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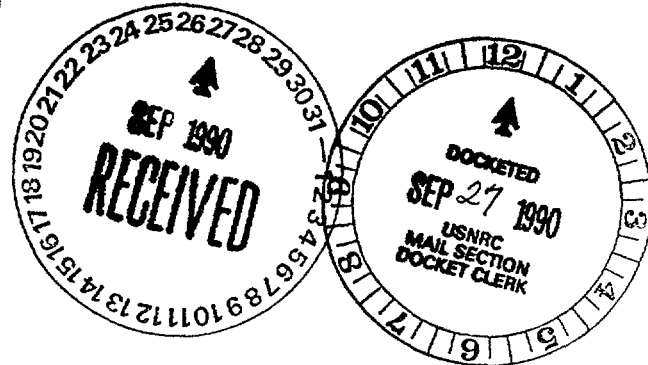


Department of Energy
Albuquerque Operations Office
P.O. Box 5400
Albuquerque, New Mexico 87115

SEP 2 1990

FEDERAL EXPRESS

Mr. Ramon E. Hall
Director, Uranium Recovery
Field Office
Region IV
U.S. Nuclear Regulatory Commission
P.O. Box 25325
Denver, CO 80225



Dear Mr. Hall:

Enclosed for your review and concurrence are four copies of the final "Remedial Action Plan and Site Conceptual Design" for the Ambrosia Lake, New Mexico, uranium mill tailings site. Also enclosed are the U.S. Department of Energy's (DOE) response to participant comments on the preliminary final Remedial Action Plan (RAP) and a summary description of changes made to the design plans and specifications (Appendix F).

Three original signature pages will be forwarded to you as soon as the State of New Mexico has signed and returned the pages to this office. Following execution of the signature pages by all parties, the final RAP will be incorporated as Appendix B of Cooperative Agreement No. DE-FC04-85AL20533 between DOE and the State of New Mexico, and a final published version of the RAP containing an original signature page will be forwarded to you. Any subsequent revision to the final RAP will result in a modification to the cooperative agreement and requires execution by both the DOE and State of New Mexico, and concurrence by the Nuclear Regulatory Commission.

Please contact Michael Abrams of my staff at (FTS) 845-4628 should you have any questions.

Sincerely,

Mark L. Matthews
Project Manager
Uranium Mill Tailings Remedial Action
Project Office

Enclosures

cc w/enclosures:
D. Gillen, NRC (2)
J. Oldham, MK-F (4)

cc w/o enclosures:
D. Bierley, JEG

OFFICIAL DOCKET COPY

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UMTRA PROJECT - AMBROSIA LAKE, NEW MEXICO
AMB-4 SUBCONTRACT DOCUMENTS
SEPTEMBER 1990
SUMMARY DESCRIPTIONS OF REVISION 1 AND 2 CHANGES

1. BID SCHEDULE

Deleted Item No. 202 (demolition of existing fences); combined Item Nos. 207 and 208 (temporary ditch excavation); combined Item Nos. 210 and 211 (north and east swale fill); added Item No. 210 (fencing for archeological site protection); divided Item No. 402 into Nos. 402 and 403 (inside and outside of final site boundary, respectively); combined Item Nos. 404 and 405 (debris and backfill quantities); added Item No. 406 (buried concrete); added Item No. 407 (disposal of hazardous and non-hazardous waste); revised Item No. 601 for 6-inch thickness of topslope Riprap Type A; combined Item Nos. 802 and 803 (backfill and finish grading); added footnote regarding measurement by neat line thickness (radon barrier, bedding and riprap).

2. SPECIAL CONDITIONS

- A. SC-1: Added "ALARA" and "Asbestos" definitions; revised contaminated and uncontaminated material definitions; revised Permanent Facilities definition.
- B. SC-2: Revised to require subcontractor and lower-tier subcontractor to observe same holidays as MK-F.
- C. SC-3: Revised radiological survey constraints (SC-3.B); revised "Stop Work" requirements (SC-3.D).
- D. SC-7: General revisions to "Construction, Environment, Safety, and Health Management Program" requirements. (Primarily requirements for: initial indoctrination and training; electrical precautions; trench/excavation barricades; subcontractor safety responsibility; galvanized materials;

back-up alarms; asbestos; noise; dust; confined space entry; construction motor vehicles; heavy equipment, and machinery).

- E. SC-8: General revisions to "Health Physics" requirements. (Primarily requirements regarding: work conditions; special examinations; health physics personnel; disposition of contaminated equipment, tools, and materials).
- F. SC-10: Revised quality assurance program description.
- G. SC-11: Revised subcontractor's permit responsibilities.
- H. SC-12: General revision to subcontractor's labor and equipment rates requirements.
- I. SC-13: General revision to subcontractor change notice proposal requirements.
- J. SC-16: Revised Paragraph C, requirements for termination for convenience.
- K. SC-20: Revised limitations on subcontracting.
- L. General - Updated revised references to current General Conditions and General Provisions.

3. SPECIFICATIONS - DIVISION 1: GENERAL REQUIREMENTS

A. Section 01010 - Summary of Work

Reformatted descriptions of borrow area locations; deleted Article 1.3 "Other Subcontracts"; revised Article 1.3 "Construction Sequence"; revised Article 1.5 "Time of Completion"; revised Article 1.5 "Time of Completion"; revised Article 1.8 "work Quality"; updated references to current General Provisions and General Conditions.

B. Section 01019 - Mobilization

Revised Article 1.4 "Description" (of mobilization).

C. Section 01025 - Measurement and Payment

Revised Article 1.1.C regarding subcontractor measurements for payment; revised Article 1.4 "Field Measurement for Payment"; updated references to current General Conditions and General Provisions.

