolled Areas (RP-003-4, Rev. 2); Protective Clothing Requirements (RP-003-6, Rev. 1); OCS operation; and noteworthy practices. The audit team concluded that the radiological aspects of the Mexican Hat-Monument Valley remedial action programs were performed effectively according to written procedures and documentation requirements. In addition, site HP personnel implemented a secondary access control point in compliance with all reviewed procedural requirements; this access point was for machinery and site personnel to cover the mill tailings with the radon barrier. The following 3 findings (DOE/HAT-1, APO/HAT-1, HAT-1), 25 observations (DOE/HAT-1, APO/HAT-9, HAT-5, No Action-10), and 6 noteworthy practices were identified during the audit. The following legend was used to distinguish DOE, programmatic, and site-specific observations or findings: DOE/HAT - DOE observation and finding, APO/HAT - programmatic observation or finding, and HAT - site-specific observation or finding.

- APO/HAT-A05-001.a - Previous open items, Finding HAT-A03-F02, Observation HAT-A03-001, Observation HAT-A04-008, and Observation HAT-A04-013 (Recommendations 1, 2, and 3) have been closed by the DOE.
- DOE/HAT-A05-002.a - The EPA and the state of Utah will be notified through the DOE at least 30 days prior to beginning radon flux measurements at the HAT disposal cell.
- HAT-A05-002.b - Site HP personnel were interviewed and determined to be familiar with the procedural requirements, as reviewed, in Procedure OP-003-5, which included receipt and control of charcoal; radon flux map; DOE approval of the measurement location drawing; validation and verification of radon flux calculation spreadsheet; initiation of counting the charcoal standards 20 times to establish 95 percent confidence limits; setting a 100 percent validity goal for all measurements although step 4.4.1 allows 85 percent of all measurements to be valid; and ordering a temperature indicator or thermometer that can read 0 to 200 degrees Celsius (°C) in 1°C increments to comply with step 4.2.3.2. No further RAC action was required.
- APO/HAT-A05-002.c - Radon flux monitoring requirements of Procedure OP-003-5, Rev. 1, do not coincide with Section 2.1.6, Radon Flux Measurement, of 40 CFR Part 61, Appendix B, Method 115.
- APO/HAT-A05-002.d - The concentration of the charcoal standard stated in the procedure do not (approximately) reflect the concentrations of the

charcoal standards (e.g., 432 picocuries per gram [pCi/g] vs. 500 pCi/g, which yields a difference of 13.6 percent).

- DOE/HAT-A05-F03.a - A DOE representative did not comply with the verbal request and procedural requirements, as reviewed, for completing site-specific documents. It also appears the DOE representative was not familiar with step 4.4.1 of Procedure AD-005-1, Rev. 1, ICN-01.
- APO/HAT-A05-F04.a - Step 5.2.1 of Procedure OP-003-1, Rev. 1, ICN-01, does not reflect the use of an electronic scale for measuring sample weights, recording daily checks in the logbook, and ensuring control of the certificate of calibration.
- HAT-A05-004.a - Site HP personnel were interviewed and determined to be familiar with the procedural requirements, as reviewed, in Procedure OP-003-1, which include site maps and site grid system; sample collection, drying, and 20-day count information; recording of sample numbers, locations, etc., on the sample can and OCS record; sampling methods using the 100-m² grid section in conjunction with the grid system; site-specific OCS correction factors; measuring and recording Th-232 in soil; performing and recording of leak test; using the RC₁₀₀₀ calculation spreadsheet; storing QA samples; and database entry and review of output. In addition, site HP personnel were waiting for 20-day soil results for transfer to the site grid map. No further action was required by the RAC.
- APO/HAT-A05-004.b - The solid rock verification protocol does not follow the same format as other RAC HP procedures.
- HAT-A05-005.a - Site HP personnel were interviewed and determined to be familiar with the procedural requirements, as reviewed, in Procedure RAC-RP-008, which include source inventory and source control log; locked storage cabinet; posting and identifying source storage locations; posting and identifying a source custodian and alternates; labeling sources and required assay information, as appropriate; integrity testing; and identifying a technician designated as site assistant broker. No further action was required by the RAC.
- HAT-A05-005.b - Step 5.3.2.1(E) of RAC-RP-008, Rev. 1, states that "All sealed radioactive sources shall be stored and locked when not in use, in a storage cabinet or locker that meets the following specifications: E) Radiation levels at the closest approach are kept ALARA and shall not exceed 0.5 millirems per hour (mrem/hr)." To comply with this requirement, the highest reading survey result of the storage cabinet (8 microroentgens per hour [μ R/hr]) is posted on a sign located near the thermoluminescent dosimeter (TLD) storage box. No further action was required by the RAC.

- HAT-A05-006.a - Site HP personnel were interviewed, and determined to be familiar with the procedural requirements, as reviewed, in Procedures RAC-RP-003 (Rev. 1), RP-003-1 (Rev. 1), and RP-003-2 (Rev. 2), which include training transcripts; proper placement of TLDs between the shoulder and waist; daily check of the two-way radios; employee records to reflect proper training prior to issuance of a TLD; access control/egress postings, entry requirements, and posting of dose rates; and as a QA check, frisking a percentage of visitors and other personnel leaving the controlled area. No further action was required by the RAC.
- HAT-A05-006.b - Step 5.1.7 of Procedure RP-003-1, Rev. 1, states in part that "The Site HP Manager or designee is responsible for tracking visitor stay times in radiological areas," and that "The Site HP Manager shall ensure that the Visitor Access Logs are entered into the database weekly." Although the "Time In/Time Out" was recorded, the "Total Hrs. In Rad. Area To Date" section was not completed for eight personnel on form F2-RP-003-1, Rev. 1. When this issue was identified, the site HP representative took immediate action to resolve it by completing that section of the form. The site HP representative informed the auditor that this form is completed and reviewed weekly when the information is entered into the database. No further action was required by the RAC.
- HAT-A05-006.c - Existing and future conditions no longer warrant the posting of "Caution Airborne Radioactive Area" at the HAT/MON UMTRA Project site.
- HAT-A05-006.d - Postings, as required by step 5.4.5 and step 5.4.6, were found at access control points CP-1 and CP-2.
- HAT-A05-006.e - Postings, as reviewed, were at eye level and did not appear to be obstructed from view.
- HAT-A05-006.f - An unopened "souvenir Coca-Cola bottle" was found on display in the counting room.
- HAT-A05-007.a - Site HP personnel were interviewed and determined to be familiar with the procedural requirements, as reviewed, in Procedure RP-003-3, Rev. 2, which include equipment calibration; equipment surveys; equipment monitoring and release criteria; and forms related to monitoring equipment entering a controlled area. No further action was required by the RAC.
- HAT-A05-007.b - Survey diagrams will be developed and with a minimum of 10 identified survey points, before equipment is removed from the controlled area.

