UMTRA-DOE/AL 050509-App.E
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United States Department of Energy

DOE/AL--050509-App.E

Remedial Action Plan and Site Design for Stabilization of the Inactive Uranium Mill Tailings Site at Mexican Hat, Utah

Appendix E

Final

July, 1988

Appendix B of the
Cooperative Agreement
No. DE-FC04-85A10533

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Uranium Mill Tailings Remedial Action Project

UMTRAP

DISCLAIMER

UNITED STATES DEPARTMENT OF ENERGY
Albuquerque, New Mexico

Uranium Mill Tailings Remedial Action Project (UMTRAP)

Mexican Hat, Utah

HAT-PH-II

Subcontract Documents

Final Design for Construction

Bid Schedule
Special Conditions
Specifications
Subcontract Drawings

June 1988

MORRISON-KNUDSEN ENGINEERS, INC.
A MORRISON KNUDSEN COMPANY

UMTRA PROJECT - MEXICAN HAT, UTAH

SUBCONTRACT DOCUMENTS HAT-PH-II

FINAL DESIGN FOR CONSTRUCTION

JUNE 1988

4774S

NOTICE OF LIMITED DISTRIBUTION

THIS DRAFT DOCUMENT IS PART OF THE DELIBERATIVE PROCESS OF THE U.S. DEPARTMENT OF ENERGY (DOE) IN ITS DECISION-MAKING FUNCTION UNDER THE URANIUM MILL TAILINGS RADIATION CONTROL ACT OF 1978, THE NATIONAL ENVIRONMENTAL POLICY ACT, AND OTHER APPLICABLE LAW. IT IS PROVIDED TO THE RECIPIENT PARTICIPATING FEDERAL OR STATE AGENCY OR INDIAN TRIBE WITH THE EXPRESS UNDERSTANDING THAT IT IS ONLY TO BE USED FOR THE PURPOSE OF PROVIDING THE DOE WITH INPUT TO SUCH DECISION-MAKING PROCESS. THE RECIPIENT PARTICIPATING FEDERAL OR STATE AGENCY EXPRESSLY AGREES TO LIMIT DISTRIBUTION OF THIS DOCUMENT TO THOSE EMPLOYEES WHO WILL PROVIDE INPUT TO THE DOE.

UMTRA PROJECT

MEXICAN HAT, UTAH

SUBCONTRACT DOCUMENTS HAT-PH-II

SECTION 00001H

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HAT-PS-10-0956, Rev. 0	Windblown Materials, Excavation Plan
HAT-PS-10-0957, Rev. 0	Tailings Embankment Plan
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HAT-PS-10-0960, Rev. 0	Final Site Grading and Drainage Plan
HAT-PS-10-0961, Rev. 0	Site Drainage (Sheet 1 of 4)
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END OF SECTION 00001H

Bid Schedule

SECTION 00310H

BID SCHEDULE

Name of Bidder _____ Date: _____

Following are the prices bid for completion of the Work as required by the Subcontract Documents:

Item No.	Spec. Section	Description*	Unit	Approx. Quantity	Unit Price	Amount
000 - MOBILIZATION						
001H	01019H	Mobilization	L.S.	100%	N/A	_____
200 - SITE PREPARATION						
201H	01500H	Temporary Offices	L.S.	100%	N/A	_____
202H	01500H	Temporary Roads and Parking Areas	L.S.	100%	N/A	_____
203H	01500H	Temporary Sanitary Facilities	L.S.	100%	N/A	_____
204H	01500H	Temporary Electric Power	L.S.	100%	N/A	_____
205H	01500H	Temporary Water	L.S.	100%	N/A	_____
206H	01500H	Decontamination System	L.S.	100%	N/A	_____
207H	01500H	Janitorial Services	Month	24	_____	_____
208H	01500H	Snow Removal Services	Year	2	_____	_____
209H	02050H	Demolition and Disposal of Structures	L.S.	100%	N/A	_____
210H	02090H	Sealing of Monitor Wells	L.F.	805	_____	_____

Item No.	Spec. Section	Description*	Unit	Approx. Quantity	Unit Price	Amount
400 - TAILINGS PILE						
401H	02200H	Upper Tailings Pile Excavation	C.Y.	974,200	_____	_____
402H	02200H	Windblown Tailings Excavation	C.Y.	210,100	_____	_____
403H	02200H	Water-Borne Tailings Excavation	C.Y.	25,200	_____	_____
404H	02200H	Disposal of Demolished Materials and Debris Stockpiled On Site By Others	L.S.	100%	N/A	_____
405H	02200H	Furnish and Install Displacement Monuments	Each	6	_____	_____
500 - COVER						
501H	02200H	Furnish and Place Radon Barrier Material	C.Y.	236,600	_____	_____
502H	02200H	Furnish Bentonite	Ton	44,840	_____	_____
600 - EROSION PROTECTION						
601H	02278H	Furnish and Place Riprap Material Type A	C.Y.	78,210	_____	_____
602H	02278H	Furnish and Place Riprap Material Type B	C.Y.	47,750	_____	_____
603H	02278H	Furnish and Place Riprap Material Type C	C.Y.	6,650	_____	_____
604H	02278H	Furnish and Place Riprap Material Type D	C.Y.	5,200	_____	_____
605H	02278H	Furnish and Place Bedding Material	C.Y.	65,700	_____	_____

Item No.	Spec. Section	Description*	Unit	Approx. Quantity	Unit Price	Amount
800 - SITE RESTORATION						
801H	02200H	Excavation of Uncontaminated Common Material and Placement as Fill for Finish Grading of the Site and Tailings Embankment	C.Y.	57,500	_____	_____
802H	02200H	Excavation of Uncontaminated Rock and Placement in the Spoil	C.Y.	174,500	_____	_____
		TOTAL (BID SCHEDULE 00310H)				$_____

* For complete description of a Bid Item and measurement and payment provisions, see Part 4 of the Specification Section cited.

END OF SECTION 00310H

Special Conditions

SECTION 00800H

SPECIAL CONDITIONS

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SC-1 DEFINITIONS

A. Wherever used in the Subcontract Documents the following terms have the meanings indicated which are applicable to both the singular and plural thereof:

1. Access Control Area - Access control area shall include the areas occupied by and in the immediate vicinity of administration facilities including, but not limited to, Contractor's and Subcontractor's office trailers, access control trailer, sanitary facilities, decontamination pad and its contaminated water collection sump, equipment and materials laydown and storage area, employee and service vehicle parking area, roadway connecting vehicular gate to decontamination pad.

2. Addenda - Written and/or graphic instruments issued prior to opening of Bids which clarify, correct or change the bidding documents.

3. Bid - The offer or proposal of the bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

4. Bonds - Bid, performance and payment bonds.

5. Construction Facilities - Construction facilities shall include temporary facilities required during construction phase of the permanent facilities. These facilities are specified in Section 01500H.

6. Contaminated Materials - Tailings and other materials having radioactive contamination levels greater than specified in the applicable US Environmental Protection Agency Standards. Contamination levels will be as determined by the Contractor. These standards are presented in the Federal Register, January 5, 1983, Section 192.12 "Standards for Remedial Actions at Inactive Uranium Processing Sites".

7. Controlled Area - Some areas on the construction site have localized health physics restrictions. Such areas are marked by ribbons, signs and tags.

8. Day - Day shall mean a calendar day of 24 hours.

9. Fiscal Year - October 1 through September 30.

10. General Requirements - Division 1 of the Specifications.

11. Lower-Tier Subcontractor/Other Subcontractor:

    a. Lower-tier Subcontractor - An individual firm or corporation having a direct contract with the Subcontractor.

    b. Other Subcontractor - An individual firm or corporation (other than the Subcontractor) having a direct contract with the Contractor for other work on the project.

12. Month - Month shall mean a calendar month.

13. Notice of Award - The written notice by Contractor to the apparent successful bidder stating that upon compliance by the apparent successful bidder with the conditions precedent enumerated therein, within the time specified, Contractor will sign and deliver the Agreement.

14. Notice to Proceed - A written notice given by Contractor to Subcontractor fixing the date on which the Subcontract Time will commence to run and on which Subcontractor shall start to perform Subcontractor's obligations under the Subcontract Documents.

15. Permanent Facilities - Permanent facilities shall include permanent features of the Project including, but not limited to, the following: Disposal of demolished debris; construction of tailings embankment; sealing of monitor wells; construction of permanent drainage ditches; and finish grading of the site.

16. Project - The total construction of which the Work to be provided under the Subcontract Documents is a part as indicated elsewhere in the Subcontract Documents.

17. Project Site/Site/Jobsite - The Project Site or Site shall include the areas occupied by Mexican Hat Site including windblown and waterborne areas outside of the existing woven wire fence.

18. Shop Drawings - All drawings, diagrams, illustrations, schedules and other data which are specifically prepared by or for Subcontractor to illustrate some portion of the Work and all illustrations, brochures, standard schedules, performance charts, instructions, diagrams and other information prepared by a Supplier and submitted by Subcontractor to illustrate material or equipment for some portion of the Work.

19. Site Manager - The authorized representative of the Contractor who is assigned to the site or any part thereof.

20. Specifications - Those portions of the Subcontract Documents consisting of written technical descriptions of materials, equipment, construction systems, standards and workmanship as applied to the Work and certain administrative details applicable thereto.

21. Subcontract Change Notice/Change Order - A document signed by Subcontractor and Contractor authorizing an addition, deletion, revision, or clarification of the Work, modified in writing and issued on or after the Effective Date of the Agreement.

22. Subcontract Drawings - The drawings which show the character and scope of the Work to be performed and which are referred to in the Subcontract Documents.

23. Subcontract Modification - A document issued to incorporate Subcontract Change Notices/Change Orders and adjustments in the Subcontract Price or Subcontract Time or to modify Subcontract.

24. Subcontract Price - The moneys payable by Contractor to Subcontractor under the Subcontract Documents as stated in the Agreement.

25. Subcontract Time - Duration of time specified in the Subcontract Agreement Form for the completion of the Work under the Subcontract. The time shall commence from the date or the day specified in the written Notice to Proceed, and may be specified in terms of number of calendar days available, or the date on or before which to complete the Work.

26. Tailings Embankment: See Section 02200H, Article 1.4.

27. Temporary Facilities - See Construction Facilities in Paragraph 5 above.

28. Temporary Roads - Improvements to existing roads and construction of new roads, if any, by the Subcontractor, for his own convenience in the performance of the Subcontract.

29. Uncontaminated Materials - All materials having radioactive contamination levels less than specified in the applicable US Environmental Protection Agency

Standards. These standards are presented in the Federal Register, January 5, 1983, Section 192.12: "Standards for Remedial Actions at Inactive Uranium Processing Sites".

30. Work - The entire completed construction required under the Subcontract Documents. Work is the result of performance of services, furnishing labor and furnishing and incorporating materials and equipment into the construction, all as required by the Subcontract Documents.

B. The other terms such as Contractor, Subcontractor, Government, DOE, Subcontract Administrator, Subcontract Documents, MK-F and Site of Work are defined in Article GP-2 of General Provisions.

SC-2 HOLIDAYS

A. The following days will be observed as holidays by MK-Ferguson Company, the Contractor:

New Year's Day
President's Day
Memorial Day
Navajo Memorial Day
Pioneer Day
Independence Day
Labor Day
Veterans Day
Thanksgiving Day
Christmas Day

B. Holidays occurring on Saturday or Sunday will be observed on Friday or Monday.

SC-3 CONSTRUCTION RESTRAINTS

A. Concurrent Work: MK-Ferguson Company (Contractor) and other subcontractors may be engaged in work in the general areas covered by the Work under this Subcontract. Such personnel will have access to the areas and to the utilities. The Subcontractor shall cooperate and coordinate his work to best utilize the available areas, roadways and facilities. Coordination shall be through the Contractor.

B. During the course of this Subcontract, the Contractor, and possibly State Personnel, will perform radiological surveys, and will conduct tests on excavated areas to determine whether additional contamination remains to be excavated. Results of such tests of contaminated materials are generally available within four hours during normal work hours; however, test equipment constraints may increase the testing time.

C. Upon apparent completion of contaminated material excavation in a distinct area, the Contractor will conduct a radiological verification survey to confirm removal of contamination to EPA standards. This survey may take up to seven work days. The Subcontractor shall plan his work accordingly.

D. Stop Work in Case of Excessive Radionuclide or Other Toxic Concentrations: The Site Manager will monitor construction activities and may shut down the Work or require modification of Subcontractor activities in the event that gaseous or particulate radionuclide or other toxic concentrations associated with construction activities exceed allowable limits. Any shut down shall be a last resort response to such conditions; other responses including watering, vehicle speed reduction, covering of material emitting radon gas, etc., shall first be implemented by the Subcontractor.

E. The Subcontractor shall maintain the exhaust systems of all vehicles and equipment to protect against excessive noise and air pollution in compliance with the applicable local, Navajo Nation, and Federal requirements. The trucks shall be equipped with sound-dampening features. Tailgate chains shall be rubber-insulated and latches shall be adequately secured. Noise surveys will be conducted on all equipment by a Contractor's representative.

F. If the Subcontractor uncovers any archaeological artifacts or human remains during the term of the Subcontract, he shall immediately halt operations in the immediate vicinity of such a discovery and notify the Site Manager. Further work in these areas shall not resume until a qualified archaeologist has inspected the site and completed all resource recovery work.

G. Placement of radon barrier material and production of erosion protection materials shall not begin prior to March 1, 1989.

SC-4 SITE LOCATION AND ACCESS

A. The location of the site is specified in Specification Section 01010H.

B. Access: Access to the Site shall be as specified in Specification Section 01560H, Article 1.8.

SC-5 COORDINATION OF WORK

The Subcontractor shall carefully coordinate all construction activities with the Site Manager to avoid conflicts and unnecessary delays in construction.

SC-6 CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

A. Unless otherwise specified elsewhere in the Subcontract Documents, the Subcontractor shall furnish and assume full responsibility for the following facilities and incidentals which are necessary for the furnishing, performance, testing, start-up and completion of the Work as shown on the Subcontract Drawings and as specified in the Specifications:

1. All materials, equipment, plant, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, decontamination facilities and all other facilities and incidentals as specified in Section 01500H.

2. All temporary controls including, but not limited to, dust control, erosion control, noise control, pollution control, surface water control and access and traffic control as specified in Section 01560H.

B. Subcontractor shall be responsible for installing, constructing, maintaining, operating, removing and disposing of the construction facilities and temporary controls through the term of the Subcontract.

SC-7 CONSTRUCTION HEALTH AND SAFETY

A. Contractor Safety Program:

1. The Subcontractor shall comply with the Construction Safety and Health Management Program (Document No. MK-UMTRA-4). This document is available upon request from the Contractor's office in Albuquerque, New Mexico.

2. The successful bidder will be issued a copy of the Construction Safety and Health Management Program Document with the Notice of Award by the Contractor's Subcontract Administrator.

3. A table of contents for the Construction Safety and Health Management Program is listed below:

SAFETY AND HEALTH MANAGEMENT PROGRAM

TABLE OF CONTENTS

B. Construction Safety and Health Initial Indoctrination and Training:

1. All construction personnel working on the site shall receive the basic Construction Safety and Health Initial Indoctrination and Training. The Indoctrination and Training will cover such matters as first aid and medical responsibilities, emergency actions, etc. The indoctrination will be oral or written (approximately 30 minutes). It will be presented to construction personnel either individually or on a group basis and at the Subcontractor's convenience. The indoctrination will be presented to all personnel upon request, between the hours of 8:00 a.m. and 4:00 p.m., Monday through Friday (holidays excluded). No construction personnel will be permitted to work without having received this basic indoctrination.

2. The use of respirators may be necessary on this Project. If respirator use becomes necessary, the respirators will be provided by the Contractor and training in the proper use of respirators in the performance of specific tasks will be provided by the

Contractor. This instruction is approximately two hours long and will be provided to the Subcontractor at no extra cost. The Subcontractor shall notify the Contractor's Representative at least one (1) week in advance of the time that the training is desired. Note, that individuals with beards or facial hair that interferes with a proper respirator seal will not be accepted for respirator training.

3. No payment will be made to the Subcontractor for his employees' attendance at Safety and Health Initial Indoctrination and Training Program or respirator training provided by the Contractor. Full compensation for such costs will be considered incidental to the Work of this Subcontract.

4. Based upon the criteria established by the MK-Ferguson Corporate Medical Director and upon the recommendations listed in the American National Standard, ANSI Z88.2-1980, "Practices for Respiratory Protection", all employees who will or may be required to wear respirators on this Project shall complete a medical questionnaire. There may be a need for further medical evaluation based on answers in the questionnaire. The Respirator Program Administrator or his designee will make this determination.

C. Electrical Precautions:

1. Personnel Ground Fault Protection: All electrical conductors used in construction, operating on single phase, 120 vac, 15 or 20 amperes circuits, shall be equipped with UL listed Ground Fault Circuit Interrupters set at five (5) milliamperes plus (+) or minus (-) one (1) milliampere. All portable electric tools and their usage shall be in compliance with applicable OSHA (29 CFR 1926) standards.

2. Electrical Clearance Requirement: All electrical circuit connections shall be made on de-energized systems. Working clearance for energized systems shall be 3 feet for 0 to 150 volts and 4 feet for 151 to 600 volts. The work shall be performed by a qualified journeyman electrician or by an apprentice electrician under the direct supervision of a qualified journeyman electrician.

D. Smoking, Drinking, Eating and Chewing Restrictions: No smoking will be permitted in the immediate vicinity of any flammable liquids, gases or highly combustible mate-

rial, or in any area posted as a non-smoking area. No smoking, drinking, eating or chewing will be permitted in any controlled area.

E. Ladders, Scaffolds, and Man Lifts: All man-lift equipment, ladders, and scaffolding shall be in compliance with applicable OSHA (29 CFR 1926) standards and be subject to inspection by the Contractor prior to and during its use.

F. Trench/Excavation Barricades:

1. Trenching, excavation, shoring, bracing, and barricading requirements shall be in accordance with OSHA, 29 CFR 1926, Subpart P.

2. The following forms of protection shall be required for open trenches/excavations adjacent to occupied buildings, crossing pedestrian crosswalks and paths, at street intersections, and crossing or adjacent to sidewalks and driveways:

a. Barricades shall be positioned on each side of the trench and stationed at a maximum of ten (10) foot intervals. Spacing on each side of the trench shall alternate to show that a front view depicts barricades at five (5) foot intervals.

b. Whenever possible, each barricade shall be positioned at least two (2) feet away from the open trench or excavation.

c. Each barricade shall be equipped with a yellow flasher of at least eight (8) inches in diameter. (NOTE: Temporary barricades used during daylight operations do not require flashers.) Street side flashers shall be directed parallel with the street, curb side flashers and flashers along pedestrian routes shall be facing in the direction of pedestrian traffic.

d. When continuous solid barricades are not provided, interconnecting ropes or tape shall be attached to all barricades. When rope is used, streamers shall be attached at 2-3 foot intervals.

e. Walkways and/or bridges with standard guard rails, shall be provided at all pedestrian crossing points except for trench width 2'-0" and less where a barricade straddling the trench on either side of the walkway may be used.

f. Where vehicle traffic must cross trenching operations, metal plate covers shall be provided to support all motor vehicles.

g. Where trenches or excavations interrupt a doorway, ramp, or other exits/entrances to buildings, the doors shall be locked or blocked and a sign displayed to indicate the condition that exists.

G. Notification of Occurrences: Subcontractors shall advise the Contractor immediately upon occurrence of any non-routine events, occurrences, incidents, or accidents, etc., particularly in situations such as lost time accidents and ambulance calls.

H. Responsibility:

1. Subcontractor Safety Responsibility:

a. Each Subcontractor shall designate a qualified person to implement the Construction Safety and Health Management Program at the work site. The designated person shall have authority for actions and for control of work activity to prevent accidents.

b. Daily work area safety and health inspections are required and appropriate action shall be taken to correct noncompliance conditions.

2. Contractor Safety Responsibility:

a. Contractor Safety Department personnel or designated representatives will make regular continuing inspections of all facilities and operations within the scope of the Subcontract. These inspections will include the facilities and operations of all Subcontractors, but do not in any way relieve Subcontractors of their responsibility for compliance with the provisions of the Construction Safety and Health Management Program.

b. Daily work area safety and health inspections will be made by Contractor personnel.

I. Galvanized Fence Materials: Personal respiratory protection or ventilation is required if a heat process takes place with galvanized fencing materials.

J. Back Up Alarms: All heavy equipment shall have functioning audible back up alarms while in use on an UMTRA project.

K. Unidentified Waste Materials: Unidentified wastes will be identified by the Contractor through laboratory analysis. If the materials are identified as hazardous, the Subcontractor shall comply with the applicable standards for personnel safety and health protection.

L. Industrial Hygiene:

1. Noise:

a. Noise levels and dosimetry will be conducted on a continuous basis for both Contractor and Subcontractor personnel. The UMTRA Project shall comply with the U.S. Air Force Noise Standard AFR 161-35. Time weighted averages for 8-hour exposure shall not exceed 84 dB(A).

b. Eight personnel from the Contractor and Subcontractor staff shall receive baseline and exit audiograms. Costs for these exams will be paid by the Contractor. These personnel will be representative of low, moderate, and high noise exposure.

2. Dust: The Subcontractor's dust control provisions shall be adequate to prevent personnel from potential inhalation exposure to Silica or Nuisance particulates. The Contractor's Safety Department will conduct ongoing dust monitoring and will inform the Subcontractor about the need for respiratory protection.

3. Prior to entry into any enclosed space or area, air contaminant testing will be done by the Contractor. The testing will be for Hydrogen Sulfide (H_2S), Carbon Monoxide (CO), % oxygen and any combustibles that may be present. Testing will be done using a direct reading instrument assigned to the Contractor's Health and Safety personnel.

M. Construction Vehicles, Machinery and Equipment Safety Inspections:

1. The Subcontractor shall designate a competent person to inspect the operating conditions of all construction vehicles, machinery and equipment. The vehi-

cles, machinery and equipment shall be inspected prior to their use and frequently during their use to make certain that they are in safe operating conditions. All deficiencies shall be repaired and defective parts replaced before using them or continuing their operations.

2. A thorough annual inspection of the hoisting machinery shall be made by a competent person, or by a government or private agency recognized by the U.S. Department of Labor and inspection report(s) shall be prepared.

3. Inspection report(s) and repair records shall be submitted to the Site Manager prior to the use of such construction vehicles, machinery and equipment on the Project.

SC-8 HEALTH PHYSICS

Portions of the Subcontract work area is a radiologically controlled area. All work shall be governed by the essential requirements given in the following paragraphs:

A. Work Conditions:

1. Radiation/Contamination Areas: Radiation/contamination controlled areas shall be established on a case-by-case basis at the discretion of the Site Manager. Protective clothing for contamination control is provided to the Subcontractor at no charge on a loan basis. Clothing will be issued by Contractor personnel when required at the access control gate.

2. Radiation Dressing Requirements:

a. All controlled area protective clothing, when required, shall be put on and removed at the controlled area boundary. The Subcontractor shall ensure that removed items are properly stored and areas are maintained in proper order.

b. When required, protective clothing for contamination control could consist of coveralls, gloves, and rubber boots, shoecovers or any combination of the above. Personnel will be required to change out of the protective clothing prior to leaving the controlled area.

3. Personnel Monitoring: All personnel will be required to self-monitor for radioactive contamination upon leaving the controlled area. Personnel will be instructed in self-monitoring procedures in accordance with paragraph 5 below defining Training Requirements.

4. Vehicles and Other Monitoring: Vehicles, equipment and tools from the controlled area will be monitored for radioactive contamination by the Contractor before leaving the area.

5. Training Requirements: In order to work in the controlled area, personnel shall be trained as Radiation Workers by the Contractor. The training course is approximately four hours long and is available to Subcontractor personnel at no cost for the instruction. Training in the proper use of respirators for performing specific tasks may be required. A test will be given to all personnel at the conclusion of training to establish qualifications as a Radiation Worker. Personnel must pass this test to work within the radiation control area. For respirator training and employee requirement, see Articles SC-7.B.2 and SC-7.B.4.

6. Radiation Exposure Limits and Restrictions:

   a. Radiation exposure on this Project is expected to be well within allowable radiation exposures. Whole body radiation exposure in rem shall be determined by Personal Thermoluminescent Dosimeters (TLD) issued to each radiation worker.

   b. Prior to working at the construction site each employee shall provide prior radiation exposure records as applicable.

   c. While working at the construction site each employee is required to wear TLD badges issued and collected daily.

   d. No one under the age of 18 shall be permitted to enter or work in the controlled area.

7. The Subcontractor shall observe Controlled Area restrictions and take applicable precautions.

B. Special Examinations:

1. Employees working in radiation control areas may be required to submit a bioassay sample prior to starting work in the radiation control areas and also upon termination or completion of the Subcontract. Certain Subcontractor employees, identified by the Contractor based on potential exposure to airborne radionuclides, will be required to submit quarterly bioassay samples. Employees may be required to submit additional bioassay samples on an occasional basis, to ensure that applicable radionuclide exposure standards are being met. It is the Subcontractor's responsibility to ensure that each employee submits bioassay samples as required by the Subcontract.

2. The Subcontractor shall notify the Contractor of any personnel terminations or transfers within 8 working hours of such terminations or transfers. The Subcontractor shall also provide the Contractor with weekly lists of all Subcontractor or subtier employees employed by or for the Subcontractor who have been issued TLD radiation exposure badges. These weekly listings shall include full name, social security number, hire date, and termination/transfer date (if applicable), of all such employees.

C. Health Physics (HP) Personnel: The Site Manager will monitor the construction work through HP personnel employed by him. The HP personnel will provide radiological surveillance over construction activities and advise supervision on matters concerning radiation safety as related to activities or conditions affecting the construction work.

D. Warning Signals: Certain circumstances such as unusual or unanticipated radiation levels, presence of toxic substances, or unsafe working conditions may prompt the Contractor to give verbal information or directions, as Warning Signals, directly to the Subcontractor and his employees. The Subcontractor and his employees shall take required actions as directed by the Contractor or his representative. The Subcontractor shall obtain the name and title of the Contractor's representative providing such information.

E. Disposition of Contaminated Equipment, Tools and Material:

1. The Subcontractor shall use his own or rental equipment in performing the required work under this Sub-

contract. All tools, vehicles, equipment and material will be inspected for radioactive contamination by the Site Manager or his designee prior to removal from the construction area.

2. Should the Subcontractor's tools, material, or equipment become contaminated, they will have to be decontaminated before removal from the area. If decontamination becomes necessary, the Site Manager will provide instructions for decontamination by the Subcontractor's employees. Decontamination may consist of steam cleaning, dry brushing, or washing with appropriate liquids. Decontamination required beyond these described will be handled under Article GP-4, "CHANGES" of the General Provisions.

3. If decontamination proves impracticable or impossible, the tools, material, or equipment in question will be retained by the Contractor and an equitable adjustment for same will be negotiated with the Subcontractor provided that:

   a. There is no fault or negligence of the Subcontractor contributing to the contamination;

   b. The Subcontractor has followed all the specific instructions of the authorized HP personnel who have surveillance over the work;

   c. Items or equipment confiscated from the Subcontractor will be documented by a Confiscation Notice furnished to the Subcontract Administrator by the Contractor and signed by HP personnel and the Site Manager;

   d. The Subcontractor allows reasonable time (a minimum of ten (10) working days, excluding weekends and holidays) in which to attempt decontamination of the item(s) in question. The reimbursement schedule will be as follows:

      1) Tools valued less than $300.00 at 95% of replacement cost.

      2) Tools/Equipment $300.00 and up: If less than one (1) year old or at top of depreciation schedule, at 75% of replacement cost; if at bottom of or off the depreciation schedule, at 50% of replacement cost.

e. Failure to agree upon equitable adjustment shall constitute a dispute within the meaning of Article GP-7 of the General Provisions.

f. In view of the foregoing, the Subcontractor is encouraged to plan his work so as to minimize the transfer of equipment into and out of the construction area.

SC-9 SUBMITTALS

Pursuant to the provisions of Specification Section 01300H, the Subcontractor shall submit samples of materials, schedules and reports, shop drawings, product data, manufacturer's instructions, and design calculations and design drawings to the Contractor.

SC-10 QUALITY ASSURANCE

All work shall be performed to the requirements of the Contractor's Quality Assurance Program. This program meets the requirements of 10 CFR 50 Appendix B and ANSI/ASME NQA-1-79. The program will be wholly administered by the Contractor. All Quality Records will be generated by and maintained by Contractor's personnel.

SC-11 PERMITS

A. The Contractor will provide the following permits and notifications as required for the Work and activities specified in the Subcontract Documents, except as noted below in Article SC-11.B:

1. National Pollutant Discharge Elimination System (NPDES) Permit
(U.S. - Environmental Protection Agency)

2. Threatened or Endangered Species Consultation
(U.S. Fish and Wildlife Service)

3. Cultural Resource Clearance
(Bureau of Indian Affairs, Utah State Historic Preservation Officer, Navajo Nation)

4. Access and Borrow Permit (Sand and Gravel Permit) for the RB-4/RB-7 Borrow Site (Radon Barrier), and Shadow Mountain Quarry (Riprap Materials)
(Bureau of Indian Affairs and Navajo Nation)

5. Consigned Water Service Contract - for withdrawal of up to 104 acre-feet of water from the San Juan River (U.S. Bureau of Reclamation)

6. Approval of Well Sealing and Abandonment (Navajo Division of Water Resources)

7. Revocable Use Permits - for temporary construction areas and water pipeline, as required (Bureau of Indian Affairs)

8. Temporary Water Diversion Permit (Utah State Engineer's Office)

9. Air Quality Notice of Intent (U.S. Environmental Protection Agency)

B. All other permits and notifications, including but not limited to the following, as required, shall be the responponsibility of the Subcontractor in accordance with Article GP-13 of the General Provisions. The Subcontractor shall submit to the Subcontract Administrator a copy of each permit prior to initiation of any work related to the permit:

1. Well Abandonment Reports (Navajo Division of Water Resources)

2. Water Well Drilling Permit, if required. (Navajo Division of Water Resources)

3. State Highway Encroachment Permits - for turnoffs into the tailings site and quarries (Utah Department of Transportation)

4. Review of Transportation on State Highways (Utah Department of Transportation)

5. Right of Way for Navajo Road Encroachment/ Modifications (Bureau of Indian Affairs and Navajo Nation)

6. Air Quality Approval Order(s) - for rock crusher and screening equipment (Utah Bureau of Air Quality)

7. Spill Prevention Control and Countermeasures Plan - for on-site fuel/oil storage if required (U.S. Environmental Protection Agency)

8. Notification and Request for Identification Number - for quarry and borrow operations (Mine Safety and Health Administration)

C. The Contractor will provide the required modifications, permits and agreements for the use of the borrow areas and quarries shown on the Subcontract Drawings. If the Subcontractor elects to use borrow areas, quarries, or access roads other than those shown on the Subcontract Drawings, the Subcontractor shall be responsible for obtaining or determining that the owner/operator of an existing borrow pit has obtained all required permits and notifications for the use and operation of such borrow areas, quarries and access roads in accordance with the requirements of Article GP-13 of the General Provisions.

D. The Subcontractor shall comply with the provisions of the permits at all times during the execution of the Subcontract. The Contractor, upon request from the Subcontractor, will make available to the Subcontractor the permits and approvals obtained by the Contractor.

E. Separate measurement or payment will not be made for work required of the Subcontractor for obtaining additional permits and for compliance with the provisions of all permits, unless specifically provided for in this Subcontract. All costs in connection with obtaining such permits and for compliance with such permits will be considered incidental to the Subcontract.

SC-12 SUBCONTRACTOR LABOR AND EQUIPMENT RATES

A. Within 15 days after receipt of Notice to Proceed, the Subcontractor shall furnish to the Contractor a list of all equipment to be used on the Project. The list, as a minimum, shall include the following for each piece of equipment:

1. Equipment number, make, model, type, year of manufacture, capacity and/or horsepower.

2. Rental rates for hourly, daily, weekly and monthly time periods. These rates shall include overhead and profit, but shall not exceed 60% of the current edition of the Rental Rate Blue Book for Construction Equipment.

3. An hourly operating rate for fuel, oil, parts, maintenance and repairs, etc. for actual hours of operation only. Each rate shall be listed separately, and shall include appropriate overhead and profit but shall not include the equipment operator.

4. The above information shall also be provided for any subsequent equipment brought onto the site during the term of the Subcontract in addition to the initial list, and shall be provided within five days of the date the equipment arrives.

5. The initial equipment rate list submittal above shall be valid for all pieces of equipment from its receipt until January 1 of the following year.

6. The equipment rate list shall be revised on January 1 of each year with the current Blue Book rates. These rates shall be used until the equipment rate list is revised on January 1 of the following year.

B. Within 15 days after receipt of Notice to Proceed, the Subcontractor shall furnish to the Contractor labor rates including premium time for all craft designations to be used on the Project as follows:

1. List craft category and classification (i.e., loader operator, 6 cy; truck driver, 3 axle; etc.).

2. Labor cost rate including fringe benefits, payroll, taxes, insurance, overhead and profit.

3. Each item in 2 above shall be listed separately.

C. The rates provided in Paragraphs A and B above shall be used for changes to the Subcontract where unit prices or other methods of pricing do not apply and shall be used solely at the discretion of the Contractor. The intent is that for small changes where there is little risk to the Subcontractor such rates are appropriate. For larger changes, unit pricing or other appropriate methods will be used which will allow more appropriate profit margins.

D. In the event the Contractor directs the Subcontractor to work overtime in addition to the Subcontractor's original intended schedule, the Contractor will pay (except in states where such a requirement is prohibited by law) only the actual labor cost over the rate of regular time plus actual payroll burdens (applicable taxes, fringes, benefits, etc.).

SC-13 MODIFICATION PROPOSALS PRICE BREAKDOWN

The Subcontractor, in connection with any proposal he makes for a Subcontract modification, shall furnish a

price breakdown, itemized as required by the Subcontract Administrator. Unless otherwise directed, the breakdown shall be in sufficient detail to permit an analysis of all material, labor, equipment, subcontract, and overhead costs, as well as profit, and shall cover all work involved in the modification, whether such work was deleted, added or changed. Any amount claimed for subcontracts shall be supported by a similar price breakdown and/or quotes from the Subcontractors. In addition, if the proposal includes a time extension, a justification therefore shall be furnished. The proposal, together with the price breakdown and time extension justification, shall be furnished by the date specified by the Subcontract Administrator.

SC-14 VARIATIONS IN QUANTITIES

In all cases, except cancellation of one or more line items, where the quantity of a unit priced line item in the Subcontract is an estimated quantity, and where the actual quantity of such line item varies by more than 10% above or 10% below the originally estimated quantity stated in the Subcontract, an adustment in unit price shall be negotiated upon demand of either party for the quantities above or below the stated variation.

SC-15 LAWS AND REGULATIONS

Subcontractor shall give all notices and comply with all laws, ordinances, rules and regulations applicable to the Work. If Subcontractor observes that the Specifications or Subcontract Drawings are at variance therewith, Subcontractor shall give Contractor prompt written notice thereof, and any necessary changes shall be adjusted by an appropriate Modification. If Subcontractor performs any Work knowing or having reason to know that it is contrary to such laws, ordinances, rules and regulations, and without such notice to Contractor, Subcontractor shall bear all costs arising therefrom; however, it shall not be Subcontractor's primary responsibility to make certain that the Specifications and Subcontract Drawings are in accordance with such laws, ordinances, rules and regulations.

SC-16 REMEDIAL ACTIONS ON LANDS OF INDIAN TRIBES

A. Pursuant to Section 105 of Public Law 95-605, the Uranium Mill Tailings Radiation Control Act of 1978 and the Co-

operative Agreement between the United States Department of Energy and the Navajo Nation, whenever remedial actions are required to be performed on sites located on lands belonging to Indian Tribes, all Subcontractors shall make full use of any local qualified members of Indian Tribe residents in the vicinity of the mill tailings site, vicinity properties, and designated disposal areas for remedial action performed on reservation lands.

B. The Subcontractor shall submit with his proposal a plan for assuring the maximum utilization of local Indian labor as referenced above.

SC-17 FUNDING LIMITATIONS

A. Of the total Subcontract Price, the sum of $_____ is presently available for payment to the Subcontractor under this Subcontract during fiscal year ____. It is anticipated that additional funds will be allotted from time to time to this Subcontract subject to Government appropriations available in this fiscal year or succeeding fiscal years. The responsibilities of Contractor are limited by this clause notwithstanding any contrary provision of the "Payments to Subcontractors" clause or any other clause of this Subcontract.

B. The Subcontractor agrees to perform or have performed work up to the point at which, in the event of termination of this Subcontract pursuant to the clause hereof entitled "Termination for Convenience", the total amount payable by the Contractor (including amounts payable in respect of lower-tier subcontracts and settlement costs), pursuant to paragraph E thereof, would in the exercise of reasonable judgment by the Subcontractor approximate the total amount at the time allotted to this Subcontract. The Contractor shall not be obligated in any event to pay or reimburse the Subcontractor in excess of the amount from time to time allotted to this Subcontract, anything to the contrary in this clause or the clauses hereof entitled "Termination for Convenience" as specified in Article GP-18 and "Payments to Subcontractors" as specified in Article GP-8 of the General Provisions notwithstanding.

C. It is contemplated that funds presently allotted to this Subcontract will cover the work to be performed until _____. In the event funds allotted are considered by the Subcontractor to be inadequate to cover the work to be performed until the above date, the Sub-

contractor shall notify the Subcontract Administrator when the work will reach a point at which, in the event of termination of this Subcontract pursuant to the clause hereof entitled "Termination for Convenience", the total amount payable by the Contractor (including amounts payable in respect of lower-tier subcontracts and settlement costs) pursuant to paragraph E thereof, will approximate 85% of the total amount then allotted to this Subcontract. Such notice shall be in writing and shall be given not less than 45 days nor more than 60 days prior to the estimated date when such point will be reached. Such notice shall also state the estimated amount of additional funds required to continue performance to the above stated date. The Subcontractor shall, 30 days prior to the date above stated, advise the Subcontract Administrator in writing as to the estimated amount of additional funds which will be required for the timely performance of this Subcontract for the balance of the current fiscal year and the succeeding fiscal year. If after such latter notification, additional funds are not allotted by the date above written or by an agreed date in substitution thereof, the Subcontractor, by written notice delivered to the Subcontract Administrator at any time before such additional funds are allotted, may elect to treat its responsibility to proceed with the work under this Subcontract as having been terminated. Such a termination shall be considered a termination pursuant to the clause hereof entitled "Termination for Convenience".

D. The Contractor may at any time prior to the Subcontractor's election to terminate as provided in Paragraph C above, and with the written consent of the Subcontractor after such election to terminate, allot additional funds for continued performance of this Subcontract. The Subcontract Administrator will promptly notify the Subcontractor in writing, of any such allotment and the parties shall: (a) agree on the applicable period of Subcontract performance which shall be covered by such funding; (b) modify the date stated in Paragraph C. above in order to reflect such extended period of coverage; and (c) modify the amount stated in Paragraph A. above. The provisions of Paragraphs B and C, above, shall apply to such additional allotted funds and modified date.

E. In the event the Subcontractor incurs additional costs, or is delayed in the performance of the Work under this Subcontract, solely by reason of the failure of the Contractor to allot additional funds pursuant to Paragraph D above in amounts sufficient for the timely performance of this Subcontract, and if additional funds are allotted by

the Contractor pursuant to Paragraph D for continued performance of this Subcontract, than an equitable adjustment may be made in the Subcontract Price (including appropriate target, billing and ceiling prices where applicable) or in the time required for the performance of the work, or both, and this Subcontract may be modified in writing accordingly; provided, that the Subcontractor provides to the Subcontract Administrator written notice of its claim of entitlement to an equitable adjustment prior to the date then stated in Paragraph C.

F. Nothing in this clause shall affect the right of the Contractor to terminate this Subcontract pursuant to the clause of this Subcontract entitled "Termination for Convenience".

SC-18 CERTIFIED PAYROLLS

In addition to the copies of certified payrolls that are to be submitted each week to the Subcontract Administrator, one copy will also be submitted to the Site Manager.

SC-19 SUBCONTRACTOR'S LIABILITY

The Subcontractor has total liability for all of his own equipment, supplies, tools, etc., brought on the job site or used in the performance of his Subcontract.

SC-20 MEASUREMENT AND PAYMENT

A. Unless otherwise provided in the Subcontract Documents, no separate measurement or payment will be made for compliance with the provisions of the General Provisions, General Conditions and Special Conditions. Full compensation for such work will be considered to be included in the related items of Bid Schedule or incidental to the Subcontract.

B. Payment for the cost of premiums paid by the Subcontractor to obtain performance and payment bonds will be as specified in Article GP-8.E of the General Provisions. The Subcontractor shall quote the price for the premiums by the lump sum in the Bid Schedule 00310HM.

END OF SECTION 00800H

Specifications

Division 1
General Requirements

SECTION 01010H

SUMMARY OF WORK

PART 1 - GENERAL

1.1 DESCRIPTION OF THE PROJECT

A. Project Location: The Mexican Hat site is approximately five miles north of the Utah-Arizona border just southwest of Mexican Hat, Utah and lies within the Navajo Reservation. Major topographic features of the area include the San Juan River in the north and Alhambra Rock to the west. The topography slopes toward the northeast. The site is at 37° 07' 54" north latitude, and 109° 52' 30" west longitude (T42S and R18E).

B. Construction site access will be granted via an existing access road located northwest of the upper pile.

1.2 SCOPE OF WORK

A. General:

1. The Work is generally described as site work related to the excavation of contaminated residual radioactive materials from the upper tailings pile, and windblown areas of the abandoned uranium mill, and placement of these materials in tailings embankment over the lower tailings pile with a protective cover. The Work is outlined in Article 1.2.B below. Such Work is more fully detailed in the Specifications and Subcontract Drawings included herein.

2. The Work includes furnishing all plant, labor, tools, equipment, materials, transportation, and services, and performing all operations necessary for and properly incidental to the construction as shown and noted on the Subcontract Drawings and as specified in these Specifications.

B. The Work Includes:

1. Mobilization: See Section 01019H.

2. Construction Facilities: Construction, operation, maintenance, and removal of construction facilities include, but are not limited to, the following as specified in Section 01500H and other sections:

   a. Subcontractor's Office
   b. Contractor's Office
   c. Parking Areas
   d. Janitorial Services
   e. Snow Removal Services
   f. Temporary Roads
   g. Storage of Materials and Equipment
   h. Construction Equipment
   i. Temporary Sanitary Facilities
   j. Temporary Electric Power
   k. Temporary Water
   l. Decontamination System
   m. Temporary Heat
   n. Temporary Telephone Service
   o. Temporary Fences

3. Temporary Controls: Temporary controls shall include dust control, noise control, pollution control, water control, and access, traffic and safety controls as specified in Section 01560H.

4. Permanent Facilities: Permanent facilities shall include construction of permanent features including, but not limited to, the following:

   a. Disposal of existing stockpiles of demolished materials and debris.

   b. Demolition and disposal of structures specified in Section 02050H.

   c. Construction of tailings embankment.

   b. Construction of permanent drainage ditches.

   c. Finish grading.

   d. Sealing monitor wells.

C. The above description of the Work is for general information only, and in no way limits the responsibility of the Subcontractor for completing the Work in strict accordance with the Subcontract Drawings and Specifications listed in the Table of Contents.

D. Environmental Observations: The Work shall be performed in strict accordance with the applicable requirements of EPA, Navajo Nation, and other involved state and federal agencies having jurisdiction, and in accordance with the requirements of General Provisions, General Conditions and Special Conditions.

1.3 CONSTRUCTION SEQUENCE

A. Unless otherwise specified, directed, or modified, the Subcontractor shall follow the sequence of operations as set forth below. Full compensation for conforming to such requirements will be considered as included in the related Bid Schedule items of Work and no additional compensation will be allowed therefor.

B. Meetings will be conducted between the Contractor and Subcontractor prior to starting each sequence of construction listed below. The intent of these meetings is to review and discuss specification requirements for that particular sequence of construction. During these meetings, the Subcontractor shall present a construction plan that will outline and detail the equipment, personnel, schedule, and source, transportation, excavation, placement and compaction of materials proposed for each construction sequence as applicable.

C. The sequence of operations:

1. Mobilization as specified in Section 01019H.

2. Construction facilities as specified in Section 01500H.

3. Temporary controls as specified in Section 01560H.

4. Sealing of monitor wells as specified in Section 02090H.

5. Construction of the tailings embankment. Construction operations will consist of excavation of upper tailings pile and north portion of lower tailings pile, excavation of contaminated off-pile materials and windblown and water-borne areas, placement and compaction of the excess excavated materials and demolished materials from the existing stockpile on the mill site into the tailings embankment. As the embankment construction nears its end, the dikes in the retention basin will be demolished and placed

within the tailings embankment along with any contaminated sediment settled in the retention basin, spillway and the drainage ditch areas.

6. Construction of the radon barrier cover over the contaminated material in the tailings embankment. The cover shall consist of selected uncontaminated material obtained from designated borrow areas. The entire thickness of the radon barrier will be mixed with bentonite.

7. Placing erosion protection materials over the radon barrier cover. The erosion protection materials consist of a layer of bedding material topped by a layer of rock riprap.

8. Construction of aprons and permanent drainage ditches at the base of the tailings embankment.

9. Final site grading can proceed concurrently with the construction of the permanent drainage ditches.

10. Site Cleanup: Removal and disposal of stockpiled materials and closing of the borrow sites.

11. Site Restoration: Grading of the site and the borrow areas to provide drainage including placement of uncontaminated fill, and conditioning for natural revegetation.