D. Section 01052 - Layout of Work and Surveys

Added surveys of locations of Contractor sampling and testing, displacement monuments, and as-built conditions to Scope of Work (Articles 1.1.A, 1.5, 1.6, and 1.7; revised accuracy and tolerances description (Article 1.8).

E. Section 01300 - Submittals

Revised Article 1.1 "Description" (submittals list); revised "Technical Submittal" requirements (Articles 1.2.A.1, 1.2.B.5, 1.2.C.2, 1.2.E, 1.2.H, 1.2.I, 1.2.J, and 1.2.K); revised requirements for "Schedule of General Submittals" (Article 1.3.A) and Project Construction Schedule (Article 1.3.D); revised requirements for subcontractor submittals not requiring Contractor's approval (Article 1.4.).

F. Section 01500 - Construction Facilities

General revision of descriptions and requirements for construction facilities (trailers, utilities, access control, decontamination, temporary and existing roads, water, status at completion, etc.)

G. Section 01560 - Temporary Controls

Added "Protection of Exposed Surfaces" (Articles 1.1.B and 1.9); revised applicable publications (Article 1.3); revised requirements for dust control (Article 1.4), and for traffic and safety controls (Article 1.8.B).

H. Section 01561 - Construction Cleaning

Revised "Related Work" (Article 1.2); revised subcontractor responsibility for trash and debris disposal (Article 1.3.C); and revised requirements for "Cleanup During Construction" (Article 1.4).

4. SPECIFICATIONS - DIVISION 2: SITEWORK

A. Section 02050 - Demolition

Revised scope to include ballast for retention basin liner, buried concrete and foundations, and miscellaneous rubbish and debris (Article 1.1.A); revised demolition requirements for solids (Article 3.1.C) and for membrane liner and tires (Article 3.1.D); added demolition requirements for buried concrete structures and foundations (Article 3.1.H); revised disposal requirements to state that "contaminated demolished materials and debris shall be placed in the tailings embankment....." (Article 3.2.A); revised "Part 4 - Measurement and Payment" in accordance with revisions above.

B. Section 02060 - Existing Utilities

Added utilities encountered during excavation to "Work Included" (Article 1.1.A); made general revision of "Part 3 - Execution" (primarily revisions to depth and method for plugging or disposing of piping and ducts, and crushing debris where practicable).

C. Section 02081 - Hazardous and Non-Hazardous Materials

Added new specification section to give requirements for handling, transportation, and disposal of hazardous and non-hazardous wastes currently stored on site, and asbestos (transite pipe) encountered during construction.

D. Section 02090 - Sealing Abandoned Wells

Revised requirements for notifying the Contractor (Articles 3.1.A.5a and 3.1.A.6); revised measurement for payment to be made to the top of the soil/bentonite mixture (Article 4.1).

E. Section 02110 - Site Clearing

Revised definitions of "Topsoil" and "Stripping of Topsoil" (Articles 1.2.B and 1.2.C); added monitor wells as features to be protected (Article 3.1.); revised definition of contaminated clearing materials (Article 3.2).

F. Section 02141 - Dewatering and Drainage

Revised wording of "Scope" (Article 1.1); revised description of work (Article 1.2); revised requirements for erosion control and drainage features to be provided by the subcontractor (Articles 3.1.A, 3.1.D, and 3.2.B); allowed recycling of retention basin water for decontamination (Article 3.1.B).

G. Section 02200 - Earthwork

Added requirements for borrow area development and restoration (Articles 1.1.A.1g, 2.1.C.7, and 3.11); revised definitions of contaminated materials excavation, topsoil, finish grading and rippable rock (Articles 1.4.C, 1.4.H, 1.4.K and 1.4.R); deleted hoe, mattock, and pick reference from "Applicable Publications" (Article 1.5.A.2); revised requirements for "Protection" (Article 1.8); clarified designated sources of borrow materials and revised submittal requirements for borrow sources proposed by the subcontractor (Articles 2.1.A.1, 2.1.A.2); revised radon barrier material specification to require selective excavation and clod sizes one inch or smaller (Articles 2.1.C.1, 2.1.C.5, and 2.1.C.6); added "other off-pile areas" as source of contaminated materials (Article 2.2); revised material descriptions for demolished materials and debris (Article 2.3); changed article titled "Seasonal Shutdowns: to "Protection of Exposed Surfaces" and revised entire article (Article 3.1); added requirements to reduce moisture addition to contaminated materials (Article 3.2.F and 3.6.B.3; deleted "reach" (Article 3.3.A.1); added statements regarding buried footings and underground piping (Article 3.3.A.7 and 3.3.A.11); restricted excavation

