UMTRA-DOE/AL

United States Department of Energy

1989 DOE/States/Tribes UMTRA Project Coordination Meeting

Grand Canyon, Arizona

October 25-27, 1989

Uranium Mill Tailings Remedial Action Project UMTRAP

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PDR WASTE
WM-39 PDC

1989 DOE/States/Tribes UMTRA Project Coordination Meeting

Grand Canyon, Arizona

October 25-27, 1989

1989 DOE/STATES/TRIBES

UMTRA PROJECT COORDINATION MEETING

GRAND CANYON, ARIZONA

OCTOBER 25-27, 1989

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FINAL AGENDA

FINAL AGENDA
DOE/STATES/TRIBES UMTRA PROJECT COORDINATION MEETING
OCTOBER 25-27, 1989
GRAND CANYON, ARIZONA

WEDNESDAY, OCTOBER 25, 1989 - THUNDERBIRD ROOM

8:00 AM	Welcome, Opening Remarks	Mark L. Matthews, Acting UMTRA Project Manager U.S. Department of Energy
8:10 AM	Project Overview and Status	Mark L. Matthews
9:00 AM	DOE Environmental Restoration and Waste Management Five Year Plan - An Overview	Patrick J. Higgins, Director, Operations and Cost Analysis Division U.S. Department of Energy
9:30 AM	BREAK	
9:45 AM	DOE Environmental Restoration and Waste Management Five-Year Plan - Site Specific Plans for UMTRA Project Sites	Wanda Fiske, Project Control Officer U.S. Department of Energy
11:15 AM	DOE Environmental Restoration and Waste Management Five-Year Plan - Implementation on the UMTRA Project Vicinity Property Program	Dee Williamson, Safety, Health, and Quality Assurance Director U.S. Department of Energy
11:45 AM	Hosted Luncheon - El Tovar Room	
1:15 PM	UMTRA Project Environmental Compliance Review	Beth Sellers, Environmental Health and Safety Manager Uranium Mill Tailings Project Office, U.S. Department of Energy
2:00 PM	UMTRA Project Funding and State Billing	Loretta Berg, Administrative Officer, Uranium Mill Tailings Project Office, U.S. Department of Energy
2:30 PM	BREAK	
2:45 PM	Long-Term Care Rule for UMTRA Project Sites	Mike Fliegel, Section Leader, Division of Low-Level Waste Management and Decommissioning, U.S. Nuclear Regulatory Commission

3:15 PM	UMTRA Project Health and Safety Program	Mar n Henderson, Construction Safety and Health Manager MK-Ferguson Co.
4:00 PM	Adjourn	
5:30 PM	No-host Cocktail Reception - KIVA ROOM	

THURSDAY, OCTOBER 26, 1989 UNDERBIRD ROOM

7:45 AM	Coffee	
8:00 AM	UMTRA Project Groundwater Issues	Charles Cormier, Technical Support Group Leader Uranium Mill Tailings Project Office, U.S. Department of Energy
8:15 AM	EPA Groundwater Protection Standards for the UMTRA Project	Jack Russell Staff Officer, Criteria and Standards Branch U.S. Environmental Protection Agency
9:00 AM	Strategies for Complying with the EPA Groundwater Protection Standards	Frank Titus, Manager, Hydrological Services, Jacobs Engineering Group Inc.
9:30 AM	BREAK	
9:45 AM	Impact of EPA Groundwater Protection Standards on UMTRA Project Designs	Jack Caldwell, Manager, Engineering Services, Jacobs Engineering Group Inc.
10:15 AM	Construction Water Impacts on Cover Designs	Jerry Thiers, Manager, Criteria and Standards, M-K Environmental Services Inc.
10:45 AM	Mobile Wastewater Treatment Plant	Hugh Hemphill, Principal Chemical Engineer, M-K Environmental Services Inc.
11:15 AM	Impacts of EPA Groundwater Protection Standards on UMTRA Project Funding Requirements	Jerry Holderness, Assistant Project Manager for Project Integration and Controls Jacobs Engineering Group Inc.
11:45 AM	Lunch (Open)	

1:00 PM	States/Tribes Reports - Arizona - Colorado - The Hopi Tribe - Idaho - The Navajo Nation - New Mexico - North Dakota - Oregon
3:00 PM	BREAK
3:15 PM	States/Tribes Reports (cont'd) - Texas - Utah - Wyoming
4:00 PM	Cooperating Agency Reports - Bureau of Indian Affairs - U.S. Environmental Protection Agency - U.S. Nuclear Regulatory Commission
4:45 PM	Closing Remarks — Mark L. Matthews
5:00 PM	Adjourn

FRIDAY, OCTOBER 27, 1989 - THUNDERBIRD ROOM

7:30 AM	Continental Breakfast
8:00 AM	Pre-tour announcements
8:15 AM	Depart for Tuba City site
10:15 AM	Tour Tuba City site
12:00 PM	Luncheon
1:00 PM	Depart Tuba City
3:00 PM	Arrive Grand Canyon

PRESENTATION BY MARK MATTHEWS
U.S. DEPARTMENT OF ENERGY

PROJECT OVERVIEW AND STATUS

U.S. DEPARTMENT OF ENERGY

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DOE/STATES/TRIBES
UMTRA PROJECT COORDINATION MEETING

UMTRA PROJECT HISTORY

- PL 95-604 Passed in 1978
- EPA Standards Promulgated in 1983
- Construction at First Site (Canonsburg, PA) Began in 1983
- EPA Groundwater Standards Remanded in 1985
- Canonsburg and Shiprock Sites Completed in 1985/1986
- EPA Proposed New Groundwater Standards in 1987
- Congress Extended UMTRA Project to 1994 in Fall of 1988

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UMTRA PROJECT

- FACTS -

- 24 Mill Tailings Sites (15 under Construction or Completed)
- Approximately 5000 Vicinity Properties (3000 under Construction or Completed)
- Total Estimated Project Cost is $1.1 Billion
- Federal Share: 90%; State Share; 10%
- JEG, RFW, SH&B Form Technical Assistance Contractor Team
- MK-Ferguson is Remedial Action Contractor

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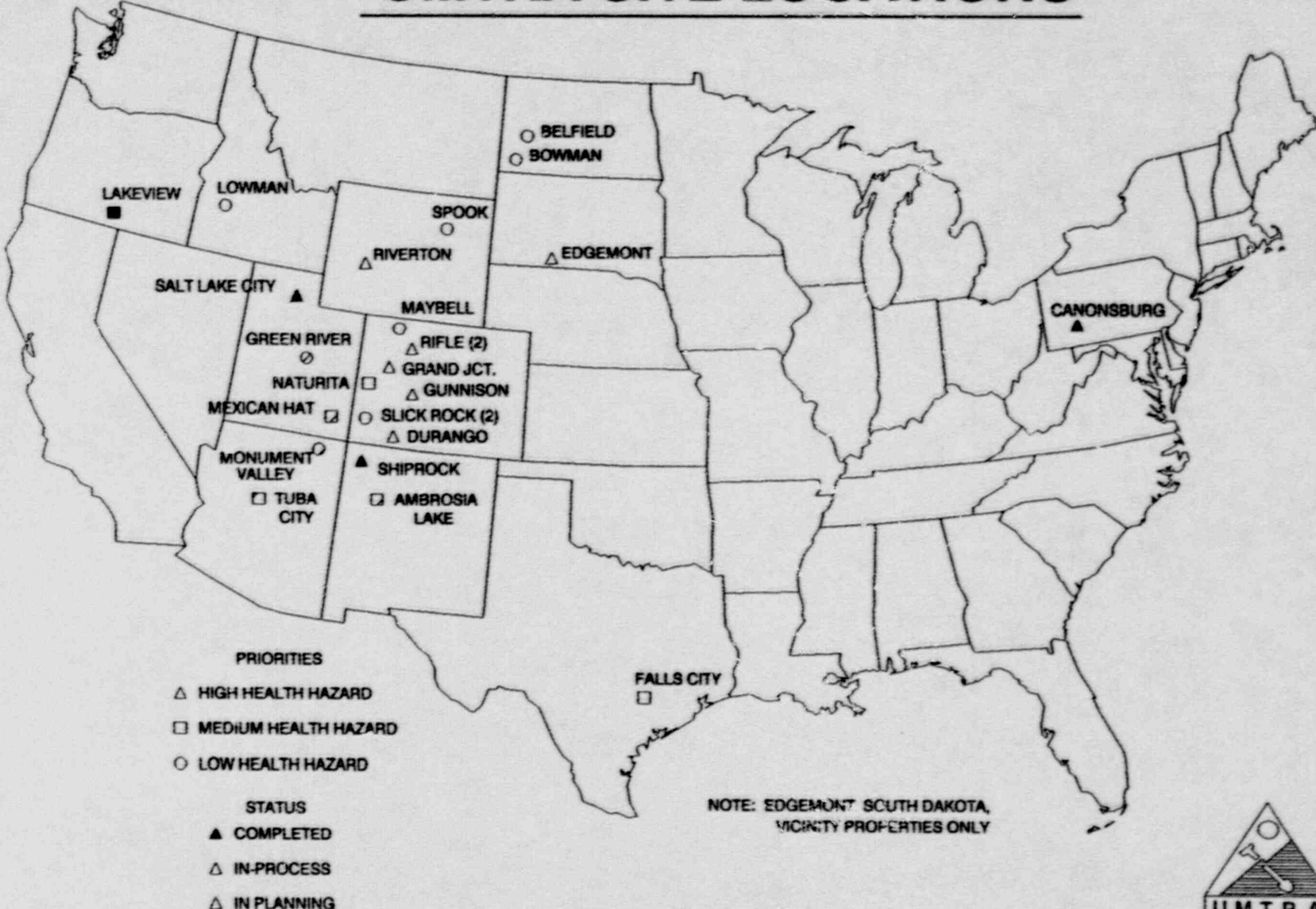
UMTRA SITE LOCATIONS



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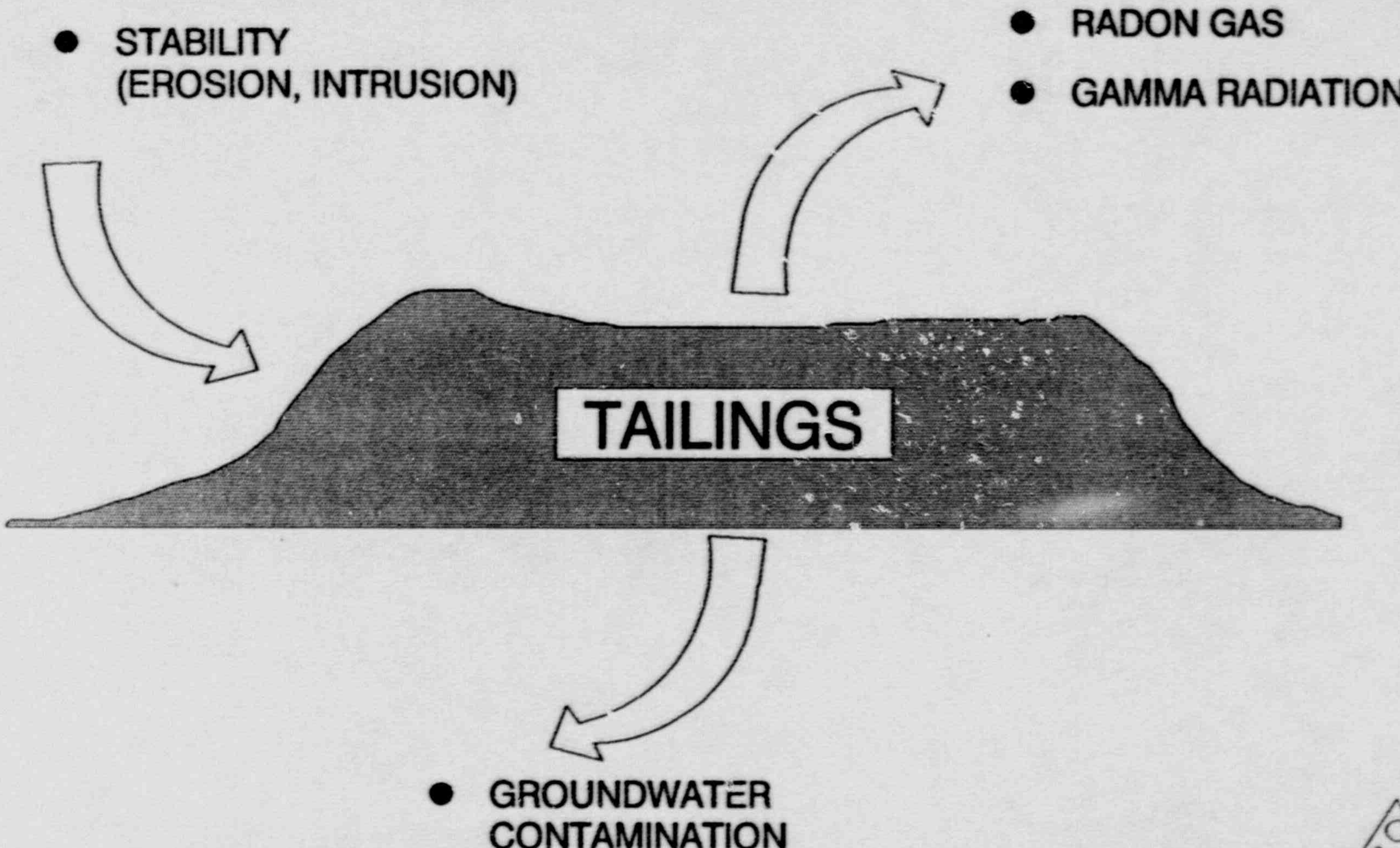
PROBLEM STATEMENT



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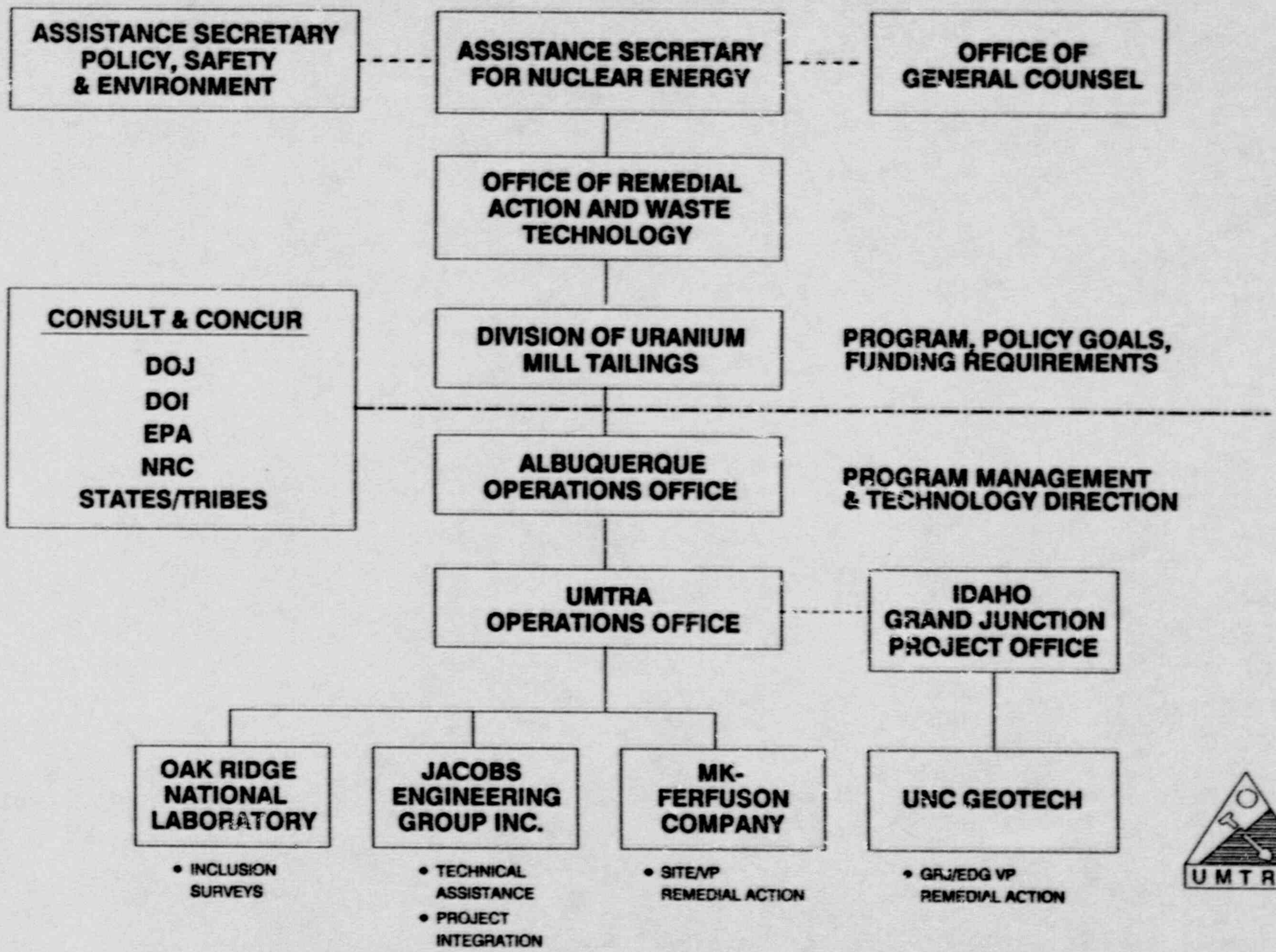
UMTRA PROJECT PARTICIPANT STRUCTURE



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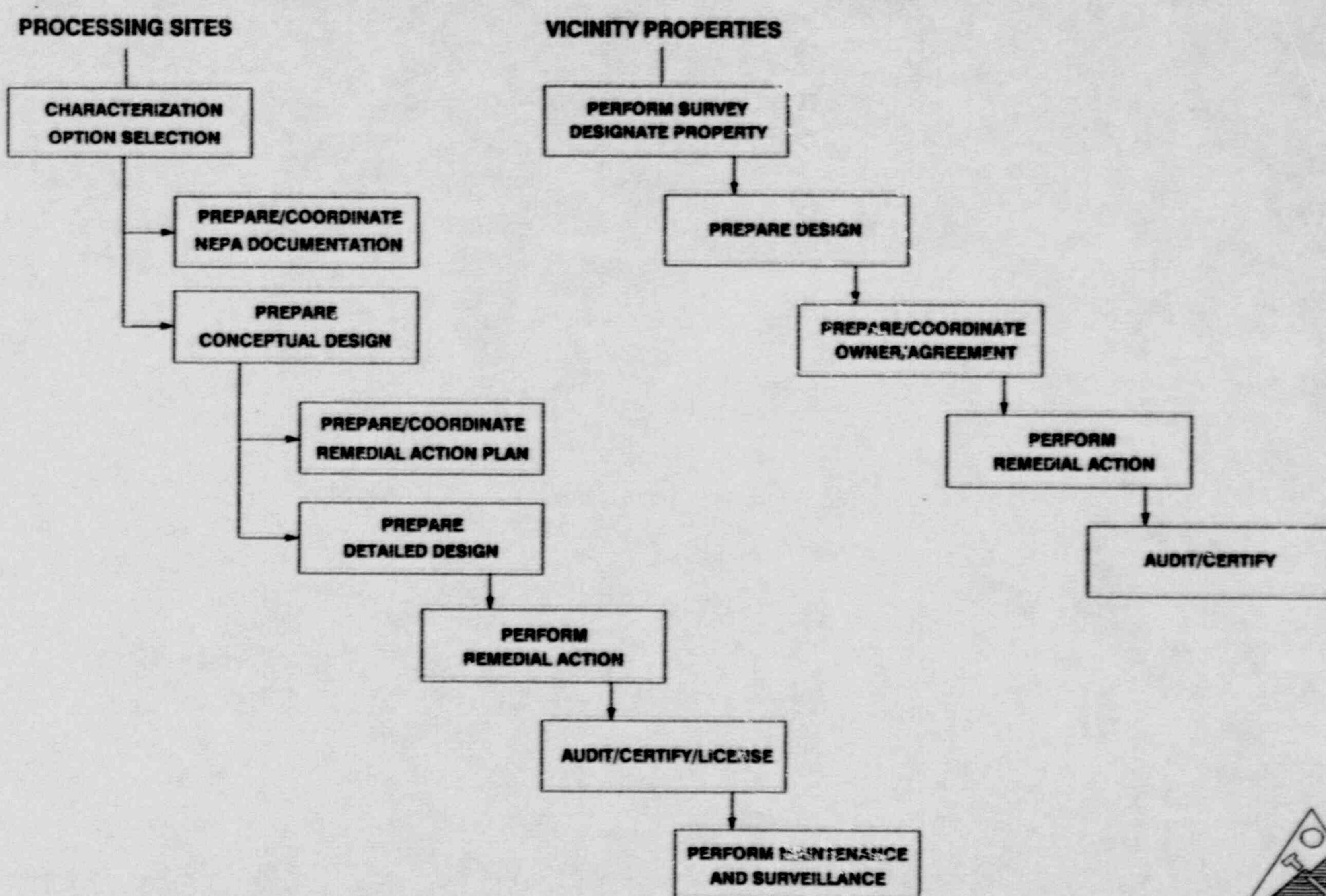
ACTIVITIES FLOW DIAGRAM



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REQUIREMENTS & SOLUTIONS

EPA STANDARDS	SOLUTIONS
Stabilize & Control Tailings Piles and Control Radiation Emissions 200-1000 yrs	Isolate In-Place or at New Location
Clean Up Contaminated Open Lands	Excavate & Remove to Disposal Site
Clean Up Contaminated Structures	Excavate & Remove to Disposal Site

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UMTRA PROGRESS TO DATE

SITES 100% COMPLETE

Canonsburg	12/85
Shiprock	10/86
Salt Lake City	08/89
Lakeview	10/89

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UMTRA PROGRESS TO DATE

SITES TO BE COMPLETED IN 1989

Spook	10/89
Green River	11/89
Riverton	11/89

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UMTRA PROGRESS TO DATE

REMEDIAL ACTION UNDERWAY AT

Tuba City	01/90
Durango	11/90
Mexican Hat/Monument Valley	09/91

PHASE I CONSTRUCTION COMPLETE AT

Rifle

Ambrosia Lake

Grand Junction

UMTRA PROGRESS TO DATE

SITES SUMMARY

- Remedial Action Completed at 4 Sites
- Engineering Complete/Underway at all Sites
- More Than 6.2 Million Cubic Yards of Material Disposed of Safely

UMTRA PROGRESS TO DATE

VICINITY PROPERTIES SUMMARY

- Remedial Action Started at 3497 of 5048 Properties (69.3%)
- Remedial Action Completed at 3348 Properties (66.3%)
- More Than 1.6 Million Cubic Yards of Material Safely Removed from Vicinity Properties

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LOCAL UMTRA ISSUES

- Tuba City Site Status
- Site Tour
- Indian Land Issues

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FEDERAL FUNDING OUTLOOK

- **FISCAL YEAR 1990 FUNDING**
  - **Requested $116 Million, Funded at $95 Million**
  - **Gramm-Rudman-Hollings, $1.2 Million Cut in Funding 1st Quarter FY 1990 (10/18/89)**
- **POTENTIAL IMPACTS**

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FEDERAL FUNDING OUTLOOK

- Five Year Plan Funds in Fiscal Year 1990

- Potential Impacts

  - New Project Startups

  - Continuation/Completion of Ongoing Construction Work

- Optimistic About Future Funding

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STATE FUNDING OUTLOOK

- States have made good faith effort to obtain funding share
- State funding has not impacted project schedules to date
- DOE will work with states in their efforts to obtain funding

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UMTRA COMMUNICATION/COORDINATION

IMPLEMENTATION OF REVISED EPA GROUNDWATER STANDARDS

- **DESCRIPTION**
  - EPA Promulgated Site-Specific Groundwater Standards (3/83)
  - Court Ordered Generally Applicable Standards (9/85)
  - EPA Issued New Draft Standards (9/87)
  - EPA Final Standards Anticipated (1990?)

- **IMPACTS**
  - Major Groundwater Protection/Restoration Program Likely
  - Cost of $ 1.4 Billion for Groundwater Protection and Aquifer Restoration Expected Based on Draft Standards

- **ACTIONS TAKEN/REQUIRED (T/R)**
  - DOE Response to Draft Standards (T)
  - EPA Finalize Standards (R)
  - DOE/NRC Implementation of Standards (R)

UMTRA COMMUNICATION/COORDINATION

NUCLEAR REGULATORY COMMISSION

- Progress Toward Licensing of Disposal Sites

- Responsive to NRC Concerns - Improvements, Procedures, Already in Place

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UMTRA COMMUNICATION/COORDINATION

BUREAU OF LAND MANAGEMENT

- Meetings Held to Resolve Land Transfer Issues
- Good Working Relationship Will Have Positive Impacts on Land Transfer Schedules

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UMTRA COMMUNICATION/COORDINATION

TRIBAL/STATE/LOCAL GOVERNMENTS/PUBLIC

- Provide Timely Information on Project
- Provide Opportunities for Input Early in the Cleanup Process

PRESENTATION BY PATRICK J. HIGGINS
U.S. DEPARTMENT OF ENERGY

DOE ENVIRONMENTAL RESTORATION AND WASTE MANAGEMENT
FIVE-YEAR PLAN - AN OVERVIEW

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ENVIRONMENTAL RESTORATION AND WASTE MANAGEMENT FIVE-YEAR PLAN

PATRICK J. HIGGINS, JR.
DIRECTOR, ALBUQUERQUE OPERATIONS
OFFICE ER / WM TASK GROUP

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SECRETARY OF ENERGY WATKINS:

- AGGRESSIVE APPROACH TO ADDRESS AND REMEDIATE ENVIRONMENTAL CONCERNS

- REALIGN DEPARTMENTAL FOCUS AND APPROACH

- REESTABLISH DEPARTMENTAL CREDIBILITY AND DEPARTMENTAL MANAGEMENT

- UTILIZE R&D TO ENHANCE TECHNOLOGICAL APPROACHES AND SOLUTIONS

→ *APPOINTMENT OF MR. LEO DUFFY: SPECIAL ASSISTANT FOR COORDINATION OF DOE DEFENSE WASTE MANAGEMENT*

→ *ENVIRONMENTAL RESTORATION & WASTE MANAGEMENT FIVE-YEAR PLAN*

ENVIRONMENTAL RESTORATION AND WASTE MANAGEMENT FIVE-YEAR PLAN

PURPOSE

- SERVE AS A BASELINE DOCUMENT
- CHARACTERIZE THE EXTENT OF CONTAMINATION, NEEDED CORRECTIVE ACTIONS, AND MANAGEMENT OF ALL WASTES
- IDENTIFY POTENTIAL RISK TO THE PUBLIC AND WORKERS
- REAFFIRM FY90 PROGRAMS AND PROVIDE THE BASIS FOR FY91 BUDGET
- PROVIDE A BASIS FOR APPLIED RESEARCH ON NEW AND INNOVATIVE TECHNOLOGIES

ENVIRONMENTAL RESTORATION AND WASTE MANAGEMENT FIVE-YEAR PLAN

SCOPE

THE PLAN WILL INCLUDE THE FOLLOWING PROGRAMS:

- **ENVIRONMENTAL CORRECTIVE ACTIVITIES**
- **ENVIRONMENTAL RESTORATION**
- **WASTE MANAGEMENT OPERATIONS**
- **APPLIED RESEARCH, DEVELOPMENT, AND DEMONSTRATION**

PLAN TIME FRAME: FY 1991 THROUGH FY 1995

FOR EACH PROGRAM THE PLAN WILL INCLUDE:

- **GOALS / OBJECTIVES / STRATEGY**
- **ASSUMPTIONS / DEFINITIONS / APPLICABLE LAWS, REGULATIONS, ETC.**
- **ORGANIZATION / MANAGEMENT STRUCTURE**
- **DETAILED PROGRAM CHARACTERIZATION**

ENVIRONMENTAL RESTORATION AND WASTE MANAGEMENT FIVE-YEAR PLAN

CORRECTIVE ACTIVITIES:	CURRENT ACTIVITIES REQUIRED TO BRING ALL ACTIVE OR STANDBY FACILITIES INTO COMPLIANCE WITH AIR, WATER, AND SOLID WASTE REGULATORY REQUIREMENTS, AGREEMENTS, AND DIRECTIVES.
ENVIRONMENTAL RESTORATION:	CURRENT AND FUTURE REMEDIAL ACTIVITIES REQUIRED AT ALL INACTIVE OR SURPLUS FACILITIES / SITES CONTAMINATED WITH RADIOACTIVE, HAZARDOUS, OR MIXED WASTES.
WASTE MANAGEMENT OPERATIONS:	ACTIVITIES ASSOCIATED DIRECTLY WITH THE PROCESSING OF RADIOACTIVE, HAZARDOUS, AND MIXED WASTES GENERATED AS A RESULT OF ONGOING OPERATIONS AT ACTIVE FACILITIES.
APPLIED RESEARCH, DEVELOPMENT, & DEMONSTRATION:	ACTIVITIES RELATING TO TECHNOLOGY EXPLORATION, DEVELOPMENT, DEMONSTRATION, OR APPLICATION EFFORTS WHICH RELATE DIRECTLY TO THE ABOVE PROGRAMS.

ENVIRONMENTAL RESTORATION AND WASTE MANAGEMENT FIVE-YEAR PLAN

PRIORITY CRITERIA

PRIORITY 1: INCLUDES ACTIVITIES NECESSARY TO PREVENT NEAR-TERM ADVERSE IMPACTS ON WORKERS, THE PUBLIC, OR THE ENVIRONMENT. INCLUDED AS A SUBSET ARE ON-GOING ACTIVITIES THAT, IF TERMINATED, COULD RESULT IN SIGNIFICANT PROGRAM OR RESOURCE IMPACTS.

PRIORITY 2: ACTIVITIES NECESSARY FOR COMPLIANCE WITH EXISTING AGREEMENTS BETWEEN DOE AND FEDERAL, STATE, AND LOCAL AGENCIES, THAT WERE NOT CAPTURED BY PRIORITY 1.

PRIORITY 3: INCLUDES THOSE ADDITIONAL ACTIVITIES THAT WOULD FURTHER REDUCE RISKS, PROMOTE FULL COMPLIANCE, BE COST EFFECTIVE, AND PREVENT DISRUPTION OF ON-GOING DOE MISSIONS, THAT WERE NOT CAPTURED BY PRIORITY 1 AND 2.

PRIORITY 4: INCLUDES ACTIVITIES THAT GO BEYOND EXTERNAL REGULATIONS BUT ARE INCLUDED IN DOE ORDERS OR IN INDUSTRY-ACCEPTED STANDARDS NOT REQUIRED BY REGULATIONS, THAT WERE NOT CAPTURED BY PRIORITY 1, 2 AND 3.

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ENVIRONMENTAL RESTORATION AND WASTE MANAGEMENT

HIGHLIGHTS

- THIRTY YEAR COMMITMENT FOR COMPLETION OF CLEANUP
- CULTURAL CHANGE, AGENCY REVITALIZATION, AND CLEANUP MISSION
- DESCRIPTION OF PROCESS FOR IMPLEMENTATION
- RESOURCE REQUIREMENTS
- DEVELOPMENT OF FORMAL PRIORITIZATION METHODOLOGY
- AGGRESSIVE RESEARCH AND DEVELOPMENT

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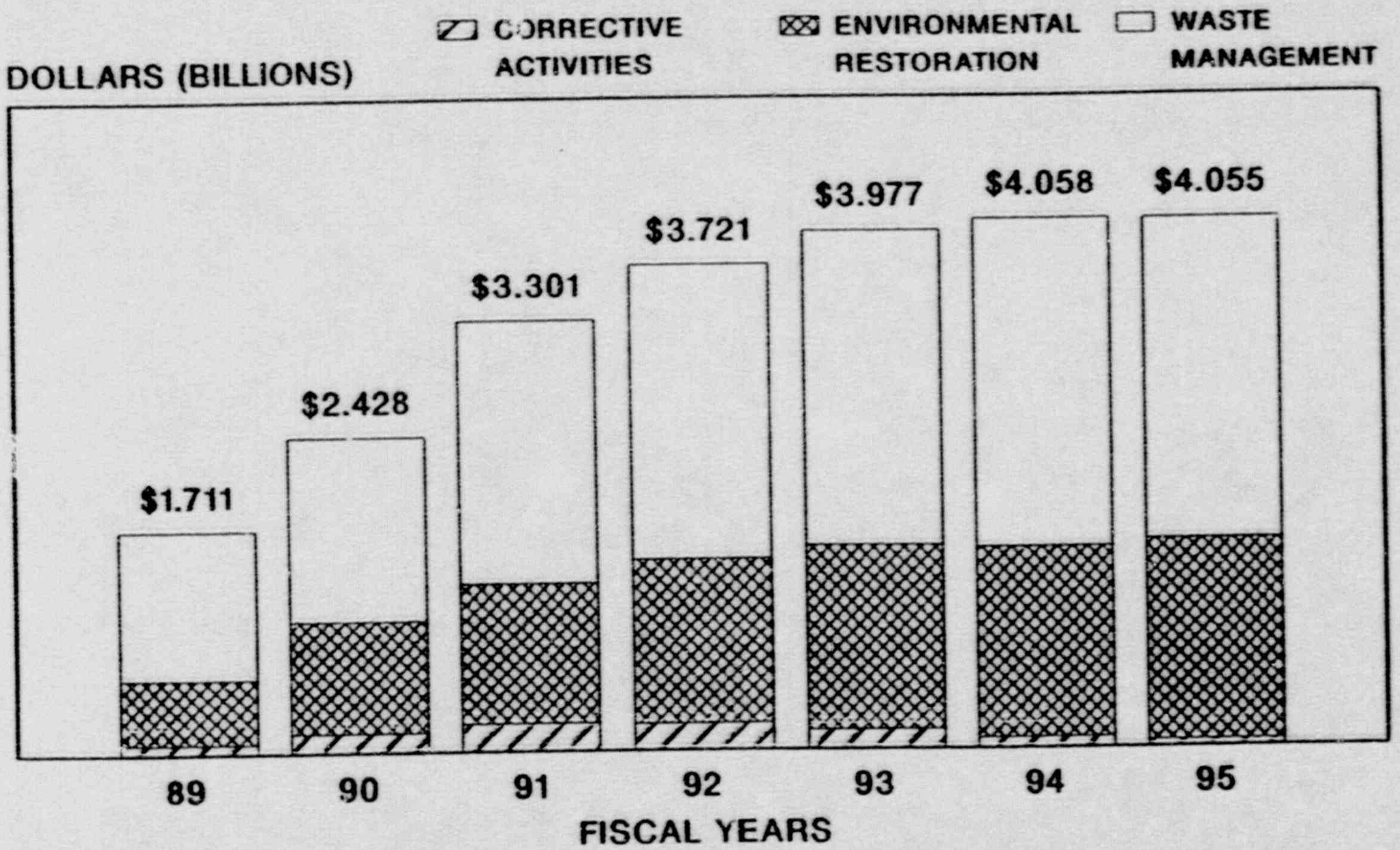
DEPARTMENT OF ENERGY
ENVIRONMENTAL RESTORATION & WASTE MANAGEMENT
FIVE YEAR PLAN



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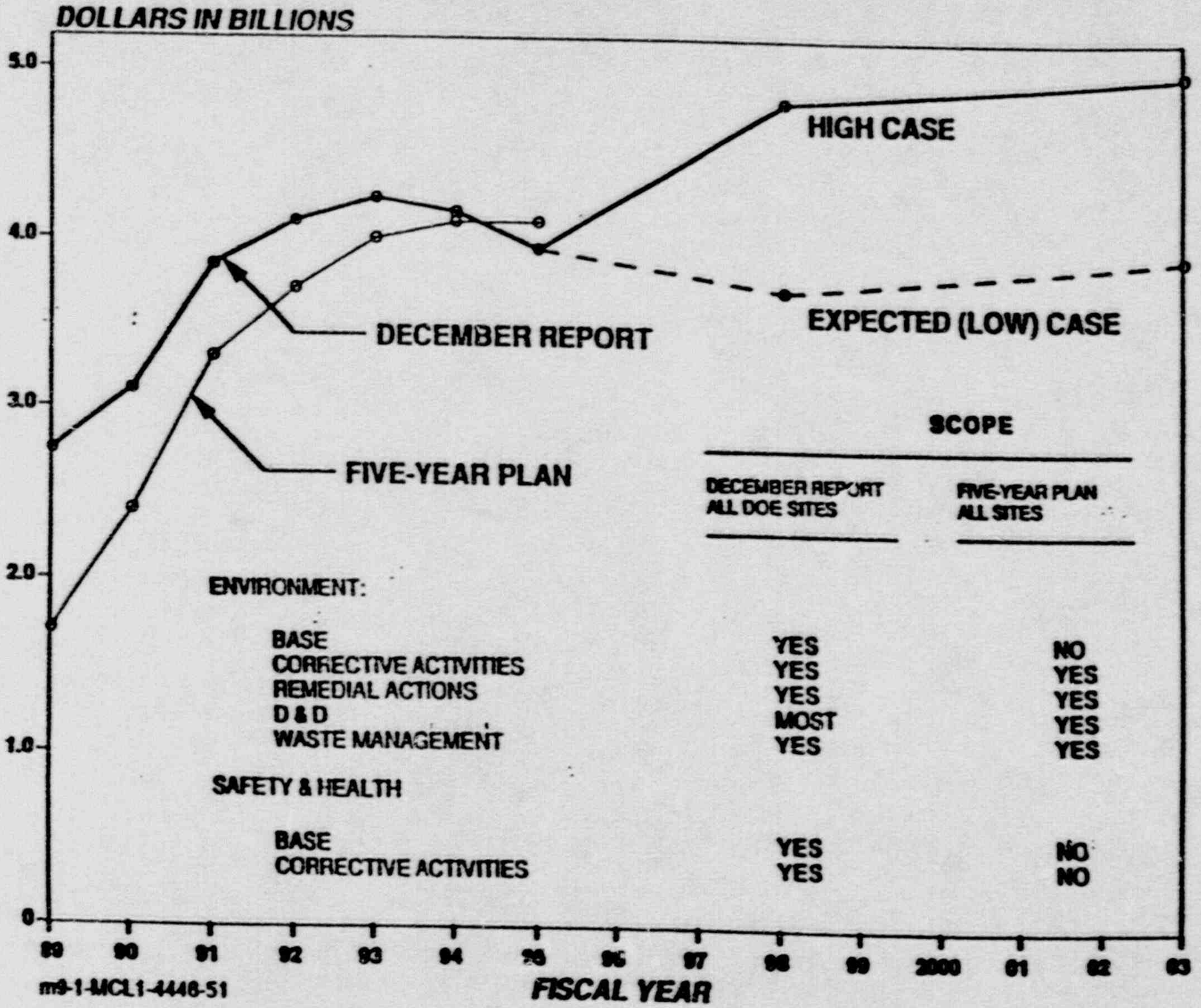
COMPARISON: DECEMBER REPORT/FIVE-YEAR PLAN



	SCOPE	
	DECEMBER REPORT ALL DOE SITES	FIVE-YEAR PLAN ALL SITES
ENVIRONMENT:		
BASE	YES	NO
CORRECTIVE ACTIVITIES	YES	YES
REMEDIAL ACTIONS	YES	YES
D & D	MOST	YES
WASTE MANAGEMENT	YES	YES
SAFETY & HEALTH		
BASE	YES	NO
CORRECTIVE ACTIVITIES	YES	NO

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ENVIRONMENTAL RESTORATION & WASTE MANAGEMENT FIVE-YEAR PLAN

ALBUQUERQUE OPERATIONS OFFICE PLAN CONTENTS

* FIVE-YEAR PLAN

  — 6 VOLUMES: AL EXECUTIVE SUMMARY - 1

  CORRECTIVE ACTIVITIES - 2

  ENVIRONMENTAL RESTORATION - 3A & 3B

  WASTE MANAGEMENT OPERATIONS - 4A & 4B

  — 14 LOCATIONS / PROGRAMS / PROJECTS

  — 700 ACTIVITY DATA SHEETS

* LOCATION-SPECIFIC PLAN:

  — 13 VOLUMES: ONE FOR EACH MAJOR LOCATION

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ENVIRONMENTAL RESTORATION & WASTE MANAGEMENT FIVE-YEAR PLAN

ALBUQUERQUE OPERATIONS OFFICE (AL) SITES / ACTIVITIES

LABORATORIES	PRODUCTION PLANTS
INHALATION TOXICOLOGY RESEARCH INSTITUTE	KANSAS CITY PLANT
LOS ALAMOS NATIONAL LABORATORY	MOUND PLANT
SANDIA NATIONAL LABORATORY, ALBUQUERQUE	PANTEX PLANT
SANDIA NATIONAL LABORATORY, LIVERMORE	PINELLAS PLANT
	ROCKY FLATS PLANT

PROJECTS / PROGRAMS / LOCAL SITES

LONG-TERM TRU WASTE TECHNOLOGY PROGRAM
URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT (UMTRA)
WASTE ISOLATION PILOT PLANT (WIPP)
CENTRAL TRAINING ACADEMY (CTA)
SOUTH VALLEY SUPERFUND SITE (OLD ACF PLANT)

ENVIRONMENTAL RESTORATION & WASTE MANAGEMENT FIVE-YEAR PLAN

BASE ASSUMPTIONS

- **PRODUCTION WORK LOAD AS DEFINED BY P&PD89, CHANGE 1, DATED JANUARY 17, 1989**
- **ONLY EXISTING OR CURRENT DRAFT REGULATIONS WILL BE IN EFFECT FOR THE YEARS FY 1989 - 1995**
- **CURRENT BUDGETING / ACCOUNTING METHODOLOGIES WERE UTILIZED**
- **CURRENT PROGRAM DATA SOURCES WERE UTILIZED**
- **WASTE MANAGEMENT OPERATIONS - BASE PROGRAM, WITH JUSTIFICATION, IS A PRIORITY 1**
- **OVERSIGHT BY OTHER AGENCIES WILL REMAIN CONSTANT**

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ENVIRONMENTAL RESTORATION & WASTE MANAGEMENT FIVE-YEAR PLAN

FINANCIAL ASSUMPTIONS

- COSTS ESCALATED THROUGH FY 1991, FY 1992 - FY 1995 STATED IN FY 1991 DOLLARS
- COSTS STATED IN BUDGET AUTHORITY (B / A)
- OVERHEAD RATES HAVE BEEN APPLIED TO
  - CORRECTIVE ACTIVITIES
  - WASTE MANAGEMENT
- LABORATORY COST ISSUE
- PASSAGE OF BUSH AMENDMENT TO FY 1990 BUDGET

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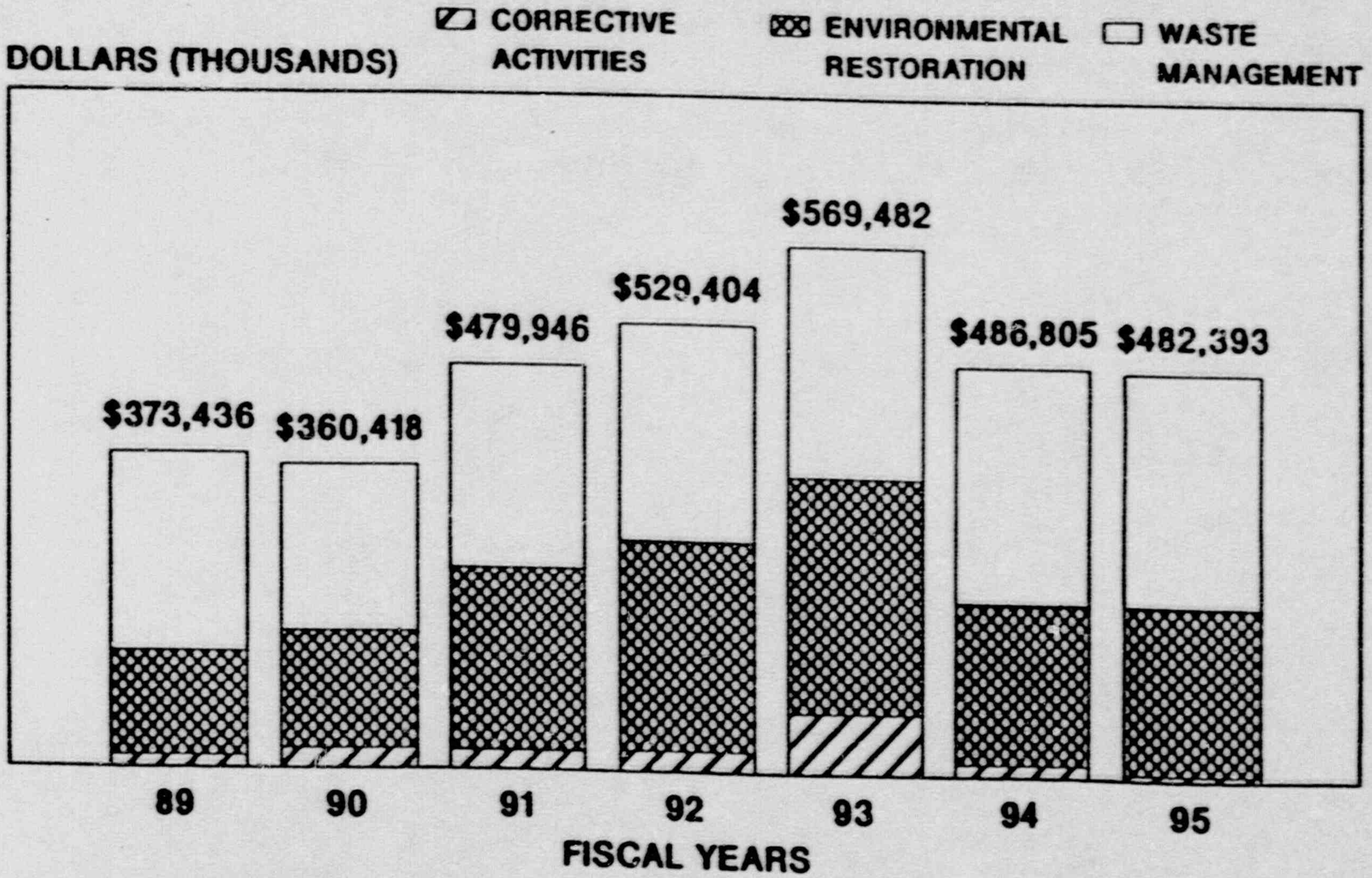
ALBUQUERQUE OPERATIONS OFFICE
ENVIRONMENTAL RESTORATION & WASTE MANAGEMENT
FIVE YEAR PLAN
PROGRAMS CATEGORIES*



* DOES INCLUDE RD&D COSTS

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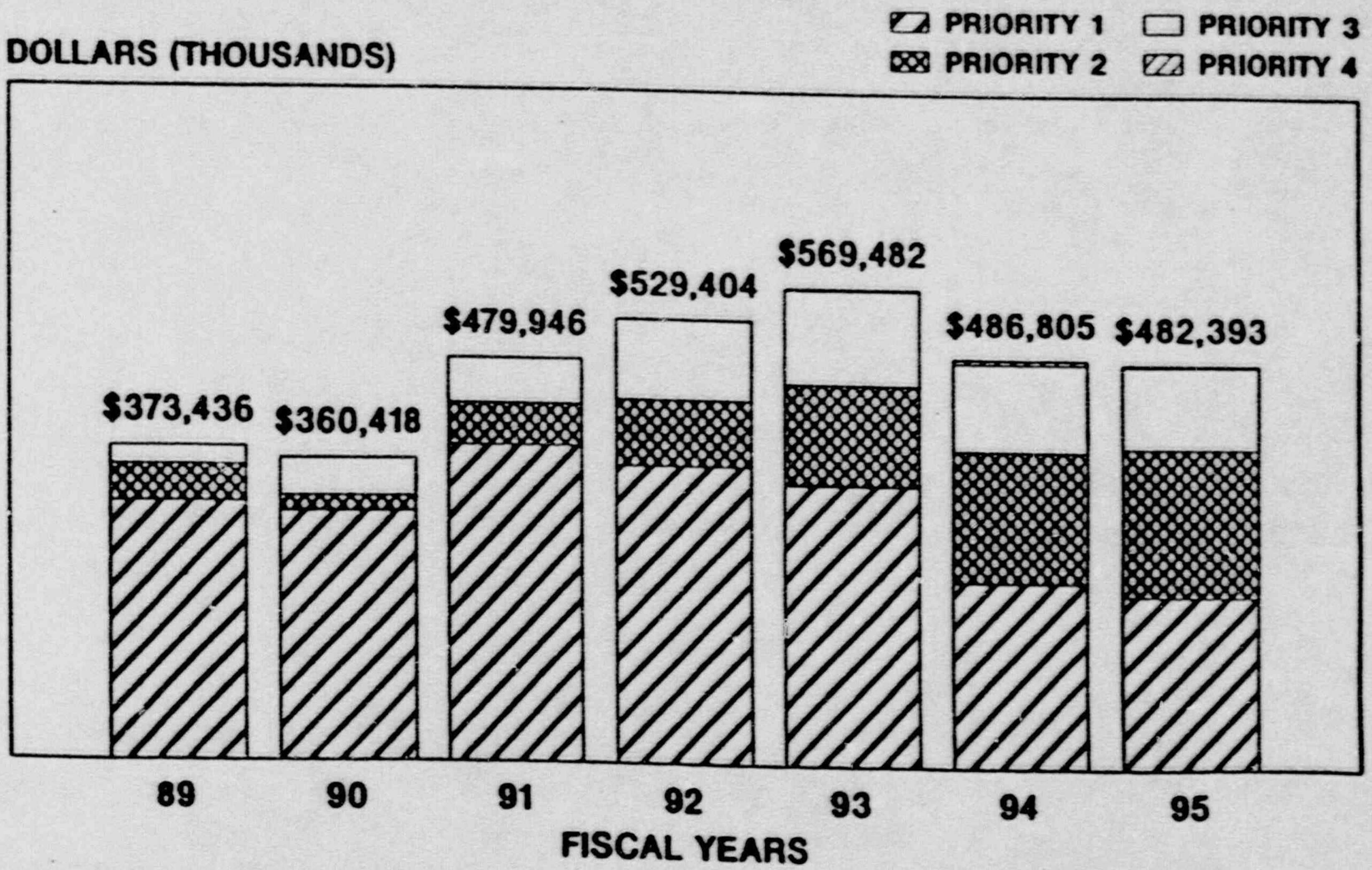
ALBUQUERQUE OPERATIONS OFFICE
ENVIRONMENTAL RESTORATION & WASTE MANAGEMENT
FIVE YEAR PLAN
PRIORITIZATION - CONSOLIDATED*



* INCLUDES RD&D

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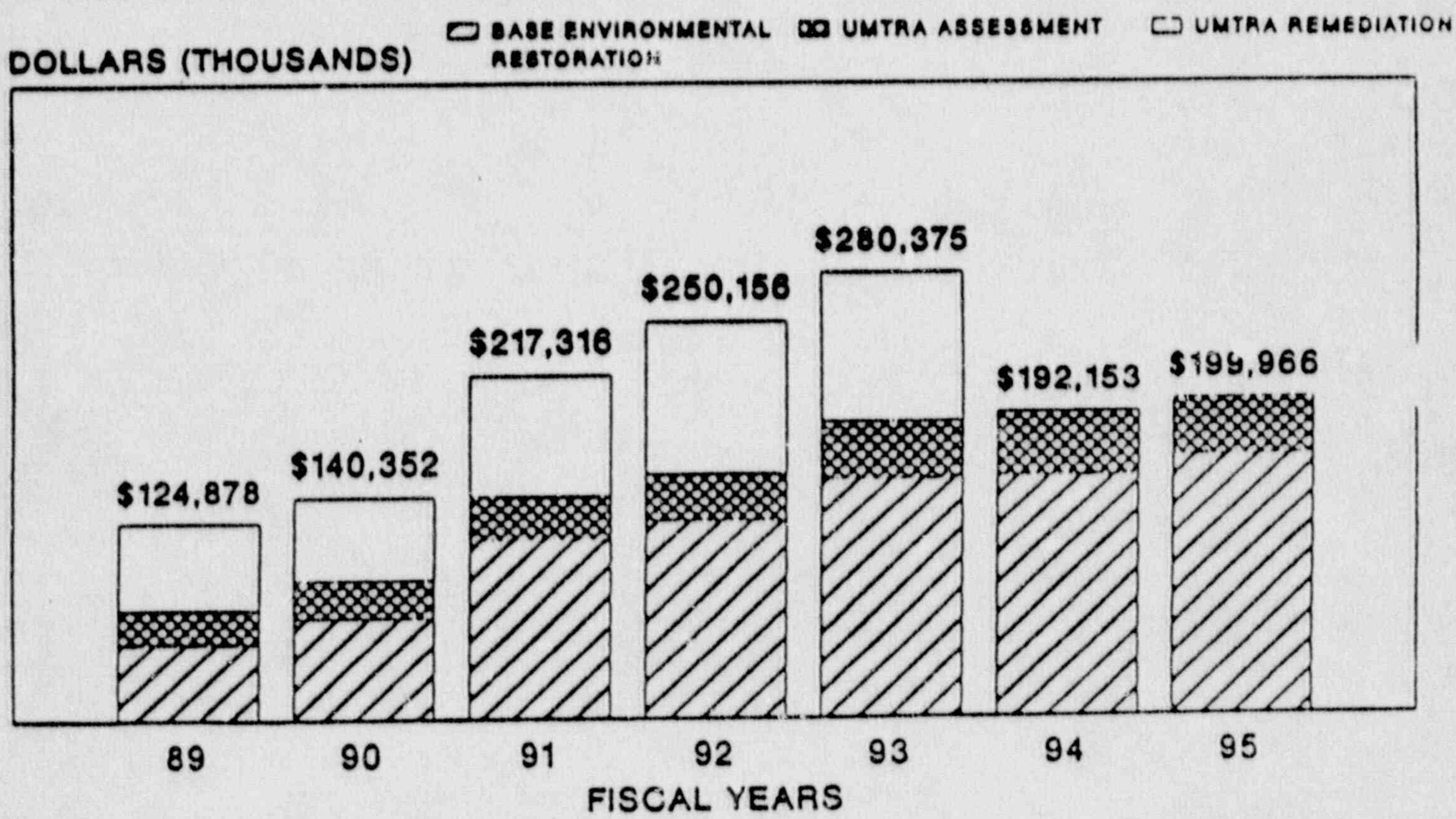
ALBUQUERQUE OPERATIONS OFFICE
ENVIRONMENTAL RESTORATION & WASTE MANAGEMENT
FIVE YEAR PLAN
TOTAL ENVIRONMENTAL RESTORATION PROGRAM