1.4 BORROW AREA LOCATION

A. The following potential borrow areas are identified and shown on the Subcontract Drawings:

1. Borrow areas RB-4 and RB-7 are located approximately five miles south of the Site.

2. Shadow Mountain Rock quarry site is located approximately 160 miles southwest of the Site.

3. Nielson Sand and Gravel borrow pit is located near Bluff, Utah approximately 26 miles northeast of the Site.

1.5 SUBCONTRACT DRAWINGS

A. A list of Subcontract Drawings and Titles is provided in the Table of Contents of these Subcontract Documents under "Subcontract Drawings".

B. Where "as shown," "as detailed," "as noted," or words of like meaning are used in the Subcontract Documents, it shall be understood that reference is being made to the Subcontract Drawings unless otherwise specified.

1.6 TIME OF COMPLETION

A. The Subcontractor shall commence Work under this Subcontract within five (5) calendar days from receipt of Notice to Proceed, and shall complete the Work within 730 calendar days of the date of start of Work.

B. Termination for default, damages for delay and time extensions are specified in Article GP-6 of General Provisions.

1.7 OTHER SUBCONTRACTS

A. Following subcontract may be awarded by the Contractor at a later date and may be in progress during the term of this Subcontract. The Contractor or his authorized representative will be responsible for coordinating all activities between the subcontractors in accordance with the requirements of Article SC-5 of the Special Conditions.

1. Installation, operation, maintenance and removal of the wastewater treatment plant at the processing site.

1.8 CODES AND STANDARDS

A. Pursuant to Section GC-3 of the General Conditions, any material, method, or procedure specified by reference to the number, symbol, or title of a specific specification or standard, such as a Commercial Standard, American National Standard, Federal or State Specification, Industry or Government Code, a trade association code or standard, or other similar standard, shall comply with the requirements in the latest revision thereof and any amendments or supplements thereto in effect on the date of Award of the Subcontract, except as limited to type, class or grade, or modified in such reference.

B. The code, specification or standard referred to, except as modified in these Specifications, shall have full force and effect as though printed in these Specifications. These Specifications and standards are not furnished to bidders because manufacturers and trades involved are assumed to be familiar with their requirements. The Contractor will furnish, upon request, information as to how copies of the specifications and standards referred to may be obtained.

1.9 MANUFACTURERS' SPECIFICATIONS AND INSTRUCTIONS

A. Unless otherwise indicated or specified, all manufactured materials, products, processes, equipment, or the like shall be installed or applied in accordance with the manufacturers' instructions, directions, or specifications. Said installation or application shall be in accordance with printed instructions furnished by the manufacturer of the material or equipment concerned for use under conditions similar to those at the jobsite. Two copies of such instructions shall be furnished to the Contractor and his acceptance thereof obtained before work is begun.

B. Any deviation from the manufacturers' printed recommendations shall be explained and acknowledged as correct for the circumstances, in writing by the particular manufacturer. Subcontractor will be held responsible for all installations contrary to the manufacturers' recommendations. If any item of material or equipment is found to be installed not in accordance with the manufacturer's recommendations, Subcontractor shall make all changes necessary to achieve such compliance without additional cost to the Contractor.

1.10 WORK QUALITY

A. Shop and field work shall be performed by qualified mechanics and craftsmen. All work on this Project shall be performed in accordance with the best practices of the various trades involved and in accordance with the Subcontract Drawings, reviewed shop drawings, and these Specifications.

B. All Work shall be erected and installed plumb, level, square and true, or true to indicated angle, and in proper alignment and relationship to the work of other trades. All finished work shall be free from defects and damage.

C. The Contractor reserves the right to reject any materials and work which are not considered to be up to the highest standards of the various trades involved. Such inferior material or work quality shall be repaired or replaced, as directed, at no additional cost to the Contractor.

1.11 FIELD MEASUREMENT AND TEMPLATES

Subcontractor shall secure all field measurements required for proper and accurate fabrication and installation of the work included in this Subcontract. Exact measurements are the Subcontractor's responsibility. Subcontractor shall also furnish or obtain all templates, patterns, and setting instructions required for the installation of all work. All dimensions shall be verified by the Subcontractor in the field.

1.12 ACCESS TO WORK

A. Pursuant to the provisions of Article GP-11 of the General Provisions, the authorized agents of the following agencies will also have the right of access to inspect the Work covered by these Subcontract Documents during the performance of this Subcontract:

1. United States Department of Energy (DOE)

2. United States Nuclear Regulatory Commission (NRC)

3. Navajo Nation

4. Various agencies listed in Article SC-11 of Section 00800H.

B. The inspections will be performed in conjunction with an inspection by the Contractor. Reasonable facilities for the proper handling and inspection of any documents, and the Work shall be furnished by the Subcontractor.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

(Not Used)

PART 4 - MEASUREMENT AND PAYMENT

(Not Used)

END OF SECTION 01010H

SECTION 01019H

MOBILIZATION

PART 1 - GENERAL

1.1 SCOPE

A. This Specification Section covers the following:

1. Organization and mobilization of Subcontractor's forces and equipment;

2. Transporting construction plant and equipment to the site and setting up of same;

3. Transporting tools, materials, and equipment to the site; and

4. Furnishing, installation, construction, maintenance, operation, and subsequent removal and disposal of construction facilities (including existing facilities) not separately paid for under other Sections of Subcontract Documents but required for construction of permanent facilities.

5. Subsequent removal of construction equipment, materials, and supplies; decontamination of equipment and facilities; cleaning of equipment for salvage; cleaning of the site; and restoration and reseeding of the offiste construction facilities.

1.2 RELATED WORK

A. Section 01500H - Construction Facilities

B. Section 01560H - Temporary Controls

C. Section 01561H - Construction Cleaning

1.3 DESCRIPTION

A. Mobilization shall include:

1. Furnishing, installation/construction of construction facilities identified in Article 1.1.A.4 above, and mobilization of all construction equipment, materials,

supplies, appurtenances, and the like, manned and ready for commencing and performing the Work.

2. Assembly and delivery to the site of plant, equipment, materials, and supplies necessary for the performance of the Work but which are not intended to be incorporated in the work; the preparation of the Subcontractor's work area; the complete assembly, in working order, of equipment necessary to perform the required work; personnel services preparatory to commencing actual work; and all other preparatory work required to permit commencement of the actual work on construction items for which payment is provided under the Subcontract.

3. Decontamination of construction facilities, equipment, materials, supplies, appurtenances; and cleaning of equipment for salvage.

4. Subsequent removal from the site of all construction equipment, materials, supplies, appurtenances, control measures, and the like upon completion of the Work.

5. Maintenance, operation, subsequent removal and disposal of construction facilities identified in Article 1.1.A.4 above, as required by the Contractor; cleaning of the site; and restoration and reseeding of offsite construction facilities.

6. Maintenance of existing fences.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

(Not Used)

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

Measurement for payment for mobilization will be by the lump sum basis.

4.2 PAYMENT

A. Payment for mobilization will be made at the lump sum price quoted therefor in the Bid Schedule, and shall include all items except as specified herein. Payment will be made as follows:

1. Payment of 50 percent of the lump sum price will be made upon completion of "move-in". Move-in is defined as organization of the Subcontractor's manpower and equipment, transporting equipment to the site, and installation of Subcontractor's field office and other supporting structures.

2. Payment of the remaining 50 percent of the lump sum price will be made upon completion of work corresponding to 10 percent of the total price quoted in the Bid Schedule exclusive of the price quoted for mobilization.

B. Payment for furnishing, installing, operating, maintaining, decontaminating, removing and disposal if required, of construction facilities not specifically included for payment under any other Bid Items will be considered to be included in the Bid Schedule item for Mobilization.

END OF SECTION 01019H

SECTION 01025H

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 SCOPE

A. This Specification Section covers descriptions of measurement and payment as they apply to this Subcontract. The provisions of this Section shall be supplemental to the requirements specified in General Provisions, General Conditions and Special Conditions.

B. Measurement methods specified in the individual Sections of these Specifications shall govern if they differ from methods specified in this Section.

C. The Subcontractor shall compute all quantities. Where necessary, such computations will be based upon surveys performed by the Subcontractor.

1.2 RELATED WORK

A. General Provisions - Article GP-8: Payments to Subcontractor

B. General Conditions - Section GC-4B: Progress Payment

C. Section 00800H - Special Conditions: Article SC-14, Variations in Quantities

D. Section 01052H - Layout of Work and Surveys

E. Section 01300H - Submittals: Schedule of Values and Progress Payment Schedule

1.3 MEASUREMENT OF QUANTITIES

A. Measurement Standards: All work to be paid for at a Contract price per unit of measurement will be measured in accordance with United States Standard Measures. A ton shall consist of 2,000 pounds avoirdupois.

B. Measurement by Weight:

1. Reinforcing steel, steel shapes, castings, miscellaneous metal, metal fabrications, and similar items, to be paid for by weight, shall be measured by scale or by handbook weights for the type and quantity of material actually furnished and used.

2. Material to be measured and paid for by scale weight shall be weighed on accurate, Contractor-approved scales, furnished by and at the expense of the Subcontractor. Use platform scales of sufficient size and capacity to permit the entire vehicle or combination of vehicles to rest on the scale platform while being weighed. Combination vehicles may be weighed as separate units provided they are disconnected while being weighed. All scales shall be inspected and certified as often as the Contractor may deem necessary to ascertain accuracy. Costs incurred, as a result of regulating, adjusting, testing, inspecting, and certifying scales, shall be borne by the Subcontractor.

3. The Contractor may be present to witness the weighing and to check and compile the daily record of such scale weights; however, in any case, the Contractor will require that the Subcontractor furnish weigh slips and daily summary weigh sheets. A duplicate weigh slip or a load slip for each vehicle weighed shall be delivered to the Contractor at the point of delivery of the material.

4. If the material is shipped by rail, the certified car weights will be accepted, provided that only actual weight of material will be paid for and not minimum car used for assessing freight tariff. Car weights will not be acceptable for material to be passed through mixing plants.

5. Trucks used to haul material being paid for by weight, shall be weighed empty daily and at such additional times as the Contractor may require. Each truck shall bear a plainly legible identification mark. The Contractor may require the weight of the material verified by weighing empty and loaded trucks on such other scales as the Contractor may designate.

C. Measurement By Volume:

1. Measurement by volume will be by the cubic dimension listed or indicated in the Bid Schedule. Method of

volume measurement will be as specified in the Specifications or as determined or directed by the Contractor.

2. When material is to be measured and paid for on a volume basis and it is impractical to determine the volume by the specified method of measurement, or when requested by the Subcontractor in writing and accepted by the Contractor in writing, the material will be weighed in accordance with the requirements specified for weight measurement. Such weights will be converted to volume measurement for payment purposes. Factors for conversion from weight measurement to volume measurement will be determined by the Contractor and shall be agreed to by the Subcontractor before such method of measurement of pay quantities will be accepted.

D. Measurement by Area: Measurement by area will be by the square dimension listed or indicated in the Bid Schedule. Method of square measurement will be as determined or directed by the Contractor.

E. Linear Measurement: Linear measurement will be by the linear dimension listed or indicated in the Bid Schedule. Method of linear measurement will be as determined or directed by the Contractor. Generally, items, components, or work to be measured will be measured at the centerline of the item in place.

F. Lump-Sum Measurement:

1. Lump-sum measurement will be for the entire item, unit of work, structure, or combination thereof, as listed or indicated in the Bid Schedule.

2. If the Subcontractor requests progress payments for lump-sum items or amounts in the Bid Schedule, such progress payments will be made in accordance with a Schedule of Values for that item as specified in Section GC-4B of the General Conditions and Article SC-12 of the Special Conditions.

1.4 FIELD MEASUREMENT FOR PAYMENT

A. The Subcontractor shall compute all quantities of Work performed or of materials and equipment delivered to the site, for payment purposes.

B. The Subcontractor shall assist the Contractor in the taking of measurements by providing all equipment, workers, and survey crews, as required, for verification of quantities by the Contractor in accordance with the provisions of Section 01052H of these Specifications.

C. All such assistance in measurement services required of the Subcontractor, as specified, shall be performed under the direction and supervision of the Contractor.

1.5 PAYMENT

A. Payment will be full compensation for furnishing all labor, materials, tools, equipment, transportation, services, and incidentals, as specified, in Article GP-8 of the General Provisions and Section GC-4B of the General Conditions, and for performing all work necessary for completing the erection or installation of the item or work classification, including all adjusting and balancing, testing, cleaning, and all other incidental work.

B. Full compensation for all expense involved in conforming to the requirements for measuring materials or work shall be considered as included in the unit or lump-sum prices paid for the materials or work being measured, and no additional compensation will be permitted therefor.

1.6 VALUES OF UNIT PRICES

A. The number of units and quantities contained in the Bid Schedule are approximate only, and final payment will be made for the actual number of units and quantities which are incorporated in or made necessary by the Work included in this Subcontract.

B. In the event that work and/or materials or equipment are required to be furnished to a greater or lesser extent than is indicated by the Subcontract Drawings and Specifications, such work and/or materials or equipment shall be furnished in greater or lesser quantities, and the adjustment in unit price shall be made as specified in Article SC-14 of the Special Conditions.

1.7 REJECTED MATERIALS

Quantities of material wasted or disposed of in a manner not called for under the Subcontract; rejected loads of material, including material rejected after it has been placed by reasons of the failure of the Subcontractor to conform to the provisions of the Subcontract; material not unloaded from the transporting vehicle; material placed outside the limits indicated on the Subcontract Drawings or established by the Contractor; or material remaining on hand after completion of the Work, will not be paid for, and such quantities shall not be included in the final total quantities. No compensation will be permitted for loading, hauling, and disposing of rejected material.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

(Not Used)

PART 4 - MEASUREMENT AND PAYMENT

(Not Used)

END OF SECTION 01025H

SECTION 01052H

LAYOUT OF WORK AND SURVEYS

PART 1 - GENERAL

1.1 SCOPE

A. This Specification Section covers the procedures and accuracy requirements for survey services for layout of work and field measurement of work quantities for payment to be determined by surveys.

B. Before commencing any layout of work and surveys, the Subcontractor shall give the Contractor five working days written notice in advance so that the Contractor may witness such work.

1.2 DESCRIPTION

A. Reference Points: The reference points to be provided by the Contractor will include referenced monuments and elevation bench marks in the vicinity of the project. Initial reference points will be furnished by the Contractor. Replacement of such reference points, if required, by the Contractor will be charged to the Subcontractor at a rate of $150 per hour. All other necessary reference points shall be established by the Subcontractor.

B. The Subcontractor shall furnish all necessary detail surveys including all lines, grades, and appropriate surveys as specified.

C. The Contractor reserves the right to perform any desired checking and/or correction of the Subcontractor's surveys but this shall not relieve the Subcontractor of responsibility for the adequate performance of the Work.

D. Equipment and Personnel: The Subcontractor's instruments and other survey equipment shall be accurate, suitable for the surveys required in accordance with recognized professional standards, and in proper condition and adjustment at all times.

E. Field Notes and Records: The Subcontractor shall record surveys in duplicate page field notebooks. The original pages of such records shall be furnished to the Contractor at intervals required by the Contractor. A duplicate of

each field notebook shall be furnished to the Contractor when filled or completed.

F. Use by the Contractor: The Contractor may at any time use line and grade points and markers established by the Subcontractor. The Subcontractor's surveys are a part of the Work and may be checked by the Contractor or representatives of the Contractor at any time. The Subcontractor shall be responsible for any lines, grades, or measurements which do not comply with specified or proper tolerances, or which are otherwise defective, and for any resultant defects in the Work. The Subcontractor will be required to conduct re-surveys or check surveys to correct errors indicated by review of the field notebooks or otherwise detected.

1.3 SURVEYS FOR LAYOUT AND PERFORMANCE

The Subcontractor shall perform all surveys for layout and performance of the Work, and shall reduce the field notes and make all necessary calculations and drawings necessary to carry out the Work.

1.4 SURVEYS FOR MEASUREMENT FOR PAYMENT

When the Specifications or the Contractor require Bid Schedule items of work to be measured by surveying methods, the Subcontractor shall perform the surveys. All such surveys, including control surveys run for establishing the measurement reference lines, shall be performed in the presence of the Contractor (or a representative of the Contractor) who will witness the surveying operation by signing the field notes or keeping duplicate field notes, at the Contractor's option. The Subcontractor shall reduce the field notes and calculate final quantities for payment purposes. A duplicate of the note reductions and calculations shall be given to the Contractor.

1.5 SURVEYING ACCURACY AND TOLERANCES IN LAYOUT OF SURVEY STAKES

A. Tolerances in layout of Work shall not exceed the following:

Type of Line or Mark	Horizontal Position	Elevation
Permanent reference points	1 in 10,000	± .01 ft.
General Excavation and earthwork	1 in 2,000	± .10 ft.

B. Tolerances for designed thicknesses shown on Subcontract Drawings with the exception of erosion protection materials, and for elevations shown on the Subcontract Drawings shall be ± 0.10 foot. Tolerances on erosion protection material thicknesses are specified in Section 02278H.

C. These tolerances shall not supersede stricter tolerances required by the Subcontract Drawings or Specifications, or by the governing authorities, and shall not otherwise relieve the Subcontractor of responsibility for measurement in compliance therewith.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

(Not Used)

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

Separate measurement for payment will not be made for work required under this Section.

4.2 PAYMENT

Separate payment will not be made for work required under this Section. All costs in connection with the work specified herein will be considered to be included in the related item of work in the Bid Schedule, or incidental to the Subcontract.

END OF SECTION 01052H

SECTION 01300H

SUBMITTALS

PART 1 - GENERAL

1.1 DESCRIPTION

A. This Specification Section describes the requirements for the following submittals:

1. Technical Submittals:

   a. Schedule of Technical Submittals
   b. Shop Drawings
   c. Samples
   d. Product Data
   e. Manufacturer's Instructions
   f. Design Calculations and Design Drawings
   g. Winter Shutdown Plan

2. General Submittals:

   a. Schedule of General Submittals
   b. Site Mobilization Schedule
   c. Project Construction Schedule
   d. Schedule of Values/Cost Profile
   e. Labor and Equipment Rates

3. Submittals Not Requiring Approval:

   a. Weekly Status Reports
   b. Weekly Manhour Reports/Employee Roster
   c. Certified Payroll
   d. Monthly Schedule Updates

B. The requirements specified in this Section shall be supplemental to the requirements specified in General Provisions, General Conditions, Special Conditions and any other requirements specified in individual sections.

C. All submittals shall be in the English language.

D. The Subcontractor shall submit all submittals to the Site Manager. A copy of the submittal, marked "Information Only," shall be sent to the Subcontract Administrator by the Subcontractor.

E. Technical and General Submittals shall be numerically serialized by type, Technical Submittal with a "T" prefix (T-1, T-2, T-3, etc.) and General Submittals with a "G" prefix (G-1, G-2, G-3, etc.).

F. The Site Manager will clearly label the submittals as follows and return to the Subcontractor:

1. Approved
2. Approved as Noted
3. Revise and Resubmit
4. Rejected
5. Information Only

G. When submittals are returned marked with either "Revise and Resubmit" or "Rejected" the Subcontractor shall make such revisions and corrections as required and resubmit the submittal with the same submittal number followed by R1 (Revision One). Example: T-5 - R1.

1.2 TECHNICAL SUBMITTALS

A. Schedule of Technical Submittals:

1. The Subcontractor shall prepare and submit a Technical Submittals Schedule listing all technical submittals required per this Section.

2. The Technical Submittals Schedule shall separate submittals by major specification section. This schedule shall include submittal delivery dates, required return dates, material delivery dates, and other pertinent data which may be required to ensure that the project schedule is met by the Subcontractor.

3. This Schedule shall be continually updated to reflect progress and any additions or deletions to the submittal schedule. Copies of the updated schedule shall be furnished to the Contractor during the first week of each calendar month.

B. Shop Drawings:

1. Shop drawings shall establish the actual detail of all manufactured or fabricated items, indicate proper relation of adjoining work, and incorporate minor changes of design or construction to suit actual conditions. Shop drawings shall be drawn to scale and shall be completely dimensioned.

2. Sheet sizes of shop drawings shall be 8 1/2 inches x 11 inches, 11 inches x 17 inches, or 22 inches x 34 inches.

3. A clear space of 3 inch by 3 inch shall be provided on each drawing for the Contractor's review stamp and comments.

4. Shop drawings shall be submitted to the Contractor in the form of a reproducible transparency, together with three blackline or blueline prints.

5. After the Contractor has completed his review of shop drawings, he will return one print to the Subcontractor indicating the approval status as described in Article 1.1.D.

6. The Contractor will review and generally return shop drawings within ten days of receipt by the Site Manager but in no case will this process take longer than 30 days.

C. Samples:

1. The Subcontractor shall furnish the Contractor at least three samples of each of the various materials, together with the finish thereon, as specified for and intended to be used on or in the work. Samples shall be sent to the Contractor.

2. The Subcontractor shall submit all samples to the Contractor at least 21 days before purchasing, fabricating, applying, or installing such materials and finishes, unless otherwise stated. The Contractor will review the samples for visual aspects such as kind, color, pattern, and texture, and will approve or ask for resubmittal of samples generally within 10 days but in no case longer than thirty days of the Subcontractor's submittal. All approvals of samples will be given by the Contractor in writing.

3. Unless otherwise specified in the various sections of these specifications, the Subcontractor shall submit all samples, other than field samples, in triplicate. A cover letter shall accompany the sample and shall list all items being transmitted, designating their particular usage and location in the project.

4. After the Contractor has performed his review and analysis of samples, two samples will be retained and

the remaining sample will be returned to the Subcontractor, with the Contractor's comments.

5. Samples shall be submitted and resubmitted until approved as satisfactory. Approval of a sample shall not be taken in itself to change or modify any Subcontract requirement.

   All materials, color, pattern and texture in the completed building or structure shall be equal in every respect to that of the approved samples.

6. Each sample shall be identified completely as to product, color, manufacturer, trade name, lot, style, model, location of use, and Subcontract Document reference, as well as the names of the Subcontractor, Supplier, Project and Contractor.

7. Test samples, as designated by the Contractor, may also be selected from the materials or equipment delivered by the Subcontractor to the site for use in the work. If any test sample fails to meet the specification requirements, such materials or equipment which fail the testing, shall be removed and replaced by the Subcontractor with materials or equipment meeting the Specification requirements.

8. Field samples shall be prepared at the site by the Subcontractor in the manner and number as specified in these specifications. Affected finish work shall not be commenced until the Contractor has approved the field samples, in writing.

D. Product Data:

1. Each copy shall be marked to identify applicable products, models, options, and other data; manufacturers' standard data shall be supplemented to provide information unique to the work.

2. The Subcontractor shall submit the number of copies which the Subcontractor requires to be returned, plus two copies which will be retained by the Contractor.

E. Manufacturer's Instructions: When required by the manufacturer's warranty requirements, the Subcontractor shall submit manufacturer's printed instructions for delivery, storage, shelf life, assembly, installation, adjusting, and finishing.

F. Design Calculations and Design Drawings:

1. Design Calculations: When requested by the Contractor, design calculations shall be submitted to the Contractor for review with all pertinent data, assumptions, objective, criteria, applicable codes, standards and references. The calculations shall be on 8-1/2 by 11-inch or 11 by 17-inch sheets. Each design calculation set shall bear page numbers, titles, revision numbers, date and calculation number. Where multiple number of items are designed in a particular system, the calculations shall be preceded by a table of contents.

2. Design Drawings:

   a. When requested by the Contractor, design drawings shall be submitted to the Contractor for review.

   b. Pertinent requirements of Article 1.2.B of this Section shall be applicable for submittal of design drawings.

G. Winter Shutdown Plan: A winter shutdown plan will be required for sites which will shutdown or limit operations for the winter season. This plan shall include grading modification drawings, product data and a narrative of the steps the subcontractor will take to address the following subjects:

1. Erosion from wind and water runoff of both contaminated and uncontaminated areas.

2. Slope protection.

3. Temporary ditching.

4. Grading of excavations and embankments to drain.

5. Segregation of contaminated and non-contaminated run-off.

6. Reduction of water in the retention ponds to allow for spring snow melt.

7. Protection of all equipment and piping from damage due to freezing.

8. Other items which may be required by the Contractor.

1.3 GENERAL SUBMITTALS

A. Schedule of General Submittals: The Subcontractor shall prepare and submit a Schedule of General Submittals listing all General Submittals required per this Section.

B. Schedules and Reports:

1. The Subcontractor shall prepare and submit Schedules and Reports in accordance with the requirements of this Section.

2. The schedules and reports shall describe the Subcontractor's work plan in sufficient detail as delineated below to provide:

a. Assurance to the Contractor that the finished work complies accurately with the Subcontract Documents,

b. A basis for determining the progress of the work, and

c. A basis for the Contractor's internal planning activities.

3. Within fifteen calendar days after Notice to Proceed, the Subcontractor shall provide the Contractor with initial copies of the General Submittals specified in this section. The cost profile shall be submitted within 30 calendar days.

4. The schedules shall be in a reproducible form and all of the same scale or may be combined as approved by the Contractor.

5. Unless otherwise specified, the schedules shall be presented in graphic format and shall be updated for each construction meeting, or at least monthly, and transmitted to the Contractor.

6. The Subcontractor shall obtain approval of the various schedules specified in this section before submitting the first application for payment. Schedule revisions also require Contractor approval.

C. Site Mobilization Schedule:

1. Format: The Subcontractor shall present, at the pre-construction meeting, the schedule for site mobilization in bar chart format. The schedule shall delineate the establishment of the construction facilities

identified in Section 01500H and the Subcontractor's plan for starting the work.

2. Written Narrative: The Site Mobilization Schedule shall be accompanied by a written narrative discussion of the schedule. The narrative shall provide a man-power level by month for the first three months of the job, transportation routes proposed for delivery of major construction equipment to be used on the project, identification of special permits required and when they are needed, and a description of the temporary facilities to be provided.

3. Status and Progress: The status of mobilization schedule items will be reported in the Weekly Status Report discussed below.

D. Project Construction Schedule:

1. Scheduling: A preliminary issue of the Project Construction Schedule shall be prepared for review at the preconstruction meeting. Fifteen days after receipt of Notice to Proceed the Subcontractor shall issue the Project Construction Schedule for approval and issue the approved Project Construction Schedule ten days after receipt of approval and comments from the Contractor.

2. Format: The Project Construction Schedule shall consist of the following items, each compatible with the other and developed from the same basis:

a. Method of Construction Narrative

b. CPM Schedule: A time scaled Critical Path Method (CPM) Schedule which depicts proper restraints, activity durations, total float and free float for each schedule activity.

c. Critical Milestone Dates as listed below.

- o Start/complete mobilization
- o Start/complete site preparation
- o Start/complete excavation/placement of upper tailings
- o Start/complete excavation/placement of other contaminated material
- o Start/complete placement of radon cover: See Article SC-3 of Special Conditions for construction restraints.
- o Start/complete permanent drainage ditches

- o Start/complete placement of erosion protection
- o Start/complete site restoration
- o Demobilization

d. Schedule of Values

3. Method of Construction: Method of construction submitted at the preconstruction meeting with the preliminary schedule shall be a written discussion of the Subcontractor's methods for completing the work. The Subcontractor shall briefly describe his approach to the Subcontract.

4. The Use of Schedule Float: In as much as the Subcontractor's Schedule represents the Project Construction Schedule, the calculated float for an activity is shared by the Subcontractor and Contractor. Adjustments to the schedule float will be equitably resolved by the Contractor.

5. Computer Generated Schedule: The Subcontractor may generate the CPM Schedule manually or by using a computer. The CPM Schedule shall include all significant items of work.

6. Comments Incorporated: The Subcontractor shall incorporate the Contractor's comments into revisions of the Project Construction Schedule, adjust the manpower loading as required and resubmit the schedule to the Contractor for approval along with a summary of the changes.

7. Revisions made to the schedule will be given a new revision number and submitted to the Contractor for approval. A written narrative shall accompany any changes to the logic and/or durations of the Construction Schedule. This narrative shall explain in detail what the change involves, the reason for the change, and any effect to the critical path of the schedule.

E. Schedule of Values/Cost Profile:

1. Each time a construction schedule is submitted, it shall be accompanied by a Schedule of Values for the entire Scope of Work. The Schedule of Values shall conform to the format sample (01300H-A) provided with this Section. The Schedule of Values shall be based upon that specific revision of the Construction Schedule, and presented in such a format to clearly provide total period and cumulative cost information for each month for the entire duration of the Subcon-

tract. This Schedule of Values shall be in a form which will provide a correlation between the subcontract bid items and the Subcontractor's schedule activities. The Subcontractor may, at his own risk, plan work in excess of the funding limitations outlined in the Special Conditions.

2. The format and the substance of the finalized Schedule of Values shall be as approved by the Contractor.

F. Labor and Equipment Rates: The Subcontractor shall submit labor and equipment rates as stipulated in Subcontractor Labor and Equipment Rates of the Special Conditions.

1.4 SUBMITTALS NOT REQUIRING APPROVAL

A. The Subcontractor shall furnish the following submittals for information only. These submittals will not be approved and returned to the Subcontractor.

1. Weekly Status Reports: The Subcontractor shall submit a Weekly Status Report to the Contractor by Friday noon. The report shall be on a form satisfactory to the Contractor, and shall include items such as a Summary of Work completed and a Two-Week Look Ahead Bar Chart.

2. Weekly Manhour Reports/Employee Roster: The Subcontractor shall provide a weekly employee roster listing all Subcontractor and lower-tier subcontractor employees. The Subcontractor shall also tabulate total manhours worked each week including manhours spent by lower-tier subcontractor's personnel, craft, supervision, management and submit this information to the Contractor. The manhour report shall include separate totals for each craft and administrative classification.

3. Certified Payrolls: Certified Payrolls shall be submitted in strict compliance with Section 10 of MK-Ferguson Company Standard Documents Package for proposed construction subcontracts.

4. Monthly Schedule Updates: The Subcontractor shall submit an updated schedule, with the Critical Milestones clearly identified, by the first of each month. The status of the CPM Schedule shall indicate percent complete by activity, remaining duration of in-progress activities, total float and free float for each schedule activity.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

(Not Used)

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

Separate measurement for payment will not be made for work required under this section.

4.2 PAYMENT

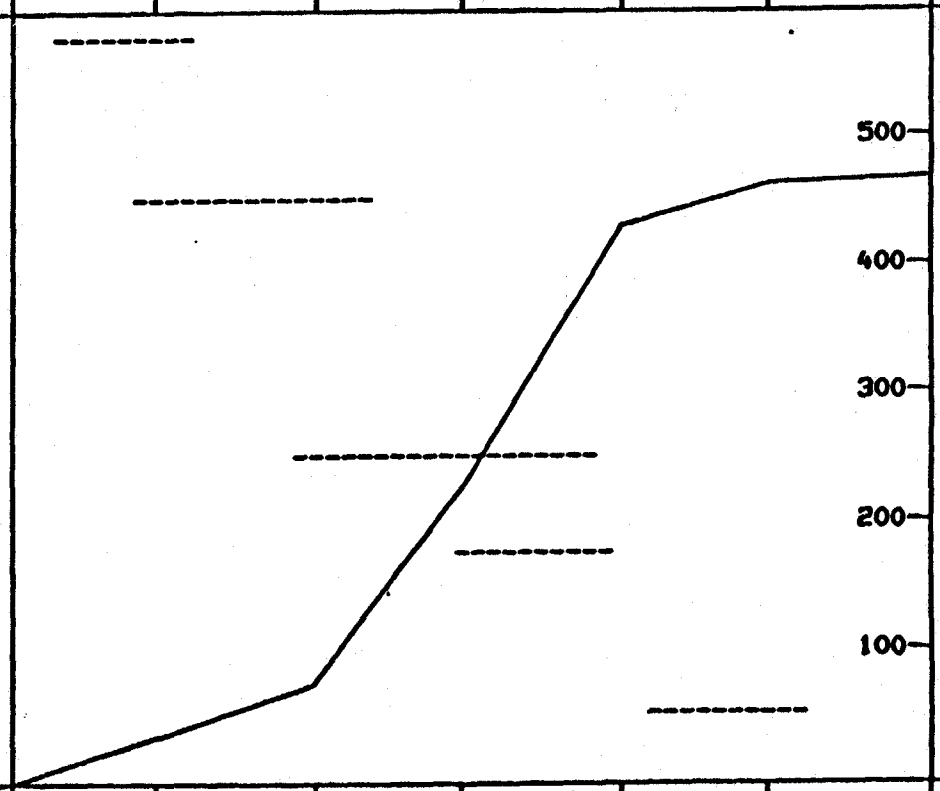
Separate payment will not be made for work required under this section. All costs in connection therewith shall be considered to be incidental to the applicable items of work to which they pertain.

END OF SECTION 01300H

UMTRA PROJECT
SUBCONTRACT DOCUMENTS _____
SCHEDULE OF VALUES

SAMPLE

DESCRIPTION	SCHEDULE ACTIVITY NUMBER	BID ITEM NUMBER	BID ITEM PERCENT	1987 MARCH	APRIL	MAY	JUNE	JULY	AUGUST	TOTAL DOLLARS
MOBILIZATION	1	001	50%	---						$32,000
INSTALL FENCE AT CONTRACTOR'S OFFICE	2	901 902	25% 100%		---					$57,000
EXCAVATION (TAILINGS)	3	204	100%			---				$320,000
INSTALL REMAINING FENCE	4	901	75%				---			$21,000
DEMOBILIZATION	5	001	50%					---		$32,000
TOTAL:		PERIOD		$31,000	$40,000	$152,000	$207,000	$30,000	$2,000	$462,000
		CUMULATIVE		$31,000	$71,000	$223,000	$430,000	$460,000	$462,000	



CONSTRUCTION START DATE: 3/10/87
CONSTRUCTION COMPLETION DATE: 8/07/87

01300H - A

MK-FERGUSON COMPANY
A MORRISON KNUDSEN COMPANY

SECTION 01500H

CONSTRUCTION FACILITIES

PART 1 - GENERAL

1.1 SCOPE

A. This Specification Section covers the requirements for the construction facilities.

B. Construction facilities shall include, but not be limited to, the following temporary offices, utilities, equipment, materials and services:

1. Subcontractor's Office
2. Contractor's Office
3. Parking Areas
4. Janitorial Services
5. Snow Removal Services
6. Temporary Roads
7. Storage of Materials and Equipment
8. Construction Equipment
9. Temporary Sanitary Facilities
10. Temporary Electric Power
11. Temporary Water
12. Decontamination System
13. Temporary Heat
14. Temporary Telephone Service
15. Temporary Fences

C. The Subcontractor shall be responsible for furnishing, installing, constructing, operating, maintaining, removing and disposing of the facilities as shown on the Subcontract Drawings, as specified in this Specification, and as required by the Contractor for the completion of the Work under the Subcontract.

D. All such temporary facilities shall be located as shown on the Subcontract Drawings, or as directed, and maintained in a clean, safe and sanitary condition at all times until completion of the Subcontract.

E. Upon completion of the Subcontract, the temporary facilities shall be left in the status specified in Article 1.21 of this Section.

F. The requirements specified herein are in addition to any requirements specified elsewhere in the Subcontract Documents. Temporary facilities shall meet the requirements for all-weather service.

G. All land disturbances related to the temporary facilities shall be minimized to the greatest extent possible and the land restored to the extent reasonable and practical, to its original contours by grading to provide positive drainage and by seeding the area to match with existing vegetation.

H. All utilities shall be designed and constructed to provide uninterrupted service during winter. The nearest utilities are located in Halchita, Utah. There, the Navajo Tribal Utility Authority provides domestic water, sanitary sewage collection service and electricity, and the Navajo Communications Company, Inc. provides telephone service. The domestic water system is a complete water-treatment facility on the San Juan River just north of Halchita. It has a production capacity of 0.43 million gallons per day and a storage capacity of 125,000 gallons. The sewer system consists of two lagoons, only one of which is currently utilized at less than full capacity. There is no natural gas service in the nearby area, but bottled propane service is available from Doxol Propane in Kayenta, Arizona.

I. Certain facilities specified in this Section, although referred to in singular, may be required in greater numbers. The number of facilities required shall be as shown on the Subcontract Drawings.

1.2 RELATED WORK

A. Section 00800H - Special Conditions: Definitions

B. Section 01019H - Mobilization: Payment

C. Section 01560H - Temporary Controls

D. Section 02050H - Demolition

E. Section 02200H - Earthwork

1.3 APPLICABLE PUBLICATIONS

A. The Publications listed below form a part of this Specification to the extent referenced. The Publications are referred to in the text by the basic designation only:

1. UMTRA Project Construction Safety and Health Management Program (MK-UMTRA-4)

2. State of Utah, Standard Specifications for Raod and Bridge Construction, 1979 Edition and Subsequent Revisions, as applicable.

3. Uniform Building Code (UBC):
1988 Edition, applicable Chapters and Sections.

4. National Fire Protection Association (NFPA), as applicable.

B. All required facilities, equipment and utilities shall also be constructed/installed, maintained and operated in accordance with applicable Federal and Navajo Nation laws, rules, and regulations. Notwithstanding contrary provisions of General Provisions, General Conditions and Special Conditions, nothing in the Subcontract Drawings and Specifications shall be construed to permit work not conforming to the above.

C. Unless otherwise specified elsewhere in the Subcontract Documents, the Subcontractor shall be responsible for obtaining applicable local and federal permits and for complying with the provisions of such permits.

1.4 SUBCONTRACTOR'S OFFICE TRAILER(S)

A. Subcontractor shall furnish and install, in good condition, one or more temporary office trailer(s) of suitable sizes for himself and his office staff.

B. The location of the trailer(s) shall be approved by the Contractor prior to setting in place.

1.5 CONTRACTOR'S OFFICE TRAILERS

A. The Subcontractor shall furnish and install following trailers for the Contractor's staff in the general area shown on the Subcontract Drawings:

1. Contractor's Office Trailer: 720 square feet (12 ft. x 60 ft.).

2. Access Control Trailer:

a. The trailer shall be used by the Contractor's administrative, security and Health Physics personnel. The trailer shall include decontamination facilities including change facilities for all personnel working on the site, a single shower for occasional use by all personnel, and a sink.

b. The trailer shall provide a floor space of 400 square feet (10 ft. x 40 ft.).

3. Radiological Control Trailer:

a. The trailer shall be used by the Health Physics personnel as a radiological laboratory.

b. The trailer shall provide a floor space of 720 square feet (12 ft. x 60 ft.).

4. Storage Van:

a. The trailer shall be used for storage of materials and equipment.

b. The trailer shall provide a floor space of 320 square feet (8 ft. x 40 ft.).

5. Quality Control Trailer:

a. The trailer shall be used as a laboratory for testing of construction materials.

b. The trailer shall provide a floor space of 300 square feet (10 ft. x 30 ft.).

B. Final locations of the trailers shall be as approved by the Contractor.

C. Each trailer shall be provided with running water and power, and shall be properly lighted and temperature conditioned for summer and winter use. Wash basins and toilets shall be connected to sanitary facilities specified in Article 1.12.

D. Each trailer shall be equipped with steps, stoops, handrailings, a deck at the door sill level, and skirting all around.

E. The Subcontractor shall furnish and install a weatherproof cover over the deck and the steps connecting Contractor's office and other trailers.

1.6 PARKING AREAS

A. No personal vehicles will be permitted inside the construction work area. Vehicles used for construction purposes will be allowed inside the work area, but will be monitored for radioactive contamination at the access gate or control point before leaving the area.

B. An aggregate surfaced parking area exists at the Site for maintenance and delivery vehicles, the Contractor's and Subcontractor's representatives, and for other authorized visitors, as indicated on the Subcontract Drawings. Parking for personal cars shall be limited to the Contractor's and Subcontractor's office areas.

1.7 JANITORIAL SERVICES

A. The Subcontractor shall provide daily janitorial services including, but not limited to, the following for all Contractor's trailers, toilet facilities and the access control area:

1. Sweep, vacuum, mop, and, if required, polish floors.

2. Clean toilets, doors and windows, office furniture.

3. Collect and dispose of office and yard solid waste.

4. Furnish toilet paper, hand towels, soap, cups, napkins, light bulbs, etc.

5. Operate and maintain trailer services including, but not limited to, the water supply and wastewater collection systems; heating, ventilating and air-conditioning system; and lighting and security systems.

6. Janitorial services shall be provided throughout the term of the Subcontract.

1.8 SNOW REMOVAL SERVICES

A. The Subcontractor shall provide snow removal services in the following areas throughout the term of the Subcontract:

1. Walkways to the office trailers,

2. Parking areas,

3. Equipment and material storage areas, and

4. Internal roads.

1.9 TEMPORARY ROADS

A. Temporary roads as defined in Article SC-1 of the Special Conditions shall meet the following requirements:

1. Construction shall be coordinated with and shall be as approved by the Contractor.

2. The improvements shall conform to the provisions of the applicable local and federal agencies having jurisdiction.

3. Thirty days prior to the start of any roadway work, the Subcontractor shall submit, for review and approval, improvement drawings to the Contractor. The drawings shall indicate approval by the agency having jurisdiction over such roads.

4. The Subcontractor shall coordinate all road construction activities with local utilities, fire and police departments.

5. Erosion shall be kept to a minimum and suitable grades and radii of curves shall be maintained to facilitate ease of movement of vehicles and equipment.

6. The Subcontractor shall furnish and install road signs and signals, and shall mark and stripe pavements if pavement is provided, as required, for the safe operation of vehicles.

7. Longitudinal and cross drainage facilities including, but not limited to, the ditches, structures, pipes and the like shall be furnished and installed by the Subcontractor.

1.10 STORAGE OF MATERIALS AND EQUIPMENT

A. Subcontractor shall make arrangements for exterior storage areas for materials, equipment, and debris. Locations and perimeters of such facilities shall be subject to the approval of the Contractor.

B. All operations of the Subcontractor, including storage of materials, shall be confined to approved areas. Subcontractor shall be liable for any and all damage caused by him during such use by him of property of the Contractor or other parties. Materials shall be stored in accordance with manufacturer's instructions as applicable.

C. Subcontractor shall store construction materials and equipment within boundaries of designated areas. Storage of gasoline or similar fuels shall conform to the requirements specified in Article 1.6.B of Section 01560H.

1.11 CONSTRUCTION EQUIPMENT

A. Subcontractor shall erect, equip, and maintain all construction equipment in accordance with all applicable statutes, laws, ordinances, rules and regulations of the Contractor or other authority having jurisdiction.

B. Scaffolding, staging, runways, hoists, barricades, and similar equipment required for performance of the Subcontract shall be provided and maintained by the Subcontractor. Hoists or similar equipment shall be provided with operators and signals, as required.

C. Subcontractor shall provide, maintain, and remove upon completion of the work, all temporary rigging, scaffolding, hoisting equipment, debris boxes, barricades around openings and excavations, fences, ladders, and all other temporary work, as required for all work hereunder unless otherwise directed by the Site Manager.

D. Construction equipment and temporary work shall conform to all the requirements of State, County, and local authorities, OSHA, and underwriters which pertain to operation,

safety, and fire hazard. Subcontractor shall furnish and install all items necessary for conformity with such requirements, whether or not called for under the separate sections of these Specifications.

1.12 TEMPORARY SANITARY FACILITIES

A. Subcontractor shall provide temporary sanitary facilities for use by all employees and persons engaged in the Work, including lower-tier subcontractors, Contractor, DOE, their employees and authorized visitors.

B. Sanitary facilities include enclosed chemical toilets, washing sinks, pipes, tanks and pumping equipment. These facilities shall meet the requirements of local public health standards. Open pit or trench latrines will not be permitted.

C. Chemical toilets and washing sinks shall be provided for use by the Subcontractor, his employees and all other workers and suppliers.

D. Contaminated water from the Access Control and Laboratory trailers wash sinks and from the emergency shower shall be collected into an underground holding tank by a separate piping system. The contents of the underground holding tank shall be pumped into the wastewater retention basin or to decontamination washwater recycling system.

E. Sanitary waste from wash sinks and toilets provided in the Contractor's trailers shall be drained to an underground septic tank by a separate piping system, or at the Subcontractor's option to existing sanitary sewer system where available. The contents of the underground septic tank, if provided, shall be disposed of offsite as Subcontractor's property.

F. During the term of the Subcontract, both tanks shall be kept pumped out at regular intervals to prevent overflow and contamination of the ground, flowing streams or surface drainage.

G. Sanitary facilities shall be located as shown on the Subcontract Drawings and as approved by the Contractor, and shall be maintained in a sanitary condition during the entire course of the Work. Subcontractor shall keep such facilities adequately supplied with toilet paper, paper toweling, paper cups, etc., as required.

H. At completion of the Work, sanitary facilities shall be properly disinfected and the tank and the contents disposed of as required by the Contractor.

1.13 TEMPORARY ELECTRIC POWER

A. The Subcontractor shall provide and maintain during the course and progress of the Work all electrical power and wiring requirements to facilitate the work of all trades and services associated with the Work. The Subcontractor shall make arrangements with the Navajo Power and Utilities Authority (NPUA) and shall pay all charges for providing and maintaining electrical service including usage costs at the site. All temporary wiring, feeders, and connections shall be furnished by the Subcontractor.

B. Routing of temporary conductors, including welding leads shall not create a safety hazard nor interfere with operation and maintenance of existing facilities. Approval from Site Manager shall be obtained prior to making connections to existing power panels.

C. All temporary wiring installed by the Subcontractor shall be accomplished in accordance with the requirements of the National Fire Protection Association (NFPA) Codes 70 and 70E (latest edition), using acceptable code materials and equipment.

D. There may be times during the period of the subcontract when the Contractor will schedule power outages which will make temporary electrical power unavailable over any of the electrical transmission and distribution systems. Normally, these outages will be scheduled sufficiently in advance to give the Subcontractor prior notification; however, due to operational requirements, it may be necessary to "kill" the lines without prior notification. The Contractor assumes no liability for interruptions, delays, or inconveniences caused to the Subcontractor as a result of such electrical power outages or power failure, scheduled or unscheduled, except that any delay in completion of the work resulting directly from such power outages shall be deemed a delay due to unforeseeable causes beyond the control and without the fault or negligence of the Subcontractor within the meaning of the Article 6, "TERMINATION FOR DEFAULT-DAMAGES FOR DELAY TIME EXTENSIONS," of the General Provisions, and the Subcontractor shall be entitled to relief in accordance with the provisions of said

Article 6, provided he gives written notice of such delay in accordance with the requirements thereof. There will be no adjustment in the Subcontract Price due to any such electrical power outage or power failure.