limits to be within areal extent of contaminated material excavation shown on the Drawings, with depth of excavation as required by the Contractor (Article 3.3.B.1); revised wording of excavation of radon barrier material to produce a composite mixture (Article 3.3.C.3d); revised requirements for disposal of unsatisfactory excavated uncontaminated materials and stockpile maintenance (Articles 3.4.B.4 and 3.4.D); referred to requirements for reducing voids in demolished materials and debris (Article 3.5.A.1a); required protection of exposed surfaces during the work and extended shutdowns (Article 3.6.A.5); required the subcontractor to determine need for drying to meet compaction specifications (Article 3.6.B.3); clarified loose lift thickness requirements (Article 3.6.B.7); revised requirements for radon barrier/cover construction (Article 3.6.B.8 and 3.6.C.7); required maintaining moisture content of radon barrier (Article 3.6.C.8); revised classification and gradation test frequencies to one test per 1000 cubic yards of radon barrier material placed (Articles 3.7.B.2 and 3.7.B.3); revised subgraded preparation requirements for existing tailings pile, including soft areas and existing pond area (Articles 3.8.C., 3.8.D and 3.8.E); excluded debris pit backfill from compaction density requirements, a clarification (Article 3.9.A); revised minimum percentage of maximum dry density for radon barrier material to 100 percent (Article 3.9.A.2c); specified rounding of percentage of maximum dry density to nearest 0.1 percent (Article 3.9.B); revised displacement monument requirements (Article 3.10); revised "Part 4 - Measurement and Payment" for consistency with Bid Schedule revisions (see above); clarified method for measuring quantities for payment (Articles 4.1.A, 4.1.B and 4.1.C); changed measurement basis for debris stockpile 'A' to lump sum (Article 4.1.D); revised list of specific items incidental to work (Article 4.1.F); included stockpiling and stockpile maintenance in payment descriptions (Articles 4.2.A and 4.2.B); revised payment descriptions for uncontaminated material fill and backfill (Article 4.2.C) and for debris disposal (Articles 4.2.D and 4.2.E); added general statement excluding separate measurement and payment for work specified in this specification section, other than for bid items stated in Part 4 (Article 4.2.J).

H. Section 02278 - Erosion Protection

Revised to allow subcontractor to propose alternate bedding material sources and added additional test methods and rock quality scoring criteria to be used for

evaluating any subcontractor-proposed bedding material sources (Articles 1.6.B, 1.6.C, 2.1.A, 2.1.C and Table A); revised "Permits" requirements (Articles 1.5); added technical submittal requirements for erosion protection materials production plan (Article 1.6.A); revised subcontractor testing description and restricted required subcontractor testing to gradations only (Article 1.6.B); revised general material requirements (Articles 2.1.A.1 and 2.1.A.2); revised riprap materials requirements (Article 2.1.B.1 and 2.1.B.3); revised bedding materials requirements (Article 2.1.C); revised source quality control requirements (Article 2.1.D); revised bedding placement requirements (Article 3.1.C); revised riprap placement requirements (Article 3.1.E); revised requirements for protection of placed bedding and riprap (Article 3.1.F); revised upper limit of riprap tolerance to 135 percent to provide 35 percent range of tolerance common for other UMTRA sites (Articles 3.2.A.2 and 3.2.A.3); revised field quality control requirements regarding unsuitable materials, segregation, and placement (Articles 3.3.A.1 and 3.3.B); revised description of gradation testing by the Contractor (Article 3.3.D); revised borrow area restoration requirements to be according to applicable permits (Article 3.4); specified single method for calculating quantities and revised measurement of thickness to be by neat line thickness shown on the drawings (Article 4.1.A).

I. Section 02771 - Membrane Liner

Added existing retention basin liner and ditch liner to scope of work, including any necessary refurbishing, repair, or replacement (Articles 1.1.B, 1.2.C, 1.6.B.5, 3.1, 4.1.A and 4.2.B); added "Demolition" to related work (Article 1.3.B); revised test method descriptions and deleted Federal Standard Test Method 2031 for puncture resistance (Article 1.4); deleted requirements for installation worker qualifications (Article 1.5.D); revised physical property numerical criteria (Article 2.2.C); revised cleaning requirement for surfaces to be joined (3.3.B.1c); added requirements for gas vents and liner hold-downs (Article 3.5);

J. Section 02833 - Woven Wire Fence

Added new specification section for woven wire fence to protect archeological sites. This section is based on AMB-5 subcontract construction documents.

<u>Drawing Number</u>	<u>Change</u>
AMB-PS-10-0413	Added archeological sites to be protected with fence and revised office facility area outline.
AMB-PS-10-0414	Revised title and required decontamination pad sump to be lined with concrete.
AMB-PS-10-0415	Revised Notes 2, 3, and 4 (utility demolition) and utilities.
AMB-PS-10-0416	Added radius for final contour.
AMB-PS-10-0417	Added new monitor wells.
AMB-PS-10-0418	Deleted "As-Built" and deleted note re "granular material".
AMB-PS-10-0419	Deleted "As-Built".
AMB-PS-10-0420	Revised temporary ditch berm design and Note 3 (settlement monuments), and changed slope of bedding under riprap toe protection from 1:1 to 2:1.
AMB-PS-10-0421	Revised Contractor's office facilities and deleted "As-Built".
AMB-PS-10-0423	Revised minimum contact pressure for compaction of debris pit backfill from 10 to 8 psi.
AMB-PS-10-0424	Added survey points for as-built tailings embankment components.

K. Section 02935 - Seeding

Revised to required submittal of U.S. Soil Conservation Service recommendations for timing of seeding, and deleted watering requirements (Articles 1.3, 3.1.A, 3.4 and 4.1.B); clarified areas to be seeded with a given mixture (Articles 2.1.A, 2.1.B and 3.1.C); deleted lime requirement (Article 2.3); clarified that broadcasting is permitted and expanded broadcasting requirements (Article 3.2.A, 3.2.B and 3.2.C); and prohibited hydroseeding (Article 3.2.A).

5. DRAWINGS

<u>Drawing Number</u>	<u>Change</u>
AMB-PS-10-0402	Revised route numbers and title for Dwg. No. AMB-PS-10-014.
AMB-PS-10-0403	Deleted archeological sites to be protected.
AMB-PS-10-0404	Revised construction facility titles.
AMB-PS-10-0405	Deleted "As-built", revised spillway dimensions (to show as-built condition from AMB-5) and revised Contractors's office facilities.
AMB-PS-10-0406	Revised debris stockpiles and showed "pit area" for demolition debris from stockpile Area "B".
AMB-PS-10-0408	Revised sequence description, legend, Note 4, and Voght Tank note reference, and added Note 12 (re demolition work already accomplished and work to be done).
AMB-PS-10-0410	Revised Notes 2 and 5, and revised limit of buried asbestos.
AMB-PS-10-0411	Revised thickness of Riprap Type A on topslope from 12 inches to 6 inches. Showed riprap toe protection on all sections.