- APO/HAT-A05-007.c - Clarification of procedure; replace the word "map" with "diagram."
- APO/HAT-A05-007.d - The HP technician sometimes obtains a 1-minute (fixed) survey instead of a 30-second (fixed) survey, as required by procedure.
- HAT-A05-008.a - Site HP personnel were interviewed, and determined to be familiar with the procedural requirements, as reviewed, in Procedure RP-003-4, Rev. 2, which include review and use of building survey maps; contamination monitoring in uncontrolled areas; and correlation data relating instrument response to radium in soil (counts per tenth minute [CPTM] vs. pCi/g). No further action was required by the RAC.
- HAT-A05-008.b - Final closeout survey of the MK-F office/Chemical Waste Management Federal Environmental Services (CWMFES) warehouse was on file, and subsequently removed from daily survey routine. No further action was required by the RAC.
- APO/HAT-A05-008.c - Increased counting time reduces counting error, but is not consistent with procedural requirement, as reviewed.
- HAT-A05-009.a - Site HP personnel were interviewed, and determined to be familiar with the procedural requirements, as reviewed, in Procedure RP-003-6, Rev. 1, that include monitoring the condition of the protective clothing. No further action was required by the RAC.
- APO/HAT-A05-009.b - The existing practice of monitoring protective clothing may not be consistent with procedural requirements of "maintaining an updated inventory of PPE" (or personal protective equipment).
- APO/HAT-A05-009.c - The RAC is no longer required by procedure to survey 10 percent of the coveralls and cotton gloves for contamination after laundering.
- HAT-A05-010.a - The analytical performance of OCS No. 5 on blind QC samples did not demonstrate the ability to meet accuracy requirements of the ± 10 percent requirement for group data.

Noteworthy practices:

- HAT-A05-NP01 - *40 CFR Part 61 Subpart T (NESHAP)/Radon Flux Measurements* (OP-003-5, Rev. 1) - Site HP personnel, as reviewed, are performing "dry runs" on collecting and measuring charcoal samples to familiarize themselves with procedural requirements.

- HAT-A05-NP02 - *Verification Soil Sampling* (OP-003-1, Rev. 1, ICN-01) - The same soil sample is used for the QC calculation, performing a leak test, and the 1000-year radium calculation. In addition, this practice results in a leak test being performed on every twenty-fifth sample instead of every fiftieth sample.
- HAT-A05-NP03 - *Sealed Radioactive Source Accountability* (RAC-RP-008, Rev. 1) - The site HP personnel have listed the 6-month inventory due date at the bottom of the site-specific sealed source inventory record (Attachment 1). This noteworthy practice provides a quick visual verification so as not to exceed the 6-month inventory due date.
- HAT-A05-NP04 - *Access Control* (RP-003-1, Rev. 1) - A secondary access control point established for personnel and vehicles to expedite placement of the radon barrier and other cover materials had all required radiological postings and controls.
- HAT-A05-NP05 - *Equipment Monitoring and Release Criteria* (RP-003-3, Rev. 2) - The site HP technicians at access control always have survey instrumentation ready to perform a restricted or unrestricted survey, for which the required detector information is already recorded in the vehicle access log.
- HAT-A05-NP06 - *Protective Clothing Requirements* (RP-003-6, Rev. 1) - Site HP personnel still survey at least 10 percent of the coveralls and cotton gloves for contamination after laundering, and record this information in a logbook, thereby "maintaining an updated inventory of PPE."

In a letter dated 28 December 1994 (from R. E. Cornish to R. E. Lawrence, reference UMT/RAC/1294-141), the DOE ERD UMTRA Project accepted the RAC's corrective actions, thereby closing this audit.

2.2.6 The TAC performed the fourth comprehensive site radiological audit (HAT-A06) for the DOE at the Mexican Hat-Monument Valley sites on 19 to 20 July 1994 (DOE, 1994b). James M. Hylko represented the TAC, and Robert E. Cornish represented the DOE. RAC personnel included Phil Mohrman and Jules Bitsilly. This audit focused on the review of previous Mexican Hat-Monument Valley observations and findings; 40 CFR Part 61, Subpart T (NESHAP)/*Radon Flux Measurements* (OP-003-5, Rev. 1); *Verification Soil Sampling* (OP-003-1, Rev. 1, ICN-01); and general HP requirements and postings. The audit team concluded that the radiological aspects of the Mexican Hat-Monument Valley remedial action programs were performed effectively according to written procedures and documentation requirements. The following seven observations (DOE/APO-1, DOE/HAT-1, APO/HAT-1, HAT-4) were identified during the audit.

The following legend was used to distinguish DOE, programmatic, and site-specific observations or findings: DOE/APO/HAT - DOE and APO programmatic

observation, DOE/HAT - DOE observation specific to site activities, APO/HAT - programmatic observation, and HAT - site-specific observation.

- DOE/APO/HAT-A06-001.a - 30-Day Notification - RAC HP Procedure OP-003-5, Rev. 1, as reviewed, states requirements for the DOE.
- DOE/HAT-A06-001.b - Site-Specific Documents/QA - UMTRA personnel have been verbally informed, and now comply with requirements of step 4.4.1 of Procedure AD-005-1, Rev. 1, ICN-01.
- HAT-A06-001.c - OCS Analytical Performance - OCS performance, as reviewed, is acceptable.
- HAT-A06-002.a - Radon flux data gathering and management practices, as reviewed, are acceptable.
- APO/HAT-A06-002.b - The RAC's radon flux measurement activities, as reviewed, are performed conservatively to ensure the validity of calculating the mean flux for the total pile.
- HAT-A06-003.a - Verification soil sampling requirements, as reviewed, are acceptable.
- HAT-A06-004.a - General HP requirements and knowledge of postings are acceptable.

In a letter dated 28 December 1994 (from R. E. Cornish to R. E. Lawrence, reference UMT/RAC/1294-141), the DOE accepted the RAC's corrective actions, thereby closing this audit. This same letter closed all audit issues pertaining to the fifth comprehensive site radiological audit (HAT-A05) performed on 29 to 31 March 1994.

2.3 SUMMARY AND CONCLUSIONS

Two comprehensive site radiological surveillances and four comprehensive audits were performed in conjunction with the Mexican Hat-Monument Valley, DOE UMTRA Project sites during remedial action activities. The radiological surveillances and audit teams concluded that the HP aspects of the remedial action program were organized and performed according to written procedures and documentation requirements. The final resolution of findings and observations in follow-up surveillances/audits and separate correspondence verified that all issues have been resolved to the satisfaction of the DOE.