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ER / WM FIVE-YEAR PLAN
ALBUQUERQUE OPERATIONS OFFICE

CURRENT ACTIVITIES

* PUBLICATION OF AL ER / WM FIVE-YEAR PLAN
* DEVELOPMENT / PUBLICATION OF SITE SPECIFIC IMPLEMENTATION PLANS
* FY92 - 96 ER / WM FIVE-YEAR PLAN GENERATION

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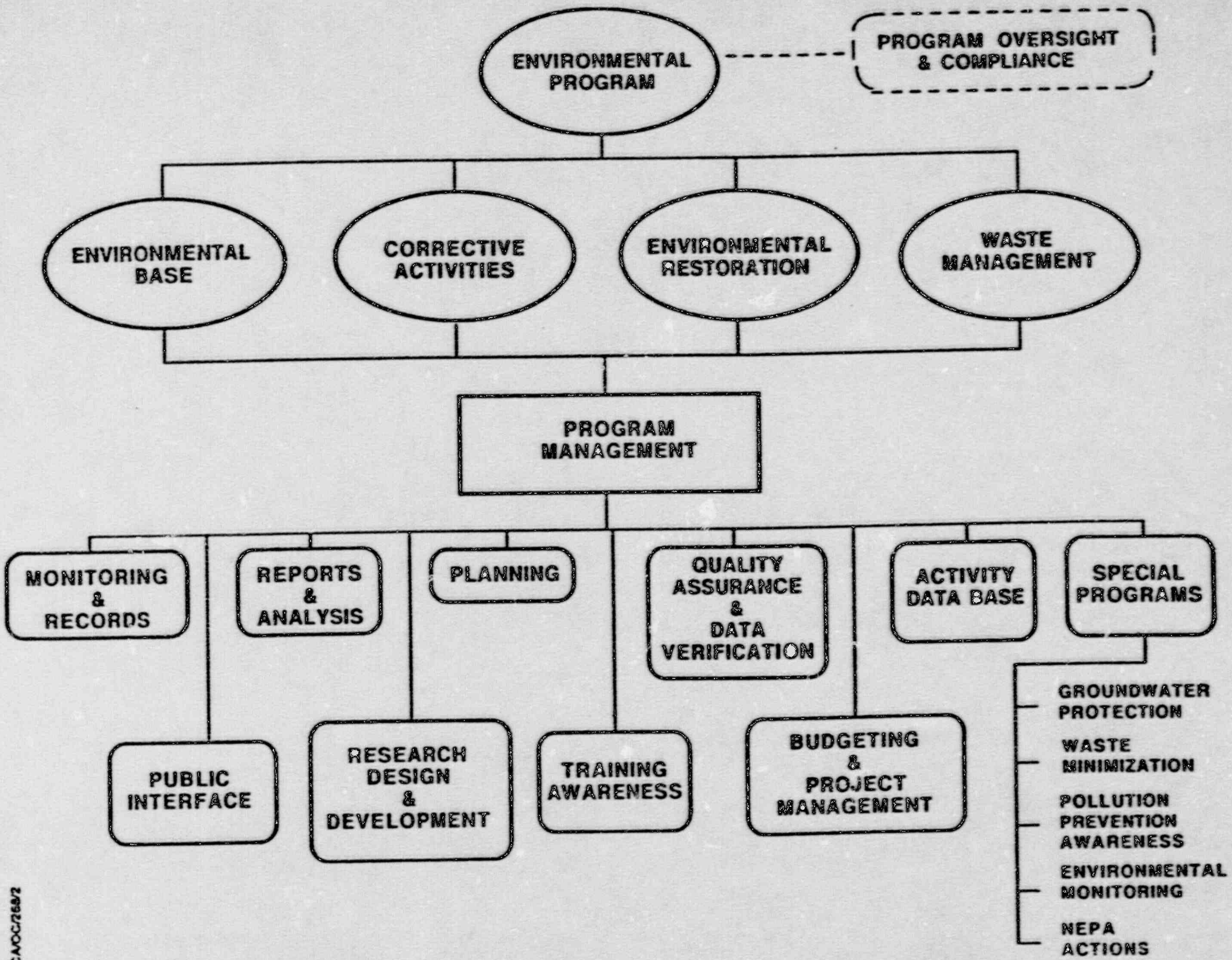
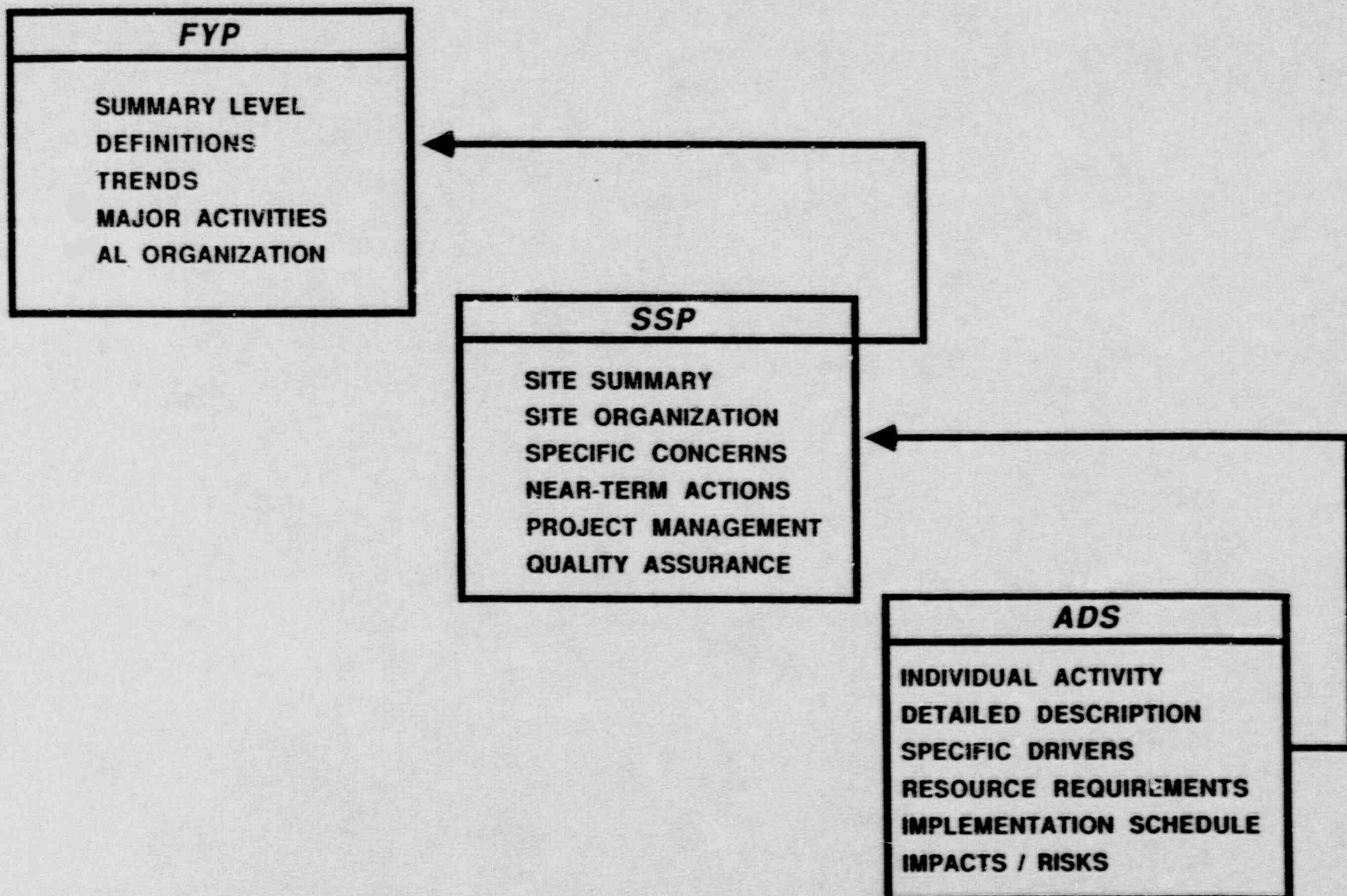

ENVIRONMENTAL PROGRAM
PROGRAM OVERSIGHT & COMPLIANCE
ENVIRONMENTAL BASE
CORRECTIVE ACTIVITIES
ENVIRONMENTAL RESTORATION
WASTE MANAGEMENT
PROGRAM MANAGEMENT
MONITORING & RECORDS
REPORTS & ANALYSIS
PLANNING
QUALITY ASSURANCE & DATA VERIFICATION
ACTIVITY DATA BASE
SPECIAL PROGRAMS
GROUNDWATER PROTECTION
WASTE MINIMIZATION
POLLUTION PREVENTION AWARENESS
ENVIRONMENTAL MONITORING
NEPA ACTIONS
PUBLIC INTERFACE
RESEARCH DESIGN & DEVELOPMENT
TRAINING AWARENESS
BUDGETING & PROJECT MANAGEMENT

FIVE-YEAR PLANNING TOOLS



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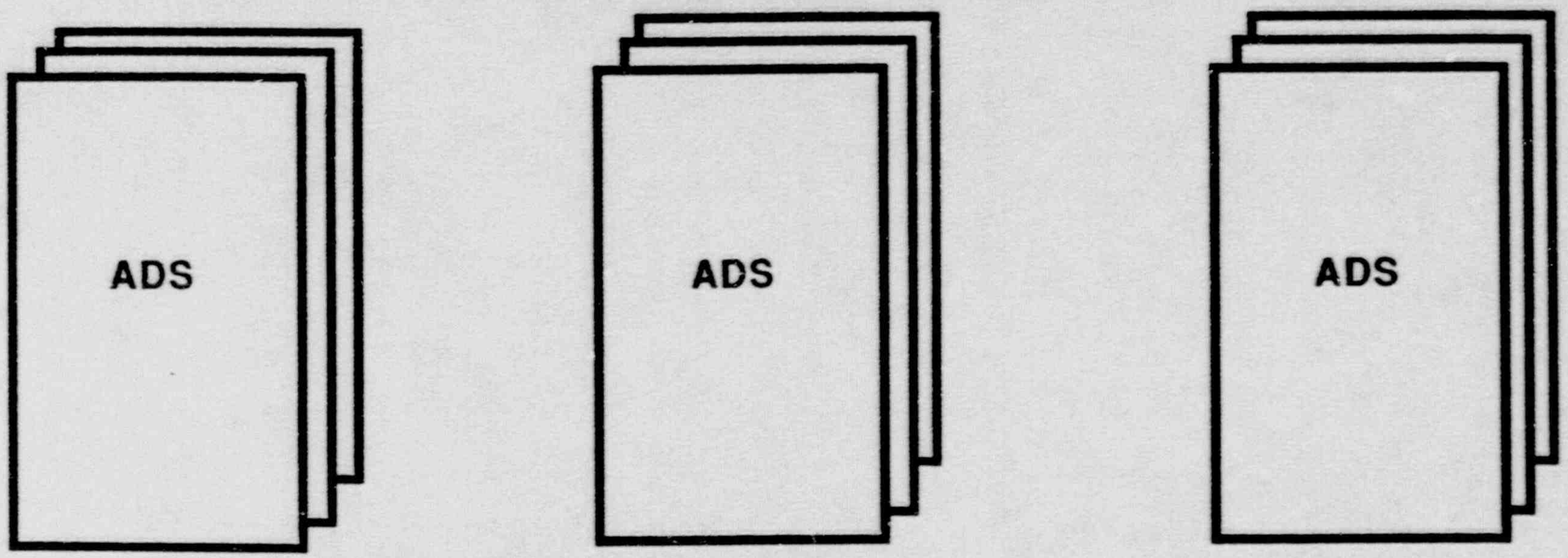
ACTIVITY DATA SHEETS
FIVE-YEAR PLAN

INITIAL | **PROPOSED REVISIONS** | **UPDATE**



7/31/89 | **9/30/89** | **2/28/90**

INITIAL (7/31/89)
- BASIS FOR HQ FYP 91-95
- BASIS FOR AL FYP 91-95
- BASIS FOR AL SSP 91-95

PROPOSED REVISIONS (9/30/89)
- PEN / INK CHANGES
- NO DATA BASE UPDATE
- CHANGES ADDRESSED SSP–89

UPDATE (2/28/90)
- DATA BASE UPDATED
- BASIS FOR AL FYP 92-96
- BASIS FOR AL SSP 92-96

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AL ENVIRONMENTAL RESTORATION & WASTE MANAGEMNT FIVE YEAR PLAN

SITE SPECIFIC PLANS

MAJOR MILESTONES/ACTIVITIES	RESP. PARTY	CURR. START	CURR. END
ISSUE SSP GUIDANCE	TG	9/21	9/21
ISSUE PA PLAN	TG	9/21	9/21
FACILITIES MEETING	TG	9/28	9/28
GENERATE SSP'S	AS/SO/CON	9/22	10/31
DRAFT SSP'S TO AL	AD/SO/CON	11/1	11/1
REVIEW DRAFT SSP'S	TG	11/2	11/8
DRAFT SSP'S TO HQ	TG	11/9	11/9
CONDUCT REVIEW SESSIONS	TG/OIEA/AO/ SO/CON	9/29	11/1
DRAFT SSP'S TO "REVIEWER	AO/SO/CON	11/1	11/1
REVIEW & COMMENT	OFF/REG	11/2	11/24
COMMENTS TO SITES & AL	OFF/REG	11/27	11/27
HQ COMMENTS TO AL	HQ	11/22	11/22
HQ COMMENTS TO SITES	TG	11/27	11/27
GENERATE FINAL SSP'S	AO/SO/CON	11/13	12/8
FINAL SSP'S TO AL	AO/SO/CON	12/11	12/11
REVIEW FINAL SSP'S	TG	12/12	12/15
FINAL SSP'S TO HQ	TG	12/15	12/15

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SITE SPECIFIC PLAN – EACH SITE

INTRODUCTION

- DESCRIPTION OF SITE
- ER / WM MANAGEMENT OVERVIEW

REQUIREMENTS FOR IMPLEMENTATION

ORGANIZATION

- ORGANIZATION
- MANAGEMENT

EACH PROGRAM CATEGORY (CA, ER, WM)

- TASK DESCRIPTION
- RESOURCES
- SCHEDULES
- COST

COMPLIANCE WITH NEPA

- RCRA / CERCLA ACTIONS UNDER DOE ORDERS
- OTHER ACTIONS RELATIVE TO NEPA

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SITE SPECIFIC PLAN – EACH SITE

REPORTING AND DATA MANAGEMENT

- REQUIRED REPORTS
- MAINTENANCE OF RECORDS
- MAINTENANCE OF SAMPLES

QUALITY ASSURANCE

- DOCUMENTATION
- SURVEILLANCE

FEDERAL, STATE, AND LOCAL INTERACTIONS

- AGREEMENTS
- MEETINGS
- APPENDIX A – ACTIVITY DATA SHEETS
- APPENDIX B – PROPOSED REVISIONS TO ACTIVITY DATA SHEETS

ENVIRONMENTAL RESTORATION & WASTE MANAGEMENT FIVE-YEAR PLAN & SITE SPECIFIC PLANS PUBLIC AFFAIRS PLAN

THREE PHASE PROCESS:

* PHASE 1: • REVIEW WITH FEDERAL / STATE / LOCAL OFFICIALS & REGULATORY AUTHORITIES

  • TIME FRAME: OCTOBER - NOVEMBER 1989

* PHASE 2: • REVIEW WITH GENERAL PUBLIC / SPECIAL INTEREST GROUPS

  – PUBLIC NOTICE OF AVAILABILITY
  – COPIES / WRITTEN COMMENTS
  – PUBLIC MEETING(S), IF REQUESTED

  • TIME FRAME: JANUARY - MARCH, 1990

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ENVIRONMENTAL RESTORATION & WASTE MANAGEMENT
FIVE-YEAR PLAN & SITE SPECIFIC PLANS
PUBLIC AFFAIRS PLAN

COVERAGE: STATE	*FACILITIES*	*EPA REGION*
CALIFORNIA	SANDIA NATIONAL LABORATORIES - LIVERMORE	9
COLORADO	ROCKY FLATS PLANT	8
FLORIDA	PINELLAS PLANT	4
MISSOURI	KANSAS CITY PLANT	7
NEW MEXICO	INHALATION TOXICOLOGY RESEARCH INSTITUTE LOS ALAMOS NATIONAL LABORATORY SANDIA NATIONAL LABORATORIES - ALBUQUERQUE CENTRAL TRAINING ACADEMY SOUTH VALLEY SITE - ALBUQUERQUE WASTE ISOLATION PILOT PLANT	6
OHIO	MOUND PLANT	5
TEXAS	PANTEX PLANT	6
MULTIPLE	UMTRAP	MULTIPLE

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9/OCA/PH/2859

ENVIRONMENTAL RESTORATION & WASTE MANAGEMENT
FIVE-YEAR PLAN & SITE SPECIFIC PLANS
PUBLIC AFFAIRS PLAN

PHASE 1 BRIEFING TEAMS' MEMBERS / RESPONSIBILITIES:

* DIRECTOR / MEMBER OF AL ER / WM FYP TASK GROUP
  - CONSISTENCY IN BRIEFING
  - COMMENTS, COLLECTION, CONSOLIDATION, REVIEW, COORDINATION, & INCORPORATION
  - LEAD OPERATIONS OFFICE ROLE

* AL PUBLIC INFORMATION OFFICER
  - SET UP OF REVIEW SESSIONS
  - REVIEW SESSION MODERATOR

ENVIRONMENTAL RESTORATION & WASTE MANAGEMENT FIVE-YEAR PLAN & SITE SPECIFIC PLANS

CONTACTS — UMTRA

NAME & TITLE	MAILING ADDRESS	PHONE NO.
PATRICK J. HIGGINS, JR. DIRECTOR, AL ER / WM TASK GROUP	U. S. DEPARTMENT OF ENERGY ALBUQUERQUE OPERATIONS OFFICE P. O. BOX 5400 ALBUQUERQUE, NM 87115	(505) 846-2149
ANNA M. BACHICHA MEDIA AFFAIRS SPECIALIST	U. S. DEPARTMENT OF ENERGY ALBUQUERQUE OPERATIONS OFFICE P. O. BOX 5400 ALBUQUERQUE, NM 87115	(505) 846-1223
NANCY LINDAS PROJECT CONTROL OFFICER	U. S. DEPARTMENT OF ENERGY UMTRA PROJECT OFFICE P. O. BOX 5400 ALBUQUERQUE, NM 87115	(505) 846-1245
JEROME HOLDERNESS ASSISTANT PROJECT MANAGER	JACOBS ENGINEERING GROUP, INC. 5301 CENTRAL AVENUE N.E. SUITE 1600 ALBUQUERQUE, NM 87108	(505) 846-4035

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9/OCA/PH/265/21

PRESENTATION BY WANDA FISKE
U.S DEPARTMENT OF ENERGY

DOE ENVIRONMENTAL RESTORATION AND WASTE MANAGEMENT
FIVE-YEAR PLAN - SITE SPECIFIC PLANS FOR UMTRA PROJECT SITES

ENVIRONMENTAL RESTORATION AND WASTE MANAGEMENT SITE SPECIFIC PLAN FOR UMTRA/UGR PROJECTS

- URANIUM MILL TAILINGS REMEDIAL ACTION (UMTRA) PROJECT
  - MANDATED BY PUBLIC LAW 95-604
  - CONGRESSIONALLY FUNDED SINCE FY-1979
  - MATURE PROJECT WITH 4 SITES COMPLETED AND 10 SITES UNDER CONSTRUCTION
  - CLOSE COORDINATION OF ACTIVITIES BETWEEN THE DOE AND STATE REPRESENTATIVES
  - REMEDIAL ACTION ACTIVITIES ARE 10% COST SHARED BY THE STATES

- UMTRA GROUNDWATER RESTORATION (UGR) PROJECT
  - MANDATED BY PUBLIC LAW 95-604
  - EPA STANDARDS WERE REVISED WHICH NOW REQUIRE RESTORATION OF GROUNDWATER ASSOCIATED WITH THE UMTRA SITES
  - FIRST TIME FUNDING IS BEING REQUESTED IN FY-91
  - ONLY PRELIMINARY COST AND SCHEDULE PLANNING HAS BEEN ACCOMPLISHED
  - DETAILED PLANNING WITH STATE/TRIBE INVOLVEMENT WILL OCCUR AFTER FUNDING IS APPROVED
  - STATES WILL BE REQUIRED TO COST SHARE 10% OF THE REMEDIAL ACTION ACTIVITIES

UMTRA

ENVIRONMENTAL RESTORATION AND WASTE MANAGEMENT SITE SPECIFIC PLAN FOR UMTRA/UGR PROJECTS

- PURPOSE OF THE SITE SPECIFIC PLAN IS TO INFORM THE PUBLIC OF DOE'S PLAN TO IMPLEMENT THE UMTRA/UGR ACTIVITIES AS IDENTIFIED IN THE WASTE MANAGEMENT AND ENVIRONMENTAL RESTORATION 5-YEAR PLAN

- THIS PLAN REPRESENTS ONLY THE PORTION OF PROJECT ACTIVITY WHICH IS FUNDED AT THE ALBUQUERQUE OPERATIONS OFFICE

- ALL SECTIONS OF THE PLAN ARE GENERIC TO THE PROGRAM WITH THE EXCEPTION OF SECTION 5

- SECTION 5 SUMMARIZES SITE SPECIFIC INFORMATION BY EACH OF THE 11 STATES AND 2 INDIAN TRIBES INVOLVED IN THE PROJECT

- APPENDIX A IS A FULL SET OF THE ACTIVITY DATA SHEETS (ADS) AS PUBLISHED IN 5-YEAR PLAN

- APPENDIX B IS A SET OF ADSs MARKED UP TO REFLECT CHANGES THAT HAVE OCCURRED SINCE THE 5-YEAR PLAN WAS DEVELOPED

UMTRA

ENVIRONMENTAL RESTORATION AND WASTE MANAGEMENT SITE SPECIFIC PLAN FOR UMTRA/UGR PROJECTS

- 5-YEAR PLAN WAS BASED UPON THE FY-91 BUDGET REQUEST WHICH WAS DEVELOPED MARCH, 1989

- SITE SPECIFIC PLAN IDENTIFIES 5-YEAR PLAN AND ALL CHANGES THAT HAVE OCCURRED SINCE THE PLAN WAS PUBLISHED

- AUTOMATIC BUDGET CUTS OF 5.3 PERCENT FROM THE GRAMM-RUDMANN-HOLLINGS ACT WENT INTO EFFECT OCTOBER 16, 1989. THESE IMPACTS WILL BE IMPOSED UNLESS A DEFICIT-REDUCTION PACKAGE IS PASSED BY CONGRESS

- FURTHER CHANGES TO THE ADSs WILL BE REQUIRED IF THESE CUTS TAKE PLACE

UMTRA

1.0 INTRODUCTION

- URANIUM MILL TAILINGS RADIATION CONTROL ACT OF 1978, P.L. 95-604
- REMEDIATION OF 24 PROCESSING SITES AND ASSOCIATED VICINITY PROPERTIES LOCATED IN 11 STATES AND 2 INDIAN RESERVATIONS
- COOPERATIVE EFFORT WITH FULL PARTICIPATION BY STATES AND TRIBES
- CLEANUP IN ACCORDANCE WITH STANDARDS ISSUED BY EPA
- NRC CONCURRENCE IS REQUIRED
- 1985 REMAND OF EPA STANDARDS NOW REQUIRES RESTORATION OF GROUNDWATER AT UMTRA SITES TO MEET REVISED STANDARDS
- UMTRA PROJECT SITES ARE IN VARIOUS STAGES OF REMEDIATION ACTIVITY WHILE UGR PROJECT HAS NOT YET BEEN FUNDED BY CONGRESSS

UMTRA

2.0 REQUIREMENTS FOR IMPLEMENTATION

- EPA STANDARDS ARE THE BASIS FOR BOTH THE CLEANUP AND DISPOSAL OF URANIUM MILL TAILINGS AS WELL AS FOR GROUNDWATER RESTORATION

3.0 ORGANIZATION

- DOE HEADQUARTERS -
  - ASSISTANT SECRETARY FOR NUCLEAR ENERGY
    - OFFICE OF REMEDIAL ACTION AND WASTE TECHNOLOGY
      - PROGRAM MANAGER, DIVISION OF URANIUM MILL TAILINGS PROJECTS

- ALBUQUERQUE OPERATIONS OFFICE -
  - AL MANAGER
    - ASSISTANT MANAGER FOR PROJECTS AND ENERGY PROGRAMS
      - PROJECT MANAGER, URANIUM MILL TAILINGS PROJECT OFFICE
        - AL MATRIX SUPPORT
        - TECHNICAL ASSISTANCE CONTRACTOR
        - REMEDIAL ACTION CONTRACTOR
        - GRAND JUNCTION VICINITY PROPERTY REMEDIAL ACTION CONTRACTOR
        - VICINITY PROPERTY INCLUSION SURVEY CONTRACTOR

- UGR PROJECT STRUCTURE EXPECTED TO BE SIMILAR WITH THE EXCEPTION OF CONTRACTOR ASSIGNMENTS

- WORK BREAKDOWN STRUCTURES AND DEFINITIONS OF WORK ACTIVITIES

- PROJECT MANAGEMENT CONTROL SYSTEM IN PLACE WITH CONTRACTOR COST AND SCHEDULE SYSTEMS FULLY VALIDATED

UMTRA

4.0 CORRECTIVE ACTIONS

- THERE ARE NO CORRECTIVE ACTIONS ASSOCIATED WITH THE URANIUM MILL TAILINGS PROJECT OR GROUNDWATER RESTORATION PROJECT

UMTRA

5.0 ENVIRONMENTAL RESTORATION

- 5.1 PROJECT SUMMARY LEVEL ACTIVITIES
  - TASK DESCRIPTION
  - RESOURCES
  - SCHEDULES
  - COSTS
  - CHANGES FROM 5-YEAR PLAN
  - SUMMARY LEVEL ADSs

- INCLUDES BOTH UMTRA AND UGR FOR ALL SITES

5.2 ACTIVITIES IN THE STATE OF ARIZONA

DESCRIPTION

- REMEDIATION OF TWO SITES LOCATED IN ARIZONA: TUBA CITY AND MONUMENT VALLEY
- TUBA CITY SITE IS ON LAND WHICH IS IN DISPUTE BETWEEN THE HOPI TRIBE AND NAVAJO TRIBE
- MONUMENT VALLEY SITE IS ON THE NAVAJO INDIAN RESERVATION AND WILL BE COLLOCATED FOR DISPOSAL WITH THE MEXICAN HAT, UTAH, SITE
- SPECIFICS OF THESE SITES WILL BE DISCUSSED IN SECTIONS 5.13, HOPI TRIBE, AND 5.14, NAVAJO NATION
- NO COOPERATIVE AGREEMENT WITH THE STATE OF ARIZONA

UMTRA

5.3 ACTIVITIES IN THE STATE OF COLORADO

DESCRIPTION

- REMEDIATION OF 9 SITES AND ASSOCIATED VICINITY PROPERTIES LOCATED IN COLORADO: DURANGO, GRAND JUNCTION, GUNNISON, MAYBELL, NATURITA, RIFLE (2 SITES), AND SLICK ROCK (2 SITES)

UMTRA SCHEDULE

SITE	COMPLETE ASSESSMENT	INITIATE REMEDIATION	COMPLETE REMEDIATION
DURANGO			FY-90
GRAND JUNCTION		FY-90	FY-94
GUNNISON	FY-90	FY-91	FY-93
MAYBELL	FY-90	FY-91	FY-93
NATURITA	FY-90	FY-92	FY-94
RIFLE		FY-90	FY-93
SLICK ROCK	FY-90	FY-92	FY-93

UMTRA

5.3 ACTIVITIES IN THE STATE OF COLORADO

(CONCLUDED)

UGR SCHEDULE

SITE	INITIATE TECH. DEV.	INITIATE S/CHAR-NEPA	INITIATE ENGINEERING	INITIATE REMEDIATION
DURANGO				
GRAND JUNCTION	FY-91	FY-94		
GUNNISON	FY-91	FY-91		
MAYBELL				
NATURITA	FY-91	FY-92	FY-93	FY-95
RIFLE				
SLICK ROCK	FY-91	FY-94		

COSTS

- ADSs ARE INCLUDED WHICH SUMMARIZE ALL THE SITES COSTS BY STATE

CHANGES FROM 5-YEAR PLAN

- INCREASED COSTS AT GRAND JUCTION AS A RESULT OF RESTRICTIONS IMPOSED BY THE COUNTY CONDITIONAL USE PERMIT
- GENERAL BUDGET REDUCTIONS TO THE UMTRA PROJECT CAUSING POSSIBLE DELAY OF RIFLE REMEDIATION SCHEDULE
- DELAY OF GUNNISON REMEDIATION START RESULTING FROM TECHNICAL ISSUES RELATING TO REVISED EPA GROUNDWATER STANDARDS
- INCREASED COSTS AT DURANGO DUE TO TECHNICAL ISSUES RELATING TO REVISED EPA GROUNDWATER STANDARDS AND SEEP CONDITIONS

UMTRA

5.4 ACTIVITIES IN THE STATE OF IDAHO

DESCRIPTION

- REMEDIATION OF THE LOWMAN SITE AND ASSOCIATED VICINITY PROPERTIES

MAJOR TASKS AND SCHEDULES AS DEFINED IN 5-YEAR PLAN

- UMTRA PROJECT:
  - COMPLETE ALL ASSESSMENT ACTIVITIES IN FY-90
  - COMPLETE VICINITY PROPERTY REMEDIATION IN FY-93
  - INITIATE AND COMPLETE SITE REMEDIATION IN FY-93
- UGR PROJECT:
  - INITIATE TECHNOLOGY DEVELOPMENT FOR ALL SITES IN FY-91
  - INITIATE SITE CHARACTERIZATION AND NEPA DOCUMENTATION IN FY-94

COSTS

- ADSs ARE INCLUDED WHICH SUMMARIZE THE STATE OF IDAHO'S ACTIVITY

CHANGES FROM 5-YEAR PLAN

- COMPLETION OF VICINITY PROPERTIES REMEDIATION RESCHEDULED TO FY-90

UMTRA

5.5 ACTIVITIES IN THE STATE OF NEW MEXICO

DESCRIPTION

- REMEDIATION OF AMBROSIA LAKE, SHIPROCK, AND ASSOCIATED VICINITY PROPERTIES

MAJOR TASKS AND SCHEDULES AS DEFINED IN 5-YEAR PLAN:

- COMPLETE REMEDIAL ACTION PLAN FOR AMBROSIA LAKE IN FY-90
- REMEDIATION SCHEDULED TO START AT AMBROSIA LAKE IN FY-91
- REMEDIATION SCHEDULED TO BE COMPLETED AT AMBROSIA LAKE IN FY-94
- SITE CERTIFICATION SCHEDULED FOR COMPLETION AT SHIPROCK IN FY-90
- INITIATE UGR TECHNOLOGY DEVELOPMENT OF ALL SITES IN FY-91

COSTS

- ADSs ARE INCLUDED WHICH SUMMARIZE THE STATE OF NEW MEXICO'S ACTIVITIES

CHANGES FROM 5-YEAR PLAN

- THERE ARE NO SIGNIFICANT CHANGES

UMTRA

5.6 ACTIVITIES IN THE STATE OF NORTH DAKOTA

DESCRIPTION

- REMEDIATION OF BELFIELD, BOWMAN, AND ASSOCIATED VICINITY PROPERTIES
- TAILINGS FROM THE BELFIELD PROCESSING SITE WILL BE RELOCATED TO THE BOWMAN PROCESSING SITE FOR PERMANENT DISPOSAL

MAJOR TASKS AND SCHEDULES AS DEFINED IN 5-YEAR PLAN:

- UMTRA PROJECT:
  - ASSESSMENT ACTIVITIES SCHEDULED FOR COMPLETION IN FY-89
  - REMEDIATION SCHEDULED TO START AND BE COMPLETED IN FY-93

- UGR PROJECT:
  - INITIATE TECHNOLOGY DEVELOPMENT FOR ALL SITES IN FY-91
  - INITIATE NEPA DOCUMENTATION FOR BOTH SITES IN FY-95

COSTS

- ADSs ARE INCLUDED WHICH SUMMARIZE THE STATE OF NORTH DAKOTA'S ACTIVITY

CHANGES FROM 5-YEAR PLAN

- COMPLETION OF ASSESSMENT ACTIVITIES HAS CHANGED FROM FY-89 TO FY-90 AS A RESULT OF DELAYS IN ACQUIRING AN ACCESS PERMIT FROM A LAND OWNER AND OTHER ISSUES RELATING TO THE REVISED EPA GROUNDWATER STANDARDS

UMTRA

5.7 ACTIVITIES IN THE STATE OF OREGON

DESCRIPTION

- REMEDIATION OF THE LAKEVIEW PROCESSING SITE AND ASSOCIATED VICINITY PROPERTIES

MAJOR TASKS AND SCHEDULES AS DEFINED IN 5-YEAR PLAN:

- UMTRA PROJECT:
  - REMEDIATION COMPLETED FY-89
  - COMPLETION OF REMEDIAL ACTION COMPLETION REPORT, SITE CERTIFICATION REPORT, SITE CERTIFICATION ACTIVITIES, AND PREPARATION OF FINAL SURVEILLANCE AND MAINTENANCE PLAN IN FY-90
- UGR PROJECT:
  - INITIATE TECHNOLOGY DEVELOPMENT FOR ALL SITES IN FY-91

COSTS

- ADSs ARE INCLUDED WHICH SUMMARIZE THE STATE OF OREGON'S ACTIVITY

CHANGES FROM 5-YEAR PLAN

- THERE ARE NO CHANGES

UMTRA

5.8 ACTIVITIES IN THE STATE OF PENNSYLVANIA

DESCRIPTION

- REMEDIATION OF THE CANONSBURG PROCESSING SITE AND ASSOCIATED VICINITY PROPERTIES

MAJOR TASKS AND SCHEDULES AS DEFINED IN 5-YEAR PLAN:

- UMTRA PROJECT:
  - COMPLETE SITE CERTIFICATION ACTIVITIES IN FY-90

- UGR PROJECT:
  - INITIATE TECHNOLOGY DEVELOPMENT FOR ALL SITES IN FY-91

COSTS

- ADSs ARE INCLUDED WHICH SUMMARIZE THE STATE OF PENNSYLVANIA'S ACTIVITY

CHANGES FROM 5-YEAR PLAN

- THERE ARE NO CHANGES

UMTRA

5.9 ACTIVITIES IN THE STATE OF SOUTH DAKOTA

DESCRIPTION

- REMEDIATION OF EDGEMONT VICINITY PROPERTIES

- ALL ACTIVITIES IN THIS STATE ARE MANAGED BY THE GRAND JUNCTION PROJECT OFFICE, IDAHO OPERATIONS OFFICE, DOE

UMTRA

5.10 ACTIVITIES IN THE STATE OF TEXAS

DESCRIPTION

- REMEDIATION OF THE FALLS CITY PROCESSING SITE AND ASSOCIATED VICINITY PROPERTIES

MAJOR TASKS AND SCHEDULES AS DEFINED IN 5-YEAR PLAN:

- UMTRA PROJECT:
  - COMPLETION OF ASSESSMENT IN FY-89
  - COMPLETION OF SITE ACQUISITION IN FY-90
  - INITIATION OF REMEDIATION IN FY-90
  - COMPLETION OF REMEDIATION IN FY-93
- UGR PROJECT:
  - INITIATE TECHNOLOGY DEVELOPMENT FOR ALL SITES IN FY-91
  - INITIATE SITE CHARACTERIZATION AND NEPA DOCUMENTATION IN FY-94

COSTS

- ADSs ARE INCLUDED WHICH SUMMARIZE THE STATE OF TEXAS' ACTIVITY

CHANGES FROM 5-YEAR PLAN

- ASSESSMENT ACTIVITIES HAVE BEEN RESCHEDULED FOR COMPLETION IN FY-90 DUE TO ISSUES RELATING TO THE REVISED EPA GROUNDWATER STANDARDS

5.11 ACTIVITIES IN THE STATE OF UTAH

DESCRIPTION

- REMEDIATION OF THE SALT LAKE CITY AND GREEN RIVER PROCESSING SITES AND ASSOCIATED VICINITY PROPERTIES
- REMEDIATION OF THE MEXICAN HAT PROCESSING SITE WHICH RESIDES ON THE NAVAJO RESERVATION AND WILL BE DISCUSSED IN SECTION 5.14, NAVAJO NATION

MAJOR TASKS AND SCHEDULES AS DEFINED IN 5-YEAR PLAN:

- UMTRA PROJECT:
  - COMPLETE SITE CHARACTERIZATION ACTIVITIES AT SALT LAKE CITY IN FY-90
  - COMPLETE REMEDIATION AT GREEN RIVER IN FY-90
- UGR PROJECT:
  - INITIATE TECHNOLOGY DEVELOPMENT FOR ALL SITES IN FY-91
  - INITIATE NEPA DOCUMENTATION AT SALT LAKE CITY IN FY-94

COSTS

- ADSs ARE INCLUDED WHICH SUMMARIZE THE STATE OF UTAH'S ACTIVITY

CHANGES FROM 5-YEAR PLAN

- THERE ARE NO CHANGES

5.12 ACTIVITIES IN THE STATE OF WYOMING

DESCRIPTION

- REMEDIATION OF RIVERTON AND SPOOK PROCESSING SITES AND ASSOCIATED VICINITY PROPERTIES

MAJOR TASKS AND SCHEDULES AS DEFINED IN 5-YEAR PLAN:

- UMTRA PROJECT:
  - COMPLETE REMEDIATION AT SPOOK FY-89
  - COMPLETE REMEDIATION AT RIVERTON FY-90

- UGR PROJECT:
  - INITIATE TECHNOLOGY DEVELOPMENT FOR ALL SITES IN FY-91

COSTS

- ADSs ARE INCLUDED WHICH SUMMARIZE THE STATE OF WYOMING'S ACTIVITY

CHANGES FROM 5-YEAR PLAN

- COMPLETION OF REMEDIATION AT SPOOK DELAYED UNTIL FY-90 DUE TO DISCOVERY OF ADDITIONAL QUANTITIES

UMTRA

5.13 ACTIVITIES ON THE HOPI RESERVATION

DESCRIPTION

- REMEDIATION OF THE TUBA CITY PROCESSING SITE AND ASSOCIATED VICINITY PROPERTIES

MAJOR TASKS AND SCHEDULES AS DEFINED IN 5-YEAR PLAN:

- COMPLETE REMEDIATION IN FY-90
- INITIATE UGR TECHNOLOGY DEVELOPMENT FOR ALL SITES IN FY-91

COSTS

- ADSs ARE INCLUDED WHICH SUMMARIZE THE HOPI TRIBE ACTIVITY

CHANGES FROM 5-YEAR PLAN

- THERE ARE NO CHANGES

5.14 ACTIVITIES ON THE NAVAJO RESERVATION

DESCRIPTION

- REMEDIATION OF FOUR PROCESSING SITES AND ASSOCIATED VICINITY PROPERTIES: TUBA CITY, AZ; MONUMENT VALLEY, AZ; MEXICAN HAT, UT; AND, SHIPROCK, NM

MAJOR TASKS AND SCHEDULES AS DEFINED IN 5-YEAR PLAN:

- COMPLETE REMEDIATION AT TUBA CITY IN FY-90
- DISCONTINUE REMEDIATION AT MEXICAN HAT/MONUMENT VALLEY IN FY-90 AND RESTART IN FY-91
- COMPLETE REMEDIATION AT MEXICAN HAT/MONUMENT VALLEY IN FY-92
- INITIATE UGR TECHNOLOGY DEVELOPMENT FOR ALL SITES IN FY-91

COSTS

- ADSs ARE INCLUDED WHICH SUMMARIZE THE NAVAJO ACTIVITY

CHANGES FROM 5-YEAR PLAN

- THERE ARE NO CHANGES

UMTRA

6.0 WASTE MANAGEMENT

- NO WASTE MANAGEMENT ACTIVITIES ARE ASSOCIATED WITH THE UMTRA PROJECT OR THE UGR PROJECT

7.0 COMPLIANCE WITH NEPA

- NEPA PROCESS RUNS CONCURRENTLY WITH THE SITE CHARACTERIZATION AND CONCEPTUAL DESIGN EFFORT
- ENVIRONMENTAL ASSESSMENT OR ENVIRONMENTAL IMPACT STATEMENT PREPARED FOR EACH UMTRA PROJECT SITE PRIOR TO THE START OF REMEDIAL ACTION
- CURRENT STATUS: 9 EAs AND 4 EISs
- FY-90 SCHEDULE: 7 EAs AND 1 EIS
- NEPA PROCESS FOR UGR PROJECT IS ANTICIPATED TO OPERATE SIMILAR TO UMTRA PROJECT PROCESS

8.0 REPORTING AND DATA MANAGEMENT

- UMTRA PROJECT IS DESIGNATED AS A MAJOR SYSTEMS ACQUISITION
- COMPLIANCE WITH DOE ORDER 4700.1, PROJECT MANAGEMENT
  - WORK BREAKDOWN STRUCTURE
  - PROJECT MASTER SCHEDULE
  - FORMAL REPORTING
- COST AND SCHEDULE CONTROL SYSTEMS
- CHANGE CONTROL BOARD
- FORMAL MEETINGS
- CLOSE COORDINATION OF MEETINGS AND REPORTING WITH STATES/TRIBES

UMTRA

9.0 QUALITY ASSURANCE

- QA PLAN FOR UMTRA PROJECT

  - MEETS REQUIREMENTS OF DOE ORDER 5700.6B AND EPA's QAMS-004/80 GUIDELINES

  - APPROVED BY PROJECT OFFICE AND DOE/AL

  - REVIEWED AND CONCURRED BY NRC

- REMEDIAL ACTION INSPECTION PLANS FOR UMTRA PROJECT SITES

- QA PLAN AND INSPECTION PLANS WILL BE DEVELOPED FOR THE UGR PROJECT ONCE THE PROJECT START IS APPROVED

UMTRA

10.0 FEDERAL STATE AND LOCAL INTERACTIONS

- PUBLIC INFORMATION AND PARTICIPATION PROGRAM
  - 1-800 TELEPHONE NUMBER
  - PUBLIC HEARINGS
  - CITIZEN TASK FORCE GROUPS
  - PUBLIC GROUNDBREAKING CEREMONIES
  - PRINTED MATERIALS, MEETINGS, PRESS RELEASES, INFORMATION MAILINGS, AND TOURS

- STATES AND INDIAN TRIBES

- NRC

UMTRA

11.0 UNBUDGETED NEEDS ASSESSMENT

- 5-YEAR PLAN IDENTIFIED ADDITIONAL FUNDING REQUIREMENTS IN FY-90
- WITHOUT RECEIPT OF ADDITIONAL FUNDING, PROJECT COMPLETION OF SEPTEMBER 1994 IS IN JEOPARDY
- SECTION 5.0 DISCUSSES SITE SPECIFICS

UMTRA

SUMMARY

- PURPOSE OF THE SITE SPECIFIC PLAN (SSP) IS TO INFORM THE PUBLIC OF THE WAY DOE PLANS TO IMPLEMENT THE ACTIVITIES SPECIFIED IN THE 5-YEAR PLAN
- SSP BEING DISTRIBUTED TODAY IS DRAFT
- SSP FOCUSES ON FY-90
- PUBLIC IS INVITED TO SUBMIT COMMENTS ON SSP's TO THE UMTRA PROJECT OFFICE NO LATER THAN 11/27/89
- COMMENTS WILL BE INCORPORATED INTO SSP's WHERE APPLICABLE
- DOE WILL RESPOND TO PUBLIC COMMENTS

UMTRA

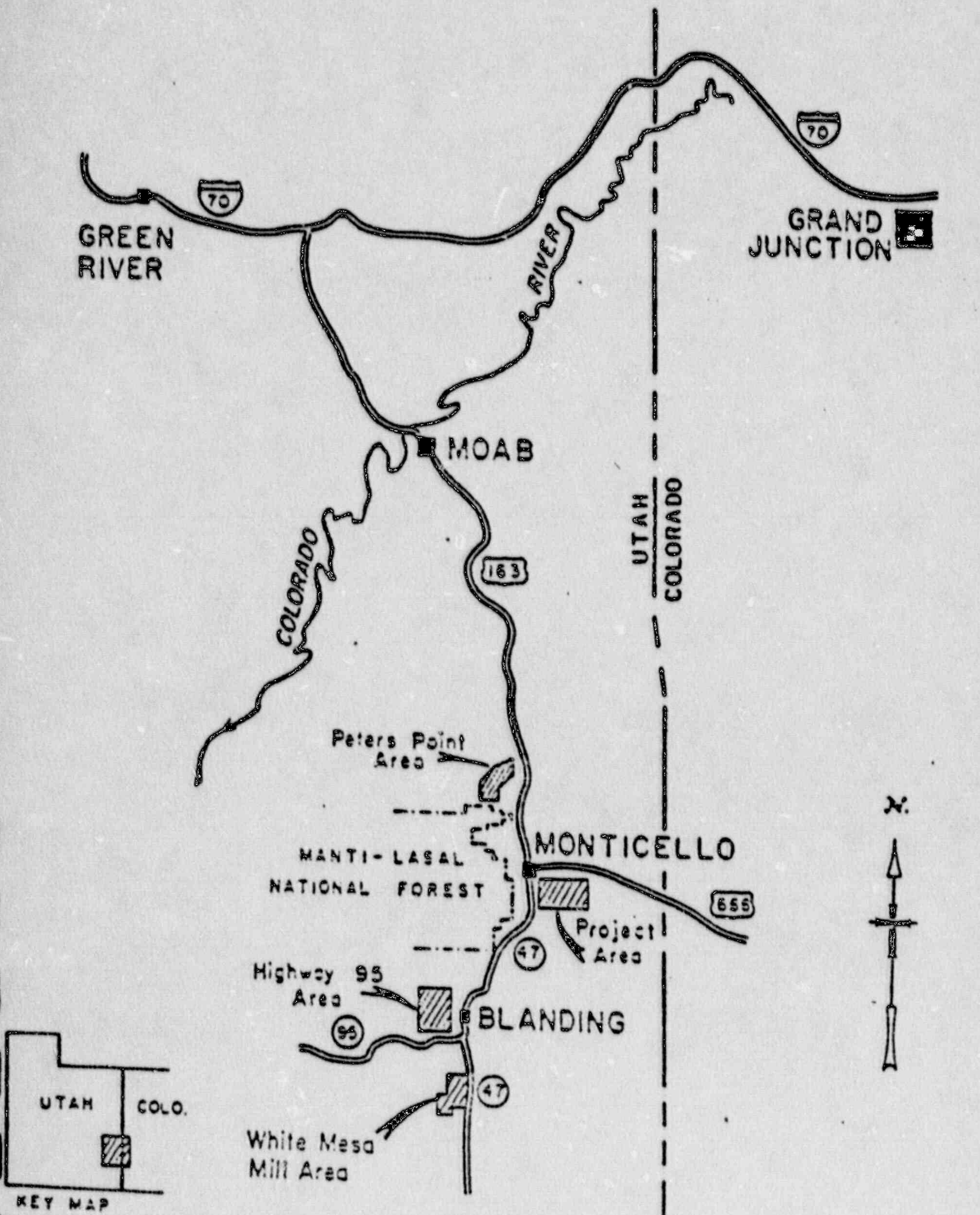
PRESENTATION BY DEE WILLIAMSON
U.S. DEPARTMENT OF ENERGY

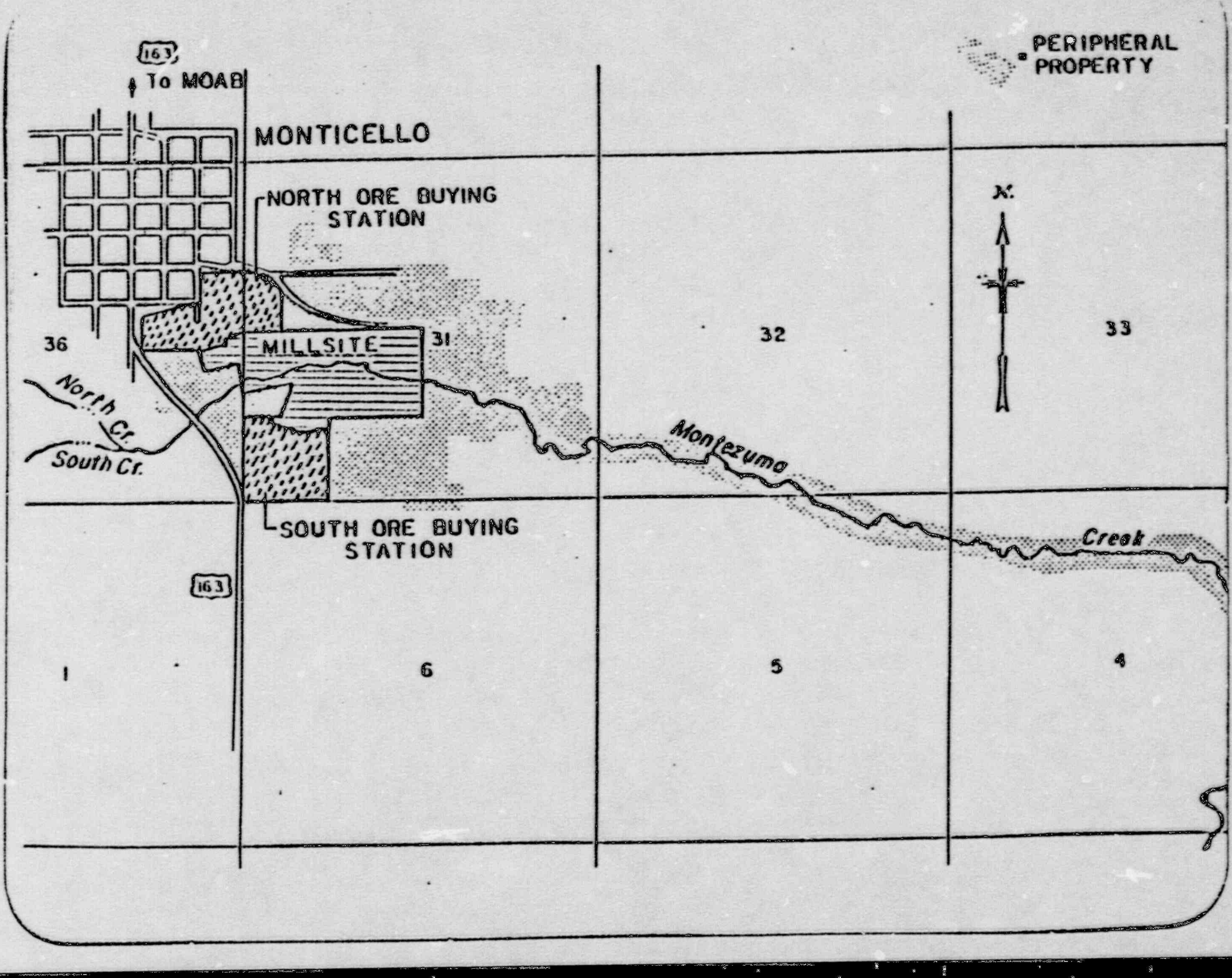
DOE ENVIRONMENTAL RESTORATION AND WASTE MANAGEMENT FIVE-YEAR PLAN
IMPLEMENTATION ON THE UMTRA PROJECT VICINITY PROPERTY PROGRAM

Environmental Restoration and Waste Management
Site Specific Plans
for Colorado and Utah

Grand Junction Projects Office
Surplus Facilities Management Program
Defense Facilities Decommissioning Program

October 25, 1989


70
70
GREEN RIVER
GRAND JUNCTION
RIVER
MOAB
COLORADO
UTAH
COLORADO
163
Peters Point Area
MONTICELLO
MANTI-LASAL NATIONAL FOREST
666
Project Area
47
Highway 95 Area
BLANDING
95
47
White Mesa Mill Area
UTAH
COLO.
KEY MAP
N.