COMMENTS AND RESPONSES
ON THE
PRELIMINARY FINAL REMEDIAL ACTION PLAN AT
AMBROSIA LAKE, NEW MEXICO

September 1990

UMTRA DOCUMENT REVIEW FORM

SECTION 1

Site: Ambrosia Lake Date: November 21, 1989
Document: Preliminary Final Remedial Action Plan
Commentor: Nuclear Regulatory Commission (Draft TER)

Comment: Page 16

Although the overall design of the disposal area relies significantly on the buttress fill, no specific moisture control for material placement is included in the specifications. DOE indicated that the maximum density requirement would produce adequate results. This specification does not appear to be adequate, and moisture control of the buttress is considered an open item.

SECTION 2

Response: Page 1 By: MK-ES
Date: April 2, 1990

Moisture content for all fill materials, except radon barrier, is specified as follows (Section 02200, Rev. 0, Subsection 3.6.C.2): "During compaction the moisture content of fill materials shall be maintained to achieve specific density. Uniform moisture distribution shall be obtained by disk, blading, or other means approved by the Contractor prior to compaction of a lift."

This specification meets requirements for engineered fills (i.e. compacted embankments) commonly used where the fill will not be saturated. For example, the California Department of Transportation Standard Specifications state "At the time of compaction, the moisture contents of embankment material shall be such that the specified relative compaction will be obtained and the embankment will be in a firm and stable condition." (Ref. 1, p. 19-21). Thus, engineered fills do not necessarily require strict moisture control requirements during compaction.

The engineering properties of the buttress fill including strength and compressibility will be adequate if density specifications are met. The only remotely possible issue would be additional compression upon saturation for soils placed very dry of optimum moisture content. However, the radon barrier and site conditions will preclude the possibility of saturation following cover placement.

SECTION 2 (Continued)

The buttress fill moisture specification is considered adequate and appropriate for the following reasons:

1. The specification is equivalent to specifications for similar engineered fills; including tailings fills on the UMTRA Project;
2. There is no technical basis to require strict moisture control during compaction;
3. There is no need to impose additional quality control work on field personnel to measure and accept as-compacted moisture contents, and;
4. Unnecessary additional moisture to contaminated materials should be avoided, where practical, to minimize long-term seepage of contaminated water. A minimum moisture content requirement would negate the potential for the Subcontractor's methods and equipment to achieve density specifications with drier materials.

References

1. State of California, Department of Transportation, July 1984, Standard Specifications, Central Publication Distribution Unit, Sacramento, California.

Plans for Implementation:

None.

SECTION 3

Confirmation of Implementation:

Checked by: _____ Date: _____
Approved by: _____ Date: _____

UMTRA DOCUMENT REVIEW FORM

SECTION 1

Site: Ambrosia Lake Date: November 21, 1989
Document: Preliminary Final Remedial Action Plan
Commentor: Nuclear Regulatory Commission (Draft TER)

The DOE has not proposed a groundwater corrective action plan.

SECTION 2

Response: Section 5.5 By: DOE/TAC
Date: August 23, 1990

Because groundwater in the uppermost aquifer, the alluvium/weathered Mancos shale and the Tres Hermanos-C sandstone is Class III, groundwater cleanup is unwarranted. There is sufficient yield in the alluvium/weathered Mancos shale and Tres Hermanos-C sandstone for it to be considered an aquifer. The low yield makes groundwater cleanup technically impracticable. Furthermore, the remedial action will reduce the major source of recharge to the uppermost aquifer so that it eventually becomes unsaturated.

By not performing groundwater cleanup, the DOE is still protecting human health and the environment because there is no present or future groundwater use in the uppermost aquifer. The disposal cell will provide institutional control over most of the existing areas of saturation in the uppermost aquifer.

Lastly, when the stratigraphic sequence in the Ambrosia Lake repressurizes with time, all existing contamination in the formations will be deleted.

Plans for Implementation:

See revisions in Appendix ____.

SECTION 3

Confirmation of Implementation:

Checked by: _____ Date: _____
Approved by: _____ Date: _____

UMTRA DOCUMENT REVIEW FORM

SECTION 1

Site: Ambrosia Lake Date: November 21, 1989
Document: Preliminary Final Remedial Action Plan
Commentor: Nuclear Regulatory Commission (Draft TER)

Comment:

Groundwater in the Tres Hermanos-B member appears to be unaffected by tailings seepage. With two exceptions, all constituents are at or below EPA's proposed MCLs. One well (678) exhibits elevated nitrate, and two (678, 777) exhibit elevated selenium. DOE (1989a) reports the geochemical data are either inconsistent or are based on only an initial sampling round. Therefore, determining whether unit TRB exhibits a trend for exceedence of MCLs remains an open item.

SECTION 2

Response: Section 5.5.2 By: DOE/TAC
Date: August 23, 1990

Elevated nitrate concentrations in samples from monitor well 678 completed in the Tres Hermanos-B sandstone are probably not related to uranium processing activities at the site, because the concentrations are much higher than the average nitrate concentrations in samples of tailings pore fluids. They are also several orders of magnitude higher than those found in the overlying alluvium/weathered Mancos shale and Tres Hermanos-C sandstones. The nitrate concentrations (as high as 2210 mg/l) could be related to improper well completion, contamination during sampling, or vandalism, but are not derived from background water quality.