E. Subcontractor shall provide power and lighting to all trailers, and for all Work as required, at no extra cost to the Contractor, and as follows:

1. A minimum of 200A electric service to all Contractor's trailers.

2. Adequate temporary lighting to all trailers, and for all Work, as required.

1.14 TEMPORARY WATER

A. General:

1. Temporary water for potable, sanitary and construction use shall be provided at no additional cost to the Contractor.

2. Subcontractor shall furnish, install, operate and maintain all equipment, including necessary tanks, piping, hoses, meters, valves, fixtures, and the like, to provide water to various points of usage throughout the site.

B. Potable Water:

1. Subcontractor shall provide chilled drinking water in bottles from an approved source to all Contractor's trailers.

2. Potable water for sanitary uses shall be provided to all fixtures in all Contractor's trailers

C. Construction Water: A source of construction water has been identified as the San Juan River and permits for its use will be obtained by the Contractor. The Subcontractor shall be responsible for obtaining any necessary permission, permits, etc., which may be required for utilizing other sources of water.

1.15 DECONTAMINATION SYSTEM

A. The Subcontractor shall furnish, install, operate, maintain, remove and dispose of, a high-pressure, low-flow type decontamination system at the site for:

1. Washing contaminations from vehicles, equipment, tools and materials that become contaminated during use in Work.

2. Recycling washwater from recirculation pond for reuse as washwater for decontamination.

3. Furnishing make-up water and emptying the surplus water, when required, to maintain the recirculation pond capacity at 3/4 full.

4. Emptying the solids from the recirculation pond, as required.

B. The system shall, as a minimum, consist of the following:

1. Subcontractor-furnished and installed high-pressure (75 to 100 psi), low-flow wash system capable of decontaminating vehicles, tools and equipment, as required, for Work under the Subcontract, consisting of pumps, motors, tanks with suction and discharge piping, valves, meters, gages, nozzles, etc.

2. Existing decontamination pad.

3. Existing recirculation lined pond, four-foot deep, 15,000-gallon capacity.

4. Existing drainage ditch from decontamination pad to the pond.

C. Contaminated washwater and sediments shall be collected from the decontamination pad by gravity through existing ditch into the lined recirculation pond. The water from the pond shall be recycled for reuse as washwater by a pumping system. The water level in the pond shall be maintained at 3/4 full. Excess capacity shall be used to the extent feasible for dust control of contaminated areas and in moisture-conditioning of soils during construction of fills in contaminated areas, and the remainder pumped out to the wastewater retention basins. Sediments from the pond shall be removed and placed in the tailings pile or other contaminated areas as approved by the Contractor.

E. The Subcontractor shall submit his proposed system designs, including calculations, drawings, and equipment list with capacities, to the Contractor for review at least 45 days prior to commencement of installation.

F. Demolition and disposal of decontamination system shall conform to Section 02050H.

1.16 TEMPORARY HEAT

Subcontractor shall provide, at his own expense, all temporary heat as necessary for the trailers, for proper installation of all work, equipment, and materials, and for the protection of all work and materials, against injury from dampness, cold, and freezing.

1.17 TEMPORARY TELEPHONE SERVICE

A. The Subcontractor shall make all necessary arrangements with Navajo Communication Company of Kayenta, Arizona for telephone service to his office.

B. All costs of telephone service connections, external and internal, shall be borne by the Subcontractor.

C. The Contractor will make his own arrangements for telephone service to his offices.

1.18 TEMPORARY FENCES

The Subcontractor shall maintain existing chain link and woven wire fences shown on the Subcontract Drawings.

1.19 SHUT-DOWN TIME OF SERVICES

The Subcontractor shall not disconnect or shut down any part of the existing utilities and services, except by express written permission of the Contractor. The Subcontractor shall submit a schedule of estimated shut-down time in order to obtain such permission, and shall notify all interested parties, utilities, County authorities, etc., as required.

1.20 MAINTENANCE

A. Subcontractor shall maintain all temporary facilities and utilities in good working condition as required by the Contractor during the term of the Subcontract.

B. Subcontractor's maintenance shall include, but not be limited to, all temporary roads including access control areas and fencing during the term of the Subcontract for the safe and efficient transport of equipment, supplies and personnel.

C. The Subcontractor shall remove from the access and the haul roads any contaminated material deposited there by his operations. Such removal and cleanup shall be at no additional cost to the Contractor.

1.21 STATUS AT COMPLETION

A. Upon completion of the Work, or prior thereto, when so required by the Contractor, Subcontractor shall:

1. Repair all existing roads improved by the Subcontractor for his convenience (used as temporary roads) including recompacting and resurfacing to at least equal or better conditions existing prior to the start of the Subcontract, at no additional cost.

2. Obliterate all new roads constructed as temporary roads.

3. Remove and dispose of all construction facilities including all equipment and trailers. Disconnect utilities to the trailers and remove the trailers from the Site.

4. Restore the areas occupied by the construction facilities to their near original contours by grading to provide positive drainage and to promote natural vegetation.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

(Not Used)

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. Measurement for payment for the following items will be by their lump sum basis:

1. Temporary Offices

2. Temporary Roads and Parking Areas

3. Temporary Sanitary Facilities

4. Temporary Electric Power

5. Temporary Water

6. Decontamination System

B. Measurement for payment for janitorial services will be by the number of months of janitorial services actually provided. Month will be a calendar month.

C. Measurement for payment for snow removal services will be by the number of years of snow removal services actually provided. Year will be a calendar year.

D. Separate measurement for payment will not be made for any other item of work specified in this Section.

4.2 PAYMENT

A. Payment for items 1 through 6 of Article 4.1.A above will be by their applicable lump sum prices quoted therefor in the Bid Schedule.

B. Payment for janitorial services will be by the unit price per month quoted therefor in the Bid Schedule.

C. Payment for snow removal services will be by the unit price per year quoted therefor in the Bid Schedule.

D. The prices quoted shall include full compensation for furnishing all labor, materials, equipment, tools, accessories, and incidentals, and for performing all work including designing, fabricating, installing/constructing, operating, maintaining, removing and disposal of facilities and providing specified services as required, through the term of the Subcontract.

E. Separate payment will not be made for any other item of work specified in this Section. Full compensation for such work will be considered to be included in the applicable related items of Work under the Subcontract or in the Bid Schedule item for Mobilization.

END OF SECTION 01500H

SECTION 01560H

TEMPORARY CONTROLS

PART 1 - GENERAL

1.1 SCOPE

A. This Specification Section covers the requirements for temporary controls required during the construction of the permanent works. Temporary controls shall include related equipment, facilities, and incidentals.

B. Temporary controls shall include, but not be limited to, the following:

1. Dust Control
2. Noise Control
3. Pollution Control
4. Water Control
5. Access, Traffic and Safety Controls

C. The Subcontractor shall be responsible for furnishing, installing, constructing, operating, maintaining, removing and disposing of the controls, as specified in this Specification, and as required by the Contractor for the completion of the Work under the Subcontract.

D. All such temporary controls shall be located as directed, and maintained in clean, safe and sanitary condition at all times until completion of the Subcontract.

E. Upon completion of the Subcontract, the temporary controls shall be left in the status specified in Article 1.10 of this Section.

F. The requirements specified herein are in addition to any requirements specified elsewhere in the Subcontract Documents. Temporary controls shall meet the requirements for all-weather service.

G. All land disturbances related to the temporary controls shall be minimized to the greatest extent possible and the land restored to the extent reasonable and practical, to its original contours by grading to provide positive drainage and to promote natural vegetation.

1.2 RELATED WORK

A. Section 00800H - Special Conditions: Noise Control

B. Section 01019H - Mobilization: Payment

C. Section 01500H - Construction Facilities

D. Section 02141H - Dewatering and Drainage

E. Section 02200H - Earthwork: Site Restoration

1.3 APPLICABLE PUBLICATIONS

A. The Publications listed below form a part of this Specification to the extent referenced. The Publications are referred to in the text by the basic designation only:

1. UMTRA Project Construction Safety and Health Management Program (MK-UMTRA-4)

2. State of Utah, Standard Specifications for Raod and Bridge Construction, 1979 Edition and Subsequent Revisions, as applicable.

3. Uniform Building Code (UBC):
1988 Edition, applicable Chapters and Sections.

4. National Fire Protection Association (NFPA), as applicable.

B. All required facilities, equipment and utilities shall also be constructed/installed, maintained and operated in accordance with applicable Federal, State, County, and Utility laws, rules, and regulations. Notwithstanding contrary provisions of General Provisions, General Conditions and Special Conditions, nothing in the Subcontract Drawings and Specifications shall be construed to permit work not conforming to such laws, rules and regulations.

1.4 DUST CONTROL

A. The Subcontractor shall be responsible for providing adequate dust control measures during the term of the Subcontract.

B. Dust control shall consist of furnishing water supply, required equipment, additives, accessories and inciden-

tals, and carrying out proper and efficient measures wherever and as often as necessary to reduce dust nuisance, and to prevent dust originating from construction operations and causing damage to crops, orchards, cultivated fields, and dwellings, or causing a nuisance to persons during the completion of the Subcontract, as required by the Contractor.

C. Water shall be applied by means of pressure-type distributors or pipe lines equipped with a spray system or hoses with nozzles that will insure a uniform application of water.

D. All equipment used for the application of water shall be equipped with a positive means of shut-off.

E. Unless otherwise permitted by the Contractor or unless all the water is applied by means of pipelines, at least one mobile unit with a minimum capacity of 5,000 gallons shall be available at each site in operating condition for applying water on the project at all times.

F. To conserve water, the Subcontractor may use chemical additives in dust control water. If such additives are used, furnishing and applying the additives shall be at no additional expense to the Contractor.

G. The use, location of application, and the amount and type of additives proposed for use by the Subcontractor shall be subject to approval by the Contractor.

H. The primary sources of water for dust control in contaminated areas at the sites will be recycled water from the wastewater retention basin, or water from tailings and subsoil dewatering to the extent feasible. When these sources are judged inadequate or unacceptable the Subcontractor may, with the Contractor's approval, use water from an alternate source.

I. The source of water for dust control in uncontaminated areas shall be free of radioactive contamination.

1.5 NOISE CONTROL

See Section 00800H, Article SC-7, Paragraph L.

1.6 POLLUTION CONTROL

A. Pollution of Waterways: The Subcontractor's construction and related activities shall be performed by methods that prevent entrance or accidental spillage of solid or liquid matter, contaminants, debris and other objectionable pollutants and wastes into streams, watercourses, flowing or dry, and underground water sources. Such pollutants and wastes will include, but will not be restricted to refuse, earth and earth products, garbage, cement, concrete, sewage effluent, industrial waste, radioactive substances, hazardous chemicals, oil and other petroleum products, aggregate processing tailings, and mineral salts. Pollutants and wastes shall be disposed of in accordance with applicable permit provisions or in a manner acceptable to and approved by the Contractor.

B. Storage and Disposal of Petroleum Products:

1. Petroleum products covered by this Section include gasoline, diesel fuel, lubricants, heating oils, and refined and used oil. During project construction, all petroleum products shall be stored in such a way as to prevent contamination of all ground and surface waters.

2. Storage facilities shall conform to the requirements of Construction Safety and Health Management Program specified in Article SC-7 of the Special Conditions.

3. Lubricating Oil: Lubricating oil may be brought into the project area in steel drums or other means, as the Subcontractor elects. If the total volume of stored oil is greater than 1320 gallons, then the Subcontractor shall provide secondary containment facilities. Used lubricating oil shall be stored in steel drums, or other approved means, and shall be returned to the supplier for disposal. It shall not be burned or otherwise disposed of at the project area.

4. If the total volume of stored petroleum products is greater than 1320 gallons and these products are stored above ground, the Subcontractor shall prepare a spill prevention control and countermeasure plan in accordance with applicable EPA and other state regulations.

1.7 WATER CONTROL

See Section 02141H - Dewatering and Drainage.

1.8 ACCESS, TRAFFIC AND SAFETY CONTROLS

A. Access Control: The Contractor will impose mandatory enforcement of the following restraints to all persons seeking construction site access:

1. Private, personal or agency vehicles not used for authorized construction purposes will not be allowed in the controlled site areas.

2. Parking of private, personal or agency vehicles shall be in a restricted area outside of the controlled site areas as designated by the Site Manager or his representative.

B. Traffic and Safety Controls:

1. The Subcontractor shall post construction areas and roads with traffic control signs or devices used for protection of workmen, the public and equipment. The signs or devices shall conform to the American National Standards Institute D6.1-1978, Manual on Uniform Traffic Control Devices for Streets and Highways.

2. Signs or traffic control devices shall be removed or covered as soon as they have served their purpose. It is particularly important to remove any markings on road surfaces which under conditions of poor visibility could cause a driver to turn off the road or into traffic moving in the opposite direction.

3. Barricades for protection of employees shall conform to the portions of the American National Standards Institute D6.1-1978, Manual on Uniform Traffic Control Devices for Streets and Highways, relating to barricades.

4. Flag persons, properly equipped with International Orange protective clothing and flags, shall be provided at all such times, as necessary, to direct or divert pedestrian or vehicular traffic. Flag persons shall be provided at both ends of the existing bridge on U.S. Highway 163 in the City of Mexican Hat during truck transport hours.

5. Pursuant to Article GP-34 of General Provisions, Section GC-3C of General Conditions, the Subcontractor shall construct and maintain fences, planking, barricades, lights, shoring, and warning signs as required by local authorities and Federal and State safety ordinances, and as required, to protect the Contrac-

tor's property from injury or loss and as necessary for the protection of the public, and provide walks around any obstructions made in a public place for carrying on the Work covered in this Subcontract. All such protection shall be left in place and maintained until removal is authorized.

6. In addition, the Subcontractor shall guard and protect all workers, pedestrians, and the public from excavations, blasting operations, construction equipment, all obstructions, and other dangerous items or areas by means of adequate railings, guard rails, temporary walks, barricades, warning signs, sirens, directional signs, overhead protection, planking, decking, danger lights, etc.

7. Material Haul on Public Roads: All requirements stated in the permits shall be followed for using public roads for hauling materials.

8. The Subcontractor shall be responsible for providing all necessary bonding required by the Utah State Highway Department and the Navajo Nation.

1.9 MAINTENANCE

Subcontractor shall maintain all temporary controls in good working conditions during the term of the Subcontract for the safe and efficient transport of equipment and supplies, and construction of permanent works, as required by the Contractor.

1.10 STATUS AT COMPLETION

A. Upon completion of the Work, or prior thereto, when so required by the Contractor, Subcontractor shall:

1. Remove all temporary controls as required by the Contractor.

2. Restore disturbed areas as specified in Sections 02200H.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

(Not Used)

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

Separate measurement for payment will not be made for work specified in this Section.

4.2 PAYMENT

Separate payment will not be made for work specified in this Section. Payment for such other work will be considered to be included in the applicable related items of Work specified elsewhere in the Subcontract Documents or incidental to the Subcontract.

END OF SECTION 01560H

SECTION 01561H

CONSTRUCTION CLEANING

PART 1 - GENERAL

1.1 SCOPE

A. This Specification Section covers furnishing of all labor, materials, equipment, and services, and performing all operations necessary for, and properly incidental to, cleanup during construction and final cleaning of the site, prior to acceptance of the Project by the Contractor as specified herein and in other sections when specified.

B. The requirements specified in this Section are supplemental to the requirements specified elsewhere in the Subcontract Documents.

1.2 WORK NOT INCLUDED

Unidentified Waste

1.3 RELATED WORK

A. Section GC-1D - General Conditions

B. Section 00800H - Special Conditions: Definitions

C. Section 02110H - Site Clearing

D. Section 02200H - Earthwork

1.4 GENERAL

A. It is required that the entire site be kept in a neat and orderly condition, and the Contractor or his representative may, at any time during construction, order a general cleanup of the site as a part of the work under this Section.

B. Subcontractor shall dispose of waste, trash, and debris in a safe, acceptable manner, in accordance with applicable laws and ordinances and as prescribed by authorities having jurisdiction. No waste material and debris shall

be buried on the site. Burning of trash and debris on the site will not be permitted.

C. Location of dump for trash and debris and length of haul are the Subcontractor's responsibility.

1.5 CLEANUP DURING CONSTRUCTION

A. Cleanup: The Subcontractor will be required to clean up construction work areas including all trailers and dispose of waste material. Cleanup of construction work areas will be required on a daily basis. At the close of each day's work all small quantities of waste and debris resulting from construction activities shall be gathered up and disposed of as designated in paragraph B below. Waste and debris shall not be allowed to accumulate in such quantities as to create an unsightly appearance, or safety or fire hazard, nor shall it interfere in any way with free access to, and operation of existing facilities.

B. Waste Disposal:

1. General: Material determined to be waste will be tested for radioactive contamination prior to removal from the construction site. Testing will be performed by the Contractor at no cost to the Subcontractor to classify the waste into the following two categories for disposal purposes:

a. Uncontaminated Waste: The Subcontractor shall provide suitable receptacles for all construction office waste material such as wrapping paper, discarded containers, scrap lumber, scrap metals, etc. Other uncontaminated waste including construction office waste shall be disposed of off-site as Subcontractor's property in a safe, acceptable manner, in accordance with the applicable laws and ordinances and as prescribed by authorities having jurisdiction. No waste material and debris shall be buried on the site. The Subcontractor shall be responsible for the location of dump for trash and debris, length of haul, and disposal costs.

b. Contaminated Waste: Waste materials identified as contaminated materials defined in Article SC-1 and materials resulting from demolition operations and demolished materials stockpiled on site by others shall be disposed of in the construction of the tailings embankment as specified in Section 02200H.

1.6 FINAL SITE CLEANUP

A. Prior to final inspection, the entire site shall be thoroughly cleaned and shall be put into a neat, acceptable condition. All construction waste and unused materials, dunnage, loose rock and stones, excess earth, and debris of any description resulting from the work shall be removed from the entire site.

B. All pavements and paved walks shall be hosed down and scrubbed clean where necessary.

C. Mortar droppings shall be thoroughly removed from concrete slabs and pavements. All concrete flatwork and exposed vertical surfaces of concrete and masonry shall be hosed down and scrubbed clean.

D. All construction areas shall be thoroughly cleaned to the satisfaction of the Contractor prior to final acceptance of the completed Subcontract.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

(Not Used)

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

Separate measurement or payment will not be made for work required under this Section. All costs in connection with the work specified herein will be considered incidental to the Subcontract.

END OF SECTION 01561H

Division 2

Sitework

SECTION 02050H

DEMOLITION

PART 1 - GENERAL

1.1 SCOPE

A. This Specification Section describes the requirements for the demolition and disposal of the following facilities:

1. Decontamination pad.

2. Membrane liner.

3. Existing fences.

4. Contaminated materials from sealing of monitor wells.

B. Approximate descriptions and data of these facilities are contained in Articles 1.4 through 1.6 of this Specification.

C. Sealing of monitor wells is specified in Section 02090H.

D. Disposal of demolished materials and debris is specified in Section 02200H.

1.2 WORK NOT INCLUDED

Removal and disposal of existing stockpiles of demolished materials and debris is not included in the Scope of Work of this Section.

1.3 RELATED WORK

A. Section 00800H - Special Conditions: Articles SC-7 and SC-8

B. Section 02090H - Sealing Monitor Wells

C. Section 02200H - Earthwork: Disposal of demolished materials and debris.

1.4 DECONTAMINATION PAD

The existing decontamination pad consists of an at-grade concrete slab 150 feet x 30 feet by 6 inches thick, reinforced with wire mesh.

1.5 MEMBRANE LINER

A. The existing membrane liner from the retention basin embankments and decontamination pad ditch shall be removed and disposed of as specified in this Section.

B. The membrane liner consists of 30 mils thick Chlorinated Polyethylene (CPE). The membrane is keyed into backfilled ditches. There is approximately 2,800 square yards of membrane liner in the retention basins, holding pond and the decontamination pad.

1.6 CONTAMINATED MATERIALS FROM SEALING OF MONITOR WELLS

Contaminated casings and other materials resulting from sealing of monitor wells as specified in Section 02090H shall, if uncontaminated, be broken into lengths not greater than 10 feet in length and crushed for disposal in the tailings embankment.

1.7 FENCING

Existing fencing consists of 640 linear feet of chain link fence and gates, 6 feet high, around the access control area.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

3.1 DEMOLITION

A. Pollution Controls:

1. Water sprinkling, temporary enclosures, and other Contractor-approved methods shall be used to limit the

amount of airborne dust and dirt to the lowest practical level. Demolition work shall comply with governing regulations pertaining to environmental protection.

2. Water shall not be used if it is likely to create hazardous or objectionable conditions such as ice, flooding, or pollution. An approved water-based biodegradable wetting agent (surfactant), such as Dupont "Duponol WAQ" or equal, may be used to reduce the quantity of water required.

B. Demolition work shall be carried out using equipment compatible to the structures to be demolished and by methods required to complete the Work in accordance with governing regulations. The structures shall be demolished, and the materials and debris disposed of as specified in Section 02200H.

C. After the completion of the construction phase, the synthetic membrane shall be removed, decontaminated and disposed of as required by the Contractor. If the membrane cannot be decontaminated by practical means, it shall be disposed of by cutting into strips, shredding and placing in the tailings embankment in a manner that would not induce settlement, inhibit water migration, or exceed the 5 percent limit on organic material by volume.

D. Concrete shall be cut in pieces to be no greater than 3 feet in any dimension, and no more than 27 cubic feet in volume.

E. Metal objects with voids shall be crushed to sizes no greater than 27 cubic feet in volume, with the least dimension not exceeding 6 inches.

F. Grading shall be performed, as required by the Contractor, to restore existing grades to near natural conditions and as specified in Section 02200H.

G. Sealing of monitor wells shall be as specified in Section 02090H.

H. Chain link fence and gates from the access control area shall be removed and disposed of as Subcontractor's property. Concrete footings shall be disposed of in the tailings embankment.

3.2 DISPOSAL OF DEMOLISHED MATERIALS AND DEBRIS

A. Demolished materials and debris shall be disposed of in the tailings embankment, as specified in Section 02200H and as shown on the Subcontract Drawings.

B. Burning of materials resulting from demolition operations will not be permitted.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

Measurement for payment for demolition and disposal of structures specified in this Section will be on a lump sum basis.

4.2 PAYMENT

Payment for demolition and disposal of structures specified in this Section will be by the lump sum price quoted therefor in the Bid Schedule. The price quoted shall include full compensation for furnishing all labor, materials, equipment, incidentals, and for performing all work specified including, but not limited to, transportation and placement of demolished materials and debris in the tailings embankment.

END OF SECTION 02050H

SECTION 02090H

SEALING MONITOR WELLS

PART 1 - GENERAL

1.1 SCOPE

A. This Specification Section describes the requirements for sealing of existing wells.

B. Table 02090H-1 lists all known wells that are to be sealed. Wells not listed in Table 02090H-1 shall be protected, unless otherwise directed by the Contractor.

C. The approximate locations of the known wells to be sealed are shown on the Subcontract Drawings.

1.2 RELATED WORK

A. Section 02050H - Demolition

1.3 APPLICABLE PUBLICATIONS

A. The Publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by the basic designation only:

1. Environmental Protection Agency (EPA): Manual of Water Well Construction Practices, EPA-570/9-75-001.

2. American Society for Testing and Materials (ASTM): C150-86 Standard Specification for Portland Cement (Rev. A).

1.4 SITE CONDITIONS

A. Subcontract Drawings show all known wells on and in the vicinity of the site. Wells not designated to be sealed shall be protected to prevent damage during construction. Such wells, if damaged, shall be reconstructed by the Subcontractor at no cost to the Contractor.

B. Sulfur Dioxide gas (SO_2) was encountered during installation of several wells that will be abandoned. The toxic nature of this gas requires that the Subcontractor take special health and safety precautions.

C. Artesian conditions exist in at least one well.

1.5 SUBMITTALS

Fifteen days prior to the start of work included in this Section, the Subcontractor shall submit for review, health and safety procedures he shall use when abandoning wells.

TABLE 02090H-1

WELLS TO BE SEALED

Well No.	Approx. Depth of Water (feet)	Depth of Well (feet)	Casing Diameter and Type (inches)	Casing Depth (ft)	Screen Interval (feet)
905	dry	20	2" PVC	12	5-10
906	10	20	2" PVC	12	5-10
907*	0	120	3/4" Steel	110	Open Borehole
908	50	160	2" PVC	162	145-160
910	170	180	2" PVC	182	140-180
911	95	100	2" PVC	105	93-103
912	75	85	2" PVC	82	60-80
930	55	120	2" PVC	116	104-114

* Known Artesian Well

PART 2 - PRODUCTS

2.1 MATERIALS

A. Approved sealing materials are as follows:

1. Cement used for sealing mixtures shall meet the requirements of ASTM C150 "Standard Specification for Portland Cement," Type II (moderate sulfate resistance) or Type V (high sulfate resistance). The cement type shall be compatible with groundwater encountered in the wells to be sealed.

2. Cement grout shall be composed of one sack of Portland Cement (94 pounds), with 3 to 5 percent, by weight, of commercially processed sodium bentonite, to not more than 6 gallons of potable water in order to achieve a weight of not less than 15 pounds per gallon. The weight of the neat cement shall be sufficient to prevent flow of water into the well from any aquifer penetrated. Calcium chloride may be added to a Portland cement grout to accelerate the set, but it shall not exceed two (2) pounds per sack of dry cement.

PART 3 - EXECUTION

3.1 GENERAL

A. Wells shall be sealed in a manner that is compatible with the well design and so as not to act as a conduit for future contamination of groundwater. Detailed well sealing criterion are outlined in the Environmental Protection Agency (EPA) Manual of Water Well Construction Practices, EPA-570/9-75-001, Article 56, pages 133-142. The basic premise of the EPA criteria is to seal abandoned wells and to restore, as much as possible, the geohydrologic regime in existence before the well was constructed. The following criteria shall apply to all wells to be sealed on and in the vicinity of the site:

1. Well sealing operations shall be performed by a licensed drilling contractor, with demonstrated experience in sealing of wells.

2. All wells shall be sealed in such a manner that they will not act as a conduit for fluids to flow from the specific strata in which they were originally encountered.

3. All wells shall be located in the field and sealed by the Subcontractor prior to the beginning of stripping, grading or other surface-disturbing activities that will hinder the detection and sealing of wells. If any well cannot be located after a reasonable search, the Subcontractor shall, prior to the commencement of the well sealing operations, submit to the Contractor a written report documenting the well number, the areas covered and the effort spent in the search.

4. Upon discovery of any unknown wells during the earthwork operations, the Subcontractor shall give the Site Manager immediate verbal notice followed by written confirmation within 24 hours.

5. Wells shall be sealed according to the following procedures:

   a. The Subcontractor shall check each well to be sealed for obstructions that may interfere with the sealing operation and shall remove any such obstructions prior to starting filling operations.

   b. In order to seal the well properly it is preferable to remove the well casings by methods approved by the Contractor as outlined in Article 56 of the EPA Manual of Water Well Construction Practices. Upon removal, if the casings or the materials are found to be contaminated, they shall be decontaminated as required by the Contractor, or disposed of in the tailings embankment as specified in Section 02050H. If casing removal is not feasible, the casing shall be perforated, ripped or otherwise disintegrated by methods outlined in Article 56, to ensure grouting of the entire annular space between the casing and the borehole.

   c. The approved methods for the placement of a grout seal shall be as follows:

      1) In wells where casing is removed, the cement grout shall be introduced at the bottom of the well or interval to be sealed (or filled) and placed progressively upward to the top of the well. The grout shall be placed by the use of grout pipe, drop pipe, tremie, cement bucket or dump bailer, in such a way as to avoid segregation or dilution of the sealing materials. Dumping grout material from the top of the well shall not be permitted.

2) In wells where casing is not removed, the calculated amount of neat cement grout required to fill the well interval plus the annular space outside the lining shall be placed within the space to be grouted, running the grout through a special cementing packer manufactured for this purpose and installed immediately above the perforated or ripped zone. The grout shall be injected at a pressure calculated to be at least 50 psi greater than the normal hydrostatic pressure within the well at the point of injection.

d. Artesian wells shall be sealed in accordance with EPA Manual of Water Well Construction Practices, EPA-570/9-75-001 Article 56.

e. For all wells located in areas where the construction grade elevation will be greater than or equal to the existing grade surface, existing casings and cement grout seals shall be removed to a minimum depth of 2 feet below the existing grade surface, or as required by the Contractor. Grouting shall extend to 2 feet below the existing grade. The interval from the top of the grout to the existing grade surface shall be filled with a mixture of uncontaminated soil (ML or CL) and a minimum of 25 percent by weight of commercially processed sodium bentonite and shall be hand-tamped, as required.

f. For all wells located in areas where the construction grade surface will be less than the existing grade surface (i.e. in areas of proposed cut), the existing casings and cement grout seals shall be removed to a minimum of 2 feet below the grade cut elevation as shown on the Subcontract Drawings or as required by the Contractor. Grouting shall extend to 2 feet below the grade cut elevation. The interval from the top of the grout to the existing surface shall be filled with a mixture of uncontaminated soil (ML or CL) and a minimum of 25 percent by weight of commercially processed sodium bentonite and shall be hand-tamped, as required.

6. The Subcontractor shall provide the following notification of the well sealing operation:

a. The Subcontractor shall notify the Contractor one week prior to commencement of well sealing operations.

b. Within 30 days of the completion of well sealings, the Subcontractor shall submit a written well sealing report to the Navajo Department of Water Management; Division of Water Resources, Window Rock, AZ 86515. This report shall contain a list and a map showing all wells that were sealed, a statement that all wells were sealed in accordance with Specification Section 02090H, and an explanation of any deviation from the Specification. A copy of the report shall be submitted to the Contractor.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

Measurement for payment for sealing of monitor wells will be by the linear feet of wells sealed. The measurement will be from bottom of well to the top of seal.

4.2 PAYMENT

Payment for sealing of monitor wells will be by the unit price per linear foot quoted therefor in the Bid Schedule. The price quoted shall include full compensation for furnishing all materials, equipment, tools, accessories, incidentals, labor, and for performing the work specified in this Section including decontamination and disposal of materials and equipment.

END OF SECTION 02090H

SECTION 02110H

SITE CLEARING

PART 1 - GENERAL

1.1 SCOPE

A. This Specification Section describes the requirements for the following:

1. Clearing of vegetation.

2. Stripping of topsoil

3. Disposal of cleared and stripped materials.

1.2 DEFINITIONS

A. Topsoil: Topsoil shall consist of natural, friable soil representative of productive soils in the vicinity, and includes roots, organic materials, vegetation, and other materials unsuitable for structural fill.

B. Clearing: Clearing is defined as removing brush, other vegetation and immature trees. All such vegetation and immature trees shall be cleared down to the natural ground surface.

C. Stripping of Topsoil: This shall consist of the removal of topsoil by blading with a bulldozer or other equivalent means. Depth of stripping shall be 6 inches, unless otherwise indicated elsewhere in the Subcontract Documents.

1.3 RELATED WORK

Section 02200H - Earthwork

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

3.1 PRESERVATION OF PROPERTY

Existing improvements, adjacent property, utility and other facilities that are not to be removed shall be protected from injury or damage.

3.2 CLEARING

A. Clearing shall be performed on all areas of construction activities. Contaminated cleared materials shall be kept separate from uncontaminated cleared materials.

B. Uncontaminated cleared materials shall be disposed of by the Subcontractor.

C. Contaminated cleared material shall be reduced in size and disposed of in the tailings embankment as specified in Section 02200H and as required by the Contractor.

3.3 STRIPPING

A. Uncontaminated Areas: Stripping will be required in the following areas:

1. Beneath all fill areas where excavation is not otherwise required;

2. In areas of excavation where excavated materials are to be used as fill.

B. Contaminated Areas: In areas of excavation where the contaminated surfaces are covered by vegetation, the removal of topsoil may be carried out together with the excavation of contaminated materials in one operation as specified in Section 02200H.

C. Stripped material shall be disposed of as specified in Article 3.4.

3.4 STOCKPILING OF UNCONTAMINATED TOPSOIL

Stockpiling of uncontaminated topsoil shall be performed only when required by the Contractor upon his determination that there is sufficient uncontaminated organic topsoil in the area to justify the operation; otherwise the

materials shall be disposed of in an approved spoil area or as Subcontractor's property. The stockpile or spoil area will be on the site as designated by the Contractor. The topsoil from the stockpile shall be used in finish grading of the site.

3.5 BURNING OF CLEARED AND STRIPPED MATERIAL

Burning of cleared and stripped materials, if performed, shall conform to the requirements of the Navajo Nation.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

Separate measurement for payment will not be made for work specified in this Section. All such work will be considered incidental to the applicable related items of work.

4.2 PAYMENT

Separate payment will not be made for work specified in this Section. Full compensation for such work will be considered incidental to the applicable related items of work.

END OF SECTION 02110H

SECTION 02141H

DEWATERING AND DRAINAGE

PART 1 - GENERAL

1.1 SCOPE

A. This Specification Section describes the requirements for dewatering and drainage work in contaminated and uncontaminated areas of the site. The Work shall include the following:

1. Collection and disposal of surface and subsurface water from the work areas, and

2. Design, construction, maintenance and removal of dewatering and drainage facilities.

B. Surface (gravity) and subsurface (pump system) dewatering and drainage system shall consist of swales, ditches, drainage pipes, inlets and manholes, sumps, pumps, drives, piping, meters, gages, valves and other accessories and incidentals as required.

C. If the groundwater level is higher than the bottom of excavation, the Subcontractor shall dewater the excavation, as required, for performance of work in the dry. Stormwater shall be removed from the excavation to maintain dry conditions.

D. A dewatering scheme for work in uncontaminated areas is not shown on the Subcontract Drawings. The Subcontractor shall, as required, design and construct gravity or pump systems or a combination of both systems for dewatering uncontaminated work areas.

E. A gravity dewatering scheme for work in contaminated areas is limited to the temporary drainage ditches as shown on the Subcontract Drawings. The Subcontractor shall, as required, augment existing system by designing and constructing additional gravity or pump systems or a combination of both systems for dewatering contaminated work areas. Dewatering from wind-blown tailings and off-pile areas will be accomplished incrementally as removal of contaminated materials proceeds.

F. Earthwork operations shall be planned, scheduled and executed to minimize dewatering.

1.2 WORK NOT INCLUDED

A. Existing retention basins and drainage ditches are shown on the Subcontract Drawings.

B. Drainage work related to the construction facilities specified in Section 01500H.

1.3 DESCRIPTION

A. The work of this Section includes, but is not limited to: dewatering the excavations by installing sump pumps in the excavations and disposal of water by providing drainage facilities including swales, ditches, interceptor dikes, pipes, and other drainage structures. Water from uncontaminated areas shall be pumped, or allowed to flow by gravity, to drainage ditches leading to the existing drainage courses that flow offsite. Water from contaminated areas shall be pumped, or allowed to flow by gravity, to drainage ditches leading to the wastewater retention basins. Excess wastewater, after recycling from the decontamination pad, shall be collected in the wastewater retention basins or used for dust control or moisture conditioning of fills in contaminated areas.

B. The Subcontractor shall be responsible for designing, scheduling, utilizing, providing, and maintaining any dikes, ditches, channels, flumes, drains, sumps, pumping equipment, monitoring wells, other subsurface dewatering devices, and other temporary diversion and protective work necessary to ensure that construction shall be performed in areas free from water.

1.3 RELATED WORK

Section 02200H - Earthwork: Construction and restoration of areas.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

The Subcontractor shall furnish all materials, equipment, tools, accessories, and incidentals required for furnishing, installing, operating, maintaining and

removing dewatering and drainage facilities, and for providing sufficient standby pumping and auxiliary equipment to preclude any interference to pumping operations during periods of breakdown and maintenance.

PART 3 - EXECUTION

3.1 DEWATERING PROCEDURES

A. Water from uncontaminated areas shall be pumped, or allowed to flow by gravity to natural drainage courses.

B. Water from contaminated areas shall be pumped or allowed to flow by gravity to nearby drainage ditches leading to the wastewater retention basins.

C. The water level in excavation shall be maintained below the lowest point in the excavation until the backfilling of the excavation has been completed, unless otherwise approved by the Contractor.

3.2 TEMPORARY DRAINAGE DITCHES

Additional new drainage ditches, if required, shall be constructed by the Subcontractor for collection of contaminated wastewater into the retention basins or for offsite discharge of water from uncontaminated areas.

3.3 MAINTENANCE

The Subcontractor shall be responsible for the maintenance of dewatering and drainage facilities during the term of the Subcontract. Drainage ditches may require periodic cleaning. Ditches shall be kept free of sediment deposits, debris and other materials that may restrict or prevent drainage. The Subcontractor, when directed by the Contractor, shall remove and replace all items not functioning properly because of clogging, damage, or deterioration.

3.4 REMOVAL

A. When no longer required for water control:

1. Dewatering equipment shall be removed and disposed of as Subcontractor's property.

2. Contaminated sediments deposited in the wastewater retention basins shall be removed and placed in the tailings embankment as specified in Section 02200H and as required by the Contractor. Uncontaminated sediments may be used in the grading of uncontaminated areas of work.

3. Areas occupied by the wastewater retention basins, dikes, spillway, and temporary drainage ditches shall be restored and graded as specified in Section 02200H.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

Separate measurement for payment will not be made for dewatering and drainage work specified in this Section.

4.2 PAYMENT

Separate payment will not be made for dewatering and drainage work specified in this Section. Full compensation for furnishing all materials, equipment, labor, tools, accessories, incidentals, and for performing all work as specified in this Section including, but not limited to, the construction of additional lined and unlined temporary drainage ditches, check dams, temporary detention ponds or other facilities, the provision of pumps, sumps, piping, valves, meters, gages, other accessories and incidentals such as pipe supports, excavation and backfill of pipes and pipe supports, and the like, if required, will be considered to be included in the related applicable item(s) of Work specified under the Subcontract.

END OF SECTION 02141H

SECTION 02200H

EARTHWORK

PART 1 - GENERAL

1.1 SCOPE

A. This Specification Section covers earthwork for the following:

1. Excavation of contaminated materials.

2. Excavation of uncontaminated common materials.

3. Excavation of uncontaminated rock materials.

4. Construction of the tailings embankment.

5. Construction of permanent drainage ditches.

6. Finish grading of the site, including restoration and regrading of areas occupied by existing temporary drainage ditches, existing wastewater retention basins and dikes, existing contaminated water recirculation pond, sumps, and temporary facilities areas.

7. Disposal of (contaminated and uncontaminated) demolished materials and debris and other contaminated materials including the following in the construction of the tailings embankment:

   a. Existing stockpiles of demolished materials and debris.

   b. Demolished materials and debris resulting from work specified in Section 02050H.

   c. Contaminated cleared vegetation and topsoil resulting from site clearing specified in Section 02110H.

   d. Contaminated sediments from retention basins, dikes and ditches specified in Section 02141H.

8. Furnishing and installing displacement monuments as shown on the Subcontract Drawings.

1.2 WORK NOT INCLUDED

A. Earthwork related to the construction of offsite construction facilities specified in Section 01500H is not included in this Section.

B. Earthwork for pipe trenches is not included in this Section.

1.3 RELATED WORK

A. Section 00800H - Special Conditions: Definitions

B. Section 01300H - Submittals

C. Section 01500H - Construction Facilities

D. Section 01560H - Temporary Controls

E. Section 02050H - Demolition

F. Section 02090H - Sealing Monitor Wells

G. Section 02110H - Site Clearing

H. Section 02141H - Dewatering and Drainage

I. Section 02278H - Erosion Protection

1.4 DEFINITIONS

A. Contaminated materials and uncontaminated materials are defined in Article SC-1 of the Special Conditions.

B. Excavation: Excavation shall include excavation of all materials including topsoil, silt, clay, sand, gravel, talus, soft or disintegrated rock, boulders or detached pieces of solid rock. Excavation shall be classified into the following categories:

1. Contaminated Materials Excavation.

2. Uncontaminated Materials Excavation.

C. Contaminated Materials Excavation: Contaminated materials excavation shall include excavation of contaminated materials regardless of the nature (soil or rock) of the

materials from the existing upper tailings pile, windblown and waterborne areas, the wastewater retention basins, and the dikes.

D. Uncontaminated Materials Excavation: Uncontaminated materials excavation shall include excavations of uncontaminated materials from the various areas of the site including, but not limited to, excavations for permanent drainage ditches and for finish grading. Uncontaminated materials excavation shall be classifed into common excavation and rock excavation in accordance with the following designations and classifications:

1. Rock Excavation: Rock excavation shall include excavation by drilling and blasting of material classified as rock and shall include the satisfactory removal of boulders 1/2 cubic yard or more in volume; solid rock; rock material that is in ledges, bedded deposits, and unstratified masses, which cannot be removed without systematic drilling and blasting; and conglomerate deposits that are so firmly cemented as to possess the characteristics of solid rock that is impossible to remove without systematic drilling and blasting. The Subcontractor shall not proceed with the excavation of this material until the Contractor has classified the materials as common excavation or rock excavation and cross sections are taken as required. Failure on the part of the Subcontractor to uncover such material, notify the Contractor, and allow ample time for classification and cross sectioning of the undisturbed surface of such material will cause the forfeiture of the Subcontractor's right of claim to any classification or volume of material to be paid for other than that allowed by the Contractor for the areas of work in which such deposit occur.

2. Common Excavation: Common excavation shall include the satisfactory removal of all such materials including rippable rocks (see definition below) not materials classified as rock excavation defined above.

E. Overexcavation: Overexcavation is defined as (1) excavation carried out beyond the lines and grades indicated on the Subcontract Drawings or in the Subcontract Specifications or (2) excavation not authorized by the Contractor.

F. Slimes: Slimes are the fraction of the tailings consisting of silty clay, clay and clayey silt, generally defined as containing 70 percent or more of minus No. 200 sieve material.

G. Percent Maximum Density: Percent maximum density is the field dry density expressed as a percentage of the maximum dry density obtained by the test procedure presented in ASTM D698, as applicable.

H. Topsoil: Topsoil for use as seed bed shall be free of any admixture of subsoil, foreign matter, toxic substances, and any material or substance that may be harmful to plant growth.

I. Tailings Embankment: Tailings embankment shall consist of in situ tailings pile materials, relocated tailings from other areas of the site, including contaminated materials from windblown and waterborne areas, wastewater retention basins, contaminated water recirculation pond, demolished materials and debris, and the protective cover materials.

J. Upper Tailings Pile: Upper tailings pile includes all tailings pile materials located outside the final boundary of the tailings pile. This includes tailings material to the north of the lower tailings pile.

K. Subgrade Preparation: Preparation of surfaces of excavations including permanent drainage ditches, backfills, apron, and embankments upon which bedding materials, riprap, or other features are to be constructed. Such surface preparation shall include mixing and manipulation, fine grading, and compaction of materials.

L. Cover: Cover shall consist of the layers of following fill materials placed over the relocated contaminated materials in the tailings embankment as shown on the Subcontract Drawings:

1. Bedding and riprap materials.

2. Radon barrier material.

M. Demolished Materials and Debris:

1. Existing stockpiles of demolished materials and debris consist of pieces of wood, concrete, masonry, and steel members cut or broken up in sizes not greater than 10 feet in any dimension and not greater than 27 cubic feet in volume, and

2. Demolished materials and debris resulting from the demolition work specified under this Subcontract.

N. Finish grading of the site shall include excavation, fill and backfill of the various areas of the site including removal of retention basin dikes (existing), backfilling of temporary drainage ditches (existing), contaminated water recirculation pond (existing), and temporary facilities (existing and proposed) areas as shown on the Subcontract Drawings.

O. Temporary Drainage Ditches: Temporary drainage ditches shall include temporary diversion, collection and interceptor ditches as shown on the Subcontract Drawings.

P. Rippable Rock: Rippable rock is defined as mineral matter in place and of such hardness and texture that it can be effectively loosened or broken down by ripping in a single pass with a late model tractor-mounted hydraulic ripper equipped with one digging point of standard manufacturer's design adequately sized for use with and propelled by a crawler-type tractor rated between 385- and 410-net flywheel horsepower, operating in low gear; or in areas where the use of the ripper described above is impracticable, rippable rock is defined as mineral material of such hardness and texture that it can be loosened or broken down by a 6-pound drifting pick. The drifting pick shall be Class D, Federal Specification GGG-H-506D, with handle not less than 34 inches in length.

Q. Disposal of Demolished Materials and Debris: Disposal shall include loading and transporting demolished materials and debris from existing stockpiles or from demolition operations performed under the Subcontract, and unloading, placing and compacting in the final placement location as indicated on the Subcontract Drawings.

1.5 APPLICABLE PUBLICATIONS

A. The Publications listed below form a part of this Specification to the extent referenced. The Publications are referred to in the text by the basic designation only:

1. American Society for Testing and Materials (ASTM):

D422-63	Method of Particle-Size Analysis of Soils
D698-78	Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 5.5 lb. (2.49-kg) Rammer and 12-in. (305-mm) Drop

D1140-54 Test Method for Amount of Material in Soils Finer than No. 200 (75-um) Sieve

D1556-82 Test Method for Density of in Place by the Sand-Cone Method

D2167-84 Test Method for Density and Unit Weight of Soil In-Place by the Rubber-Balloon Method

D2216-80 Test Method for Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil-Aggregate Mixtures

D2487-85 Test Method for Classification of Soils for Engineering Purposes

D2922-81 Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

D3017-78 Test Method for Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

2. American Petroleum Institute (API):

13A-85 Specification for Oil Well Drilling-Fluid Materials, Section 4 - Bentonite

3. Blasting practices shall generally be in accordance with the "Blasters Handbook" - 16th Edition by E. I. du Pont de Nemours and Co. (INC) of Wilmington, Delaware 19898.