PERIPHERAL PROPERTY
163
To MOAB
MONTICELLO
NORTH ORE BUYING STATION
N.
MILLSITE
36
31
32
33
North Cr.
South Cr.
Montezuma
Creek
SOUTH ORE BUYING STATION
163
1
6
5
4

MONTICELLO MILLSITE AND VICINITY PROPERTIES

SCHEDULES

MRAP

Complete Public Review of the RI/FS	12/30/89
Obtain a Record of Decision	09/01/90
Complete Definitive Design	09/30/91
Initiate Remedial Action	09/30/91
Complete Remedial Action	09/30/96

MVP

Obtain a Record of Decision	09/15/89
Complete Ongoing Remedial Actions	09/30/91
Complete Verification and Reporting Activities	09/30/92

COST (dollars in thousands)

	FY 1989 Approved	FY 1990 Amended Presid. Budget	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995
TOTAL MRAP	1,508	5,395	4,365	13,072	13,568	10,757	8,315
TOTAL MVP	1,182	2,000	1,500	100	--	--	--

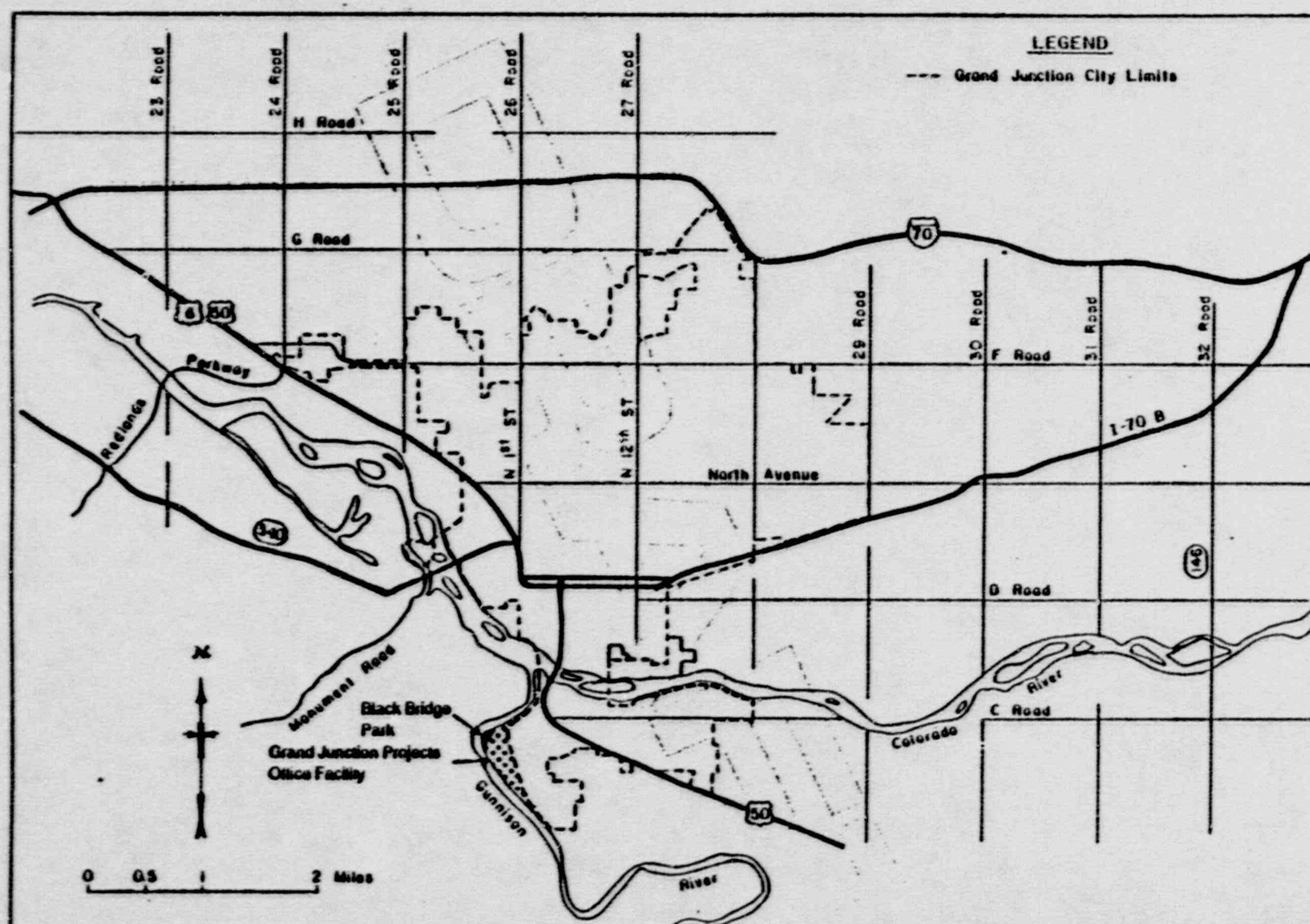


Figure 1-1. Location Map of U.S. Department of Energy Grand Junction Projects Office Facility.

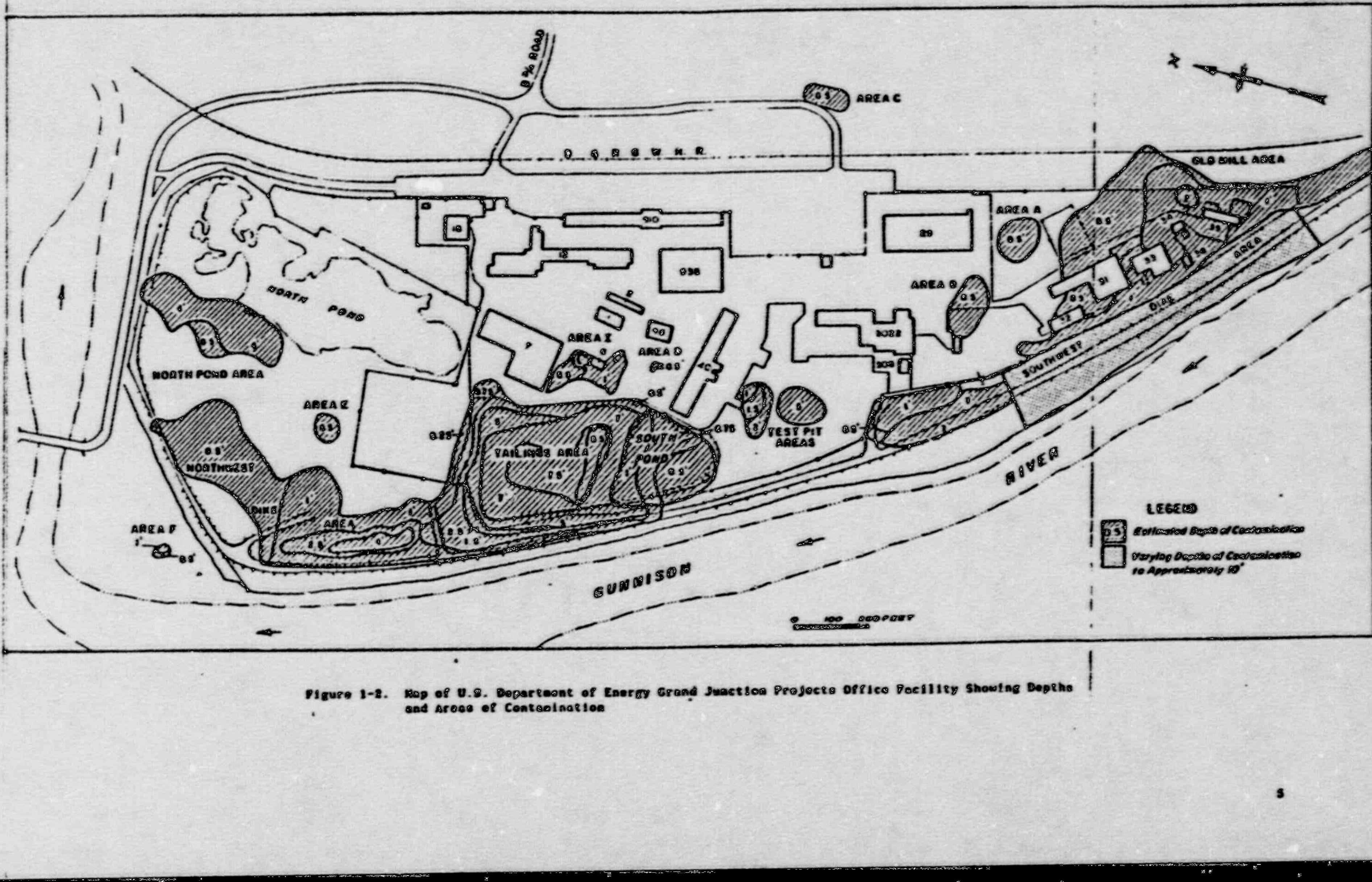


Figure 1-2. Map of U.S. Department of Energy Grand Junction Projects Office Facility Showing Depths and Areas of Contamination

/91/

Table 2. DOE/GJPO Environmental Restoration and Waste Management Five-Year Plan
State of Colorado Funding Summary, Budget Authority ($000s)

Identification Number	Activity Title	FY 1989 Appropriation	FY 1990 Bush Budget	FY 1990 R	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995
IG-0004-1/5-26	Program Management of DOE Disposal Site LTSM								
	Operating	300	652	652	650	780	820	960	1,000
	Capital	0	0	0	90	290	0	0	0
	SUBTOTAL	300	652	652	740	1,070	820	960	1,000
IG-0006-1/5-26	GJVP Project								
	Operating	28,311	29,383	29,383	20,895	1,683	525	0	0
	Capital	781	202	202	34	42	0	0	0
	SUBTOTAL	29,092	29,585	29,585	20,929	1,725	525	0	0
IG-0007-1/5-26	UMTRA Program--Site Support, Technical Measurements, and Long-Term Surveillance and Maintenance (management costs for LTSM included in IG-0004-00/04-19)								
	Operating	2,209	941	941	842	605	281	0	0
	Capital	0	0	0	0	0	0	0	0
	SUBTOTAL	2,209	941	941	842	605	281	0	0
IG-0003-2/6-26	GJPORAP								
	Operating	4,555	3,604	3,604	171	0	0	0	0
	Capital	0	0	0	0	0	0	0	0
	SUBTOTAL	4,555	3,604	3,604	171	0	0	0	0
	TOTAL COLORADO	36,156	34,062	34,062	22,682	3,400	1,626	960	1,000

DOE/ID/12584--55

Environmental Restoration and Waste Management Site-Specific Plan for Idaho Operations Office

For the State of Colorado

December 1989

U.S. Department of Energy
Idaho Operations Office
Grand Junction Projects Office
Grand Junction, Colorado

DOE/ID/12584-55

ENVIRONMENTAL RESTORATION AND WASTE MANAGEMENT SITE-SPECIFIC PLAN FOR IDAHO OPERATIONS OFFICE

FOR THE STATE OF COLORADO

December 20, 1989

Prepared for
U.S. Department of Energy
Idaho Operations Office
Idaho Falls, Idaho

Prepared by
UNC Geotech
Under DOE Contract No. DE-AC07-86ID12584
U.S. Department of Energy
Grand Junction Projects Office
Grand Junction, Colorado

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FUNDING SUMMARY

GRAND JUNCTION PROJECTS OFFICE
FY 1991 ENVIRONMENTAL RESTORATION AND WASTE MANAGEMENT FIVE-YEAR PLAN
STATE OF COLORADO

(dollars in thousands)

Description	ADSS No.	FY89	FY90	FY91	FY92	FY93	FY94	FY95
AH1O1501								
Long Term Surveillance & Maintenance	IG-0007-1/5-26	2209	879	847	685	281	0	0
Long Term Surveillance & Maintenance	IG-0004-1/5-26	300	652	740	1070	820	960	1000
AH101502								
Grand Junction Vicinity Property Project (GRJVP)	IG-0006-1/5-26	29092	29585	20929	1725	525	0	0
GF729202								
Grand Junction Projects Office Remedial Action Project (GJPORAP)	IG-0003-2/6-26	4555	3684	171	0	0	0	0
Total		36156	34800	22687	3480	1626	960	1000

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LIST OF ACRONYMS AND ABBREVIATIONS

ACWP	Actual Cost of Work Performed
ANSI	American National Standards Institute
AR	Arizona
ASME	American Society of Mechanical Engineers
B&R	Budget and Reporting Number
BCWP	Budgeted Cost of Work Performed
BCWS	Budgeted Cost of Work Scheduled
CC	Complex Commercial
CDH	Colorado Department of Health
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CO	Colorado
CS	Simple Commercial
D&D	Decontamination and Decommissioning
DOE	U.S. Department of Energy
DOE/AL	U.S. Department of Energy Albuquerque, New Mexico, Operations Office
DOE/GJPO	U.S. Department of Energy Grand Junction, Colorado, Projects Office
DOE/HQ	U.S. Department of Energy Headquarters
EA	Environmental Assessment
EDGVP	Edgemont Vicinity Properties
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ER	Energy Research
FONSI	Finding of No Significant Impact
FUSRAP	Formerly Utilized Sites Remedial Action Program
FY	Fiscal Year
GJPO	Grand Junction Projects Office
GJPORAP	Grand Junction Projects Office Remedial Action Project
GJRAP	Grand Junction Remedial Action Program
GRJVP	Grand Junction Vicinity Properties
HRS	Hazard Ranking Score
ID	Idaho
ID	Identification
JEG	Jacobs Engineering Group, Inc.
LTSM	Long-Term Surveillance and Maintenance (also LTS&M)
MR	Major Residential
ND	North Dakota
NEPA	National Environmental Policy Act
NM	New Mexico
NPL	National Priorities List
NRC	U.S. Nuclear Regulatory Commission
ORNL	Oak Ridge National Laboratory
PA	Pennsylvania
PL	Public Law
QA	Quality Assurance
QAPP	Quality Assurance Program Plan
RA	Remedial Action
RAA	Remedial Action Agreement

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RD	Remedial Design
RD&D	Research Development and Demonstration
REA	Radiologic and Engineering Assessment
RI/FS	Remedial Investigation/Feasibility Study
RS/VL	Single Residential/Vacant Land
SARA	Superfund Amendments and Reauthorization Act
SFMP	Surplus Facilities Management Program
TAC	Technical Assistance Contractor
TEC	Total Estimate at Completion
TMC	Technical Measurements Center
TX	Texas
UMTRA	Uranium Mill Tailings Remedial Action
UMTRAP	Uranium Mill Tailings Remedial Action Program
UMTRCA	Uranium Mill Tailings Radiation Control Act
UNC	UNC Geotech
UT	Utah
WY	Wyoming

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1.0 INTRODUCTION

The U.S. Department of Energy Grand Junction, Colorado, Projects Office (DOE/GJPO) has responsibility for several DOE projects as well as Work for Others. The environmental restoration and waste management programs conducted by the DOE/GJPO include the Uranium Mill Tailings Remedial Action Program (UMTRAP), Surplus Facilities Management Program (SFMP), and Long-Term Surveillance and Maintenance Program.

1.1 DESCRIPTION OF THE INSTALLATION

URANIUM MILL TAILINGS REMEDIAL ACTION (UMTRA) PROGRAM

The UMTRA Program, as administered by the DOE/GJPO consists of the Grand Junction Vicinity Properties (GRJVP) Remedial Action Project and the Edgemont Vicinity Properties (EDGVP) Remedial Action Project. The purpose of the GRJVP Project is the removal of residual radioactive materials (mill tailings) from contaminated properties in the Grand Junction, Colorado, area. The GRJVP is the most significant Uranium Mill Tailings Remedial Action (UMTRA) project conducted by the DOE/GJPO. The project is administrated under authorization of the Uranium Mill Tailings Radiation Control Act (UMTRCA) of 1978 (Public Law 95-604).

UMTRA INACTIVE MILLSITE PROGRAM

The UMTRA Program includes provisions for site support, surveillance and maintenance, and Technical Measurements Center (TMC) assistance for inactive millsites. UNC Geotech, operating contractor for the U.S. Department of Energy Grand Junction Projects Office (DOE/GJPO), performs these activities.

Site support and surveillance and maintenance have a Priority 1 level because these activities are required to measure the potential off-site health risks and groundwater or soil contamination on a continuing basis. The Technical Measurements Center, located at the DOE/GJPO, supports programs under the DOE Office of Remedial Action and Waste Technology.

Site Support

Site support activities include site characterizations and assisting Jacobs Engineering Group, Inc. (JEG), Albuquerque, NM, the UMTRA Program Technical Assistance Contractor (TAC). UNC Geotech (UNC) completed the radiologic characterization of 22 UMTRA millsites and the archiving of project records in FY 1987.

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UNC Geotech will perform the following activities in support of JEG projects:

- Analyze appr[illegible]tely 200 samples for non-radiological toxicants from each of the sites listed below.

  -- Ambrosia Lake, NM
  -- Belfield/Bowman, ND
  -- Falls City, TX
  -- Grand Junction, CO
  -- Gunnison, CO
  -- Lowman, ID
  -- Maybell, CO
  -- Mexican Hat, UT
  -- Monument Valley, AR
  -- Naturita, CO
  -- Shiprock, NM
  -- Slick Rock, CO
  -- Spook, WY

- Prepare and verify quality-control water samples for the above sites, as well as other sites, when requested by JEG.

- Provide laboratory analyses of soil and water samples for trace elements and radionuclides, as requested by JEG.

The primary mission of surveillance and maintenance is performing activities such as monitoring, maintenance, and emergency measures that are undertaken at a site prior to and after remedial action to protect the public health, safety, and the environment. Monitoring of the sites is required whether remedial action activities are ongoing or have been discontinued.

Technical Measurements Center

The mission of the Technical Measurements Center is to support programs under the DOE Office of Remedial Action and Waste Technology. These programs are: (1) UMTRA Program, (2) Formerly Utilized Sites (Manhattan Engineer District/ Atomic Energy Commission) Remedial Action Program (FUSRAP), and (3) SFMP.

The scope of the Technical Measurements Center support to the UMTRA Program is to provide and/or identify calibration facilities and procedures; standardize field and laboratory measurements; develop measurement procedures for field and laboratory use; compare measurements and verify data; evaluate instruments; and address measurement problems, as directed. In addition, the TMC conducts technical exchange meetings for States, Indian federations, and subcontractors involved with the DOE Remedial Action Programs.

GRAND JUNCTION PROJECTS OFFICE REMEDIAL ACTION PROJECT (GJPORAP)

The Grand Junction Projects Office Remedial Action Project (GJPORAP) is to remediate the DOE/GJPO site. From 1954 to 1958, the Atomic Energy Commission operated a uranium mill pilot plant on the DOE/GJPO site. The last shipment of uranium concentrate from the GJPO was in January 1975. The site, immediately south and west of the Grand Junction city limits, occupies 56.4 acres and is bordered on the west by the Gunnison River.

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Pilot-plant operations at the site are believed to be almost exclusively responsible for the contaminated material buried at the GJPO facility. The contaminated material consists of uranium mill tailings, ore, and related process equipment. Total volume of the contaminated material is estimated to be 81,500 cubic yards.

LONG-TERM SURVEILLANCE AND MAINTENANCE PROGRAM

The mission of the Long-Term Surveillance and Maintenance (LTSM) Program is to assure the long-term integrity and performance of DOE disposal sites after remedial actions are completed. Regularly scheduled site inspections, environmental monitoring, site maintenance, and emergency responses in case of site failure will accomplish this mission. The LTSM Program will include uranium ore milling sites, research and development sites, and production facilities that once supported the early nuclear power programs.

Disposal sites are transferred to the LTSM Program at the completion of remedial action by the following DOE remedial action programs: (1) UMTRAP, (2) FUSRAP, (3) SFMP, and (4) low-level waste sites assigned to the DOE under Section 151(c) of the Nuclear Waste Policy Act of 1954. Other sites, including non-DOE sites, may be assigned to the LTSM Program at the direction of the Office of Remedial Action and Waste Technology.

1.2 ENVIRONMENTAL RESTORATION AND WASTE MANAGEMENT OVERVIEW

UMTRA GRJVP PROJECT

The objective of the GRJVP Project is the decontamination of approximately 3,900 vicinity properties designated by DOE identification (ID) numbers, as well as 24 complex commercial sites in the Grand Junction area. Through FY 1989, vicinity properties with a total of 2,624 DOE ID numbers had been decontaminated. The GRJVP Project is planned not only by construction completions but also by other key milestone categories. Milestone summaries are reported for submittal of Radiologic and Engineering Assessments (REAs), construction starts (mobilization at a construction site), submittal of Property Completion Reports to the DOE, and archiving of vicinity property records. The assumption is that approximately three percent (120) of the REA submittals for the GRJVP Project will not be constructed due to either owner refusal or "no-action" recommendations. Each of these properties will, however, require a Property Completion Report and archiving of records.

The assumption that 4,000 DOE ID numbers will be included in the program is based on historical data for the project. Oak Ridge National Laboratory (ORNL) performs inclusion surveys on designated vicinity properties and, subsequently, recommends that DOE either include or exclude such properties for decontamination. Through FY 1988, the rate of inclusion compares favorably to a projection of 4,009.

Findings of the Vicinity Property Special Study of March 1988 indicated that there may be as many as 4,114 included properties. The actual number of inclusions at the end of FY 1988 was 3,578. Of that number, 3,163 were recommended for inclusion by ORNL and 415 were processed as "spillover"

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inclusions by UNC. Current activities by ORNL may, or may not, lead to an additional 400 inclusions.

The availability of the State-owned temporary repository in Grand Junction for the receipt of materials removed from vicinity properties will extend to November 1991. This will permit the expeditious management of "last minute" requests by property owners, particularly refusals, for decontamination by UMTRA. Most, if not all, of these "last minute" requests will be small projects that could be decontaminated during the spring and summer of 1991. The summer decontamination would accommodate the November 1991 closure date for the temporary repository. Final disposal of materials removed from vicinity properties will occur with the transfer of the temporary repository to a permanent site in 1992.

GJPORAP

Hazards associated with the material impounded at the GJPO include localized surface water and groundwater contamination. The water supply used by the GJPO facility comes from a municipal water source. Isolated areas of on-site surface water exceed drinking water standards for radium-226; on-site groundwater regularly exceeds the Uranium Mill Tailings Radiation Control Act (UMTRCA) limits for arsenic and selenium.

Samples from monitoring wells indicate that contamination is also present in the alluvial aquifer underlying the facility. Although the aquifer is in direct hydraulic contact with the Gunnison River, modeling of the aquifer/river system and actual testing indicate that no drinking water standards are being or will be exceeded. No wells exist on-site or off-site that tap this aquifer for domestic or livestock use.

2.0 REQUIREMENTS FOR IMPLEMENTATION

2.1 REQUIREMENTS

GRJVP PROJECT

The Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA), required the U.S. Environmental Protection Agency (EPA) to establish health and environmental standards to govern cleanup, stabilization, and control of inactive uranium mill tailings sites and associated vicinity properties. These standards are contained in Subpart B to 40 CFR Part 192, and are the basis for preparing the Radiologic and Engineering Assessments, performing the remedial action, and verifying that the vicinity properties have been adequately remediated. During remediation, excavation work is monitored to determine when the contamination has been removed and restoration can begin. This decision is concurred with by the Colorado Department of Health (CDH) in accordance with a formal agreement between the CDH and the DOE.

The project complies with the requirements of Public Law 95-604, Public Law 97-415, Public Law 100-616, National Environmental Policy Act (NEPA), Solid Waste Disposal Act, EPA Health and Environmental Protection Standards for

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Uranium Mill Tailings, and DOE Order 5400.1, *General Environmental Protection Program*.

GJPORAP

Remedial action site investigations formally began at the Grand Junction Projects Office in 1984 when the facility was accepted into the Department of Energy's SFMP. In 1988, the facility was transferred from the SFMP to the DOE Defense Decontamination and Decommissioning (D&D) Program.

Using the standards set forth in 40 CFR 192, "Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings," site characterization and remedial action studies were initiated to assess the radiologic environmental hazards at the facility. The Hazard Ranking Score (HRS) for the GJPO is 14.6, which is below the HRS of 28.5 needed for a site to be included on the National Priorities List (NPL). However, DOE has made the determination to complete compliance documentation and remediate the site under the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act and the Superfund Amendments and Reauthorization Act (CERCLA/SARA).

A Remedial Investigation/Feasibility Study (RI/FS) has been completed and is available for public review. In addition, the remedial selection has been agreed to by the Colorado Department of Health. Building decontamination and on-site priority tailings removal activities have been initiated. A Record of Decision is expected in October 1989, with construction to be complete by FY 1991. The proposed preferred alternative is complete removal of the contaminated materials, with passive groundwater restoration.

LTSM PROGRAM

Long-term surveillance and maintenance of DOE disposal sites is mandated under one or more of the following laws and regulations: PL 96 604 (UMTRCA), 40 CFR 192, 40 CFR 260-265, 10 CFR Part 40, 10 CFR 61, and DOE Order 5820.2A. Additional U.S. Environmental Protection Agency (EPA) regulations may apply to these disposal sites in accordance with the Clean Air Act of 1970 (amended 1977). Intent of these laws, orders, and regulations is long-term protection of public health, safety, and the environment from exposure to radioactive wastes.

Long-term surveillance and maintenance of the first four to seven disposal sites will begin in Fiscal Year 1990. By Fiscal Year 1995, the LTSM Program will have responsibility for the long-term safety of 20 to 25 sites located in 12 states. About one-fourth of these sites are situated near populated areas; the other sites are more remote. Whereas immediate or near-term health risks are low, failure of these sites over the long term is probable without the protection of long-term surveillance and maintenance.

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3.0 ORGANIZATION AND MANAGEMENT

U.S. Department of Energy

The DOE/GJPO, under the direction of the DOE Idaho Operations Office (DOE/ID), is responsible for the control and direction of programs assigned to the GJPO. These programs currently include the UMTRA Grand Junction Vicinity Properties Project, Long-Term Surveillance and Maintenance Program, SFMP Monticello Remedial Action (millsite) Project and Monticello Vicinity Properties Project, and the Defense Decontamination and Decommissioning (D&D) Grand Junction Projects Office Remedial Action Project.

Figure 1 presents the DOE/GJPO organization structure. Responsibility for environmental matters, safety, and quality assurance is assigned to DOE/GJPO engineers. The DOE/GJPO Environmental Engineer provides independent oversight of environmental matters, safety, and quality assurance.

UNC Geotech

UNC Geotech, operating contractor for DOE/GJPO under Contract No. DE-AC07-86ID12584, is responsible for accomplishing environmental restoration activities associated with programs assigned to the GJPO.

UNC Geotech uses the Program Management System to accomplish the assigned program activities. The UNC Geotech organization provides matrixed support to Program Managers to ensure that adequate resources are available for each activity. Figure 2 presents the UNC Geotech organization structure.

Responsibility for accomplishing environmental restoration in compliance with DOE requirements is vested in a Project Manager. The Project Manager is responsible for the planning and control of the project, assignment of specific tasks, milestone achievement, and compliance with DOE quality, safety, and environmental requirements. Figure 3 presents the UNC Geotech Remedial Action Program Management System.

Remedial action construction activities are competitively bid by local subcontractors. The UNC Geotech Program Manager has the ultimate responsibility for controlling and reporting to DOE the project's cost, schedule, and technical performance.

4.0 CORRECTIVE ACTIVITIES

(This section is not applicable.)

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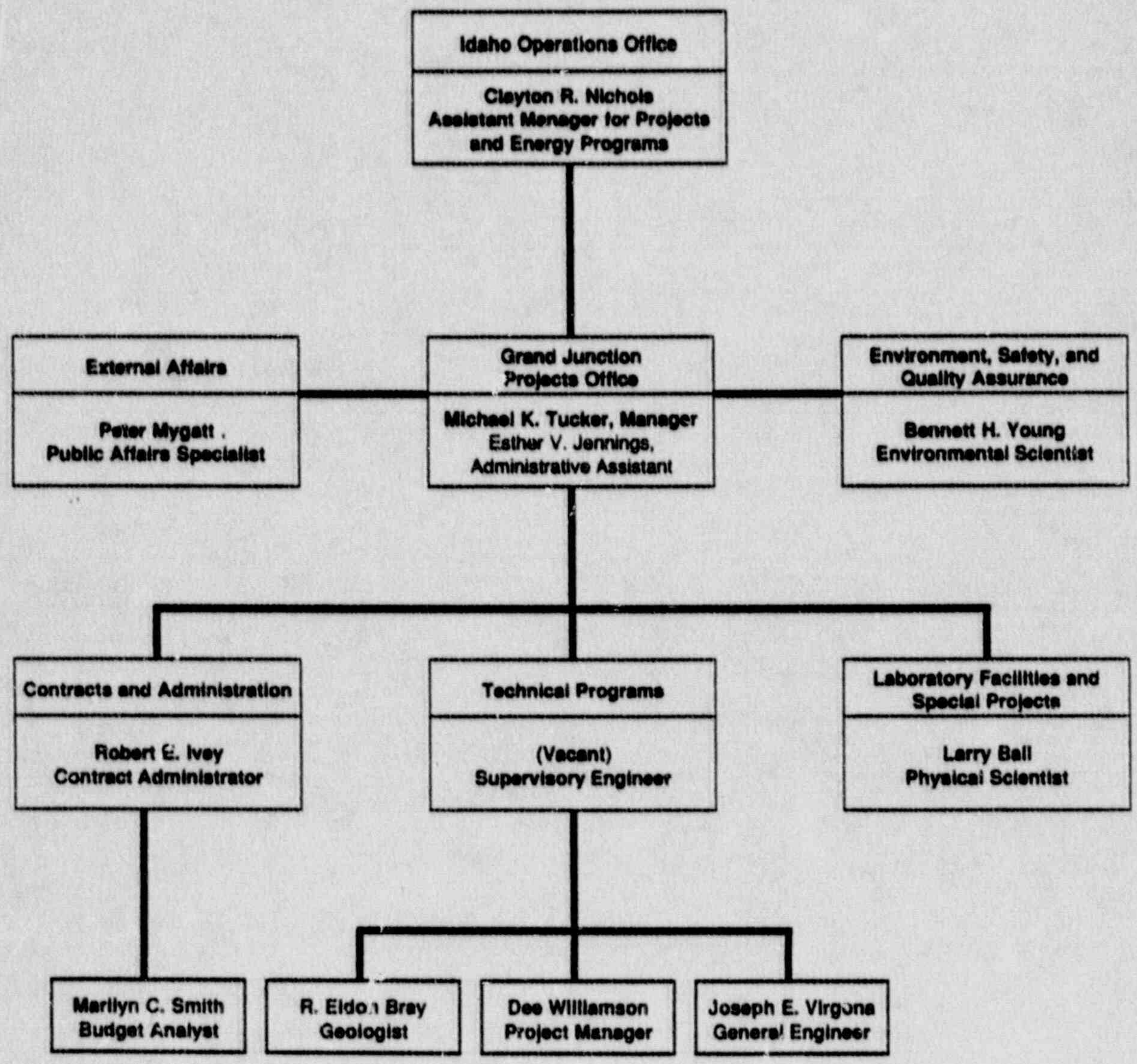

Figure 1. U.S. Department of Energy Grand Junction Projects Office Organization Structure

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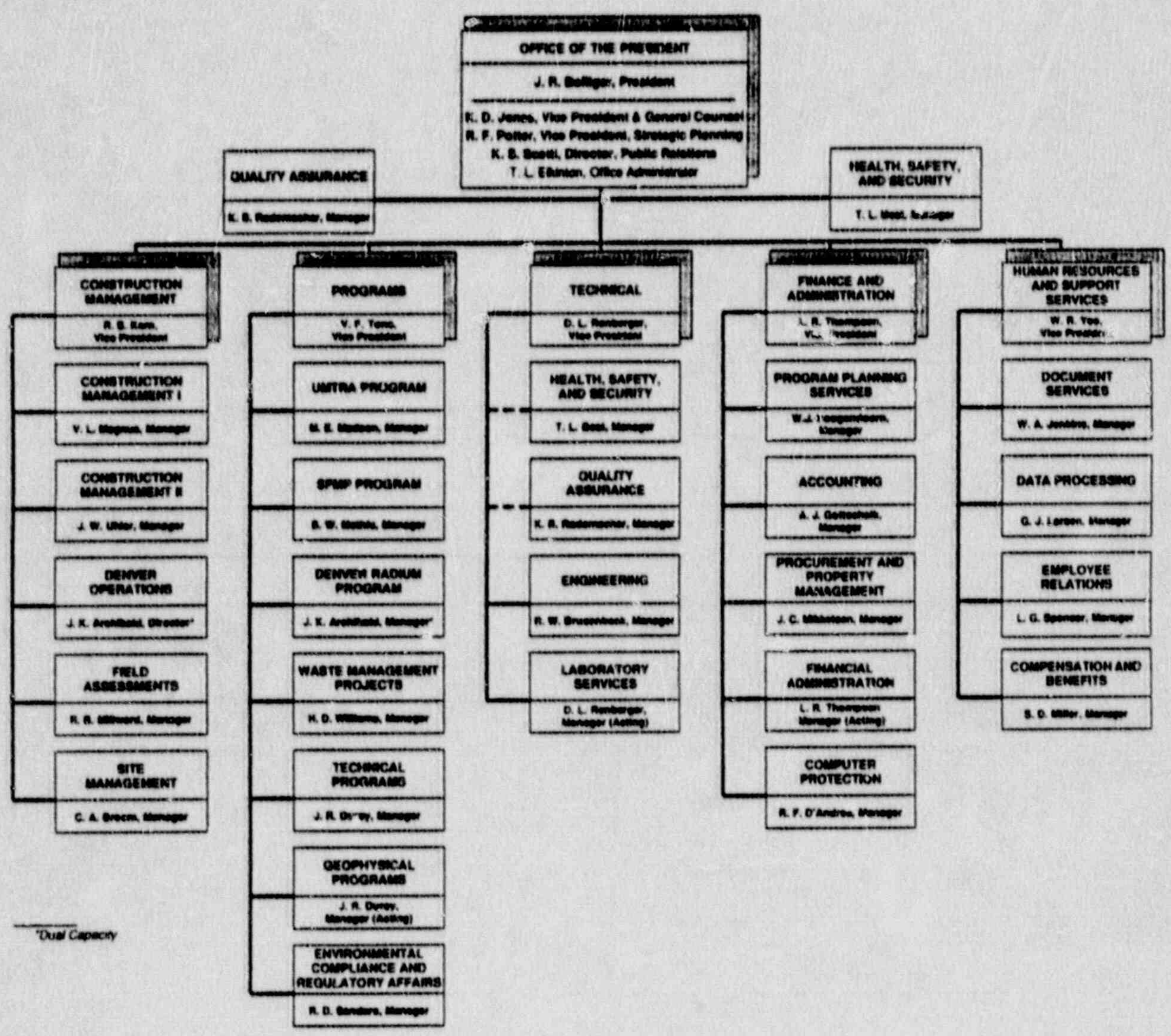

Figure 2. UNC Geotech Organization Structure

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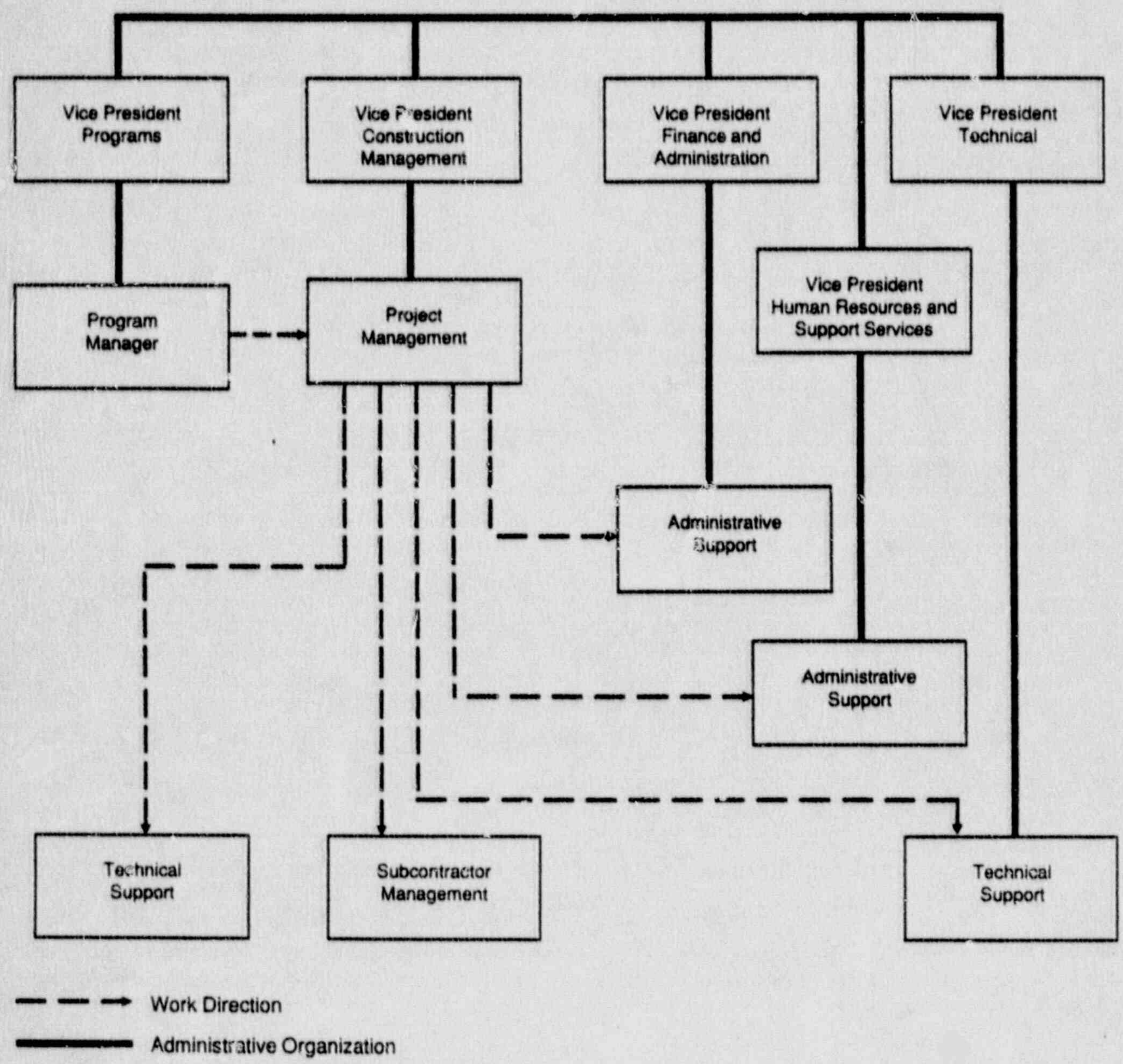

Figure 3. UNC Geotech Remedial Action Program Management System

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5.0 ENVIRONMENTAL RESTORATION

5.1 TASK DESCRIPTION

UMTRA GRJVP Project

The purpose of the UMTRA Grand Junction Vicinity Properties Project is removal of residual radioactive materials (mill tailings) from contaminated properties in and near Grand Junction, Colorado. For management and scheduling purposes, the vicinity properties have been divided into four general property types that require remedial action.

These property types are described as follows:

- Simple Residential/Vacant Land (RS/VL)--Properties where contamination is restricted to open areas. These properties represent approximately 50 percent of the total properties (excluding complex commercials).

- Major Residential (MR)--Properties having contamination involved with the structure, usually requiring some structural modification. These properties represent approximately 15 percent of the total properties (excluding complex commercials).

- Simple Commercial (CS)--Commercial properties for which the remedial action is straightforward, not involving excessive cost or coordination. These properties represent approximately 35 percent of the total properties (excluding complex commercials).

- Complex Commercial (CC)--Commercial properties or groupings of properties where the remedial action is complex in nature, requiring extensive coordination; the possibility of commingled contaminants exists; a high remedial action cost will be incurred; and extensive expenditure of manpower will be required to accomplish the remedial action. These properties comprise 24 property groups. A number of individual vicinity properties may be designated as a single complex commercial when there is a single owner, the remedial action environment is similar, or for other reasons.

Following is a summary description of the tasks to be performed in implementing the GRJVP Project. These tasks along with organizational responsibilities are discussed in detail in the *Grand Junction Projects Office, United States Department of Energy Management and Implementation Plan for Uranium Mill Tailings Remedial Action (UMTRA) Program*, dated December 31, 1988.

- Land Survey--Produces a plot plan map that is used as the base map for all further activities on the property.

- Radiologic Assessment--Measures and records the extent of contamination. Using field data, produces an overlay on the base map showing the extent and location of contamination and generates a written Radiologic Assessment Report.

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- Engineering Design--Based on land survey and radiologic data, a Remedial Action Design Package is assembled that contains the Radiologic and Engineering Assessment, the Remedial Action Agreement (RAA), and the property design drawings. The REA is the basis for design, and is reviewed and approved by the DOE, CDH, and, if appropriate, the U.S. Nuclear Regulatory Commission (NRC). The RAA is the formal contract between the DOE, CDH, and the property owner. This document sets forth the terms and conditions under which the remedial action will be performed and includes the remedial action design.

- Subcontracting--After appropriate signatures have been obtained on the Remedial Action Design Package, an Engineering Package is prepared and forwarded to the Procurement organization for implementation of the bid process. Fixed-price type contracts are used; subcontracts for UMTRA construction are awarded based on Solicited Sealed Bids.

- Remedial Action Management--During remedial action, all subcontractor construction activities are monitored for verification of compliance with the subcontract.

- Verification Activities--Throughout the remedial action activities, radiologic monitoring of construction sites is conducted to ensure appropriate control of excavation depths and boundaries, and to provide verification that EPA standards have been met. After contaminated material has been removed, CDH personnel perform an independent verification survey to check on the success of remedial action. When CDH has been satisfied of successful remediation, reconstruction commences.

- Radon Decay-Product Concentration Monitoring--A certain amount of post-remedial-action monitoring is necessary to adequately document that the property meets EPA standards. Such monitoring is performed on any occupied or habitable structure on a property to ensure that radon decay-product concentrations comply with EPA standards. This monitoring may require up to one year to complete.

- Property Completion Report--The Property Completion Report documents the effectiveness of the remedial action and provides a basis for certification. Each Property Completion Report documents the radiologic conditions that existed on the property prior to remedial action, radiologic condition of the property after remedial action has been performed, extent of the residual radioactive materials removed from the property, and date the remedial action was completed.

- Certification--Certification is the process by which the DOE determines that the remedial action has been completed on a vicinity property and that the applicable EPA standards have been met. The DOE reviews the Property Completion Report and attached Certification Summary, and certifies that the property meets EPA standards. The entire property folio is then archived.

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UMTRA INACTIVE MILLSITE SUPPORT

In FY 1987, the last of 22 UMTRA millsite radiologic characterizations was completed and all records were archived on the GJPO site. UNC will continue to provide site support activities for Jacobs Engineering Group, Inc., as indicated below.

Ongoing field sampling and analytical-laboratory services will be provided to JEG on an as-needed basis and include:

- Quality-control sample preparation and analysis.
- Water sampling and analysis at selected sites.
- Analyses of archived samples collected at selected millsites.
- Special sampling and analyses upon request.

Responsibility for provision of analytical support rests with the UNC Analytical Chemistry Laboratory. Requests for services are directed from JEG to UNC via the Department of Energy Albuquerque Operations Office (DOE/AL) and the DOE/GJPO.

Technical Measurements Center

The Technical Measurements Center supports the three programmatic elements of the Department of Energy remedial action programs: the Uranium Mill Tailings Remedial Action Project, the Formerly Utilized (Manhattan Engineer District/Atomic Energy Commission) Site Remedial Action Program, and the Surplus Facilities Management Program.

Technical Measurements Center tasks for a given fiscal year are developed through a process that begins approximately six months before the beginning of the fiscal year. Initially, a letter soliciting problem topics is sent to each lead program office and the DOE Headquarters. Responses are developed into task concepts that address the respondent's problem topics.

These proposed tasks are combined in one master list with the current tasks to be continued during the upcoming fiscal year. The list briefly defines the benefit, justification, and estimate to complete, as well as a preliminary cost estimate.

The TMC Program Manager (at the Grand Junction Projects Office) ranks and submits the listed tasks to the DOE Office of Remedial Action and Waste Technology for consideration and authorization. This task development and selection process results in a managed, cost-effective, timely response to the needs of the remedial action programs.

The Technical Measurements Center tasks are divided into 14 categories that are consistent with TMC support areas and for purposes of project matrix management, baseline planning, scheduling, and tracking:

- Subsurface Radiologic Measurements
- Subsurface Measurements
- Indoor Measurements for Radon and Radon Daughters

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- Sample Gathering and Preparation
- Special Problem Solving
- Radiologic Calibration
- Laboratory Calibration Reference Materials
- Outdoor Radon and Radon-Flux Measurements
- Transuranics, Tritium, and Fission-Products Measurements
- Procedures for Laboratory Measurements
- Sample Archive Procedures
- Verification Sampling for Certification
- GJPO Calibration Facilities
- Mixed Contamination

The number of task activities precludes listing the specific methodology for each task. In general, the technical activities are best described as direct applications beneficial to the remedial action program; the task activities described herein are not considered basic research. The Technical Measurements Center is concerned with applied problem solving and demonstration for purposes of technology transfer.

GJPORAP

The GJPO facility's radioactive wastes will be excavated and hauled to the State-owned temporary repository (Climax Mill site) and then hauled to the final UMTRA disposal site along with the Climax material. All contaminated material from the GJPO site will be removed via truck transport and the Climax and GJPO facility material will be consolidated into a single, contoured disposal area. The material will be compacted and covered with an earthen radon barrier and an erosion-protection layer of rock.

Remediation will include the removal of all tailings from the GJPO facility that currently contaminate the groundwater aquifer. Because the groundwater system is characterized by the flushing of the alluvial aquifer, cleansing of the affected groundwater should ensue. Groundwater modeling indicates the shallow alluvial aquifer will flush itself of contaminants in 50 to 80 years, which is within compliance of the proposed UMTRA groundwater regulations (100-year cleanup).

After removal of tailings and other contaminated material, affected areas of the GJPO facility will be recontoured, reconstructed, and revegetated, as appropriate. Ultimately, there will be no significant tailings-related environmental hazard associated with the facility. A long-term monitoring program will be initiated to verify passive groundwater restoration at the GJPO facility. The UMTRA co-disposal site requires long-term surveillance and maintenance to ensure that contaminated material continues to be impounded.

LTSM PROGRAM

The four types of on-site activities under the LTSM Program are (1) inspections, (2) environmental monitoring, (3) routine maintenance, and (4) emergency responses.

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Inspections include visual examination of the site, re-surveying, photography, and monitoring of soil settling and groundwater levels. Environmental monitoring includes radiation surveys and chemical monitoring of air, soil, and surface water and groundwater samples. Small animal control and maintenance of fence lines, warning signs, and vegetation are considered routine maintenance.

Emergency responses are actions that will be taken in response to actual or imminent site failure. In most cases, emergency responses will constitute repairs but could, in a worst-case situation, amount to major reconstruction of parts of the disposal site.

Implementation of long-term surveillance and maintenance under the auspices of the LTSM Program will begin in Fiscal Year 1990. The first sites to be included in the LTSM Program will be UMTRAP sites. Final agreement between UMTRAP and the LTSM Program on procedures and arrangements for inclusion of these sites will be concluded in Fiscal Year 1990.

Discussions with SFMP on policy and procedures for including SFMP sites in the program will begin early in Fiscal Year 1990. Since FUSRAP sites will not be completed and "closed" until about the year 2009, current planning does not include FUSRAP disposal sites.

5.2 RESOURCES

GRJVP

DOE is committed to protecting human health and the environment from risks resulting from past and current Government operations. Additional DOE objectives include complying with interagency agreements, complying with State and Federal regulations, maintaining an effective waste management program, and being a good steward of Government resources. To fulfill DOE objectives and commitments, GRJVP Project activities have been defined as a Priority 1 activity to minimize the near-term impact to the public and the environment. DOE, contractor, and subcontractor personnel will be dedicated to these activities, as necessary, to ensure successful and timely remediation.

UMTRA INACTIVE MILLSITE SUPPORT

Site support and surveillance and maintenance activities fall under Priority Level 1, since these activities are required to measure the potential off-site health risks and off-site groundwater or soil contamination on a continuing basis.

GJPORAP

The GJPORAP is an ongoing remediation project and, as such, has been ranked as a Priority 1 under the Environmental Restoration and Waste Management Five-Year Plan. DOE, UNC Geotech, and subcontractor resources have been dedicated to this project to ensure the project's success and timely completion.

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LTSM PROGRAM

The Priority Level of 3 was assigned to this activity because the program promotes compliance to Federal regulations and DOE Orders, and addresses public concern about the long-term stability of contaminated waste disposal sites. This program will consolidate surveillance and maintenance activities under one contractor, resulting in minimizing the total cost of the program.

5.3 SCHEDULE

GRJVP PROJECT

Following are definitions of the major milestones used to monitor the status of the Grand Junction Vicinity Properties Project:

- REA Submittals--This milestone activity is complete when the Radiologic and Engineering Assessment, along with the Remedial Action Agreement, is submitted to the DOE for approval.
- Construction Starts--This milestone activity is complete when remedial action begins on a given property.
- Construction Completions--This milestone activity is complete when the Notice of Final Completion Inspection has been executed.
- Property Completion Reports--This milestone activity is complete when the Property Completion Report on a given property is submitted to the DOE for approval.
- Archive--Archiving is complete when the property folio is microfilmed and copies of the microfiche are created for distribution.

Table 1 shows the GRJVP Project milestone schedule for each property type in the project.

UMTRA Inactive Millsite Support

The site support and surveillance and maintenance activities are an annual expense until the site work is completed and the sites are turned over to the LTSM Program.

GJPORAP

• Obtain Record of Decision	9/29/89
• Issue Finding of No Significant Impact (FONSI)	9/29/89
• Initiate Site Remediation	11/1/89
• Complete Site Remediation	9/30/91

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Table 1. GRJVP Project Milestone Schedule

Milestone	Prior Actual	FY 1989	FY 1990	FY 1991	FY 1992	Total
REA Submittals						
RS/VL	1,607	195	229	0	0	2,031
MR	452	91	62	0	0	605
CS	633	407	312	0	0	1,352
	12	4	5	0	0	21
TOTAL	2,704	697	608	0	0	4,009
Construction Starts						
RS/VL	1,292	260	261	146	0	1,959
MR	342	150	89	0	0	581
CS	457	246	296	323	6	1,328
CC	15	4	1	1	0	21
TOTAL	2,106	660	647	470	6	3,889
Construction Completions						
RS/VL	1,256	275	245	183	0	1,959
MR	317	149	106	9	0	581
CS	396	221	295	410	6	1,328
CC	8	2	4	6	1	21
TOTAL	1,977	647	650	608	7	3,889
Property Completion Reports						
RS/VL	748	420	300	245	318	2,031
MR	173	156	96	121	59	605
CS	196	199	151	313	493	1,352
CC	5	3	2	4	7	21
TOTAL	1,122	778	549	683	877	4,009
Archive						
RS/VL	350	421	420	440	400	2,031
MR	77	147	147	158	76	605
CS	64	171	265	257	595	1,352
CC	0	0	8	5	8	21
TOTAL	491	739	840	860	1,079	4,009

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LTSM PROGRAM

In accordance with the assignment of the program, the following activities are scheduled for completion by the Grand Junction Projects Office.

• Develop a general guidance document for long-term surveillance and maintenance of DOE disposal sites.	March 30, 1990 (proposed date)
• Initiate long-term surveillance and maintenance at Canonsburg, PA, and Burrell, PA, disposal sites.	November 1989
• Initiate long-term surveillance and maintenance at Shiprock, NM, and Salt Lake City, UT, disposal sites.	To Be Determined, FY 1990 (depends on UMTRAP completion schedules)
• Conclude agreement with SFMP on transfer of SFMP disposal sites into the LTSM Program	September 30, 1990
• Add the Edgemont disposal site (an UMTRA Title II) site to the LTSM Program.	September 30, 1990
• Include first SFMP sites in the LTSM Program.	FY 1991, 3 Sites
• Add additional UMTRAP sites as they are completed. (All UMTRAP sites are scheduled for completion by FY 1994.)	FY 1991, 5 Sites FY 1992, 1 Site FY 1993, 9 Sites FY 1994, 1 Site
• Add additional SFMP sites.	FY 1998, 2 Sites FY 1999, 1 Site
• Add Section 151(c) low-level waste sites to the LTSM Program.	Open

5.4 COST

Table 2 presents the DOE/GJPO Environmental Restoration and Waste Management Five-Year Plan State of Colorado funding summary. Please note these dollars are Budget Authority not Budget Outlay. Funding Budget Authority for the entire fiscal year should be received during the first quarter of the fiscal year to ensure cost-effectively managed programs.

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Table 2. DOE/GJPO Environmental Restoration and Waste Management Five-Year Plan
State of Colorado Funding Summary, Budget Authority ($000s)

Identification Number	Activity Title	FY 1989 Appropriation	FY 1990 Bush Budget	FY 1990 R	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995
IG-0004-1/5-26 AH-10-15-01	Program Management of DOE Disposal Site LTSM								
	Operating	300	652	652	650	780	820	960	1,000
	Capital	0	0	0	90	290	0	0	0
	SUBTOTAL	300	652	652	740	1,070	820	960	1,000
IG-0006-1/5-26 AH-10-15-02	GRJVP Project								
	Operating	28,311	28,663	28,663	20,895	1,683	525	0	0
	Capital	781	202	202	34	42	0	0	0
	SUBTOTAL	29,092	28,865	28,865	20,929	1,725	525	0	0
IG-0007-1/5-26 AH-10-15-01	UMTRA Program--Site Support, Technical Measurements, and Long-Term Surveillance and Maintenance (management costs for LTSM included in IG-0004-00/04-19)								
	Operating	2,209	879	879	847	685	281	0	0
	Capital	0	0	0	0	0	0	0	0
	SUBTOTAL	2,209	879	879	847	685	281	0	0
IG-0003-2/6-26 GF-72-92-02	GJPORAP								
	Operating	4,555	3,604	3,604	171	0	0	0	0
	Capital	0	0	0	0	0	0	0	0
	SUBTOTAL	4,555	3,604	3,604	171	0	0	0	0
	TOTAL COLORADO	36,156	34,000	34,000	22,687	3,480	1,626	960	1,000

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GRJVP PROJECT

Various assumptions were made in the preparation of the Program's total estimate to complete. The Program estimate assumes: (1) completion of approximately 4,000 properties; (2) future work at DOE/GJPO will absorb the current UMTRA personnel costs and does not include Program closeout costs; and (3) unit rates are held constant throughout the Program even though unit rates may increase dramatically in the final stages of the Program. Another funding assumption is that cost sharing between DOE and the State of Colorado will continue with the State contributing 10 percent of total costs.