3.0 QUALITY ASSURANCE IN-PROCESS SURVEILLANCES

The DOE and TAC performed five QA in-process surveillances at the Mexican Hat UMTRA site and four QA in-process surveillances at the combined Mexican Hat-Monument Valley UMTRA Project sites. The in-process surveillances were performed to ensure that the RAC properly implemented approved construction plans and specifications. The in-process surveillances were independent of the organizations performing the work and did not relieve the RAC from its own QC requirements. The QA in-process surveillances were performed by a team consisting of at least one representative from the DOE and one QA TAC lead auditor.

The DOE/TAC QA in-process surveillance reports included observations and recommendations. Observations were comments considered appropriate by the auditors for documenting topics of concern to the DOE, and for noting improvements in techniques or procedures to noncritical areas. Comments on proficiency, favorable comparisons, or developmental activities were included as observations. Recommendations were made for observations that did not meet project requirements or where a best management practice would improve work processes.

3.1 SURVEILLANCE OBJECTIVES

The QA in-process surveillances had three objectives. First, verify RAC compliance with the approved RAP for the Mexican Hat-Monument Valley sites. The surveillance team accomplished this objective by reviewing the approved Mexican Hat-Monument Valley RAP and preparing checklists of key construction activities.

Second, verify RAC compliance with approved plans and specifications. The surveillance team accomplished this by reviewing site documentation and observing construction activities from established checklists.

Third, verify that the Mexican Hat-Monument Valley remedial action inspection plan (RAIP) was implemented. The surveillance team accomplished this objective by observing testing and inspection activities performed by the RAC's QC technicians in the field.

3.2 SURVEILLANCE RESULTS

The results of the QA in-process surveillances performed at the Mexican Hat-Monument Valley sites are summarized below.

3.2.1 Surveillance S115

This QA in-process surveillance was performed on 27 to 28 March 1989 (DOE, 1989c) at the Mexican Hat site. The surveillance team consisted of Milt Scoutaris and Debbie Mann of the DOE and John McBee and David Van Bibber of the TAC. The surveillance resulted in 10 observations, none of which

required a response from the RAC. The surveillance team reviewed field and laboratory reports for construction activities and observed construction activities at Mexican Hat disposal cell.

The DOE closed this QA surveillance on 5 May 1989.

3.2.2 Surveillance S128

This QA in-process surveillance was performed on 25 to 26 July 1989 (DOE, 1989d) at the Mexican Hat site. The surveillance consisted of Milt Scoutaris of the DOE and Bob Bearden of the TAC. The surveillance resulted in eight observations with no recommendations issued and no responses required. The surveillance team reviewed field and laboratory reports for construction activities and observed construction activities at Mexican Hat disposal cell.

The DOE closed this QA surveillance on 28 August 1989.

3.2.3 Surveillance S138

This QA in-process surveillance was performed on 23 October 1989 (DOE, 1989e) at the Mexican Hat-Monument Valley sites. The surveillance team consisted of Milt Scoutaris of the DOE and John McBee and Marty Alewine of the TAC. The surveillance resulted in eight observations with no recommendations or responses required. A site orientation was performed at the Monument Valley site, consisting of site tours, interviews of site personnel, and a review of the construction plans and specifications. The Mexican Hat surveillance consisted of site tours, interviews of site personnel, examination of on-site quality documentation, and observations of construction activities.

The DOE closed the surveillance on 10 November 1989.

3.2.4 Surveillance S149

This QA in-process surveillance was performed on 20 to 21 March 1990 (DOE, 1990a) at the Mexican Hat site. The surveillance team consisted of Milt Scoutaris of the DOE and Marty Alewine of the TAC. The surveillance resulted in seven observations with no recommendations issued or responses required. The surveillance consisted of site tours, interviews of site personnel, examination of on-site quality documentation, and observation of construction activities.

The DOE closed the surveillance on 13 April 1990.

3.2.5 Surveillance S224

This QA in-process surveillance was performed on 29 to 30 March 1993 (DOE, 1993c) at the Mexican Hat-Monument Valley sites. The surveillance team consisted of Milt Scoutaris of the DOE and Paul Pehrson of the TAC. The

surveillance resulted in 17 observations, none of which required a response from the RAC. During an on-site inspection at the Mexican Hat disposal cell, the surveillance team observed the contractor placing and compacting contaminated material. The surveillance team also observed the contractor cleaning up contaminated areas, loading hauling units with contaminated material, and decontaminating hauling units at the Monument Valley processing site.

The DOE closed the surveillance on 5 May 1993.

3.2.6 Surveillance QS93058

This QA in-process surveillance was performed on 5 to 7 October 1993 (DOE, 1993d) at the Mexican Hat site. The surveillance team consisted of Milt Scoutaris with the DOE and Paul Pehrson with the TAC. The surveillance resulted in 14 observations and no recommendations. None of the observations required a RAC response. An on-site inspection was performed at the Monument Valley processing site where the surveillance team observed the contractor cleaning up and loading contaminated material and decontaminating hauling units. QC test and inspection records detailing QC activities performed at the Mexican Hat disposal cell were reviewed, and the field laboratory and equipment were inspected. Weather prohibited inspection of the contractor's placement and compaction of tailings.

The DOE concurred with the RAC's responses and closed the surveillance on 8 November 1993.

3.2.7 Surveillance QS94124

This QA surveillance was performed on 22 to 24 March 1994 (DOE, 1994c) at the Mexican Hat-Monument Valley sites and resulted in 15 observations. The surveillance team consisted of Milt Scoutaris with the DOE and Paul Pehrson and Richard Papsch with the TAC. Recommendations associated with two observations (13 and 15) required RAC responses. The MK-F QC field laboratory and the contractor's construction activities were observed. QC tests and inspection records detailing QC activities associated with the remediation process at the Mexican Hat site were reviewed. The surveillance team also traveled to Monument Valley to verify remedial action activities associated with the wetlands.

Observation 13 noted that four gradation tests performed on the bedding material failed to meet the current specified grading in Section 002278, Rev. 2. Don Janz, QC supervisor, stated that the failing gradations will be compared to the revised approved gradation of project interface document (PID) No. 09-S-21.

Observation 15 noted that QC laboratory work sheets from Redmond Clay and Salt Company did not specify grit content on the work sheets, but, specified sand. Section 02200, Rev. 0, states the maximum allowed percentage of grit for a given sample. The surveillance team could not determine if the laboratory

work sheet reference to sand percentage was meant to be grit percentage. Using "sand" in the quality control laboratory work sheets might indicate that the bentonite is diluted with a "silica" sand. MK-F was requested to obtain a letter of explanation from Redmond to define sand percentage recorded on QC laboratory work sheets. Additionally, the QA surveillance team requested that Redmond's QC technician change the laboratory work sheet to read "percentage of grit" instead of sand, if appropriate.

The RAC responded to the surveillance on 23 May 1994. In response to observation 13, MK-F included a copy of the approved PID No. 09-S-21, and compared gradation test results to the new gradation limits. All previous gradation tests that failed the old criteria passed the new gradation criteria outlined in PID NO. 09-S-21. Additionally, a copy of the revised Redmond Clay and Salt Company laboratory work sheet showing the grit content (not sand) was included in its response to observation 15.