4. U.S. Federal Specifications (FS):

GGG-H-506D Hoe, Mattock and Pick
Int AMD 1

1.6 PERMITS AND APPLICABLE LAWS

A. All required Federal, State, and local permits for blasting and explosives shall be obtained and paid for by the Subcontractor. Copies of such permits shall be furnished to the Contractor before any blasting operations are started.

B. All blasters and blasting foremen shall be properly qualified and licensed in accordance with the applicable laws and regulations of Federal, State, and local governments.

C. All transportation and storage of explosives shall be in accordance with the applicable laws and regulations of Federal, State and local governments.

1.7 QUALITY ASSURANCE

A. The Contractor will take soil samples and perform moisture-density, gradation and other tests to ascertain that the work is being performed in compliance with these Specifications. Samples may be taken at the place of excavation, stockpiles, or in the fill itself. The Contractor will conduct the density and other tests on the fill and related laboratory testing as frequently as the Contractor considers necessary. The Subcontractor shall remove surface material and render assistance as necessary to enable sampling and testing.

B. Methods of Sampling and Testing:

1. In-Place Density: ASTM D1556, D2167, or D2922

2. Particle Size Analysis: ASTM D422

3. Percentage Passing No. 200 Sieve: ASTSM D1140

4. Moisture Content: ASTM D2216

5. Laboratory Moisture-Density Relations: ASTM D698

6. Soil Classification: ASTM D2487

7. In-Place Moisture Content: ASTM D3017

C. Suitability of Materials: The suitability of all materials for foundations and backfill will be determined by the Contractor. Fill material will be approved material from borrow areas or required excavations.

D. The Contractor may direct that inspection trenches or test pits be cut into fills to determine that the Specifications have been met. Such trenches or pits will be of limited depth and size, and shall be backfilled with the material excavated therefrom, or other fill material meeting the requirements for the zones cut into. Backfill shall be compacted to a density at least equal to that of the contiguous fill.

E. When the Contractor directs inspection trenches or test pits to be excavated into fills and backfills and materials are found to meet all Specification requirements,

the excavation and refilling shall be paid for as additional work pursuant to the applicable provisions of the General Conditions. Inspection trenches or test pits, and the refilling of the same, shall be at the Subcontractor's expense when it is found that the materials do not meet the Specification requirements.

F. Tolerances: See Specification Section 01052H, Article 1.5.

1.8 SUBMITTALS

A. General submittal requirements are specified in Section 01300H.

B. At least 30 days before commencing blasting operations, the Subcontractor shall submit to the Contractor for review a detailed blasting plan covering the area to be blasted. The blasting plan shall contain complete hole layouts, proposed loading, delays and all information required by this Specification. The Contractor may require changes in the blasting plan if the results of blasting do not meet Subcontract requirements.

C. All changes in the blasting plan shall be submitted for approval at least 48 hours prior to the time of the proposed changes.

D. At least 48 hours before blasting within one-quarter mile of a stream course, the Subcontractor shall submit for approval a plan showing all details of his proposed blasting operation and the scheduled time for the blast.

E. The Contractor's review of the Subcontractor's proposed blasting procedures shall not be construed to relieve the Subcontractor of his responsibility to protect existing facilities not to be demolished. Any damage done by the Subcontractor's operations shall be repaired at Subcontractor's expense.

F. Sixty days prior to delivery at the site, the Subcontractor shall submit test results and certificates from the supplier verifying that the bentonite meets the requirements of this Section.

1.9 SAFETY PROVISIONS

A. The Subcontractor shall provide and operate at all times an instrument for the detection of approaching electrical storms, including an automatic alarm such as a Litton TSM/C.

B. Electrical Storms: No explosive material shall be handled, transported or in any way made use of during any period of electrical storm or lighting or other electrical phenomenon. In the event that any such condition should appear imminent or occur, or if some known leakage of electricity should occur in the neighborhood of, or in, the work, while the transport, handling, making-up or charging or other use of explosives is being effected, then the work shall be evacuated and abandoned completely until at least thirty minutes after the condition has ceased or the leakage stopped.

C. Detonating Explosive Charges:

1. Only approved exploding devices shall be used for detonating charges. Under no circumstances are lighting and power cables to be used for detonating. All pipes, ducts, track, and other metal shall be properly grounded.

2. An adequate warning system shall be provided by the Subcontractor to ensure that all personnel, staff, visitors and anyone else is at a safe distance before blasting takes place.

3. No radio transmitter shall be operated within 75 feet of the area where electric blasting operations are in progress.

4. No naked lights or sparks are allowed anywhere in the vicinity of blasting operations on the surface.

5. Where detonating is carried out electrically the Subcontractor shall take every precaution necessary to prevent premature explosions and misfires. Before connection of the detonating wires to the detonating cable the round shall be tested for electrical continuity in an approved manner with an approved testing device or meter. In the event that this testing should show a lack of continuity then the round shall be retested leaving out one detonator at a time until the fault is identified. Should this procedure identify a faulty detonator then stemming shall be carefully removed from the hole and an additional primer inserted and wired into the circuit in place of the defective one. No attempt shall be made to draw a defective detonator or primer. On satisfactory completion of the circuit all workers other than those immediately necessary shall be

withdrawn to a safe distance before detonating wires are connected to the detonating cable, and the connection of the detonating cable to the detonator shall be the last operation.

6. Where detonating is carried out by electricity, following a blast, before any person returns to the work place affected by the operation,

   a. The detonating cables shall be withdrawn from the battery, blasting machine or other source of electricity and shall be short circuited.

   b. The blasting switch shall be locked in the open position.

7. Blasting cables and wires shall be clearly distinguishable from other cables and wires and shall only be used for blasting.

D. Misfires of Explosive Charges:

1. Should a misfire occur, then the Subcontractor shall warn all persons affected, and no persons other than those required shall enter the workings until the charge has exploded or, in the case of electrical detonating, an interval of at least twenty minutes, has elapsed after operation of the exploder.

2. A misfired detonator may only be removed from the face by means of approved apparatus which permits such an operation to be carried out with absolute safety. Under no circumstance shall charges which have misfired be otherwise tampered with. Should it prove impossible to extract the charge with safety, then the Contractor may authorize the Subcontractor to explode the charge by sympathetic detonation, the greatest care being taken to ensure that no new hole is drilled to intersect an old one or that the unexploded charge is in any other way affected. After the second shot is detonated, the search shall be made for the unexploded charge.

1.10 PROTECTION

A. The Subcontractor shall protect the following:

1. Trees, shrubs and other features remaining as a portion of final grading.

2. Bench marks and monuments, existing structures, fences, walks, pavings, curbs, etc. from equipment and vehicular traffic.

3. Utilities not specified for removal.

4. Excavations from cave-in by shoring, bracing, sheet-piling, underpinning or by other methods.

5. Bottoms of excavations and soil adjacent to and beneath foundations from frost.

6. Perimeter of excavation top to prevent surface water runoff into excavation.

7. Monitor wells to be saved.

8. Finished work.

1.11 EXISTING CONDITIONS

The Subcontractor shall not disturb the existing asbestos-containing materials burial area marked by ribbons and flags on the lower tailings pile.

PART 2 - PRODUCTS

2.1 EXPLOSIVES

A. A record shall be maintained by the Subcontractor for storage and withdrawal of explosive stocks and detonators. The inventory record shall be subject to inspection at all times. The Subcontractor shall provide such reasonable and adequate protective facilities as may be necessary to prevent loss and theft of explosives and to minimize hazards of subversive action or sabotage. Loss or theft of explosives shall be reported to the Contractor immediately. Overnight storage of explosives and detonators outside of the magazine will not be permitted. Only qualified personnel shall be permitted to handle explosives.

2.2 UNCONTAMINATED FILL MATERIALS

A. General:

1. Fill materials shall be obtained from required excavations and from borrow areas shown on the Subcontract Drawings or from other approved borrow areas selected by the Subcontractor and approved by the Contractor.

2. The Subcontractor shall be responsible for obtaining required permits and approvals for Subcontractor-selected borrow areas in accordance with the provisions of Article SC-11 of the Special Conditions. Designation of a borrow area does not indicate that all material within that area meets the Specification requirements specified herein.

   a. The Subcontractor shall make his own determination of any processing or selective excavation that may be required, and shall perform testing as required to meet the Specifications for the various construction materials.

   b. Submittals to the Contractor for approval of sources proposed for use by the Subcontractor shall include boring logs, borrow area maps and supporting laboratory test data. The Subcontractor also shall provide evidence of availability, right of access to private property including by the Contractor for sampling and testing, and his plan for hauling the materials to the site. Submittals for approval of sources for uncontaminated fill materials shall be received by the Contractor at least 30 days (60 days for radon barrier materials) before use of the material at the site. The Contractor may perform additional tests to determine if the materials meet the requirements specified herein.

   c. Approval will be based on evidence of compliance with the requirements specified herein and on verification by the Subcontractor that the volume of materials available is sufficient for construction requirements.

3. Gradations: Gradations specified shall be as determined after delivery to the site, except where normal compaction operations reduce materials to acceptable sizes, in which case in-place gradations shall be acceptable.

B. Uncontaminated Common/General Fill Materials: Uncontaminated common/general fill materials for general fill shall conform to the following requirements. All references to "uncontaminated fill" or "uncontaminated fill materials" shall mean "uncontaminated common/general fill" or "uncontaminated common/general fill materials".

1. Uncontaminated fill materials shall not contain more than 5 percent, by volume, of organic material or other deleterious substances.

2. Maximum particle size shall not be greater than the compacted lift thickness in any dimension, except as noted hereinafter. Individual large stones shall be distributed within the fill materials to provide visual void-free mass, and be able to meet the requirements of Article 3.8. For fill areas under pavement locations, maximum stone dimension allowed in the upper 6 inches of the fill shall be 4 inches. Larger stones may be utilized in initial backfill in the lower layers of finish grading of the site.

C. Radon Barrier Materials:

1. General: Radon barrier materials shall be a mixture of uncontaminated soils and bentonite.

2. Uncontaminated Soils:

a. Uncontaminated soils shall be obtained from borrow areas RB-4 and RB-7 as shown on the Subcontract Drawings. Uncontaminated soil for mixing with bentonite to produce radon barrier material for use in bottom two lifts shall be material obtained from borrow area RB-4.

b. Selective excavation and processing of the uncontaminated soil may be required to ensure the soil material meets the requirements specified herein.

c. Uncontaminated soil shall meet the following gradation limits prior to mixing with bentonite:

Sieve Size	% Passing by Weight
4-inch	100%
3/4-inch	70-100
No. 4	50-100
No. 60	15-100
No. 200	5-100

d. Uncontaminated soil shall not contain clearly visible organic matter or other deleterious substances.

3. Bentonite:

a. Bentonite shall be high swelling, unaltered, sodium montmorillonitic clay. High swelling is defined as the ability of two grams of bentonite, mechanically reduced to 100 mesh, to swell in water to an apparent volume of 16.0 cubic centimeters or more when added a little at a time, to 100 cubic centimeters of distilled water in a graduated cylinder.

b. Colloid content of the base bentonite shall exceed 70% as measured by evaporating the suspended portion of a 2% solution after 24 hours of sedimentation in a beaker.

c. Bentonite shall have the following physical properties determined in accordance with the requirements of A.P.I Specification 13A, Section 4:

Grit Content (plus 200 Mesh wet sieve analysis)	5% maximum
Viscosity (600 RPM)	12 cps minimum
Filtrate (30 minutes)	17 mils maximum
Moisture Content	10% maximum

d. Dry fines of the bentonite shall be:

100% passing Number 10 sieve by weight
20% maximum passing Number 200 sieve by weight

e. Bentonite shall be protected from the weather during shipping and storage.

f. Mixing of bentonite with uncontaminated soil shall conform to Article 3.5.C.

4. Placing of radon barrier shall conform to Article 3.5.C.

2.3 CONTAMINATED FILL MATERIALS

Contaminated materials as defined in Article SC-1 of the Special Conditions resulting from the clearing, stripping and excavation operations in contaminated areas. These

materials shall include materials excavated from tailings piles, windblown and waterborne areas, contaminated sediments from drainage ditches and wastewater retention basins, and recirculation pond.

2.4 DEMOLISHED MATERIALS AND DEBRIS

A. The demolished materials and debris shall include the following:

1. Existing stockpiles of contaminated and uncontaminated demolished materials and debris.

2. Contaminated and uncontaminated demolished materials and debris resulting from work specified under Section 02050H.

B. For disposal purposes all demolished materials and debris shall be considered as contaminated materials.

PART 3 - EXECUTION

3.1 PROTECTION OF EXPOSED SURFACES

A. During seasonal shutdowns and during other periods of prolonged exposure of excavated or filled areas, the Subcontractor shall provide labor, materials and equipment, as required by the Contractor, to maintain and protect exposed surfaces of uncontaminated and contaminated materials against wind erosion and excessive stormwater erosion. Prior to the application of protective erosion control measures, the exposed surfaces shall be sloped to drain and compacted with a smooth drum roller to eliminate ruts and ridges formed by construction equipment. Unless otherwise approved by the Contractor, acceptable methods of erosion protection are as follows:

1. Spraying with Water containing Chemical Additives: Acceptable chemical additive is "Soil Seal Concentrate" as manufactured by Soil Stabilization Products Company of Merced, California, or approved equal. Mixing and application shall be in accordance with the manufacturer's recommendations, or

2. Covering exposed surfaces with geotextile fabric such as "Supac" as manufactured by Phillips Fibers Corporation of Sacramento, California, or approved equal. Handling and installation shall be as recommended by the manufacturer of the product.

3.2 EARTHWORK - GENERAL

A. Preparation:

1. Clearing and stripping shall be as specified in Section 02110H.

2. Required lines, levels, contours and datum shall be identified before the start of earthwork operations.

3. The Subcontractor shall verify the existing aboveground and underground utilities, identify them, and notify the Contractor immediately of his finding, if any, for appropriate action.

B. Dewatering and Drainage: Prior to commencement of earthwork operations, the Subcontractor shall verify that the dewatering and drainage facilities are constructed and operational in accordance with the requirements of Section 02141H.

C. In order to avoid cross-contamination of uncontaminated material, the contaminated and uncontaminated materials shall be kept separated during earthwork operations. Stockpiles of contaminated materials shall be placed on contaminated areas and the drainage collected in the retention basin.

D. Earthwork shall conform to lines and grades indicated on the Subcontract Drawings or specified in this Section.

E. The excavated uncontaminated common materials, where practicable, shall be used as fill in various areas of the sites including general fill, roadway fill, structure fill, backfill, fill for the final grading of the site and for the construction of the tailings embankment, as required.

F. The excavated uncontaminated rock materials shall be placed in the spoil area indicated on the Subcontract Drawings.

3.3 EXCAVATION

A. General:

1. Excavation shall be carried out to reach the lines and grades indicated on the Subcontract Drawings or specified herein, or, in the case of contaminated materials, as required by the Contractor's Health Physics Personnel.

2. At all times, the Subcontractor shall conduct his operations in such a manner as to prevent free standing water and contamination of uncontaminated materials. The Subcontractor shall, as a minimum, take the following measures to safeguard against such problems:

   a. Water leaving a contaminated excavation area or contaminated area otherwise disturbed by construction activities shall be routed into the retention basins as specified in Section 02141H.

   b. Exposed surfaces of contaminated and uncontaminated materials excavations shall be protected from erosion as specified in Article 3.1 above.

3. The Subcontractor shall remove all excavated material from the excavation site and dispose of it in fills required at the site or use it for other purposes, as approved.

4. Unsuitable or low density subgrade material not readily capable of in-place compaction shall be excavated as directed by the Contractor and disposed of as specified in Article 3.4.

5. Adequate working space for safety of personnel shall be provided within the limits of the excavation.

6. Except as otherwise noted, care shall be exercised to preserve the material below and beyond the lines of all excavation. Where excavation is carried below grade, the Subcontractor shall backfill to the required grade or to indicated invert grade, as specified, and recompact the backfill to meet the existing conditions.

7. Excavation for the convenience of the Subcontractor shall conform to the limits approved by the Contractor and shall be at no additional expense to the Contractor.

8. Excavated material shall be placed at sufficient distance from edge of excavations to prevent cave-ins or bank slides. Slopes of excavated cuts and stockpiles shall not be steeper than 2(H) to 1(V) unless indicated otherwise on the Subcontract Drawings.

9. Where practicable, suitable materials removed from excavation shall be used as fill or backfill.

B. Contaminated Materials Excavation:

1. Contaminated materials excavation shall include excavation of (a) contaminated materials from the upper tailings pile, (b) windblown and waterborne off-pile areas including wet slimes and rippable rock, and (c) existing retention basin dikes. The Subcontractor shall minimize the open excavation area of contaminated materials at any time during excavation work. The Subcontractor shall operate from one or two sides at one time, progressing uniformly to opposite sides for completion, unless directed otherwise by the Site Manager. Contaminated materials shall be excavated to the depths indicated on the Subcontract Drawings, or as required by the Contractor, and placed in the proper part of the tailings embankment. Contaminated materials will be excavated generally in priority of its placement in the tailings embankment to minimize rehandling and stockpiling. Excavation shall be carried out to the limits and grades required by the Health Physics Personnel. Rock requiring drilling and blasting operations shall not be included in this excavation.

2. During excavation operation, tests will be performed by the Contractor to determine radioactive contamination of the material to be excavated.

C. Uncontaminated Materials Excavation:

1. General: Uncontaminated materials excavation shall include excavations of uncontaminated materials from the various areas of the site. The excavated materials shall be used as fill in various areas of the site including construction of berms, dikes, general fill, roadway fill, structure fill, backfill, and fill for final grading of site, as required. Uncontaminated excavated material may be stockpiled for later use.

2. Rock Excavation:

a. The Subcontractor shall perform required rock excavation to the limits shown on the Subcontract Drawings or as directed by the Contractor.

b. Care shall be exercised to avoid excessive overbreak beyond or below grade lines of excavation.

c. Blasting methods and procedures shall be such that, upon completion of the excavation, all rock surfaces will be sound and relatively uniform. Explosives shall be of such quantity and power and shall be used in a manner that will minimize opening of seams and disturbing of rock outside the prescribed limits of excavation. As the excavation approaches its final limits, the depths of holes for blasting and the quantity of explosives used for each hole shall be reduced so that the rock underlying or adjacent to the final limits is not shattered or otherwise disturbed.

d. The Subcontractor shall remove all shattered material and debris from excavation.

e. Excavated rock materials shall be used as fill, where required, or may be stockpiled in approved locations for later placement as fill.

3. Permanent Drainage Ditches Excavation:

a. Ditches shall be excavated true to line and grade. Any erosion which occurs to ditch excavation before placing erosion protection materials shall be repaired with compacted backfill. All such repairs shall be at Subcontractor's expense and shall not be included in pay quantities, unless otherwise shown on the Subcontract Drawings.

b. The subgrade shall be compacted as specified in Article 3.8 below. After compaction has been completed, finish grading shall be done in such a manner that the sideslopes and bottom are rendered smooth surfaces. All rocks, brush, roots, large clods, and other objects shall be removed before place- ment of the bedding material and the riprap material.

4. Borrow Area Excavation:

a. General:

1) Borrow areas for general fill and for fill to mix with bentonite to produce radon barrier material are indicated on the Subcontract Drawings.

2) Borrow areas shall meet all permit and negotiated requirements as required by the Contractor.

3) Necessary clearing, grubbing, and disposal of debris shall be performed by the Subcontractor as incidental operations to the borrow excavation.

4) After borrow excavations are completed, borrow areas shall be graded to drain. Natural drainage patterns shall be maintained.

5) Where general fill materials are not available in sufficient quantity from the required excavations, such materials shall be obtained from approved offsite borrow areas.

b. Uncontaminated Material Borrow Excavations for Use in Radon Barrier:

1) Only portions of the area within the designated borrow area contain material suitable for mixing with bentonite to produce radon barrier material. The material shall meet the requirements specified in Article 2.2.C. Subcontractor shall identify the areas that contain material suitable for radon barrier material prior to the excavation.

2) Excavations shall not be within 50 feet of the shoulders of the existing Navajo Nation road that separates the borrow areas.

3) Excavations for uncontaminated materials to be used for mixing with bentonite to produce radon barrier materials shall be carried out in the presence of a qualified technician employed by the Subcontractor.

4) Materials excavated for mixing with bentonite to produce radon barrier shall not be used for other purposes except as approved by the Contractor.

5) The Subcontractor shall notify the Contractor at least 30 days in advance of opening any borrow area so that adequate time will be allowed for testing the material.

3.4 DISPOSAL OF EXCAVATED MATERIALS

A. Contaminated Materials: All contaminated materials excavated from the tailings piles, retention basins, windblown, and other areas of the site shall be used in the construction of the tailings embankment as specified herein. Contaminated material will be placed in the tailings embankment by priority generally as indicated Article 3.5.B.5. Radiological monitoring of contaminated materials or construction expediency may change this priority, as directed by the Contractor.

B. Uncontaminated Materials:

1. Materials excavated from the site, including excavations for drainage ditches which do not classify as contaminated materials, shall be used as uncontaminated material fill for construction of various features, or stockpiled for later use for site grading as specified in this Section and as required by the Contractor.

2. Where used in fills, such material shall be transported directly from the excavation and placed in its final position in such fills whenever possible. If required by the Subcontractor's schedule, the material may be placed temporarily in stockpiles at approved locations. Material in stockpile shall be protected from contamination of any kind that would render it unsuitable for use in fills.

3. Clean, sound, unweathered rock, of suitable material, from the required excavation may be incorporated into fills, after processing as necessary, provided it meets the appropriate specifications.

4. Uncontaminated Common and Rock Materials: See Article 3.2, Paragraphs E and F.

5. Garbage, refuse, debris, oil, and any waste material which is harmful to the environment shall be removed from the job site and disposed of offsite in a manner approved by the authority having jurisdiction over the offsite disposal facility.

C. Disposal of Demolished Materials and Debris:

1. Existing stockpiles of demolished materials and debris, and demolished materials and debris resulting from demolition work specified in Section 02050H shall be disposed of in the tailings embankment conforming to the applicable provisions of this Section and as required by the Contractor.

2. During construction of the tailings embankment, provision shall be made to leave required space at proper location in the embankment for the placement of the demolished materials and debris resulting from the demolition work specified in Section 02050H.

3.5 FILL CONSTRUCTION

A. General Requirements:

1. Clearing and stripping shall be as specified in Section 02110H.

2. Fill materials shall be placed and compacted to the lines and grades shown on the Subcontract Drawings or as required by the Contractor.

3. Prior to placing of uncontaminated fill materials, the subgrade will be radiologically surveyed by the Contractor to confirm that EPA standards have been met. These radiological surveys may cause delays to backfill operations of up to seven working days. The Subcontractor shall plan his work accordingly.

4. If any portion of the materials placed as fill does not meet the specified requirements, the Subcontractor shall remove such material and replace it with fill materials meeting the specification at no additional cost to the Contractor.

5. Constructed fills shall be maintained to meet the requirements of this Specification until final completion and acceptance of the Work. This shall include all measures to prevent erosion or contamina-

tion during construction, including contamination by radioactive material. During seasonal or other extended shutdowns, all exposed surfaces shall be protected with special treatments specified in Article 3.1 above.

B. Placing Requirements:

1. Prior to placement of materials, the in-place density of the subgrade shall be as specified in Article 3.8. Subgrade preparation, where required, shall be as specified in Article 3.7.

2. No material shall be placed on any portion of the subgrade or against or upon any structure until consent to place such fill has been obtained from the Contractor.

3. Fill materials may require moisture conditioning (wetting or drying) prior to compaction. Some tailings slimes particularly will require spreading and extended drying time prior to compaction.

4. Fill materials shall be placed in continuous and approximately horizontal lifts for their full length and width unless otherwise specified or specifically permitted by the Contractor.

5. The following sequence shall be followed in placing materials in the tailings embankment:

   a. Contaminated tailings from the upper pile including all tailings materials outside the limits of the final tailings embankment including demolished materials and debris.

   b. Contaminated materials from windblown, waterborne and off pile areas.

   c. Excess uncontaminated materials from required excavations, including retention basin dikes.

   d. Radon barrier material: The entire thickness shall be ammended with 12 percent bentonite.

   e. Bedding material.

   f. Riprap protection.

6. Method of dumping and spreading the materials shall ensure uniform distribution of the material.

7. Loose thickness of each lift of materials shall not be greater than that required to achieve the required compaction, and in no case shall exceed 12 inches.

8. Unless otherwise indicated, fill materials shall be placed to a grade no flatter than 2 percent to facilitate drainage of water. In areas where ponding cannot be prevented or ponding has occurred and fill is required to be placed, placing shall begin only after the area is dewatered and permission to place is obtained from the Contractor.

9. Materials shall not be placed on frozen subgrade or frozen fill, nor shall frozen material be used as fill.

10. Bulky (demolished materials and debris) materials shall be disposed of in the lower portion of the tailings embankment. The materials shall be placed evenly in each lift to minimize the volume of voids created in the disposal mass and to avoid nesting. Organic matter shall be distributed to provide a concentration of not more than five percent in any area of the embankment.

11. When no longer needed for control of contamination, as determined by the Contractor, the retention basins, recirculation pond, and the like shall be removed and the area restored.

C. Mixing and Placing of Radon Barrier:

1. The uncontaminated soil shall be thoroughly mixed with bentonite. Mixing of bentonite and moisture conditioning of soil shall be performed on an uncontaminated surface. The bentonite content shall not be less than 12 percent by weight. The percentage shall be determined by dividing the dry weight of bentonite by the dry weight of soil with bentonite.

2. Loose thickness of each layer of materials shall not be greater than that required to achieve the required compaction, but in no case shall exceed 9 inches.

3. Bentonite shall be distributed over unrutted material prior to adding water and compaction. Bentonite shall be applied in two transverse passes with a spreader used for spreading fertilizer, lime or seed and capable of controlling the rate of application.

4. Bentonite shall be mixed with a roto-tiller type of mixer, that can be adjusted to the full depth of

uncompacted materials. The mixer shall have an enclosement around the tires to prevent blowing of material being mixed. Disk type of mixers are not acceptable. Mixing shall be accomplished by overlapping transverse passes with the mixing equipment.

5. Mixing of bentonite and soil shall be in a dry condition. Water shall be added only after dry mixing of bentonite and soil are complete. Material with an initial moisture content above optimum as determined by ASTM D698 shall be scarified to accelerate drying before bentonite is added. The moisture content shall be brought to within acceptable limits after bentonite mixing is complete and before compaction. Water shall not be applied by trucks operating on the lift surface to avoid rutting and potholing of the surface. Application of water shall be by spraying from off the lift surface.

6. Unfavorable Weather: Placing, spreading, rolling or compacting fill material that is frozen or thawing, or during unfavorable weather conditions shall not be permitted. If the work of placement of radon barrier material is interrupted by heavy rain or other unfavorable weather, such work shall not be resumed until after ascertaining that the moisture content and density of the previously placed soil are acceptable to the Contractor.

7. The Subcontractor shall only work on an area that can be completed in one working day. Completion shall be defined as soil moisture adjustment, spreading of the bentonite, the mixing of the soil with the bentonite, and compaction of the soil bentonite layer.

8. The radon barrier layer shall be compacted to the requirements of Article 3.8. The Subcontractor shall demonstrate to the Contractor the effectiveness of the compacting equipment.

9. The final surface of the radon barrier shall be compacted in a manner to prevent formation of ruts, depressions or low areas in which water can accumulate.

D. Compaction Requirements:

1. Each lift of fill materials shall be compacted to a minimum density specified in Article 3.8.

2. During compaction, the moisture content of fill material shall be maintained to achieve specified density. Uniform moisture distribution shall be obtained by disking, blading, or other methods approved by the Contractor prior to compaction of a lift. During compaction of radon barrier materials, moisture content shall be maintained to within optimum moisture and optimum plus three percent as determined by ASTM D698.

3. If the surface of the prepared foundation or the rolled surface of any lift of fill is too dry or too smooth to bond properly with the lift of material to be placed thereon, it shall be scarified and moistened by sprinkling to the acceptable moisture content prior to placement of the next lift of fill.

4. If the rolled surface of any lift of the fill in place is too wet for proper compaction of the lift of fill material to be placed thereon, it shall be removed, allowed to dry or worked with harrow, scarifier, or other suitable equipment to reduce the water content to the required amount, and then re-compacted before the next succeeding lift of fill is placed.

5. Fill placed at densities lower than the specified minimum density or at moisture contents outside the specified acceptable range of moisture content shall be reworked to meet the density and moisture requirements or removed and replaced by acceptable fill compacted to meet these requirements.

6. Uncontaminated fill material in the stockpile areas shall be placed by spreading with a bulldozer and track walking. Lift thickness before compaction shall not exceed one foot. Compaction shall be accomplished by routing of hauling and spreading equipment units.

3.6 FIELD QUALITY CONTROL

A. General: The Contractor will take samples and perform tests throughout the construction period, and the Subcontractor shall cooperate in providing access for the Contractor to areas where testing is to be performed and shall schedule his placing to avoid interference with the testing operations.

B. Tests: The Contractor will perform the following tests on a regular basis.

1. In-place density and moisture content tests where density is specified will be as follows:

   a. A minimum of one test per 1000 cubic yards of contaminated and uncontaminated materials placed excluding radon barrier material. At least two tests shall be performed for each day of material placement in excess of 150 cubic yards.

   b. A minimum of one test per 1500 square yards of the subgrade surface area.

2. Gradation tests, where required, minimum of one test per 2000 cubic yards of fill placed.

3. Radon Barrier:

   a. Insitu density moisture content tests shall be taken a minimum of one test per 250 cubic yards of bentonite-soil mixture.

   b. The percentage of bentonite mixed with the soil shall be determined by placing a 1 foot x 1 foot metal pan in selected locations prior to spreading the bentonite. After the bentonite is spread, the material on the metal pan is weighed to determine the amount of bentonite distributed. A minimum of one test per 25,000 square feet shall be performed.

4. The placing and compaction of temporary stockpiles will be subject to the approval of the Contractor.

3.7 SUBGRADE PREPARATION

A. Subgrade Preparation: Subgrade preparation includes fine grading and compaction of excavations, backfills, embankments (including stockpiles) upon which pavement, surfacing, base, subbase, and riprap or other structures are constructed.

B. The entire surface of the subgrade shall be plowed, harrowed, and mixed to a depth of at least 6 inches. Compaction shall be carried out for the full area below finished subgrade to at least the density specified in Article 3.8 below. Soft spots developed during working shall be removed or corrected.

3.8 COMPACTION DENSITIES

A. Subgrades of permanent drainage ditches and embankments, and each layer of embankment and backfill shall be compacted to at least the following percentage of maximum dry density, as determined by ASTM D698 test method:

1.	Subgrade Preparation:	90 percent
2.	Subgrade Preparation for Permanent Drainage Ditches	95 percent
3.	Tailings Embankment Fill Except Top 3 ft.	90 percent
4.	Tailings Embankment Fill Top 3 ft. Immediately Below the Bottom of Radon Barrier	95 percent
5.	Trench Backfill and Common Fill	95 percent
6.	Radon Barrier	100 percent
7.	Site Restoration	90 percent

3.9 DISPLACEMENT MONUMENTS

Displacement monuments shall be furnished and installed by the Subcontractor as shown on the Subcontract Drawings. The Subcontractor shall take precautions not to damage the monuments once they are installed. Damaged monuments shall be replaced by the Subcontractor at no additional cost to the Contractor.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. Measurement for payment for the following items of excavations and fills will be by the cubic yards of material excavated. The quantities for payment will be computed from lines and dimensions shown, or by average end area method from surveys conducted before and after excavation operations as shown on the Subcontract Drawings, or by the methods determined by the Contractor.

Separate measurement for payment will not be made for temporary stockpiling or for placement of the materials in their final locations:

1. Excavation of contaminated material from the upper tailings pile and placement in the tailings embankment. (Bid Schedule Item 401H)

2. Excavation of windblown tailings material and placement in the tailings embankment. (Bid Schedule Item 402H)

3. Excavation of water-borne contaminated material and placement in the tailings embankment. (Bid Schedule Item 403H)

4. Excavation of uncontaminated common material and placement as fill for finish grading of the site and tailings embankment. (Bid Schedule Item 801H)

5. Excavation of uncontaminated rock and placement in the spoil. (Bid Schedule Item 802H)

B. Measurement for payment for furnishing and placing radon barrier materials will be by the cubic yards of material furnished and placed. The quantities for payment will be computed from the lines and dimensions shown, or by average end area method from surveys conducted before and after placement as shown on the Subcontract Drawings, or by the methods determined by the Contractor. Separate measurement will not be made for excavation and transportation of materials. Bentonite will be measured separately for payment. (Bid Schedule Item 501H)

C. Measurement for payment for furnishing bentonite will be by the tons of material furnished. The quantities for payment will be calculated from the weigh slips of the material delivered to the site and utilized in the Work. (Bid Schedule Item 502H)

D. Separate measurement for payment will not be made for the following items, and such work will be considered incidental to the related items of work:

1. Subgrade preparation.
2. Stockpiling of excavated materials.
3. Required rehandling of materials.
4. Blasting.

E. Overexcavation: Overexcavation for the Subcontractor's convenience or due to error or lack of control by the Subcontractor will not be measured for payment. At the discretion of the Contractor, overexcavation shall be backfilled with compacted contaminated or uncontaminated fill, as required, at the Subcontractor's expense.

F. Separate measurement for payment will not be made for any other excavations or fills specified in this Section.

G. Measurement for payment for disposal of demolished materials and debris stockpiled on site by others will be by the lump sum. (Bid Schedule Item 404H)

H. Measurement for payment for disposal of demolished materials and debris resulting from work specified in Section 02050H of this Subcontract will be as specified in Section 02050H.

I. Measurement for payment for furnishing and installing displacement monuments will be by the number of monuments installed. (Bid Schedule Item 405H)

4.2 PAYMENT

A. Payment for the items of Article 4.1.A above will be by their applicable unit prices per cubic yard quoted therefor in the Bid Schedule. The prices quoted shall include full compensation for excavating, hauling, and placing the excavated materials in their final locations including all clearing, stripping, grading, shaping, preparing subgrade, compacting, temporary stockpiling and required rehandling.

B. Payment for furnishing and placing radon barrier materials will be by the unit price per cubic yard quoted therefor in the Bid Schedule. The price quoted shall include full compensation for excavating, hauling the materials from excavated areas or retrieving the materials from temporary stockpiles, and placing the excavated materials in their final locations including all clearing, stripping, grading, shaping, preparing subgrade, placing, mixing with bentonite, moisture control, and compacting. No deduction will be made for the quantity of bentonite material mixed with radon barrier materials. Payment will not include cost of furnishing bentonite.

C. Payment for furnishing bentonite will be by the unit price per ton quoted therefor in the Bid Schedule. Payment will not include costs for mixing, placing, moisture control and compacting.

D. Separate payment will not be made for the items mentioned in Article 4.1.D above. All costs for such work will be considered to be included in the prices quoted for the applicable related items of work.

E. Separate payment will not be made for any other excavations or fills specified in this Section. All costs for excavations or for furnishing and placing such fills will be considered to be included in the related items of excavation.

F. Payment for disposal of demolished materials and debris stockpiled onsite by others will be by the lump sum price quoted therefor in the Bid Schedule. The price quoted shall include full compensation for transporting the debris from the stockpile and placing, and compacting in the final location.

G. Payment for disposal of demolished materials and debris resulting from the work specified in Section 02050H of this Subcontract will be as specified therein.

H. Payment for furnishing and installing displacement monuments will be by the unit price per each quoted therefor in the Bid Schedule.

END OF SECTION 02200H

SECTION 02278H

EROSION PROTECTION

PART 1 - GENERAL

1.1 SCOPE

This Specification Section describes the requirements for furnishing and placing riprap and bedding materials for tailings embankment cover, drainage ditches, apron and gullies.

1.2 WORK NOT INCLUDED

Erosion protection related to the construction facilities specified in Section 01500H is not included in the scope of work of this Specification.

1.3 RELATED WORK

A. Section 01300H - Submittals

B. Section 02200H - Earthwork: Subgrade Preparation

1.4 APPLICABLE PUBLICATIONS

A. The Publications listed below form a part of this Specification to the extent referenced. The Publications are referred to in the text by the basic designation only:

1. American Society for Testing and Materials (ASTM):

C88-83	Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
C117-87	Test Method for Materials Finer Than 75-um (No. 200) Sieve in Mineral Aggregates by Washing
C127-84	Test Method for Specific Gravity and Absorption of Coarse Aggregate
C131-81	Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

C295-85 Practice for Petrographic Examination of Aggregates for Concrete

2. International Society for Rock Mechanics (ISRM), 1981

Rock Characterization Testing and Monitoring, ISRM Suggested Methods, E.T. Brown, Editor, Pergamon Press, New York:

Suggested Method for Determining Indirect Tensile Strength by the Brazil Test, pp. 120-121

Suggested Method for Determination of the Schmidt Rebound Hardness, PP. 101-102

1.5 PERMITS

The Contractor will provide permits for the use of borrow areas shown on the Subcontract Drawings as specified in Article SC-11 of Special Conditions. If the Subcontractor uses other sources for erosion protection materials, he shall be responsible for obtaining all required permits.

1.6 SUBMITTALS

A. During production of materials from approved sources, the Subcontractor shall submit test results, in triplicate, including, as a minimum, specific gravity, absorption, soundness and abrasion tests for each 10,000 cubic yards of material produced. After the original petrographic examination is performed, additional examinations shall be performed when there is a change in the source of material.

B. The Subcontractor shall submit, in writing, the name and qualifications of his proposed testing laboratory to the Contractor for approval.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Material Sources: Erosion protection materials including riprap and bedding materials shall be obtained from sources approved by the Contractor. The approved source for Types A and B erosion protection and bedding materials

is the Nielson Rock Quarry near Bluff, Colorado, located approximately 30 miles northeast of the tailings site. The approved source for Types C and D erosion protection materials is the Shadow Mountain Quarry located approximately 160 miles southwest of the tailings site.

B. Subcontractor may propose other sources of materials. The basis for approval of the Subcontractor-proposed sources shall be as specified in Article 2.3. The materials shall meet the requirements of this Specification.

B. Approval of source as a borrow area does not mean that all materials excavated will meet the requirements of this Specification. Processing or selective quarrying may be necessary to meet the quality requirements of this Section. The basis for approval of other sources proposed by the Subcontractor is specified in Article 2.3 below. The Subcontractor shall be responsible for providing the laboratory test results.

C. The materials shall be free from radioactive or other contamination.

D. Individual pieces shall be dense, sound, resistant to abrasion, and shall be free from cracks, seams, and other defects as shown in the petrographic examination and during field inspection as per Article 3.3 below.

E. The shape of at least 75 percent of the material, by weight, shall be such that the minimum dimension is not less than one third of the maximum dimension.

F. Quality and Gradation Tests: For record purposes the following tests shall be performed and the results shall be provided to the Contractor in accordance with Article 1.6.B:

Test	Designation
Gradation	ASTM C117 ASTM C295
Specific Gravity (Saturated Surface Dry Basis)	ASTM C127
Absorption	ASTM C127
Sodium Sulfate Soundness Soundness (5 Cycles)	ASTM C88 Coarse Aggregate

Abrasion (Los Angeles Machine) (100 Cycles)	ASTM C131
Schmidt Hammer	ISRM Method
Splitting Tensile Strength (Modified-Loading rate shall cause failure in 1 to 3 minutes)	ISRM Method
Petrographic Examination	ASTM C295

2.2 QUALITY REQUIREMENTS

A. All riprap and bedding materials used shall meet the following requirements:

1. Results of the tests specified in Table 02278H-A on a minimum of three samples of each material shall be used to obtain rock quality scores using the criteria given in the table. The score for each test is determined by multiplying the appropriate weighting factor by the score (0 to 10) based on the specific test result. The final score for each sample is the ratio of the sum of the individual test scores (six tests) to the maximum possible score, expressed as a percentage. To be acceptable, the final score must be no less than 65 percent for bedding material, and no less than 80 percent for Riprap Types A, B, C and D. The Schmidt Hammer Test and Splitting Tensile Strength Test will not be required on the bedding material or on Type A Riprap. The scoring of bedding material and Type A Riprap will be based on the four remaining tests.

2.3 SUBCONTRACTOR-PROPOSED SOURCES

A. The basis for approval of sources proposed by the Subcontractor shall be as follows:

1. A site inspection report by an engineering geologist which will include, as a minimum, an evaluation of soundness, hardness, and durability for three samples representative of the proposed source. The evaluation of durability shall be based in part on petrographic examination of rock types available from the source. In addition, the material shall meet the quality requirements of Article 2.2 above. Representativeness of samples shall be determined by the Contractor, based on precise location and source of sample taken in relation to the whole borrow area. The site inspection report shall include locations of all samples and methods of sampling.

2. If available, examples of successful uses of the material including riprap that has been in place on other project sites for more than 20 years, rock that has functioned satisfactorily as foundation stone or building facing for 50 years or more, and abandoned quarry faces which have maintained their integrity after not being worked for approximately 50 years or more. Durability shall be indicated by lack of significant weathering or loss of volume and strength over decades of exposure to natural weathering elements.

3. The Subcontractor shall have a qualified laboratory perform the six (6) types of tests listed in Table 02278H-A on each sample (minimum of 3 samples) obtained from the proposed source. Special attention shall be given to ensure that the samples are representative of the proposed rock materials. Test samples shall be obtained from within the precise locations of rock deposits from which materials will be produced. To be approved as a source, the final score for each sample shall be obtained and evaluated as specified in Paragraph 2.2.A.1.

2.4 GRADATION

A. Materials shall be reasonably well graded within the following limits:

1. Riprap:

U.S. Standard Sieve Size (Square Openings)	Percent Passing (by weight)
Type A	
3-inch	100
2-inch	30-100
1-1/2-inch	15-40
1-inch	0-22
1/2-inch	0-5
Type B	
8-inch	100
6-inch	40-100
4-inch	0-40
2-inch	0-20
1/2-inch	0-5

Type C

11-inch	100
8-inch	20-100
6-inch	0-40
4-inch	0-20
1-inch	0-5

Type D

14-inch	100
11-inch	40-100
8-inch	20-50
6-inch	10-30
4-inch	0-15
1-inch	0-5

2. Erosion protection materials from Shadow Mountain quarry shall consist of Dense Basalt or Matrix Basalt. Vesicular Basalt shall not be used.

B. Bedding Materials:

1. Bedding materials shall be obtained from the Nielson Rock quarry approved by the Contractor. Rock for the bedding material shall meet the quality requirements for riprap materials in Articles 2.1 and 2.2. The Subcontractor shall process the materials to conform with the gradation requirements specified below.

2. Gradation: Bedding materials shall be reasonably well graded within the following limits:

U.S. Standard Sieve Size (Square Openings)	Percent Passing (by weight)
3-inch	100
1-1/2-inch	60-100
3/4-inch	45-75
No. 20	22-45
No. 200	0-5

2.5 SOURCE QUALITY CONTROL

The Subcontractor shall have a qualified, experienced person present at the quarry during production of rock materials to ensure that only suitable quality rock is processed. The materials may be inspected and tested by

the Contractor at the borrow area prior to mining operations to ensure that they meet all requirements of this Specification with the exception of the gradation requirement. The Subcontractor shall assist the Contractor in obtaining samples. Gradation requirements will be tested at the placement location.

PART 3 - EXECUTION

3.1 PLACEMENT AND COMPACTION

A. Subgrade preparation for apron, ditches and gullies shall conform to Specification Section 02200H.

B. Where the required bedding material thickness is 6 inches, the bedding material shall be spread and compacted in one layer.

C. Each layer of bedding material shall be compacted by two passes of a 2- to 3-ton working weight vibratory smooth-drum roller operating across the slope, over the entire area of placement.

D. Riprap material shall be placed so that the larger pieces are uniformly distributed and the smaller pieces serve to fill the spaces between them to provide well-keyed, densely placed layers of riprap of the specified thicknesses.

E. Riprap material may be placed by end-dumping and may be spread by bulldozers or other suitable equipment.

F. Construction equipment other than spreading and compaction equipment shall not be allowed to move over the placed riprap material and bedding material layers except at equipment crossovers as designated by the Contractor. Each crossover shall be cleaned of all contaminating materials and approved by the Contractor before additional materials are placed in these areas.

3.2 TOLERANCES

A. The material layers shall be placed generally to the limits and thicknesses shown on the Subcontract Drawings within the following tolerances:

1. General:

   a. The minimum in-place thickness shall not be less than 90 percent of the thickness shown.

   b. The maximum in-place thickness shall not be more than 125 percent of the thickness shown.

   c. Local irregularities will be permitted provided that such irregularities do not form noticeable mounds, ridges, swales or depressions which in the opinion of the Contractor could cause concentrations of surface runoff or form ponds or gullies.

2. Bedding Materials: Top of bedding material shall be within 0.1 foot of elevations shown on the Subcontract Drawings.

3.3 FIELD QUALITY CONTROL

A. The placement of the materials will be inspected and tested by the Contractor during and after placement to ensure that the following requirements are met:

   1. The correct type of material is being placed.

   2. The material being placed is clean and free of unsuitable material.

   3. The material is being loaded, transported and placed in a manner which minimizes segregation.

   4. The material is being placed to line and grade within the tolerances and limits designated in Article 3.2 above.

   5. The material placed meets the gradation requirements specified.

B. Materials segregated or not placed according to the above requirements shall be regraded or adjusted, using appropriate equipment, to conform with the tolerances and limits given above, at no additional cost to the Contractor.