UMTRA Inactive Millsite Support

Estimates for the site support and surveillance and maintenance activities are based on current program requirements and historical costs. Details of the cost are included in Table 3.

LTSM PROGRAM

Funding for the LTSM Program will come from two sources. Funding provided by the DOE Office of Remedial Action and Waste Technology will apply to program management and implementation costs. Funding for on-site or site-specific activities (including inspections, monitoring, maintenance, and emergency responses) is budgeted by the respective DOE remedial action programs and will be transferred to the LTSM Program on a Financial Plan transfer.

Cost estimates for management and implementation of the LTSM Program are in the following table (dollars in thousands); FY 1990 funds are appropriated. (Funding for on-site or site-specific activities is the responsibility of the respective remedial action programs. The LTSM Program is responsible for reviewing and concurring in these cost proposals, but not for preparing the cost proposals. The first review and concurrence of cost proposals for on-site work will be in FY 1990.)

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Table 3. Estimates for Site Support and Surveillance and Maintenance Activities ($000s)

Site	FY 1989 Approp.	FY 1990	FY 1991	FY 1992	FY 1993
Ambrosia Lake	$ 121	$ 55	$ 85	$ 99	$ 50
Belfield	247	142	130	187	101
Canonsburg	42	55	58	71	50
Durango	121	80	85	71	50
Edgemont		52			
Falls City	121	80	58	71	50
Grand Junction	121	80	85	99	50
Green River	121	80	85	71	50
Gunnison	121	55	85	99	50
Lakeview	121	55	58	71	50
Lowman	121	80	85	71	50
Maybell	121	55	58	99	50
Mexican Hat	121	80	85	99	50
Monument Valley	121	80	85	71	50
Naturita	121	55	85	71	50
Rifle	121	80	85	99	50
Riverton	121	80	58	71	50
Salt Lake City	42	55	58	71	50
Shiprock	121	55	58	71	50
Slick Rock	121	80	85	71	50
Spook	121	55	58	71	50
Tuba City	121	80	58	71	50
SUBTOTAL	$2,509	$1,569	$1,587	$1,755	$1,101
Less Long-Term Surveillance and Maintenance Management Costs	(300)	(690)	(740)	(1,070)	(820)
TOTAL	$2,209	$879	$847	$685	$281

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6.0 WASTE MANAGEMENT OPERATIONS

(This section is not applicable.)

7.0 COMPLIANCE WITH NEPA

GRJVP Project

The remediation activities on the GRJVP Project associated with the former Climax Uranium Company uranium mill site are fully compliant with the National Environmental Policy Act. The *Environmental Assessment* (DOE/EA-0311) on the project was approved and the Finding of No Significant Impact (FONSI) was issued at Washington, D.C., on July 11, 1986.

GJPORAP

The GJPORAP CERCLA compliance documentation has been combined with the National Environmental Policy Act (NEPA) evaluation in the GJPORAP RI/FS-Environmental Assessment (EA). Both NEPA and CERCLA decision documents have been prepared and are expected to be approved by DOE/Headquarters in October 1989.

LTSM PROGRAM

The DOE remedial action program responsible for closing a disposal site prepares the required Environmental Impact Statement (EIS) or an Environmental Assessment (EA). The documents address and include long-term surveillance and maintenance as the final step in the remediation process. As long as the equipment for long-term surveillance and maintenance of completed disposal sites is covered in existing EIS or EA documents, no further preparation of National Environmental Policy Act (NEPA) documents is required.

8.0 REPORTING AND DATA MANAGEMENT

8.1 REQUIRED REPORTS

Progress and cost reporting for programs to the Department of Energy is in accordance with the GJPO Management and Implementation Plans. Reporting requirements are both external and internal. Grand Junction Projects Office has no requirements for reporting to State and/or Federal regulatory agencies.

External reporting requirements include, but are not limited to:

- Formal Monthly Reports to DOE/GJPO--Written reports conveying specific information relative to performance against cost and milestone plans. Each report summarizes progress for the month, and explains cost or schedule variances, together with corrective action taken. Cost information is reported, based on the project Work Breakdown Structure, in terms of Budgeted Cost of Work Performed (BCWP), Actual Cost of Work Performed (ACWP), and Budgeted Cost of Work Scheduled (BCWS)--figures

Included in this report are the following documents: the current approved BCWS and cost plans; cost-performance report; milestone schedule and status reports and earned value graphs for GRJVP and EDGVP activities; and a Contract Management Summary Report narrative on the DOE/GJPO programs.

- Semiannual DOE/GJPO Program Reviews--Reviews conducted twice a year to focus on cost and scheduling. Presentations cover past progress, present activity, and future plans. Items addressed include programmatic issues as well as recommended changes to the program.

- Weekly Progress Reports to DOE/GJPO--Written reports covering progress, problem areas, and plans for all DOE/GJPO programmatic activity. These written reports are supplemented by regular UNC/GJPO Management meetings.

- Monthly Quality Assurance Status Reports--Formal reports issued every month to update status of Corrective Action Requests, Nonconformance Reports, audits and surveillances, project plans and procedures, Operation Readiness Reviews, and software verification/validation.

Internal reporting requirements include, but are not limited to:

- Weekly Meeting--Weekly interfunctional meetings involving the discussion of problems and solutions, milestone accomplishment, and program objectives.

- Weekly Report--Written reports covering status, problem areas, and plans are prepared by functional managers for the Program Manager.

- Radiologic Support Property Tracking Report--Report prepared weekly.

- Architecture/Engineering Design Status Report--Report prepared weekly.

- Remedial Action Agreement Status Report--Report prepared weekly.

- Invitation for Bid/Request for Proposal Status Report--Report prepared weekly.

8.2 MAINTENANCE OF RECORDS

Publication and reproduction services and records management are provided from a pool of specialists. Skills include writing/editing, graphics, composition, photography, and reprographics. A Records Management staff of one administrative specialist and three clerks is required to handle the duties associated with document control, reproduction, filing, and archiving hundreds of property folios. Two computer operations specialists are required to track automated vicinity properties data; and generate weekly, monthly, quarterly, and annual reports.

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8.3 MAINTENANCE OF SAMPLES

Project samples are stored at the GJPO sample storage facilities. are placed in appropriate containers, permanently marked, entered into the inventory control listing, and stored.

The detailed procedures for handling and maintaining the samples are included in the UNC Geotech *Analytical Chemistry Laboratory Administrative Plan and Quality Control Methods Manual* and the UNC Geotech *Analytical Chemistry Laboratory Handbook of Analytical and Sample Preparation Methods*. Special equipment for processing and maintaining the samples is a part of the Analytical Chemistry Laboratory.

9.0 QUALITY ASSURANCE

The work performed by UNC Geotech for DOE at the GJPO is performed in accordance with the UNC *Quality Assurance* (QA) manual. The QA program was designed as a total quality management system, using ANSI/ASME NQA-1 as a basis. Additional Quality Assurance requirements appropriate to environmental restoration work have been added to assure achievement of quality during restoration activities.

The QA program is implemented by UNC Geotech operating procedures and instructions. The QA program and the implementing procedures and instructions were developed for use in environmental restoration work and have been refined during UNC's extensive environmental restoration and management experience.

Specific requirements applicable to a program are identified in Quality Assurance Program Plans (QAPPs). The QAPPs include the specific applicable QA requirements, responsibilities for accomplishment, and the specific manuals and procedures which implement the requirements.

The QAPPs and implementing procedures document the system for the review and approval of technical procedures, tests, plans, and designs, including their changes, used to control work. Also included are QA procedures addressing nonconformances, development of acceptance criteria, control of purchased items and services, inspection, instrument calibration and testing, control of processes, plan change authority, records control, and the identification control of items and samples.

The responsibility for achieving and verifying quality is assigned to those performing the work. Independent verification of quality is performed by the Quality Assurance organization through scheduled system and performance audits. The audits are supplemented by regular surveillances of the work and documentation of the surveillances.

The readiness to perform program work, including applicability of procedures, availability of qualified personnel, and adequate and appropriate equipment is accomplished by a system of readiness reviews.

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10.0 FEDERAL, STATE, AND LOCAL INTERACTIONS

The GJPO personnel serve as liaison with the other Department of Energy offices; Jacobs Engineering Group, Inc., in association with the DOE/AL; the U.S. Nuclear Regulatory Commission; and the U.S. Environmental Protection Agency. Other liaison is performed with the Colorado Department of Health, the South Dakota Department of Water and Natural Resources, Mesa County Health Department, City of Grand Junction operational offices, and specific interest groups and individuals affected by the respective programs.

A Public Information Plan is developed annually. Ongoing public involvement activities have consisted of routine status briefings for city, county, and state officials; close working relationships with city, county, and state officials to coordinate remedial activities; periodic status-report news releases and feature stories; maintenance of a public information point-of-contact for all public inquiries; an Owner Relations organization that routinely works with property owners from the inclusion process through the completion of cleanup; and an active speakers bureau. Specific communications strategies are developed for large, high visibility public projects.

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APPENDIX A

ACTIVITY DATA SHEETS

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ENVIRONMENTAL RESTORATION AND WASTE MANAGEMENT FIVE-YEAR PLAN
ACTIVITY DATA SHEET

Grand Junction Projects Office Remedial Action Project (GJPORAP)

Operations Office: ID　　ID NUMBER: IG-0003-2/6-26
Installation: GJPO
Facility/Waste Area Grouping: Grand Junction Projects Office　　CATEGORY: ER
Program B&R Code: GF 72 92 02
Activity Title: Grand Junction Projects Office Remedial Action Project (GJPORAP) (143)　　PRIORITY: 1

Funding Summary:

Budget Authority ($K)

	FY 1989 Approp.	FY 1990 Amended Presid. Budget	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995
Operating	4555	3684	171	0	0	0	0
Capital	0	0	0	0	0	0	0
Total	4555	3684	171				

Key Words: CERCLA RI/FS, CERCLA RD/RA, uranium millsite, pilot mill, uranium mill tailings

Narrative: The Grand Junction Projects Office contains over 81,000 cubic yards of uranium and mill tailings-contaminated soils and structures from past uranium ore processing activities. Contamination includes groundwater and potentially the Gunnison River. The GJPO Remedial Action Project (GJPORAP) is currently funded through the Defense D&D Program.

The CERCLA/SARA-prompted cleanup has been agreed to by the Colorado Department of Health. Building decontamination and on-site priority tailings removal activities have been initiated . The final RI/FS is planned to be made available to the public by June 1989. A Record of Decision is anticipated by July 1989 with construction to be complete by FY 1991.

Failure to perform these remedial activities could be perceived as a lack of environmental concern/action and could result in substantially higher waste disposal costs when final remedial activities must be performed.

- Driving Force:
    - The GJPO poses a potential health risk to off-site residents through groundwater contamination, and potential surface water contamination into the Gunnison River. Removal of this contaminant point source is essential to mitigating these potential health effects.

ENVIRONMENTAL RESTORATION AND WASTE MANAGEMENT FIVE-YEAR PLAN
ACTIVITY DATA SHEET

Grand Junction Projects Office Remedial Action Project (GJPORAP)

ID NUMBER: IG-0003-2/6-26

- The CDH has reviewed the final RI/FS. They have agreed in writing to their role in the remediation process and expressed their concern that the project be performed in accordance with the UMTRA GJVP protocol and schedule.

- The tailings removed during the GJPORAP are currently planned to be transported for interim storage at the Colorado State Temporary Repository. These wastes will then be hauled to the Cheney Repository along with the Climax Millsite and Grand Junction Vicinity Property Tailings. The GJPO remedial activities must be completed by FY 1992 to take advantage of the cost savings associated with using the temporary repository. If schedule delays cause the project to miss this window of opportunity, GJPO would have to request a conditional use permit to haul directly to the Cheney Repository. In light of the current public sentiment surrounding the UMTRA conditional use permit, this should be avoided if at all possible. In no case should the project be delayed past the available window of waste disposal at the Cheney Repository.

- Approximately $350,000 of annual maintenance and environmental monitoring costs could be reduced once remedial action has been completed.

- Cost Estimates: Costs and duration estimates are based upon the definitive design with passive groundwater treatment. The cost estimates are based on the following major milestones: NEPA/CERCLA--9/30/89 and complete remedial action--4/30/91.

  Alternatives: The only alternative - stabilization in place is unacceptable to CDH.

- RD&D: There are no RD&D activities being performed under this project. However, groundwater contamination is a significant problem. Funding the development of treatment technology is recommended to reduce treatment costs should they become necessary.

- Level of Confidence: Medium - Definitive design is essentially complete. Contamination volumes and groundwater treatment are the greatest variables.

Prepared by: Betty L. Hollowell

Approved by: Clay Nichols

ENVIRONMENTAL RESTORATION AND WASTE MANAGEMENT FIVE-YEAR PLAN
ACTIVITY DATA SHEET - LTS&M Program Management

Operations Office: ID
Installation: GJPO
Facility/Waste Area Grouping: Program Management of Post-Closure, Long-Term Surveillance and Maintenance
Program B&R Code: AH 10 15 01, 35 AH 10 15
Activity Title: Program Management of the DOE, Disposal Site Long-Term Surveillance and Maintenance Program (LTS&M) (144, 145)

ID NUMBER: IG-0004-1/5-26
CATEGORY: ER
PRIORITY: 3

Funding Summary: Budget Authority ($000's)-Contained in FY 1991 Budget Submittal

	FY 1989 Approp.	FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995
Operating	300	652	650	780	820	960	1000
Capital	0	0	90	290	0	0	0
Line-item							
Total	300	652	740	1070	820	960	1000

Key Words: Management of the DOE disposal site, postclosure, long-term surveillance and maintenance

Narrative: The primary mission of Long-Term Surveillance and Maintenance (LTS&M) is to perform such activities as monitoring, maintenance and emergency measures at disposal sites after remedial activities are completed. These activities are designed to verify that disposal sites continue to function as designed. Included in this program are uranium ore milling sites, and research, development, and production facilities that supported the early nuclear power programs. The DOE remedial action programs included within LTS&M are: (1) the Uranium Mill Tailings Remedial Action Project (UMTRAP), (2) the Formerly Utilized Manhattan Engineer district/Atomic Energy Commission Sites Remedial Action Project (FUSRAP), (3) The Surplus Facilities Management Project (SFMP), (4) the recently completed Grand Junction Remedial Action Project (GJRAP), and (5) low-level waste sites assigned to the DOE under Section 151(c) of the Nuclear Waste Policy Act.

The driving forces behind the LTS&M program are current Federal regulations and guidelines including: PL 96 604 (UMTRCA); 40 CFR 192, 40 CFR 260-265; 10 CFR Part 40; 10 CFR 61; and DOE Order 5820.2A. Additional EPA regulations apply to the disposal sites in accordance with the clean air and water acts.

The program management responsibilities were assigned to the Grand Junction Projects Office in January 1989, which initiated the program. Currently, it is estimated that approximately 13 of the anticipated 31 disposal sites

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will exist before the end of FY 1990 and will require some form of routine post closure surveillance and maintenance. Delaying the development of the surveillance and maintenance program beyond FY 1990 will delay the consolidation of surveillance and maintenance activities under one contractor. This delay in consolidation will in turn require the continued funding of three separate contractors to perform the post closure surveillance and maintenance activities. The continuation of separate contractor performance would result in higher total costs to the Government and could compromise the DOE's compliance with regulatory requirements of DOE orders. Deferring funding for the LTS&M Program beyond FY 1996 could require the continuation of some remedial action programs beyond their current mission objectives.

Cost Basis: Costs shown in the summary below represent GJPO's program management and equipment costs to provided 1) assumption of long-term surveillance and maintenance responsibility at 13 disposal sites in FY 1990 increasing to 17 sites in FY 1995, 2) coordination of the activities of an LTS&M working group, 3) management of a long-term repository for site characterization records and closure plans and documents, and 4) management, technical, regulatory, and administrative support to the program. Equipment costs are identified to establish the records repository and to perform laboratory analysis of environmental samples.

Costs for on-site surveillance and maintenance activities are, at DOE-HQ's direction, included in FY 1991 budget submittals of UMTRAP, FUSRAP, and SFMP. Funding for surveillance and maintenance at assigned low-level waste sites will be provided by the owner of the site through financial arrangements approved by NRC.

Major Elements of Cost:

($000)

	FY 1989 Approp	FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995
Operating Man Years	2	4	5	6	6	7	7
Labor Costs	240	500	530	640	680	800	840
Non-Labor Costs	30	102	60	70	70	70	70
Subtotal	$ 270	$ 602	$ 590	$ 710	$ 750	$ 870	$ 910
Contingency	30	50	60	70	70	90	90
Subtotal Operating	$ 300	$ 652	$ 650	$ 780	$ 820	$ 960	$ 1000
Capital	0	0	90	290	0	0	0
TOTAL	$ 300	$ 652	$ 740	$ 1070	$ 820	$ 960	$ 1000

ENVIRONMENTAL RESTORATION AND WASTE MANAGEMENT FIVE-YEAR PLAN
ACTIVITY DATA SHEET - LTS&M Program Management

ID NUMBER: IG-0004-1/5-26

TEC: Program Management costs are expected to continue at FY 1995 levels for at least the next 100 years.

Major Milestones: In accordance with the assignment of the program, the following activities were scheduled for completion by GJPO.

• Assume responsibility for an intercontractor working group.	1/89
• Develop a first draft and publish a final Program Plan.	9/89
• Review and finalize the DOE Generic Guidance document for LTS&M.	9/89
• Provide management, technical, regulatory and administrative support to the program.	Annually
• Continue to coordinate the activities of the LTS&M Working Group in the development of DOE policies, procedures and technical approach.	As required
• Provide for the turnover and management of site characterization and background records which are required by GJPO to support LTS&M.	Annually
• Plan, manage and perform coordination of LTS&M activities at completed disposal sites.	Annually

Alternatives: Based on cost impacts and mission objectives, no alternative to funding this program should be seriously considered.

Priority Rationale: The priority ranking score of ER-3 was assigned to this activity because the program promotes compliance to Federal regulations and DOE orders; it addresses public concern over the long-term stability of contaminated waste disposal sites; and the consolidation of surveillance and maintenance activities under one contractor, which will minimize the total costs of the program.

RD&D: The Grand Junction Projects Office is well equipped to provide the support required to accomplish the objectives of the Long-Term Surveillance and Maintenance Program. No cost reductions can be currently achieved though research and development or technology transfers. Legislation reversing the requirement to monitor the disposal sites would not reduce costs since it would not reduce the DOE's liability to third parties inadvertently exposed to the contaminated waste.

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ENVIRONMENTAL RESTORATION AND WASTE MANAGEMENT FIVE-YEAR PLAN
ACTIVITY DATA SHEET - LTS&M Program Management

ID NUMBER: IG-0004-1/5-26

Level of Confidence: The level of confidence is high and comparable to that of a construction project's definitive design estimate.

Prepared by: Betty L. Hollowell

Approved by: C. R. Nichols

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ENVIRONMENTAL RESTORATION AND WASTE MANAGEMENT FIVE-YEAR PLAN
ACTIVITY DATA SHEET

UMTRA Program - GRJVP

Operations Office: ID
Installation: GJPO
Facility/Waste Area Grouping: Grand Junction Projects Office
Program B&R Code: AH-10-15-02, 35 AH 10 15
Activity Title: Grand Junction Vicinity Property Project (GRJVP) (141,142)

ID NUMBER: IG-0006-1/5-26
CATEGORY: ER
PRIORITY: 1

Funding Summary:

Budget Authority ($K)

	FY 1989 Approp.	FY 1990 Amended Presid. Budget	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995
Operating	28,311	29,383	20,895	1,683	525	0	0
Capital	781	202	34	42	0	0	0
Total	29,092	29,585	20,929	1,725	525	0	0

Key Words: UMTRA Program, GRJVP

Narrative: The purpose of the UMTRA Vicinity Properties project is the removal of residual radioactive materials (mill tailings) from contaminated properties in Grand Junction, Colorado. The purpose of Site Support (also referred to as the Site Characterization Support project) is the collection and analysis of groundwaters from UMTRA millsites as well as analyses of quality control and miscellaneous media for the DOE/AL Technical Assistance Contractor (TAC). The project activities are currently planned to be completed by the end of FY 1993.

The project complies with the requirements of PL 95-604, PL 97-415, PL 100-616, NEPA, Solid Waste Disposal Act, EPA Health and Environmental Protection Standards for Uranium Mill Tailings and DOE Order 5400.1 General Environmental Protection Program.

Vicinity properties activity falls under priority level 1, as a result of being a potential health risk.

ENVIRONMENTAL RESTORATION AND WASTE MANAGEMENT FIVE-YEAR PLAN
ACTIVITY DATA SHEET

UMTRA Program - GRJVP

ID NUMBER: IG-0006-1/5-26

GRJVP Milestone Schedule

Milestone	Prior Actual	FY 1989	FY 1990	FY 1991	FY 1992	Total
REA submittals	2,701	697	611	--	--	4,009
Construction starts	2,103	650	647	489	--	3,889
Construction completions	1,974	647	650	618	--	3,889
Property completion reports	1,119	778	549	683	880	4,009
Archive	491	739	840	860	1,079	4,009

- Cost Basis: Vicinity property estimates are based on a trending analysis of historical costs. The major categories of cost by project are Engineering, Construction, and Management.

($K)

	FY 1989 Approp.	FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995
Operating Man years	220	154	94	14	7	--	--
Labor costs	15,437	11,981	7,050	1,282	450	--	--
Nonlabor costs	12,874	14,189	10,532	200	50	--	--
Subtotal	28,311	26,170	17,582	1,482	500	--	--
Contingency	0	3,213	3,313	201	25	--	--
Subtotal Operating	28,311	29,383	20,895	1,683	525	--	--
Capital	781	202	34	42	0	--	--
Total	29,092	29,585	20,929	1,725	525	--	--

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- Alternatives:

    - Short Range: Stop work at end of FY 1989 at vicinity properties and provide interim cover protection to all exposed contaminated material, demobilize contractors and provide maintenance and surveillance pending remobilization and completion of remaining remedial action.

    - Long Range: None (cleanup is mandated by PL 95 604).

- RD&D: Bioremediation may be applicable on some UMTRA GJVP and groundwater restoration activities.

- Level of Confidence: This project is 61 percent complete, and we, therefore, have a high level of confidence in the funding requirements for this project.

Prepared by: Betty L. Hollowell

Approved by: Clay Nichols

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ENVIRONMENTAL RESTORATION AND WASTE MANAGEMENT FIVE-YEAR PLAN
ACTIVITY DATA SHEET
UMTRA Program - Site Support, Technical Measurements Center (TMC), and Long-Term Surveillance and Maintenance (LTS&M)

Operations Office: ID
Installation: GJPO
Facility/Waste Area Grouping:
Program B&R Code: AH-10-15-01
Activity Title: UMTRA Inactive Millsite (141, 142)

ID NUMBER: IG-0007-1/5-26
CATEGORY: ER
PRIORITY: 1

Funding Summary: *

Budget Authority ($000's) - Contained in FY 1991 Budget Submittal

	FY 1989 Approp.	FY 1990	FY 1991	FY 1992	FY 1993
Ambrosia Lake	$ 121	$ 55	$ 85	$ 99	$ 50
Belfield	247	142	130	187	101
Canonsburg	42	55	58	71	50
Durango	121	80	85	71	50
Sagemont		52			
Falls City	121	80	58	71	50
Grand Junction	121	80	85	99	50
Green River	121	80	85	71	50
Gunnison	121	55	85	99	50
Lakeview	121	55	58	71	50
Lowman	121	80	85	71	50
Maybell	121	55	58	99	50
Mexican Hat	121	80	85	99	50
Monument Valley	121	80	85	71	50
Naturita	121	55	85	71	50
Rifle	121	80	85	99	50
Riverton	121	80	58	71	50
Salt Lake City	42	55	58	71	50
Shiprock	121	55	58	71	50
Slick Rock	121	80	85	71	50
Spook	121	55	58	71	50
Tuba City	121	80	58	71	50
Subtotal	$2,509	$1,569	$1,587	$1,755	$1,101
Less LTS&M Mgmt. Costs**	(300)	(690)	(740)	(1,070)	(820)
TOTAL	$2,209	$ 879	$ 847	$ 685	$ 281

*These activities are currently budgeted only through FY 1993 at the Grand Junction Projects Office.

**The above management costs for LTS&M are included in ID: IG-004-00/04-19 and should not be duplicated in this site summary.

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ENVIRONMENTAL RESTORATION AND WASTE MANAGEMENT FIVE-YEAR PLAN
ACTIVITY DATA SHEET
UMTRA Program - Site Support, Technical Measurements Center (TMC), and Long-Term Surveillance and Maintenance (LTS&M)

ID NUMBER: IG-0007-1/5-26

Key Words: UMTRA program, site support, technical measurements center (TMC), and long-term surveillance and maintenance.

Narrative: Site characterization activities will include:

- Field water sampling and sample analyses on a quarterly basis.
- Preparation and verification of quality-control water samples.
- Laboratory analyses of soil and water samples for trace elements and radionuclides.

In addition, the scope of the Technical Measurements Center (TMC) support to the UMTRA Program is to provide and/or identify calibration facilities and procedures; standardize field and laboratory measurements; develop measurement procedures for field and laboratory use; compare measurements and verify data; evaluate instruments; and address measurement problems, as directed. In addition, the TMC conducts technical exchange meetings for States, Indian federations, and subcontractors involved with the DOE remedial action programs.

The primary mission of interior surveillance and maintenance activities is to perform those activities, such as monitoring, maintenance and emergency measures, which are undertaken at a site prior to and after remedial activities are complete in order to protect the public health, safety, and environment.

Site support and surveillance and maintenance activities fall under priority level 1, since these activities are required to measure the potential offsite health risks and offsite groundwater or soil contamination on a continuing basis.

Cost Estimates: Estimates for these activities are based on current programs requirements and historical costs.

Major Milestones: The site support and surveillance and maintenance activities are an annual expense until the sites work is completed and the sites are turned over to the Long-Term Surveillance and Maintenance Program.

Alternatives: None. Monitoring of the sites is required whether remedial action activities are ongoing or have been discontinued.

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ENVIRONMENTAL RESTORATION AND WASTE MANAGEMENT FIVE-YEAR PLAN
ACTIVITY DATA SHEET
UMTRA Program - Site Support, Technical Measurements Center (TMC), and Long-Term Surveillance and Maintenance (LTS&M)

ID NUMBER: IG-0007-1/5-26

RD&D: Not applicable.

Level of Confidence: Medium to high, based on completed activities to date.

Prepared by: Betty L. Hollowell

Approved by: C. R. Nichols

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DOE/ID/12584-56

ENVIRONMENTAL RESTORATION AND WASTE MANAGEMENT SITE-SPECIFIC PLAN FOR IDAHO OPERATIONS OFFICE

FOR THE STATE OF UTAH

December 20, 1989

Prepared for
U.S. Department of Energy
Idaho Operations Office
Idaho Falls, Idaho

Prepared by
UNC Geotech
Under DOE Contract No. DE-AC07-86ID12584
U.S. Department of Energy
Grand Junction Projects Office
Grand Junction, Colorado

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FIGURES

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FUNDING SUMMARY

GRAND JUNCTION PROJECTS OFFICE
FY 1991 ENVIRONMENTAL RESTORATION AND WASTE MANAGEMENT FIVE-YEAR PLAN
STATE OF UTAH

(dollars in thousands)

Description	ADS No.	FY89	FY90	FY91	FY92	FY93	FY94	FY95
AH1020882 - Cleanup								
Monticello Vicinity Properties (MVP)	IG-0002-3/7-27	1182	2000	1500	100	0	0	0
Monticello Remedial Action Project (MRAP)	IG-0008-2/7-27	0	2000	2683	13072	13566	10757	8315
AH1020881 - Assessment								
Monticello Remedial Action Project (MRAP)	IG-0001-2/7-27	1506	3395	1702	0	0	0	0
Total		2690	7395	5885	13172	13566	10757	8315

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LIST OF ACRONYMS AND ABBREVIATIONS

AEC	Atomic Energy Commission
ARARs	Applicable or Relevant and Appropriate Requirements
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
DOE	U.S. Department of Energy
DOE/GJPO	U.S. Department of Energy Grand Junction, Colorado, Projects Office
DOE/ID	U.S. Department of Energy Idaho Operations Office
EA	Environmental Assessment
EPA	U.S. Environmental Protection Agency
ER	Energy Research
ERA	Expedited Response Action
FFA	Federal Facilities Agreement
FONSI	Finding of No Significant Impact
FS	Feasibility Study
FY	Fiscal Year
FYP	Five-Year Plan
ID	Idaho
ID	Identification
IRA	Interim Remedial Action
MED	Manhattan Engineer District
MRAP	Monticello Remedial Action Project
MVP	Monticello Vicinity Properties
NCP	National Contingency Plan
NEPA	National Environmental Policy Act
NPL	National Priorities List
QA	Quality Assurance
QAPP	Quality Assurance Program Plan
RA	Remedial Action
RAA	Remedial Action Agreement
RD	Remedial Design
RD&D	Research Development and Demonstration
REA	Radiologic and Engineering Assessment
RI	Remedial Investigation
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
SFMP	Surplus Facilities Management Program
UMTRCA	Uranium Mill Tailings Radiation Control Act
UNC	UNC Geotech
VCA	Vanadium Corporation of America
WBS	Work Breakdown Structure

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1.0 INTRODUCTION

1.1 DESCRIPTION OF THE INSTALLATION

The U.S. Department of Energy Grand Junction Projects Office (DOE/GJPO) is chartered under the Surplus Facilities Management Program to perform the necessary surveillance and maintenance, assessment, and remediation of contaminated vicinity properties and the inactive uranium millsite at Monticello, Utah. The primary contaminants are uranium ore and mill tailings from the processing of uranium ore.

1.2 ENVIRONMENTAL RESTORATION OVERVIEW

The Monticello Millsite is a 78-acre tract located along Montezuma Creek south of the City of Monticello, San Juan County, Utah. The mill was constructed by the Vanadium Corporation of America (VCA) in 1942 with funds from the Defense Plant Corporation. The mill initially produced vanadium and then a uranium-vanadium sludge for the Manhattan Engineer District (MED). After milling operations ceased in 1944, VCA leased the mill from 1945 to 1946 to produce the uranium-vanadium sludge for MED.

The Atomic Energy Commission (AEC) bought the site in 1948. Uranium milling commenced September 15, 1949, and continued to January 1, 1960, when the mill was permanently closed. Part of the land was transferred to the Bureau of Land Management, but otherwise the site has remained under the control of the AEC and its successor agencies, the U.S. Energy Research and Development Administration and the U.S. Department of Energy.

The total volume of tailings and tailings-contaminated soil is estimated to be 2,400,000 cubic yards. In addition, some properties adjacent to the site (referred to as peripheral properties) are contaminated by residues from ore stockpiles and dispersed tailings. A number of business and residential properties in the City of Monticello are contaminated from the use of radioactive mill tailings as construction and fill material. The tailings piles at the millsite were stabilized and covered with soil in 1961 to eliminate the possibility of further dispersal or use.

The DOE, under the authority of the Atomic Energy Act, initiated the Surplus Facilities Management Program (SFMP) in 1978 to assure safe caretaking and decommissioning of government facilities that had been retired from service but that still had radioactive contamination. In 1980, the millsite was accepted into the SFMP and the Monticello Remedial Action Project (MRAP) was established to restore the government-owned millsite to safe levels of radioactivity, dispose of or contain the tailings in an environmentally safe manner, and perform remedial actions on off-site (vicinity) properties that had been contaminated by radioactive material from the mill operations. In 1983, remedial activities for the vicinity properties were separated from MRAP with the establishment of the Monticello Vicinity Properties (MVP) Project. The two projects (MRAP and MVP) are referred to collectively in this document as the Monticello Site.

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2.0 REQUIREMENTS FOR IMPLEMENTATION

2.1 REQUIREMENTS

The U.S. Congress acknowledged the potential health hazards associated with uranium mill tailings and other residual radioactive material abandoned at inactive privately owned millsites, by passing the Uranium Mill Tailings Radiation Control Act (UMTRCA) of 1978 - Public Law 95-604. The Monticello Millsite is owned by the Federal Government and is therefore not subject to UMTRCA. However, the Department of Energy recognized the intent of Congress as expressed in the Act and intends to meet the Act's requirements and bring the site into full compliance with present environmental legislation, including the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 and the Superfund Amendments and Reauthorization Act of 1986 (CERCLA/SARA).

Under SARA Section 120 and Executive Order No. 12580, the DOE in consultation with the U.S. Environmental Protection Agency (EPA) is authorized to respond to actual or threatened releases of hazardous substances, pollutants, or contaminants into the environment at DOE-owned facilities. The EPA, as required by Superfund, has developed regulations embodied in the National Contingency Plan (NCP) of 40 Code of Federal Regulations (CFR) Part 300 that are designed to guide and control such response actions.

The Monticello Vicinity Properties are listed and the DOE Monticello Millsite will be listed on the National Priorities List (NPL). Thus, guidance from DOE and EPA mandates that DOE and its contractors shall comply with the requirements of CERCLA and SARA.

The EPA, DOE, and the State of Utah entered into a Federal Facilities Agreement (FFA) in February 1989 to complete remedial action of both Monticello Projects in conformance with CERCLA Section 120.

The general purposes of the FFA are to:

1. Ensure that the environmental impacts associated with past and present activities at the Monticello Site have been and will continue to be thoroughly investigated and that appropriate response action is taken and completed as necessary to protect the public health, welfare, and the environment.

2. Evaluate that all past investigative and response actions taken at the Site and documented by the DOE in Radiological Engineering Assessments (REAs) and related documents are the functional equivalent of, and consistent with, those actions and documentation required by CERCLA (as amended), the NCP, and Superfund guidance and policy.

3. Facilitate cooperation and the exchange of information and expertise of the parties to the Agreement.

4. Establish a procedural framework and schedule for developing, implementing, and monitoring appropriate response actions at the Site in accordance with CERCLA/SARA, the NCP, and Superfund guidance and policy.

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Specifically, the purposes of the Agreement are to:

1. Identify Interim Remedial Action (IRA) alternatives, if any, that are appropriate at the Monticello Site prior to the implementation of final remedial actions for the Site. This process is designed to promote cooperation among the parties in identifying IRA alternatives prior to selection of final remedial action.

2. Establish requirements for the performance of a Remedial Investigation (RI) to determine fully the nature and extent of the threat to the public health or welfare or the environment caused by the release or threatened release of hazardous substances, pollutants, or contaminants at the Site. Establish requirements for the performance of a Feasibility Study (FS) for the Site; identify, evaluate, and select alternatives for the Site; and identify, evaluate, and select alternatives for the appropriate remedial action(s) to prevent, mitigate, or abate the release or threatened release of hazardous substances, pollutants, or contaminants at the Site in accordance with CERCLA/SARA.

3. Identify the nature, objective, and schedule of response actions to be taken at the Site. Response actions at the Site shall attain that degree of cleanup of hazardous substances, pollutants, or contaminants mandated by CERCLA/SARA.

4. Implement the selected interim and final remedial action(s) in accordance with CERCLA/SARA.

5. Assure compliance with applicable Federal and State hazardous waste laws and regulations for matters covered by this Agreement.

6. Describe the roles and responsibilities of the parties.

7. Describe and list the applicable or relevant and appropriate requirements (ARARs) for this remedial action.

8. Describe the procedures by which additional properties or locations may be added to or deleted from the Site.

9. Identify existing documentation prepared by the DOE that is functionally equivalent to a Remedial Investigation/Feasibility Study (RI/FS) and/or other CERCLA/SARA requirements and is consistent with the NCP. Also identify sampling, analysis, chain of custody, and related protocols followed by the DOE and/or its contractor laboratories that are functionally equivalent to, or meet the requirements of, EPA approved procedures for purposes of meeting CERCLA/SARA requirements.

10. With respect to current and future activities at the Site, establish requirements for the performance of the Remedial Investigation and Feasibility Study or equivalent DOE process consistent with CERCLA (as amended), the NCP, and EPA guidance and policy.

11. Identify the nature, objective, and schedule of response actions to be taken at the Site(s).

12. Identify the process by which the Site may be delisted from the NPL.

13. Provide for continued operation and maintenance of the selected remedial action(s).

3.0 ORGANIZATION AND MANAGEMENT

U.S. Department of Energy

The Department of Energy Grand Junction Projects Office, under the direction of the DOE Idaho Operations Office (DOE/ID), is responsible for the control and direction of activities of programs assigned to the GJPO. These programs currently include the Uranium Mill Tailings Remedial Action (UMTRA) Grand Junction Vicinity Properties Program, Long-Term Surveillance and Maintenance Program, the SFMP Monticello Remedial Action and Monticello Vicinity Properties Projects, and the Defense Decommissioning and Decontamination Grand Junction Projects Office Remedial Action Project. Figure 1 presents the DOE/GJPO organization structure.

Responsibility for environmental matters, safety, and quality assurance is assigned to DOE/GJPO engineers. The DOE/GJPO Environmental Engineer provides independent oversight of environmental matters, safety, and quality assurance.

UNC Geotech

UNC Geotech (UNC), operating contractor for DOE/GJPO under contract No. DE-AC07-86ID12584, is responsible for accomplishing environmental restoration activities associated with programs assigned to the GJPO.

UNC Geotech uses the Program Management System to accomplish the assigned program activities. The UNC Geotech organization provides matrixed support to Program Managers to ensure that adequate resources are available for each activity. Figure 2 presents the UNC organization structure.

Responsibility for accomplishing environmental restoration in compliance with DOE requirements is vested a Project Manager. The Project Manager is responsible for the planning and control of the project, assignment of specific tasks, milestone achievement, and compliance with DOE Environmental, Safety, and Quality requirements. Figure 3 presents the UNC Geotech remedial action Program Management System.

4.0 CORRECTIVE ACTIVITIES

(This section is not applicable to either the Monticello Remedial Action Project or the Monticello Vicinities Properties Project.)

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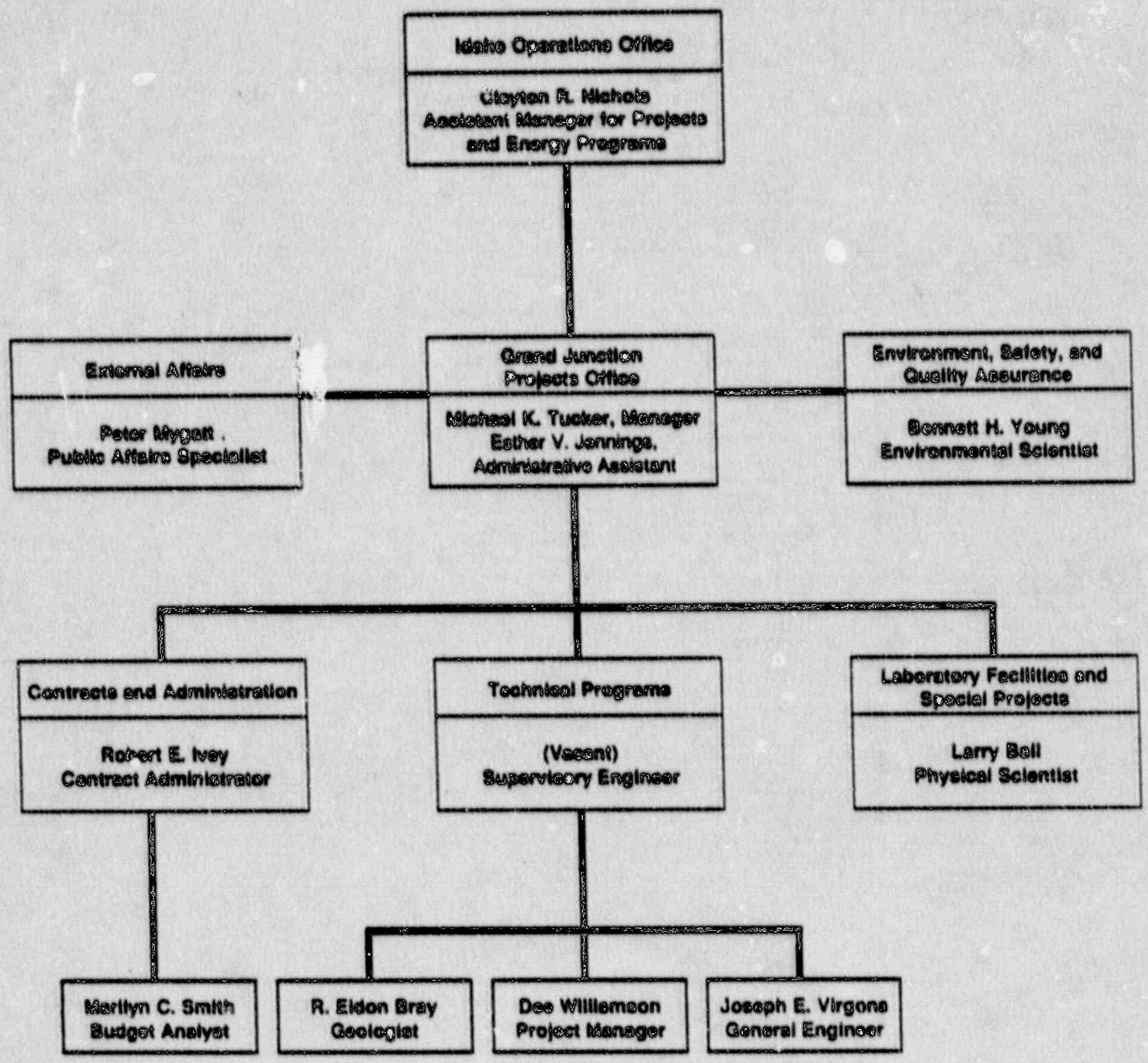

Figure 1. U.S. Department of Energy Grand Junction Projects Office Organization Structure

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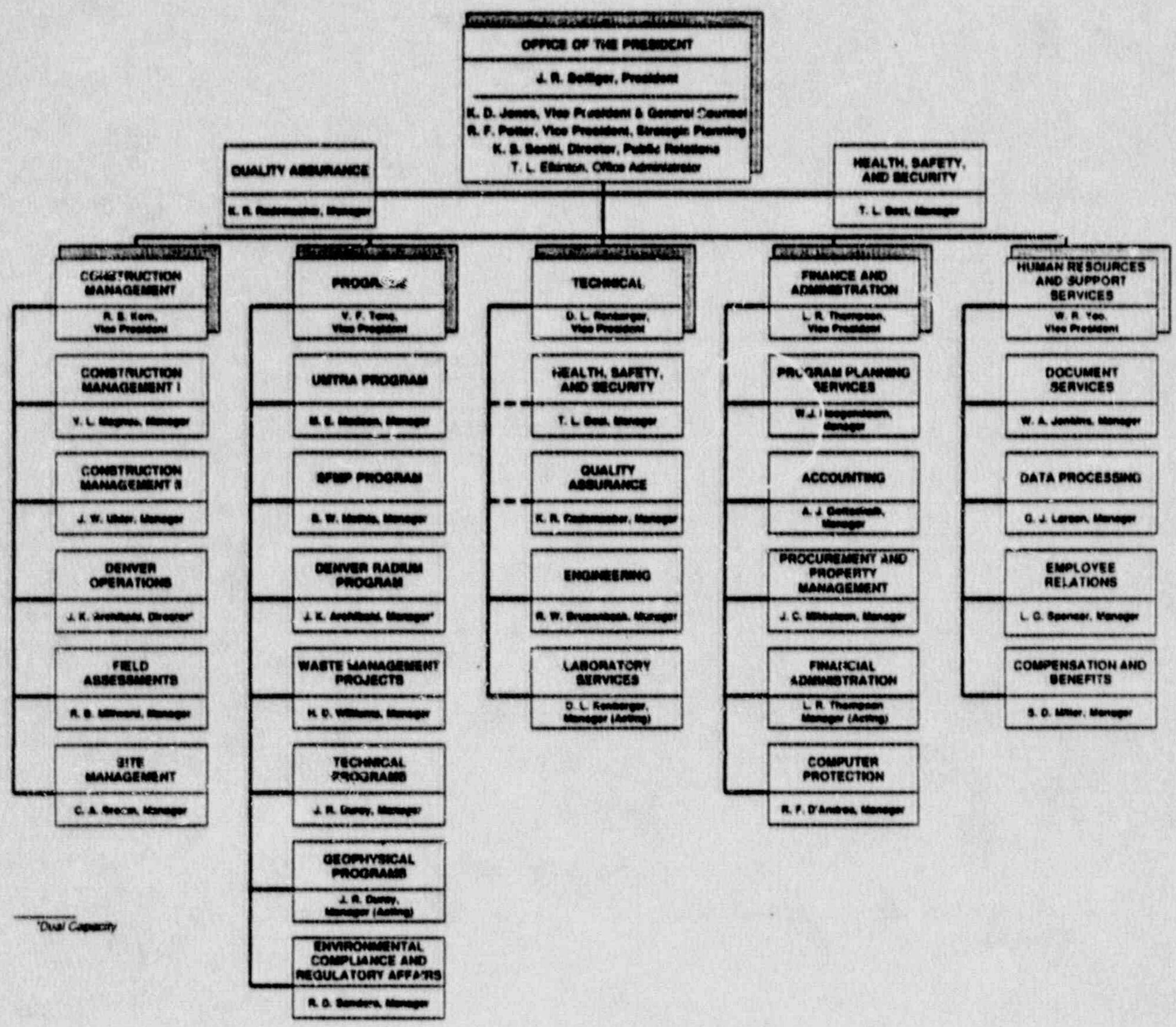

Figure 2. UNC Geotech Organization Structure

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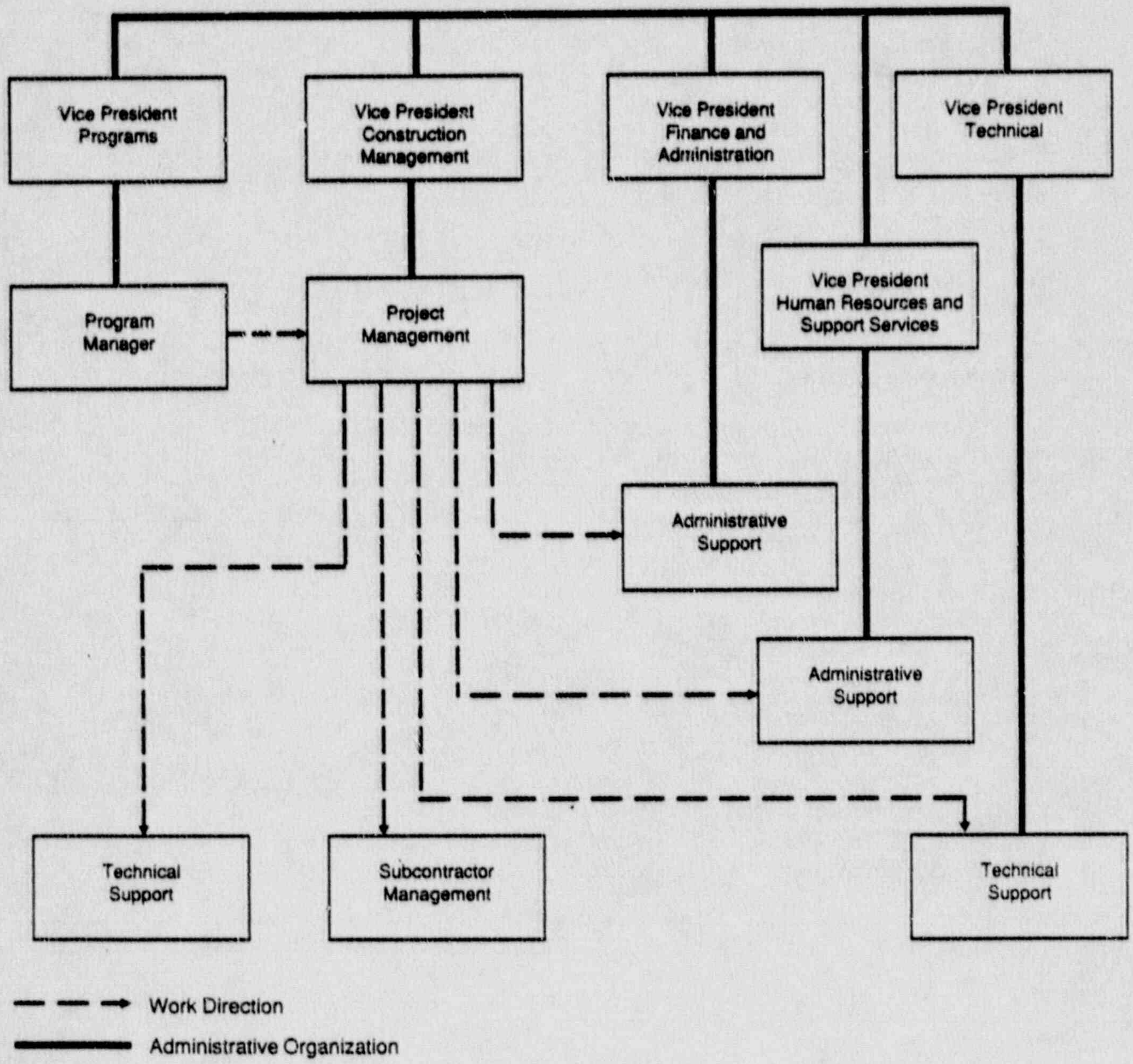

Figure 3. UNC Geotech Remedial Action Program Management System

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5.0 ENVIRONMENTAL RESTORATION

5.1 TASK DESCRIPTION

The project approach is divided into two sections--one for the Monticello Remedial Action Project and one for the Monticello Vicinity Properties. The organization of the project approach is presented in a Work Breakdown Structure (WBS) format to be consistent with the Department of Energy's functional organization system.

The major assumptions included in the preparation of the Five-Year Plan (FYP) include:

- That Federal funding will be available for these priority activities.
- That there are only 100 to 110 vicinity properties requiring DOE cleanup.
- That the millsite compliance process will select on-site stabilization and passive groundwater restoration as the preferred alternatives.
- That CERCLA/SARA and National Environmental Policy Act (NEPA) compliance documentation can be completed and approved following the schedule defined in the Five-Year Plan.

5.1.1 Monticello Remedial Action Project

Specific work elements relevant to the FFA and pertaining to the Monticello Remedial Action Project follow:

PROJECT MANAGEMENT

Project Management activities include the day-to-day management of all phases of the MRAP program.

Primary Documents

As defined in the FFA, primary documents include those reports that are major, discrete portions of the RI/FS or Remedial Design/Remedial Action activities. The DOE shall complete and transmit draft reports of primary documents to EPA and the State for review and comment. If DOE submits a document with a claim of functional equivalency of one of the documents listed below, the document shall be treated as a Primary Report. DOE may also submit a combined package of Primary Documents, where appropriate.

Primary documents that may be submitted are:

- Scope of Work
- RI/FS Work Plan, including Sampling and Analysis Plan and Quality Assurance Program Plan (QAPP)
- Risk Assessment

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- Community Relations Plan
- Remedial Investigation (RI) Report
- Initial Screening of Alternatives
- Feasibility Study (FS) Report
- Proposed Plan
- Record of Decision
- Remedial Design
- Remedial Action Work Plan

The project-specific management and implementation plans will be prepared after issuance of a Record of Decision, in accordance with FFA-established durations.

Secondary Documents

As defined in the FFA, secondary documents include those reports that are discrete portions of primary documents and are typically input of feeder documents. DOE shall complete and transmit draft reports of secondary documents (or documents that DOE claims are the functional equivalent of the documents listed below) to EPA and the State for review and comment. Secondary documents may include:

- Initial Remedial Action/Data Quality Objectives
- Site Characterization Summary
- Detailed Analysis of Alternatives
- Post-Screening Investigation Work Plans
- Treatability Studies
- Sampling and Data Results

Administrative Record

The GJPO will prepare and maintain an Administrative Record at or near the Monticello Site to contain all previous and on-going work, including, but not limited to:

- Factual information/data documents.
- Revision documents.

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- Community relations documents.

- Enforcement documents.

Remedial Investigation/Feasibility Study

EPA and the State shall provide written comments to the draft RI/FS report within 60 days from receipt. These comments shall be incorporated into the draft Final RI and FS reports.

DOE shall provide a minimum of 30 days for formal public review of the draft final RI and FS reports or functionally equivalent DOE documents, which shall be based on the contents of the Administrative Record.

DOE shall submit to EPA and the State the Final RI and FS reports and a Responsiveness Summary, or the functionally equivalent DOE documents. The Responsiveness Summary shall be based on key public concerns and incorporate EPA's and the State's responses to the draft final reports. The Final Reports shall incorporate any changes resulting from public comment.