The DOE concurred with the RAC's responses and closed the surveillance on 15 July 1994.

3.2.8 Surveillance QS94126

This surveillance was performed on 18 to 19 May 1994 (DOE, 1994d) at the Mexican Hat-Monument Valley sites. The surveillance team consisted of Milt Scoutaris with the DOE and Paul Pehrson and Richard Papusch with the TAC. The surveillance resulted in 19 observations with no recommendations issued and no recommendations requiring a RAC response. The surveillance team reviewed QC tests and records detailing QC activities associated with remediation activities at the Mexican Hat and Monument Valley sites.

The DOE closed the surveillance on 16 June 1994.

3.2.9 Surveillance QS94137

This surveillance was performed on 22 September 1994 (DOE, 1994e) at the Mexican Hat site. The surveillance team consisted of Milt Scoutaris with the DOE and Richard Papusch with the TAC. The surveillance resulted in 17 observations. Two observations (5 and 16) had recommendations that required a response. The surveillance team reviewed test and inspection records and observed the placement of erosion protection materials.

In observation 5, daily inspection reports and their attachments were found stapled together and secured in a locked, fire-resistant filing cabinet. The sheets have the potential to become separated after the Mexican Hat project is completed and records are moved to another location. The surveillance team recommended that all report number and sheet number boxes be completed when filling out new reports.

In observation 16, the surveillance team noted that some corrections on the depth check forms were initialed but not dated (specifically, the depth check for bedding material dated 22 June 1994). The QC manager should emphasize to all QC personnel completing forms that all corrections shall be initialed and dated as required by the RAC quality assurance program plan (QAPP).

The RAC responded to the surveillance on 1 November 1994. For observation 5, the RAC stated that the daily inspection report continuation sheets have been corrected, as requested, at the Mexican Hat site. Additionally, direction has been provided to personnel at other UMTRA Project sites to ensure continuation sheets are completed consistently. For observation 16, the RAC stated that a memorandum has been distributed to each site QC supervisor, reiterating to each inspector the appropriate method for correcting errors made while completing QA records.

The DOE concurred with the RAC's response to observations 5 and 16 and closed the surveillance in a memo to the RAC dated 29 November 1994.

3.3 SUMMARY AND CONCLUSIONS

The DOE and TAC performed nine QA in-process surveillances at the Mexican Hat-Monument Valley sites for remedial construction activities. The surveillance teams concluded that the RAC remediation construction activities were performed in compliance with the Mexican Hat-Monument Valley RAP, RAIP and project specifications. The surveillances resulted in 119 observations. Four observations had recommendations that required RAC responses. Three observations had a recommendation that required no response. All recommendations that required responses were resolved and closed to the satisfaction of the DOE ERD. All the surveillances are considered closed by the DOE ERD.

4.0 REMEDIAL ACTION CLOSE-OUT INSPECTION

The DOE/TAC performed a remedial action close-out inspection at the Mexican Hat-Monument Valley sites to ensure that remedial action was performed according to approved construction plans and specifications. The remedial action close out inspection for the Mexican Hat-Monument Valley UMTRA Project site was performed on 17 to 18, January 1995 (DOE, 1995). The DOE/TAC inspection team included Russel Edge, Milt Scoutaris, and Dave Bourne with the DOE and John McBee, Paul Pehrson, and Richard Papusch with the TAC. RAC personnel included Robert D'Arezzo, Tim Swisse, Don Janz, Robert Haygood, Steven Martz, and Brian Brow. Robert Claire represented Morrison Knudsen-Environmental Government Group (MK-EGG). Lewis R. Young represented Dine Bi Ghan Industrial Joint Venture (D.B.I.J.V).

A second remedial action close-out inspection for the Mexican Hat-Monument Valley UMTRA Project sites was performed on 13 June 1995 (DOE, 1995). The inspection team consisted of Russel Edge and Milton Scoutaris of the DOE ERD. Richard Papusch represented the TAC.

The results of the final close-out inspection (both visits) are documented in DOE/TAC report No. QA95145.

4.1 REMEDIAL ACTION CLOSE-OUT INSPECTION OBJECTIVES

The objective of the remedial action close-out inspection was to determine if the degree of completion of the Mexican Hat-Monument Valley sites is in accordance with the approved site construction plans and specifications, latest editions of the Mexican Hat-Monument Valley RAP, RAIP, design specifications, and RAC final walk-over items from its punch list.

4.2 REMEDIAL ACTION CLOSE-OUT INSPECTION RESULTS

The DOE/TAC inspection teams held a short opening meeting with the RAC and their representatives at the Mexican Hat UMTRA Project site temporary construction office. The meeting was performed at 1 p.m. on 17 January 1995 (DOE, 1995). All DOE, TAC and RAC personnel listed in paragraph 1, Section 4.0, were present. The meeting consisted of introductions, schedule of inspection, and discussions of the RAC final walk-over inspection checklist and open punch list items. The RAC check-listed all items the RAC inspected and reviewed for the Mexican Hat site on 16 January 1995. The RAC close-out inspection checklist verified that 13 items needed to be completed at the Mexican Hat site before the final inspection could be closed. Four additional items were added as a result of the DOE/TAC inspection. The 13 punch list items and 4 additional items are listed below.

Seven punch list items relating to long-term surveillance issues:

1. Install four (4) survey monuments.

2. Install twelve (12) boundary monuments. *These monuments had been installed at the time of the inspection, but had not been stamped.*
3. Install two (2) site markers.
4. Install thirty-three (33) perimeter signs. *Posts are installed but installation of perimeter signs are approximately 50 percent complete.*
5. Install one (1) entrance sign.
6. Install perimeter fencing. *One section of the fence needs to be finished. This section is across the west diversion ditch to the entrance gates of the disposal cell. The steel posts have been set but the wire has not been stretched.*
7. Complete aerial photography and mapping. *The aerial photography and mapping is scheduled for completion in early February 1995.*

Two punch list items regarding site restoration issues:

1. Grade roads on- and off-site.
2. Grade office areas.

One punch list item regarding a miscellaneous issue:

1. Remove all on-site survey lathe and other materials/trash.

Two punch list items regarding survey issues:

1. Complete survey for final grading areas.
2. Complete survey for permanent monument/markers in reference to required station.

Both items 1 and 2 will be completed when the long-term surveillance plan (LTSP) is completed.