C. Materials not meeting the requirements of this Section shall be removed and replaced with specified materials at no additional cost to the Contractor. Rejected materials shall be disposed of offsite as Subcontractor's property

at no additional cost to the Contractor. Materials not meeting the grading requirements shall be reprocessed or discarded. The Contractor may require modification of the processing and grading operations to ensure that the specified grading requirements are met.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. Measurement for payment for the following materials will be by the cubic yards of material placed. The quantities shall be calculated from the lines and dimensions shown on the Subcontract Drawings:

1. Riprap Material, Type A
2. Riprap Material, Type B
3. Riprap Material, Type C
4. Riprap Material, Type D
5. Bedding Material

4.2 PAYMENT

Payment for the items of Article 4.1.A above, will be by their applicable unit prices per cubic yard quoted therefor in the Bid Schedule. The prices quoted shall include full compensation for furnishing labor, materials, tools, equipment and incidentals and for performing specified work including development of the source (where applicable), obtaining required permits (where applicable), clearing, stripping and excavating; processing the materials; testing and evaluating the materials; transporting to placement locations; placing; compacting and consolidating complete in place.

END OF SECTION 02278H

TABLE 02278H-A
ROCK QUALITY SCORING CRITERIA

	Weighting Factor			Score										
	Lime-stone	Sand-stone	Igne-ous	10	9	8	7	6	5	4	3	2	1	0
Specific Gravity	12	5	9	2.75	2.70	2.65	2.60	2.55	2.50	2.45	2.40	2.35	2.30	<2.3
Absorp-tion (%)	13	5	2	0.1	0.3	0.5	0.67	0.83	1.0	1.5	2.0	2.5	3.0	>3.0
Sodium Sulfate (%)*	4	3	11	1	3	5	6.7	8.3	10	12.5	15	20	25	>25
Abrasion (%)**	1	8	1	1	3	5	6.7	8.3	10	12.5	15	20	25	>25
Schmidt Hammer	11	13	3	70	65	60	54	47	40	32	24	16	8	<8
Splitting Tensile Strength (psi)	5	4	10	1400	1200	1000	833	666	500	400	300	200	100	<100

Note: Any rock to be used must be qualitatively rated at least "fair" in a petrographic examination conducted by a geologist experienced in petrographic analysis.

* 5 cycles
** 100 revolutions

Subcontract Drawings

UNITEI
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UM

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ACTION

PHA
CONSTRUCTI

MEXICAN I

STATES
T OF ENERGY

TRAP
AILINGS REMEDIAL
PROJECT

SE II
ON DRAWINGS

IAT, UTAH

REGISTERED ENGINEER
Nº 4719
EDWIN S. SMITH
STATE OF UTAH

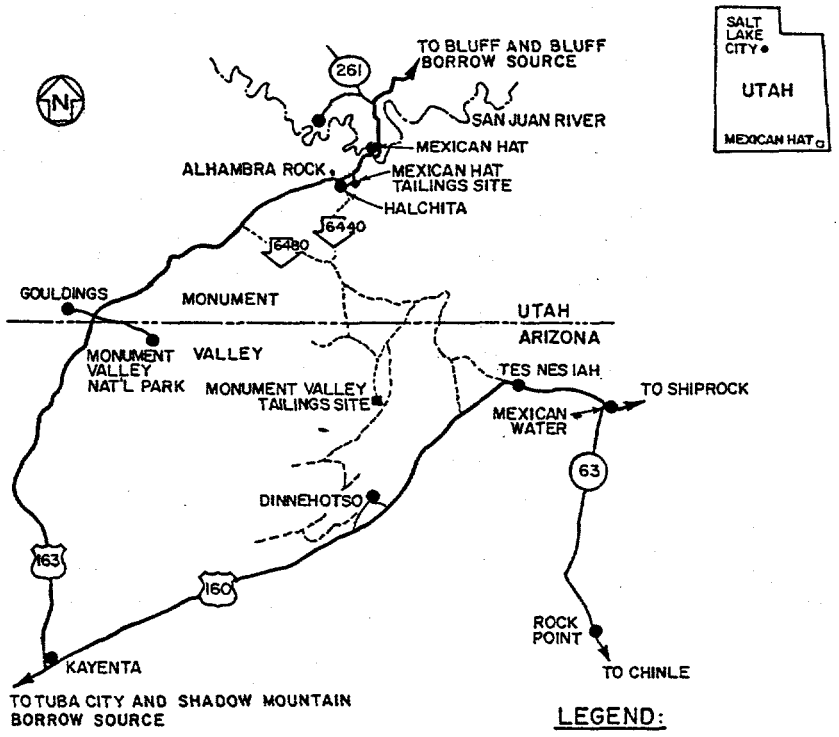
QA REVIEWED FOR QUALITY REQUIREMENTS BY Bill Compton 6-16-88

QA REVIEWED FOR QUALITY REQUIREMENTS BY ____________

88	ISSUED FOR CONSTRUCTION	—	—	—	—	—	—
E	REVISIONS	BY	CK	E&D MGR.	CHIEF ENG.	TAC REV.	DOE APP.

U. S. DEPARTMENT OF ENERGY
ALBUQUERQUE, NEW MEXICO

DESIGNED: H. M. / DRAWN: RBC	MEXICAN HAT SITE MEXICAN HAT, UTAH PHASE II CONSTRUCTION
CHECKED	
INSPECTED	TITLE SHEET
RECOMMENDED: F. I. FELIZ	
APPROVED / DATE: 6-15-88	E. S. Smith / 6/15/88 — DOE PROJECT ENGINEER — DATE: 6/14/88
MORRISON-KNUDSEN ENGINEERS, INC. UMTRA PROJECT 180 HOWARD ST. SAN FRANCISCO, CA 94105	PROJECT NO. DE-AC04-83AL18796
	DRAWING NO. HAT-PS-10-0951 — REV. 0

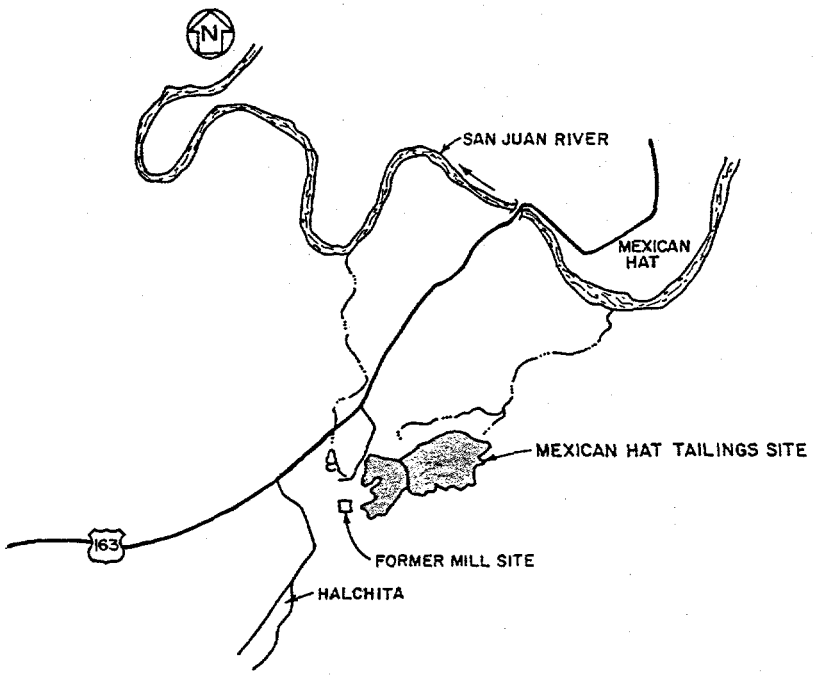


LOCATION MAP

5 0 5 10
SCALE MILES

LEGEND:

- 163 U.S. HIGHWAY
- 261 STATE HIGHWAY
- 6440 INDIAN SERVICE ROUTE
- 63 COUNTY ROAD



VICINITY MAP

0 1/2 1
SCALE MILE

5-16-88 PC	0
QA MK-F	NO.

LIST OF DRAWINGS

DRAWING NO.	DRAWING TITLE
HAT-PS-10-0951	TITLE SHEET
HAT-PS-10-0952	VICINITY MAP, LOCATION MAP & LIST OF DRAWINGS
HAT-PS-10-0953	SITE PLAN
HAT-PS-10-0954	BORROW AREA LOCATIONS
HAT-PS-10-0955	UPPER TAILINGS PILE EXCAVATION PLAN
HAT-PS-10-0956	WINDBLOWN MATERIALS EXCAVATION PLAN
HAT-PS-10-0957	TAILINGS EMBANKMENT PLAN
HAT-PS-10-0958	TAILINGS EMBANKMENT SECTIONS
HAT-PS-10-0959	TAILINGS EMBANKMENT DETAILS
HAT-PS-10-0960	FINAL SITE GRADING AND DRAINAGE PLAN
HAT-PS-10-0961	SITE DRAINAGE (SHEET 1 OF 4)
HAT-PS-10-0962	SITE DRAINAGE (SHEET 2 OF 4)
HAT-PS-10-0963	SITE DRAINAGE (SHEET 3 OF 4)
HAT-PS-10-0964	SITE DRAINAGE (SHEET 4 OF 4)
HAT-PS-10-0965	TAILINGS EMBANKMENT EROSION PROTECTION PLAN
HAT-PS-10-0966	BORING LOCATION PLAN
HAT-PS-10-0967	GEOLOGIC CROSS SECTIONS

QA REVIEWED FOR QUALITY REQUIREMENTS BY Bill Condon 6-16-88

REGISTERED ENGINEER NO. 4719 EDWIN S. SMITH STATE OF UTAH

E. S. Smith

		BY	CK	E&D MGR	CHIEF ENG	TAC REV.	DOE APP.
	ISSUED FOR CONSTRUCTION	—	—	—	—	—	—
	REVISIONS						

U. S. DEPARTMENT OF ENERGY
ALBUQUERQUE, NEW MEXICO

DESIGNED H. Hernandez | DRAWN RBC
CHECKED
INSPECTED
RECOMMENDED F.J. FELIZ
APPROVED | DATE 6-15-88 | E.S. Smith / | CW Leach 6/15/88 | DOE PROJECT ENGINEER | DATE 6/16/88

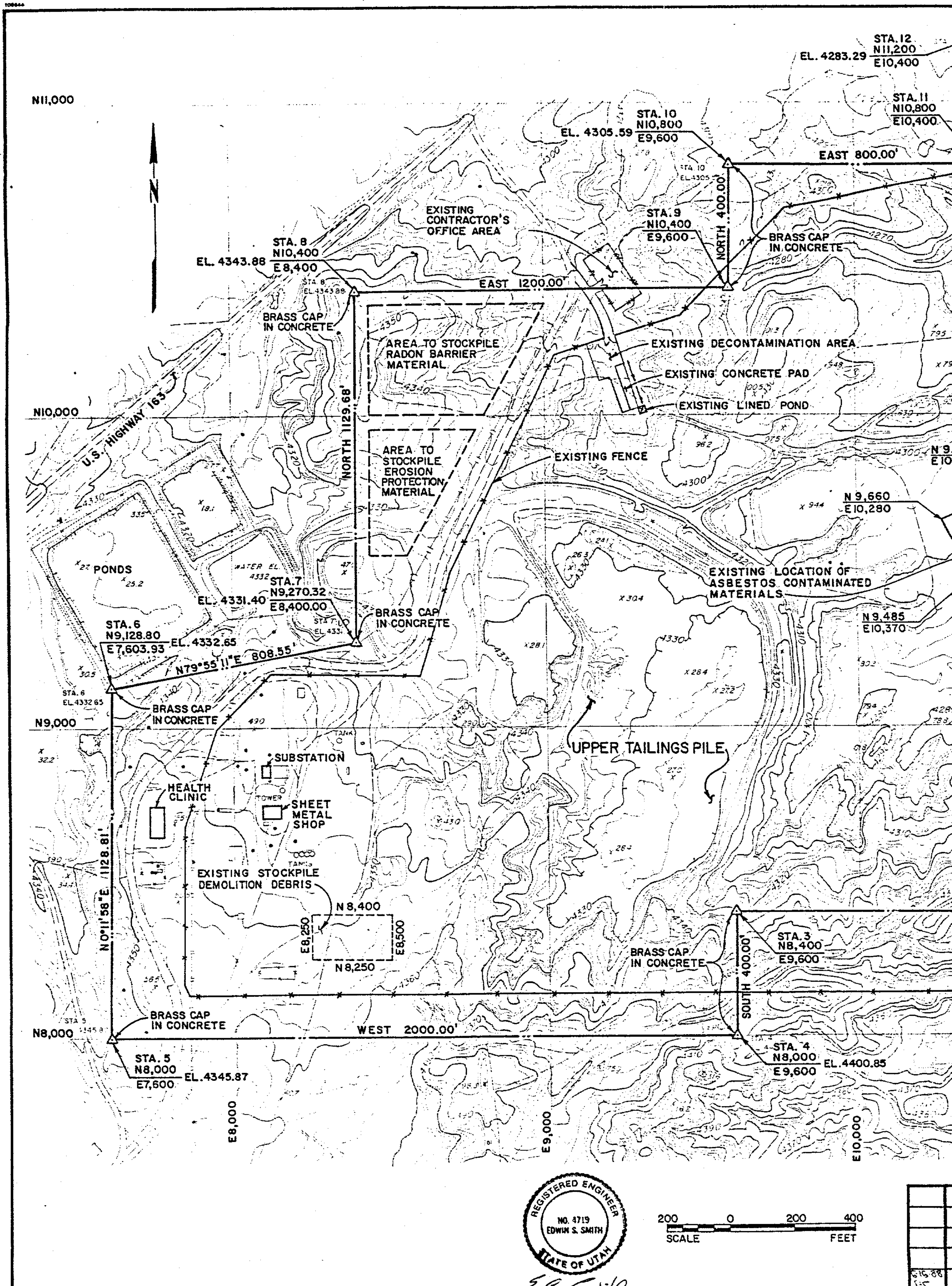
MEXICAN HAT SITE
MEXICAN HAT, UTAH
PHASE II CONSTRUCTION

VICINITY MAP, LOCATION MAP & LIST OF DRAWINGS

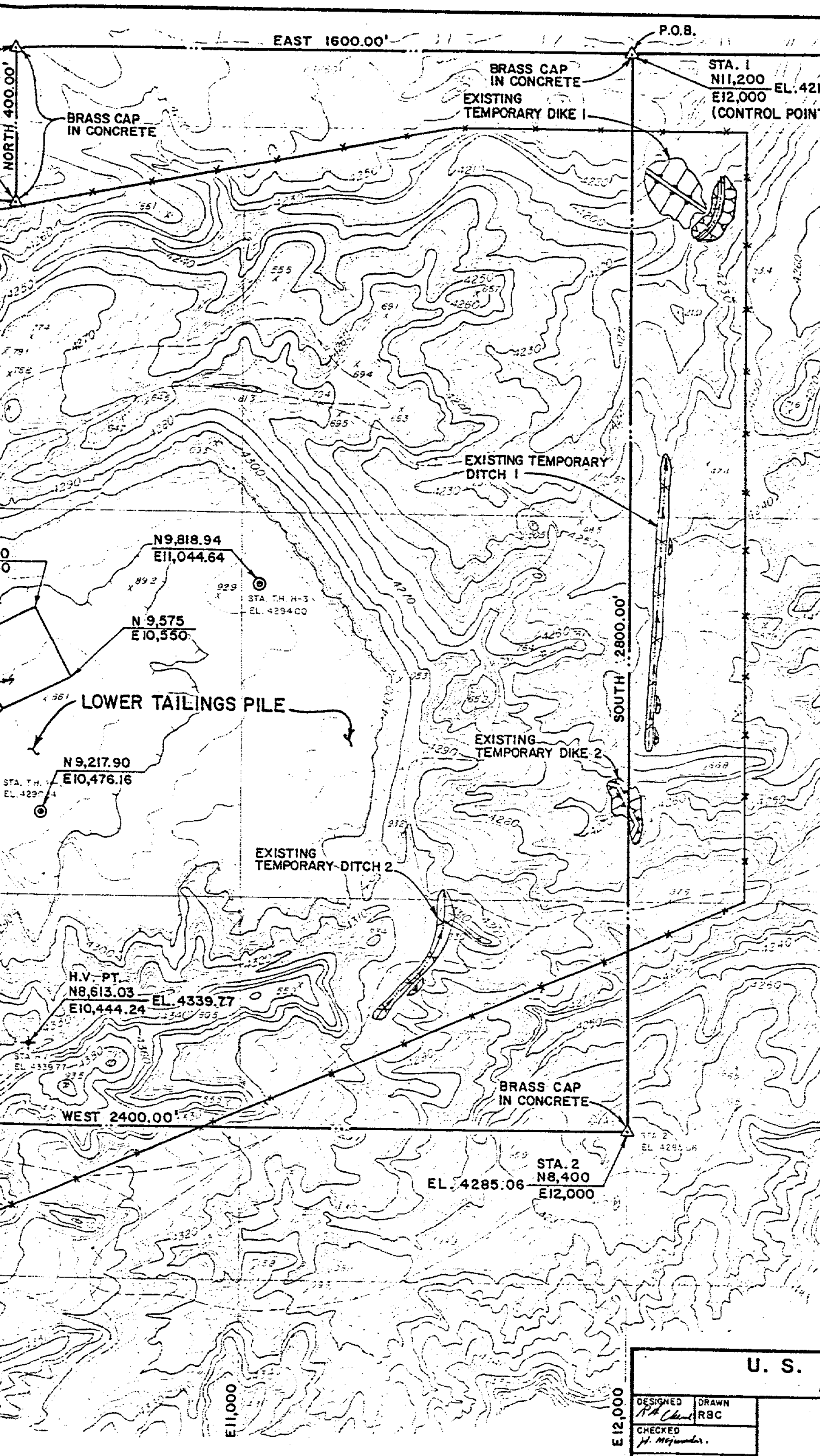
MORRISON-KNUDSEN ENGINEERS, INC.
A MORRISON-KNUDSEN COMPANY
UMTRA PROJECT
180 HOWARD ST. SAN FRANCISCO, CA 94105

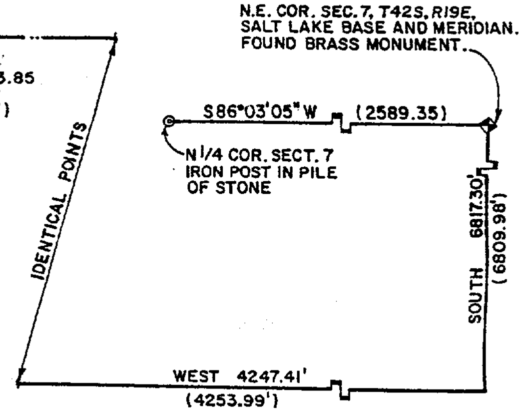
PROJECT NO. DE-AC04-83AL18796

DRAWING NO. HAT-PS-10-0952 | REV. 0



N11,000
N10,000
N9,000
N8,000
E8,000
E9,000
E10,000
N
STA. 12
N11,200
E10,400
EL. 4283.29
STA. 11
N10,800
E10,400
STA. 10
N10,800
E9,600
EL. 4305.59
EAST 800.00'
NORTH 400.00'
STA. 9
N10,400
E9,600
BRASS CAP
IN CONCRETE
EXISTING
CONTRACTOR'S
OFFICE AREA
STA. 8
N10,400
E8,400
EL. 4343.88
EAST 1200.00'
BRASS CAP
IN CONCRETE
AREA TO STOCKPILE
RADON BARRIER
MATERIAL
EXISTING DECONTAMINATION AREA
EXISTING CONCRETE PAD
EXISTING LINED POND
U.S. HIGHWAY 163
NORTH 1129.68'
AREA TO
STOCKPILE
EROSION
PROTECTION
MATERIAL
EXISTING FENCE
N 9,660
E10,280
PONDS
WATER EL.
4332
STA.7
N9,270.32
E8,400.00
EL. 4331.40
BRASS CAP
IN CONCRETE
EXISTING LOCATION OF
ASBESTOS CONTAMINATED
MATERIALS
N 9,485
E10,370
STA. 6
N9,128.80
E7,603.93
EL. 4332.65
N79°55'11"E 808.55'
BRASS CAP
IN CONCRETE
SUBSTATION
UPPER TAILINGS PILE
HEALTH
CLINIC
TOWER
SHEET
METAL
SHOP
TANKS
EXISTING STOCKPILE
DEMOLITION DEBRIS
N 8,400
E8,250
E8,500
N 8,250
N0°11'58"E 1128.81'
STA. 3
N8,400
E9,600
BRASS CAP
IN CONCRETE
SOUTH 400.00'
BRASS CAP
IN CONCRETE
WEST 2000.00'
STA. 5
N8,000
E7,600
EL. 4345.87
STA. 4
N8,000
E9,600
EL. 4400.85
REGISTERED ENGINEER
NO. 4719
EDWIN S. SMITH
STATE OF UTAH
E. S. Smith
200
0
200
400
SCALE
FEET
QA
MK-F





NOTES:

1. SECTION CORNER TIE SHOWN IN PARENTHESIS IS PER CONTROL FOUND ON STAKE OUT OF HALCHETA HOUSING DEVELOPMENT.
2. FOR HORIZONTAL AND VERTICAL CONTROL, THE SUBCONTRACTOR SHALL USE POINTS MARKED THUSLY: △ (BRASS CAP IN CONCRETE). SUBCONTRACTOR MAY USE OTHER CONTROL POINTS AFTER VERIFICATION BY SURVEY.
3. HORIZONTAL AND VERTICAL CONTROL POINTS ESTABLISHED BY WESTERN DESIGN CONSULTANTS OF SALT LAKE, UTAH.
4. TOPOGRAPHIC SURVEY CONDUCTED BY WESTERN DESIGN CONSULTANTS ON AUGUST 11, 1982. ELEVATIONS ARE TWO FEET INTERVALS AND ARE TIED TO DATUM POINT NORTHEAST CORNER SECTION 7, T42S, R19E, SALT LAKE BASE AND MERIDIAN.
5. COORDINATES SHOWN ARE THE PROJECT COORDINATES. STATE COORDINATES FOR STA. 4 ARE X = 2,473,150.34 AND Y = 172,750.12, SURVEYED BY SAN JUAN ENGINEERS OF FARMINGTON N.M., JUNE 1987.
6. FOR WATERLINE AS-BUILTS SEE DRAWING NO. HAT-PS-10-0961
7. THE ACCESS CONTROL TRAILER SHALL BE LOCATED IN THE DECONTAMINATION AREA AS DIRECTED BY THE CONTRACTOR. THE CONTRACTORS' RADIOLOGICAL CONTROL AND QUALITY CONTROL TRAILERS, AND THE STORAGE VAN, SHALL BE LOCATED IN THE CONTRACTORS' OFFICE AREA AS DIRECTED BY THE CONTRACTOR.

LEGEND:

Symbol	Meaning
4290 (line)	EXISTING SITE FEATURES AND CONTOURS
(line)	SITE BOUNDARY
E10,000	CONSTRUCTION GRID COORDINATE
◉	TEST HOLE
△	BRASS CAP IN CONCRETE

REFERENCE DRAWINGS:

HAT-PS-10-0961 SITE DRAINAGE (SHEET 1 OF 4)

QA REVIEWED FOR QUALITY REQUIREMENTS BY Bill Conaldson 6-16-88

U. S. DEPARTMENT OF ENERGY
ALBUQUERQUE, NEW MEXICO

MEXICAN HAT SITE
MEXICAN HAT, UTAH
PHASE II CONSTRUCTION

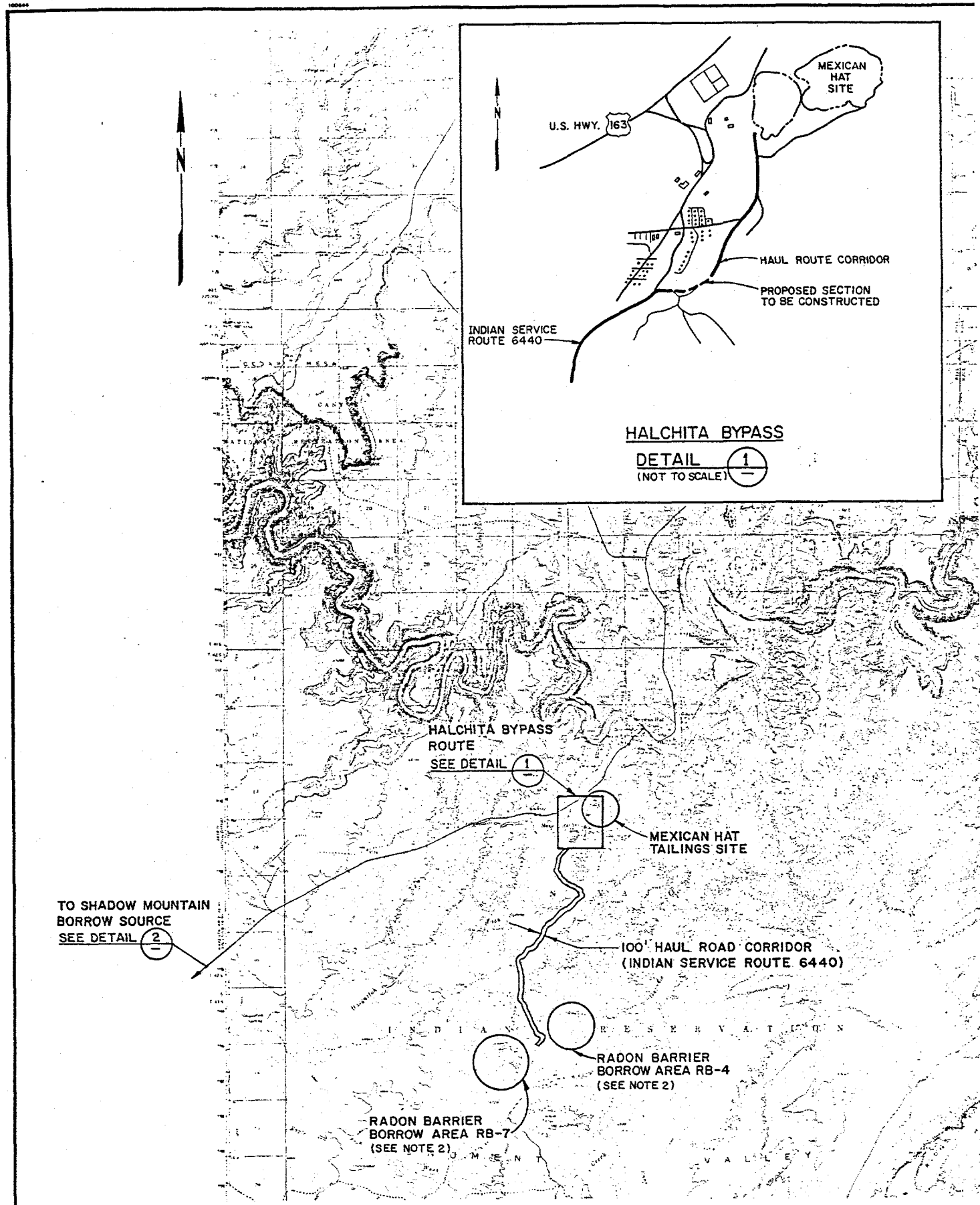
SITE PLAN

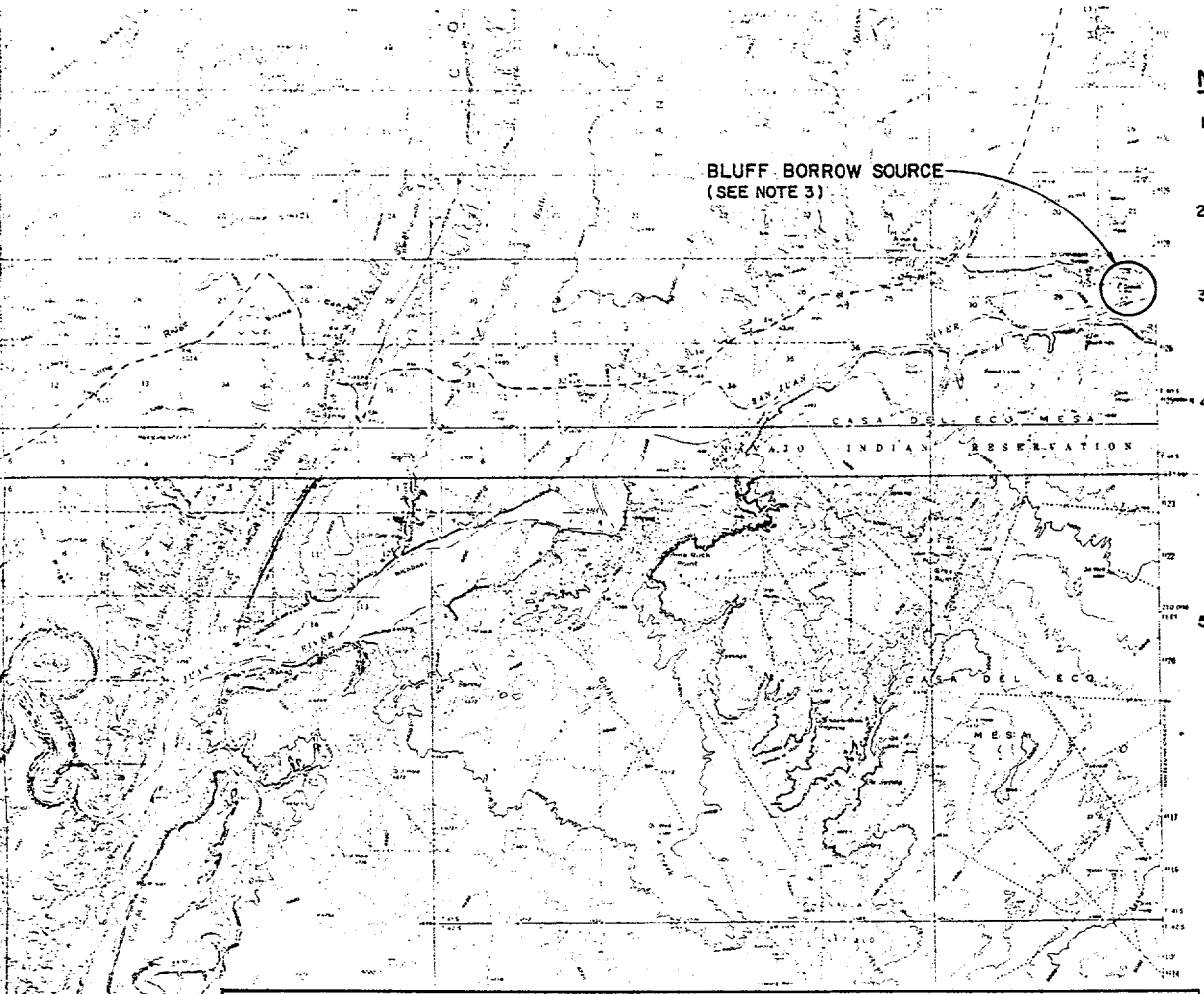
DESIGNED: R.A. Clark — DRAWN: RBC
CHECKED: H. Mejumder
INSPECTED: A. Anyford
RECOMMENDED: F.J. Feliz
APPROVED: J.R. Nathan — DATE: 6-15-88 — E.S. Smith — C.W. Lord 6/15/88
DOE PROJECT ENGINEER: John L.D. Antonio — DATE: 6/16/88

MORRISON-KNUDSEN ENGINEERS, INC.
A MORRISON-KNUDSEN COMPANY
UMTRA PROJECT
180 HOWARD ST. SAN FRANCISCO, CA 94105

PROJECT NO. DE-AC04-83AL18796
DRAWING NO. HAT-PS-10-0953 — REV. 0

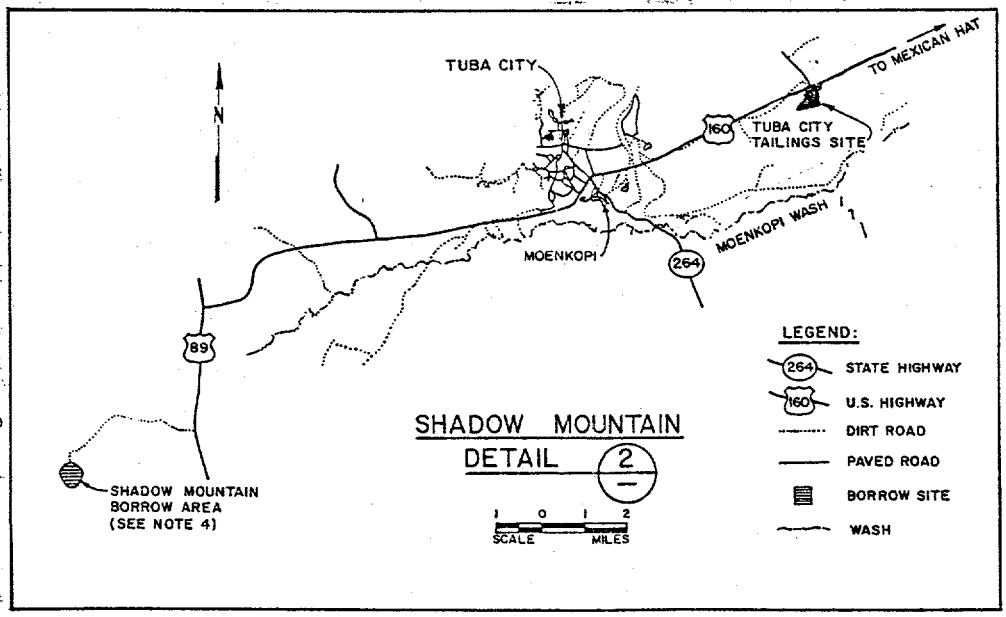
DATE	REVISIONS	BY	CK	E&D MGR.	CHIEF ENG.	TAC REV	DOE APP.
24-88	ISSUED FOR CONSTRUCTION	–	–	–	–	–	–


N
MEXICAN HAT SITE
U.S. HWY. 163
HAUL ROUTE CORRIDOR
PROPOSED SECTION TO BE CONSTRUCTED
INDIAN SERVICE ROUTE 6440
HALCHITA BYPASS
DETAIL 1
(NOT TO SCALE)
HALCHITA BYPASS ROUTE
SEE DETAIL 1
MEXICAN HAT TAILINGS SITE
TO SHADOW MOUNTAIN BORROW SOURCE
SEE DETAIL 2
100' HAUL ROAD CORRIDOR
(INDIAN SERVICE ROUTE 6440)
RADON BARRIER BORROW AREA RB-4
(SEE NOTE 2)
RADON BARRIER BORROW AREA RB-7
(SEE NOTE 2)
1 1/2 0 1 2
SCALE MILES



NOTES:

1. TOPOGRAPHIC MAP TAKEN FROM U.S.G.S. 15 MIN. QUAD. MAP – CEDAR MESA, BLUFF, MEXICAN HAT AND BOUNDARY BUTTE.
2. THE SURVEY PLAT FOR THE RADON BARRIER BORROW AREAS, RB-4 AND RB-7 ARE AVAILABLE IN THE PROJECT OFFICE.
3. THE BLUFF BORROW SOURCE (NIELSON'S GRAVEL PIT) IS LOCATED APPROXIMATELY 1.5 MILES EAST OF BLUFF UTAH, ALONG HIGHWAY 262. THE SITE IS ACCESSIBLE THROUGH A SHORT GRAVEL ROAD.
4. THE BLUFF BORROW SOURCE MAY REQUIRE EXTENSIVE PROCESSING OF EXCAVATED MATERIALS TO OBTAIN REQUIRED GRADATIONS. THE SUBCONTRACTOR MAY PROPOSE ALTERNATIVE ROCK BORROW SOURCES SUBJECT TO CONTRACTOR APPROVAL. THE SUBCONTRACTOR SHALL BE RESPONSIBLE FOR ALL PERMITS AND TESTING NECESSARY TO SHOW THAT THE ALTERNATIVE SOURCE OF MATERIALS MEETS SPECIFICATIONS.
5. THE SHADOW MOUNTAIN BORROW SOURCE IS LOCATED APPROXIMATELY 3 MILES SOUTH OF THE INTERSECTION OF ROUTES 160 AND 89 AND 5 MILES WEST ALONG AN UNPAVED ROAD.



REGISTERED ENGINEER
NO. 4719
EDWIN S. SMITH
STATE OF UTAH

E.S. Smith

QA REVIEWED FOR QUALITY REQUIREMENTS
BY [illegible]
6-16-88

U. S. DEPARTMENT OF ENERGY
ALBUQUERQUE, NEW MEXICO

DESIGNED	DRAWN
RFC	RBC
CHECKED	
INSPECTED	
RECOMMENDED	
F.J. FELIZ	

MEXICAN HAT SITE
MEXICAN HAT, UTAH
PHASE II CONSTRUCTION

BORROW AREA LOCATIONS

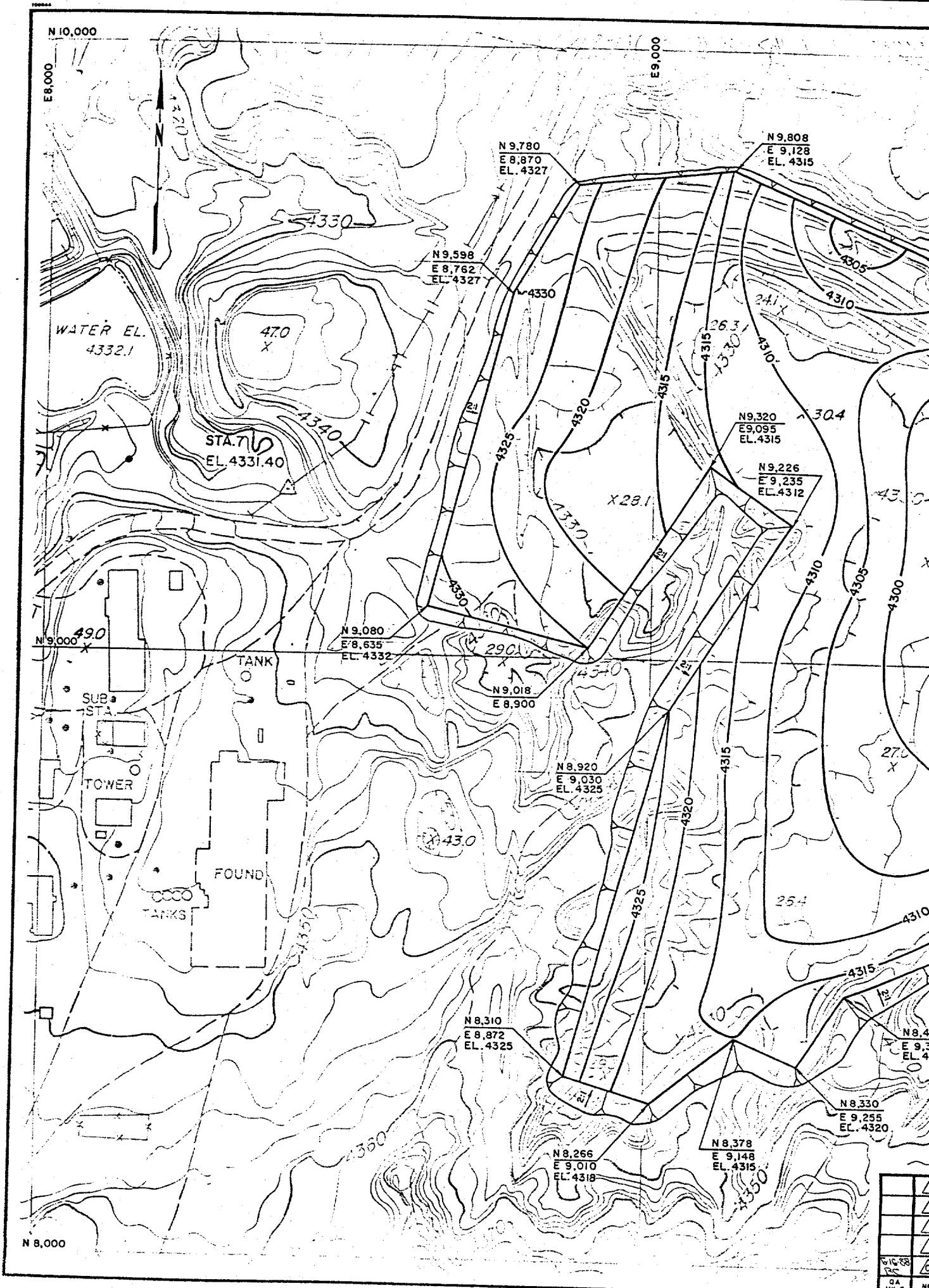
APPROVED	DATE		DOE PROJECT ENGINEER	DATE
	6-15	E.S. Smith / 6/15/88		6/16/88

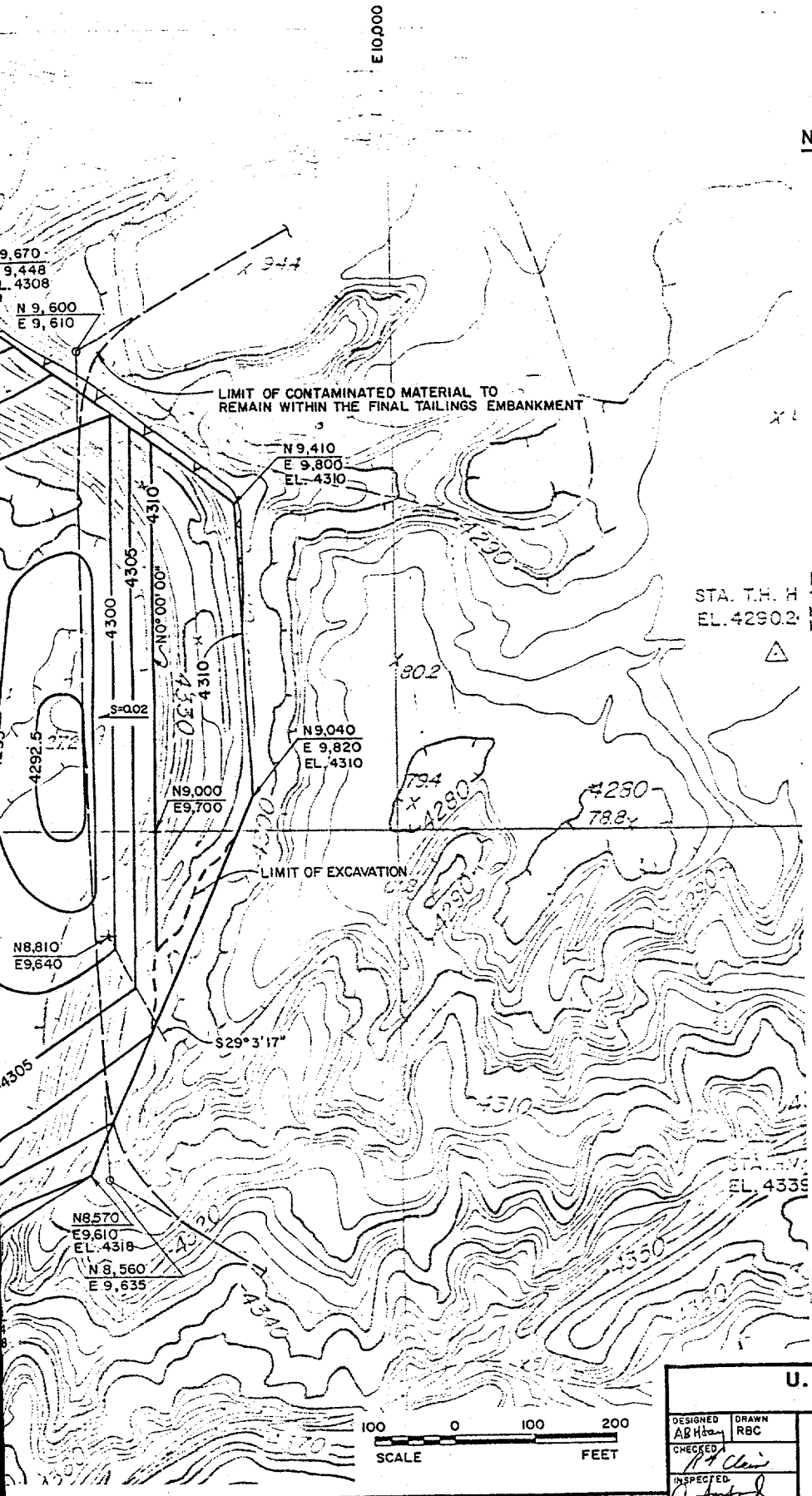
MORRISON-KNUDSEN ENGINEERS, INC.
A MORRISON-KNUDSEN COMPANY
UMTRA PROJECT
180 HOWARD ST SAN FRANCISCO, CA 94105

PROJECT NO. DE-AC04-83AL18796

DRAWING NO. HAT-PS-10-0954 REV. 0

DATE	REVISIONS	BY	CK	E&O MGR.	CHIEF ENG.	TAC REV.	DOE APP.
6-24-88	ISSUED FOR CONSTRUCTION	—	—	—	—	—	—


N 10,000
E 8,000
E 9,000
N 9,780
E 8,870
EL. 4327
N 9,808
E 9,128
EL. 4315
N 9,598
E 8,762
EL. 4327
WATER EL.
4332.1
47.0
STA. 7
EL. 4331.40
N 9,320
E 9,095
EL. 4315
N 9,226
E 9,235
EL. 4312
N 9,080
E 8,635
EL. 4332
N 9,000
TANK
SUB STA.
TOWER
FOUND
TANKS
N 9,018
E 8,900
N 8,920
E 9,030
EL. 4325
N 8,310
E 8,872
EL. 4325
N 8,330
E 9,255
EL. 4320
N 8,266
E 9,010
EL. 4318
N 8,378
E 9,148
EL. 4315
N 8,000



NOTES:

1. ALL EXCAVATED CUT SLOPES SHALL BE 2(H):1(V) MAXIMUM.
2. COORDINATES SHOWN ARE ESTIMATED LIMIT OF EXCAVATION. FINAL EXCAVATION LIMITS WILL BE DETERMINED BY THE CONTRACTOR DURING CONSTRUCTION.
3. CONTAMINATED MATERIAL WITHIN THE FINAL TAILINGS EMBANKMENT SHALL BE EXCAVATED TO THE LIMITS SHOWN. LIMIT MAY BE ADJUSTED DURING CONSTRUCTION AS REQUIRED.