Record of Decision

Following completion and submittal of the RI/FS or its functional equivalent, DOE shall, after consultation with EPA and the State, publish its proposed remedial action alternative(s) (Proposed Plan) for a public review and comment period that will last at least 30 days. Following public comment, DOE shall submit its proposed remedial action alternative(s) (Proposed Plan) to EPA in the form of a draft Record of Decision, in accordance with applicable guidance. If the Parties agree on the draft Record of Decision, it shall be adopted by EPA, DOE, and the State. DOE shall issue the final Record of Decision. If the Parties are unable to reach agreement on the draft Record of Decision, selection of a remedial action shall be made by the EPA Administrator, or his delegate, and EPA shall then prepare the final Record of Decision.

Implementation of Selected Remedial Action Alternative

Following selection of the final remedial action alternative, DOE shall submit a plan to EPA and the State for implementation of the selected remedial action, including appropriate timetables and schedule. Once the remedial action plan is approved by the EPA, after consultation with the State, GJPO shall implement the remedial action(s) in accordance with the requirements of the Agreement. The EPA shall consult with the State prior to approval of the remedial action plan.

Remedial Design

Remedial design can proceed ahead of the selection of the final remedial action alternative on certain items that are generic to all alternatives. Specifically, these include cleanup design of contiguous properties, radon cover, and biointrusion barrier. Thus, the first 60-percent design phase can occur concurrent with EPA/Utah final reviews and ROD development. EPA/Utah reviews of final engineering design of the selected remedial action will occur at the 30-, 60-, 90-, and 100-percent design stages.

UNC Geotech, as the Remedial Action Contractor, will coordinate and acquire all necessary permits and access agreements for remedial action activities for which DOE is responsible. Any additional permits required by the subcontractors will be the subcontractors' responsibility and clearly stated in procurement documents. Permits and access agreements that UNC Geotech may have to acquire include, but are not limited to:

- Flora/fauna survey.
- Aquatic habitat survey.
- Cultural resource survey.
- Seismic study.
- Geotechnical work.
- Aquifer characterization.
- Peripheral properties and radiological characterizations.
- Corps of Engineer's 404 Permit.
- State Air Quality Approval Plan.
- State Water Well Permit.
- State well-plugging approval.
- County Conditional Use Permit.
- County Encroachment and Transportation Permit.
- National Pollutant Discharge Elimination System (NPDES) Wastewater Discharge Permit.
- State solid-waste disposal permit.
- State temporary water diversion permit.
- State highway transport permit.
- U.S. Nuclear Regulatory Commission (NRC) license amendment.

Project Plan/Project Management Plan

In accordance with DOE Directive 4700, a Project Plan and a Project Management Plan will be developed. The Project Plan will describe the project

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and establish approved project baselines against which overall progress of the project can be measured. The Project Management Plan will describe the plans, organization, and systems that will be used for managing the project.

Remedial Action

Remedial action is divided into procurement and construction. Procurement may extend through Fiscal Year 1993, as the total remedial action could be segmented into several consecutive construction packages. Construction will generally proceed approximately 150 days after procurement starts, although more complex construction segments will require a longer lead time. Upon completion of remedial actions, certification activities will occur to document the remedial action. Verification surveys will be performed by an independent contractor.

Environmental Monitoring

Continued environmental monitoring activities include:

- Routine sampling and analysis of air, surface water, and groundwater for radioactive and nonradioactive constituents.
- Annual Environmental Monitoring Report summarizing the previous year's monitoring effort.

Site Maintenance

Continued site maintenance includes interim stabilization of tailings and maintenance of fencing, drainage, etc., until permanent remedial action is completed. It also includes long-term operation and maintenance of the site after remedial action is completed. For this activity, the Department of Energy will follow the DOE *Guidance for UMTRA Project Surveillance and Maintenance* procedures that include site inspection, groundwater monitoring, aerial photography, custodial maintenance and contingency repair activities, and reporting and recordkeeping.

5.1.2 MONTICELLO VICINITY PROPERTIES PROJECT

Work elements relevant to the FFA and pertaining to the Monticello Vicinity Properties follow.

Engineering

Final engineering design of remaining included vicinity properties and new inclusions will be completed so that Interim Remedial Action (IRA) can proceed.

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Project Management

A work plan will be developed by DOE to complete all tasks required by the FFA. Also under this work element, DOE will prepare equivalency documents for EPA/Utah review for consistency with CERCLA/SARA requirements. The equivalency of documentation of the Monticello Vicinity Properties is based on an "Expedited Response Action" (ERA) scenario. Under this scenario, remediation is taken at NPL sites by the remedial program using removal program authorities.

Actual documentation or functionally equivalent documents as defined in the FFA to be submitted for EPA and State review and comment include the Preliminary Assessment/Site Inspection, Engineering Evaluation/Cost Analysis, Comprehensive Risk Assessment, ARARs analysis, QAPP, CRP, and Record of Decision.

Management of Regulatory Affairs

This work element entails the following efforts by the DOE contractor, UNC Geotech.

- Coordinate and acquire all necessary permits for remedial action activities.
- Maintain liaison between all agencies involved in the compliance action.
- Coordinate Owner Relations activities, including, but not limited to, Consent for Access, surveys, and engineering studies; Notice of Intent to Continue; Remedial Action Agreement (RAA); Owner Acceptance Form; Pre-Construction Inspection; and Notice of Final Inspection.

Administrative Record

UNC Geotech will prepare and maintain an Administrative Record, as required by CERCLA, at or near the Monticello Site to contain all previous and ongoing work, including, but not limited to factual information/data documents, revision documents, Community Relations documents, and enforcement documents.

Remedial Action

Remedial action is divided into procurement and construction that will continue through Fiscal Years 1989, 1990, and 1991. Upon completion of remedial action on vicinity properties, Remedial Action Verification reports will be performed by an independent contractor. These reports will verify that completed vicinity properties are no longer a potential threat to public health or the environment.

There is potential that additional properties will be added to the MVP list based on new data. DOE/EPA/Utah will determine if these new sites should be included by the methodology described in the FFA. Discovery of new potential additional properties will be through construction chasing (to locate

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spillovers) of tailings onto adjacent properties, advertisements, historic reviews of tailings use, and inclusion surveys by an independent verification contractor. The inclusion surveys would resurvey known hot spots and the specific list of properties shown in Attachment 4 of the FFA. If new vicinity properties are included in the Monticello Vicinity Properties Project, complete remedial action will occur.

5.2 RESOURCES

DOE is committed to protecting human health and the environment from risks resulting from past and current Government operations. Additionally, DOE objectives include complying with interagency agreements, complying with State and Federal regulations, maintaining an effective waste management program, and being a good steward of Government resources.

To fulfill DOE objectives and commitments, the Monticello activities have been defined as a Priority I Activity to minimize the near-term impact to the public and the environment. DOE, contractor, and subcontractor personnel will be dedicated to these activities, as necessary, to ensure their successful and timely remediation.

5.3 SCHEDULES

MRAP

Complete Public Review of the RI/FS	12/30/89
Obtain a Record of Decision	09/01/90
Complete Definitive Design	09/30/91
Initiate Remedial Action	09/30/91
Complete Remedial Action	09/30/98

MVP

Obtain a Record of Decision	09/15/89
Complete Ongoing Remedial Actions	09/30/91
Complete Verification and Reporting Activities	09/30/92

5.4 COST (dollars in thousands)

	FY 1989 Approved	FY 1990 Amended Presid. Budget	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995
TOTAL MRAP	1,508	5,395	4,385	13,072	13,566	10,757	8,315
TOTAL MVP	1,182	2,000	1,500	100	--	--	--

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Total MRAP costs are from the Environmental Restoration and Waste Management Five-Year Plan Activity Data Sheets ID Number IG-0001-2/7-27 (Program Budget and Reporting Code AH-10-20-88-1, 35 AH 10 20) and IG-0008-2/7-27 (Program Budget and Reporting Code AH-10-20-88 2). Total MVP costs are from the Environmental Restoration and Waste Five-Year Plan Activity Data Sheet ID Number IG-0002-3/7-27 (Program Budget and Reporting Code AH-10-20-88 2). Please note these dollars are Budget Authority not Budget Outlay. Funding Budget Authority for the entire fiscal year should be received during the first quarter of the fiscal year to ensure cost-effectively managed programs.

6.0 WASTE MANAGEMENT OPERATIONS

(This section is not applicable to either the Monticello Remedial Action Project or the Monticello Vicinities Properties Project.)

7.0 COMPLIANCE WITH NEPA

Both Monticello projects' activities are fully compliant with NEPA. Remediation of Monticello Vicinity Properties has been ongoing since 1984 and has received NEPA determination by the June 1984 Action Description Memorandum.

The Monticello Remedial Action Project will be completing its NEPA documentation with the CERCLA process. The Environmental Assessment (EA) is being combined with the RI/FS for the millsite. The NEPA determination should be completed prior to the CERCLA ROD determination, currently scheduled to be completed by September 1, 1990.

8.0 REPORTING AND DATA MANAGEMENT

8.1 REQUIRED REPORTS

The FFA for the Monticello Site specifically defines the technical plans and reports that are mandatory submittals to EPA and the State of Utah. The FFA designates which reports are Primary (EPA/State approval) and which are Secondary (EPA/State information), as stated previously in this document. In addition, monthly progress reports and annual Environmental Monitoring Reports are prepared and submitted to EPA and the State of Utah.

8.2 MAINTENANCE OF RECORDS

The Administrative Record for the Monticello Site's activities is maintained to ensure that all documents are recorded and controlled in common repositories. The Monticello Administrative Records are maintained at the GJPO facility and the San Juan (Monticello, Utah) County Library; an additional information repository is also maintained at the San Juan County Library. Changes to documents that have been submitted to the Record can only be made through an addendum or issuance of complete revisions.

8.3 MAINTENANCE OF SAMPLES

Monticello Projects samples are stored at the GJPO sample storage facilities. Samples are placed in appropriate containers, permanently marked, entered into the inventory control listing, and stored. Monticello samples are currently designated as permanent samples.

The detailed procedures for handling and maintaining the samples are included in the UNC Geotech *Analytical Chemistry Laboratory Administrative Plan and Quality Control Methods Manual* and the UNC Geotech *Analytical Chemistry Laboratory Handbook of Analytical and Sample Preparation Methods*. Special equipment for processing and maintaining the samples is a part of the Analytical Chemistry Laboratory.

9.0 QUALITY ASSURANCE

The work performed by UNC Geotech for DOE at the GJPO is performed in accordance with the UNC *Quality Assurance* (QA) manual. The QA program is designed as a total quality management system, using ANSI/ASME NQA-1 as a basis. Additional quality assurance requirements appropriate to environmental restoration work have been added to ensure achievement of quality during restoration activities.

The QA program is implemented by UNC Geotech operating procedures and instructions. The QA program and the implementing procedures and instructions were developed for use in environmental restoration work and have been refined during UNC's extensive environmental restoration and management experience.

Specific requirements applicable to a program are identified in Quality Assurance Program Plans (QAPPs). The QAPPs include the specific applicable QA requirements, responsibilities for accomplishment, and specific manuals and procedures that implement the requirements. The QAPPs and implementing procedures document the systems for the review and approval, including changes, of technical procedures, tests, plans, and designs used to control work. Also included are QA procedures addressing nonconformances, development of acceptance criteria, control of purchased items and services, inspection, instrument calibration and testing, control of processes, plan change authority, records control, and identification and control of items and samples.

The responsibility for achieving and verifying quality is assigned to those performing the work. The Quality Assurance organization conducts independent verification of quality through scheduled system and performance audits. The audits are supplemented by regular surveillances of the work and documentation of the surveillances.

The readiness to perform program work, including applicability of procedures, availability of qualified personnel, and adequate and appropriate equipment is accomplished by a system of readiness reviews.

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10.0 FEDERAL, STATE, AND LOCAL INTERACTIONS

The Monticello activities are controlled under the Federal Facilities Agreement that was executed on February 24, 1989. The agreement stipulates specific EPA and State reviews that the cleanup activities will be performed in accordance to CERCLA/SARA. In addition, DOE will comply with NEPA process.

Public meetings and review/comment periods have been held in Monticello to discuss the Federal Facilities Agreement and the Proposed Plan for the Monticello Vicinity Properties. Future outreach activities include the public review/comment period for the Monticello millsite RI/FS-EA and Proposed Plan. Federal (primarily EPA) and State of Utah (Bureau of Radiation Control and Solid and Hazardous Waste) remain ongoing in accordance with the Federal Facilities Agreement.

A formal Community Relations Plan has been submitted to the EPA for approval. The Community Relations Plan will be used to maintain public awareness of Monticello Projects' activities.

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APPENDIX A

ACTIVITY DATA SHEETS

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ENVIRONMENTAL RESTORATION AND WASTE MANAGEMENT FIVE-YEAR PLAN
ACTIVITY DATA SHEET
Monticello Remedial Action Project (MRAP)

Operations Office: ID — ID NUMBER: IG-0001-2/7-27*
Installation: GJPO
Facility/Waste Area Grouping: Monticello, Utah — CATEGORY: ER
Program B&R Code: AH-10-20-88 1, 35 AH 10 20
Activity Title: Monticello Remedial Action Project (MRAP) (141, 142) — PRIORITY: 1

Funding Summary:

Budget Authority ($K) Contained in FY 1991 Budget Submittal

	FY 1989 Approp.	FY 1990 Amended Presid. Budget	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995
State of Utah Grant	$ 200	$ 45	$ 45	$0	$0	$0	$0
Operating	1,258	3,290	1,597	0	0	0	0
Capital	50	60	60	0	0	0	0
Total	$1,508	$3,395	$1,702	$0	$0	$0	$0

Key Words: CERCLA RI/FS, Monticello Millsite, Uranium Millsite, uranium mill tailings.

*This task is shared with IG-0008.

Narrative: The Monticello Millsite is an inactive uranium millsite containing over two million tons of mill tailings on approximately 78 acres. The Monticello Remedial Action Project (MRAP) is currently funded through the Surplus Facilities Management Program (SFMP).

The Millsite has been placed on the National Priorities List (NPL) and a Federal Facilities Agreement (FFA) has been implemented between DOE, EPA Region VIII, and the State of Utah. The FFA established specific schedules for this remediation activity.

Public review of the Remedial Investigation/Feasibility Study (RI/FS) is scheduled for no later than 12/30/89; a Record of Decision (ROD) is scheduled for 9/1/90 with remedial action (see IG-0008) to commence by end of 1991 and continue through FY 1998.

Failure to perform these remedial action milestones in accordance with the FFA can result in stipulated financial penalties, up to $10,000 per week, and litigation by local residents, EPA and the State of Utah.

ENVIRONMENTAL RESTORATION AND WASTE MANAGEMENT FIVE-YEAR PLAN
ACTIVITY DATA SHEET
Monticello Remedial Action Project (MRAP)

ID NUMBER: IG-0001-2/7-27

The driving forces and justification for the priority on this project are:

- As represented by a very high NPL score; the two million tons of mill tailings pose potentially serious off-site health risks to nearby residents both from the radon emanation and groundwater contamination plume. Stabilization, treatment and/or removal of the contaminant point source is essential to mitigating the health effects and removing the project from the NPL.

- Compliance with the Federal Facilities Agreement is necessary to prevent EPA and the State of Utah penalties. The funds to reimburse the State of Utah for its involvement in the FFA are included in the above funding table. Costs are limited to an amount not to exceed $600K.

- Approximately $350,000 of annual surveillance and maintenance and environmental monitoring costs can be substantially reduced once remedial action has been completed.

Cost estimates: Cost and duration estimates are based on preliminary design efforts and may vary due to public/EPA comments on the proposed plan and/or definitive design. The cost estimate is based on the following major milestones: NEPA/CERCLA compliance - 9/1/90.

Alternatives: Currently, there are no viable alternatives to comply with the FFA and performing tailings removal/stabilization.

RD&D: There are no RD&D activities being performed under this project. However, groundwater contamination is a potentially significant problem. Funding the development of innovative and cost-effective treatment technology is recommended to significantly reduce total project cost. Bio-remediation technology has strong cost-saving potential for this project.

Level of Confidence: Medium - Preliminary site design is complete. Requirements for groundwater treatment are still unknown, but it is highly probable that active treatment will be required.

Prepared by: Betty L. Hollowell

Approved by: C. R. Nichols

ENVIRONMENTAL RESTORATION AND WASTE MANAGEMENT FIVE-YEAR PLAN
ACTIVITY DATA SHEET
Monticello Vicinity Properties (MVP)

Operations Office: ID
Installation: GJPO
Facility/Waste Area Grouping: Monticello, Utah
Program B&R Code: AH-10-20-88 2
Activity Title: Monticel'o Vicinity Properties (MVP) (141, 142)

ID NUMBER: IG-0002-3/7-27
CATEGORY: ER
PRIORITY: 1

Funding Summary:

Budget Authority ($K) Contained in FY 1991 Budget Submittal

	FY 1989 Approve.	FY 1990 Amended Presid. Budget	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995
Operating	$1,182	$2,000	$ 1,500	$ 100			
Capital							
Total	$1,182	$2,000	$ 1,500	$ 100			

Key Words: CERCLA RI/FS, CERCLA RD/RA, Monticello Millsite, Uranium Millsite, uranium mill tailings, Vicinity Property Contamination

Narrative: Monticello Millsite mill tailings were used as backfill and as brick/concrete construction material on residential properties through the 1960's and early 1970's. Radiometric surveys of Monticello have currently identified 91 vicinity properties that require remediation. These remediations are funded under the Surplus Facilities Management Program (SFMP), and since 1984, 53 properties have been remediated.

The vicinity properties have been listed on the National Priorities List (NPL) and a Federal Facilities Agreement (FFA) has been implemented between DOE, EPA Region VIII and the State of Utah. The FFA established specific schedules for these remediation activities. Funding of state's costs for implementation of the FFA are included under ID Number: IG-0001.

Functionally equivalent documentation will be utilized to establish a Record of Decision (ROD) by September 30, 1989, with the ongoing remediation activities to be completed by 1992.

Failure to perform these remedial action milestones in accordance with the FFA could result in stipulated financial penalties, up to $10,000 per week, and litigation by local residents, EPA, and the State of Utah.

The driving forces and justification for the priority on this project are:

ID NUMBER: IG-0002-3/7-27

- As represented by being placed on the NPL, the vicinity property contamination poses potentially serious health risks to private residents from the radon emanation. Remedial action is necessary in order to mitigate the long-term health effects for these residents.

- Compliance with the Federal Facilities Agreement is necessary to prevent EPA and the State of Utah penalties. EPA expects the vicinity properties to be cleaned up at the rate of FY 1989, 13 properties; FY 1990, 21 properties; FY 1991, remaining balance - up to 21 properties.

- Disruption of the ongoing vicinity property cleanup program would have a negative impact upon the currently favorable DOE relationship with town residents. Any disruption to the current cleanup schedule could result in adverse reactions and potential lawsuits by the residents, State of Utah and the EPA.

Cost Estimates: Cost and duration estimates for this project are based upon previous project experience and engineering estimates. The estimates are contingent upon remediating a maximum of 107 properties (91 currently included). Any inclusions above 107 may increase the overall cost and schedule.

	FY 1989 Approve.	FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995
Operating							
Man Years	7	5	7	2			
Labor Costs	601	488	731	100			
Non-Labor Costs	473	1,421	633	0			
Subtotal	$ 1,074	$ 1,909	$ 1,364	$ 100			
Contingency	108	91	136	0			
Subtotal Operating	$ 1,182	$ 2,000	$ 1,500	$ 100			
Capital	0	0	0	0			
Total	$ 1,182	$ 2,000	$ 1,500	$ 100			

Alternatives: There are no viable alternatives to complying with the FFA and Remediating the residential properties.

ENVIRONMENTAL RESTORATION AND WASTE MANAGEMENT FIVE-YEAR PLAN
ACTIVITY DATA SHEET
Monticello Vicinity Properties (MVP)

ID NUMBER: IG-0002-3/7-27

RD&D: There is no applicable RD&D effort for this project.

Level of Confidence: Medium - The EPA must agree to a functionally equivalent ROD, and there is some potential for inclusions above the planned 107.

Prepared by: Betty L. Hollowell

Approved by: C. R. Nichols

ENVIRONMENTAL RESTORATION AND WASTE MANAGEMENT FIVE-YEAR PLAN
ACTIVITY DATA SHEET
Montice1lo Remedial Action Project (MRAP)

Operations Office: ID — ID NUMBER: IG-0008-2/7-27*
Installation: GJPO
Facility/Waste Area Grouping: Monticello, Utah — CATEGORY: ER
Program B&R Code: AH-10-20-83 2
Activity Title: Monticello Remedial Action Project (MRAP) (141, 142) — PRIORITY: 1

Funding Summary:

Budget Authority ($K) Contained in FY 1991 Budget Submittal

	FY 1989 Approp.	FY 1990 Amended Presid. Budget	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995
State of Utah Grant	$0	$ 0	$ 0	$ 45	$ 45	$ 45	$ 45
Operating	0	2,000	2,683	13,027	13,521	10,712	8,270
Capital	0	$ 0	0	0	0	0	0
Total	$0	$2,000	$2,683	$13,072	$13,566	$10,757	$8,315

Key Words: CERCLA RI/FS, Monticello Millsite, Uranium Millsite, uranium mill tailings.

*This task is shared with IG-0001.

Narrative: The Monticello Millsite is an inactive uranium millsite containing over two million tons of mill tailings on approximately 78 acres. The Monticello Remedial Action Project (MRAP) is currently funded through the Surplus Facilities Management Program (SFMP).

The Millsite has been placed on the National Priorities List (NPL) and a Federal Facilities Agreement (FFA) has been implemented between DOE, EPA Region VIII, and the State of Utah. The FFA established specific schedules for this remediation activity.

Public review of the Remedial Investigation/Feasibility Study is scheduled for no later than 1/15/90; a Record of Decision (ROD) is scheduled for 1/15/91 with remedial action to commence by mid-1992 and continue through FY 1998.

Failure to perform these remedial action milestones in accordance with the FFA can result in stipulated financial penalties, up to $10,000 per week, and litigation by local residents, EPA and the State of Utah.

The driving forces and justification for the priority on this project are:

- As represented by a very high NPL score; the two million tons of mill tailings pose potentially serious off-site health risks to nearby residents both from the radon emanation and groundwater contamination

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plume. Stabilization, treatment and/or removal of the contaminant point source is essential to mitigating the health effects and removing the project from the NPL.

- Compliance with the Federal Facilities Agreement is necessary to prevent EPA and the State of Utah penalties. The funds to reimburse the State of Utah for its involvement in the FFA are included in the above funding table. Costs are limited to an amount not to exceed $600K.

- Approximately $350,000 of annual surveillance and maintenance and environmental monitoring costs can be substantially reduced once remedial action has been completed.

Cost estimates: Cost and duration estimates are based on preliminary design efforts and may vary due to public/EPA comments on the proposed plan and/or definitive design. The cost estimate is based on the following major milestones: Engineering Design - 3/1/92, and start remedial action - 4/15/92.

Alternatives: Currently, there are no viable alternatives to comply with the FFA and performing tailings removal/stabilization.

RD&D: There are no RD&D activities being performed under this project. However, groundwater contamination is a potentially significant problem. Funding the development of innovative and cost-effective treatment technology is recommended to significantly reduce total project cost. Bio-remediation technology has strong cost-saving potential for this project.

Level of Confidence: Medium - Preliminary site design is complete. Requirements for groundwater treatment are still unknown, but it is highly probable that active treatment will be required.

Prepared by: Betty L. Hollowell

Approved by: C. R. Nichols

PRESENTATION BY BETH SELLERS
U.S. DEPARTMENT OF ENERGY

UMTRA PROJECT ENVIRONMENTAL COMPLIANCE REVIEW

NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)

- PURPOSE
- ENVIRONMENTAL PROTECTION AGENCY (EPA)
- GOALS
- ENVIRONMENTAL IMPACT STATEMENT (EIS)
- ENVIRONMENTAL ASSESSMENT (EA)

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UMTRA

ENDANGERED SPECIES ACT

- PURPOSE
- U.S. FISH AND WILDLIFE SERVICE

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UMTRA

CULTURAL RESOURCES

- NATIONAL HISTORIC PRESERVATION ACT
  - PURPOSE
  - NATIONAL PARK SERVICE

- ARCHAEOLOGICAL AND HISTORIC PRESERVATION ACT OF 1974

- ARCHAEOLOGICAL RESOURCES PROTECTION ACT OF 1979

- AMERICAN INDIAN RELIGIOUS FREEDOM ACT

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UMTRA

FLOODPLAINS AND WETLANDS

- U.S. CORPS OF ENGINEERS REGULATORY AUTHORITY
  - RIVERS AND HARBORS ACT
  - CLEAN WATER ACT

- DOE REGULATORY REQUIREMENTS
  - 10 CFR PART 1022
    - EXECUTIVE ORDER 11988
    - EXECUTIVE ORDER 11990

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WATER QUALITY

- FEDERAL WATER POLLUTION CONTROL ACT
  (CLEAN WATER ACT)
  - PURPOSE
  - NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
  - WATER QUALITY STANDARDS

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UMTRA

AIR QUALITY

- CLEAN AIR ACT

  - PURPOSE
  - NEW SOURCE PERFORMANCE STANDARDS (NSPS)
  - NATIONAL EMISSION FOR HAZARDOUS AIR POLLUTANTS (NESHAP)

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TOXIC SUBSTANCE CONTROL ACT (TSCA)

- U.S. ENVIRONMENTAL PROTECTION AGENCY

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PERMITS & APPROVALS
AMBROSIA LAKE

FEDERAL

- CLEAN WATER ACT
  - 404 DREDGE & FILL PERMIT
  - NPDES PERMIT

- THREATENED & ENDANGERED SPECIES CONSULTATION

PERMITS & APPROVALS
AMBROSIA LAKE

FEDERAL (CONCLUDED)

- CULTURAL RESOURCE CLEARANCE
- SPECIAL USE PERMIT
- RIGHT–OF–WAY
- SPILL PREVENTION CONTROL & COUNTER MEASURES PLAN

PERMITS & APPROVALS
AMBROSIA LAKE

STATE

- AIR QUALITY CONSTRUCTION PERMIT
- WATER RIGHTS
- WELL ABANDONMENT
- GROUNDWATER DISCHARGE PLAN
- ASBESTOS REMOVAL
- TEMPORARY RETENTION RESERVOIR PERMIT

PERMITS & APPROVALS
DURANGO

FEDERAL

- CLEAN WATER ACT
  - 404 DREDGE & FILL PERMIT
  - NPDES PERMIT

- THREATENED & ENDANGERED SPECIES CONSULTATION

PERMITS & APPROVALS
DURANGO

FEDERAL (CONCLUDED)

- CULTURAL RESOURCE CLEARANCE
- SPECIAL USE PERMIT
- SPILL PREVENTION CONTROL & COUNTER MEASURES PLAN

PERMITS & APPROVALS
DURANGO

STATE

- AIR EMISSIONS NOTICE AND PERMIT
- WELL PERMITS
- WATER RIGHTS
- WELL ABANDONMENT
- MINING PERMIT
- SOLID WASTE DISPOSAL
- RIGHT–OF–WAY

PERMITS & APPROVALS
DURANGO

LOCAL

- LAND USE CHANGE PERMIT
- COUNTY ROAD ACCESS

RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)

- OBJECTIVE
- "CRADLE TO GRAVE" TRACKING OF HAZARDOUS WASTE
- EPA/STATE AUTHORITY

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UMTRA

WHAT IS A HAZARDOUS WASTE ?

- SUBTITLE C - HAZARDOUS WASTE MANAGEMENT
- DEFINITION
- " LISTED "
- EXHIBIT FOUR CHARACTERISTICS

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UMTRA

"CRADLE TO GRAVE" CONCEPT

- GENERATION TO DISPOSAL
- WHO ARE GENERATORS ?
- EPA ID NUMBERS

UMTRA ENVIRONMENTAL COMPLIANCE EVALUATION GROUP

- **DOE, TAC, RAC**
- **OBJECTIVE - ASSESS THE PROJECT'S COMPLIANCE WITH ENVIRONMENTAL REGULATIONS, PRIMARILY RCRA**
- **ACTION - FORMULATE AN UMTRA PROJECT POLICY ON MANAGEMENT OF HAZARDOUS MATERIALS**

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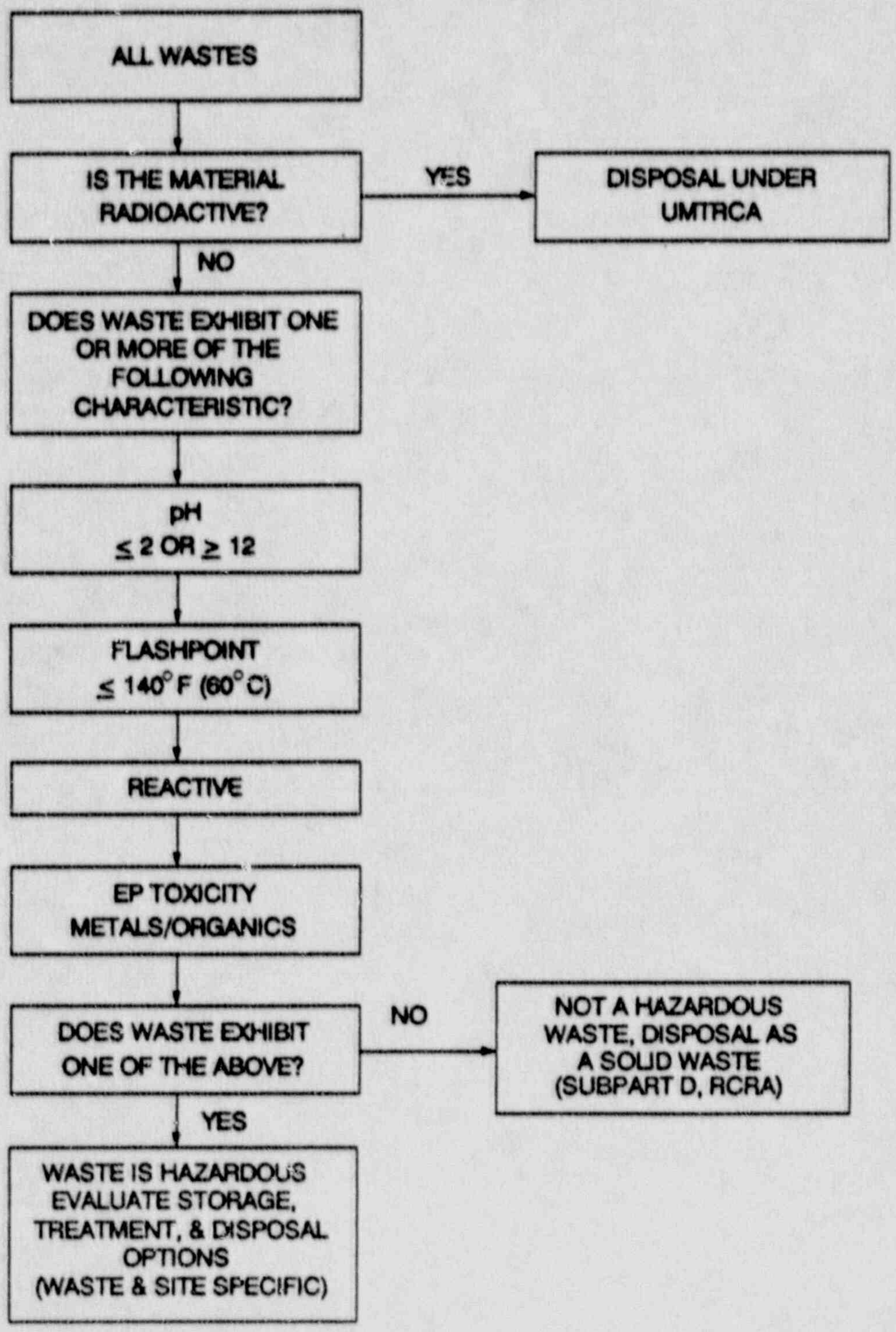
UMTRA

FLOW CHART FOR UMTRA PROJECT HAZARDOUS WASTE & RESIDUAL RADIOACTIVE MATERIALS MANAGEMENT

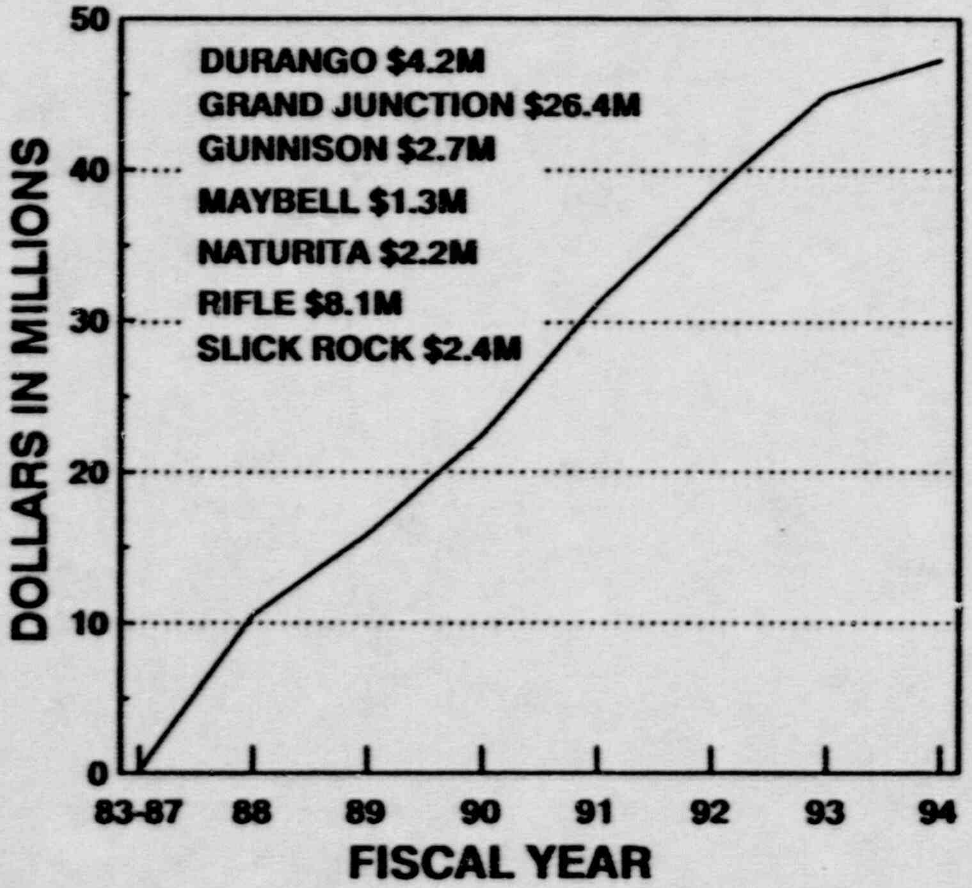


PRESENTATION BY LORETTA BERG
U.S. DEPARTMENT OF ENERGY

UMTRA PROJECT FUNDING AND STATE BILLING

COLORADO

STATE FUNDING PROFILE



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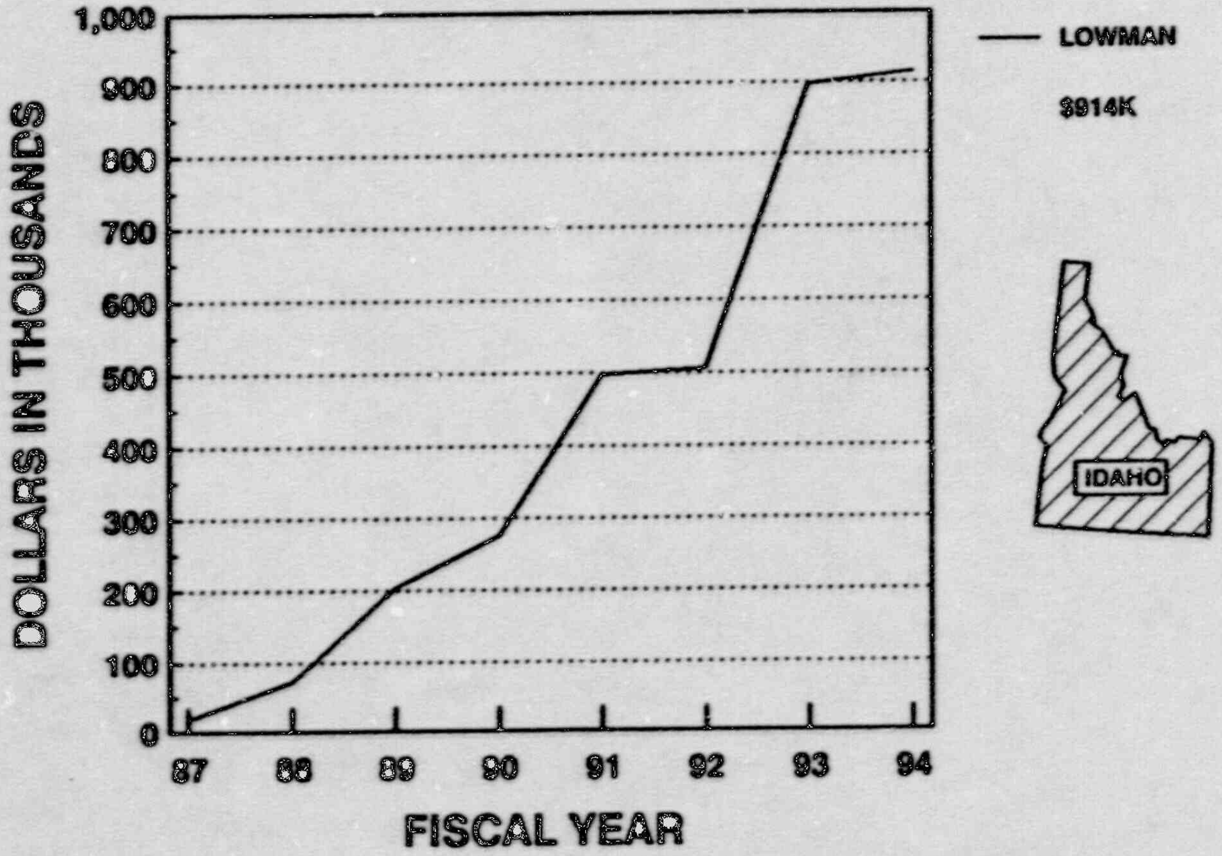
IDAHO

STATE FUNDING PROFILE



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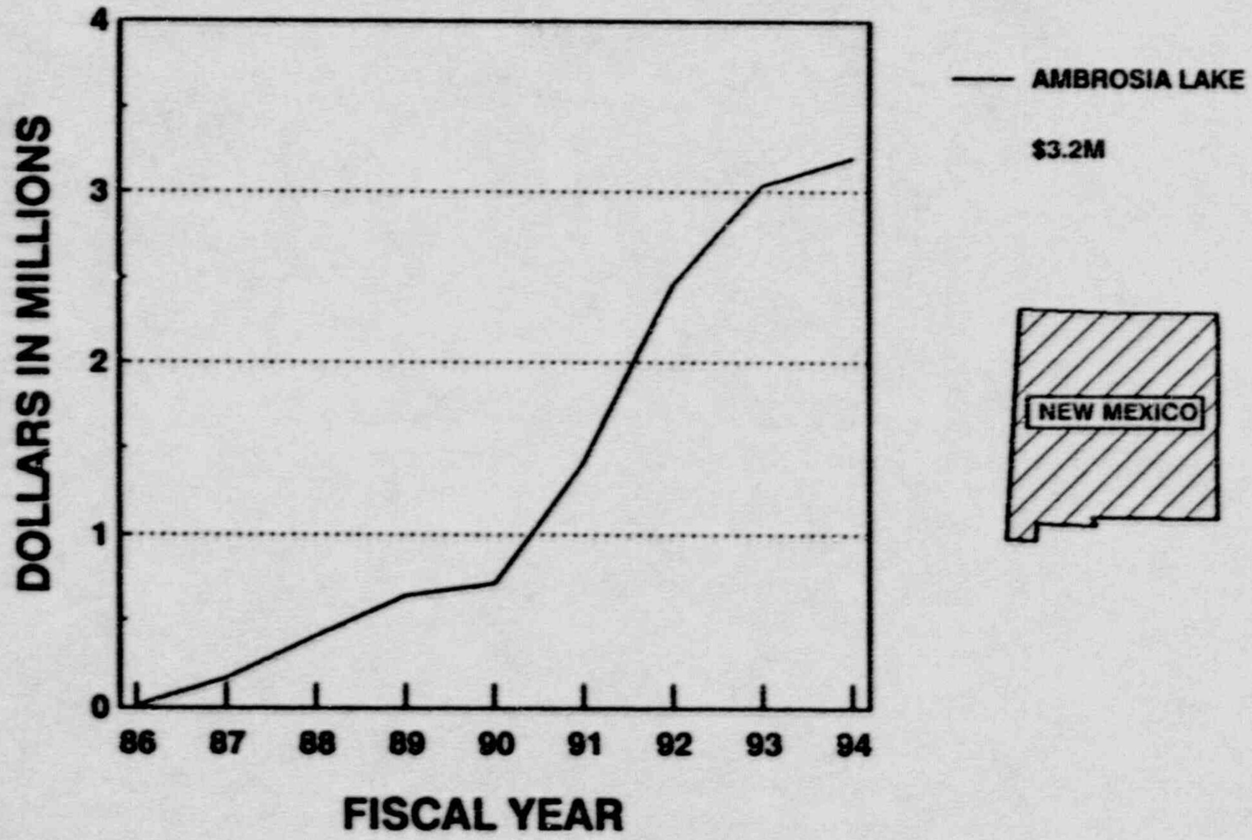
NEW MEXICO

STATE FUNDING PROFILE



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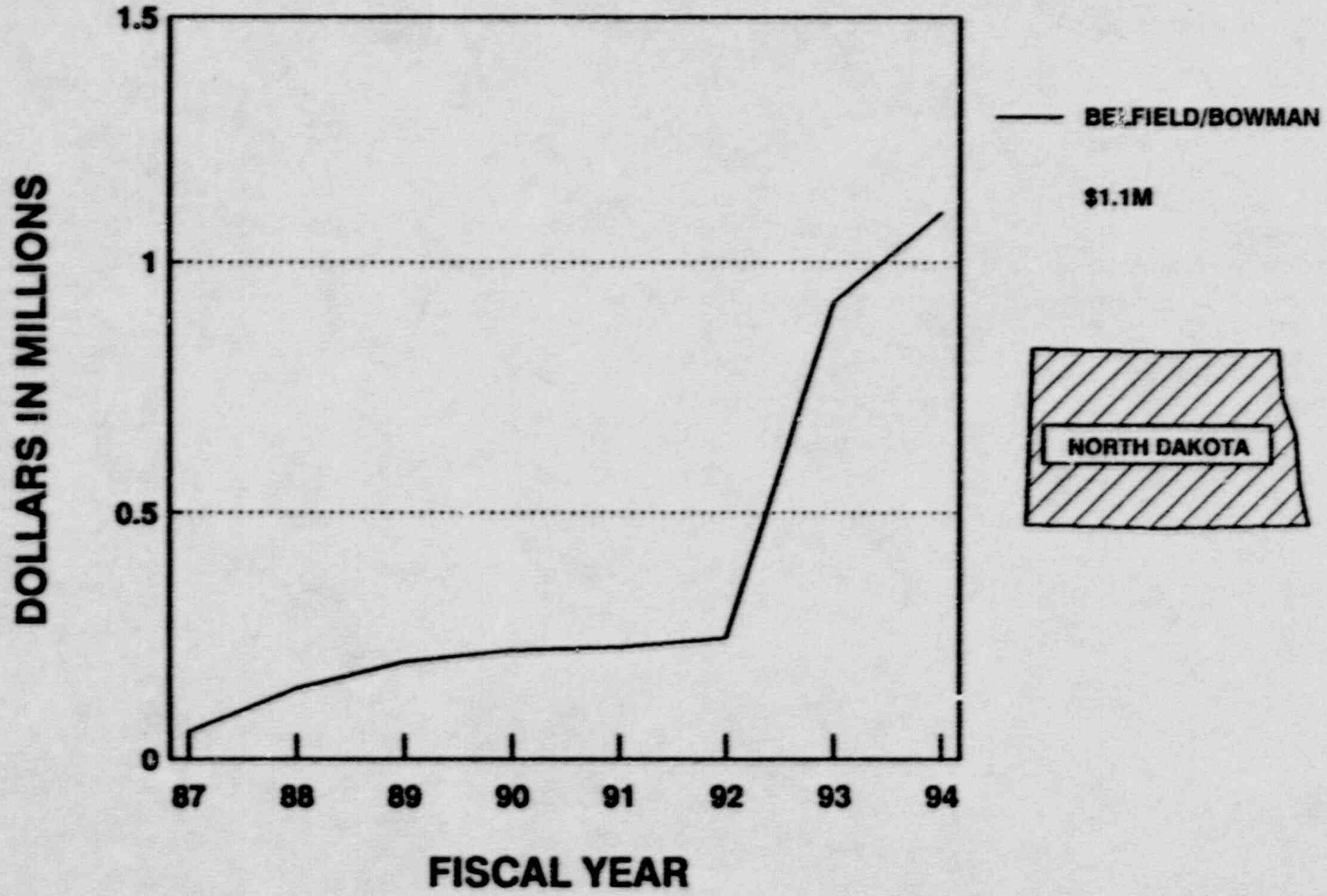
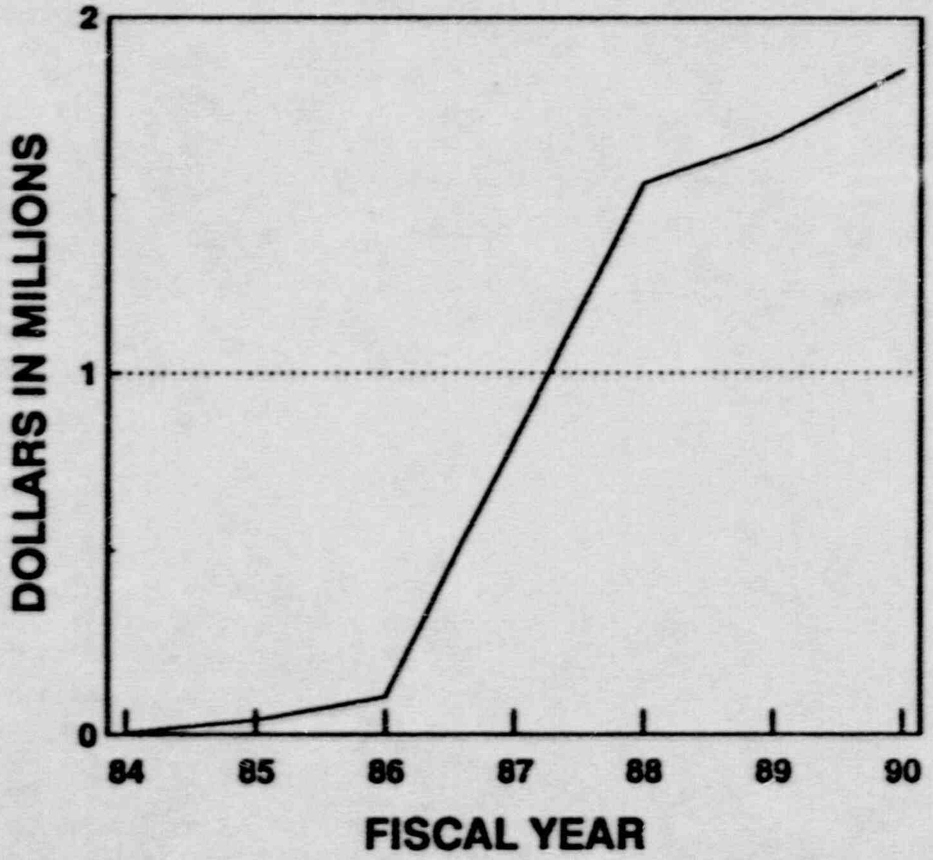
NORTH DAKOTA

STATE FUNDING PROFILE



OREGON

STATE FUNDING PROFILE



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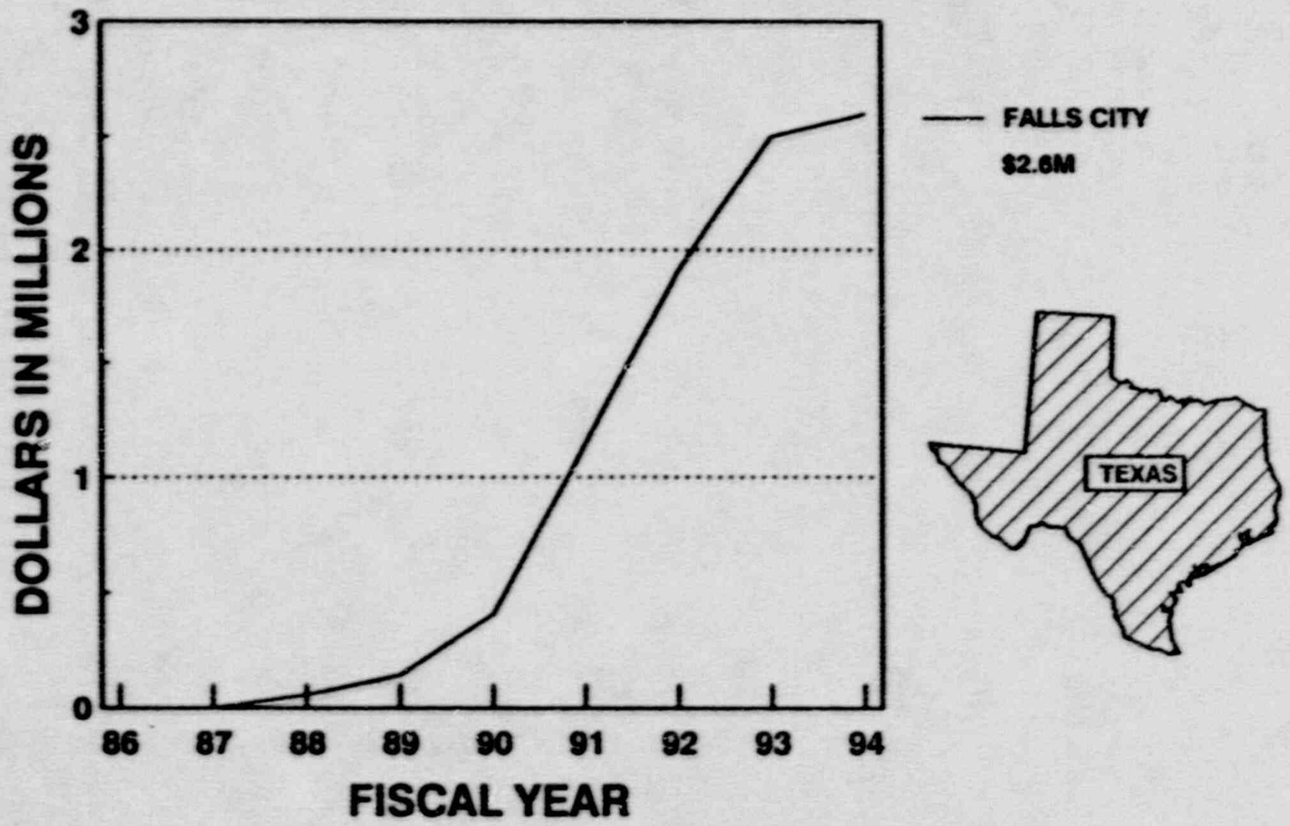
TEXAS

STATE FUNDING PROFILE



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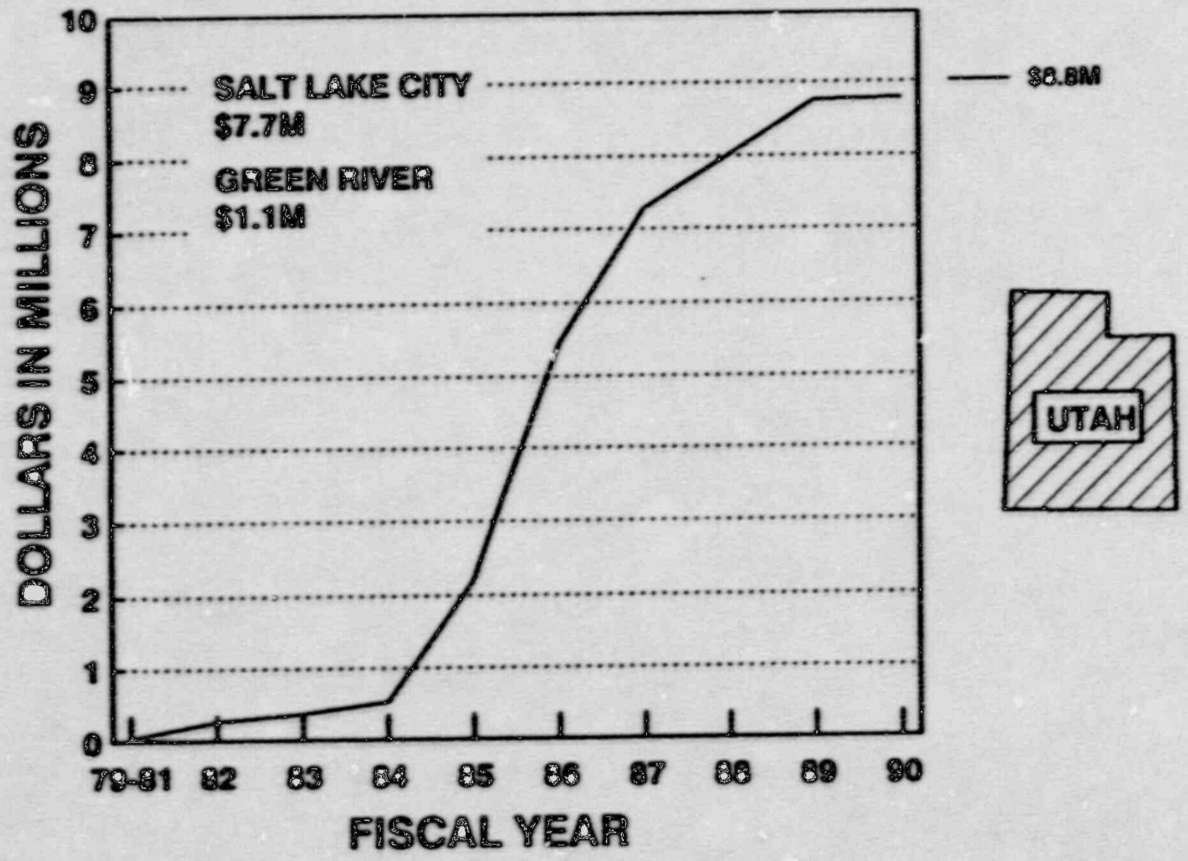
UTAH

STATE FUNDING PROFILE



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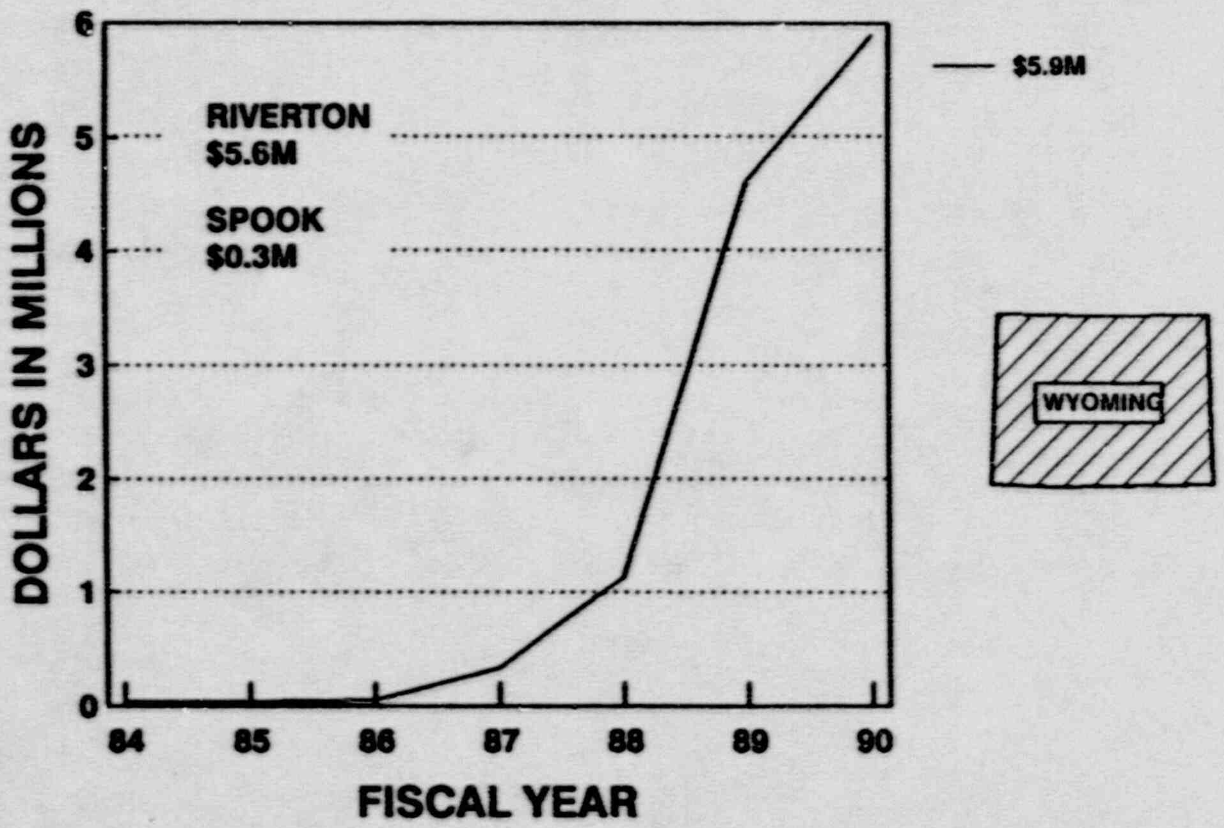
WYOMING

STATE FUNDING PROFILE



STATE BILLING ISSUES

- ROUND *ALL* ENTRIES ON SF-270
- CARRY COSTS AS CUMULATIVE-TO-DATE
- SEPARATE COSTS INTO CATEGORIES OF SITE ACQUISITION, ENGINEERING, AND REMEDIAL ACTION
- PROVIDE SUPPORTING DOCUMENTATION
- SUBMIT BILLINGS QUARTERLY
- USE OF INDIRECT RATE

UMTRA

STATE BILLING ISSUES

- ROUND *ALL* ENTRIES ON SF-270
- CARRY COSTS AS CUMULATIVE-TO-DATE
- SEPARATE COSTS INTO CATEGORIES OF SITE ACQUISITION, ENGINEERING, AND REMEDIAL ACTION
- PROVIDE SUPPORTING DOCUMENTATION
- SUBMIT BILLINGS QUARTERLY
- USE OF INDIRECT RATE

UMTRA

FUNDING ISSUES

- FLEXIBLE FUNDING POLICY PAPER
- GRAMM - RUDMAN - HOLLINGS BUDGET CUT
- PRIORITY SITES
- SUPPLEMENTAL FUNDING
- EAC REPORTS

UMTRA

GROUNDWATER PROJECT BUDGET

- INCLUDED IN 5-YEAR PLAN AS ROUGH ESTIMATE

- FY 1991 THROUGH FY 2065; TEC $1209M

- INITIAL BUDGET PROFILE:

FY 91 - $1M	FY 93 - $10M	FY 95 - $35M
FY 92 - $4M	FY 94 - $28M	

- RA ONLY PLANNED AT SELECTED SITES

UMTRA

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PRESENTATION BY MIKE FLIEGEL
U.S. NUCLEAR REGULATORY COMMISSION

LONG-TERM CARE RULE FOR UMTRA PROJECT SITES

LONG-TERM CARE RULE

MYRON FLIEGEL
US Nuclear Regulatory Commission

October 25, 1989

PURPOSE AND SCOPE

* UMTRCA license requirement
* After remediation
* Perpetual surveillance and custody
* No provision in NRC regulations
* Rulemaking to amend 10 CFR Part 40

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GENERAL LICENSE

* General vs. specific license
* Advantages of general license
* Implementation
* Groundwater restoration

NRC RULEMAKING

* Process
* Status
* Orders

PRESENTATION BY MARVIN HENDERSON
MK-FERGUSON CO.