One punch list item regarding a permit issue:

1. Revocable Use Permit (Mexican Hat and Monument Valley). *The termination of the revocable use permit item will be completed when the Navajo Environmental Protection Agency inspection is performed. This inspection is planned for 25 to 26 January 1995.*

Four additional action items added by the DOE/TAC inspection team:

1. The inspection team recommended that the fence in the northwest corner of the Monument Valley UMTRA Project site property, in the draw area, needs to have three steel posts anchored in the bedrock. The fence along the south and east side of the property needs to be restored to its original condition.
2. The DOE requests that the settlement plates located on the Mexican Hat disposal cell have an identification number stamped on them for further reference.
3. The DOE requests that MK-F obtain a letter from the Bureau of Land Management (BLM) stating that the Bluff, Utah, material pit has been graded to the satisfaction of the BLM.
4. The last comment concerns the seeding completed at the Monument Valley site. The DOE understands that the warranty has expired for the RAC revegetation. However, the Navajo Nation wants the option of negotiating additional seeding in the leachate areas should the initial seeding fail to germinate and grow. The follow-up to this item will be the responsibility of the DOE ERD and does not require a response from the RAC.

The DOE/TAC inspection team and the RAC team performed a site walk-over of the completed Mexican Hat disposal cell. The inspection teams walked along the west boundary fence and diversion ditch, entered the site at the northwest corner and walked up the northwest slope and across the top of the cell to the disposal cell monument. After inspecting a settlement monument adjacent to the disposal cell monument, the inspection team walked north to the number one diversion ditch, east to the number two diversion ditch, then southeast to the number three diversion ditch. The inspection team walked the southern fence line and viewed the disposal cell from the south bluff. The team examined the following:

- Erosion protection material was inspected for visual segregation, line and grade, and erosion of the slopes or diversion ditches. The line and grade of all erosion protection materials were very good and materials well keyed.
- The perimeter fence was inspected for excessive gaps under the bottom strand of barbed wire; loose strands of barbed wire; and anchoring of fence posts, corner posts, and gate posts.
- Sign posts were inspected to verify that the posts were anchored properly and the warning signs had been installed.
- Boundary markers were inspected to verify that they had been installed properly and had been surveyed and identified.

- Site grading was inspected to determine if all grading had been completed.

The site walk-over inspection verified that more than 90 percent of the fence had been installed. Two entrance gates needed to be installed at the northeast entrance into the site. Steel fence posts had been anchored in drilled concrete-filled holes. Approximately 10 inches (25.4 cm) of space had been maintained between the bottom strand and consecutive strands of all of the installed perimeter fence. There was no evidence of erosion, digging, or, excessive open areas beneath the fence.

Sign posts had been installed at 200-yard (182.9-m) intervals around the perimeter of the disposal cell on the property line. The site warning signs were installed approximately 5 ft (1.5 m) off the ground using nonremovable nuts. Warning signs need to be installed on the west and north side of the disposal cell.

Boundary monuments have been installed in drilled holes and set in concrete. Boundary monuments were surveyed in but still required stamped identification.

Erosion protection materials for the Mexican Hat, Utah, disposal cell were predominately rounded river-run materials. Keying of the rounded river-run erosion material was difficult to accomplish because of the nature of the material. However, the erosion protection material exhibited no evidence of segregation on the top, sideslopes, or diversion ditches of the disposal cell. The line and grade of the erosion protection materials were good. Additionally, the contractor used excess nongraded Type B erosion protection material to fill in areas where erosion may have been a problem. As a result of this attention, the line and grade of the disposal cell looks good.

Site grading was inspected during the on-site walk-over. The original office complex had been graded and appeared to be complete. Minor grading still needed to be finished around the perimeter of the Mexican Hat disposal cell to remove access roads and minor grading around the temporary construction trailers. Overall site grading appeared to be nearly completed.

At the completion of the Monument Valley-Mexican Hat sites inspection, the DOE/TAC team traveled to the Monument Valley site. The RAC team did not accompany the inspection team to the Monument Valley site.

The inspection team walked the west fence area at the request of the DOE site manager, Russel Edge. The fence was intact and there was no evidence of excessive open areas beneath it. Near the northwest corner of the property, a draw runs through the property. The fence that was stretched across this section, approximately three fence posts in length, was not anchored into bedrock.

The water retention basin was intact and securely fenced. There was no sign of digging or excessive open areas. Additionally, the wetlands area (frog ponds) was inspected. The natural vegetation appeared to be reestablishing.

The inspection team returned to the Mexican Hat RAC temporary office and established the inspection schedule for the next day's activities (18 January 1995).

On 18 January 1995 the inspection team of Milton Scoutaris, Paul Pehrson, and Richard Papusch reviewed the testing, daily inspection records, and photographs for erosion protection materials placed on the Mexican Hat disposal cell between 22 September 1994 to completion of the project.

An exit meeting was held at the RAC's temporary office trailer on 18 January 1995, at 11:15 a.m. Participants at the meeting were the DOE, TAC, RAC (MK-F), MK-EGG, and D.B.I.J.V. The inspection reaffirmed the 13 open items brought up at the opening meeting, and the inspection team introduced the 4 additional observations discussed previously.

At the conclusion of the exit meeting, the inspection team drove to the Bluff, Utah, pit to inspect the final grading and photograph the area for documentation. The Bluff pit had been graded and contoured to blend in with surrounding areas, seeded, and fenced.

4.3 SUMMARY AND CONCLUSIONS FOR THE 17 TO 18 JANUARY CLOSE-OUT INSPECTION

The DOE decided that before the remedial action close-out inspection could be closed, the RAC must respond to the 13 open items listed on the RAC's final walk-over inspection punch list and the applicable 3 of the 4 additional issues raised by the DOE/TAC inspection team.

The RAC responded to the remedial action close-out inspection on 22 March 1995, including the 16 items listed in Remedial Action Close-Out Inspection Report No. QA95145. The DOE concurred with the RAC's responses but decided to verify the responses with another visit to the Mexican Hat-Monument Valley sites.

4.4 SECOND REMEDIAL ACTION CLOSE-OUT INSPECTION, MEXICAN HAT-MONUMENT VALLEY UMTRA SITES

A second site visit was made on 13 June 1995 (DOE, 1995) to verify open items the RAC had completed after the remedial action close-out inspection of 17 to 18 January 1995. The RAC documented 5 items in its response; the remaining 11 items were verified during this inspection.