Selenium concentrations that exceed the MCLs in monitor wells 678 and 777 are related to natural mineralization of background groundwater quality in the Tres Hermanos-B sandstone.

Because groundwater in the Tres-Hermanos-B sandstone is hydrogeologically isolated from potential influence of uranium processing activities, it was not identified as part of the uppermost aquifer that includes the alluvium/ weathered Mancos shale and Tres Hermanos-C sandstone. Therefore the EPA groundwater protection standards do not apply to the Tres-Hermanos-B sandstone. A comparison with EPA MCLs has been provided for characterization purposes, but not to assess regulatory compliance.

Furthermore, groundwater in the Tres-Hermanos-B sandstone can be Class III based on limited yield.

UMTRA DOCUMENT REVIEW FORM

Plans for Implementation:

See additional discussion in Appendix ____.

SECTION 3

Confirmation of Implementation:

Checked by: _____ Date: _____

Approved by: _____ Date: _____

UMTRA DOCUMENT REVIEW FORM

SECTION 1

Site: Ambrosia Lake Date: November 21, 1989
Document: Preliminary Final Remedial Action Plan
Commentor: Nuclear Regulatory Commission (Draft TER)

Comment: Page 30

This (NRC) analysis resulted in a required barrier thickness of 2.3 feet, about 1 foot less than DOE's analysis. Therefore, DOE's estimated barrier thickness of 3.5 feet is considered reasonable for preliminary acceptance. The design of the radon barrier will be evaluated when it is submitted for review to ensure that the EPA standards for release of radon-222 to the atmosphere are met. Radon attenuation will remain an open issue.

SECTION 2

Response: Page 5 By: MK-ES
Date: April 2, 1990

Comments acknowledge.

Plans for Implementation:

Submit final radon barrier thickness calculation, using data obtained during construction.

SECTION 3

Confirmation of Implementation:

Checked by: _____ Date: _____
Approved by: _____ Date: _____

UMTRA DOCUMENT REVIEW FORM

SECTION 1

Site: Ambrosia Lake Date: November 21, 1989
Document: Preliminary Final Remedial Action Plan
Commentor: New Mexico State Engineer's Office

Comment: Page 1

1. The State Engineer Office should be notified in advance of the schedule for the plugging of 16 monitoring wells and possibly one domestic well to ensure that the plugging conforms to Article 4 of the Groundwater Rules and Regulations. (Refer to Volume I, Section 7.2.1; Volume I, Appendix A-19, Volume III, Section 02090, and Section 00800, Article SC-11A8, and SC-11B4 of the preliminary final report.)

SECTION 2

Response: Page 1 By: MK-ES
Date: July 25, 1990

Specification Section 02090, Article 3.1.A.6.a, requires the Subcontractor to notify the Contractor (MK-F) one week prior to commencement of well sealing operations.

By MK-ES telephone conversation record dated April 19, 1990, the State Engineer's office indicated that they would prefer one week advanced notice. Therefore, specification Section 02090, Article 3.1.A.6.a will be revised to require the Subcontractor to notify the Contractor (MK-F) ten days prior to commencement of well sealing. This notification will facilitate notifying the State Engineer office one week in advance.

Plans for Implementation:

Specification Section 02090 has been revised as stated above (see Rev. 1).

SECTION 3

Confirmation of Implementation:

Checked by: _____ Date: _____
Approved by: _____ Date: _____

UMTRA DOCUMENT REVIEW FORM

SECTION 1

Site: Ambrosia Lake Date: November 21, 1989
Document: Preliminary Final Remedial Action Plan
Commentor: New Mexico State Engineer's Office

Comment: Page 1

2. An impoundment will be constructed to contain all waters generated during the remediation. This impoundment is sized to minimally contain water generated in a 10-year 24-hour storm. This is a sufficient capacity to require a permit to impound water. (Refer to Volume I, Sections 4.4.2, and 7.2.1, and Appendix A-18 of the preliminary final report).

SECTION 2

Response: Page 2 By: MK-ES

Date: July 25, 1990

A permit to construct the retention basin was granted to MK-F on August 3, 1987. This permit fulfills the requirements of a permit to impound water. Clarification of meeting state requirements to satisfy this comment was obtained as per MK-ES telephone conversation record of discussion with the State Engineer's office dated April 5, 1990.

Plans for Implementation:

None.

SECTION 3

Confirmation of Implementation:

Checked by: _____ Date: _____

Approved by: _____ Date: _____

UMTRA DOCUMENT REVIEW FORM

SECTION 1

Site: Ambrosia Lake Date: November 21, 1989
Document: Preliminary Final Remedial Action Plan
Commentor: New Mexico State Engineer's Office

Comment: Page 3

3. A domestic well exists on the site and will be used for all necessary purposes except for drinking. It is unknown if the well will sufficiently meet the needs of the work to be done. Therefore, the Department of Energy should be informed that a permit must be obtained from the office to drill a supplemental well if needed. (Refer to Volume I, Appendices A-16 and/or A-17; Section 00800, Article SC-11B4; and Section 01500, Parts 1.14 and 1.15)

SECTION 2

Response: Page 3 By: MK-ES
Date: July 25, 1990

Comment acknowledged.

Plans for Implementation:

A permit will be obtained as required by the State Engineer's Office if a supplemental well is needed.