UMTRA PROJECT HEALTH AND SAFETY PROGRAM

MK-FERGUSON COMPANY
A MORRISON KNUDSEN COMPANY

1989 DOE/STATES/TRIBES UMTRA PROJECT COORDINATION MEETING OCTOBER 25-27, 1989

MK-FERGUSON COMPANY

SAFETY AND HEALTH PROGRAM

PRESENTED BY:

MARVIN W. HENDERSON

OCTOBER 25, 1989

H-S1.GAL

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MK-FERGUSON COMPANY
A MORRISON KNUDSEN COMPANY

AGENDA

I. CONSTRUCTION ENVIRONMENT, SAFETY AND HEALTH MANAGEMENT PROGRAM

II. PROJECT TRAINING MATRIX

III. PROJECT INDUSTRIAL HYGIENE PROGRAM

IV. PROJECT TRUCK MATERIAL HAULING SAFETY

V. PROJECT AUDITS AND APPRAISALS

VI. PROJECT MANHOUR AND INJURY ANALYSIS

VII. PROJECT TRUCK MILES AND EQUIPMENT HOURS

H-S2.GAL

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MK-FERGUSON COMPANY
A MORRISON KNUDSEN COMPANY

UMTRA PROJECT
CONSTRUCTION ENVIRONMENT, SAFETY & HEALTH

- CORPORATE ACCIDENT PREVENTION POLICY

- PROJECT CONSTRUCTION ENVIRONMENT SAFETY & HEALTH MANAGEMENT PROGRAM

- ALL MANAGEMENT & SUPERVISORY PERSONNEL ARE RESPONSIBLE FOR IMPLEMENTING THE PROGRAM

H-S3.GAL

MK-FERGUSON COMPANY
A MORRISON KNUDSEN COMPANY

- SITE ENVIRONMENTAL TECHNICIAN AND SAFETY REPRESENTATIVE
  - SITE SAFETY & HEALTH INSPECTIONS
  - FOLLOW-UP CORRECTIVE ACTION
  - WEEKLY SAFETY MEETINGS (TOOL BOX)
  - WEEKLY REPORT TO THE CONSTRUCTION SAFETY & HEALTH MANAGER

H-S4.GAL

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MK-FERGUSON COMPANY
A MORRISON KNUDSEN COMPANY

- SIGNIFICANT PROGRAM INCLUSIONS
  - LOCAL, STATE & FEDERAL RULES, REGULATIONS & STANDARDS
  - FIRE PREVENTION AND PROTECTION
  - FIRST AID AND MEDICAL PROGRAM, INCLUDING FIRST AID KITS AND TRAINED PERSONNEL WITH LOCAL MEDICAL AND AMBULANCE SERVICES COORDINATION
  - INDUSTRIAL HYGIENE PROGRAM WITH MONITORING OF DUST, NOISE, HEAT STRESS, CONFINED SPACE ENTRY, AND OTHER POTENTIAL HEALTH HAZARDS
  - SPECIAL CONDITIONS

H-SS.GAL

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MK-FERGUSON COMPANY
A MORRISON KNUDSEN COMPANY

- SAFETY & HEALTH TRAINING
  - CONSTRUCTION SAFETY & HEALTH INITIAL INDOCTRINATION AND TRAINING
  - WEEKLY TOOL BOX MEETINGS
  - RESPIRATOR PROGRAM
  - FIRE EXTINGUISHERS
  - RAD WORKER
  - EMERGENCY PREPAREDNESS
  - HAZARDOUS MATERIALS
- SECURITY
- RECORDS
- AUDITS

H-S6.GAL

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MK-FERGUSON COMPANY
A MORRISON KNUDSEN COMPANY

UMTRA PROJECT TRAINING MATRIX

LOCATION	INITIAL INDOCT/RAD	RESPIRATOR	WKLY TOOL BOX MTGS	ANNUAL MGMT	UMTRA CAP	TRUCK & EQPT. SAFETY	INITIAL QC	QC CERT.	RESP. PROTECTION MGMT	NOISH P.F.T.	FIELD I.H. (ONGOING)	I.H. PROGRAM	ES&H WORKSHOP	ENVIRON COUNCIL	OSHA 40-HOUR	HAZ COM
MK FIELD	*	*	*	*	*	*	*		*		*					*
S/C SUPER	*	*	*			*	*									*
S/C EMP	*	*	*			*										*
I.H. EMP	*	*	*							*	*	*				*
CNSI EMP	*	*	*													*
ABQ/E&HS				*	*	*							*	*	*	*
AMB	*	*	*			*		*								*
DUR	*	*	*			*		*								*
FCT	*	*	*			*		*								*
GRJ	*	*	*			*		*								*
GRN	*	*	*			*		*								*
LKV	*	*	*			*		*								*
HAT/MON	*	*	*			*		*								*
RIF	*	*	*			*		*								*
RVT	*	*	*			*		*								*
SPK	*	*	*			*		*								*
TUB	*	*	*			*		*								*
MK-ES	*	*	*			*		*								*

H-S19.GAL

MK-FERGUSON COMPANY
A MORRISON KNUDSEN COMPANY

UMTRA PROJECT
INDUSTRIAL HYGIENE PROGRAM

* SITE CHARACTERIZATION

  o IDENTIFICATION OF HAZARDOUS MATERIALS

    - SAMPLING OF MATERIALS ON SITE

    - LABORATORY ANALYSIS OF MATERIALS

    - DEVELOP PROCEDURES FOR COMPLIANCE WITH LOCAL, STATE, AND FEDERAL REGULATIONS, AND OBTAINING OF PERMITS

H-S7.GAL

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MK-FERGUSON COMPANY
A MORRISON KNUDSEN COMPANY

UMTRA PROJECT
INDUSTRIAL HYGIENE PROGRAM

* TRAINING

  - TRAINING OF SITE PERSONNEL IN INDUSTRIAL HYGIENE TERMINOLOGY AND CALCULATIONS

  - USE OF INDUSTRIAL HYGIENE EQUPMENT WHICH IS PROVIDED ON EACH SITE

  - REPORTING REQUIREMENTS FOR FEDERAL, STATE AND LOCAL AGENCIES

  - RECORDKEEPING REQUIREMENTS FOR AUDIT PURPOSES OR EMPLOYEE "RIGHT-TO-KNOW"

H-38.GAL

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MK-FERGUSON COMPANY
A MORRISON KNUDSEN COMPANY

UMTRA PROJECT
INDUSTRIAL HYGIENE PROGRAM

* OCCUPATIONAL HEALTH HAZARDS
  - NOISE
  - IONIZING RADIATION
  - NON-IONIZING RADIATION
  - TEMPERATURE (HEAT & COLD STRESS)
  - SILICA DUST (PRESENT ON ALL SITES)
  - CHEMICALS
  - ASBESTOS

H-S9.GAL

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MK-FERGUSON COMPANY
A MORRISON KNUDSEN COMPANY

UMTRA PROJECT
INDUSTRIAL HYGIENE PROGRAM

* OCCUPATIONAL HEALTH PROGRAMS

  - HEARING CONSERVATION
  - RESPIRATORY PROTECTION
  - HAZARD COMMUNICATION
  - AIR CONTAMINANTS

H-S10.GAL

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MK-FERGUSON COMPANY
A MORRISON KNUDSEN COMPANY

UMTRA PROJECT
INDUSTRIAL HYGIENE PROGRAM

* PREVENTION OF ILLNESS/INJURY

  - o SAMPLING TO DETERMINE EXPOSURES

  - o DEVELOP CONTROLS
    - VENTILATION
    - WATERING FOR DUST CONTROL
    - PERSONAL PROTECTION EQUIPMENT

  - o EMPLOYEE TRAINING

H-S11.GAL

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MK-FERGUSON COMPANY
A MORRISON KNUDSEN COMPANY

UMTRA PROJECT
INDUSTRIAL HYGIENE PROGRAM

* PERMITS

  - REVIEW PERMIT APPLICATIONS DEALING WITH FEDERAL, STATE OR LOCAL REQUIREMENTS

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H-S12.GAL

MK-FERGUSON COMPANY
A MORRISON KNUDSEN COMPANY

UMTRA PROJECT
INDUSTRIAL HYGIENE PROGRAM

* SPECIAL CONDITIONS IN CONTRACTS

  - o REVIEW SAFETY, INDUSTRIAL HYGIENE PORTIONS FOR PROPER CONTEXT

  - o ASSURE THAT SITE SPECIFIC CONDITIONS ARE PROPERLY ADDRESSED

H-S13.GAL

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MK-FERGUSON COMPANY
A MORRISON KNUDSEN COMPANY

UMTRA PROJECT MATERIALS HAULING SAFETY

- TRUCK INSPECTION PLAN
  - PURPOSE
  - PARTICIPATION
  - FREQUENCY
  - EXECUTION
  - RESULTS
- FLEET SAFETY COMPLIANCE MANUAL
  - OPERATIONS
  - EQUIPMENT
  - QUALIFICATIONS OF DRIVERS (49 CFR PART 391)

H-S17.GAL

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MK-FERGUSON COMPANY
A MORRISON KNUDSEN COMPANY

UMTRA PROJECT MATERIALS HAULING SAFETY

CONTINUED

- FLEET SAFETY COMPLIANCE MANUAL CONT'D
  - DRIVING OF MOTOR VEHICLES (49 CFR PART 392)
  - PARTS AND ACCESSORIES NECESSARY FOR SAFE OPERATION (49 CFR PART 393)
- DEPARTMENT OF TRANSPORTATION - NORTH AMERICAN UNIFORM OUT-OF-SERVICE CRITERIA

H-S18.GAL

/220/

MK-FERGUSON COMPANY
A MORRISON KNUDSEN COMPANY

UMTRA PROJECT AUDITS AND APPRAISALS

- THERE HAVE BEEN A MULTITUDE OF AUDITS AND APPRAISALS BY SEVERAL ORGANIZATIONS IDENTIFIED AS FOLLOWS:

  - MK CORPORATE HEALTH PHYSICS AND INDUSTRIAL SAFETY
  - MK UMTRA PROJECT SAFETY AND HEALTH MANAGER
  - UMTRA PROJECT DOE AND TAC - ALBUQUERQUE
  - A 6-MEMBER TEAM FROM DOE/WASHINGTON, DC
  - A 4-MEMBER TEAM FROM DOE/ALBUQUERQUE
  - AETNA LIFE & CASUALTY ENGINEERING LOSS CONTROL

H-S14.GAL

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MK-FERGUSON COMPANY
A MORRISON KNUDSEN COMPANY

UMTRA PROJECT AUDITS AND APPRAISALS

- THERE HAVE BEEN A MULTITUDE OF AUDITS AND APPRAISALS BY SEVERAL ORGANIZATIONS IDENTIFIED AS FOLLOWS:
  - MK CORPORATE HEALTH PHYSICS AND INDUSTRIAL SAFETY
  - MK UMTRA PROJECT SAFETY AND HEALTH MANAGER
  - UMTRA PROJECT DOE AND TAC - ALBUQUERQUE
  - A 6-MEMBER TEAM FROM DOE/WASHINGTON, DC
  - A 4-MEMBER TEAM FROM DOE/ALBUQUERQUE
  - AETNA LIFE & CASUALTY ENGINEERING LOSS CONTROL

H-S14.GAL

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MK-FERGUSON COMPANY
A MORRISON KNUDSEN COMPANY

UMTRA PROJECT AUDITS AND APPRAISALS

CONTINUED

- OSHA INDUSTRIAL SAFETY AND INDUSTRIAL HYGIENE
- A STATE EPA INSPECTOR
- A 3-MEMBER TEAM INDEPENDENT REVIEW OF EH&S ACTIVITIES - AUGUST 1 THROUGH 5, 1988
- A 7-MEMBER TEAM FROM DOE/ALBUQUERQUE ENVIRONMENT AND HEALTH DIVISION H&S APPRAISAL - SEPTEMBER 11 THROUGH 22, 1989

H-S15.GAL

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A MORRISON KNUDSEN COMPANY

UMTRA PROJECT MANHOURS AND INJURY ANALYSIS

MANHOURS
APRIL 1983 - SEPTEMBER 1989

1983-1984	1985	1986	1987	1988	TOTAL THROUGH SEPTEMBER 1989
232,545.75	466,725.75	423,080.00	651,940.25	1,182,009.25	856,185.00

GRAND TOTAL
3,812,486.00

OVERALL RECORDABLE CASE INCIDENCE RATE FOR UMTRA - 1.84

NATIONAL SAFETY COUNCIL RATE - 6.5

DOE & CONTRACTOR CONSTRUCTION RATE - 4.7

BUREAU OF LABOR STATISTICS RATE - 8.0

OVERALL LOST TIME CASE INCIDENCE RATE FOR UMTRA - 1.42

NATIONAL SAFETY COUNCIL RATE - 3.4

DOE & CONTRACTOR CONSTRUCTION RATE - 2.15

BUREAU OF LABOR STATISTICS RATE - 6.8

H-S16.GAL

MK-FERGUSON COMPANY
A MORRISON KNUDSEN COMPANY

UMTRA PROJECT TRUCK MILEAGE AND EQUIPMENT HOURS

Truck Mileage Through September 1989:

Total Project Truck Miles	10,415,852*
Public Road Truck Miles	9,796,921

Heavy Equipment (i.e., scrapers, trackhoes, rollers, etc.,) Hours through September 1989:

Total Project Heavy Equipment Hours	1,311,769

*These total project truck miles have resulted in three minor incidents with no injuries sustained.

H-520.GAL

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PRESENTATION BY CHARLES CORMIER
U.S. DEPARTMENT OF ENERGY

UMTRA PROJECT GROUNDWATER ISSUES

GROUNDWATER PROTECTION

HISTORY OF THE EPA GROUNDWATER PROTECTION STANDARDS:

- **EPA PROMULGATED UMTRA STANDARDS (3/83)**
- **COURT ORDERED REMAND OF GROUNDWATER PORTION OF STANDARDS TO EPA (9/85)**
- **EPA REISSUED PROPOSED GROUNDWATER PROTECTION STANDARDS (9/87)**
- **EPA TO ISSUE FINAL GROUNDWATER PROTECTION STANDARDS (?)**

GROUNDWATER PROTECTION

DOE/UMTRA POLICY ON EPA PROPOSED GROUNDWATER PROTECTION STANDARDS:

- **SOURCE - FEBRUARY 1, 1989 - UMTRA PROJECT REPORT ENTITLED " REMEDIAL ACITON PLANNING AND DISPOSAL CELL DESIGN"**

- **POLICY STATEMENT: "DURING THE PERIOD PRIOR TO PROMULGATION OF THE FINAL STANDARDS, THE DOE INTENDS TO COMPLY WITH SUBPART A AND C OF THE PROPOSED STANDARDS AS THEY APPLY TO DISPOSAL SITES AND THE DESIGN AND CONSTRUCTION OF DISPOSAL CELLS. THE PROVISIONS OF SUBPART B AND C, AS THEY APPLY TO GROUNDWATER REMEDIATION WILL BE COMPLIED WITH FOLLOWING ISSUANCE OF THE FINAL STANDARDS"**

UMTRA

GROUNDWATER PROTECTION

TIMETABLE RESTRICTIONS:

- SOURCE - URANIUM MILL TAILINGS REMEDIAL ACTION AMENDMENTS ACT OF 1988
- SURFACE REMEDIATION - "THE AUTHORITY OF THE SECRETARY (DOE) TO PERFORM REMEDIAL ACTION UNDER THIS TITLE SHALL TERMINATE ON SEPTEMBER 30, 1994..."
- GROUNDWATER RESTORATION - "... THE AUTHORITY OF THE SECRETARY (DOE) TO PERFORM GROUNDWATER RESTORATION ACTIVITIES UNDER THIS TITLE IS WITHOUT LIMITATION"

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UMTRA

GROUNDWATER PROTECTION

UMTRA GROUNDWATER RESTORATION PROJECT (UGRP):

- **UGRP TO BE PERFORMED UNDER A NEW SEPARATE DOE PROJECT**
- **PROJECT ASSIGNMENT TO THE ALBUQUERQUE OPERATIONS OFFICE**
- **CURRENT BUDGET:**
  - FY 91 - $ 1M
  - FY 92 - $ 4M
  - FY 93 - $10M
  - FY 94 - $28M
  - FY 95 - $35M

UMTRA

PRESENTATION BY JACK RUSSELL
U.S. ENVIRONMENTAL PROTECTION AGENCY

EPA GROUNDWATER PROTECTION STANDARDS FOR THE UMTRA PROJECT

Final Ground-Water Standards for DOE Cleanup and Disposal of Title I Uranium Mill Tailings Sites

(This Is a Response to a Court-Ordered Remand)

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E8917-02

Outline of Briefing

Final Ground Water Standards for Uranium Mill Tailings

I. **Status**

II. **Background Information**
- (a) Tailings
- (b) Legislation (UMTRCA)
- (c) Hazards
- (d) Existing Standards

III. **Results of Litigation**

IV. **Standards**
- (a) Requirements of UMTRCA
- (b) Requirements of RCRA
- (c) The Standards

V. **Final Standards**

E8766-01

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Uranium Tailings

- Sand-Like Wastes from Processing Uranium Ore
- Two Classes of Piles - - Inactive (24) and Active (26)

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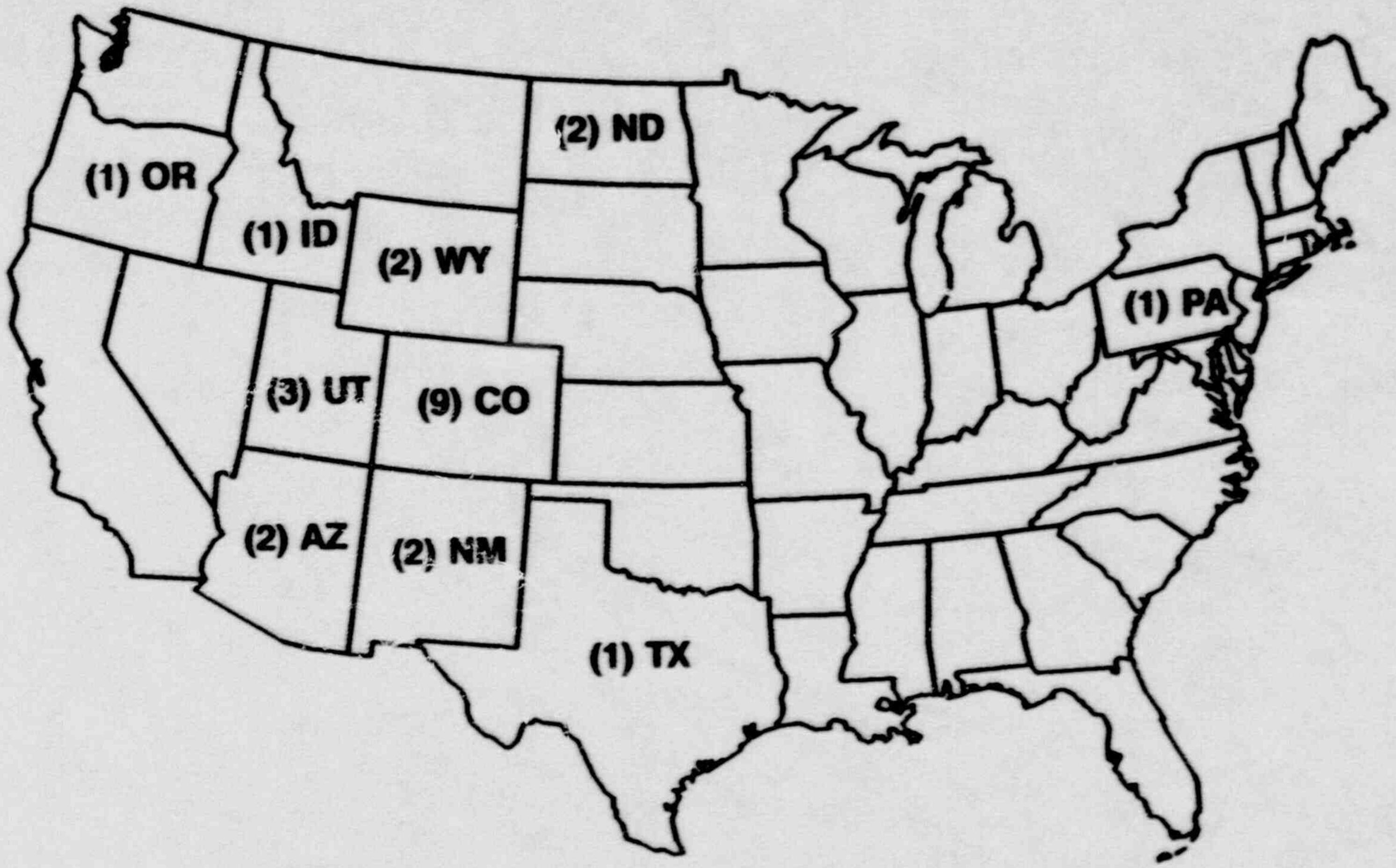
- Tailings Piles are Relatively Large:

    225 Million Tons (25 Inactive, 200 Active)

    5300 Acres (1000 Inactive, 4300 Active)

E8917-03

Location and Number of Inactive Piles by State



E8917-05

1234/

Uranium Mill Tailings Radiation Control Act (UMTRCA)

Title I: Inactive Piles

- EPA Standards
- DOE Cleanup and Disposal
- NRC Oversight, and Licensing After Completion

Title II: Active (Licensed) Piles

- EPA Standards
- Licensee Cleanup and Disposal
- NRC or Agreement State Regulation

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E8766-07

Hazards of Uranium Tailings

- Emissions of Radon to Air
- Gamma Radiation (100 Times Background)
- Indoor Radon, if Misused
- Contamination of Ground Water by Radioactive and Hazardous Constituents

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E8917-08

Existing Standards (40 CFR 192) Require

For Title I (Inactive) Piles:

- Design Disposal for 1000 Years to Limit Radon Emissions, Erosion, and Misuse
- Clean Up Land and Vicinity Sites to Reduce Indoor Radon and Gamma Radiation
- Disposal and Cleanup Must Meet Qualitative Ground-Water Guidance (Remanded)

For Title II (Active) Piles:

- Design Disposal for 1000 Years to Limit Radon Emissions, Erosion, and Misuse
- Clean Up Onsite Areas to Reduce Gamma Radiation
- Disposal and Cleanup Must Meet RCRA Ground-Water Standards

E8917-09

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Litigation

- U.S. Court of Appeals, Tenth Circuit
- Petitioners:
  - American Mining Congress
  - 4 Mining Companies
  - Sierra Club
  - Environmental Defense Fund
  - 3 Others
- The Court Denied All Challenges, Except That on Ground-Water Standards by the Sierra Club and Environmental Defense Fund
- The Supreme Court Denied Certiorari in June 1986

E8917-10

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Litigation
(Continued)

- The Court Held

  "We reject all challenges to the regulations except as discussed in Part VIII above. The following regulation, concerning water contamination, is set aside: 40 C.F.R. 192.20 (a)(2)-(3) (1984). The case is remanded to the Agency for further consideration of that specific provision."

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- And

  "On remand, the EPA will have to treat these toxic chemicals that pose a ground water risk as it did in the active mill site regulations."

UMTRCA Requirements for EPA Standards

- Protect Public Health, Safety, and the Environment
- Cover Radiological and Nonradiological Hazards
- Be Consistent with Requirements of RCRA
- Provide 30-Day Comment Period and Public Hearing
- Consult with NRC and DOE

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E8917-12

Basic Requirements of RCRA are Covered by Including:

- The Hazardous Constituents List in RCRA Rules
- Concentration Limits in RCRA Rules
- A Liner Requirement, if Tailings Contain Water
- Monitoring and Corrective Action if Design Fails

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E8917-13

The Standard Has Three Parts

- Subpart A - Disposal Standards
- Subpart B - Cleanup Standards
- Subpart C - Supplemental Standards

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E8917-14

Subpart A - Disposal Standards for Ground Water

- RCRA List of Hazardous Constituents
- RCRA Concentration Limits (MCLs, Background, or ACLs)
- RCRA Point of Compliance
- 4 Additional Hazardous Constituents and MCLs (Molybdenum, Radium, Uranium, and Nitrate)
- Liner or Equivalent if Tailings Contain Excess Water
- DOE Monitors in Post-Remedial Period to Verify Design Performance
- Corrective Action if Standard Exceeded

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E8917-15

Subpart B - Cleanup Standards for Ground Water

- Cleanup of Ground Water to Levels in Subpart A
- Extension of Remedial Period to Use Natural Flushing Permitted if:
  - No Public Drinking Water Supply Exists or is Projected
  - Institutional Measures Will Effectively Protect Health and Satisfy Other Uses
  - Standards Will Be Met in Less Than 100 Years
- Supplemental Standards Provided Under Subpart C

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E8917-16

Subpart C - Supplemental Standards for Ground Water

Alternative Actions Which Come as Close to Standards "As Reasonable Under the Circumstances," with NRC Concurrence, When Protection of Human Health and the Environment Is Assured and:

- **Harm of Action Clearly Exceeds Benefits,**
- **Restoration is Technically Impracticable from an Engineering Perspective, or**
- **The Ground Water Is Class III**

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Differences Between These Standards and Existing Title II Standards

- Add MCLs for Molybdenum, Uranium, and Nitrate
- Liner Requirement Relaxed for Dry Tailings
- Natural Flushing Under Institutional Control Explicitly Permitted
- Supplemental Standards If:
  - Class III Ground Water
  - Restoration Technically Impracticable from an Engineering Perspective
  - Harm of Action Exceeds Its Benefits

E8917-19

PRESENTATION BY FRANK TITUS
JACOBS ENGINEERING GROUP INC.

STRATEGIES FOR COMPLYING WITH THE EPA
GROUNDWATER PROTECTION STANDARDS

STRATEGIES FOR COMPLYING WITH THE EPA GROUNDWATER PROTECTION STANDARDS

- MEETING MAXIMUM CONCENTRATION LIMITS (MCLs) OR BACKGROUND CONCENTRATIONS AT THE POINT OF COMPLIANCE (POC) BY DEMONSTRATING DILLUTION/DISPERSION (POC nominally = the downgradient margin of the disposal facility)
- MEETING MCLs OR BACKGROUND CONCENTRATIONS AT THE POC BY DEMONSTRATING A TRAVEL TIME OF CONTAMINANTS TO THE POC GREATER THAN 1000 YEARS (200 years nominal)
- SUPPLEMENTAL STANDARDS OR ALTERNATE CONCENTRATION LIMITS (ACLs)
- 100-YEAR WINDOW IN WHICH TO COMPLETE COMPLIANCE IS MANDATED BY A TIME LIMIT ON INSTITUTIONAL CONTROLS

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UMTRA

CONCENTRATION LIMITATIONS MANDATED BY THE GROUNDWATER PROTECTION STANDARDS

- MCLs OR BACKGROUND CONCENTRATIONS, WHICHEVER ARE HIGHER, FOR:

  9 METALS, PLUS NITRATE

  14 ORGANIC COMPOUNDS

  3 RADIOACTIVITY CRITERIA

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- BACKGROUND CONCENTRATIONS FOR THE "LISTED CONSTITUENTS" IN APPENDIX I:

  382 CONSTITUENTS - MOSTLY ORGANIC COMPOUNDS

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COMPLIANCE BY MEETING MCLs/BACKGROUND CONCENTRATIONS AT THE "TOE OF THE PILE"

- MINIMIZING LEACHATE CREATED BY TRANSIENT DRAINAGE
- CONTROLLING STEADY-STATE (LONG-TERM) LEACHATE BY DESIGNING/CONSTRUCTING LOW-PERMEABILITY COVERS
- CONTROLLING CONTAMINANT FLUX BY PROVIDING GEOCHEMICAL BARRIERS
- CONTROLLING CONTAMINANT VELOCITIES TO INCREASE TRAVEL TIME BEYOND 200 TO 1000 YEARS

UMTRA

COMPLIANCE BY OBTAINING FORMAL RELIEF FROM NUMERICAL LIMITATIONS (MCLs/BACKGROUND)

- SUPPLEMENTAL STANDARDS
- ALTERNATE CONCENTRATION LIMITS (ACLs)

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UMTRA

PRESENTATION BY JACK CALDWELL
JACOBS ENGINEERING GROUP INC.

IMPACT OF EPA GROUNDWATER PROTECTION STANDARDS
ON UMTRA PROJECT DESIGNS

DOE/STATES/TRIBES
UMTRA PROJECT COORDINATION MEETING

IMPACT OF EPA STANDARDS
ON UMTRA PROJECT
DESIGNS

BY

JACK CALDWELL
TECHNICAL ASSISTANCE CONTRACTOR
JACOBS ENGINEERING GROUP INC

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OUTLINE OF TALK

- GENERAL APPROACH
- DOCUMENTS OF RECORD
- TOPSLOPE COVER DESIGN
- TOPSLOPE COVER PERFORMANCE
- SIDESLOPE COVER DESIGN
- TAILINGS PLACEMENT
- DATA REDUCTION

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UMTRA

GENERAL APPROACH

EFFECT OF EPA STANDARDS

- CAUSED A REEVALUATION OF DISPOSAL CELL PERFORMANCE
- FORCED A NEW FORMULATION OF DISPOSAL CELL DESIGN APPROACH
- MANDATED DESIGN CHANGES
- PROMPTED RESEARCH ON DISPOSAL CELL COMPONENTS BEHAVIOR
- RESULTED IN REVISED CONSTRUCTION PROCEDURES

UMTRA

GENERAL APPROACH

RESPONSE

- CONTRIBUTIONS TO UMTRA ENGINEERING BY DOE/NRC/TAC/RAC/STATES

- CONTRIBUTIONS RESULT FROM:

  - SPECIAL STUDIES
  - NEW TECHNICAL APPROACHES
  - GENERAL DESIGN IMPROVEMENTS
  - SOLUTION OF SITE-SPECIFIC DEMANDS

- APPROACH HAS BEEN EVOLUTIONARY RATHER THAN REVOLUTIONARY

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DOCUMENTS OF RECORD

- 1988 — SPECIAL STUDY REPORTS

1989

- JANUARY — REMEDIAL ACTION PLANNING & DISPOSAL CELL DESIGN
- MAY — REVISED TECHNICAL APPROACH DOCUMENT
- JUNE — PERFORMANCE ASSESSMENT OF SELECT COVERS
- AUGUST — DESIGN OF EROSION PROTECTION COVERS
- SEPTEMBER — RADON BARRIER EROSION AND BEDDING DRAINAGE CRITERIA

UMTRA

1989 SPECIAL STUDIES

- **HIGH PERCENTAGE BENTONITE AMENDMENT OF INFILTRATION BARRIER**
- **FLUME STUDY TESTING OF BEDDING LAYER PERFORMANCE**
- **LABORATORY TESTING OF CLAYMAX**
- **COVER PERFORMANCE STATISTICAL ASSESSMENT**
- **BIOBARRIER DESIGN AND PERFORMANCE**

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UMTRA

TOPSLOPE COVER DESIGN

- **THE NRC WRITES:**

  THE MOST DISRUPTIVE NATURAL PHENOMENA AFFECTING LONG-TERM STABILIZATION ARE WIND AND WATER EROSION

  A RECLAMATION DESIGN ALSO NEEDS TO ADDRESS OTHER CONSIDERATIONS, SUCH AS GROUNDWATER PROTECTION

  THE COVER DESIGN SHOULD NOT LIMIT CONSIDERATION TO ONLY WIND AND WATER EROSION

  THE DECISION TO USE A PARTICULAR RECLAMATION STRATEGY SHOULD CONSIDER ALL THE POSSIBLE FAILURE MODES WITH RESPECT TO ALL APPLICABLE EPA AND NRC STANDARDS

  A SYSTEMATIC, INTEGRATED ANALYSIS MAY BE REQUIRED TO ADDRESS DESIGN ASPECTS AND FEATURES NECESSARY TO COMPLY WITH APPLICABLE REGULATIONS AND STANDARDS

UMTRA

SOIL COVER STABILITY

TECHNICAL ADVANCE

DEFINITION OF TECHNICAL PROCEDURES TO EVALUATE THE 1,000-YEAR EROSIONAL STABILITY OF A SOIL COVER

TECHNICAL PROCEDURES

- CALCULATE SHEAR STRESS ON SOIL FROM SHEET FLOW OVER COVER
- PROVIDE SOIL WITH ADEQUATE RESISTANCE TO IMPOSED SHEAR STRESS

UMTRA

SOIL COVER STABILITY

BENEFITS OF NEW APPROACH

CLARITY ABOUT ACCEPTABLE TECHNICAL APPROACHES

PRACTICAL IMPLICATIONS

- VERY FLAT TOPSLOPES - LESS THAN 1 PERCENT
- USE GRAVEL MULCH ON TOP OF SOIL GROWTH MEDIUM

UMTRA

BEDDING LAYER PLACEMENT

TECHNICAL CHANGE

REMOVE COMPACTION REQUIREMENT

RATIONALE FOR CHANGE

FLUME STUDIES SHOW THAT RIPRAP ON DENSE SMOOTH SURFACE IS 40% LESS STABLE THAN WELL BEDDING RIPRAP

PRACTICAL ADVANTAGES

- REDUCED COST OF BEDDING PLACEMENT
- INCREASED EROSION RESISTANCE FOR RIPRAP

UMTRA

RADON BARRIER EROSION

TECHNICAL BACKGROUND

- BEDDING PLACED TO PREVENT EROSION OF RADON BARRIER BY FLOW IN BEDDING
- PREVIOUSLY USED CONSERVATIVE FILTER STABILITY CRITERIA TO SIZE BEDDING
- RESULT WAS FINE-GRAINED FILTER THAT IMPEDED WATER SHEDDING AND PROVIDED MOISTURE FOR VEGETATION

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SPECIAL STUDY

FLUME TESTING OF EROSION BARRIER STABILITY

TECHNICAL CHANGE

- USE TRACTIVE FORCE APPROACH TO ASSESS RADON BARRIER SOIL STATILITY
- USE COARSER BEDDING LAYER SOILS

UMTRA

RADON BARRIER EROSION

ADVANTAGES OF NEW APPROACH

- MORE RAPID SHEDDING OF PRECIPITATION FROM PILE COVER
- LESS INFILTRATION TO DISPOSAL CELL
- LESS MOISTURE AVAILABLE TO SUSTAIN VEGETATION
- REDUCED MAINTENANCE REQUIREMENTS

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UMTRA

RADON BARRIER PERMEABILITY

PREVIOUS TECHNICAL APPROACH

TO GET LOW-PERMEABILITY INFILTRATION BARRIER:

- USE SILTY SOILS WITH UP TO 10% BENTONITE
- PLACE A LAYER OF CLAYMAX

SPECIAL STUDY

- TESTED SANDY SOILS WITH UP TO 24% BENTONITE

UMTRA

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RADON BARRIER PERMEABILITY

ADVANTAGES OF APPROACH

- VERY LOW PERMEABILITY, DIMENSIONALLY STABLE MATERIAL TO MEET UMTRA LONGEVITY REQUIREMENTS
- AN ECONOMIC ALTERNATIVE TO CLAYMAX IS AVAILABLE
- SITE PRODUCTION AND PLACEMENT IS POSSIBLE

UMTRA

IMPACT OF EPA STANDARDS

SOME NEGATIVES

- NEUTRON PROBES INTO CELL
- EXTENSIVE INSTRUMENTATION OF RADON BARRIER
- RADON FLUX MEASURING - REMOVAL OF RIPRAP

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UMTRA

IMPACT OF EPA GWS ENGINEERING IMPACTS

- CHOOSE ALTENATE DISPOSAL SITE: SRK
- RELOCATE SITE: GRJ
- FULL COMPONENT COVER: DUR, MAY, SRK, NAT, GUN, GRJ
- CLEAN FILL DIKES: GRJ, GUN, NAT, MAY
- ADDITONAL SITE CHARACTERIZATION: NAT, SRK, MAY, FCT, GRJ, GUN

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UMTRA

IMPACT OF EPA STANDARDS ON UMTRA PROJECT DESIGNS: A YEAR OF TECHNICAL ADVANCES

by

JACK A CALDWELL P.E.
MANAGER, ENGINEERING

TECHNICAL ASSISTANCE CONTRACTOR
JACOBS ENGINEERING GROUP INC.

and

JIM CRAIN
ENGINEER

TECHNICAL ASSISTANCE CONTRACTOR
ROY F. WESTON

DOE/STATES/TRIBES UMTRA PROJECT
COORDINATION MEETING

GRAND CANYON, ARIZONA
OCTOBER 25-27, 1989

1.0 INTRODUCTION

This paper describes the engineering advances made in FY89 in the design and evaluation of the performance of UMTRA Project disposal cells. Most of these advances and changes have come about in response to the proposed EPA groundwater protection standards. Others are the result of a conscious effort to reduce construction costs, to establish a better technical approach, or to make improvements that simply result in a better disposal cell.

The engineering advances this past year have been evolutionary rather than revolutionary. We have built on the past, rather than overturned the past. We have refined designs, found better ways to do things, and added to previously proven concepts.

Contributions to advances in the engineering of UMTRA Project disposal cells have been made by many people, including staff from the DOE, the NRC, the RAC, and the TAC. This paper covers advances made by contributors from all the organizations involved in the UMTRA Project. While one organization may have originated the idea, another documented it, and a third implemented it, we believe that the healthy processes of multi-company and multi-disciplinary interaction, review, and professional effort are the true reasons for the FY89 improvements and advances in UMTRA Project disposal cell engineering discussed in this paper.

2.0 BACKGROUND

The FY89 engineering advances on the UMTRA Project are primarily documented in the following:

- o January 1989 "Remedial Action Planning and Disposal Cell Design" (RAP/DCD) DOE document 400503.
- o May 1989 Revised "Technical Approach Document" (TAD) DOE draft document issued for comment.
- o June 1989 "Performance Assessment of Select Covers and Disposal Cell Compliance with EPA Groundwater Standards" (PAS) DOE document 400657.
- o August 1989 "Design of Erosion Protection Covers for Stabilization of Uranium Mill Tailings Sites" NRC draft document.
- o September 1989 "Radon Barrier Erosion and Bedding Drainage Criteria For UMTRA Sites" Colorado State University draft document.

Other advances are documented in the results of special studies and as-yet unpublished reports. Examples are:

- o Laboratory testing of high-percentage bentonite mixes.
- o Laboratory tests of the performance of CLAYMAX^{R}.
- o Studies of the statistical performance evaluation of cover infiltration.

The engineering advances on the UMTRA Project in FY89 are being incorporated into the conceptual and final designs that have been or are now being completed. One example is the fine work that has been done to understand and analyze the phenomenon of transient drainage of tailings. Another is the conceptual disposal cell layout prepared for the Grand Junction tailings in response to the groundwater conditions encountered at the Cheney disposal site.

3.0 CELL PERFORMANCE

The EPA standards applicable to the design of an UMTRA Project disposal cell have always required that the facility be stable for 1,000 years to the extent reasonably achievable, and at any rate for 200 years. Added to the longevity or stability standard are the recently proposed groundwater protection standards.

The NRC recognizes the potential tension between the stability standards and the groundwater protection standards when they write:

> A reclamation design also needs to address other considerations, such as groundwater protection. The cover design should not limit consideration only to wind and surface water erosion. It is possible that the placement of a cover with a gentle slope could result in an unacceptable rate of water infiltration through the cover.

To deal with this potential conflict of requirements, the NRC suggests a "systematic, integrated analysis" to formulate a "reclamation strategy that considers all the possible failure modes with respect to all applicable EPA and NRC standards."

This need to formulate a systematic and integrated strategy to design and construct disposal cells that comply with applicable standards is at the heart of the work done and the advances made in the engineering of UMTRA Project piles in FY89.

A central theme to presenting and appreciating the engineering advances in the design and construction of UMTRA Project disposal cells is the concept of cell performance. And central to pile performance that complies with applicable standards are the topics of:

- The stability of the pile and the potential for erosion of the cover and its components.
- Seepage through the disposal cell and the impact of that seepage on groundwater quality.
- The amount of water in the tailings when they are placed in the disposal cell and the rate at which they drain thereafter.

Each of these topics is interlinked with the others. In FY89 there have been advances in our engineering understanding and technical design approach in each area. To present these topics in this paper we discuss the ideas under the heading of: topslope cover, sideslope cover, and tailings transient drainage.

4.0 TOPSLOPE COVER DESIGN

4.1 GENERAL

Three different cover designs are proposed in the TAD for possible use on different UMTRA Project disposal cells. The basis for the design of the three different covers is the need to provide a disposal cell cover that provides for "all the possible failure modes with respect to all applicable EPA and NRC standards."

The basis of the design and performance of these three covers is described in the TAD and the RAP/DCD report.

4.2 SOIL COVER STABILITY

The full component cover shown in Figure 4.1 provides for erosional stability by incorporating a gravel mulch, or, if appropriate, a very flat slope and vegetation. The procedures for selecting stable gravel mulches or flat soil slopes with vegetation are described in the TAD and the NRC document "Design of Erosion Protection Covers for Stabilization of Uranium Mill Tailings Sites."

In brief, the procedure adopted to design a stable soil cover is as follows:

- o Calculate the shear stress that water flowing downslope on top of the soil cover will exert on the soil. (This is the classic sheet erosion problem.)
- o Select a soil with sufficient resistance to the tractive force associated with sheet erosion that would otherwise cause erosion.
- o Alternatively or in addition, flatten the cover slope to reduce the shear stresses caused by flowing water.
- o Alternatively or in addition, change the configuration of the topslope to reduce the quantity of water that will flow over a given reach of the topslope.

The significant advance in the new technical approach is the identification of appropriate procedures for calculating the shear stress imposed on the soil by the flowing water, and the identification of the resistance of various soils to flow-induced tractive force.

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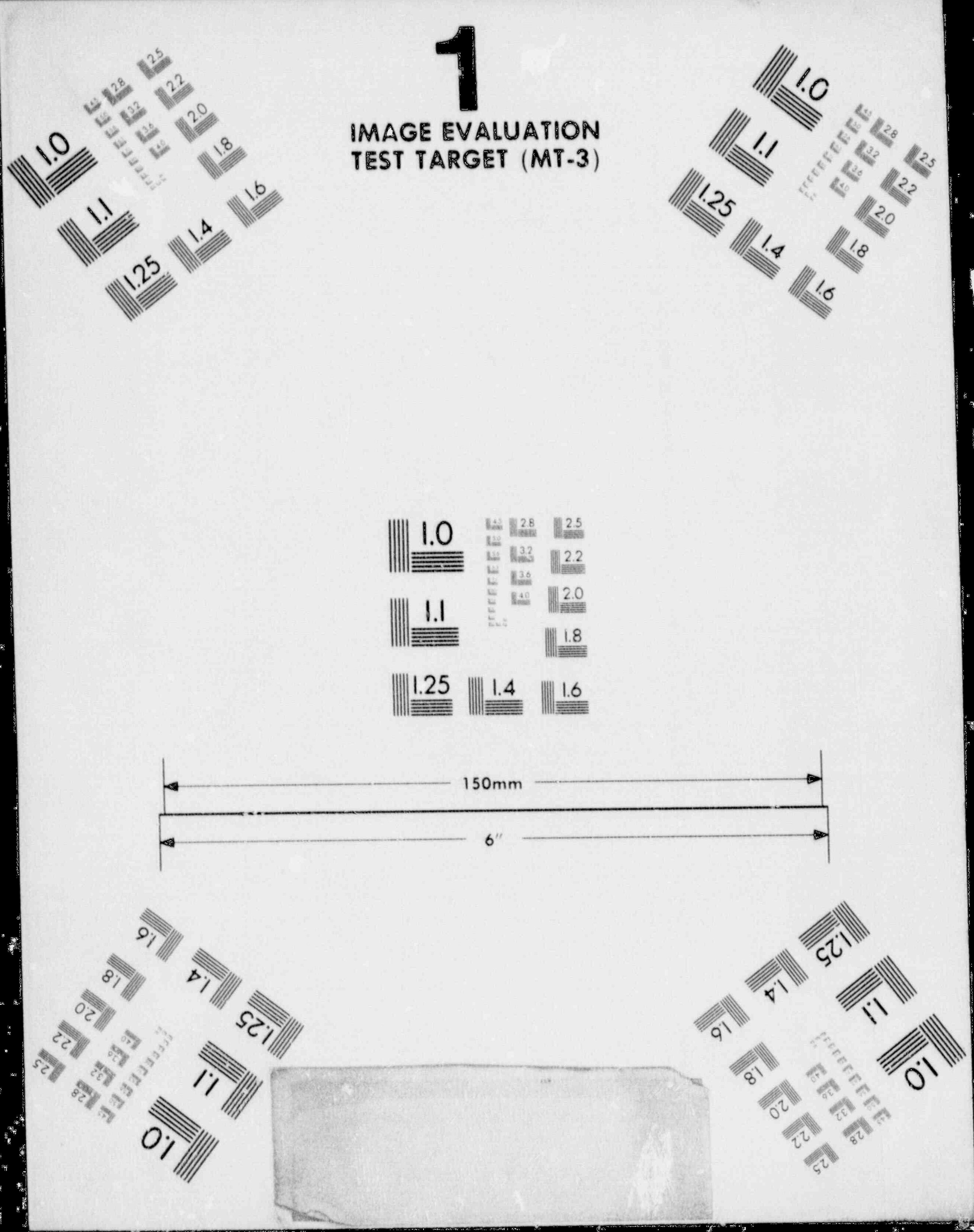
IMAGE EVALUATION TEST TARGET (MT-3)



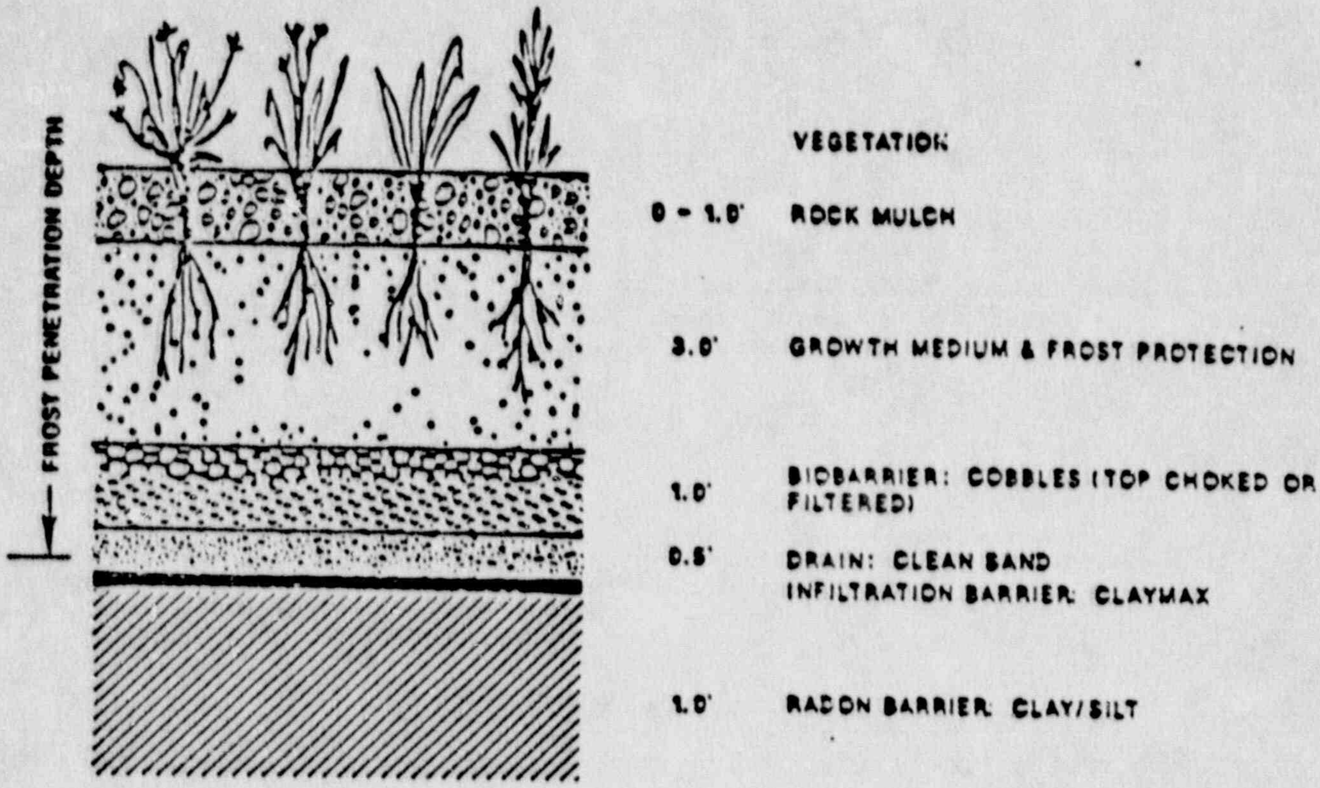


Figure 4.1 "Checklist" top cover

4.3 BEDDING LAYER PLACEMENT

A number of the UMTRA Project remedial action construction specifications for the placement of the bedding or filter layer called for compaction of the bedding by up to four passes of a vibratory compactor. This compaction produces a very dense layer with a smooth surface.