The inspection team was represented by Russel Edge and Milton Scoutaris of the DOE ERD, the TAC was represented by Richard Papusch, and the Navajo

Nation was represented by Ray Charley. The inspection began at 12:30 p.m. During the site walk-over they verified the following items:

- Survey markers (1, 3, and 4) were verified along the north, east, and south boundaries of the disposal cell.
- Twelve boundary markers, marked BM 1-12, were verified around the disposal cell outside the perimeter fence.
- Two site monuments were verified as placed at the center of the disposal cell and by the entrance gate.
- Forty-three perimeter signs were verified as installed around the disposal cell outside the perimeter fence.
- One entrance sign was verified as placed next to the entrance gate inside the perimeter fence. *The DOE representatives noted that the area code for the Navajo Nation telephone number listed on the sign would need to be changed in the near future.*
- All perimeter fencing was verified as installed.
- On- and off-site roads were graded adequately.
- Grading of office areas was adequate.
- The site was verified as clean of trash materials.
- Six settlement plates were verified as placed on the disposal cell top surface. All settlement plate protective casings are marked as I-VI and locked securely with padlocks.
- The fence at the Monument Valley site was not anchored at the proper draw area and also was not anchored into bedrock as requested in Remedial Action Close-out Inspection Report No. QA95145. The lower portions of the fence posts that are anchored are set into concrete-filled, 5-gallon (gal) (18.9-liter [L]) buckets that were left suspended at the bottom of the fence line.

Ray Charley of the Navajo Nation raised one additional item. Specifications required that the foundation piers be removed when the pug-mill was disassembled. Apparently, the pier foundations placed for the radon barrier pug-mill were covered during the final grading. Because of heavy rainfall, erosion uncovered the tops of the piers. Ray Charley has requested that the piers be removed from the site. The RAC has agreed to remove the piers after the conclusion of the 1995 calendar year construction season activities.

The results of the remedial action close-out inspection verified that 10 of the 11 items had been completed to the satisfaction of the DOE/TAC inspection team. One item, the fence at the Monument Valley site, remained open from the 17 to 18 January 1995 remedial action close-out inspection. Three additional items were raised during this remedial action close-out inspection. The following activities were requested of the RAC.

- Document final grading in the vicinity of the subcontractor office trailers.
- Discuss the adequacy of anchoring the Monument Valley northwest corner fence line in a 5-gal (18.9-L) bucket of concrete instead of in bedrock.
- Correct the Navajo Nation telephone area code number on the entrance sign.
- Confirm that the radon borrow area was seeded.

The RAC responded to the second remedial action close-out inspection on 15 September 1995.

4.5 SUMMARY AND CONCLUSION OF THE REMEDIAL ACTION CLOSE-OUT INSPECTION OF 13 JUNE 1995

The DOE concurred with the RAC response on the open items from the remedial action close-out inspection of 13 June 1995. The RAC responded adequately to three issues. One issue, removing the piers at the radon barrier pug mill site, will be completed during the winter season of 1995-1996.

After reviewing the responses from the RAC, the DOE ERD administratively closed out the remedial action close-out inspection on 4 October 1995. At that time, all recommendations that required responses were considered resolved to the satisfaction of the DOE ERD. Both remedial action close-out inspections are considered closed by the DOE ERD.

5.0 OTHER AUDITS AND CONSTRUCTION REVIEWS

5.1 ON-SITE CONSTRUCTION REVIEW OBJECTIVES

This section covers OSCRs performed by the NRC and a Field Surveillance performed by the Navajo Nation. The NRC performed three OSCRs during the Mexican Hat-Monument Valley UMTRA Project remedial action construction activities. The OSCRs were performed on 2 September 1993 (NRC, 1993a), 27 October 1993 (NRC, 1993b), 18 May 1994 (NRC, 1994). The Navajo Nation performed one field surveillance 17 to 19 August 1988 (Navajo Nation, 1988). No other site-related construction audits, except RAC internal audits, were performed at the Mexican Hat-Monument Valley sites. The RAC's site-related audits are referenced in the Mexican Hat-Monument Valley completion report.

The NRC OSCRs involved 1-day site visits. During these OSCRs, materials, records, and construction activities were verified using the approved RAP, RAIP, and construction specifications for the Mexican Hat-Monument Valley UMTRA Project sites.

5.2 ON-SITE CONSTRUCTION REVIEWS

The NRC OSCRs had three distinct objectives. First, assess the effectiveness of the construction and QC programs to ensure compliance with the RAP and EPA standards. Second, verify compliance with the RAIP- and RAP-approved plans and specifications. These two objectives were accomplished by reviewing documentation and observing construction activities as they were performed. Finally, verify that the approved RAIP for the Mexican Hat-Monument Valley sites was being implemented. This was accomplished by qualified personnel witnessing the RAC QC staff perform testing and inspection activities in the field.

5.3 NRC ON-SITE CONSTRUCTION REVIEW RESULTS

OSCR results in the NRC reports are documented as observations and issues. The results of the OSCRs performed at the Mexican Hat-Monument Valley UMTRA sites included 11 observations but no issues. Observations focused on placement and compaction of tailings, radon barrier, and erosion protection. The observations and issues are summarized in the following:

2 September 1993 - An OSCR was performed by Daniel S. Rom of the NRC on 2 September 1993 (NRC, 1993a). Other participants included Russel Edge of the DOE and Don Janz of the RAC.

The NRC OSCR team performed a walking tour of the disposal site and observed operations. Following a review of test records and project documents, the OSCR team drove to Monument Valley and walked the site.

Observations

- The review of the Mexican Hat disposal cell verified that the tailings were substantially uniform in appearance and makeup. The sandy nature of the tailings made it difficult for trucks to cross the site. Additionally, several rock pinnacles were observed within the disposal cell area. The actual quantity of tailings for disposal and the resulting level of the radon barrier will affect the decision about the rock pinnacles.

At Monument Valley, cleanup of contaminated materials surrounding the cell was nearly complete. Radiological testing was being performed to confirm adequate removal of contamination. Contaminated materials were being excavated from the heap leach area and contaminated materials were being hauled.

- Construction records reviewed were found to be complete and up-to-date, with minimum test requirements met.

At the close of the OSCR, the reviewer met with DOE and RAC representatives. No open issues were generated from this visit. This OSCR was closed on 17 November 1993.

27 October 1993 - An OSCR was performed by Daniel Rom and Ted Johnson of the NRC on 27 October 1993 (NRC, 1993b). Other participants included Russel Edge of the DOE, Bob Myers of the TAC, Tim Swisse and Chris Weston of the RAC, and Fang Wu of MK-EGG.

During this OSCR, tailings placement and heap-leach-treated materials from Monument Valley continued at Mexican Hat. In addition to a general construction review, the staff discussed possible changes to the erosion protection design, particularly to the south portion of the cell. Much of the discussion centered on the issue regarding the tailings shortfall and resulting proposed design changes.

Observations

- The OSCR team performed a walking tour of the disposal site and observed operations. Much of the discussion was about probable grading changes and surface construction details, which would change due to the new, lower embankment configuration.
- Although tailings were still being hauled to the cell from Monument Valley, little activity and no placement or compaction occurred at the time of the OSCR. The disposal cell was observed primarily to evaluate effects of the tailings shortfall on erosion protection measures. Details of riprap placement that would be affected by the change in elevation were considered. The DOE indicated that changes in the disposal cell would be

incorporated into PID No. 20. DOE further indicated that a draft PID would be submitted before formally submitting changes to NRC.