SECTION 3

Confirmation of Implementation:

Checked by: _____ Date: _____
Approved by: _____ Date: _____

UMTRA DOCUMENT REVIEW FORM

SECTION 1

Site: Ambrosia Lake Date: July, 1989
Document: Preliminary Final Remedial Action Plan
Commentor: New Mexico EID - Willy Abeele

Comment: Page D-9

1. A reminder:

Schiager assumes a conversion of $4.84 \times 10^{-15} \text{ C Bg}^{-15-1}$
or
 $2.5/\text{ur/hr/pCi/g}$

SECTION 2

Response: D-9 By: J. Millard - TAC
Date: February 14, 1990

Thank you for the reminder. See previous responses made to the same concern on June 29, 1987. Schiager's conversion factor applies only to tailings, not background soil exposure vs. Ra-226 concentrations.

Plans for Implementation:

None required

SECTION 3

Confirmation of Implementation:

Checked by: _____ Date: _____
Approved by: _____ Date: _____

UMTRA DOCUMENT REVIEW FORM

SECTION 1

Site: Ambrosia Lake Date: July, 1989
Document: Preliminary Final Remedial Action Plan
Commentor: New Mexico EID - Willy Abeele

Comment: Page D-9

2. Last Line - principal not principle

SECTION 2

Response: D-9 By: J. Millard - TAC
Date: February 14, 1990

Corrected as suggested.

Plans for Implementation:

Corrected.

SECTION 3

Confirmation of Implementation:

Checked by: _____ Date: _____
Approved by: _____ Date: _____

UMTRA DOCUMENT REVIEW FORM

SECTION 1

Site: Ambrosia Lake Date: July, 1989
Document: Preliminary Final Remedial Action Plan
Commentor: New Mexico EID - Willy Abeele

Comment: Page D-156

3. Borehole 753 would have to have a specific density of 2.959 to satisfy a moisture content of 20% (by mass???) and a dry density of 1.86 (of 116 pcf) - 2.959 would be kind of high?

SECTION 2

Response: D-156 By: N. Larson - TAC
Date: February 14, 1990

There are difficulties in measuring physical properties in the laboratory that are consistent with calculated values. In this case, the moisture content, specific gravity, or unit weight could be off. However, a calculated saturation using these values exceeded 100 percent, which is not physically possible. Since it is not possible to determine which parameter is incorrect, the data for borehole 753 will be eliminated since they may give misleading information.

Plans for Implementation:

Page revised.

SECTION 3

Confirmation of Implementation:

Checked by: _____ Date: _____
Approved by: _____ Date: _____

UMTRA DOCUMENT REVIEW FORM

SECTION 1

Site: Ambrosia Lake Date: July, 1989
Document: Preliminary Final Remedial Action Plan
Commentor: New Mexico EID - Willy Abeelee

Comment: Page D-156

4. Indicate that % moisture is by mass as was done on D-194 e.g.

SECTION 2

Response: D-156 By: N. Larson - TAC
Date: February 14, 1990

Standard geotechnical practice uses gravimetric moisture content. This practice was consistently followed for all the moisture contents used in the areas dealing with geotechnical data. However, a statement stating that all reported moisture contents are gravimetric will be placed at the beginning of Sections D.5, D.6, and D.7.

Plans for Implementation:

Change made as noted above.

SECTION 3

Confirmation of Implementation:

Checked by: _____ Date: _____
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UMTRA DOCUMENT REVIEW FORM

SECTION 1

Site: Ambrosia Lake Date: July, 1989

Document: Preliminary Final Remedial Action Plan

Commentor: New Mexico EID - Willy Abeele

Comment: Page D-158

5. Coeff. of consolidation should be expressed in cm^2/s .

SECTION 2

Response: D-158 By: N. Larson - TAC

Date: February 14, 1990

The units should be cm^2/s and will be corrected in the text.

Plans for Implementation:

Change made as noted above.

SECTION 3

Confirmation of Implementation:

Checked by: _____ Date: _____

Approved by: _____ Date: _____

UMTRA DOCUMENT REVIEW FORM

SECTION 1

Site: Ambrosia Lake Date: July, 1989
Document: Preliminary Final Remedial Action Plan
Commentor: New Mexico EID - Willy Abeelee

Comment: Page D-164

6. Hydraulic conductivity on D.6.1.4 in cm/i?

SECTION 2

Response: D-164 By: N. Larson - TAC
Date: February 14, 1990

The units are cm/s and will be added to the appropriate number.

Plans for Implementation:

Change made as noted above.

SECTION 3

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UMTRA DOCUMENT REVIEW FORM

SECTION 1

Site: Ambrosia Lake Date: July, 1989
Document: Preliminary Final Remedial Action Plan
Commentor: New Mexico EID - Willy Abee

Comment: Page D-165

7. Cohesion expressed in pcf???

SECTION 2

Response: D-165 By: N. Larson - TAC
Date: February 14, 1990

The units should be psf and this correction will be made in the text.

Plans for Implementation:

Change made as noted above.

SECTION 3

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Checked by: _____ Date: _____

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UMTRA DOCUMENT REVIEW FORM

SECTION 1

Site: Ambrosia Lake Date: July, 1989
Document: Preliminary Final Remedial Action Plan
Commentor: New Mexico EID - Willy Abeelee

Comment: Page D-165

8. Where does avg. cohesion and avg. friction angle come from? (not avg. from fig D.6.11-D.6.13!!)

SECTION 2

Response: D-165 By: N. Larson - TAC
Date: February 14, 1990

This will be corrected in the final text.

Plans for Implementation:

Change made as noted above.