As a matter of common experience, we recognize that less energy is required to move an object down a smooth surface than down a rough surface. If there is no bedding, or the bedding is compacted so that it is unyielding and smooth, less energy is required to cause the riprap layer to fail on top of smooth bedding than is required if the bedding surface is rough or the riprap tends to bed into the filter materials.

This conclusion is supported by the results of flume tests reported by the NRC in "Development of Riprap Design Criteria," NUREG/CR-4651, by Dr. S. Abt of Colorado State University, who reports as follows:

> The 2-inch median stone diameter riprap was tested in the facility on a 20 percent slope with and without a 6-inch filter blanket. The average unit discharge at failure of the 2-inch riprap without a filter was 0.30 cfs/ft. However, when a 6-inch filter blanket was placed beneath the 6-inch layer of 2-inch riprap, the unit discharge at failure increased to 0.50 cfs/ft. Apparently, the presence of the filter increased the resistance to riprap movement by nearly 67 percent.

Accordingly, the requirement for compaction of the bedding layer has been removed from all future specifications. This change was readily concurred in by the NRC. The benefits of this change are:

- o An improvement in disposal cell performance and long-term stability.
- o Potential cost savings because of the elimination of compaction.

Some engineers believe that very tight control on the elevation of the top of the bedding layer will be necessary to substitute for the planar surface that would result from the compaction. They consider that extensive grading of the bedding will be required to eliminate surface irregularities resulting from the placement of the material and the passage over the material of construction equipment. A planar top surface is not, per se, required, although deep ruts that reduce the thickness of the bedding layer to less than a reasonable minimum should indeed be controlled and removed.

4.4 RADON BARRIER EROSION

Water flowing in the bedding layer and on top of the radon barrier could erode the upper surface of the radon barrier. If this were to occur, it could lead to surface deformation of the cover, concentrated flows, and potential cover instability.

The previous UMTRA Project technical approach to preventing erosion of the radon barrier was to select bedding layer material with a gradation that complied with conventional filter criteria. This was a conservative approach. Nevertheless, it was justified because the required materials were readily and economically available, and there were no significant disadvantages to the resulting cover.

The advent of the EPA groundwater protection standards forced us to evaluate all possible details that might reduce infiltration into the topslopes of the cell. The fine-grained bedding soils that resulted from previous criteria slowed shedding of precipitation through the bedding. If a coarser material could be used, the precipitation would be shed more rapidly and less would infiltrate the cover to the tailings; hence groundwater protection would be enhanced.

The UMTRA Project commissioned Dr. S. Abt to carry out flume tests to study the erosion of a radon barrier over coarse bedding layers. His work is described in the report "Radon Barrier Erosion and Bedding Drainage Criteria." Dr. Abt's work confirmed the extreme conservatism of previous design approaches. He established that the mechanism controlling erosion of the radon barrier is the critical tractive force associated with the flow of water in the bedding. Provided the bedding gradation reduces peak interstitial flow velocities to less than the critical flow velocity for the erosional resistance of the radon barrier soil, no adverse radon barrier erosion will occur. The resulting permissible bedding gradation is, in general, much coarser than those resulting from the filter criteria approach.

As can be calculated with standard procedures, and as confirmed by additional testing done by Dr. Abt, precipitation is shed through the coarser bedding at a considerably greater rate than with previous, fine-grained bedding materials.

In general, the cost of coarser bedding material is likely to be the same or only slightly more than the finer material, and in some instances the coarser material may cost less than finer material. Accordingly, without significantly changing the cost of remedial works we can improve pile performance and enhance groundwater protection by changing the bedding gradation.

An additional benefit that results from increasing the bedding gradation and more rapid shedding of water is potentially reduced vegetation establishment and growth on piles with a standard cover. As noted at the Shiprock disposal cell, vigorous vegetation can occur on a cover consisting of a radon barrier, a bedding layer, and rock riprap. One of the reasons such vegetation can germinate and grow is the ready availability of moisture in the fine-grained bedding layer. Using a coarse bedding layer substantially reduces the availability of moisture for vegetation germination and growth.

4.5 INFILTRATION BARRIER PERMEABILITY

The control of infiltration into the disposal cell, and hence enhanced groundwater protection, is best achieved by a low permeability infiltration barrier. The radon barrier most frequently acts also as the infiltration barrier. In addition, a layer of CLAYMAX has been proposed for covers at some sites to limit infiltration further.

The lowest achievable hydraulic conductivity for a compacted soil is about 1E-8 cm/s. A reasonable hydraulic conductivity for most fine-grained compacted soils is about 1E-7 cm/s. A CLAYMAX layer has a rated hydraulic conductivity of 2E-9 cm/s. This is probably as low an hydraulic conductivity as can be achieved with natural materials that will last for the UMTRA Project design life of 1,000 years. The bentonite is the key operative element in the CLAYMAX that results in its low hydraulic conductivity.

CLAYMAX has two potential disadvantages, however:

- o It is a sole-source, proprietary product. If specified for an UMTRA Project cell cover, a monopoly situation could develop, and the cost could increase significantly.
- o The layer of bentonite is thin (about 25 mm). The NRC has expressed concerns about basing a groundwater compliance strategy on the long-term performance of so thin a layer.

In order to deal with these potential disadvantages, we undertook a test program to characterize sandy soils amended with high percentages of bentonite (up to 24 percent bentonite by mass). Conventionally, silts and clays have been amended with up to ten percent bentonite to reduce their hydraulic conductivity. Bentonite-amended silts and clay are, however, often subject to significant volume change with changing moisture content, and they are often very weak, hence giving rise to stability problems. Use of sand as the matrix material reduces volume change potential and the tendency for low strength.

Table 4.1 shows the results of tests on sandy soils amended with high percentages of bentonite. Generally we note that low hydraulic conductivities can be achieved with high percentages of bentonite. Potential site-specific applications of this technology are currently being evaluated.

Table 4.1 High Percent Bentonite Soil Amendment

Soil	Bentonite %	K cm/s	ø
GRAVEL	24	1E-9	19
SAND	16	4E-7	28
SAND	24	3E-9	24
SILT	16	2E-8	16
SILT	24	8E-9	17

5.0 TOPSLOPE COVER PERFORMANCE ASSESSMENTS

5.1 GENERAL

The most important factor controlling the ability of an UMTRA Project disposal cell to comply with the proposed EPA groundwater protection standards is the amount of water that seeps through the cover of the cell. Any water that seeps through the cover ultimately emerges at the base of the cell. In passing through the tailings and other encapsulated materials, the seeping water picks up contaminants. Depending on site-specific conditions, the amount of water and the quantity of contaminants emerging at the base of the disposal cell may lead to contamination of groundwater at the site.

If the cover limits seepage to a very low amount, the volume of water and the quantity of contaminants emerging at the base of the cell may be sufficiently small to cause so minor a change in groundwater quality that it is easy to achieve MCLs, background water quality, or acceptable ACLs.

In order to calculate the change in groundwater quality resulting from water and contaminants seeping from the base of the disposal cell, it is necessary to calculate the rate (or flux) of water flow through the cover. Flow through the cover may be termed "infiltration." Flow from the base of the disposal cell may be termed "seepage." As is discussed in this paper, the infiltration through the cover depends on:

- The properties of the materials of the various layers of the cover.
- The physical phenomena that govern water flow from one layer to the next.
- The climate of the site, and in particular the pattern of precipitation.
- The disposal cell geometry, including the cover slope and length.

We believe that the inherent and numerous variations in the many factors influencing and controlling infiltration make it impractical and maybe impossible to determine analytically a unique value for the infiltration. Instead we believe that the most that can be done is to establish the range of likely infiltration rates that may reasonably be expected to occur in the 1,000 year design life of an UMTRA Project disposal cell.

5.2 PROBABILITY DISTRIBUTIONS FOR COVER PERFORMANCE

Figure 5.1 shows possible histograms of infiltration through a full component cover and the seepage from the base of the disposal cell.

In order to establish curves such as those shown on Figure 5.1 and to formulate the technical approach to site-specific applications of the procedure, we will probably have to define the various probability distributions shown on Figure 5.2.

In defining the probability/cover-flux relationship we will have to keep in mind that the performance of a cover (particularly a full component cover) is complex and the behavior of various layers is interdependent. Thus it is not enough simply to study the flux through only the CLAYMAX (or high-percentage bentonite) without considering the effect of adjacent layers.

We recognize that complete quantification of the probability/cover-flux relationship may be difficult, if not impossible. Nevertheless, we believe we should proceed--if only to elucidate, explain, and clarify the mechanisms and phenomena that control cover flux and the determination, on a site-specific basis, of cover flux and cell seepage.

Two recent studies have examined in detail the workings of aspects of the full component cover. While neither study is a comprehensive evaluation or modeling of the performance of a full component cover, they both contribute to our understanding of the performance of the cover and assist in establishing reasonable bounds for cover fluxes.

5.3 COVER PERFORMANCE EVALUATIONS WITH HELP

The computer code "Hydrological Evaluation of Landfill Performance" (HELP) was developed by the U.S. Army Corps of Engineers. The computer code models the performance of layered cover systems. The code uses a water balance approach to calculate daily, monthly, and annual water budgets of vertical flow through a landfill cover and horizontal flow through the drainage layers in the cover. The model considers the effects of precipitation, evapotranspiration, runoff, percolation, and lateral drainage.

The HELP code was used by the RAC to model the performance of the full component cover, with and without a CLAYMAX layer. A full component cover generally consists of (from the top down) vegetation, random soil, biointrusion gravels, filter sands, CLAYMAX, and clay/silt radon barrier.

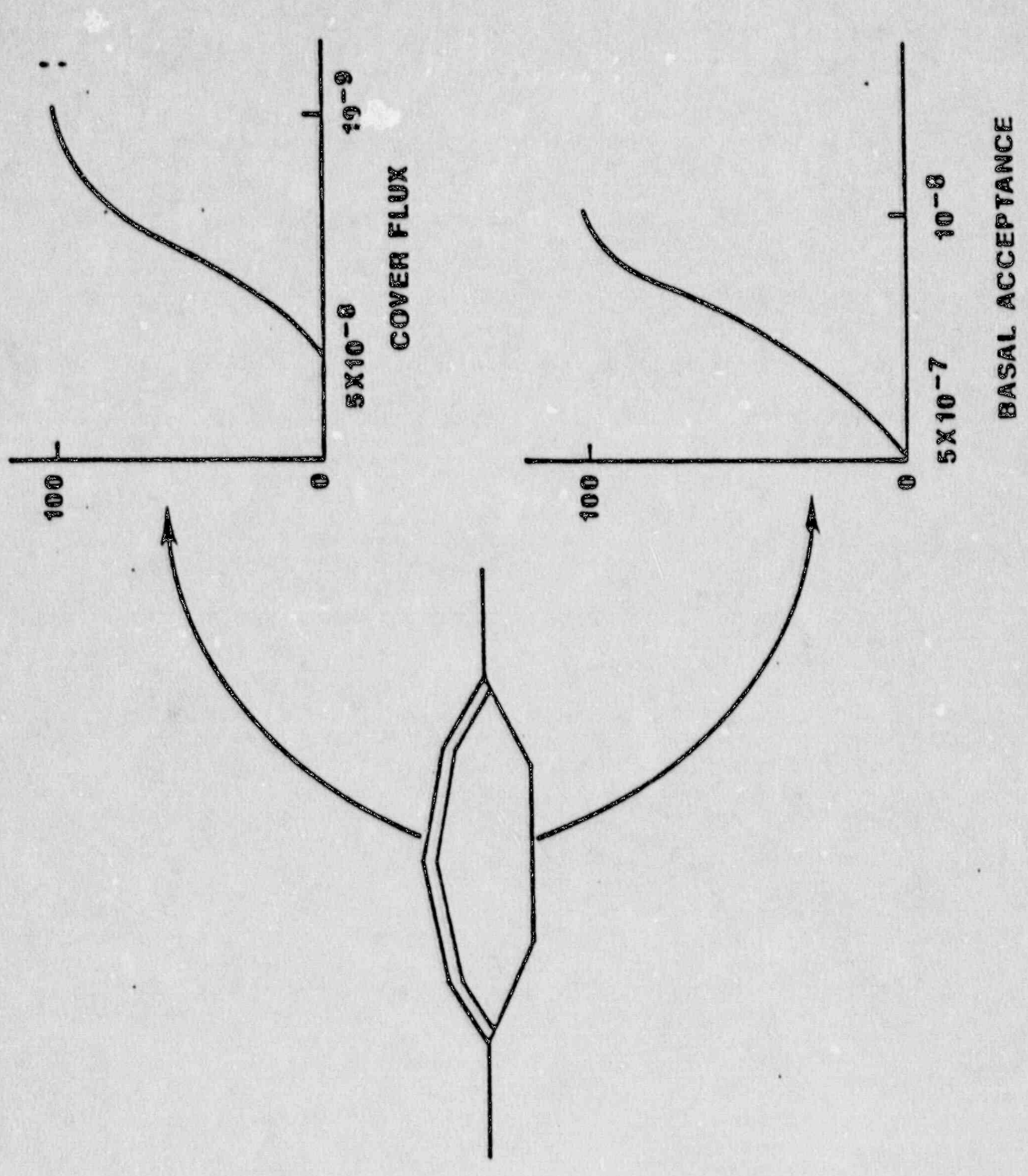


Figure 5.1 Infiltration and seepage histograms

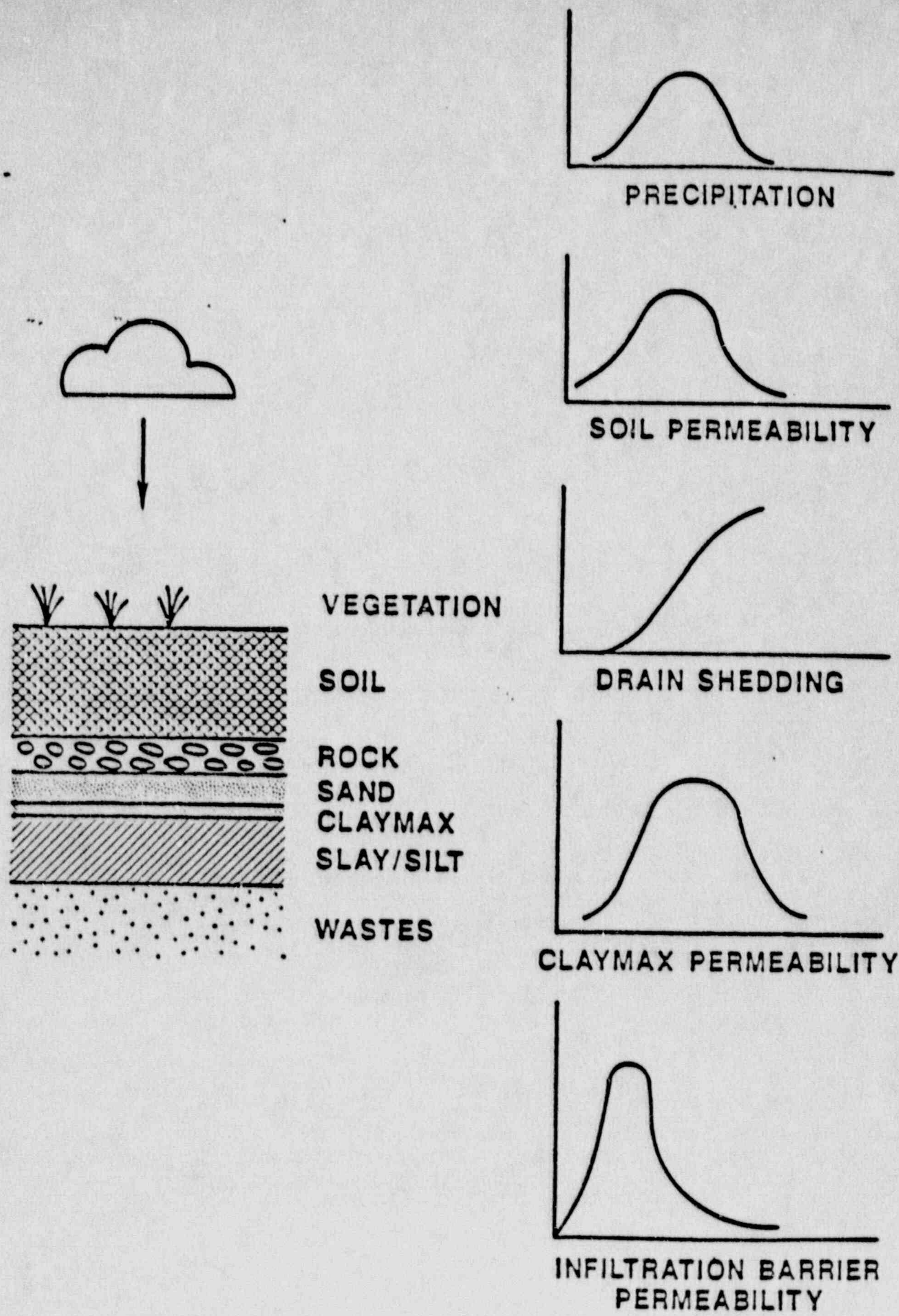


Figure 5.2 Cover Statistical Factors

The HELP computer code calculated the infiltration through the cover for the following main or significantly different conditions as follows:

CONDITION				
CLAYMAX	Vegetation	Soil K (cm)	Precip. (x Avg)	Cover Flux (cm/s)
No	bare soil	E-4	1.0	0.0
No	bare soil	E-4	2.0	3.7E-8
No	Yes	E-4	1.5	2.8E-8
No	Yes	E-4	2.0	3.9E-8
Yes	Yes	E-4	2.0	3.2E-8
No	Yes	E-5	1.5	0.0

The choice of the following parameters or conditions is justified for these reasons:

- o A soil hydraulic conductivity of 1E-4 cm/s. This hydraulic conductivity could well be the operative value even for a clayey/silty soil. The natural processes of freezing and thawing, plant and root growth, and soil development will probably result in an actual flux potential of the assumed value.

- o Consideration of precipitation greater than the average. It is conceivable that extended periods of precipitation greater than the average may occur. Certainly the assumption of a 50 percent increase in average precipitation for a period of 10 to 20 years is not unreasonable.

- o The condition of bare soil. It is conceivable that for some extended period, say up to five years, the vegetation may be inoperative.

- o Consideration of the no CLAYMAX condition. It is probably very conservative to entirely ignore the potentially beneficial impact of CLAYMAX, but the NRC has expressed concerns about the reliability of CLAYMAX and the prudence of basing a groundwater compliance strategy on the efficacy of CLAYMAX.

From the calculations we may conclude:

- o The cover infiltration is very sensitive to the precipitation. Relatively small variations in the assumed annual precipitation seem to have a significant effect in increasing cover infiltration.
- o Realistic variations in precipitation yield potentially troublesome cover infiltration rates.
- o The infiltration rate is sensitive to the assumed hydraulic conductivity of the random soil in which the vegetation grows.
- o A realistic and by no means conservative soil hydraulic conductivity leads to potentially troublesome infiltration rates.
- o The use of CLAYMAX is well warranted as a means of reducing the potentially high infiltration rates that are calculated.
- o Even with CLAYMAX, significant infiltration rates may occur for precipitation that is only double the average.
- o It is probably not possible to establish with complete confidence an absolute single point or unique value for the infiltration rate through a full component cover. Reasonable variations of material properties, climate, and the interaction of the cover layers will always result in a potentially large variation in the calculated cover flux.
- o The lower bound value of cover flux is probably zero. The upper bound cover flux is about 4E-8 cm/s. A median value in the range of 1E-9 cm/s may be reasonable.
- o Any attempt to evaluate the disposal cell performance, and the manner in which it meets EPA groundwater protection standards, must consider a range of reasonable cover fluxes.

5.4 COVER PERFORMANCE EVALUATION WITH UNSAT2

The computer code UNSAT2 was used to examine the range of likely fluxes through a CLAYMAX layer underlain by a radon barrier (Goering, 1989, Personal Communcation). Details of the layers modeled are:

- o A CLAYMAX layer, with saturated hydraulic conductivity of 2E-9 cm/s, over a 600 mm radon barrier with an hydraulic conductivity of 1E-7 cm/s.

- Upper boundary conditions ranging from zero water pressure to 500 cm suction. Suction could occur as a result of evaporation from the layers above the CLAYMAX (that are not incorporated into the model).

- Lower boundary conditions ranging from 100 to 1,750 cm suction. Suction could result from partially saturated flow conditions in the tailings.

On the basis of the calculations we may conclude:

- Transient flux through the CLAYMAX and radon barrier could exceed 2xE-9 cm/s, and indeed could be as high as 8E-8 cm/s. Transient conditions occur during the period that the bentonite in the CLAYMAX is unsaturated.

- Steady state flux through the CLAYMAX and radon barrier will approach 2E-9cm/s, the saturated hydraulic conductivity of the CLAYMAX.

While these calculations do not directly simulate an actual UMTRA Project cover, they are nevertheless a valuable contribution to our understanding of one of the many mechanisms that leads to the uncertainty of cover flux rates. The results reinforce the prudence of considering a range of cover fluxes, as described in the document "Performance Assessment of Selected Covers and Disposal Cell Compliance with EPA Groundwater Standards" (DOE, 1989).

6.0 SIDESLOPE COVER DESIGN AND PERFORMANCE EVALUATIONS

6.1 THE SACRIFICIAL SLOPE CONCEPT

Figure 6.1 is reproduced from the draft NRC staff technical position paper "Design of Erosion Protection Covers." The basic idea illustrated by this figure is that if a clean fill dike is constructed, or, as is the case with many Title II sites, already exists, erosion protection need not be provided on the dike surface. This is certainly one of the most radical new ideas to emerge this past year in the engineering of UMTRA Project disposal cells.

The NRC describes the potential use and design basis for this technical approach thus:

> licensees may be able to demonstrate that it is impractical to provide stability for 1,000 years and may choose to show that stability for less than 1,000 years, but for at least 200 years, is a more cost effective option. Such a design may incorporate embankment "outslopes," where there are no tailings directly under the soil cover....The procedure is based on the assumption that a specific depth of gullying will not be exceeded within the 200 year period.

This design procedure has been adopted at the Title II Conquista site in Texas, where the sideslope will be constructed at five horizontal to one vertical, and vegetation will be established on the soil.

Not all engineers accept this approach. One comment proceeds as follows (Rager, 1989, Personal Communication):

> The methodology...is of questionable technical value when considered in the light of even the 200 year minimum criterion. The database is too limited to allow such extrapolations. There is no basis to conclude that this method will provide "reasonable assurance of tailings stability for at least 200 years." Therefore, it must be concluded that the method involves unsound practices and should not be used.

Without a compelling cost problem, this approach is, accordingly, unlikely to be used on the UMTRA Project.

6.2 SIDESLOPE COVER PERFORMANCE USING HELP

A parametric study of infiltration through a double drain cover placed on the sideslopes of a disposal cell has been completed by the RAC (1989). We recognize the many potential limitations associated with using the HELP computer code to calculate infiltration through a

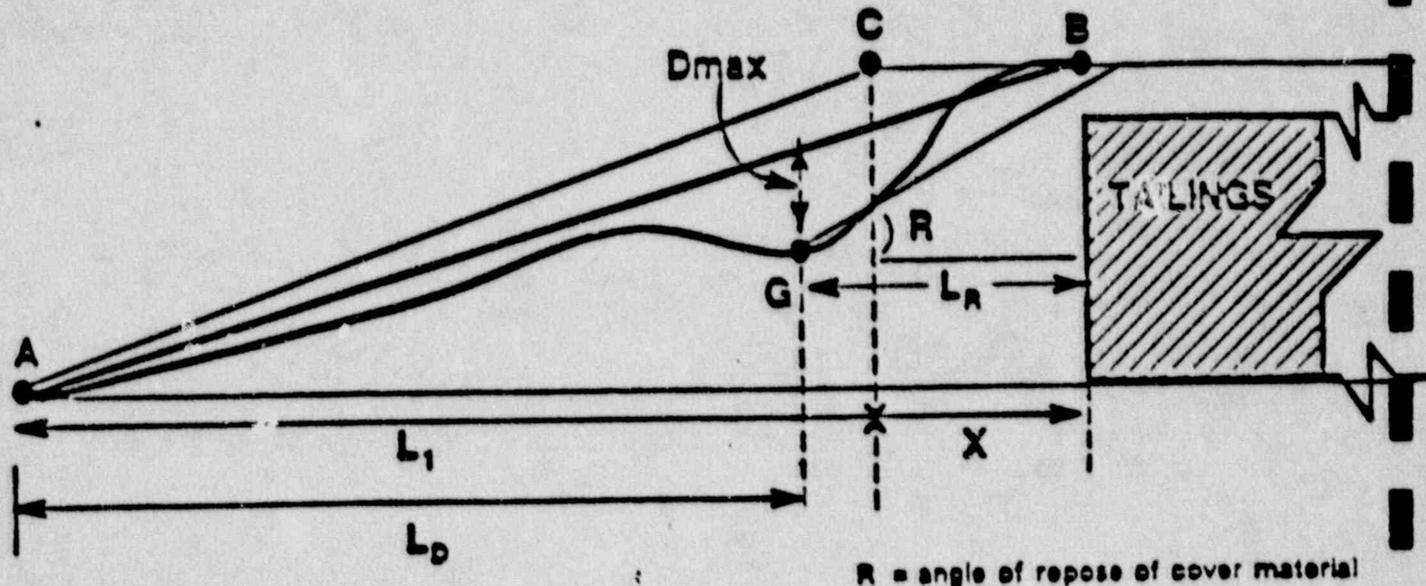


Figure 6.1 Procedure for Determining Sacrificial Slope Requirements and Setback Distance, No Drainage Area Above Point C

cover, the upper layer of which is a rock riprap layer 12 inches thick. Nevertheless, the results of the computer parametric studies are interesting and instructive in elucidating the range of possible performance responses of a multicomponent cover.

The sideslope cover analyzed consisted of (from the top down) erosion protection (riprap), drain (sand), random soil (clay/silt), drain (sand), and radon barrier (clay/silt). A cover similar to this has been proposed for the Durango, Colorado, pile. The assumed hydraulic conductivities are as follows: radon barrier, 4E-8 cm/s; random soil, 1E-6 cm/s; and drain layer, 1.0 cm/s. The slope of the cover is twenty percent and the rainfall was assumed to be similar to that likely in western Colorado.

In order to model evaporation from the surface of the rock riprap, a range of evaporation depths was considered. Changing the evaporation depth from 1 inch to 18 inches decreases infiltration from 2.3E-8 cm/s to 5.2E-9 cm/s. There is no definitive procedure for establishing an operative evaporation depth at a given site; at this stage an evaporation depth of 1 inch is a rationally conservative number.

Assuming an 18-inch evaporation depth and varying the hydraulic conductivity of the radon barrier (from 1E-8 to 4E-8 cm/s) and the riprap layer (from 1 to 10 cm/s) yielded infiltration that varied from 1.3E-9 to 1.3E-8 cm/s.

These results once again illustrate the point that reasonable variations in material properties and possible physical responses of disposal cell covers can result in variations in infiltration of at least an order of magnitude.

7.0 DISPOSAL CELL CONTENTS

7.1 TRANSIENT DRAINAGE

We must be careful to distinguish between the flux through the cover and the seepage rate from beneath the disposal cell. It is tempting to think of them as being equal. In the long run for steady state conditions this may be so, but either or both of the following factors may cause the two to be unequal:

- o Transient drainage from the tailings as a result of in situ or placement moisture content.

- o Changes in the moisture content of the radon barrier or immediately underlying tailings.

7.2 DEFINITION OF TRANSIENT DRAINAGE

Transient drainage is a term used to describe seepage that is not constant over time. It is expected that after an UMTRA Project pile is completed and its cover system is in place, the moisture content of the tailings will reach equilibrium. Thereafter, infiltration through contaminated material will occur under steady state conditions. The transient drainage, however, is of immediate concern because its Darcian velocity (flow rate) can be several orders of magnitude greater than the eventual steady state flux. In addition, the transient flux can occur over a period of many years.

7.3 OCCURRENCE OF TRANSIENT DRAINAGE

Transient drainage can occur when the tailings are placed at moisture conditions wetter than their specific retention. The tailings may be saturated or only partially saturated prior to consolidation and compaction. In addition, the moisture content of the tailings may be raised by water added during construction. For example, precipitation, snowmelt, and water used to control dust can infiltrate into the uncompleted pile and create a moisture content greater than the specific retention, hence resulting in transient flux. To calculate this non-steady state flux, the UMTRA Project engineering staff began using computer models to simulate water movement through the tailings during the construction period and after pile completion.

7.4 MODEL SELECTION

Because most UMTRA Project sites are in arid or semiarid climate zones, the saturated flux (Darcian flux) may not accurately represent water movement through tailings. Hence, the engineering staff recommended using variable saturated flow models at UMTRA Project sites. These models contain algorithms that simulate flow for saturated to unsaturated soil conditions. Although there are many such models currently available, UNSAT2 was selected for use on the project for the following reasons: (1) the code has been benchmarked by several studies; (2) data are available for the program's input parameter; (3) a large number of model boundary conditions are available to the user; and (4) the restart features of the model allow changing boundary conditions at different time intervals.

7.5 ONE-DIMENSIONAL SIMULATION

The UNSAT2 code was initially used to simulate water movement through a vertical column of tailings. The program was run in this one-dimensional mode for analysis of transient drainage at three UMTRA Project sites.

At the Gunnison, Colorado, site, UNSAT2 predicted the magnitude of the transient flux and the time to reach steady state conditions. The values calculated by the UNSAT2 algorithms were then used as input to the Konikow and Bredehoeft contaminant transport model.

The engineering staff determined that UNSAT2 was also applicable for predicting the effect drying the tailings has on transient drainage. It was proposed that drying the tailings at the Green River, Utah, site would reduce the transient flux and thereby reduce the migration of hazardous constituents from the pile. The results of numerous UNSAT2 runs suggested that drying the tailings yielded a measurable reduction in the transient flux.

7.6 BENCHMARKING UNSAT2

The water levels in monitor wells at the Falls City, Texas, site (Pile #7) have been recorded for three years. The results of the UNSAT2 simulation were compared with field data. The transient flux generated by UNSAT2 compared favorably with the flux from the field observation of water movement through Pile #7.

7.7 TWO-DIMENSIONAL SIMULATION

In addition to one-dimensional simulation, the model is currently being used to calculate moisture redistribution throughout a full-scale (two-dimensional) cross section of the proposed pile for the Rifle, Colorado, materials (Estes Gulch). The engineering staff has recently developed a mesh-generating program for the purpose of analyzing large-scale cross sections.

7.8 CONCLUSION

Based on a review of the literature, numerous models that simulate flow under variably saturated conditions have been available to engineers for many years. The UMTRA Project engineering staff has used these models to the full extent of its capabilities. We are confident that further comparison of computer runs with field data will justify the confidence in the prior studies. In cases like Falls City, where field data are available and model output compares favorably with known conditions, the UNSAT2 model can be used with confidence. Not all model output can be verified by field data or testing; however, code-generated values provide guidance and will be included as a useful part of the UMTRA Project engineering design process.

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8.0 CONCLUSIONS

In an evolutionary way the design of UMTRA Project disposal cells has advanced in the preceding years. The technical approach to engineering disposal cells has responded to the requirements and constraints of the proposed EPA groundwater standards, cost control, and the logic of advancing knowledge.

This paper has described some of the numerous technical advances made by the many people and organizations associated with the UMTRA Project. These technical advances contribute not only to this project, but are significant in the wider field of geotechnical and civil engineering as it applies to professional remediation and reclamation of all waste disposal facilities.

PRESENTATION BY JERRY THIERS
M-K ENVIRONMENTAL SERVICES INC.

CONSTRUCTION WATER IMPACTS ON COVER DESIGNS

CONSTRUCTION WATER IMPACTS ON DESIGN

BY

G. R. THIERS, J. T. KAM AND P. K. CHEN

DOE/STATES/TRIBES

UMTRA PROJECT COORDINATION MEETING

GRAND CANYON, ARIZONA

OCTOBER 25 - 27, 1989

5025 GEN

4005-GEN-R-01-07419-00

Construction Water Impacts on Design

by

G. R. Thiers, J. T. Kam and P. K. Chen

CONTENTS

I. INTRODUCTION

To introduce the subject of construction water and provide background information regarding this subject, this report begins with the description of recent experiences at the Durango site. The paper goes on to present what was done at this site, what can be done for future sites so that construction water seepage problems won't happen, and what construction and design problems may accompany the solutions. The report ends with a summary and conclusion.

The problem the Durango Site [Slide 1] developed in the fall of 1988 when seeps [Slide 2] appeared at the elevation of the top of the underliner [Slide 3]. The only restrictions that had been specified for the water content of the tailings at Durango had been the typical construction requirements shown in [Slide 4]:

1) Water content maintained as required to achieve specified density.
2) Fill surface graded to drain.
3) No placement in ponded areas.

The water in the tailings before transport to the cell (resulting from being uncovered for over 40 years, plus water sprinkled for dust control at the processing site and water added for compaction and dust control at the disposal site, caused the water content in some locations to greatly exceed the holding moisture content (specific retention) of the tailings. The excess water moved down through the voids between tailings particles until it hit the clay underliner. The liner served the intended purpose of preventing direct flux to the groundwater, but the water in the tailings pores moved laterally over the lip of the underliner [Slide 5]. Once on the ground surface it ran down the rest of the slope, and was collected and treated before being released. The rate of flow never exceeded one gpm, but was of unacceptable quality (high in arsenic and selenium). Therefore something had to be done at Durango. It was also considered prudent to do additional analyses to prevent similar or other seepage problems at future sites.

II. ANALYSIS OF THE PROBLEM - SOLUTION AT DURANGO AND ELSEWHERE

The situation at Durango when the seeps were active is shown in [Slide 5]. The use of water for compaction and dust control was, of course, cut way back, but there was still a need to remove at least some of the water that was already in the cell. First extensive drilling, monitoring, pump testing and analyses were completed. Based on the results of this work a pumping program was designed and implemented [Slide 6]. This removed over 500,000 gallons of water, greatly reducing the area of seepage. A toe drain is being installed to remove the remaining free water by gravity [Slide 7]. Monitoring of water levels within the pile will continue during the remainder of the construction and post construction surveillance periods.

Analyses to see if the problem at Durango could have been predicted and if something needed to be done at other sites to prevent additional troubles were performed as part of the general study of construction water impacts on design. The general situation to be analyzed is shown in [Slide 8]. [The reason only the flat portion of the liner is included is discussed below.] The analysis starts with the tailings and the other materials each having their own water content and pore suction pressure, their own water content-pore suction pressure curve (as water content changes, suction pressure changes), and their own hydraulic conductivity-water content curve (as water content decreases, k decreases, becoming the partially saturated k). [Slide 9]. Depending on the distribution of pore suction pressure and hydraulic conductivity, water will or will not move.

If the water flows downward faster than the clay liner can accept there will be a buildup on top of the liner. However, to meet the groundwater quality standards specified for UMTRA (essentially drinking water standards) it is usually necessary to restrict flow from a given tailings pile to be less than that corresponding to saturation of the liner. [Slide 10]. Thus no head can be allowed to build up on the liner and there is no need to model the fact that the liner rises somewhere to meet the clay cap. The so-called "bathtub effect" cannot be allowed to develop.

A numerical model (for example UNSAT 2) is used to predict the changes in moisture content and suction, and thus the water velocity and flux leaving the tailings and reaching the groundwater. If a given analysis results in a flux exceeding the allowable for a given site it shows that the design must be revised. One possible revision is to restrict the tailings water content to a lower value, resulting in a lower rate of flux to the groundwater. By repeating the analysis one finds the placement water content corresponding to just hitting the allowable flux. [Recent experience at Durango indicates that the soil may actually be unsaturated below the phreatic surface. This possibility may be investigated in the future.]

The results of this procedure for Durango and three other sites are shown in [Slide 11]. Also shown are the actual average placement water contents and the drainage events reported. For the four cases shown the method gives consistent predictions; i. e., the site where placement w_c exceeded the limiting w_c for allowable flux experienced noted seeps, the others did not.

III. Construction and Design Problems

The above analyses seem to indicate that an appropriate method is available for studying the situation at each future site and establishing the permissible placement water content corresponding to the allowable hydraulic flux for that site. An additional problem can develop, however, if the specified water content range is so low that the tailings cannot be compacted to a state which will be firm enough to satisfactorily support the overlying tailings. This includes both prevention of excessive settlement as well as avoidance of landsliding due to inadequate soil compaction. The problem is illustrated in [Slide 12] which shows the density achieved at different moisture contents. In most cases compaction to 90% of the maximum dry density by Standard Proctor is sufficient to avoid excessive settlement or landsliding. Standard Proctor corresponds to compaction accomplished by normal compaction equipment, with a normal number of passes and lift thickness. Coming down the dry side of optimum we see that 90% of maximum density cannot be achieved at water contents below a certain value if we stick to "normal compaction procedures". If that water content is > the allowable it will be necessary to increase the compactive effort, thus getting on Curve 2, which allows getting the required density within the specified allowable w_c range.

Greater compactive effort requires larger equipment, thinner lifts, more passes, or a combination of these approaches. All of these cost money, so the study should show whether increasing the compactive effort in order to compact on the dry side of the limit required to meet groundwater quality standards is practical. Or the study may lead to alternative methods needed to meet standards in a practical manner. This would, in turn, impact the design.

IV. SUMMARY AND CONCLUSION

[Slide 13]. Seeps which developed near the toe of the partially constructed Durango tailings cell were apparently caused by the development of a high water content in the tailings. Water present before transport plus that added for compaction and dust control resulted in this condition. Analyses using numerical modelling agree with the observed result at Durango. Similar analyses were performed for three other sites. For each case the analysis gave the limiting water content which would just result in development of the hydraulic flux corresponding to that meeting the specified groundwater standards. However, restricting the placement water content to values below this limit may require increasing the compactive effort to impractical levels in order to achieve adequate compaction and avoid excessive settlement or slope stability problems. The impacts of meeting ground water requirements by alternative designs can be studied using this procedure. [Slide 14], a photo of the recently completed Lakeview cell, illustrates successful accomplishment of the required construction.

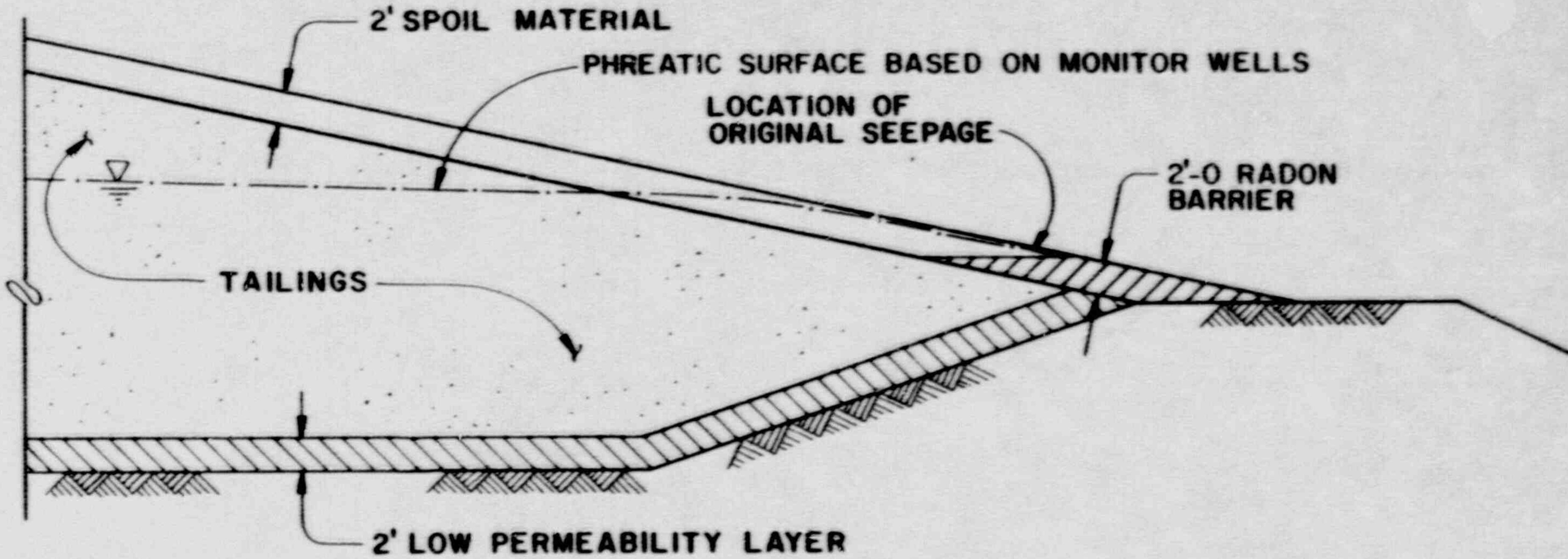
LIST OF SLIDES

OVERVIEW OF SEEP AT DURANGO

CLOSEUP VIEW OF SEEP AT DURANGO

5025.SLIDE

SLIDES 1 and 2



CROSS-SECTION OF SEEP AT DURANGO

SLIDE 3

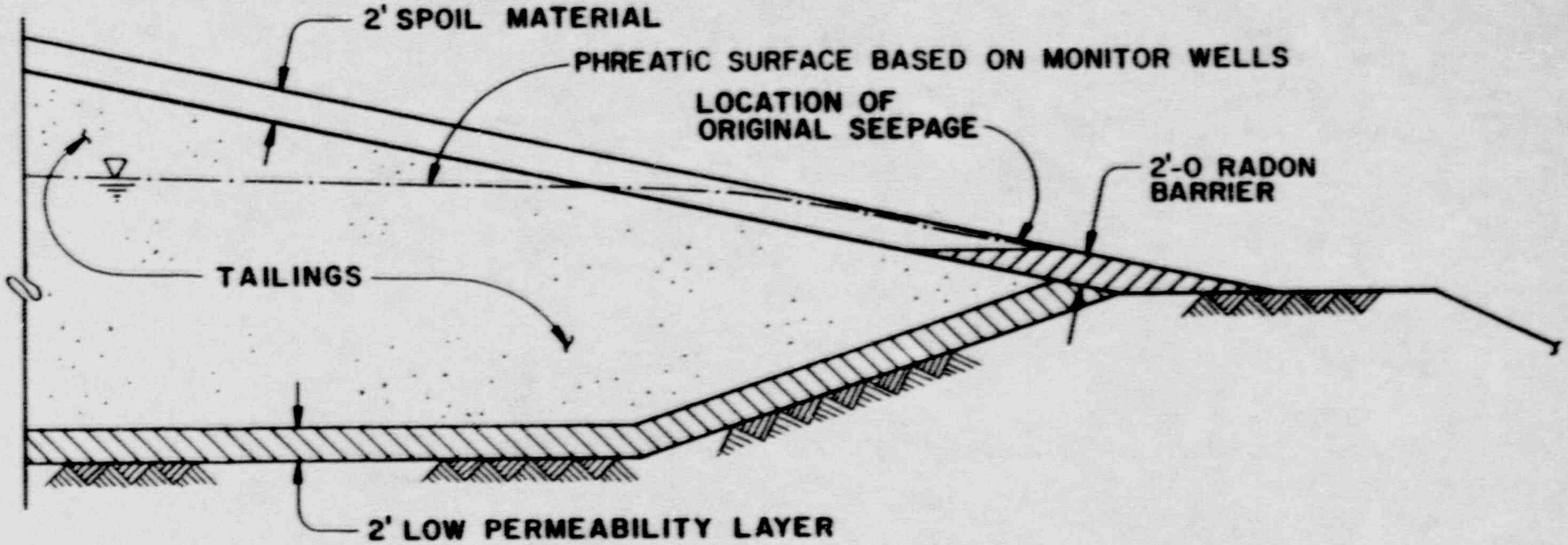
GEN.SLIDES

/302/

RESTRICTIONS ON WATER CONTENT OF TAILINGS AT DURANGO

- Water content maintained as required to achieve specified density.
- Fill surface graded to drain.
- No placement in ponded areas.

/303/



CROSS-SECTION OF SEEP AT DURANGO

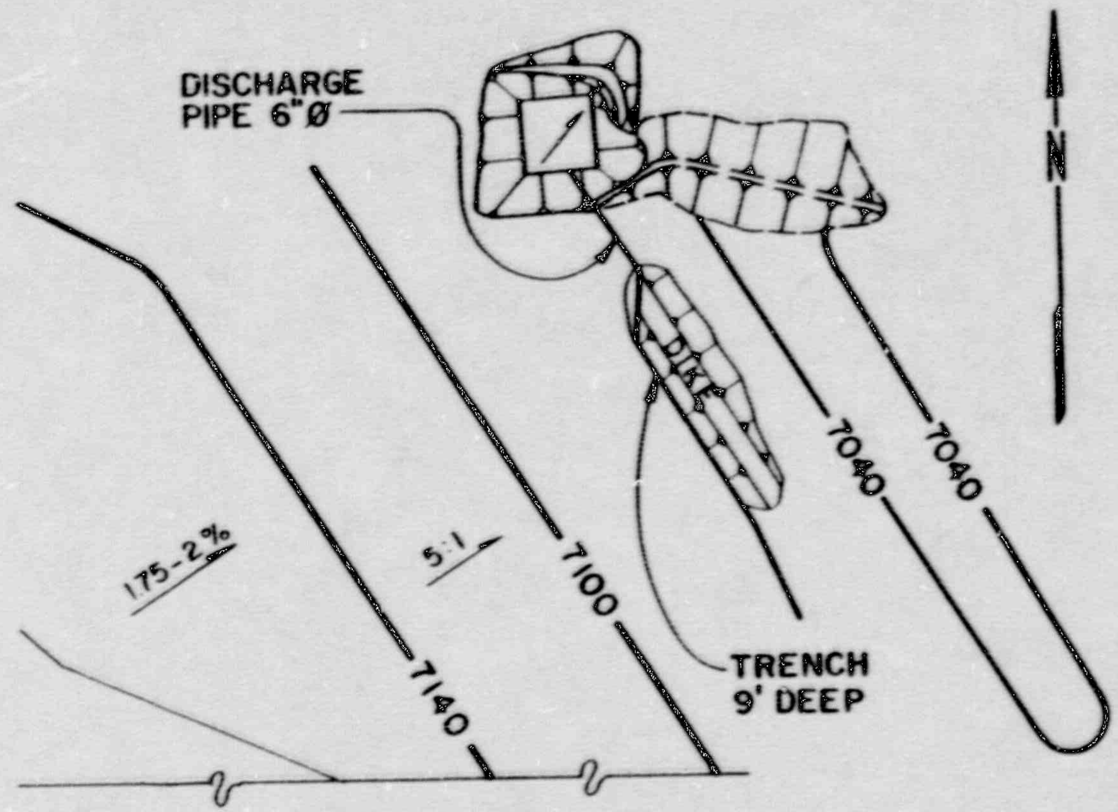
SLIDE 5

/304/

GEN.SLIDES

PUMPING OF WATER FROM TAILINGS AT DURANGO

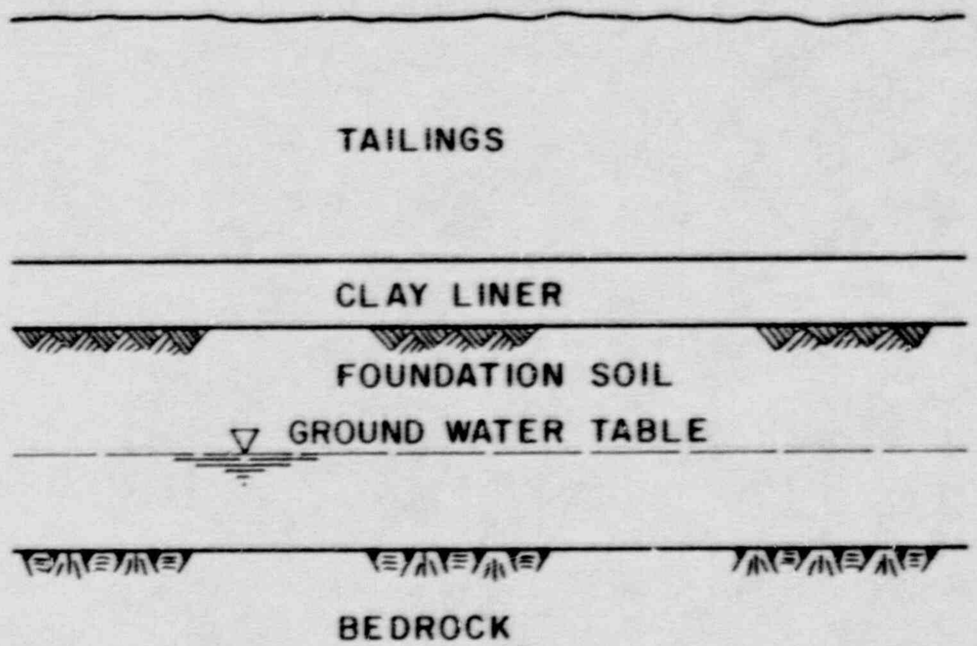
SLIDE 6



TOE DRAIN INSTALLATION AT DURANGO

SLIDE 7

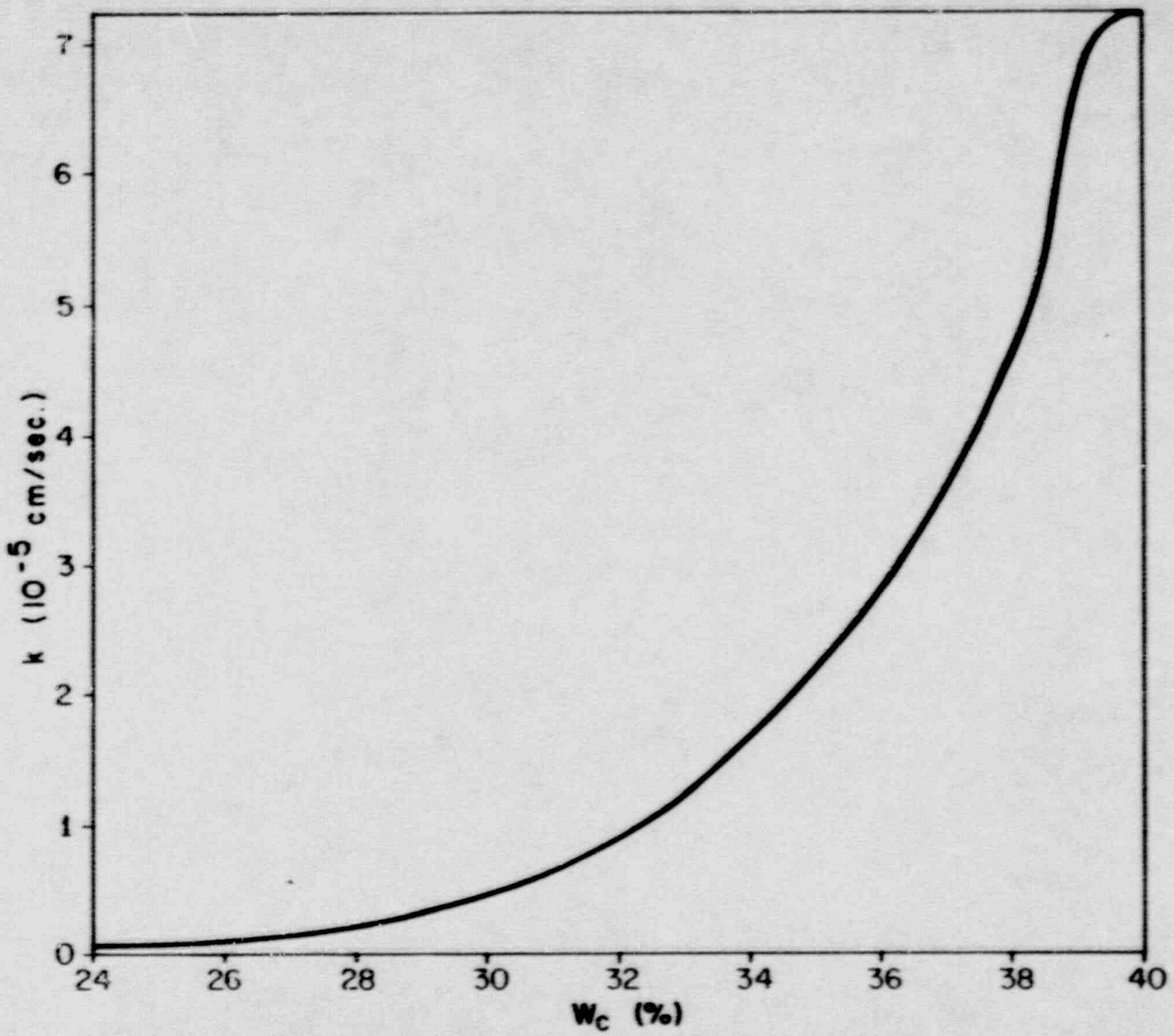
GEN.SLIDES



CONSTRUCTION CONDITION FOR SEEPAGE ANALYSIS

/307/

SLIDE 8



TYPICAL CURVE OF
HYDRAULIC CONDUCTIVITY VS. MOISTURE CONTENT

SLIDE 9

/308/

GEN.SLIDES

ALLOWABLE LEACHATE FLUX VALUES FOR
GREEN RIVER, DURANGO, LAKEVIEW & TUBA CITY DISPOSAL SITES

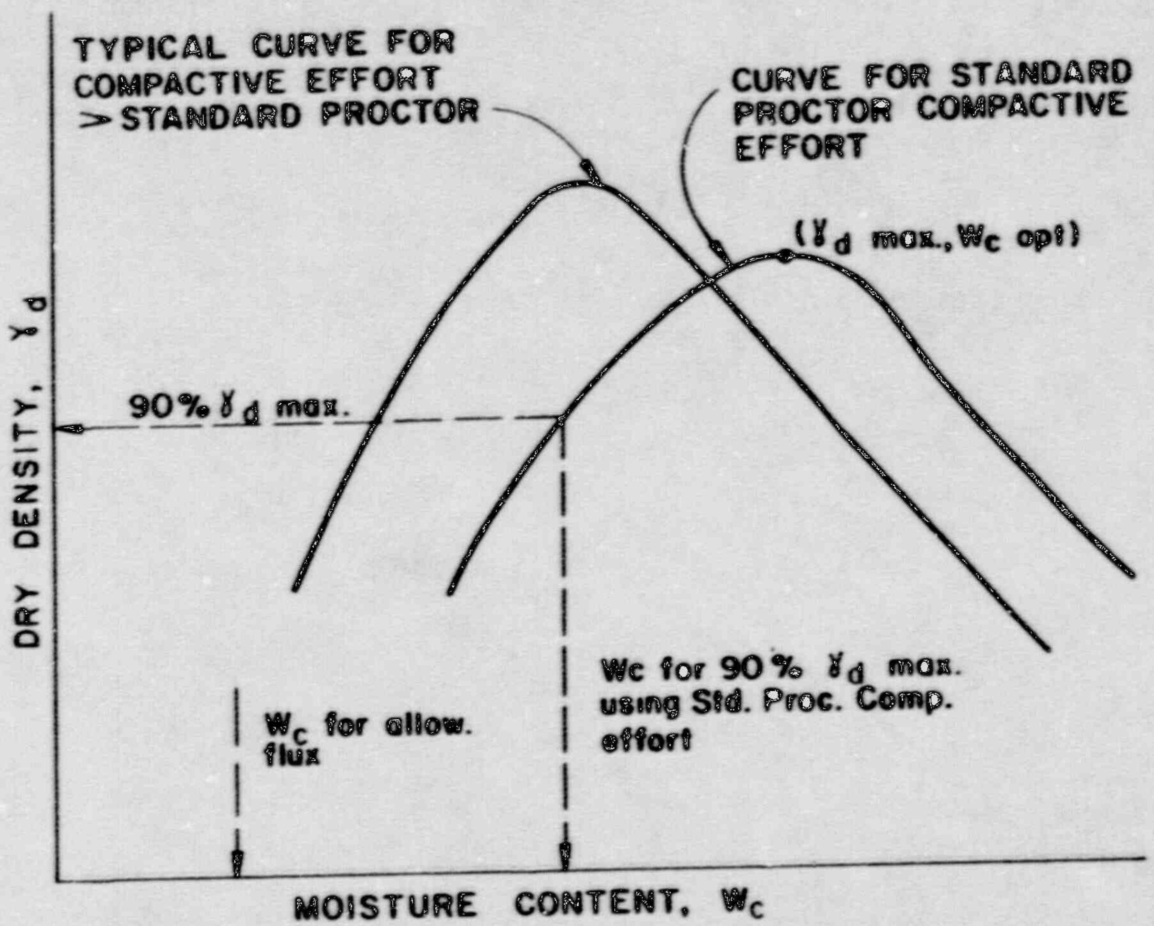
Site	Allowable Steady State Leachate Flux (cm/sec).
GREEN RIVER	1.0×10^{-8}
DURANGO	1.6×10^{-8}
LAKEVIEW	7.0×10^{-8}
TUBA CITY	1.0×10^{-8}

/309/

COMPARISON OF AVERAGE PLACEMENT WATER CONTENTS TO WATER CONTENTS CORRESPONDING TO ALLOWABLE LEACHATE FLUX LIMITS FOR RELOCATED TAILINGS AT GREEN RIVER, DURANGO, LAKEVIEW, & TUBA CITY

Site	Average Placement Water Content (%)	Water Content Corresponding to Allowable Leachate Flux Limit (%)	Drainage Events Reported
GREEN RIVER	7.0	*	NONE
DURANGO	13.2	6.1 to 7.3	SEEP
LAKEVIEW	26.0	> 26	NONE
TUBA CITY	5.3	≥ 13.6	NONE

*Designed to meet travel time criteria.