REFERENCE DRAWINGS:

HAT-PS-10-0960	FINAL SITE GRADING AND DRAINAGE PLAN
HAT-PS-10-0957	TAILINGS EMBANKMENT PLAN

LEGEND:

LIMIT OF CUT

REGISTERED ENGINEER NO. 4719 EDWIN S. SMITH STATE OF UTAH

E.S. Smith

QA REVIEWED FOR QUALITY REQUIREMENTS BY Bill Grossman 6-16-88

DATE	REVISIONS	BY	CK	E&D MGR.	CHIEF ENG.	TAC REV.	DOE APP.
6-24-88	ISSUED FOR CONSTRUCTION	—	—	—	—	—	—

U. S. DEPARTMENT OF ENERGY

ALBUQUERQUE, NEW MEXICO

DESIGNED AB Hay | DRAWN RBC
CHECKED
INSPECTED
RECOMMENDED F.J. Peiz

MEXICAN HAT SITE
MEXICAN HAT, UTAH
PHASE II CONSTRUCTION

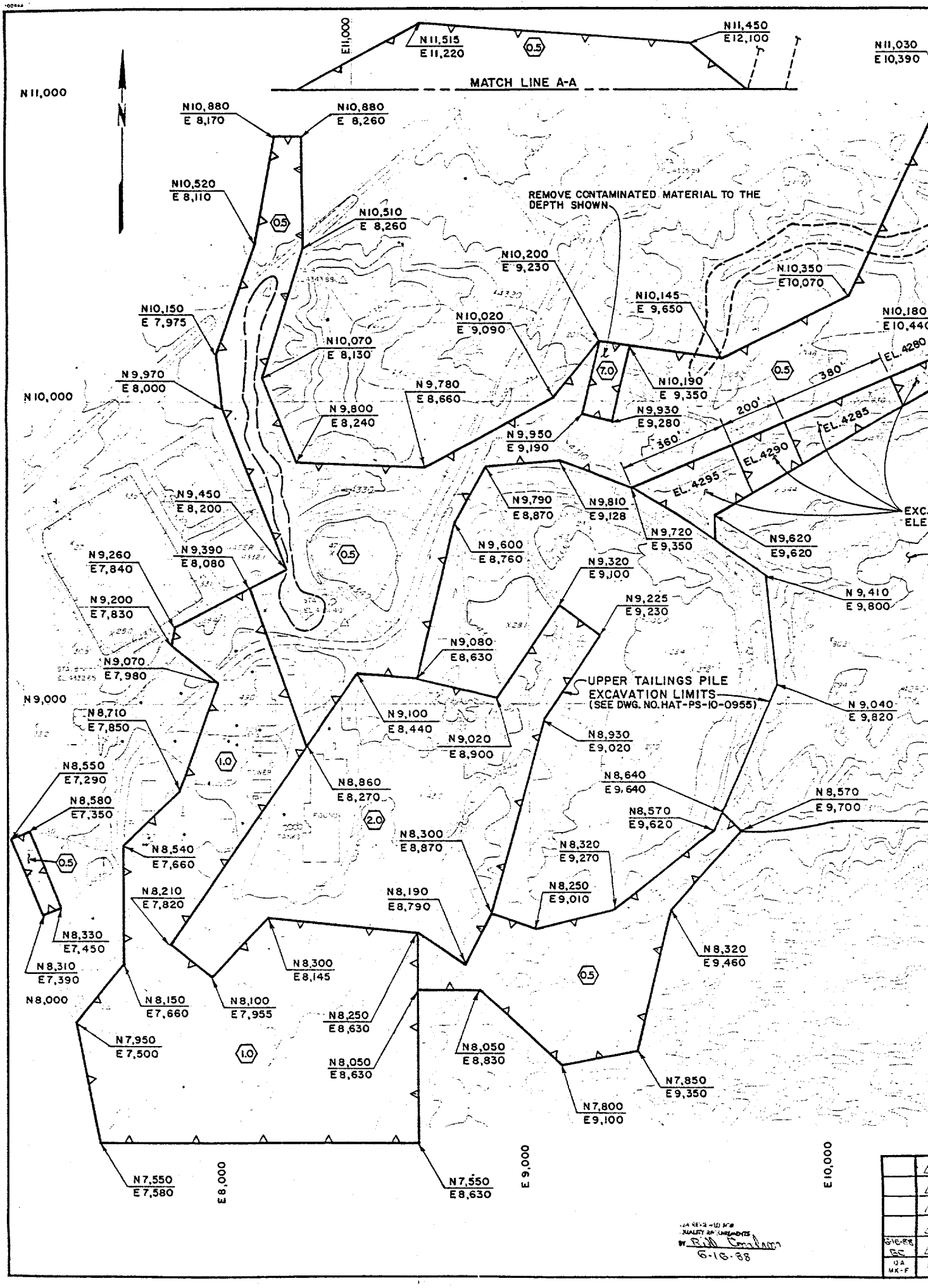
UPPER TAILINGS PILE EXCAVATION PLAN

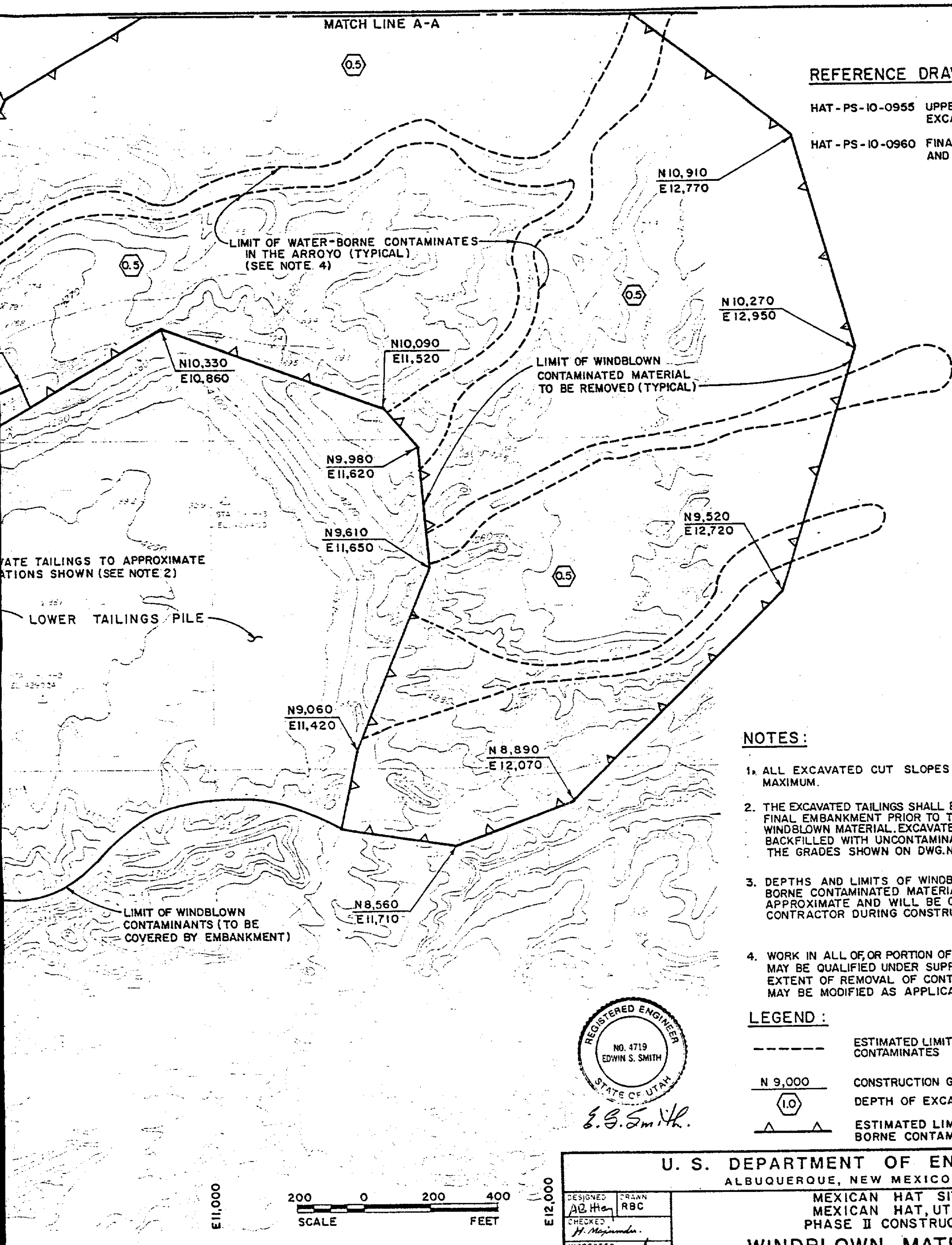
APPROVED | DATE 6-15-88 | E.S. Smith / Acting 6/15/88 | DOE PROJECT ENGINEER John R. D'Antonio | DATE 6/15/88

MORRISON-KNUDSEN ENGINEERS, INC.
A MORRISON-KNUDSEN COMPANY
UMTRA PROJECT
180 HOWARD ST. SAN FRANCISCO, CA 94105

PROJECT NO. DE-AC04-83AL18796

DRAWING NO. HAT-PS-10-0955 | REV. 0


MATCH LINE A-A
N11,515 E11,220
N11,450 E12,100
N11,030 E10,390
N11,000
N10,880 E 8,170
N10,880 E 8,260
N10,520 E 8,110
N10,510 E 8,260
REMOVE CONTAMINATED MATERIAL TO THE DEPTH SHOWN
N10,200 E 9,230
N10,350 E10,070
N10,145 E 9,650
N10,180 E10,440
N10,150 E 7,975
N10,020 E 9,090
N10,070 E 8,130
N10,190 E 9,350
EL. 4280
380'
200'
360'
EL. 4285
EL. 4290
EL. 4295
N10,000
N9,970 E 8,000
N9,780 E 8,660
N9,800 E 8,240
N9,930 E9,280
N9,950 E 9,190
N9,450 E 8,200
N9,790 E 8,870
N9,810 E9,128
N9,720 E9,350
N9,620 E9,620
N9,390 E 8,080
N9,600 E 8,760
N9,320 E9,100
N9,260 E7,840
N9,200 E7,830
N9,225 E9,230
N9,410 E 9,800
N9,080 E8,630
N9,070 E7,980
UPPER TAILINGS PILE EXCAVATION LIMITS (SEE DWG. NO. HAT-PS-10-0955)
N9,000
N8,710 E 7,850
N9,100 E 8,440
N9,020 E 8,900
N9,040 E 9,820
N8,930 E9,020
N8,550 E7,290
N8,580 E7,350
N8,860 E 8,270
N8,640 E 9,640
N8,570 E 9,700
N8,570 E9,620
N8,540 E7,660
N8,300 E8,870
N8,320 E9,270
N8,210 E7,820
N8,190 E8,790
N8,250 E9,010
N8,330 E7,450
N8,310 E7,390
N8,320 E9,460
N8,300 E8,145
N8,000
N8,150 E7,660
N8,100 E7,955
N8,250 E8,630
N7,950 E 7,500
N8,050 E8,630
N8,050 E8,830
N7,850 E9,350
N7,800 E9,100
N7,550 E7,580
N7,550 E8,630
E8,000
E9,000
E10,000
7.0
2.0
1.0
0.5



REFERENCE DRAWINGS:

HAT-PS-10-0955 UPPER TAILINGS PILE EXCAVATION PLAN.

HAT-PS-10-0960 FINAL SITE GRADING AND DRAINAGE PLAN.

NOTES:

1. ALL EXCAVATED CUT SLOPES SHALL BE 2(H):1(V) MAXIMUM.
2. THE EXCAVATED TAILINGS SHALL BE PLACED ON THE FINAL EMBANKMENT PRIOR TO THE PLACEMENT OF WINDBLOWN MATERIAL. EXCAVATED AREAS SHALL BE BACKFILLED WITH UNCONTAMINATED MATERIAL TO THE GRADES SHOWN ON DWG. NO. HAT-PS-10-0960.
3. DEPTHS AND LIMITS OF WINDBLOWN AND WATER-BORNE CONTAMINATED MATERIALS SHOWN ARE APPROXIMATE AND WILL BE CONFIRMED BY THE CONTRACTOR DURING CONSTRUCTION
4. WORK IN ALL OF, OR PORTION OF THE ARROYOS MAY BE QUALIFIED UNDER SUPPLEMENTAL STANDARDS. EXTENT OF REMOVAL OF CONTAMINATED MATERIALS MAY BE MODIFIED AS APPLICABLE.

LEGEND:

- - - - - - ESTIMATED LIMITS OF WATER-BORNE CONTAMINATES

N 9,000 CONSTRUCTION GRID COORDINATES

(1.0) DEPTH OF EXCAVATION IN FEET

△ △ ESTIMATED LIMITS OF WATER-BORNE CONTAMINANTS

REGISTERED ENGINEER NO. 4719 EDWIN S. SMITH STATE OF UTAH

E.S. Smith

U. S. DEPARTMENT OF ENERGY
ALBUQUERQUE, NEW MEXICO

MEXICAN HAT SITE
MEXICAN HAT, UTAH
PHASE II CONSTRUCTION

WINDBLOWN MATERIALS EXCAVATION PLAN

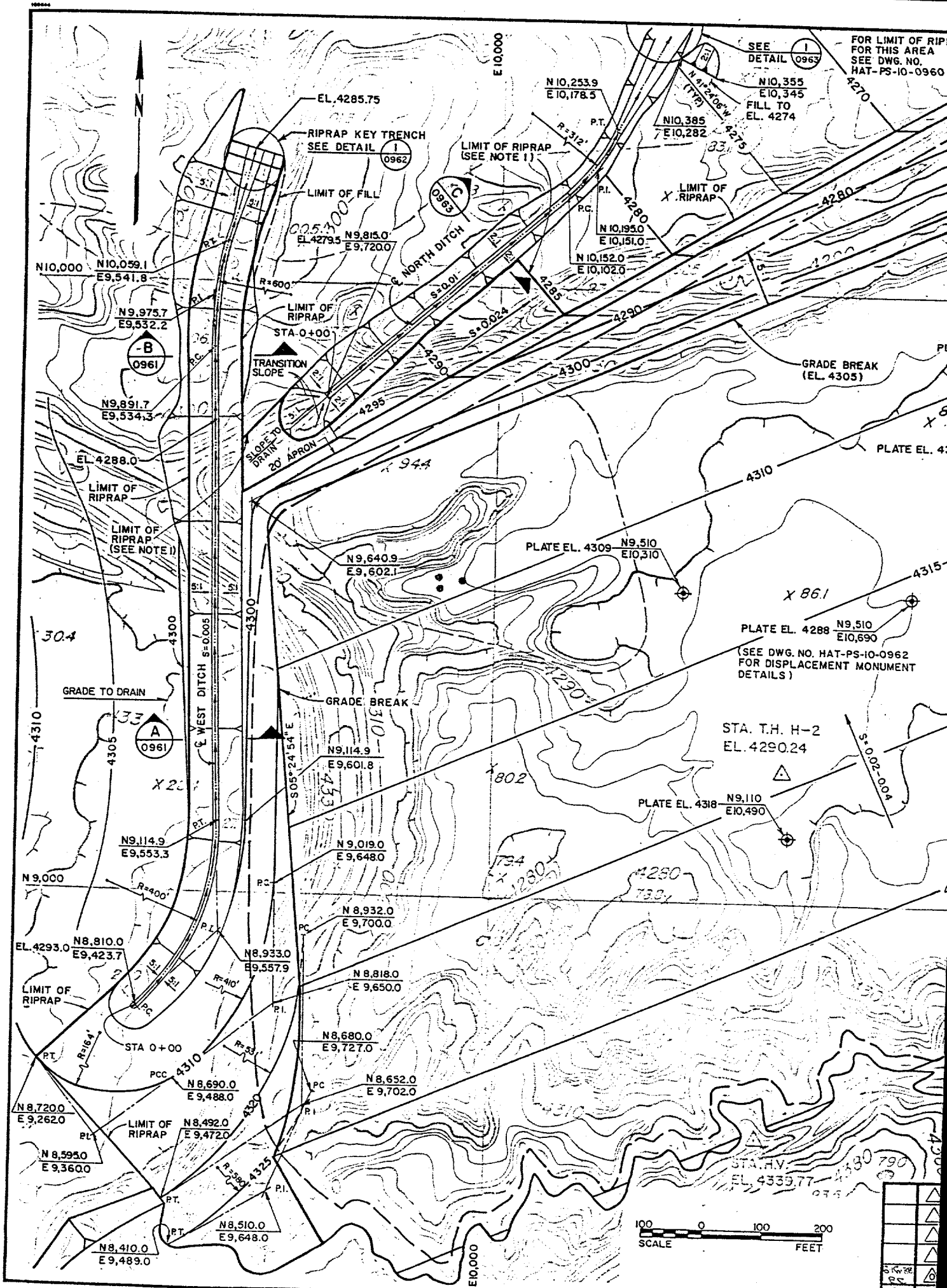
DESIGNED: AB Hla — DRAWN: RBC
CHECKED: H. Majumder
INSPECTED: [signature]
RECOMMENDED: F. J. Feliz
APPROVED: [signature] — DATE 6-15-88 — E.S. Smith / C.W. Wade 6/15/88 — DOE PROJECT ENGINEER: John R. DiAntonio — DATE 6/18/88

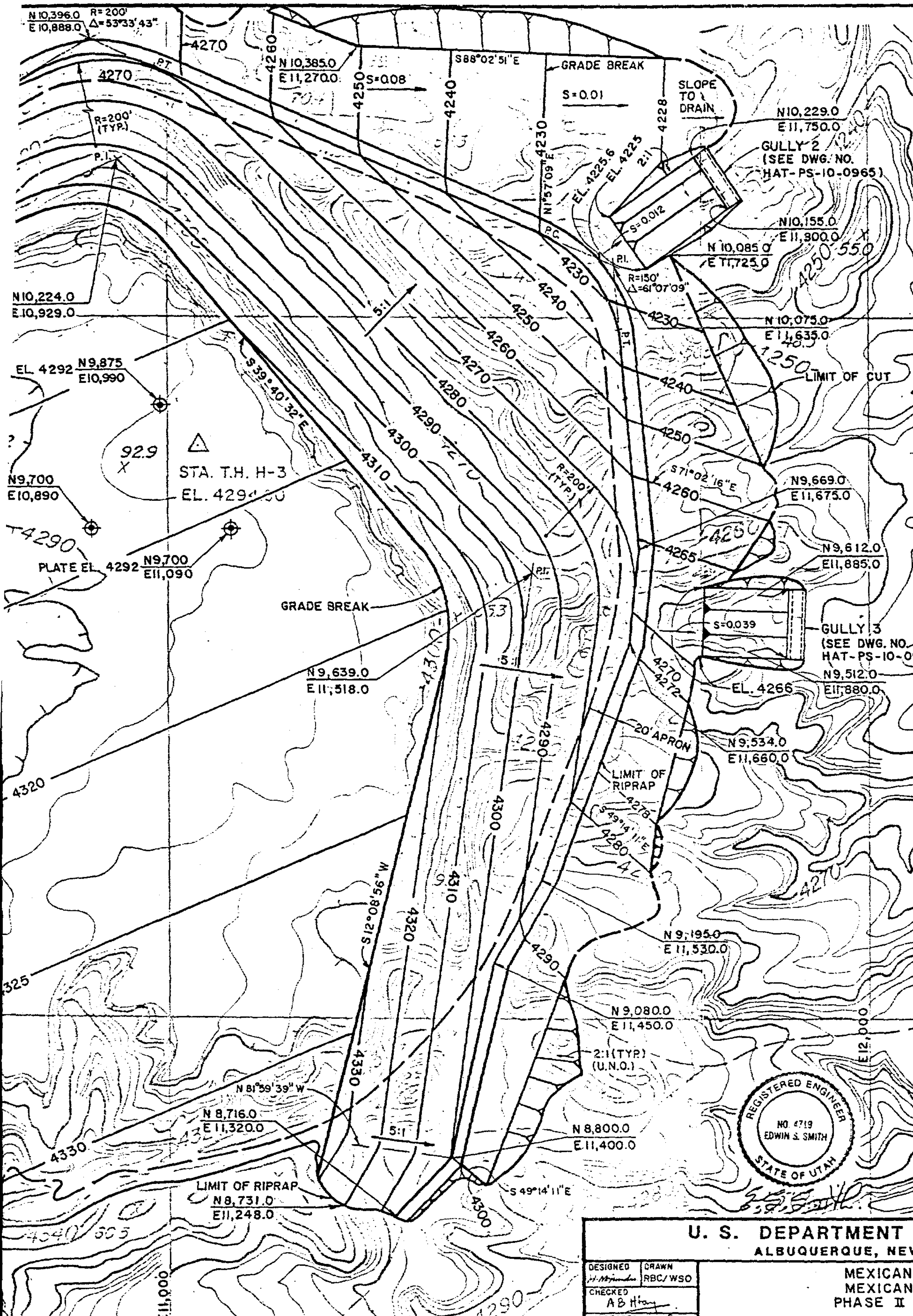
MORRISON-KNUDSEN ENGINEERS, INC.
UMTRA PROJECT
180 HOWARD ST. SAN FRANCISCO CA 94105

PROJECT NO: DE-AC04-83AL18796

DRAWING NO: HAT-PS-10-0956 — REV 0

	DATE	REVISIONS	BY	CK	ENG MGR	CHIEF ENG	TAC REV	DOE APP
	6-24-88	ISSUED FOR CONSTRUCTION	—	—	—	—	—	—


N
SEE DETAIL 1 0963
FOR LIMIT OF RIP
FOR THIS AREA
SEE DWG. NO.
HAT-PS-10-0960
N 10,253.9
E 10,178.5
N10,355
E10,345
FILL TO
EL. 4274
N10,385
E10,282
EL.4285.75
RIPRAP KEY TRENCH
SEE DETAIL 1 0962
LIMIT OF RIPRAP
(SEE NOTE 1)
LIMIT OF FILL
LIMIT OF
RIPRAP
N10,195.0
E10,151.0
N10,152.0
E10,102.0
N10,059.1
E9,541.8
N10,000
N9,815.0
E9,720.0
EL 4279.5
℄ NORTH DITCH
S=0.01
S=0.024
N9,975.7
E9,532.2
B 0961
STA 0+00
TRANSITION
SLOPE
GRADE BREAK
(EL. 4305)
N9,891.7
E9,534.3
EL 4288.0
SLOPE TO
DRAIN
20' APRON
PLATE EL. 4309
N9,510
E10,310
N9,640.9
E9,602.1
PLATE EL. 4288
N9,510
E10,690
(SEE DWG. NO. HAT-PS-10-0962
FOR DISPLACEMENT MONUMENT
DETAILS)
GRADE TO DRAIN
GRADE BREAK
℄ WEST DITCH S=0.005
A 0961
STA. T.H. H-2
EL. 4290.24
S=0.02-004
N9,114.9
E9,601.8
S05°24'54"E
PLATE EL. 4318
N9,110
E10,490
N9,114.9
E9,553.3
N 9,019.0
E 9,648.0
N 9,000
R=400'
N 8,932.0
E 9,700.0
EL.4293.0
N8,810.0
E9,423.7
N8,933.0
E9,557.9
N 8,818.0
E 9,650.0
LIMIT OF
RIPRAP
R=410'
N8,680.0
E9,727.0
STA 0+00
R=164'
PCC
N8,690.0
E9,488.0
N8,652.0
E9,702.0
N 8,720.0
E 9,262.0
LIMIT OF
RIPRAP
N8,492.0
E9,472.0
N 8,595.0
E 9,360.0
R=380'
N8,510.0
E9,648.0
N8,410.0
E9,489.0
STA. H.V.
EL. 4339.77
E10,000
100 0 100 200
SCALE FEET



NOTES:

1. ALL FILL AREAS DOWNSLOPE FROM THE 20'-0 APRON SHALL BE COVERED WITH 6 INCHES OF BEDDING MATERIAL AND 12 INCHES OF TYPE B MATERIAL UNLESS NOTED OTHERWISE. (SEE DWG. NO. HAT-PS-10-0965)
2. BASED ON THE INFORMATION OBTAINED FROM THE PHASE I CONTRACT, NATURAL ROCK SURFACE IS APPROXIMATELY 12 INCHES BELOW THE EXISTING GROUND SURFACE.
3. CORNER CONTOURS ON THE TAILINGS EMBANKMENT SHALL BE ROUNDED WITH A 50' RADIUS IN THE PLAN VIEW UNLESS NOTED OTHERWISE.

REFERENCE DRAWINGS:

HAT-PS-10-0961
SITE DRAINAGE (SHEET 1 OF 4)

HAT-PS-10-0962
SITE DRAINAGE (SHEET 2 OF 4)

HAT-PS-10-0963
SITE DRAINAGE (SHEET 3 OF 4)

HAT-PS-10-0965
TAILINGS EMBANKMENT EROSION PROTECTION PLAN

LEGEND:

4300	EXISTING CONTOURS
—4320—	FINAL CONTOURS
	DRAINAGE DITCH
N10,000	CONSTRUCTION GRID COORDINATE
	TOP OF CUT
	TOP OF FILL
	LIMIT OF CONTAMINATED MATERIAL
	DISPLACEMENT MONUMENT LOCATION & ELEVATION OF BASE PLATE

QA REVIEWED FOR QUALITY REQUIREMENTS BY Bill Goodman 6-16-88

U. S. DEPARTMENT OF ENERGY
ALBUQUERQUE, NEW MEXICO

MEXICAN HAT SITE
MEXICAN HAT, UTAH
PHASE II CONSTRUCTION

TAILINGS EMBANKMENT PLAN

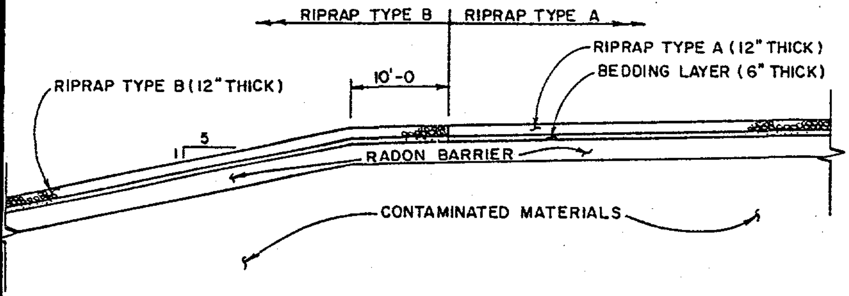
DESIGNED	DRAWN RBC/WSO				
CHECKED AB Hay					
INSPECTED					
RECOMMENDED F. J. Feliz					
APPROVED	DATE 6-15-88	E.S. Smith	6/15/88	DOE PROJECT ENGINEER John R. D'Antonio	DATE 6/16/88

MORRISON-KNUDSEN ENGINEERS, INC.
A MORRISON-KNUDSEN COMPANY
UMTRA PROJECT
180 HOWARD ST. SAN FRANCISCO, CA 94105

PROJECT NO. DE-AC04-83AL18796

DRAWING NO. HAT-PS-10-0957 REV. 0

DATE	REVISIONS	BY	CK	E&D MGR.	CHIEF ENG.	TAC REV	DOE APP.
6-24-88	ISSUED FOR CONSTRUCTION	—	—	—	—	—	—



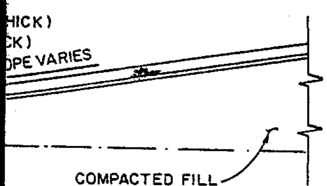
TYPICAL TRANSITION FROM RIPRAP TYPE A TO TYPE B

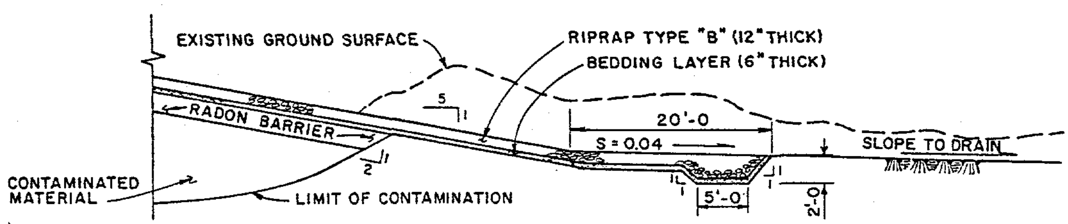
DETAIL 2 / 0958

10 0 10 20
SCALE FEET

REFERENCE DRAWINGS:

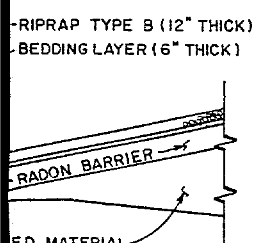
HAT-PS-10-0958 TAILINGS EMBANKMENT SECTIONS

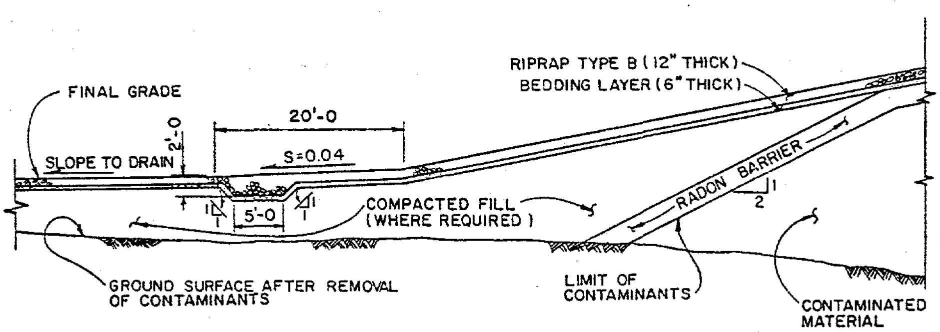




TYPICAL NORTH AND EAST APRON IN CUT AREAS

DETAIL 4 / 0958





TYPICAL NORTH AND EAST APRON IN FILL AREAS

SECTION D / 0960

10 0 10 20
SCALE FEET

QA REVIEWED FOR QUALITY REQUIREMENTS BY Bill Condron 6-16-88

REGISTERED ENGINEER NO. 4719 EDWIN S. SMITH STATE OF UTAH
E.S. Smith

	DATE	REVISIONS	BY	CK	E&D MGR.	CHIEF ENG.	TAC REV.	DOE APP.
	6-24-88	ISSUED FOR CONSTRUCTION	—	—	—	—	—	—

U. S. DEPARTMENT OF ENERGY
ALBUQUERQUE, NEW MEXICO

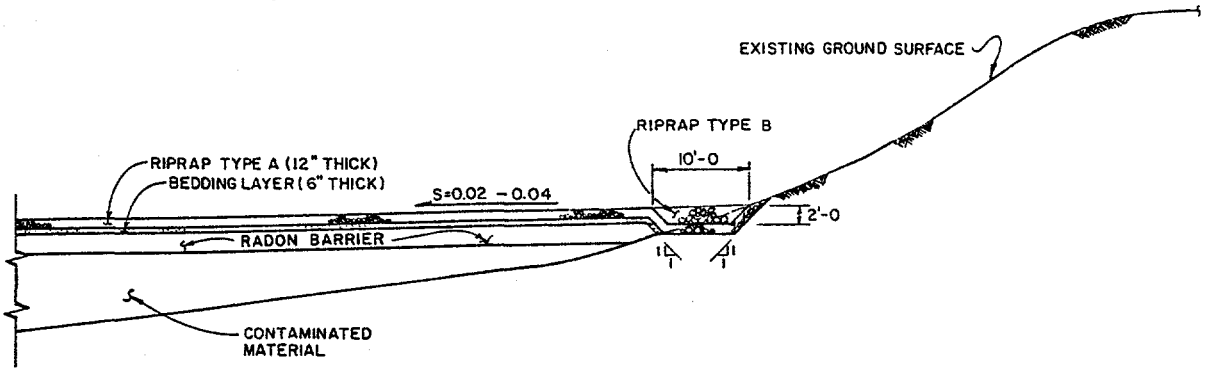
MEXICAN HAT SITE
MEXICAN HAT, UTAH
PHASE II CONSTRUCTION

TAILINGS EMBANKMENT DETAILS

DESIGNED: N. Majumdar | DRAWN: RBC/
CHECKED: [signature]
INSPECTED: [signature]
RECOMMENDED: F.J. FELIZ
APPROVED: [signature] | DATE: 6-15-88 | E.S. Smith / CWhite 6/15/88
DOE PROJECT ENGINEER: John R. D'Antoni | DATE: 6/16/88

MORRISON-KNUDSEN ENGINEERS, INC.
A MORRISON-KNUDSEN COMPANY
UMTRA PROJECT
180 HOWARD ST. SAN FRANCISCO, CA 94105

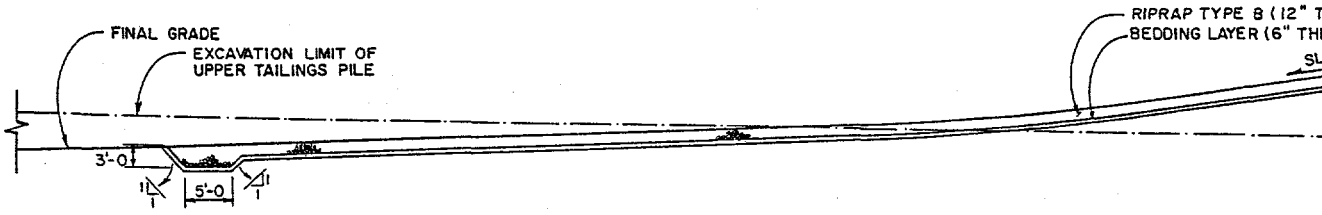
PROJECT NO. DE-AC04-83AL18796
DRAWING NO. HAT-PS-10-0959 REV. 0



TYPICAL KEY FOR SOUTH TOE

DETAIL 1 / 0958

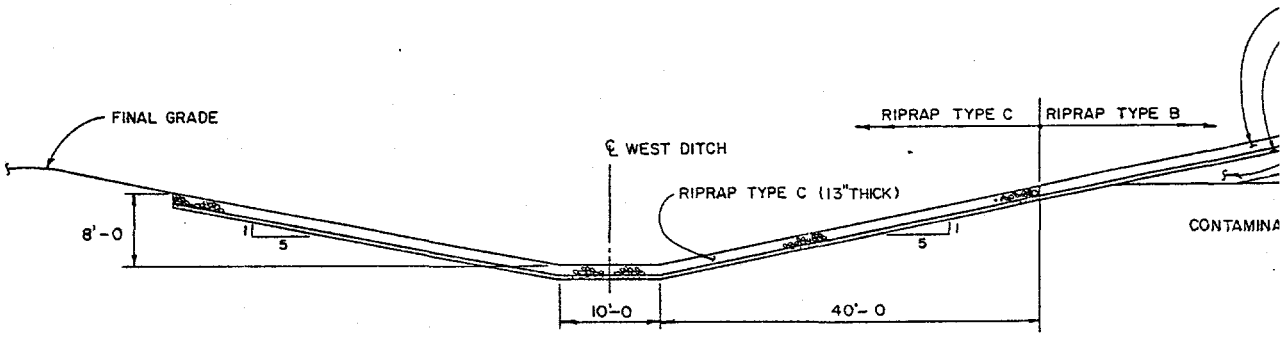
10 0 10 20
SCALE FEET



TYPICAL KEY FOR WEST TOE

DETAIL 5 / 0958

10 0 10 20
SCALE FEET

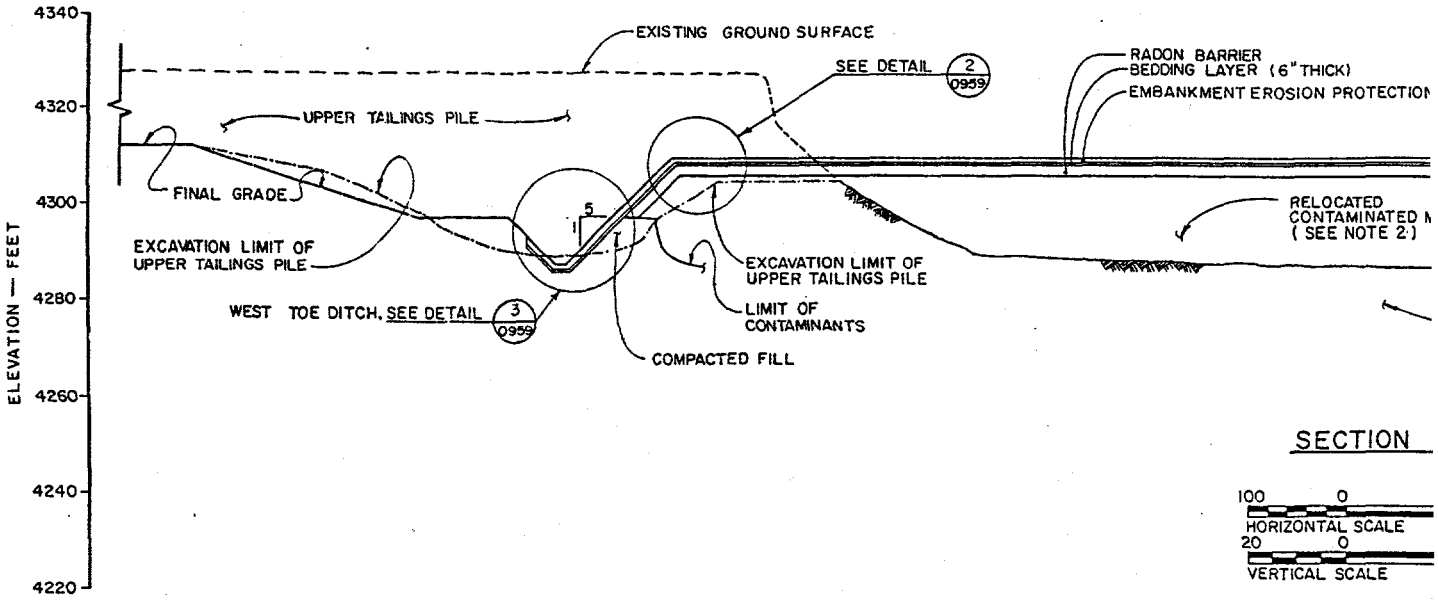


EMBANKMENT TOE WITH DITCH

DETAIL 3 / 0958

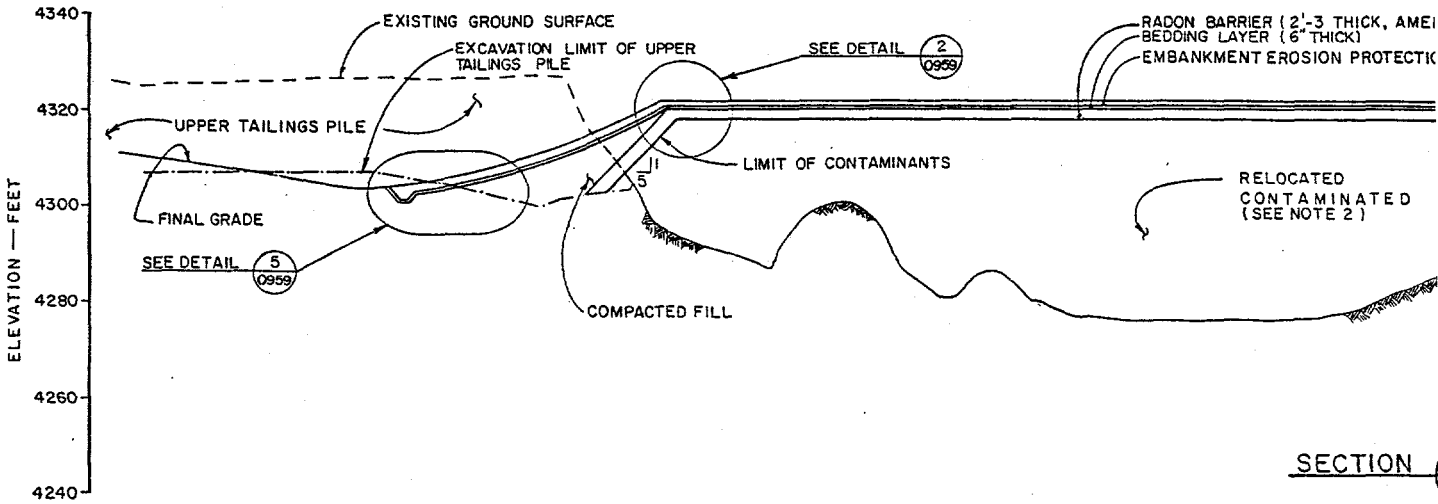
10 0 10 20
SCALE FEET

5/16/82	
RJC	
QA MK-F	



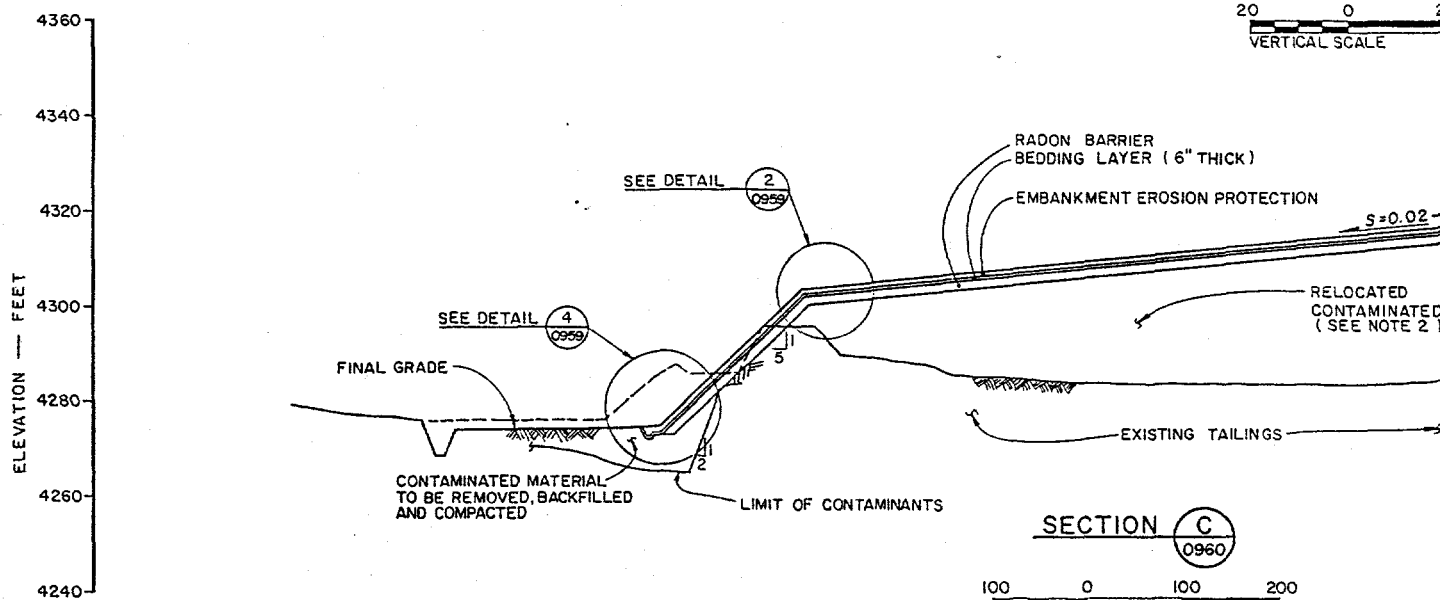
SECTION

100 0
HORIZONTAL SCALE
20 0
VERTICAL SCALE



SECTION

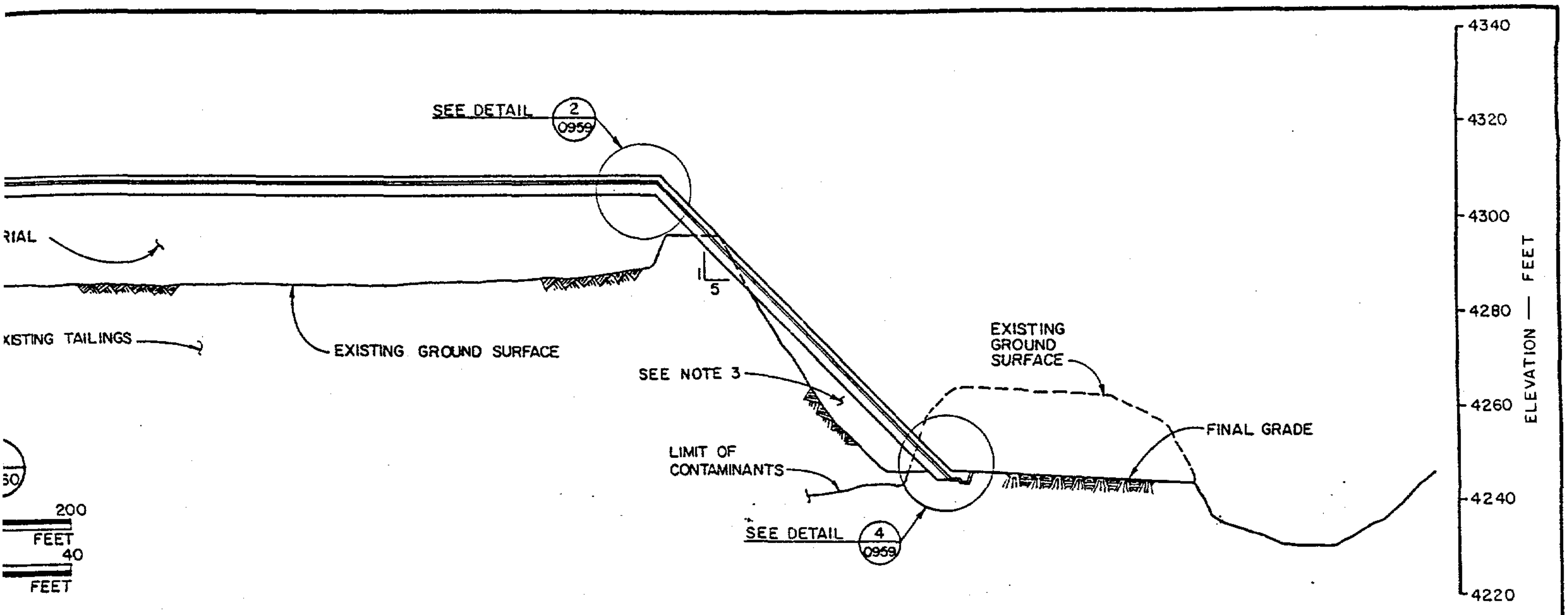
100 0
HORIZONTAL SCALE
20 0
VERTICAL SCALE

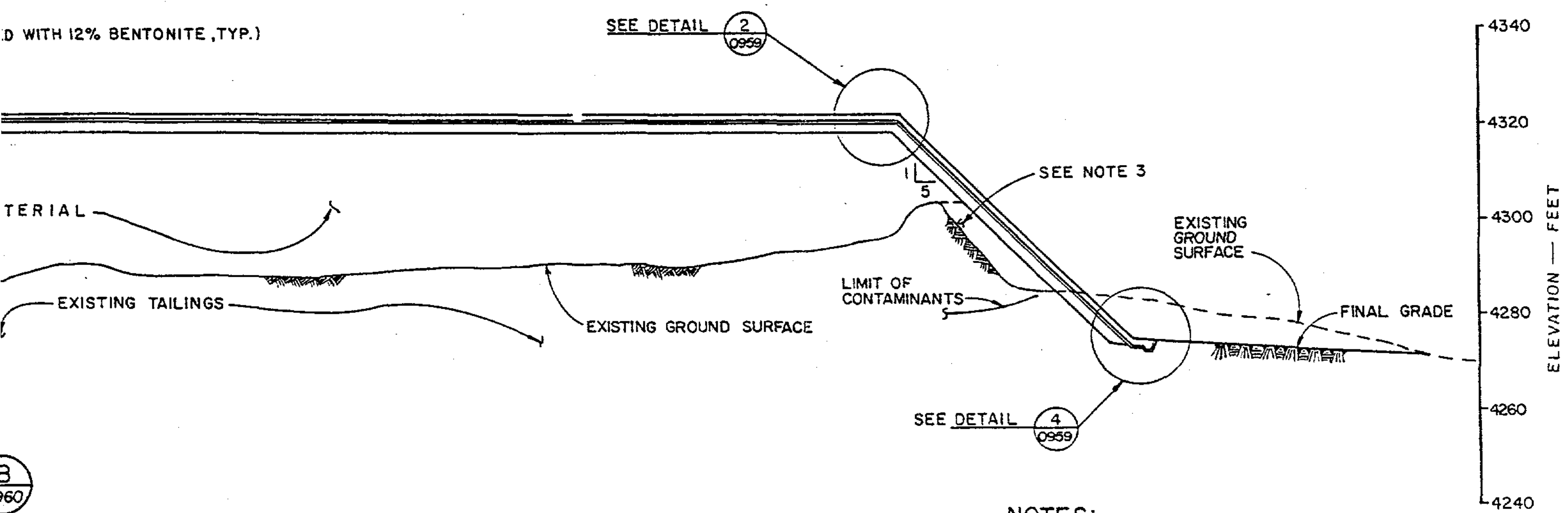


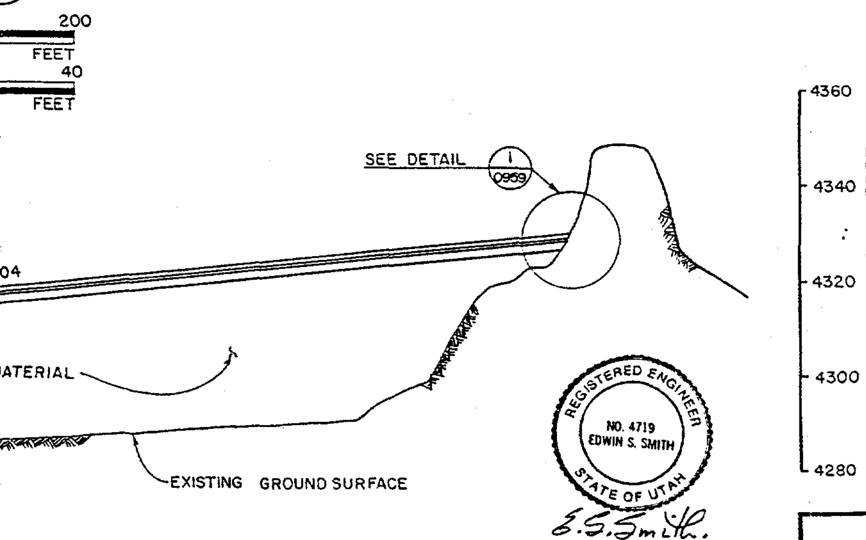
SECTION C 0960

100 0 100 200
HORIZONTAL SCALE FEET
20 0 20 40
VERTICAL SCALE FEET

6/16/88
OA
MK-F







NOTES:

1. THICKNESS OF THE RADON BARRIER MAY BE REVISED BY THE CONTRACTOR BASED ON THE FINAL LABORATORY TEST RESULTS.
2. EXCESS UNCONTAMINATED COMMON MAT'L. SHALL BE SPREAD UNIFORMLY OVER THE ENTIRE CONTAMINATED PILE PRIOR TO PLACEMENT OF RADON BARRIER MATERIAL. SEE SPECS. SEC. 02200-EARTHWORK.
3. UPPER TAILINGS MATERIALS SHALL NOT BE PLACED OUTSIDE THE EXISTING SLOPES OF THE LOWER TAILING PILES.