- Construction records generated since the time of the last visit were reviewed. The records were found to be complete and up-to-date, with the minimum test frequency requirements met.

At the close of the review the OSCR team met with DOE and RAC representatives. It was determined that there were no open issues generated from this visit. This OSCR was closed on 23 December 1993.

18 May 1994 - An OSCR was performed by Daniel Rom, Ted Johnson, and Robert Carlson of the NRC on 18 May 1994 (NRC, 1994). Other participants included Russel Edge of the DOE, Bob Myers of the TAC, Tim Swisse and Don Janz of the RAC, and Jose Cercone of MK-EGG.

During this OSCR, the staging area for mixing of sand and bentonite for the radon barrier, the upper surface of the disposal cell, and the toe areas of the cell were observed by T. Johnson and D. Rom. R. Carlson toured the Monument Valley site with DOE and RAC representatives.

Observations

- B. Meyers, D. Rom and T. Johnson performed a walking tour of the toe of the disposal cell foundation area, and observed rock capability and continuity testing operations being performed by the RAC with a power auger and power excavator. D. Rom observed the bentonite mixing operations at the pug mill and radon barrier placement operations on the cell.
- Records reviewed indicated that the required minimum 10 percent bentonite was being added to the sand. The blended cover material appeared to be uniform and easy to place and compact. The radon barrier surface was rolled until satisfactory densities were attained.
- R. Carlson toured the Monument Valley site with DOE and RAC personnel. Remedial action construction activities were complete at Monument Valley. The perimeter fence around the site was inspected and found to be in good condition. Vegetation was beginning to grow within the fenced area at the site. The wetland, a vicinity property, appeared to be in good condition.
- Construction records generated since the last visit were reviewed. The records were found to be complete and up-to-date, with the minimum test frequency requirements met. New computer-generated Proctor test forms included zero-air void curves. The new forms correct a potential deficiency, because the zero-air voids and specific gravity data are shown.

At the close of the NRC OSCR the staff met with DOE and RAC representatives. It was determined that the field procedures were satisfactory, and that no open issues were identified. This OSCR was closed on 5 July 1994.

5.4 NAVAJO NATION SURVEILLANCE

23 August 1988 - A Navajo Nation surveillance was performed by Perry H. Charley of the Navajo Nation on 17 to 19 August 1988 (Navajo Nation, 1988). No other participants were listed.

The Mexican Hat-Monument Valley UMTRA Project sites surveillance was part of a surveillance performed at three UMTRA Project sites. Mexican Hat and Monument Valley were two of the sites. The results of the surveillances can be found in the Navajo Nation's surveillance report dated 23 August 1988. Some areas of concern were noted but they do not immediately threaten site security or integrity. The following observations were made during the Navajo Nation surveillance.

Observation

Mexican Hat site

1. Radiological postings along the control fence are being removed.
2. There is evidence that bikers can access the southeast control area via poorly fenced arroyos. No evidence of access onto the tailing piles was noted. Several smaller arroyos/drainage with poor fencing also may allow entrance to the piles.
3. All other demolished contaminated structures, monitoring wells, retention ponds/drainages, decontamination pads and other on-site features remain secure.
4. Local task force officials were contacted. No major concerns were voiced or have risen since the 3 August 1988 public meeting with DOE.

Monument Valley site

1. The only problem area is the ever-increasing drainage developing through the middle of the old tailings site, transporting contamination further downstream toward Cane Valley Wash.
2. Lysimeter wells at the east end are being pulled from the ground.

On 6 June 1989, the DOE responded to each observation in the Navajo Nation surveillance report. Where action was required, the DOE corrected the problem through either the RAC or TAC. All Navajo Nation concerns were considered

closed at the beginning of the remedial action construction activities. The DOE considered the above issues closed on 6 June 1989.

5.5 SUMMARY AND CONCLUSIONS

Documentation from the NRC OSCRs verified that no open issues resulted from the site visits. At this time no observations require responses and all OSCRs are considered resolved to the satisfaction of the DOE. No observations remain open from the Navajo Nation's surveillance of 23 August 1988. The three NRC OSCRs and the one Navajo Nation surveillance are considered closed by the DOE ERD.

6.0 SUMMARY AND CONCLUSIONS

Two radiological surveillances, four radiological audits, nine QA in-process surveillances, and two remedial action close-out inspections were performed by the DOE/TAC during remedial action construction activities at the Mexican Hat-Monument Valley UMTRA Project sites. Three NRC OSCRs and one Navajo Nation surveillance were performed before or during remedial action construction activities at the Mexican Hat-Monument Valley UMTRA Project sites. A total of 227 observations/issues were noted during DOE/TAC audit and surveillance activities. A total of 10 observations were noted during NRC OSCRs and 6 observations were noted during the Navajo Nation surveillance. Follow-up to responses required from the RAC for the DOE/TAC surveillance and audit observations indicated that all issues related to the Mexican Hat-Monument Valley sites were resolved and closed to the satisfaction of the DOE.

All audit and surveillance observations and recommendations have been closed out to the DOE's satisfaction. Therefore, this final audit report segment of the site certification process is complete.

7.0 LIST OF CONTRIBUTORS

The following individuals contributed to the preparation of this report.

Name	Contribution
J. McBee	Document sponsor
P. Pehrson	Document coordinator
J. Hylko, P. Pehrson	Primary authors
R. Bennett, J. McBee	Document review
R. Papusch	QA review
J. Torline	Technical editing
L. Sanchez	Text processing