SECTION 3

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SECTION 1

Site: Ambrosia Lake Date: July, 1989
Document: Preliminary Final Remedial Action Plan
Commentor: New Mexico EID - Willy Abeelee

Comment: Page D-165

9. Why put 6.5 and seven?
Why not 6.5 to 7 feet.

SECTION 2

Response: D-165 By: A. Dutcher - TAC
Date: February 14, 1990

According to the Guidelines for Production of UMTRA Project Documents, all numbers less than ten shall be spelled out unless they are fractions. Fractions shall be written in decimal form.

Plans for Implementation:

None.

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Site: Ambrosia Lake Date: July, 1989
Document: Preliminary Final Remedial Action Plan
Commentor: New Mexico EID - Willy Abeele

Comment: Page D-167

10. I don't believe zero voids curve to be correct. A void filled with water is still a void. Should be saturation curve. Same for pp. 168, 169, 170, 171, 172, 173.

SECTION 2

Response: D-167 By: N. Larson - TAC
Date: February 14, 1990

These are zero air voids curves or saturation as noted.

Plan for Implementation:

None.

SECTION 3

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SECTION 1

Site: Ambrosia Lake Date: July, 1989
Document: Preliminary Final Remedial Action Plan
Commentor: New Mexico EID - Willy Abee

Comment: Page D-174, 175, 176

11. Scale would help for ordinate (e) on pp. D-174, D-175, D-176

SECTION 2

Response: D-174, 175, 176 By: N. Larson - TAC
Date: February 14, 1990

The scales will be added.

Plans for Implementation:
Change made as noted above.

SECTION 3

Confirmation of Implementation:

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SECTION 1

Site: Ambrosia Lake Date: July, 1989
Document: Preliminary Final Remedial Action Plan
Commentor: New Mexico EID - Willy Abeele

Comment: Page D-174, 175, 176

12. How can saturation occur after consolidation has started.
Consolidation is to be performed on saturated samples (174-175-176).

SECTION 2

Response: D-174, 175, 176 By: N.Larson - TAC
Date: February 14, 1990

In order to determine the swelling potential of a soil, the consolidation is started on a sample; after a load or two, water is added to saturate the sample.

Plans for Implementation:

None.

SECTION 3

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Approved by: _____ Date: _____

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Site: Ambrosia Lake Date: July, 1989
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Commentor: New Mexico EID - Willy Abeele

Comment: Page D-174, 175, 176

13. e should not be influenced by the occurrence of saturation (surely no increase)! Sudden swelling of the clay, may decrease it if you start with unsaturated samples (which should not be the case)! (174, 175, 176)

SECTION 2

Response: D-174, 175, 176 By: N. Larson - TAC
Date: February 14, 1990

When water is added to a consolidation test, an increase in void ratio indicates a swelling soil while a significant decrease in the void ratio may indicate a collapsing soil.

Plans for Implementation:

None.

SECTION 3

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Approved by: _____ Date: _____

UMTRA DOCUMENT REVIEW FORM

SECTION 1

Site: Ambrosia Lake Date: July, 1989
Document: Preliminary Final Remedial Action Plan
Commentor: New Mexico EID - Willy Abeelee

Comment: Page D-174, 175, 176

14. How can O_m (water content) be higher after test? (174, 175, 176)

SECTION 2

Response: D-174, 175, 176 By: N. Larson - TAC
Date: February 14, 1990

The soil has swelled from the soil taking on more water.

Plans for Implementation:

None.

SECTION 3

Confirmation of Implementation:

Checked by: _____ Date: _____
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SECTION 1

Site: Ambrosia Lake Date: July, 1989
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Commentor: New Mexico EID - Willy Abeelee

Comment: Page D-175

15. How can the saturation ratio jump from 0.82 to 1.00 with such a seemingly small (and inexplicable) change in void ratio.

SECTION 2

Response: D-175 By: N. Larson - TAC
Date: February 14, 1990

Only the first point is unsaturated; after water is added during the second point, the sample becomes saturated. Saturation for this point is due to the added water and not from consolidating the soil skeleton.

Plans for Implementation:

None.

SECTION 3

Confirmation of Implementation:

Checked by: _____ Date: _____
Approved by: _____ Date: _____

UMTRA DOCUMENT REVIEW FORM

SECTION 1

Site: Ambrosia Lake Date: July, 1989
Document: Preliminary Final Remedial Action Plan
Commentor: New Mexico EID - Willy Abeelee

Comment: Page D-176

16. How can $e_f > e_i$?

SECTION 2

Response: D-176 By: N. Larson - TAC
Date: February 14, 1990

The soil swelled and increased the double boundary layer of the clays. Had the test started in a saturated condition, e_f could not be larger than e_i .

Plans for Implementation:

None.

SECTION 3

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Approved by: _____ Date: _____

UMTRA DOCUMENT REVIEW FORM

SECTION 1

Site: Ambrosia Lake Date: July, 1989
Document: Preliminary Final Remedial Action Plan
Commentor: New Mexico EID - Willy Abee

Comment: Page D-188

17. Why not be consistent and present the moist unit weight, moisture content, dry unit weight and degree of saturation for slimes, sand and sand-slime mixtures instead of presenting all four characteristics for slimes alone?

SECTION 2

Response: D-188 By: N. Larson - TAC
Date: February 14, 1990

The dry density and moisture content allow for the moist unit weight to be calculated. Therefore, the moist unit weights will be eliminated.

Plans for Implementation:

Change made as noted above.

SECTION 3

Confirmation of Implementation:

Checked by: _____ Date: _____
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SECTION 1

Site: Ambrosia Lake Date: July, 1989
Document: Preliminary Final Remedial Action Plan
Commentor: New Mexico EID - Willy Abee

Comment: Page D-188

18. Why use dry unit weight and dry density? What is the difference?

SECTION 2

Response: D-188 By: N. Larson - TAC
Date: February 14, 1990

For geotechnical purposes, dry density and dry unit weight are used interchangeably.