REFERENCE DRAWINGS:

HAT-PS-10-0959 TAILINGS EMBANKMENT DETAILS
HAT-PS-10-0960 FINAL SITE GRADING AND DRAINAGE PLAN

QA REVIEWED FOR QUALITY REQUIREMENTS BY Bill Condon 6-16-88

DATE	REVISIONS	BY	CK	E&D MGR.	CHIEF ENG.	TAC REV.	DOE APP.
6-24-88	ISSUED FOR CONSTRUCTION	—	—	—	—	—	—

U. S. DEPARTMENT OF ENERGY
ALBUQUERQUE, NEW MEXICO

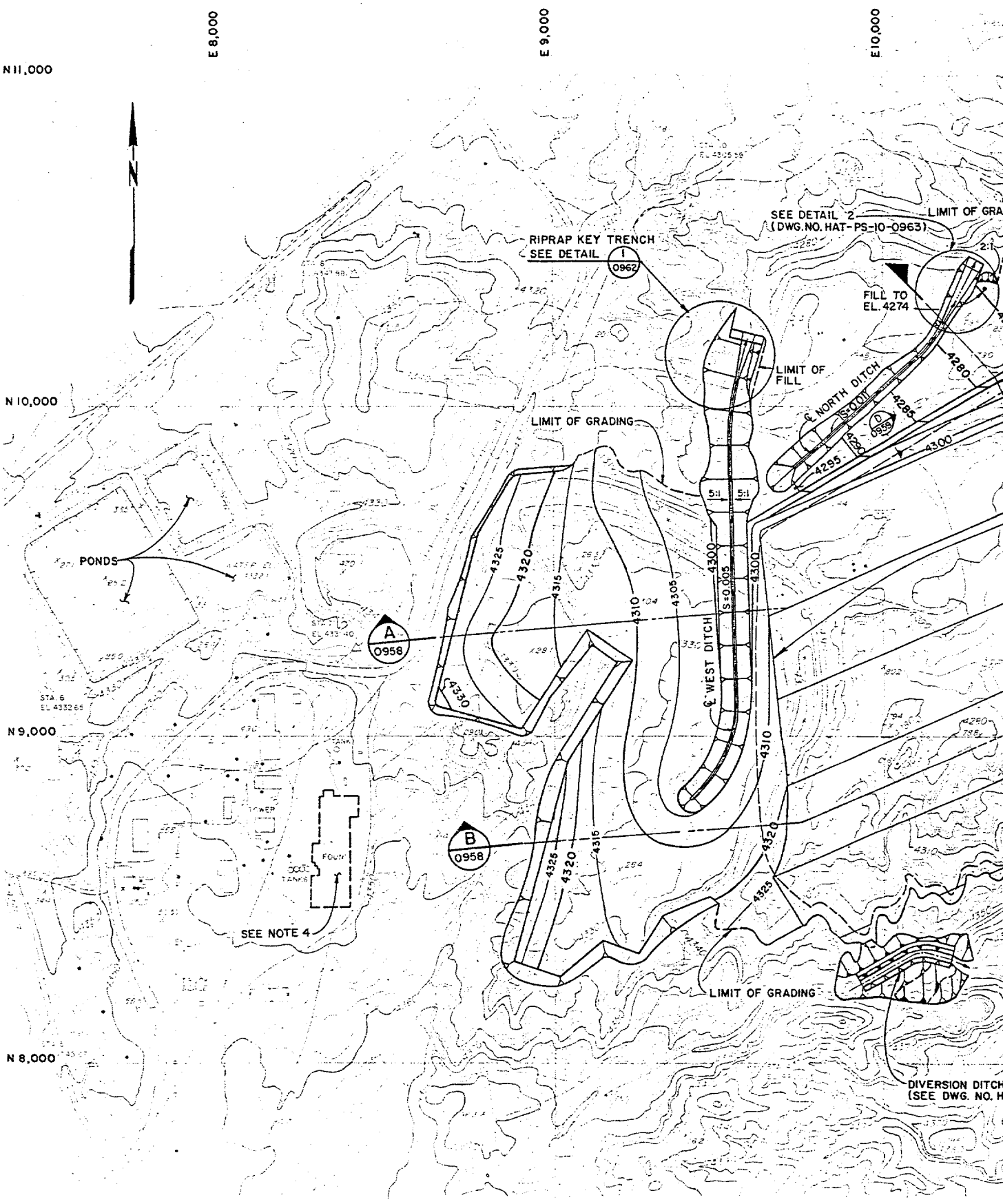
MEXICAN HAT SITE
MEXICAN HAT, UTAH
PHASE II CONSTRUCTION

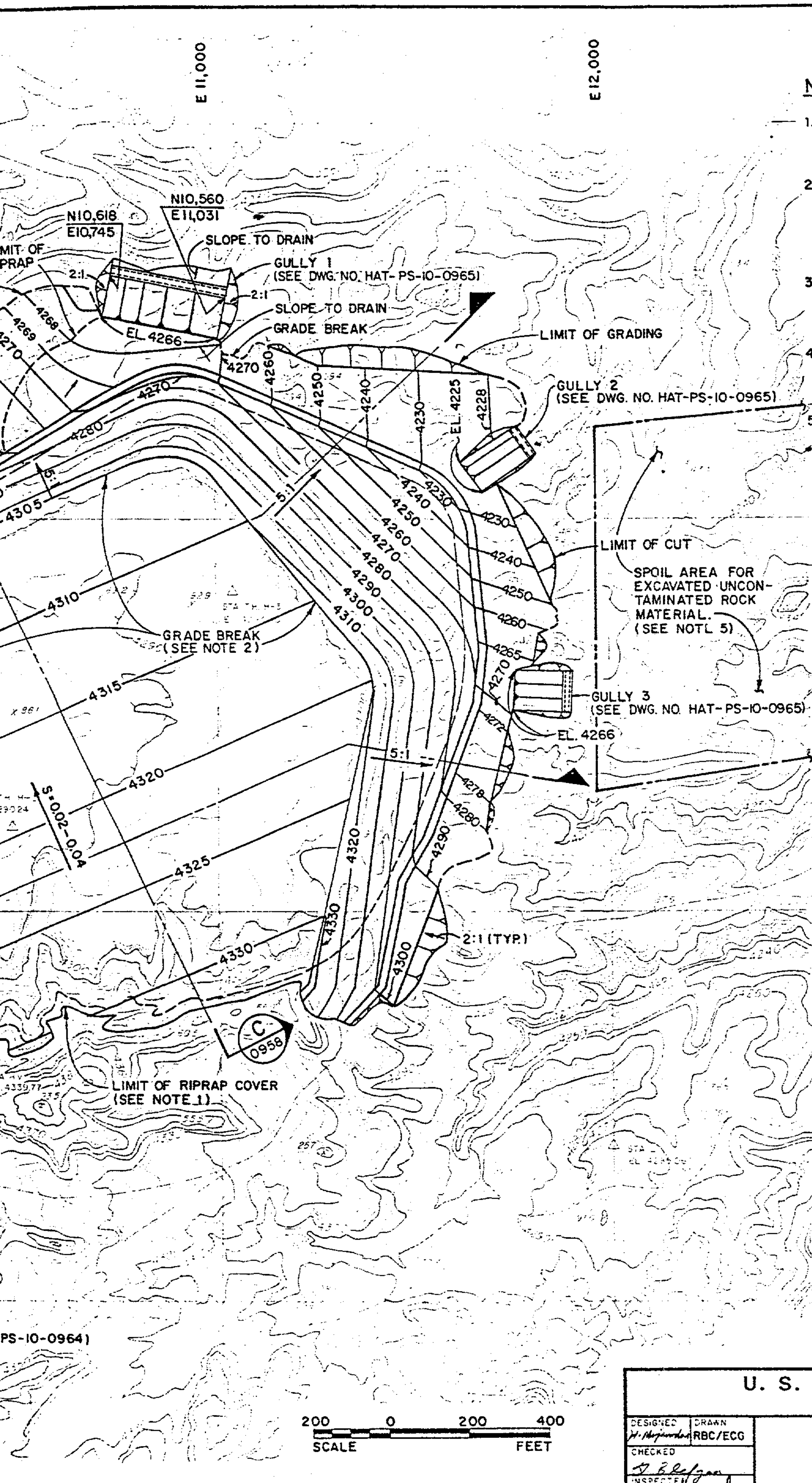
TAILINGS EMBANKMENT SECTIONS

DESIGNED: H. Majumdar — DRAWN: RBC/
CHECKED: Allen
INSPECTED: A. Angel
RECOMMENDED: F.J. FELIZ
APPROVED — DATE 5-15-88 — E.S. Smith — CWood 6/15/88 — DOE PROJECT ENGINEER: John R D'Antonio — DATE 6/88

MORRISON-KNUDSEN ENGINEERS, INC.
A MORRISON-KNUDSEN COMPANY
UMTRA PROJECT
180 HOWARD ST SAN FRANCISCO, CA 94105

PROJECT NO. DE-AC04-83AL18796
DRAWING NO. HAT-PS-10-0958 REV. 0


E 8,000
E 9,000
E 10,000
N 11,000
N 10,000
N 9,000
N 8,000
N
SEE DETAIL 2
(DWG. NO. HAT-PS-10-0963)
LIMIT OF GRA
RIPRAP KEY TRENCH
SEE DETAIL 1
0962
FILL TO
EL. 4274
LIMIT OF
FILL
℄ NORTH DITCH
S=0.010
D
0958
LIMIT OF GRADING
PONDS
A
0958
B
0958
℄ WEST DITCH
S=0.005
SEE NOTE 4
LIMIT OF GRADING
DIVERSION DITCH
(SEE DWG. NO. H
5:1
2:1
4330
4325
4320
4315
4310
4305
4300
4295
4290
4285
4280



NOTES:

1. EMBANKMENT CONTOURS SHOWN ARE REFERENCED TO THE TOP OF EROSION PROTECTION LAYER.
2. THE ACTUAL LOCATION OF THE GRADE BREAK BETWEEN THE EMBANKMENT TOP AND THE 5:1 SIDESLOPES WILL VARY BASED ON THE VOLUME OF CONTAMINATED MATERIAL PLACED IN THE EMBANKMENT.
3. SURFACE DISPLACEMENT MONUMENTS ARE SHOWN IN DRAWING NO. HAT-PS-10-0957.
4. AREA OF EXPOSED FOUNDATIONS SHALL BE BACKFILLED AND COMPACTED.
5. ALTERNATIVE SPOIL AREA MAY BE SELECTED BY CONTRACTOR.

REFERENCE DRAWINGS:

HAT-PS-10-0955	UPPER TAILINGS PILE EXCAVATION PLAN
HAT-PS-10-0957	TAILINGS EMBANKMENT PLAN
HAT-PS-10-0958	TAILINGS EMBANKMENT SECTIONS
HAT-PS-10-0962	SITE DRAINAGE (SHEET 2 OF 4)
HAT-PS-10-0963	SITE DRAINAGE (SHEET 3 OF 4)
HAT-PS-10-0964	SITE DRAINAGE (SHEET 4 OF 4)
HAT-PS-10-0965	TAILINGS EMBANKMENT EROSION PROTECTION PLAN

LEGEND:

4300	EXISTING CONTOURS
4320	FINAL CONTOURS
	DRAINAGE DITCH
N11,000	CONSTRUCTION GRID COORDINATE
	TOP OF FILL
	TOP OF CUT
	LIMIT OF TAILINGS
(U.N.O.)	UNLESS NOTED OTHERWISE

REGISTERED ENGINEER NO. 4719 EDWIN S. SMITH STATE OF UTAH

QA REVIEWED FOR QUALITY REQUIREMENTS BY Bill Condron 6-16-88

E.S. Smith

U. S. DEPARTMENT OF ENERGY
ALBUQUERQUE, NEW MEXICO

MEXICAN HAT SITE
MEXICAN HAT, UTAH
PHASE II CONSTRUCTION

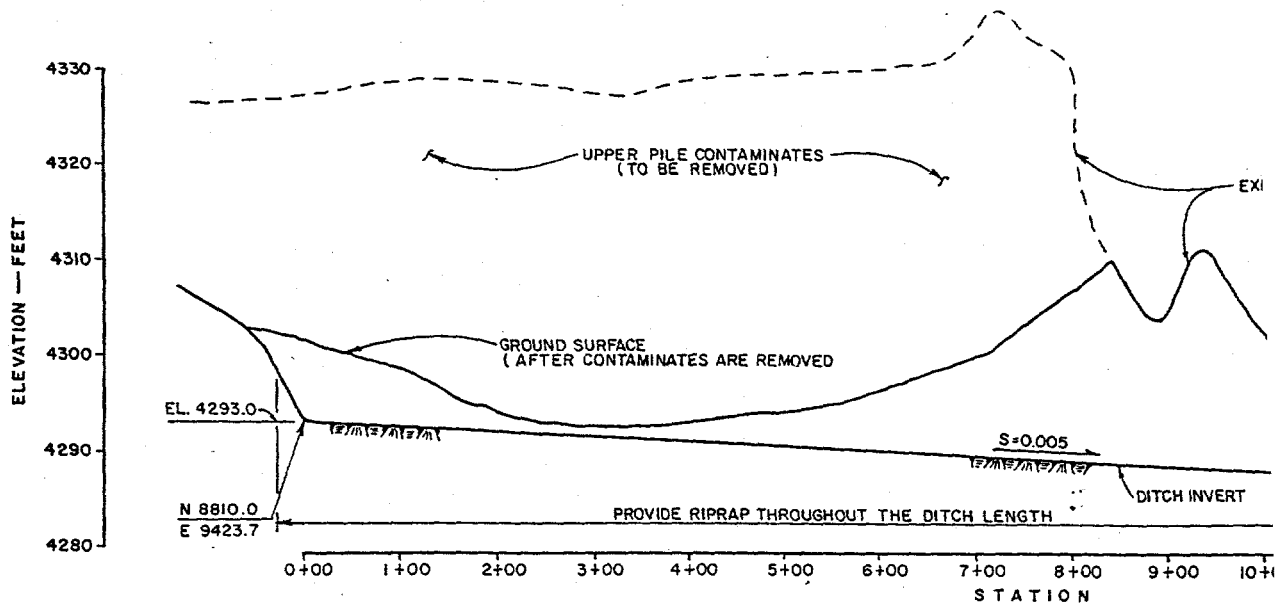
FINAL SITE GRADING AND DRAINAGE PLAN

DESIGNED: H. Hernandez DRAWN: RBC/ECG
CHECKED: D. Elefson
INSPECTED: A. Anyund
RECOMMENDED
APPROVED: J.R. Secka
DATE: 6-15-88 E.S. Smith / C.W. Cho 6/15/88
DOE PROJECT ENGINEER: John L. D'Antonio DATE: 6/16/88

MORRISON-KNUDSEN ENGINEERS, INC.
A MORRISON KNUDSEN COMPANY
UMTRA PROJECT
180 HOWARD ST. SAN FRANCISCO CA 94105

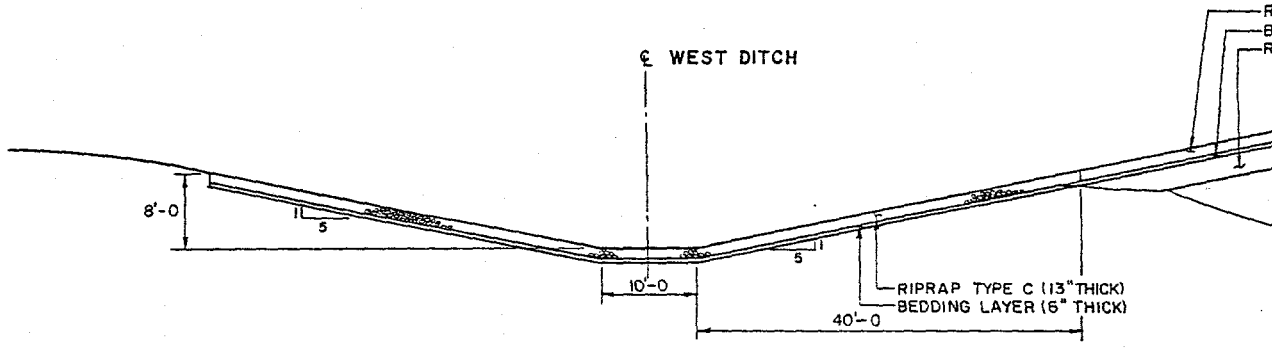
PROJECT NO: DE-AC04-83AL18796
DRAWING NO: HAT-PS-10-0960 REV 0

DATE	REVISIONS	BY	CK	ENG MGR	CHIEF ENG	TAC REV	DOE APP
88	ISSUED FOR CONSTRUCTION	—	—	—	—	—	—



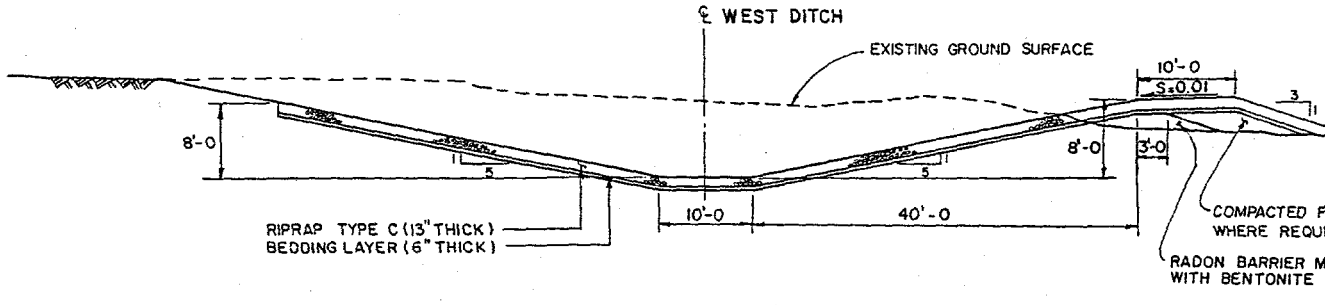
WEST DITCH PROFILE

100 0 100 200
HORIZONTAL SCALE FEET
10 0 10 20
VERTICAL SCALE FEET



SECTION A 0957

10 0 10 20
SCALE FEET



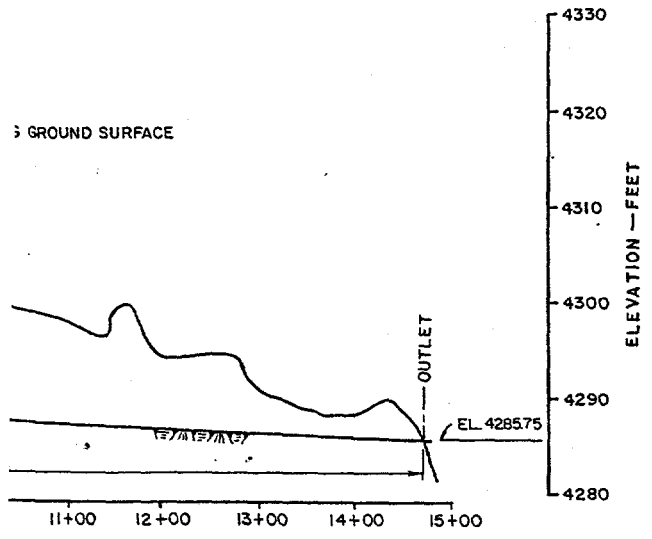
SECTION B 0957

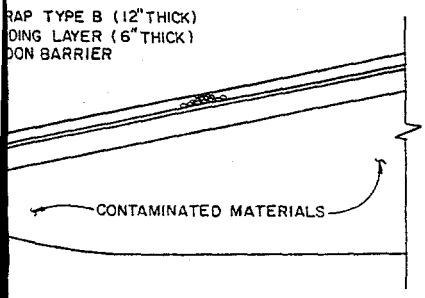
10 0 10 20
SCALE FEET

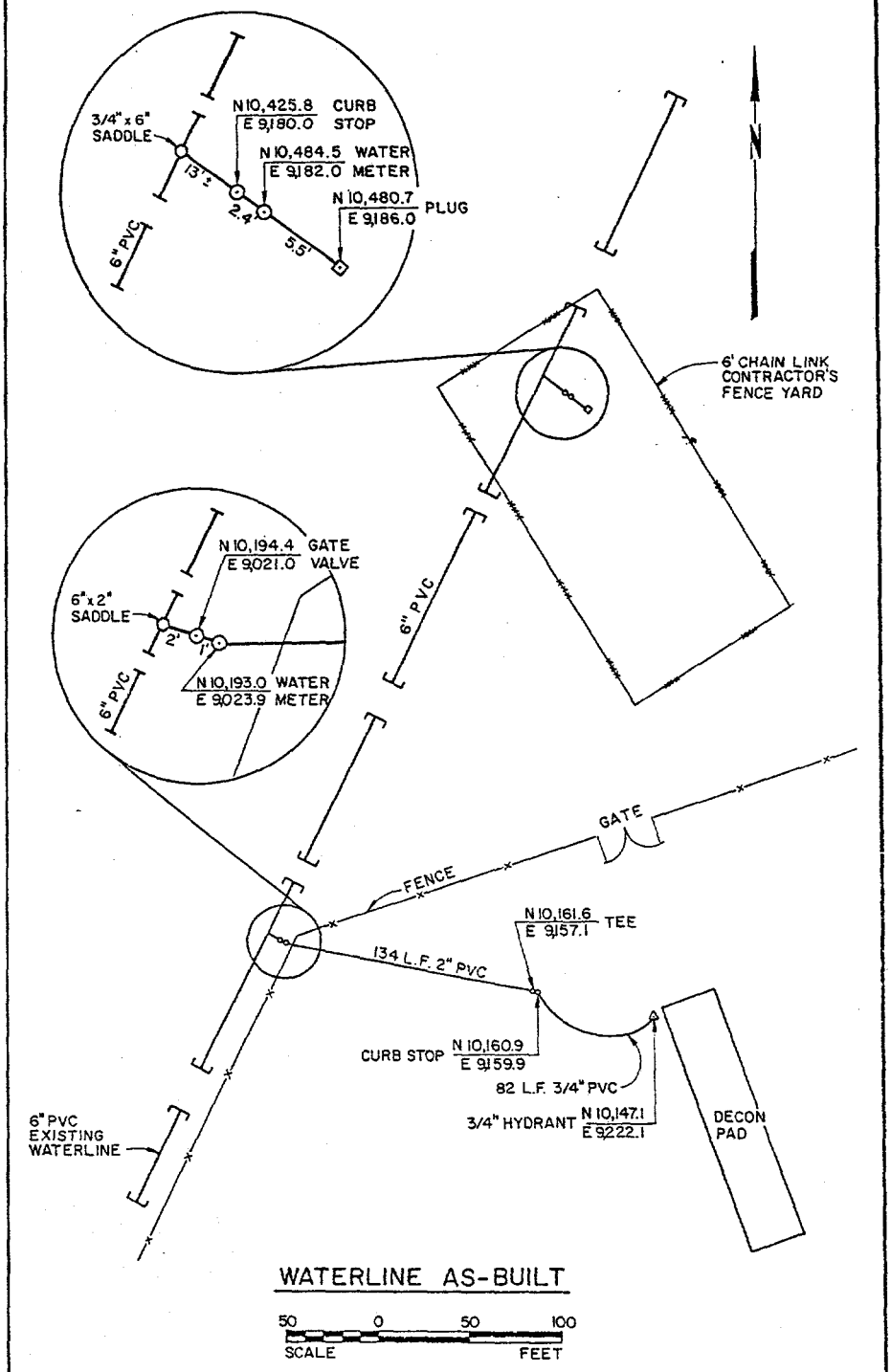
REGISTERED ENGINEER
NO. 4719
EDWIN S. SMITH
STATE OF UTAH

E.S. Smith

6-16-88
RC
QA
MK-F







ERIAL
MENDMENT

QA REVIEWED FOR QUALITY REQUIREMENTS
BY [illegible] 6-15-88

DATE	REVISIONS	BY	CK	E&D MGR.	CHIEF ENG.	TAC REV.	DOE APP.
6-24-88	ISSUED FOR CONSTRUCTION	—	—	—	—	—	—

U. S. DEPARTMENT OF ENERGY
ALBUQUERQUE, NEW MEXICO

DESIGNED [illegible] DRAWN RBC/AMC
CHECKED [illegible]
INSPECTED [illegible]
RECOMMENDED [illegible]

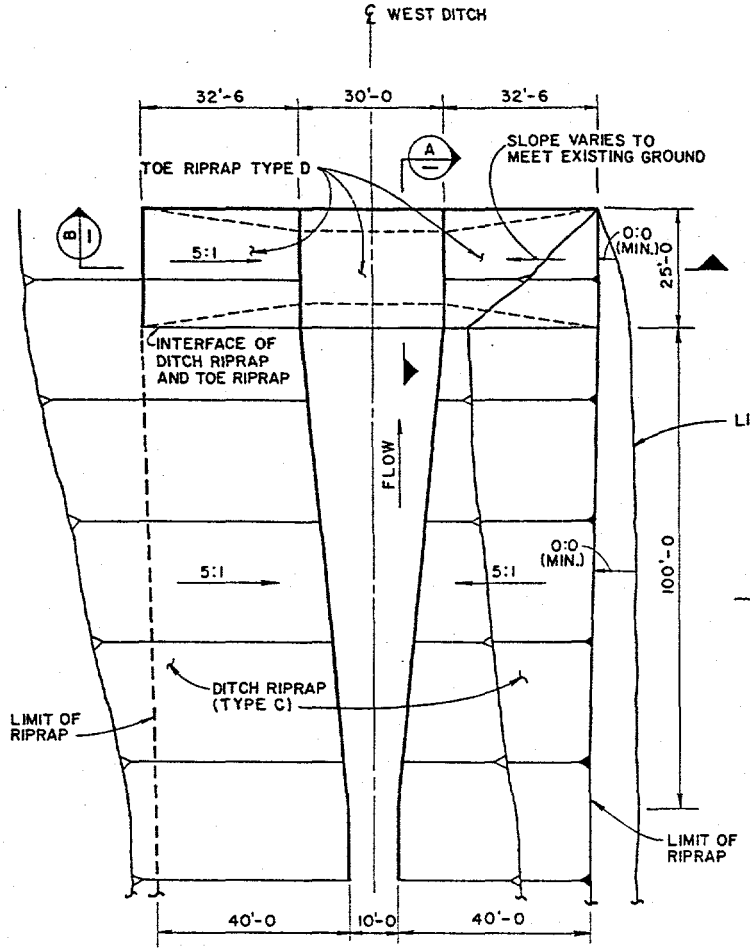
MEXICAN HAT SITE
MEXICAN HAT, UTAH
PHASE II CONSTRUCTION

SITE DRAINAGE
(SHEET 1 OF 4)

APPROVED [illegible] DATE 6-15-88 [illegible] / [illegible] 6/15/88 DOE PROJECT ENGINEER [illegible] DATE 6/16/88

MORRISON-KNUDSEN ENGINEERS, INC.
A MORRISON-KNUDSEN COMPANY
UMTRA PROJECT
180 HOWARD ST. SAN FRANCISCO, CA 94105

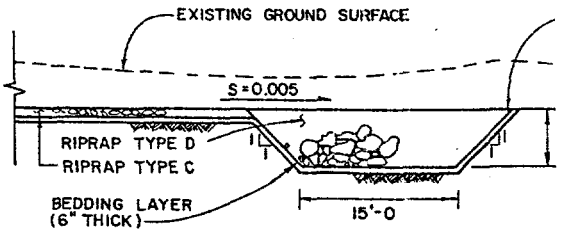
PROJECT NO. DE-AC04-83AL18796
DRAWING NO. HAT-PS-10-0961 REV. 0



WEST DITCH TOE OUTLET

DETAIL 1 (0957)

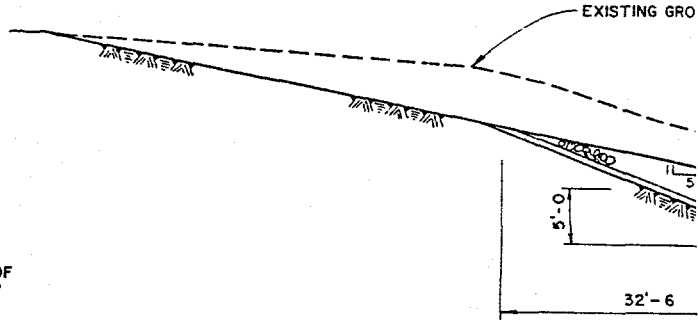
20 0 20 40
SCALE FEET

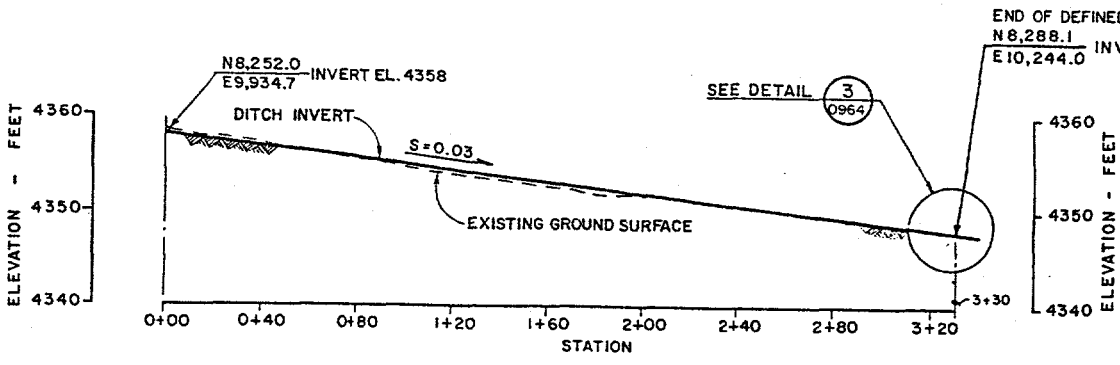


WEST DITCH OUT

SECTION A

10 0 10
SCALE





PROFILE OF DIVERSION DITCH AND OUTLET

(HAT-PS-10-0960)

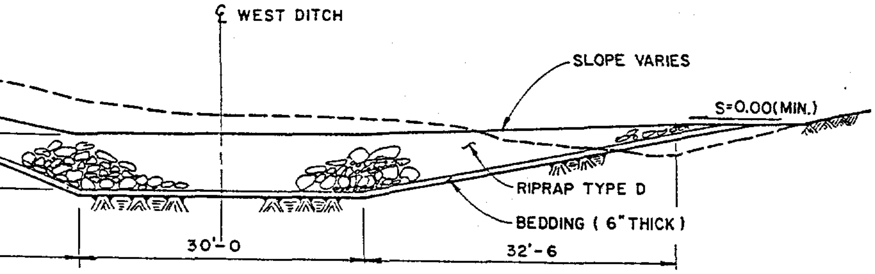
40 0 40 80
HORIZONTAL SCALE FEET

10 0 10 20
VERTICAL SCALE FEET

REGISTERED ENGINEER
NO. 4719
EDWIN S. SMITH
STATE OF UTAH

E.S. Smith

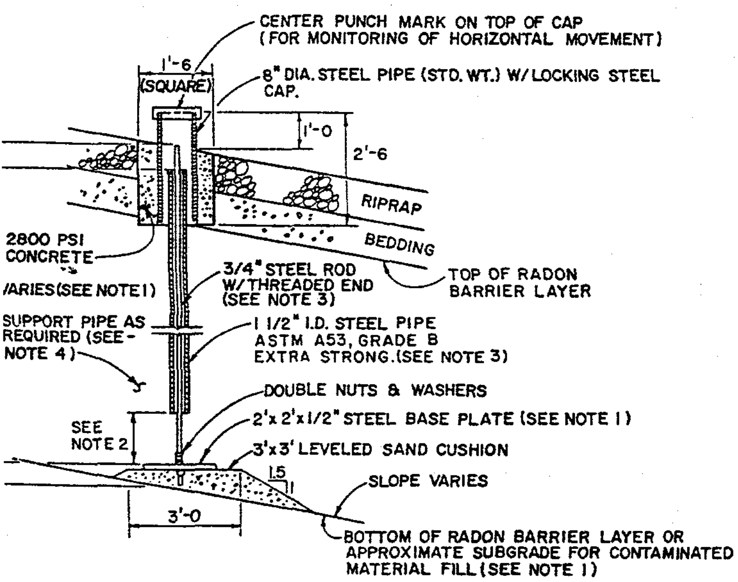
QA MK-F



WEST DITCH OUTLET

SECTION (B)

10 0 10 20
SCALE FEET



YP. DISPLACEMENT MONUMENT DETAIL

(HAT-PS-10-0957)

NOT TO SCALE

NOTES:

1. LENGTH OF PIPE AND ROD VARY ACCORDING TO ELEVATION OF BASE PLATE AS SHOWN ON DWG. NO. HAT-PS-10-0957.
2. WHERE THE STEEL BASE PLATE IS LOCATED ON THE SUBGRADE OF THE RELOCATED TAILINGS, CLEAR SPACE OF 1'-0 SHALL BE PROVIDED AS SHOWN. WHERE THE BASE PLATE IS LOCATED AT THE TOP OF THE RELOCATED TAILINGS (UNDERNEATH THE RADON BARRIER) THE PIPE SHALL BE PLACED DIRECTLY ON THE PLATE. PIPES SHALL NOT BE ATTACHED TO PLATES OR RODS.
3. PIPES AND RODS WITH TOTAL LENGTH GREATER THAN 5 FEET SHALL BE INSTALLED IN 5-FOOT SECTIONS AS FILL CONSTRUCTION PROGRESSES. RODS SHALL BE SECURELY FLUSH-COUPLED AS REQUIRED. PIPES SHALL BE SECURELY COUPLED SUCH THAT INSIDE DIAMETER IS NOT LESS THAN 1 1/2" AT ANY POINT. SUBCONTRACTOR SHALL MAKE ELEVATION MEASUREMENTS OF TOP OF ROD IMMEDIATELY BEFORE AND AFTER ADDITION OF EACH ROD SECTION. PIPES SHALL BE CAPPED AT ALL TIMES TO PREVENT ENTRANCE OF FOREIGN MATTER.
4. PIPES SHALL BE SUPPORTED BY FILL COMPACTED BY LIGHT WEIGHT TAMPERS WITHIN 5 FEET OF PIPES TO MEET SAME COMPACTION REQUIREMENTS AS FOR ADJACENT FILL. CARE SHALL BE TAKEN TO ENSURE THAT PIPES REMAIN NOMINALLY CENTERED AROUND RODS.

REFERENCE DRAWINGS:

HAT-PS-10-0957	TAILINGS EMBANKMENT PLAN
HAT-PS-10-0960	FINAL SITE GRADING AND DRAINAGE PLAN
HAT-PS-10-0964	SITE DRAINAGE (SHEET 4 OF 4)

LEGEND:

—Y—Y—	TOP OF CUT
—T—T—	TOP OF FILL

QA REVIEWED FOR QUALITY REQUIREMENTS BY Bill Condon 6-16-88

24-88	ISSUED FOR CONSTRUCTION	—	—	—	—	—	—	
ATE	REVISIONS	BY	CK	E&D MGR.	CHIEF ENG.	TAC REV.	DOE APP.	