8.0 REFERENCES

- DOE (U.S. Department of Energy), 1995. *Report of Remedial Action Close-Out Inspection of the MK-Ferguson Company Remedial Action Construction, UMTRA Project, Mexican Hat-Monument Valley site, 17-18 January 1995, Report No. QA95145*, prepared by the U.S. Department of Energy Environmental Restoration Division, UMTRA Project Team, Albuquerque, New Mexico, UPDCC File Location No. 9.13.2.3.
- DOE (U.S. Department of Energy), 1994a. *Radiological Audit of Remedial Action Activities at the Mexican Hat-Monument Valley site, 29-31 March 1994, Report Hat-A05*, prepared by the U.S. Department of Energy, UMTRA Project Office, Albuquerque, New Mexico, UPDCC File Location No. 9.18.5.
- DOE (U.S. Department of Energy), 1994b. *Radiological Audit of Remedial Action Activities at the Mexican Hat-Monument Valley site, 19-20 July 1994, Report Hat-A06*, prepared by the U.S. Department of Energy, UMTRA Project Office, Albuquerque, New Mexico, UPDCC File Location No. 9.18.5.
- DOE (U.S. Department of Energy), 1994c. *Report of Quality Assurance Surveillance of the MK-Ferguson Company Remedial Action Construction, UMTRA Project Mexican Hat-Monument Valley Site, 22-24 March 1994, Report No. QS95124*, prepared by the U.S. Department of Energy, UMTRA Project Office, Albuquerque, New Mexico, UPDCC File Location No. 9.29.3.2.
- DOE (U.S. Department of Energy), 1994d. *Report of Quality Assurance Surveillance of the MK-Ferguson Company Remedial Action Construction, UMTRA Project Mexican Hat-Monument Valley site, 18-19 May 1994, Report No. QS95126*, prepared by the U.S. Department of Energy, UMTRA Project Office, Albuquerque, New Mexico, UPDCC File Location No. 9.29.3.2.
- DOE (U.S. Department of Energy), 1994e. *Report of Quality Assurance Surveillance of the MK-Ferguson Company Remedial Action Construction, UMTRA Project Mexican Hat-Monument Valley site, 22 September 1994, Report No. QS95137*, prepared by the U.S. Department of Energy, UMTRA Project Office, Albuquerque, New Mexico, UPDCC File Location No. 9.29.3.2.
- DOE (U.S. Department of Energy), 1993a. *Radiological Audit of Remedial Action Activities at the Mexican Hat-Monument Valley site, 3-7 May 1993, Report Hat-A03*, prepared by the U.S. Department of Energy, UMTRA Project Office, Albuquerque, New Mexico, UPDCC File Location No. 9.18.5.
- DOE (U.S. Department of Energy), 1993b. *Radiological Audit of Remedial Action Activities at the Mexican Hat-Monument Valley site, 23-26 August 1993, Report Hat-A04*, prepared by the U.S. Department of Energy, UMTRA Project Office, Albuquerque, New Mexico, UPDCC File Location No. 9.18.5.

- DOE (U.S. Department of Energy), 1993c. *Report of Quality Assurance Surveillance of the MK-Ferguson Company Remedial Action Construction, UMTRA Project Mexican Hat-Monument Valley site, 29-30 March 1993, Report No. S224*, prepared by the U.S. Department of Energy, UMTRA Project Office, Albuquerque, New Mexico, UPDCC File Location No. 9.29.3.2.
- DOE (U.S. Department of Energy), 1993d. *Report of Quality Assurance Surveillance of the MK-Ferguson Company Remedial Action Construction, UMTRA Project Mexican Hat-Monument Valley site, 5-7 October 1993, Report No. QS95058*, prepared by the U.S. Department of Energy, UMTRA Project Office, Albuquerque, New Mexico, UPDCC File Location No. 9.29.3.2.
- DOE (U.S. Department of Energy), 1990a. *Report of Quality Assurance Surveillance of the MK-Ferguson Company Remedial Action Construction, UMTRA Project Mexican Hat-Monument Valley site, 20-21 March 1990, Report No. S149*, prepared by the U.S. Department of Energy, UMTRA Project Office, Albuquerque, New Mexico, UPDCC File Location No. 9.29.3.2.
- DOE (U.S. Department of Energy), 1989a. *Radiological Audit of Remedial Action Activities at the Mexican Hat-Monument Valley site, 27-30 March 1989, Report Hat-A01*, prepared by the U.S. Department of Energy, UMTRA Project Office, Albuquerque, New Mexico, UPDCC File Location No. 9.18.5.
- DOE (U.S. Department of Energy), 1989b. *Radiological Audit of Remedial Action Activities at the Mexican Hat-Monument Valley site, 13-16 November 1989, Report Hat-A02*, prepared by the U.S. Department of Energy, UMTRA Project Office, Albuquerque, New Mexico, UPDCC File Location No. 9.18.5.
- DOE (U.S. Department of Energy), 1989c. *Report of Quality Assurance Surveillance of the MK-Ferguson Company Remedial Action Construction, UMTRA Project Mexican Hat-Monument Valley site, 27-28 March 1989, Report No. S115*, prepared by the U.S. Department of Energy, UMTRA Project Office, Albuquerque, New Mexico, UPDCC File Location No. 9.29.3.2.
- DOE (U.S. Department of Energy), 1989d. *Report of Quality Assurance Surveillance of the MK-Ferguson Company Remedial Action Construction, UMTRA Project Mexican Hat-Monument Valley site, 25-26 July 1989, Report No. S128*, prepared by the U.S. Department of Energy, UMTRA Project Office, Albuquerque, New Mexico, UPDCC File Location No. 9.29.3.2.
- DOE (U.S. Department of Energy), 1989e. *Report of Quality Assurance Surveillance of the MK-Ferguson Company Remedial Action Construction, UMTRA Project Mexican Hat-Monument Valley site, 23 October 1989, Report No. S138*, prepared by the U.S. Department of Energy, UMTRA Project Office, Albuquerque, New Mexico, UPDCC File Location No. 9.29.3.2.

- DOE (U.S. Department of Energy), 1988. *UMTRA Project Audit/Surveillance Program Plan*, UMTRA-DOE/AL-400326.0000, U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.
- Navajo Nation, 1988. *Navajo Nation Surveillance at the Mexican Hat-Monument Valley Site, 17-19 August, 1988*, report NN-01, prepared for the U.S. Department of Energy, UMTRA Project Office, by the Navajo Nation, UPDCC File Location No. 9.13.4.2.7.
- NRC (U.S. Nuclear Regulatory Commission), 1994. *On-Site Construction Review of Remedial Action Activities at the Mexican Hat-Monument Valley Site, 18 May 1994*, report NRC-03, prepared for the U.S. Department of Energy, by the U.S. Nuclear Regulatory Commission, UPDCC File Location No. 9.13.4.2.7.
- NRC (U.S. Nuclear Regulatory Commission), 1993a. *On-Site Construction Review of Remedial Action Activities at the Mexican Hat-Monument Valley site, 2 September, 1993*, report NRC-01, prepared for the U.S. Department of Energy, UMTRA Project Office, by the U.S. Nuclear Regulatory Commission, UPDCC File Location No. 9.13.4.2.7.
- NRC (U.S. Nuclear Regulatory Commission), 1993b. *On-Site Construction Review of Remedial Action Activities at the Mexican Hat-Monument Valley site, 27 October, 1994*, report NRC-02, prepared for the U.S. Department of Energy, UMTRA Project Office, by the U.S. Nuclear Regulatory Commission, UPDCC File Location No. 9.13.4.2.7.

CODE OF FEDERAL REGULATIONS

- 40 CFR Part 61, *National Emission Standards for Hazardous Air Pollutants*, U.S. Environmental Protection Agency.
- 40 CFR Part 192, *Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings*, U.S. Environmental Protection Agency.

DOE ORDER

- Order 5400.11, *Radiation Protection for Occupational Workers* (1988).

FEDERAL REGISTER

- 60 FR 2854, *Groundwater Standards for Remedial Actions at Inactive Uranium Processing Sites*, final rule, U.S. Environmental Protection Agency, 11 January 1995.

UNITED STATES CODE

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