Plans for Implementation:

None.

SECTION 3

Confirmation of Implementation:

Checked by: _____ Date: _____
Approved by: _____ Date: _____

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Site: Ambrosia Lake Date: July, 1989
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Commentor: New Mexico EID - Willy Abee

Comment: Page D-188

19. Why use moist unit weight and wet unit weight? What is the difference?

SECTION 2

Response: D-188 By: N. Larson - TAC
Date: February 14, 1990

Moist and wet unit weights are used interchangeably. However, all references to either will be eliminated.

Plans for Implementation:

Change made as noted above.

SECTION 3

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Site: Ambrosia Lake Date: July, 1989
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Commentor: New Mexico EID - Willy Abeelee

Comment: Page D-188

20. Please indicate if moisture content is by mass or volume.

SECTION 2

Response: D-188 By: N. Larson - TAC
Date: February 14, 1990

A comment as such will be added in Chapter D.7.

Plans for Implementation:

Change made as noted above.

SECTION 3

Confirmation of Implementation:

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Site: Ambrosia Lake Date: July, 1989
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Commentor: New Mexico EID - Willy Abeelee

Comment: Page D-191

21. No possibility of converting the psf obtained for shear strength into kg/cm² or Pa so that comparison with elasticity modules (expressed in kg/cm²) could readily be made.

SECTION 2

Response: D-191 By: N. Larson - TAC
Date: February 14, 1990

Although the units could be changed so they match, a direct comparison between shear strength and modulus of elasticity would still not be meaningful. Shear strength is determined from a Mohr-Coulomb diagram while modulus of elasticity is determined from a stress-strain diagram.

Plans for Implementation:

None.

SECTION 3

Confirmation of Implementation:

Checked by: _____ Date: _____
Approved by: _____ Date: _____

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SECTION 1

Site: Ambrosia Lake Date: July, 1989
Document: Preliminary Final Remedial Action Plan
Commentor: New Mexico EID - Willy Abeele

Comment: Page D-199, 200, 201

22. AGAIN: Initially, saturation ratio <1.00 or <100%.

SECTION 2

Response: D-199, 200, 201 By: N.Larson - TAC
Date: February 14, 1990

These samples were initially unsaturated before the consolidation test began.

Plans for Implementation:

None.

SECTION 3

Confirmation of Implementation:

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Approved by: _____ Date: _____

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Site: Ambrosia Lake Date: July, 1989
Document: Preliminary Final Remedial Action Plan
Commentor: New Mexico EID - Willy Abeelee

Comment: Page D-212

23. What comes in fifth column: What is 97.2, 100.2, 95.2, 91.0?

SECTION 2

Response: D-212 By: N.Larson - TAC
Date: February 14, 1990

Dry density is in the fifth column. This will be added in the final.

Plans for Implementation:

Change made as noted above.

SECTION 3

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Site: Ambrosia Lake Date: July, 1989
Document: Preliminary Final Remedial Action Plan
Commentor: New Mexico EID - Willy Abeele

Comment: Page D-213

24. Table with one independent variable?

SECTION 2

Response: D-213 By: N. Larson - TAC
Date: February 14, 1990

This page will be eliminated.

Plans for Implementation:

Change made as noted above.

SECTION 3

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Site: Ambrosia Lake Date: July, 1989
Document: Preliminary Final Remedial Action Plan
Commentor: New Mexico EID - Willy Abee

Comment: Page D-216

25. A hydraulic gradient averaging 0.025. The above sentence is sufficient. No need to specify foot per foot, it is also true m/m or km/km or mile per mile.

SECTION 2

Response: D-216 By: E. Storms - TAC
Date: February 14, 1990

We will specify hydraulic gradient without units.

Plans for Implementation:

The change will be made.

SECTION 3

Confirmation of Implementation:

Checked by: _____ Date: _____
Approved by: _____ Date: _____

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Site: Ambrosia Lake Date: July, 1989
Document: Preliminary Final Remedial Action Plan
Commentor: New Mexico EID - Willy Abeelee

Comment: Page D-222

26. Units of transmissivity have the dimensions L^2T^{-1} so (gpd/ft^2) is incorrect.

SECTION 2

Response: D-222 By: E. Storms - TAC
Date: February 14, 1990

Agreed. We will change units of transmissivity from gpd/ft^2 to gpd/ft .

Plans for Implementation:

The correction will be made.

SECTION 3

Confirmation of Implementation:

Checked by: _____ Date: _____
Approved by: _____ Date: _____

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Site: Ambrosia Lake Date: July, 1989
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Commentor: New Mexico EID - Willy Abeelee

Comment: Page D-222

27. Since conductivities are expressed in cm/s, why not express transmissivities in cm^2/s ? An immediate relationship could then be established.

SECTION 2

Response: D-222 By: E. Storms - TAC
Date: February 14, 1990

The units for transmissivity will be expressed in cm^2/s for consistency and the equivalent conversion in gpd/ft will be shown in parenthesis.

Plans for Implementation:

The change will be made.

SECTION 3

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Site: Ambrosia Lake Date: July, 1989
Document: Preliminary Final Remedial Action Plan
Commentor: New Mexico EID - Willy Abeele

Comment: Page D-222

28. Quivira

SECTION 2

Response: D-222 By: E. Storms - TAC
Date: February 14, 1990

The correct spelling for Quivira will be used.

Plans for Implementation:

The correction will be made.

SECTION 3

Confirmation of Implementation:

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Approved by: _____ Date: _____