U. S. DEPARTMENT OF ENERGY

ALBUQUERQUE, NEW MEXICO

MEXICAN HAT SITE
MEXICAN HAT, UTAH
PHASE II CONSTRUCTION

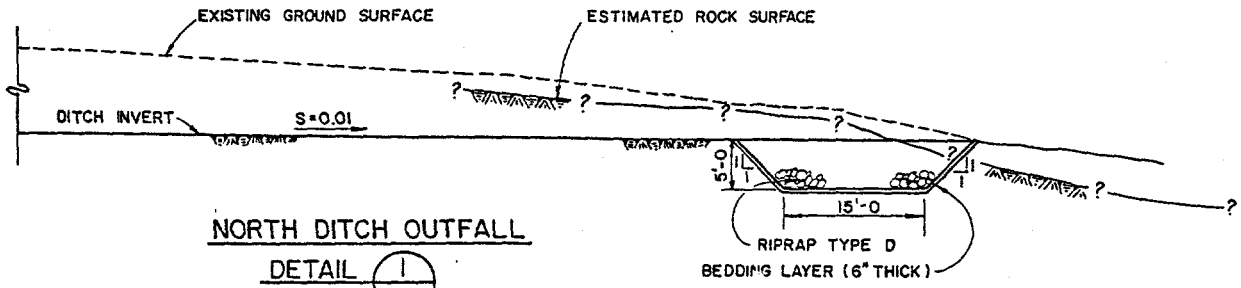
SITE DRAINAGE
(SHEET 2 OF 4)

DESIGNED: [signature] DRAWN: E.C.G./W.S.O.
CHECKED: [signature]
INSPECTED: [signature]
RECOMMENDED: [signature]
APPROVED: [signature] DATE 6-15-88 E.S. Smith / CWhead 6/15/88
DOE/PROJECT ENGINEER: [signature] DATE 6/16/88

MORRISON-KNUDSEN ENGINEERS, INC.
A MORRISON-KNUDSEN COMPANY
UMTRA PROJECT
180 HOWARD ST. SAN FRANCISCO, CA 94105

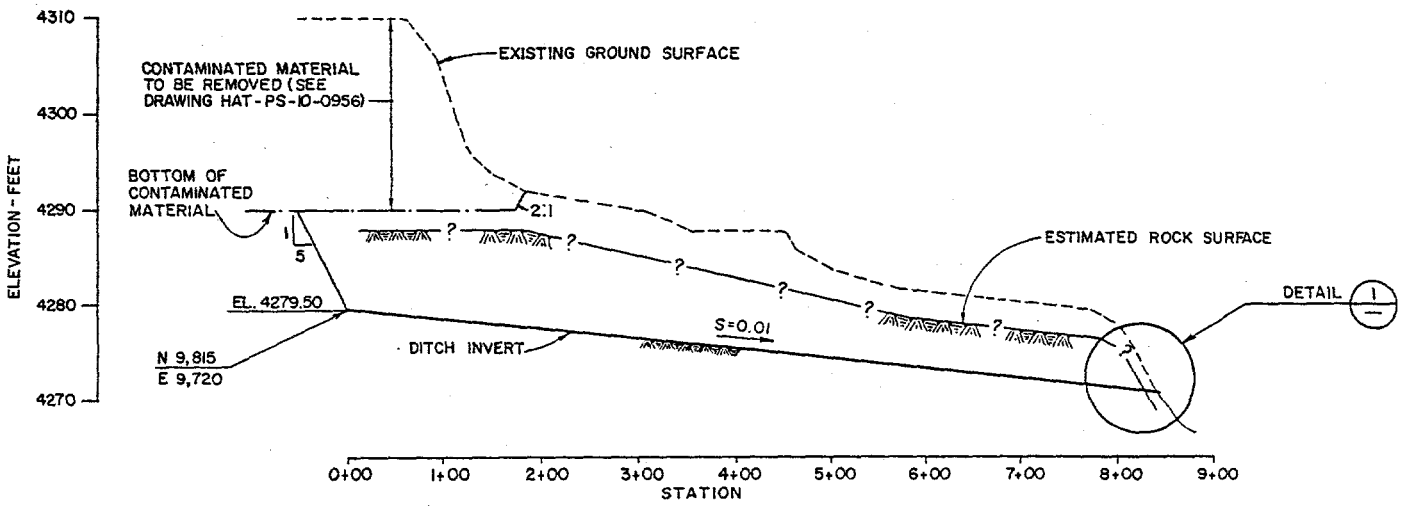
PROJECT NO. DE-AC04-83AL18796

DRAWING NO. HAT-PS-10-0962 REV. 0



NORTH DITCH OUTFALL DETAIL (1)

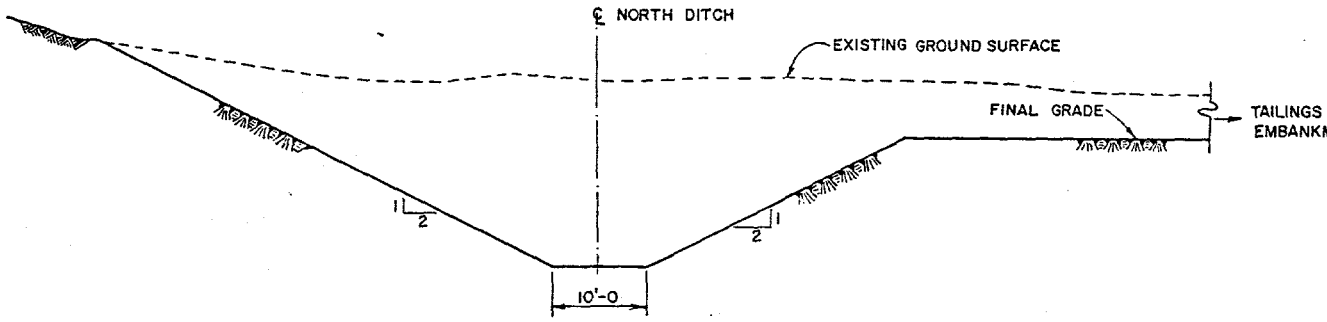
10 0 10 20
SCALE FEET



NORTH DITCH PROFILE

100 0 100 200
HORIZONTAL SCALE FEET

10 0 10 20
VERTICAL SCALE FEET



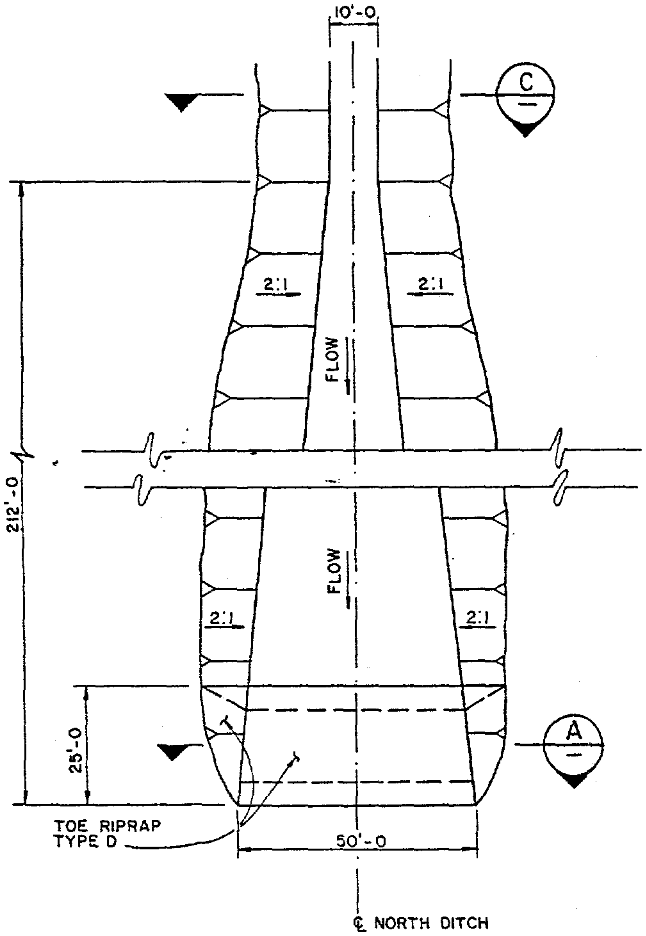
TYPICAL CROSS SECTION - NORTH DITCH SECTION (C)

10 0 10 20
SCALE FEET

REGISTERED ENGINEER
NO. 4719
EDWIN S. SMITH
STATE OF UTAH

6.55 mile

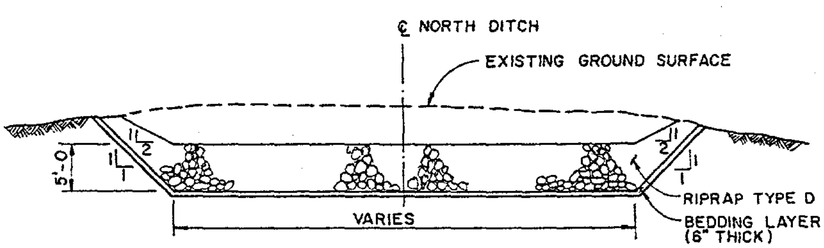
	4
	4
	4
	4
9-16-88 PC	4
QA MK-F	N



NORTH DITCH TOE OUTLET

DETAIL 2/0960

SCALE 20 0 20 40 FEET



NORTH DITCH OUTFALL

SECTION A

SCALE 10 0 10 20 FEET

NOTES:

1. THE LOCATION OF THE ROCK SURFACE AS SHOWN IS APPROXIMATE AND SHALL BE VERIFIED DURING THE CONSTRUCTION.

REFERENCE DRAWINGS:

HAT - PS - 10 -0956 WINDBLOWN MATERIALS EXCAVATION PLAN

HAT - PS - 10 -0960 FINAL SITE GRADING AND DRAINAGE PLAN

LEGEND:

TOP OF CUT

QA REVIEWED FOR QUALITY REQUIREMENTS BY Bill Carlson 6-16-88

DATE	REVISIONS	BY	CK	E&D MGR.	CHIEF ENG.	TAC REV.	DOE APP.
6-24-88	ISSUED FOR CONSTRUCTION	—	—	—	—	—	—

U. S. DEPARTMENT OF ENERGY
ALBUQUERQUE, NEW MEXICO

DESIGNED: [signature] DRAWN: E.C.G.
CHECKED: [signature]
INSPECTED: [signature]
RECOMMENDED: [signature]
APPROVED: [signature] DATE 6-15-88 E.S. Smith / [signature] 6/15/88
DOE PROJECT ENGINEER: John R. D'Antonio DATE 6/16/88

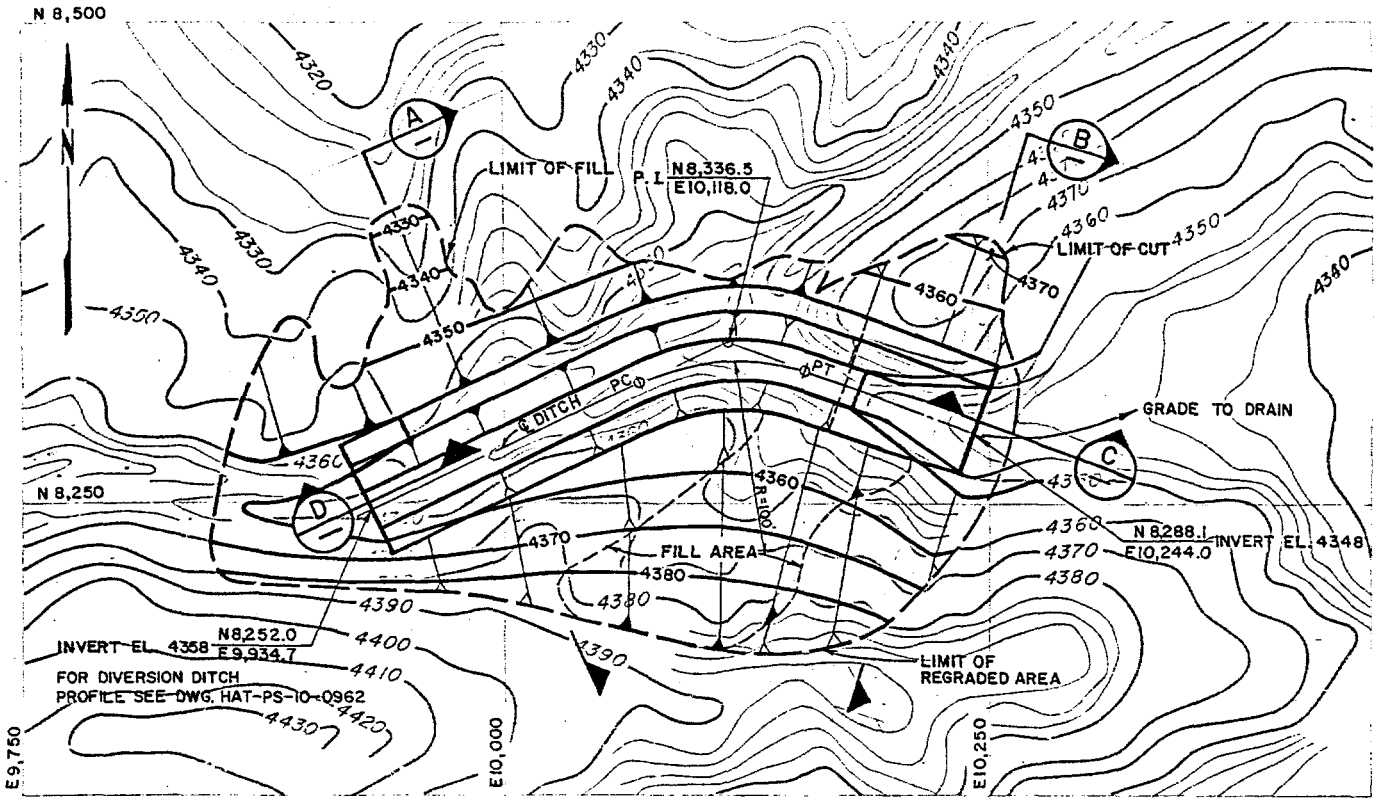
MEXICAN HAT SITE
MEXICAN HAT, UTAH
PHASE II CONSTRUCTION

SITE DRAINAGE
(SHEET 3 OF 4)

MORRISON-KNUDSEN ENGINEERS, INC.
A MORRISON-KNUDSEN COMPANY
UMTRA PROJECT
180 HOWARD ST SAN FRANCISCO, CA 94105

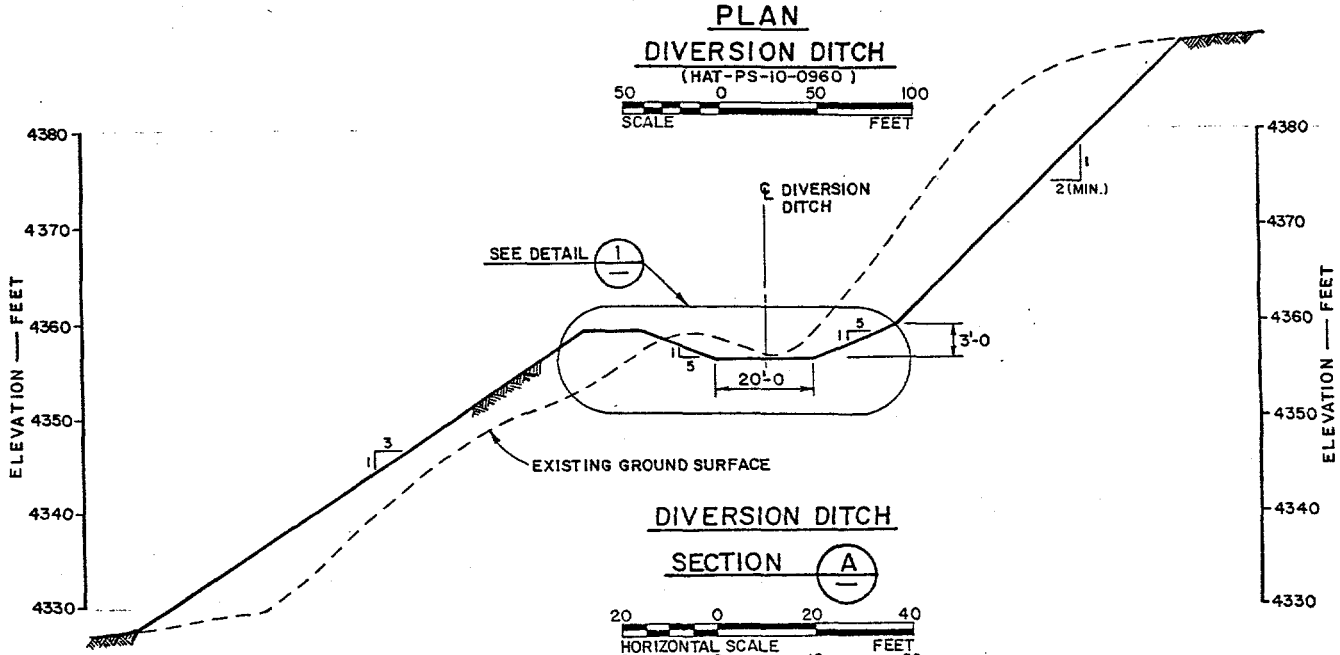
PROJECT NO. DE-AC04-83AL18796

DRAWING NO. HAT-PS-10-0963 REV 0



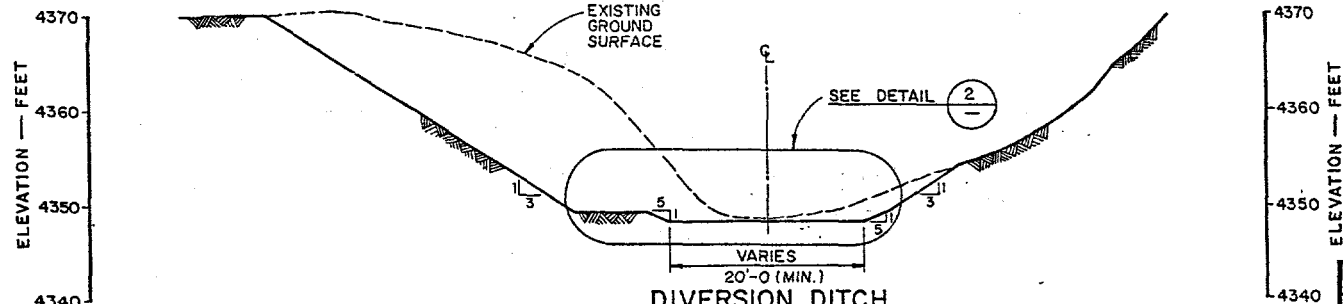
PLAN
DIVERSION DITCH
(HAT-PS-10-0960)

50 0 50 100
SCALE FEET



DIVERSION DITCH
SECTION A

20 0 20 40
HORIZONTAL SCALE FEET
10 0 10 20
VERTICAL SCALE FEET



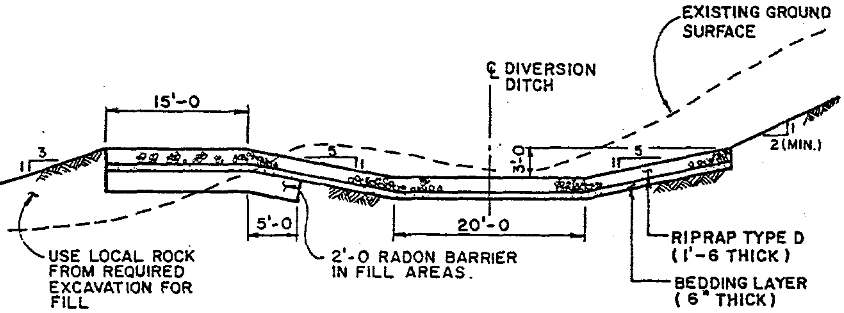
DIVERSION DITCH
SECTION B

20 0 20 40
HORIZONTAL SCALE FEET
10 0 10 20
VERTICAL SCALE FEET

	△
	△
	△
	△
6-16-88	0
DA MK-F	NO.

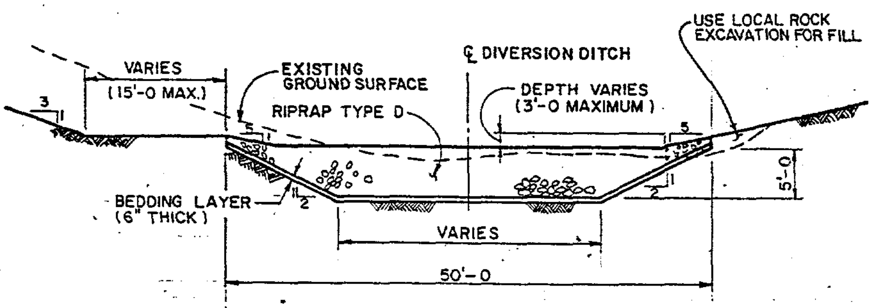
NOTE:

1. FOR PROFILE OF DIVERSION DITCH, SEE DRAWING NO. HAT-PS-10-0962.



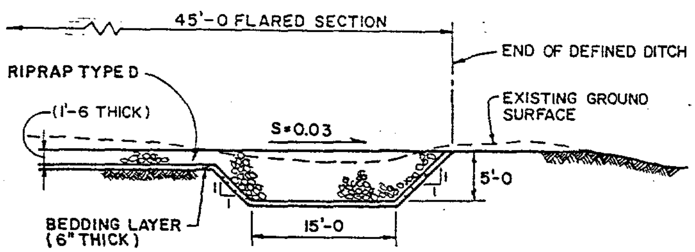
DIVERSION DITCH
DETAIL 1

10 0 10 20
SCALE FEET



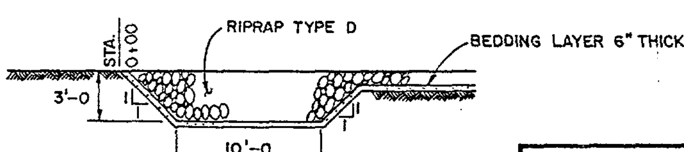
DIVERSION DITCH
DETAIL 2

10 0 10 20
SCALE FEET



DIVERSION DITCH OUTLET
SECTION C

10 0 10 20
SCALE FEET



SECTION D
NOT TO SCALE

REFERENCE DRAWINGS:

HAT-PS-10-0960	FINAL SITE GRADING AND DRAINAGE PLAN
HAT-PS-10-0962	SITE DRAINAGE (SHEET 2 OF 4)

LEGEND:

~4350~	EXISTING CONTOURS
—4320—	FINAL CONTOURS
	TOP OF CUT
	TOP OF FILL

REGISTERED ENGINEER NO. 4719 EDWIN S. SMITH STATE OF UTAH

QA REVIEWED FOR QUALITY REQUIREMENTS BY Bill Cordova 6-16-88

E.S. Smith

U. S. DEPARTMENT OF ENERGY
ALBUQUERQUE, NEW MEXICO

MEXICAN HAT SITE
MEXICAN HAT, UTAH
PHASE II CONSTRUCTION

SITE DRAINAGE
(SHEET 4 OF 4)

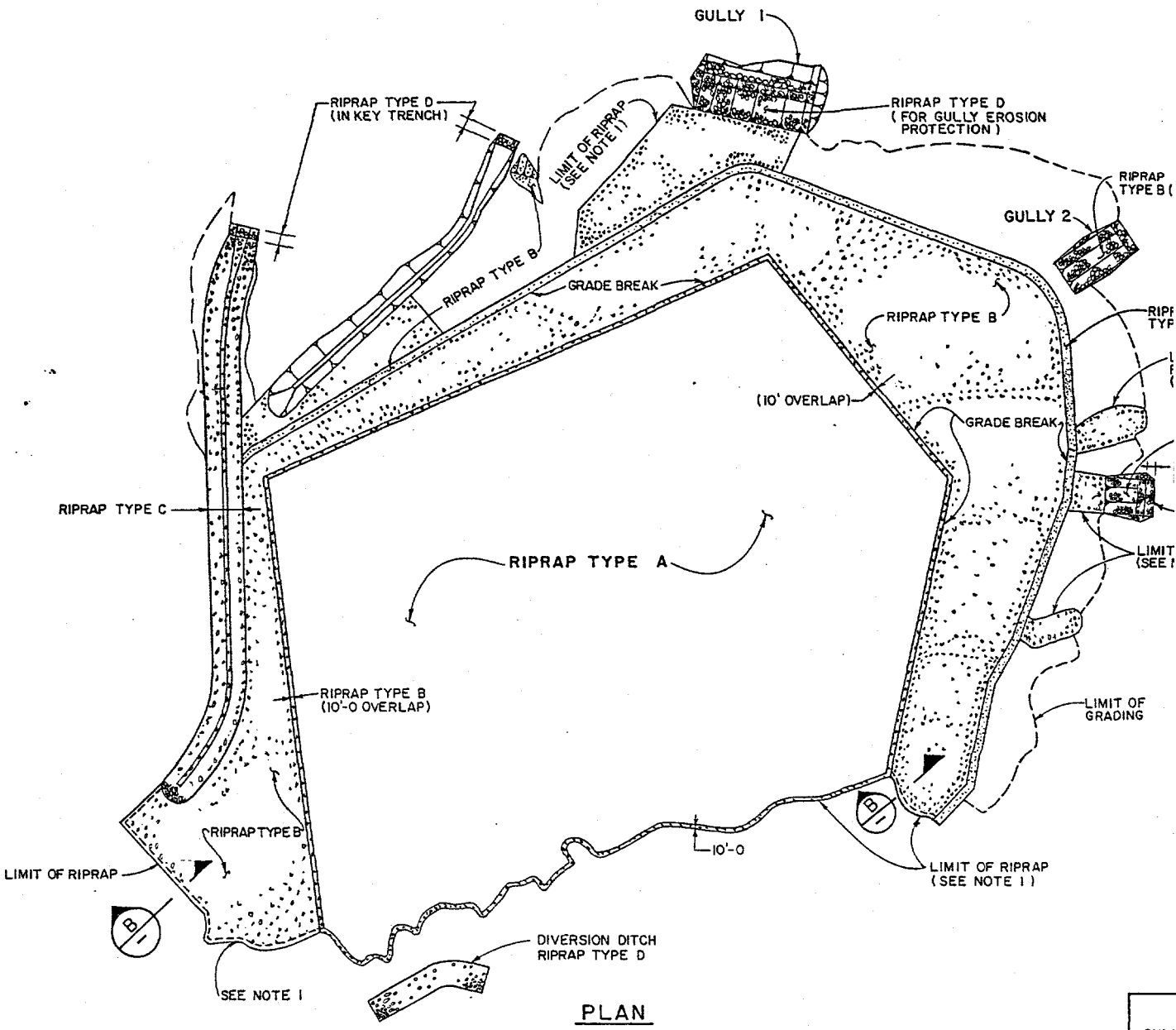
DESIGNED: | DRAWN: RBC
CHECKED:
INSPECTED:
RECOMMENDED: F. J. FELIZ
APPROVED:
DATE: 6-15-88 E.S. Smith / 6/15/88
DOE PROJECT ENGINEER: DATE: 6/16/88

MORRISON-KNUDSEN ENGINEERS, INC.
A MORRISON-KNUDSEN COMPANY
UMTRA PROJECT
180 HOWARD ST. SAN FRANCISCO, CA 94105

PROJECT NO. DE-AC04-83AL18796

DRAWING NO. HAT-PS-10-0964 | REV. 0

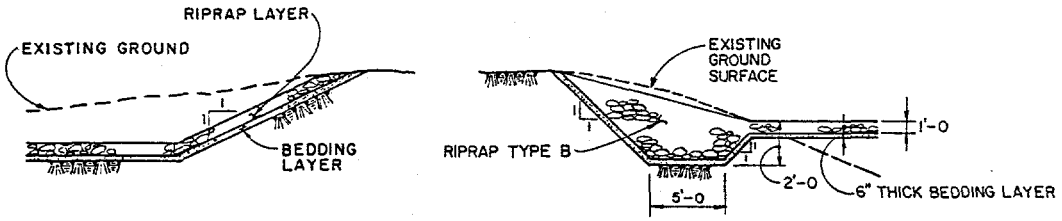
REVISIONS	BY	CK	E&D MGR.	CHIEF ENG.	TAC REV.	DOE APP.
ISSUED FOR CONSTRUCTION	—	—	—	—	—	—



PLAN
EROSION PROTECTION
(HAT-PS-10-0957)

200 0 200 400
SCALE FEET

GULL
1
2
3



TYPICAL SECTION A
NOT TO SCALE

TYPICAL SECTION B
NOT TO SCALE

	4
	4
	4
	4
6/16/88	4
QA MK-F	

P.)

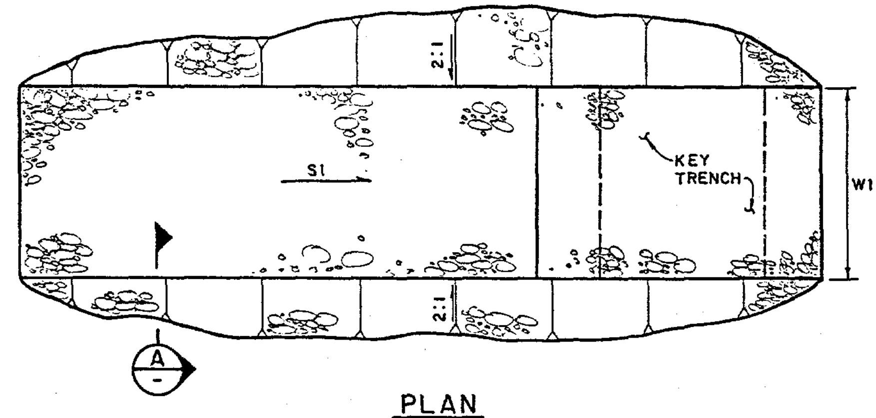
IT OF
RAP
E NOTE 1)

RIPRAP
TYPE C

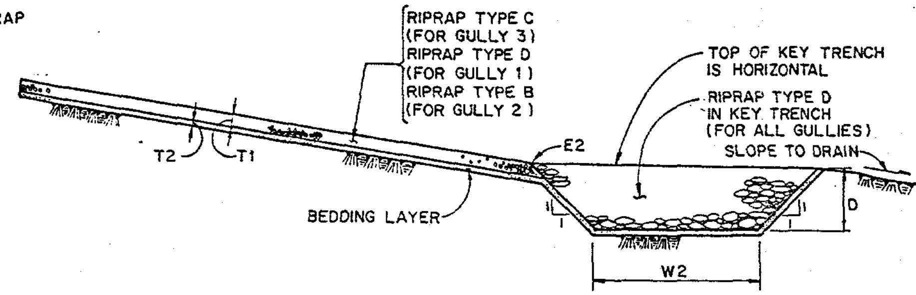
RAP TYPE D
KEY TRENCH (TYP.)

-GULLY 3

F RIPRAP
TE 1)



PLAN
EROSION PROTECTION AT GULLIES
NOT TO SCALE



PROFILE
EROSION PROTECTION AT GULLIES
(SEE TABLE 1 FOR DIMENSIONS)
NOT TO SCALE

ABLE 1. APRON AND KEY TRENCH SETTING AND DIMENSIONS

APRON WIDTH (FT.) W1	ELEVATION (FT.)		SLOPE	APRON THICKNESS (FT.)		KEY TRENCH SIZE (FT.)	
	E1	E2	S1	T1	T2	D (MIN.)	W2
290	4266.00	4248.15	0.17	1.5	0.5	5.0	15.0
90	4225.00	4219.50	0.038	1.5	0.5	5.0	15.0
100	4266.00	4253.00	0.108	1.5	0.5	5.0	15.0

NOTES:

1. THE OUTER LIMIT OF RIPRAP COVER SHOWN IS APPROXIMATE. FINAL LIMIT SHALL BE DETERMINED IN THE FIELD DURING THE CONSTRUCTION.

REFERENCE DRAWINGS:

HAT-PS-10-0957 TAILINGS EMBANKMENT PLAN

LEGEND:

TOP OF CUT

TOP OF FILL

REGISTERED ENGINEER NO. 4719 EDWIN S. SMITH STATE OF UTAH

E.S. Smith

QA REVIEWED FOR QUALITY REQUIREMENTS BY Bill Condam 6-16-88

6-24-88	ISSUED FOR CONSTRUCTION	—	—	—	—	—	—	
DATE	REVISIONS	BY	CK	E&D MGR.	CHIEF ENG.	TAC REV.	DOE APPR.	

U. S. DEPARTMENT OF ENERGY
ALBUQUERQUE, NEW MEXICO

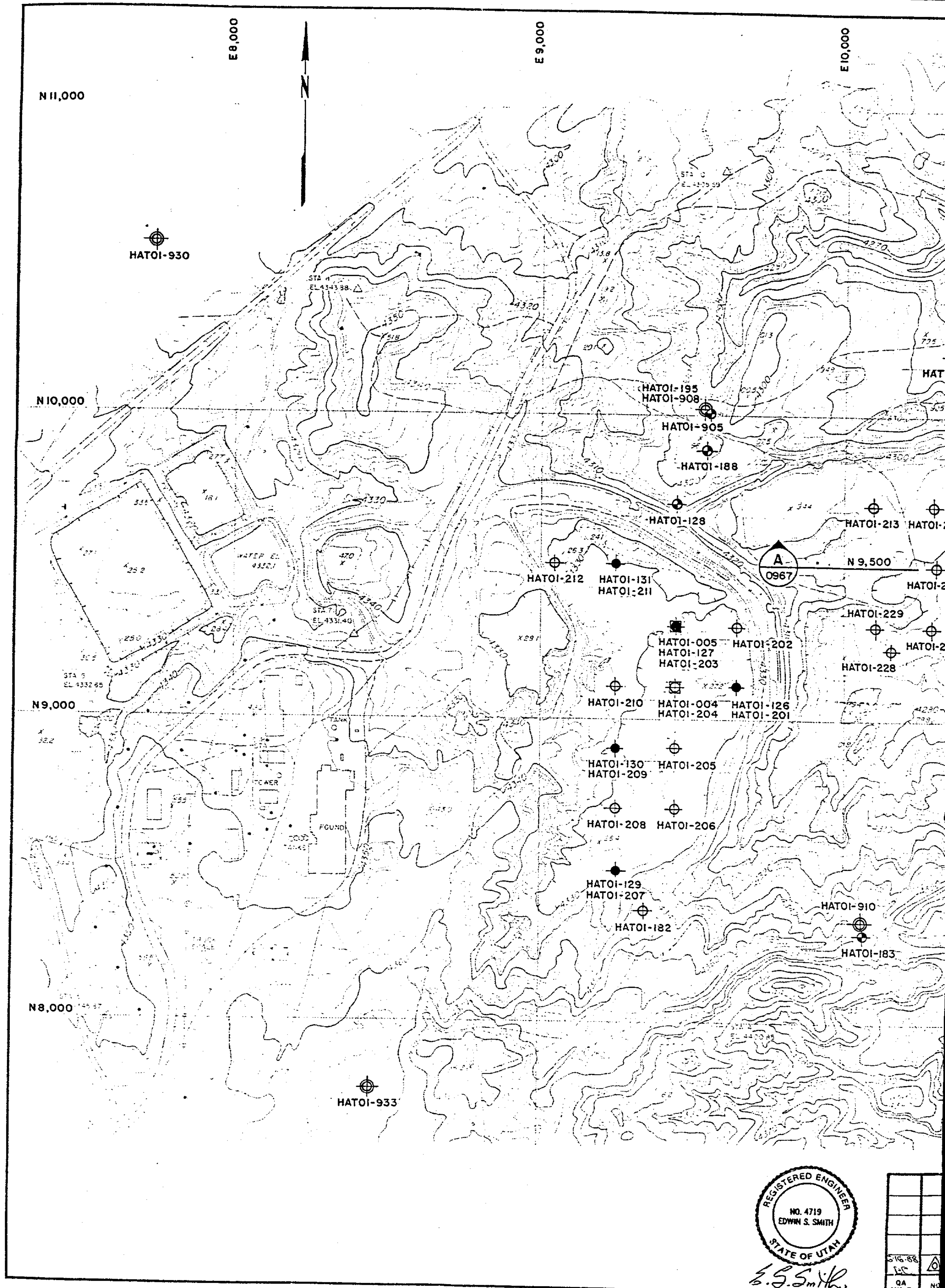
DESIGNED H. Mojumdar | DRAWN RBC/WSO
CHECKED
INSPECTED
RECOMMENDED
APPROVED | DATE 6-15-88 | E.S. Smith / CW Wade 6/15/88 | DOE PROJECT ENGINEER | DATE 6/16/88

MEXICAN HAT SITE
MEXICAN HAT, UTAH
PHASE II CONSTRUCTION

TAILINGS EMBANKMENT EROSION PROTECTION PLAN

MORRISON-KNUDSEN ENGINEERS, INC.
A MORRISON-KNUDSEN COMPANY
UMTRA PROJECT
180 HOWARD ST. SAN FRANCISCO, CA 94105

PROJECT NO. DE-AC04-83AL18796
DRAWING NO. HAT-PS-10-0965 REV. 0


E 8,000
E 9,000
E 10,000
N
N 11,000
N 10,000
N 9,000
N 8,000
N 9,500
HAT01-930
HAT01-195
HAT01-908
HAT01-905
HAT01-188
HAT01-128
HAT01-213
HAT01-212
HAT01-131
HAT01-211
HAT01-229
HAT01-005
HAT01-127
HAT01-203
HAT01-202
HAT01-228
HAT01-210
HAT01-004
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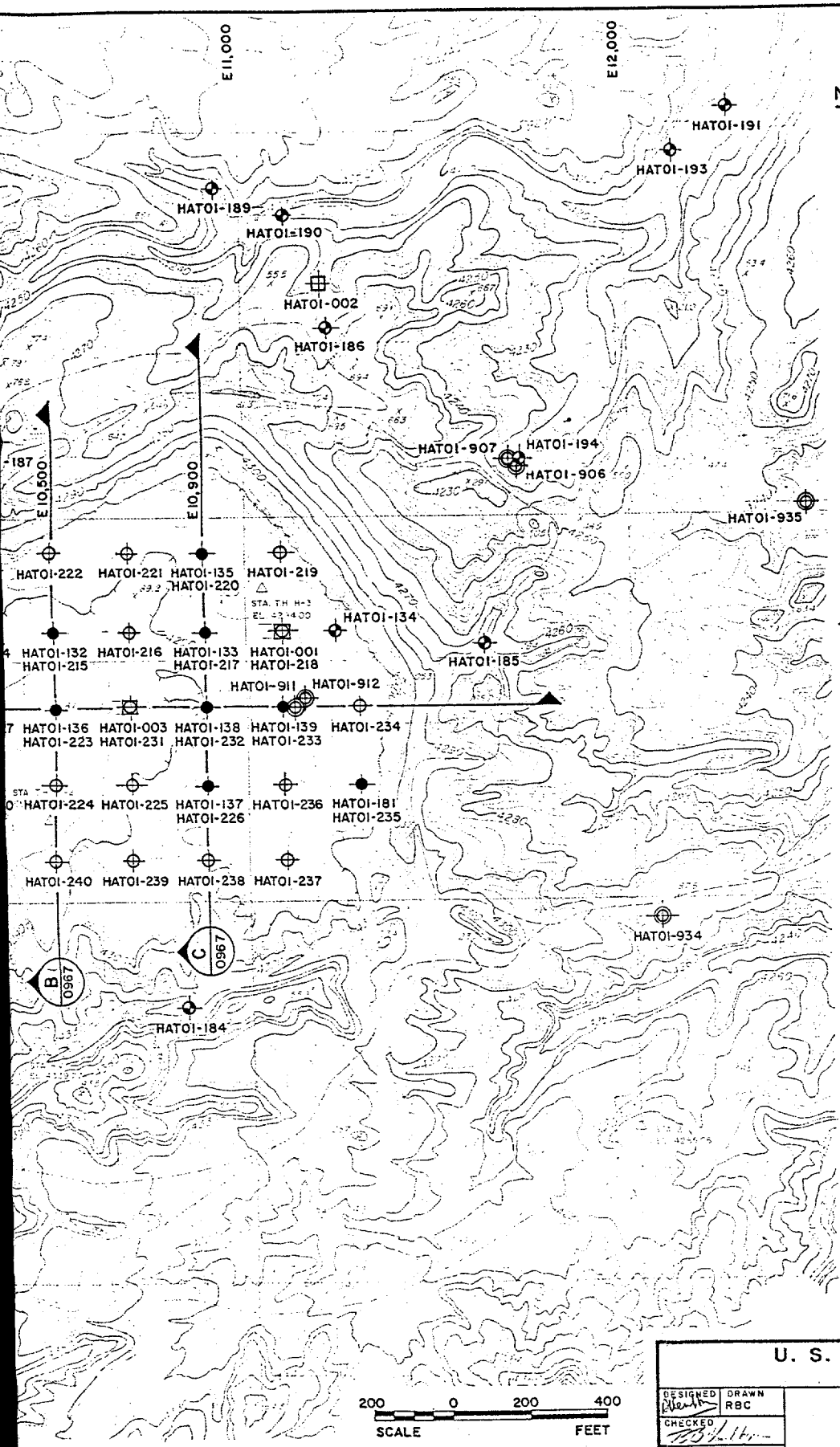
HAT01-207
HAT01-182
HAT01-910
HAT01-183
HAT01-933
A
0967
WATER EL 4332.1
STA 7 EL 4331.40
STA 5 EL 4332.65
TANK
TOWER
FOUND
4320
4330
4340
4350
4300
4270
REGISTERED ENGINEER
NO. 4719
EDWIN S. SMITH
STATE OF UTAH
E.S. Smith
QA MK-F



NOTES:

1. GEOTECHNICAL INVESTIGATIONS WERE CONDUCTED BY DOE IN LATE 1984 AND EARLY 1985. A TOTAL OF 40 PIEZOCONE SOUNDINGS, 17 BORINGS AND FOUR TESTS PITS WERE MADE ON THE EXISTING TAILINGS PILES. ADDITIONAL 27 BORINGS AND ONE TEST PIT WERE MADE IN THE VICINITY OF THE PILES. FOURTEEN OF THE BORINGS WERE CASED AND COMPLETED AS MONITORING WELLS. THREE BORINGS AND FOUR MONITORING WELLS WHICH ARE LOCATED AWAY FROM THE TAILINGS PILE AREA ARE NOT SHOWN.

2. LOCATION COORDINATES OF WELLS THAT ARE TO BE SEALED AND ABANDONED ARE AS FOLLOWS:

HATOI-906	N 10,137	E 11,703
HATOI-907	N 10,154	E 11,692
HATOI-908	N 10,019	E 9,539
HATOI-905	N 10,019	E 9,558
HATOI-910	N 8,336	E 10,067
HATOI-911	N 9,508	E 11,114
HATOI-912	N 9,527	E 11,133
HATOI-930	N 10,550	E 7,733

REFERENCE DRAWINGS:

HAT-PS-10-0967 GEOLOGIC CROSS SECTIONS

LEGEND:

- PIEZOCONE SOUNDINGS
- BORINGS
- BORING AND PIEZOCONE SOUNDING IN SAME LOCATION
- TEST PITS
- TEST PIT AND PIEZOCONE SOUNDING IN SAME LOCATION
- TEST PIT, BORING AND PIEZOCONE SOUNDING IN SAME LOCATION
- MONITORING WELLS

QA REVIEWED FOR QUALITY REQUIREMENTS BY [illegible] 6-16-88

U. S. DEPARTMENT OF ENERGY

ALBUQUERQUE, NEW MEXICO

MEXICAN HAT SITE
MEXICAN HAT, UTAH
PHASE II CONSTRUCTION

BORING LOCATION PLAN

6-24-88	ISSUED FOR CONSTRUCTION	—	—	—	—	—	—
DATE	REVISIONS	BY	CK	E AND MGR	CHIEF ENG	TAC REV	DOE APP

DESIGNED [illegible] DRAWN RBC
CHECKED [illegible]
INSPECTED [illegible]
RECOMMENDED [illegible]
APPROVED [illegible] DATE 6-15-88

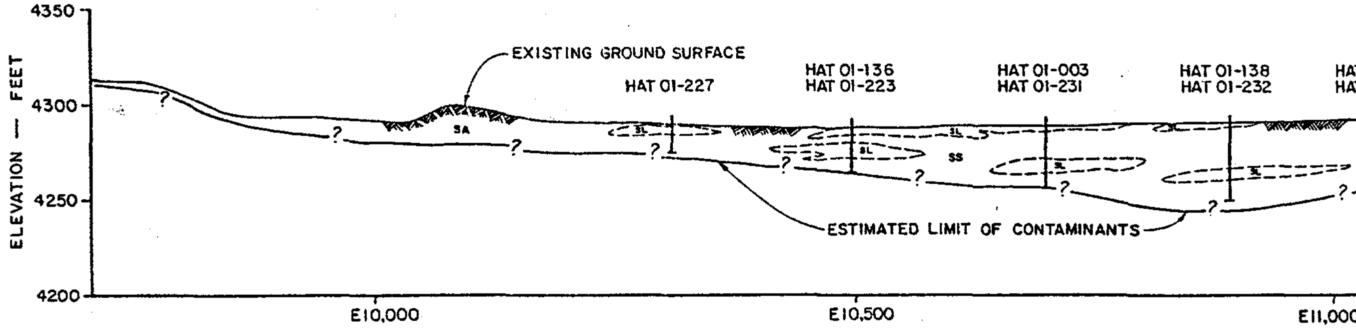
[illegible] / [illegible] 6/15/88

DOE PROJECT ENGINEER [illegible] DATE 6/16/88

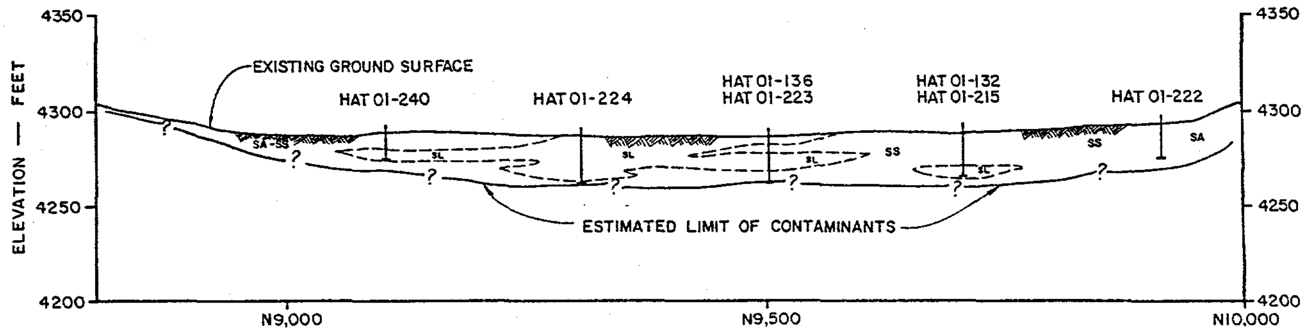
MORRISON-KNUDSEN ENGINEERS, INC.
A MORRISON-KNUDSEN COMPANY
UMTRA PROJECT
180 HOWARD ST. SAN FRANCISCO, CA 94105

PROJECT NO. DE-AC04-83AL18796

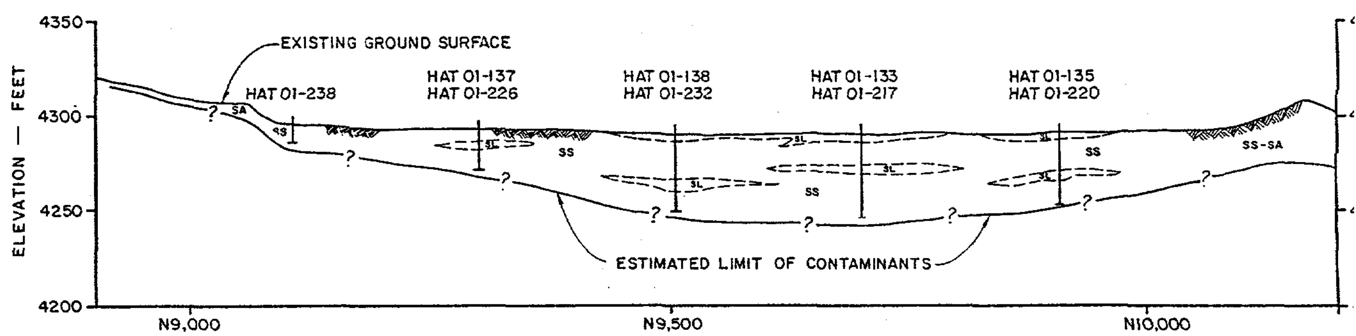
DRAWING NO. HAT-PS-10-0966 REV 0



SECTION (A / 0966) @ N9,500



SECTION (B / 0966) @ E10,500

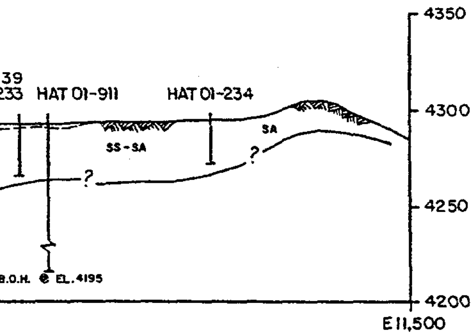


SECTION (C / 0966) @ E10,900

REGISTERED ENGINEER
NO. 4719
EDWIN S. SMITH
STATE OF UTAH

E.S. Smith

QA
MK-F



NOTES:

1. LOCATION AND EXTENT OF MATERIAL AS SHOWN ON THE GEOLOGIC SECTIONS IS APPROXIMATE, AND IS MEANT ONLY TO REPRESENT THE HIGHLY VARIABLE SOIL CONDITIONS EXISTING WITHIN THE LOWER TAILINGS EMBANKMENT.

REFERENCE DRAWINGS:

HAT-PS-10-0966 BORING LOCATION PLAN

LEGEND:

SL	SLIMES	SEE NOTE 1
SS	SAND-SLIMES	
SA	SANDS	

ELEVATION — FEET

100	0	100	200

HORIZONTAL SCALE FEET

50	0	50	100

VERTICAL SCALE FEET

QA REVIEWED FOR QUALITY REQUIREMENTS BY Bill Condon 6-16-88

DATE	REVISIONS	BY	CK	E&D MGR.	CHIEF ENG.	TAC REV.	DOE APP.
4-88	ISSUED FOR CONSTRUCTION	—	—	—	—	—	—

U. S. DEPARTMENT OF ENERGY
ALBUQUERQUE, NEW MEXICO

MEXICAN HAT SITE
MEXICAN HAT, UTAH
PHASE II CONSTRUCTION

GEOLOGIC CROSS SECTIONS

DESIGNED: B.L.H. DRAWN: RBC/ECG
CHECKED
INSPECTED
RECOMMENDED
APPROVED DATE 6-15-88 E.S. Smith 6/15/88
DOE PROJECT ENGINEER DATE 6/16/88

MORRISON-KNUDSEN ENGINEERS, INC.
A MORRISON-KNUDSEN COMPANY
UMTRA PROJECT
180 HOWARD ST. SAN FRANCISCO, CA 94105

PROJECT NO. DE-AC04-83AL18796
DRAWING NO. HAT-PS-10-0967 REV 0