DRY DENSITY - WATER CONTENT RELATIONSHIPS FOR DURANGO - TYPE SITUATIONS

SLIDE 12

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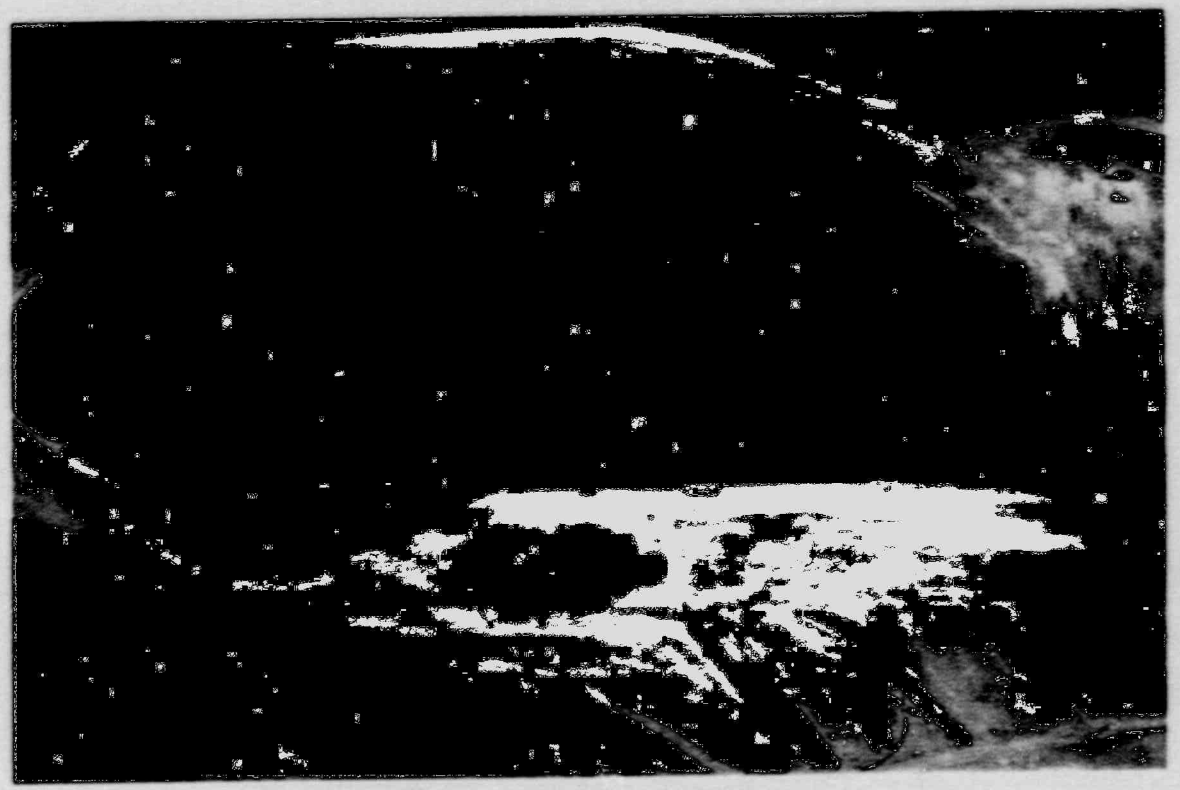
GEN.SLIDES

/312/

SUMMARY OF CONSTRUCTION WATER STUDY

- High water content in Durango tailings → seep at toe.
- Seepage analyses using numerical modeling → maximum allowable water content to avoid groundwater contamination.
- Compacting to 90% at water contents below maximum allowable may be impractical.
- Potential impacts of using water contents slightly above maximum allowable may be evaluated by numerical modeling.



OVERVIEW OF LAKEVIEW CELL

SLIDE 14

GEN.SLIDES

PRESENTATION BY HUGH HEMPHILL
M-K ENVIRONMENTAL SERVICES INC.

MOBILE WASTEWATER TREATMENT PLANT

THE UMTRA MOBILE WASTEWATER TREATMENT PLANT

BY

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DOE/STATES/TRIBES
UMTRA PROJECT
COORDINATION MEETING

GRAND CANYON, ARIZONA
OCTOBER 25-27, 1989

THE UMTRA MOBILE WASTEWATER TREATMENT PLANT

JAMES G. OLDHAM
AND
HUGH G. HEMPILL

THE REMEDIAL ACTION CONTRACTOR IS RESPONSIBLE FOR ASSURING THAT WASTEWATER LEAVING UMTRA SITES BE ACCEPTABLE FOR DISCHARGE INTO NEARBY SURFACE WATERS. DURING THE PROCESS OF EXCAVATION AND TAILINGS STABILIZATION, THERE ARE FIVE PRINCIPAL SOURCES OF CONTAMINATED WASTEWATER TO CONTEND WITH:

- SNOWMELT
- STORMWATER RUNOFF
- EQUIPMENT DECONTAMINATION WATER
- PERSONNEL DECONTAMINATION WATER
- PROCESSING AND DISPOSAL SITE DEWATERING

THE CONSTRUCTION PLAN SPECIFIES THAT MEASURES MUST BE TAKEN TO CONTROL AND CONTAIN THESE WATERS. WASTEWATER IS TO BE COLLECTED AND MAY NOT LEAVE THE SITE UNTIL ITS COMPOSITION HAS BEEN DETERMINED TO BE SATISFACTORY FOR RELEASE. DEFLECTION BERMS ARE CONSTRUCTED TO DIRECT RUNOFF TO LINED COLLECTION DITCHES AND RETENTION BASINS. PERSONNEL AND EQUIPMENT DECONTAMINATION OPERATIONS TAKE PLACE ON CONCRETE PADS THAT DIRECT THE WATER TO CLOSED DRAINAGE SYSTEMS. AS A CONSERVATION MEASURE DECONTAMINATION WATER IS RECIRCULATED TO THE MAXIMUM EXTENT POSSIBLE. BOTH THE QUANTITY AND QUALITY OF WASTEWATERS VARY WIDELY FROM SITE TO SITE. AFTER DEVELOPING OUR BEST ESTIMATE OF BOTH QUANTITY AND QUALITY WE AS DESIGNERS ARE REQUIRED TO DETERMINE THE TYPE AND EXTENT OF TREATMENT REQUIRED.

METEOROLOGICALLY, UMTRA SITES (FIG.1) CAN BE CONVENIENTLY PLACED INTO ONE OF TWO CLASSIFICATIONS - WET OR DRY. WHEN THE WASTEWATER MANAGEMENT PROGRAM IS DEVELOPED FOR A DRY SITE, THAT IS - ONE OF THOSE LOCATED IN A SEMI-ARID AREA, IT IS POSSIBLE THAT THERE WILL BE NO NET ACCUMULATION OF WATER DURING CONSTRUCTION. AT THESE LOCATIONS THE VOLUME OF WATER GENERATED FROM ALL ON SITE SOURCES MAY BE LESS THAN THAT WHICH CAN BE EVAPORATED NATURALLY FROM A PROPERLY DESIGNED RETENTION BASIN. AS A CONSEQUENCE, NO WASTEWATER TREATMENT WILL BE REQUIRED. AT WET SITES AND THOSE WHERE LARGE VOLUMES OF DEWATERING ARE ANTICIPATED, WATER TREATMENT MUST BE CONSIDERED.

RETENTION BASINS ARE DESIGNED SO THAT THEY WILL CONTAIN A 24 HOUR STORM OF AN INTENSITY THAT WILL OCCUR ONCE IN TEN YEARS PLUS THE VOLUME PRODUCED BY THE MAXIMUM INSTANTANEOUS SUM OF RUNOFF AND SEDIMENT THAT IS EXPECTED TO ACCUMULATE OVER THE LIFE OF THE PROJECT. THIS IS A SUPER-SAFE BASIS FOR DESIGN, BUT IT GAVE US MORE THAN A FEW ANXIOUS MOMENTS WHEN, EARLIER THIS YEAR, WE HAD A 125 YEAR STORM COUPLED WITH A PLUGGED CULVERT AT THE OLD RIFLE SITE.

TO DATE THE WASTEWATER QUALITY CONCERNS AT UMTRA SITES HAVE BEEN HEAVY METAL CONTAMINATION, PH ADJUSTMENT, AND THE REMOVAL OF SUSPENDED SEDIMENT. HOWEVER, WITH THE START OF CONSTRUCTION AT

SITES LOCATED ON THE COLORADO RIVER AND SOME OF ITS MAJOR TRIBUTARIES, WE ARE HAVING TO ADDRESS SOME NEW PROBLEMS - THE REDUCTION OF GROSS SALINITY AND DISOLVED AMMONIA. IN ADDITION, AT SOME OF THE SITES THAT WILL BE OPENED IN THE FUTURE WE MAY BE FACED WITH HAVING TO REMOVE ORGANIC CHEMICAL CONTAMINATION.

AT THE AMBROSIA LAKE, SHIPROCK, GREEN RIVER, AND RIVERTON SITES, THE WASTEWATERS WERE COLLECTED IN RETENTION BASINS AND ALLOWED TO EVAPORATE NATURALLY. THE CANNONSBURG, LAKEVIEW, AND SALT LAKE CITY SITES ALL REQUIRED CHEMICAL TREATMENT PLANTS DESIGNED TO CONTROL HEAVY METAL RELEASE. THE SITE AT DURANGO, COLO. INITIALLY REQUIRED ONLY MINIMAL TREATMENT FOR RADIUM AND SEDIMENT REDUCTION. HOWEVER, DURING RECENT STAGES OF CONSTRUCTION IT HAS BECOME NECESSARY TO PERFORM SOME UNEXPECTED DEWATERING. A MOBILE TREATMENT PLANT WAS MADE READY AND PLACED IN OPERATION TO CONTROL HEAVY METALS. AT COLORADO SITES IN GRAND JUNCTION, GUNNISON, AND RIFLE, RELATIVELY EXTENSIVE DEWATERING OPERATIONS ARE ANTICIPATED AND MEASURES TO LIMIT SALINITY WILL PROBABLY BE REQUIRED.

THERE ARE A NUMBER OF OPTIONS AVAILABLE TO DESIGNERS OF INDUSTRIAL WASTEWATER TREATMENT SYSTEMS. AFTER STIPULATING A FEW UMTRA PROJECT SPECIFIC CONSIDERATIONS, THE BEST CHOICE AMONG THESE ALTERNATIVES IS DRIVEN BY TWO THINGS - THE VOLUME OF WATER TO BE TREATED AND THE CONTAMINANTS TO BE REMOVED.

IF LARGE VOLUMES OF WATER ARE TO BE TREATED ON A CONTINUOUS BASIS A FIELD ERECTED OR FIXED PLANT IS THE PROPER CHOICE (FIG.2). IF THE WASTEWATER FLOW IS LOW ENOUGH THAT IT CAN BE ACCUMULATED OVER A REASONABLE PERIOD OF TIME OR IF IT IS ONLY A ONE TIME REQUIREMENT SUCH AS THE CLOSING OF A SITE, THEN A MOBILE PLANT (FIG. 3) IS APPROPRIATE.

THE TECHNOLOGY TO BE EMPLOYED IS A FUNCTION OF THE CONTAMINANTS THAT ARE TO BE REMOVED. IF ORGANIC CHEMICALS ARE THE CAUSE OF CONCERN, THEN, DEPENDING UPON THE PHYSICAL AND CHEMICAL PROPERTIES OF THE CONTAMINANTS, TREATMENT USING ENHANCED OXIDATION, AIR STRIPPING, OR ACTIVATED CARBON WOULD BE SPECIFIED. IF BOTH ANIONS AND CATIONS ARE TO BE REMOVED THE OPTIONS ARE REVERSE OSMOSIS AND ION EXCHANGE. IF ONLY TOXIC METALS ARE TO BE REMOVED SUCH AS IS THE CASE AT MOST OF THE UMTRA SITES, THEN CHEMICAL PRECIPITATION WITH FILTRATION ENTERS INTO THE TECHNOLOGY COMPETITION.

AT WET SITES, THE VOLUME OF WATER TO BE TREATED IS RELATIVELY LARGE, AND USUALLY THE ANION LOADING IS EITHER FAIRLY LOW OR OF MINIMAL CONCERN. AS A CONSEQUENCE, A FIELD ERECTED CHEMICAL PRECIPITATION PLANT WITH HIGH EFFICIENCY FILTRATION IS THE CHOICE.

THE DRY SITES POSE ANOTHER PROBLEM ALTOGETHER. TREATMENT PLANTS FOR THESE SITES ARE REQUIRED FOR ONLY A SHORT PERIOD OF TIME, AND THE PROCESS DEMANDS ARE QUITE VARIED. IT WAS TO SATISFY THESE NEEDS THAT THE CONCEPT OF A MOBILE WASTEWATER TREATMENT PLANT WAS DEVELOPED.

ON THE SURFACE, WHAT IS REQUIRED OF AN UMTRA MOBILE WASTEWATER TREATMENT PLANT IS THAT IT BE:

- EASILY SET UP
- EASILY MADE READY FOR TRANSFER TO ANOTHER SITE
- RELATIVELY COMPACT
- FLEXIBLE FROM A PROCESS STANDPOINT
- CAPABLE OF UNRESTRICTED MOVEMENT ON HIGHWAYS
- FREE-STANDING

THE ANSWER TO THE QUESTION OF WHAT TECHNOLOGY TO USE IN A MOBILE PLANT IS NOT EASILY COME BY. THE CHEMICAL SPECIES TO BE REMOVED ARE MANY AND VARIED. IN VIEW OF THIS, IT WAS DECIDED THAT PRIOR TO COMPLETING THE MOBILE PLANT BID SPECIFICATION, IT WOULD BE APPROPRIATE TO PREPARE AN ORDER OF MAGNITUDE COMPARISON OF THE OBVIOUSLY COMPETITIVE TECHNOLOGIES. IT WAS INTENDED THAT THIS STUDY WOULD EVALUATE THE TECHNOLOGIES FROM BOTH AN ENVIRONMENTAL AND ECONOMIC STANDPOINT.

THE TECHNOLOGIES REVIEWED INCLUDED CHEMICAL PRE-TREATMENT WITH CLARIFICATION, MICROFILTRATION, ULTRAFILTRATION, REVERSE OSMOSIS, AND ION EXCHANGE. EARLY ON, IT BECAME CLEAR THAT THE CHANCES OF A SINGLE TECHNOLOGY SATISFYING ALL OF THE DEMANDS OF THIS APPLICATION WERE RATHER SLIM. BY INSPECTION, IT WAS DETERMINED THAT REVERSE OSMOSIS AND PRECIPITATION WITH MICROFILTRATION WERE THE TECHNOLOGIES AROUND WHICH AN EFFECTIVE SYSTEM COULD BE DESIGNED. THERE ARE A NUMBER OF COMPANIES THAT CAN PROVIDE BOTH OF THESE TECHNOLOGIES, SO IT WAS FELT THAT A GOOD COMPETITIVE SITUATION WOULD EXIST WHEN IT CAME TIME TO PURCHASE THE SYSTEM. THERE ARE THREE SUBSETS OF THE MICROFILTRATION PROCESS WHICH REQUIRED EXAMINATION:

- REPLACEABLE CARTRIDGE
- HOLLOW FIBER
- POROUS MEMBRANE

REPLACEABLE CARTRIDGE FILTER ELEMENTS CANNOT READILY BE CLEANED AND THEY ARE NORMALLY DISCARDED WHEN THEY BECOME FOULED. WHILE THEY ARE CAPABLE OF REMOVING EXTREMELY SMALL PARTICLES, THEIR CAPACITY IS LIMITED AND THEY ARE EXPENSIVE TO REPLACE. THESE CHARACTERISTICS ALL BUT RULE OUT CARTRIDGE FILTERS FOR HEAVY SOLIDS LOADING APPLICATIONS SUCH AS THOSE FOUND ON THE UMTRA PROJECT.

HOLLOW FIBER FILTERS CONSIST OF ONE OR MORE CANISTERS CONTAINING A LARGE NUMBER OF MICROPOROUS HOLLOW FIBERS. WATER UNDER PRESSURE ENTERS THE CARTRIDGE AND FLOWS THROUGH THE PORE STRUCTURE OF THE FIBERS LEAVING THE REJECTED PARTICLES OF PRECIPITATED IMPURITIES ON THE HIGH PRESSURE SIDE OF THE SYSTEM THERE TO BE REMOVED AS PART OF A BLEED STREAM. WATER TO BE TREATED IN HOLLOW FIBER FILTERS REQUIRES EXTENSIVE PRE-TREATMENT. THESE FILTERS ARE HIGH MAINTENANCE ITEMS REQUIRING FREQUENT CLEANING, AND FIBER REPLACEMENT. THIS RESULTS IN EXCESSIVELY HIGH OPERATING COSTS.

THE THIRD TYPE OF FILTER EVALUATED, THE MICROPOROUS MEMBRANE FILTER, IS CAPABLE OF EFFICIENTLY REMOVING SUBSTANTIAL QUANTITIES OF PRECIPITATED CONTAMINANTS ON A CONTINUOUS BASIS. MEMBRANE FILTERS CAN BE USED TO REMOVE PARTICLES WITH EFFECTIVE DIAMETERS DOWN TO 0.1 MICRON. RELATIVELY SIMPLE, BRUTE FORCE CHEMICAL PRETREATMENT CAN BE USED TO PRECIPITATE HEAVY METAL CONTAMINANTS PROVIDING AN IDEAL FEED FOR A MICROPOROUS FILTER SYSTEM. FINAL ANION CLEAN-UP, IF REQUIRED, CAN BE HANDLED BY ION EXCHANGE.

REVERSE OSMOSIS REQUIRES EXTENSIVE FILTERING FOR PRE-TREATMENT IF FOULING BY PARTICULATE MATTER IS TO BE AVOIDED. ANOTHER CONSIDERATION IS THAT, THE BRINE STREAM WHICH CONTAINS THE REJECTED IMPURITIES REPRESENTS A FAIRLY LARGE PERCENTAGE OF THE ENTERING VOLUME AND IT MUST BE DISPOSED OF IN AN ENVIRONMENTALLY SOUND MANNER. THE CONTAMINANTS IN THIS BRINE STREAM ARE

STILL IN SOLUBLE FORM WHEN THEY LEAVE THE R-O UNIT. THEY WILL REMAIN IN THIS FORM AND UNLESS CHEMICAL STABILIZATION STEPS ARE TAKEN THE BRINE STREAM WILL NOT ACCEPTABLE FOR DISPOSAL ON THE TAILINGS EMBANKMENT. THE FILTRATE FROM REVERSE OSMOSIS TYPICALLY CONTAINS LESS THAN 1 PPM OF DISSOLVED SOLIDS AND LESS THAN 1 PPB OF SUSPENDED SOLIDS. THE QUALITY OF THIS TREATED WATER STREAM WOULD EXCEED, BY FAR, ALL KNOWN DISCHARGE REQUIREMENTS.

IN THE FINAL ANALYSIS, REVERSE OSMOSIS WAS FOUND TO HAVE NOT ONLY HIGHER CAPITAL COSTS BUT ALSO HIGHER OPERATING AND MAINTENANCE COSTS WHEN COMPARED TO A MICROFILTRATION SYSTEM COUPLED WITH ION EXCHANGE. IN ADDITION, THOUGH THERE IS NOT ADEQUATE DATA AVAILABLE TO SUPPORT IT, THERE IS A GOOD SUSPICION THAT THE MECHANICAL CONSTRUCTION TECHNIQUES USED IN THE FABRICATION OF REVERSE OSMOSIS SYSTEMS WOULD NOT SURVIVE THE RIGORS OF FREQUENT HIGHWAY TRANSPORTATION. IF THIS IS CORRECT, IT WOULD RESULT IN A SIGNIFICANT REDUCTION IN THE EXPECTED OPERATING LIFE OF THE SYSTEM.

THIS TABLE PROVIDES A SUMMARY OF THE COMPARISON OF THE CAPITAL AND OPERATING COSTS OF THE TWO SYSTEMS THAT WERE EVALUATED:

	R.O.	MICROFILTRATION
OPERATING COST, $ PER 1000 GAL	27.92	21.31
YEARLY CAPITAL COST, $	503,000	384,000

TABLE 1

THESE RESULTS NOTWITHSTANDING, IT WAS DECIDED THAT THE PERFORMANCE SPECIFICATION FOR THE MOBILE PLANT SHOULD REMAIN SILENT ON THE MATTER OF TECHNOLOGY. THE SPECIFICATION REQUIRED ONLY THAT THE TECHNOLOGY SATISFY A VERY DEMANDING LIST OF DISCHARGE CONDITIONS UNDER A WIDELY VARYING SET OF FEED COMPOSITIONS. TABLE ONE IN THE SPECIFICATION WAS A LONG AND COMPREHENSIVE LIST OF THE PROCESS CONDITIONS WHICH THE MOBILE PLANT WAS EXPECTED TO SATISFY. FIGURE FOUR SHOWS SOME OF THE LIMITS THAT WERE SPECIFIED FOR A FEW OF THE MAJOR IMPURITIES.
IN ADDITION THE SPECIFICATION INCLUDED THE FOLLOWING GENERAL PROCESS REQUIREMENTS:

- CONTINUOUS FLOW RATE — 60 GPM
- PEAK FLOW RATE — 75 GPM
- WASTE STREAM — <5% OF FEED
- MOBILIZATION TIME — 24 HOURS
- DEMOBILIZATION TIME — 48 HOURS
- INTERSITE MOVES — 5 TO 10 PER YEAR

THE SPECIFICATION ALSO SPELLED OUT GENERAL CONSTRUCTION REQUIREMENTS WHICH INCLUDED:

- CAPABLE OF UNRESTRICTED TRAVEL ON WESTERN HIGHWAYS
- CONTAINED IN NO MORE THAN THREE SEMI-TRAILER VANS
- WEATHERPROOF ELECTRICAL SYSTEMS
- CONTINUOUS MONITORING OF FLOW, PH, AND CONDUCTIVITY
- ELECTRIC INTERIOR HEATING
- INSULATED TO R-10
- INTERIOR SUITABLE FOR HOSE DOWN DECONTAMINATION
- SUITABLE FOR STORAGE AT 0° F
- LARGE DOORS FOR EASY OPERATION AND MAINTENANCE

REQUESTS FOR PROPOSAL WERE SENT TO TEN POTENTIAL VENDORS. BASED ON COST, TECHNICAL PRESENTATION, AND EXPERIENCE, THE SUCCESSFUL BIDDER WAS A CONSORTIUM LEAD BY CHEM-NUCLEAR SYSTEMS OF COLUMBIA, S.C. IN PARTNERSHIP WITH THE RESOURCE TECHNOLOGIES GROUP OF DENVER, COLO.; AND MEMTEK CORP. OF WOBURN, MASS. THEY PROPOSED A THREE TRAILER DUAL TECHNOLOGY SYSTEM WHICH USED CHEMICAL PRECIPITATION WITH MEMBRANE FILTRATION FOR THE REMOVAL OF METALS AND ION EXCHANGE FOR ANION CONTROL AND TO SATISFY ANY EXTRAORDINARY DISCHARGE REQUIREMENTS. THE ION EXCHANGE SECTION OF THE SYSTEM WAS TO BE DESIGNED TO BE FREE STANDING SO THAT, IF APPROPRIATE CIRCUMSTANCES PRESENTED THEMSELVES, THE THREE TRAILER SYSTEM COULD IN ESSENCE BE BROKEN UP TO SERVE TWO SITES SIMULTANEOUSLY.

THE DECISION TO USE CHEMICAL PRECIPITATION WAS BASED ON THE FOLLOWING:

- LIME PRECIPITATION HAS A LONG AND SUCCESSFUL RECORD OF EFFECTIVELY REMOVING THOSE METALS MOST COMMONLY ENCOUNTERED ON THE UMTRA SITES.
- TECHNIQUES USING IRON COAGULANTS TO REMOVE SOME OF THE MORE TROUBLESOME METALS ARE WELL KNOWN
- THE USE OF BARIUM TO COPRECIPITATE RADIUM EFFECTIVELY TO LOW RESIDUAL LEVELS IS WIDELY USED IN THE URANIUM MINING INDUSTRY.

MEMBRANE OR CROSS FLOW FILTRATION WAS SELECTED AS THE METHOD FOR REMOVING PRECIPITATED METALS BECAUSE OF ITS DEMONSTRATED ABILITY TO REMOVE LARGE QUANTITIES OF PRECIPITATED SOLIDS AT HIGH FLOW RATES. MEMBRANE FILTER SYSTEMS AS SUPPLIED BY MEMTEK CONSIST OF A NUMBER OF ONE INCH MEMBRANE TUBES MOUNTED IN PARALLEL INSIDE OF A LARGE DIAMETER SHELL FABRICATED FROM SIX INCH DIAMETER PLASTIC PIPE. A SINGLE UNIT OR MODULE IS SHOWN IN FIG. 5. THESE MODULES ARE ASSEMBLED IN A SERIES PARALLEL FLOW ARRANGEMENT (FIG. 6). FILTERS, IN GENERAL, ARE HYDRAULICALLY LIMITED. THE NUMBER OF MODULES REQUIRED FOR A GIVEN SYSTEM IS DETERMINED SOLELY BY THE REQUIRED THROUGHPUT. FOR PURPOSES OF COMPARISON, THE FIRST OF THESE TWO FIGURES SHOW (FIG. 7) THE FILTER SYSTEM FOR A 400 GPM FIXED PLANT AND THE SECOND (FIG. 8), THE 60 GPM MOBILE PLANT.

THE TREATED WASTEWATER CONTAINING PRECIPITATED SOLIDS, IS CHARGED TO THE FILTRATION SYSTEM AT HIGH VELOCITY AND ELEVATED PRESSURE. REFERRING TO FIG. 9, THE SOLIDS ARE CARRIED ALONG IN THE TURBULENT HIGH PRESSURE TURBID WATER STREAM, WHILE CLARIFIED WATER PASSES THROUGH THE MEMBRANE TO THE LOW PRESSURE SIDE OF THE SYSTEM WHERE IT IS COLLECTED FOR FINAL TREATMENT AND ULTIMATE DISCHARGE. THE TURBULENT FLOW ON THE HIGH PRESSURE SIDE OF THE FILTER KEEPS THE SOLIDS IN SUSPENSION WHERE THEY SCOUR THE MEMBRANE PREVENTING THE BUILD-UP OF FOULING SLIMES AND GELS. WHEN THE SYSTEM THROUGHPUT DROPS BELOW A SPECIFIED LEVEL, THE MEMBRANE SYSTEM MUST BE CLEANED. THIS CLEANING WHICH CAN BE DONE WITH ANY NUMBER OF VIGOROUS ACIDIC OR ALKALINE CLEANING AGENTS IS USUALLY REQUIRED NO MORE OFTEN THAN ONCE OR TWICE A MONTH. THE MOST COMMON CLEANING AGENT IS DILUTE SODIUM HYPOCHLORITE USING A 30 TO 60 MINUTE CYCLE.

THE WATER THAT HAS PASSED THROUGH THE FILTRATION SYSTEM OFTEN REQUIRES ADJUSTMENT OF ITS PH BACK TO CLOSE TO NEUTRAL. THIS IS DONE BY THE ADDITION OF DILUTE SULFURIC ACID. AFTER THIS PH ADJUSTMENT THE WATER IS EITHER DISCHARGED OR TRANSFERRED TO THE ION EXCHANGE UNIT FOR FURTHER TREATMENT.

THE FLOW DIAGRAM FOR THE MOBILE PLANT WAS DEVELOPED SO THAT THERE WAS A RATIONAL SEPARATION OF THE CHEMICAL UNIT PROCESSES IN EACH OF THE THREE TRAILERS.

- TRAILER NO. 1 - CHEMICAL PRECIPITATION
- TRAILER NO. 2 - MEMBRANE FILTRATION
- TRAILER NO. 3 - ION EXCHANGE

REFERRING TO THE FLOW DIAGRAM FOR TRAILER NUMBER ONE (FIG. 10): THE RAW WATER IS FED INTO THE AGITATED REACTION TANK, R-1, WHERE SULFURIC ACID IS ADDED TO REDUCE THE PH TO ABOUT 4. WITH THIS LEVEL OF ACIDITY, RESIDUAL URANIUM IN THE CARBONATE FORM IS DECOMPOSED LIBERATING CARBON DIOXIDE AND PRECIPITATING THE URANIUM ITSELF AS AN OXIDE. AT THE SAME TIME, BARIUM CHLORIDE IS ADDED TO LOWER THE RADIUM CONCENTRATION. BARIUM CHLORIDE REACTS WITH THE SULFATE CONTENT OF THE WATER TO PRODUCE BARIUM SULFATE WHICH FORMS A HIGHLY INSOLUBLE COMPLEX WITH THE RADIUM, REDUCING THE RADIUM CONCENTRATION INTO THE RANGE OF SINGLE DIGIT PICOCURIES PER LITER. IRON SULFATE IS ADDED AS A COAGULANT, AND AS THE PH IS BROUGHT UP TOWARDS NEUTRAL WITH LIME, ARSENIC AND SELENIUM BEGIN TO PRECIPITATE. AFTER SUFFICIENT RESIDENCE TIME HAS BEEN ALLOWED AT THE CONDITIONS IN R-1, THE WATER IS ALLOWED TO OVERFLOW TO A SECOND REACTION VESSEL WHERE LIME IS ADDED TO RAISE THE PH TO 10 PRECIPITATING THE REMAINING HEAVY METALS.

THE TREATED WATER CONTAINING THE METAL PRECIPITATES IN SUSPENSION FLOWS BY GRAVITY INTO TRAILER NUMBER TWO WHERE IT IS RECEIVED IN THE 1800 GAL CONCENTRATION TANK (FIG. 12). THE PROCESS PUMP TAKES WATER

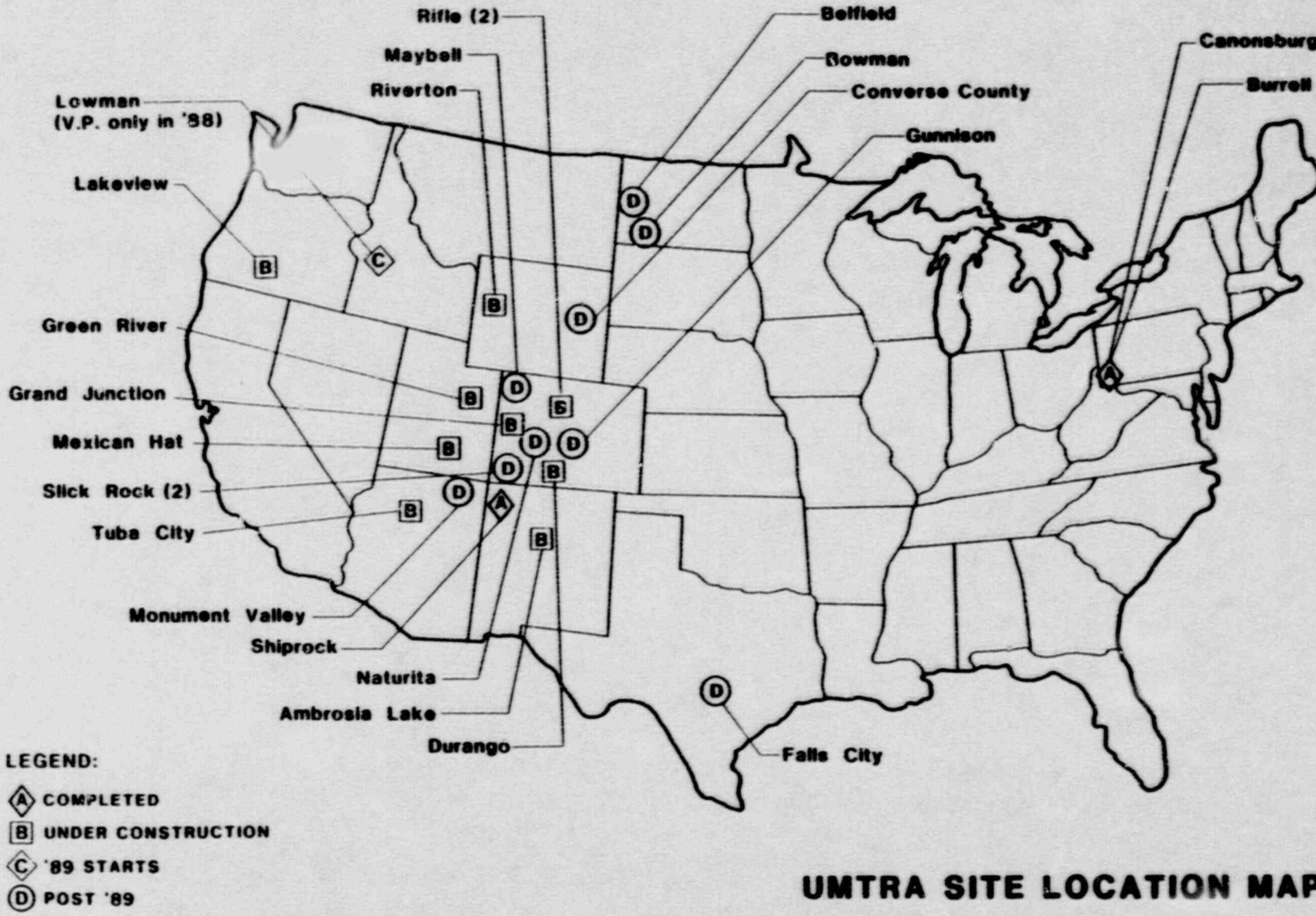
FROM AN INTERMEDIATE LEVEL IN THE CONCENTRATION TANK AND CIRCULATES IT AT HIGH VELOCITY AND PRESSURE THROUGH THE MEMBRANE FILTERS. CLARIFIED WATER PASSES THROUGH THE MEMBRANE TUBES, AND THE INCREASINGLY MORE CONCENTRATED SUSPENSION IS RETURNED TO THE CONCENTRATION TANK. THE PRECIPITATED SOLIDS SETTLE TO THE BOTTOM OF THE TANK TO BE REMOVED AS PART OF A BLEED STREAM FOR ULTIMATE DISPOSAL ON THE TAILINGS EMBANKMENT. THE CLARIFIED WATER FLOWS TO THE NEUTRALIZATION TANK WHERE ACID IS ADDED TO LOWER THE PH TO A LEVEL THAT IS ACCEPTABLE FOR DISCHARGE OR ADDITIONAL TREATMENT IN TRAILER NUMBER THREE.

TRAILER NUMBER THREE (FIG. 14) IS GENERALLY REFERRED TO AS THE "ION EXCHANGE" TRAILER; HOWEVER, IT SHOULD BE POINTED OUT THAT THE PROCESSES THAT MAY BE ACCOMPLISHED IN THIS TRAILER ARE NOT LIMITED TO ION EXCHANGE. THESE VESSELS WHICH ARE PIPED FOR DOWNFLOW OPERATION CAN BE CHARGED WITH, FOR INSTANCE, ACTIVATED CARBON FOR MOLYBDENUM REMOVAL OR ACTIVATED ALUMINA FOR FLUORIDE REDUCTION. IRRESPECTIVE OF THE TREATMENT MEDIUM USED, THIS SYSTEM IS NORMALLY OPERATED IN THE BYPASS MODE. THE BYPASS METHOD OF OPERATION DIVIDES THE INCOMING FLOW IN A MANNER THAT SEPARATES THE WATER INTO TWO FRACTIONS. ONE PORTION OF THE WATER IS TREATED TO REMOVE ALL OF THE CONTAMINANT OR CONTAMINANTS OF CONCERN, WHILE THE REMAINING PORTION IS ALLOWED TO PASS THROUGH THE SYSTEM UNTREATED. THE RATIO OF THESE TWO PORTIONS IS DETERMINED BY A MATERIAL BALANCE THAT RESULTS IN A MIXED

EFFLUENT STREAM HAVING A COMPOSITION THAT SATISFIES THE REQUIREMENTS FOR DISCHARGE INTO THE RECEIVING STREAM.

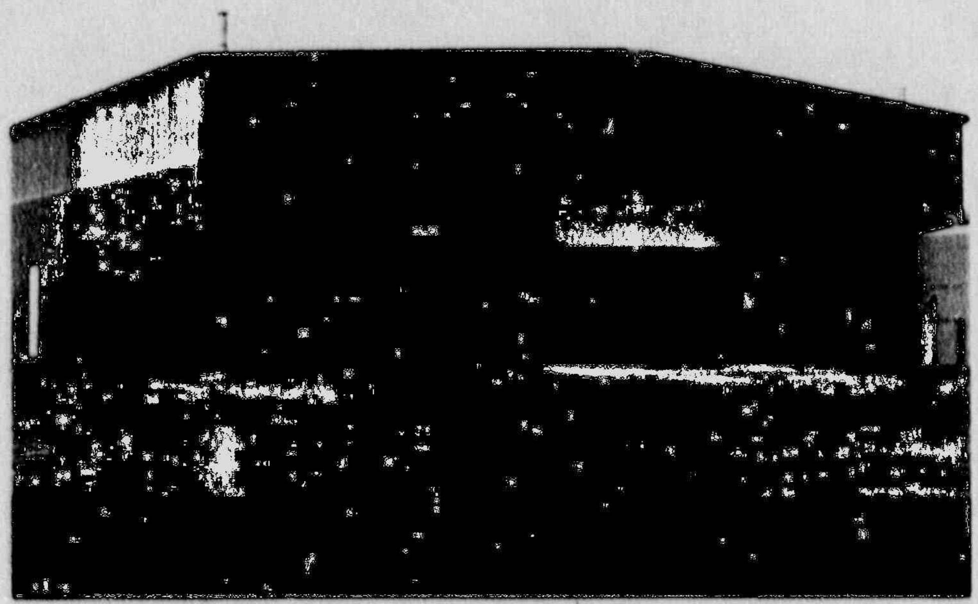
THE FOLLOWING PHOTOGRAPHS WHICH WERE TAKEN DURING CONSTRUCTION AND START-UP OF THE UMTRA MOBILE WASTEWATER TREATMENT PLANT DETAIL SOME THE SPECIAL FEATURES OF THE SYSTEM.

LIST OF ILLUSTRATIONS

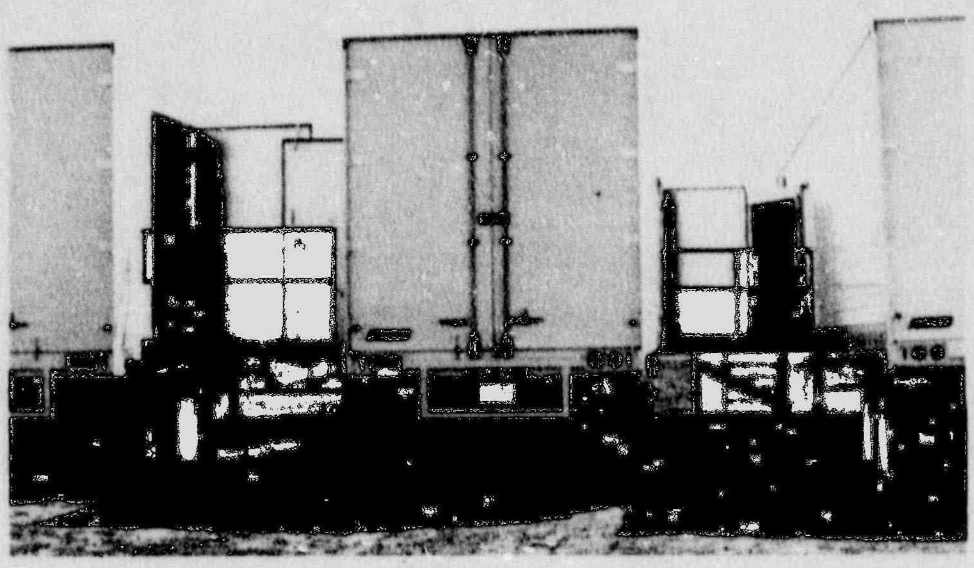


UMTRA SITE LOCATION MAP

/332/



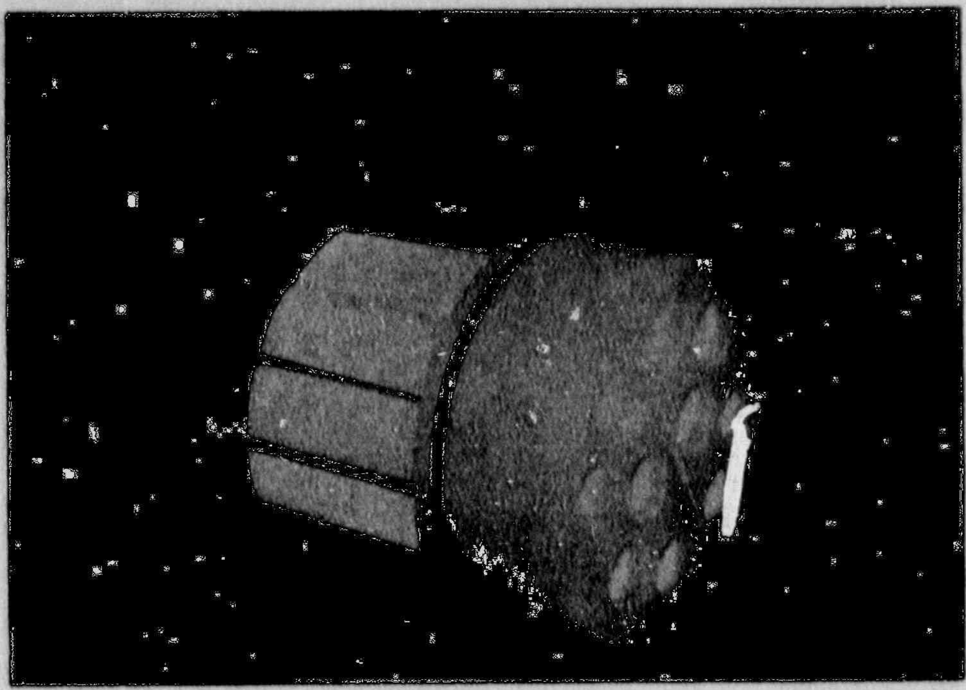
VIEW OF BUILDING HOUSING 400 GPM FIXED PLANT



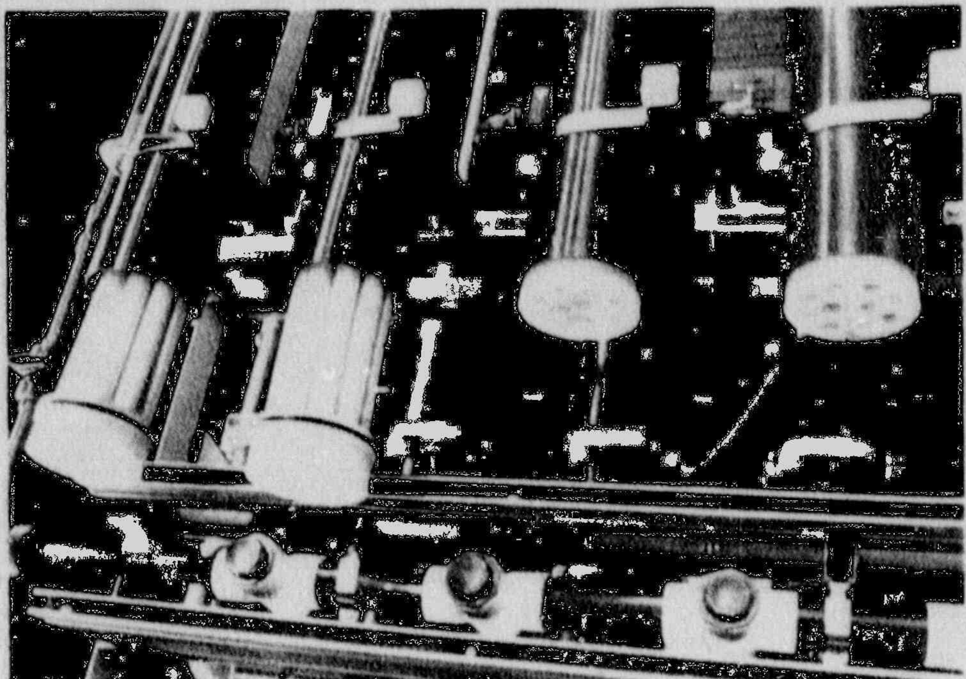
REAR VIEW OF MOBILE WASTEWATER TREATMENT PLANT (MWWTP)

PARAMETER	FEED MAXIMUM mg/l	LIMIT mg/l
As	.3	.01
Pb	1.0	.05
Mn	18.0	.05
M	3.2	.10
Se	.3	.01
U	105.0	.04
Ra-226	46.0	5.00

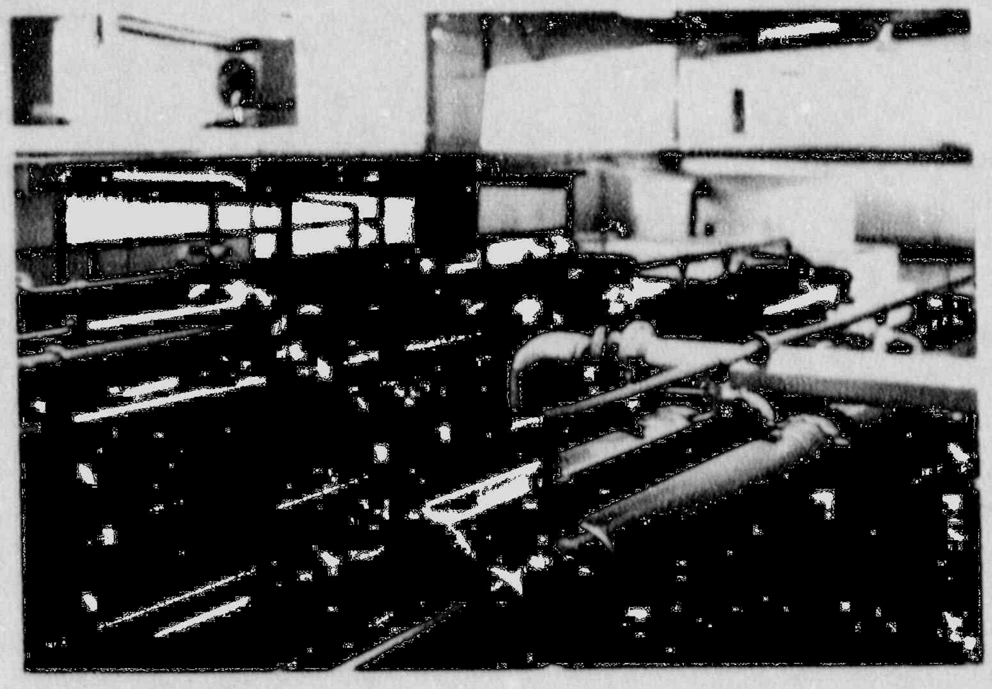
TYPICAL CONTAMINANT REMOVAL SPECIFICATIONS



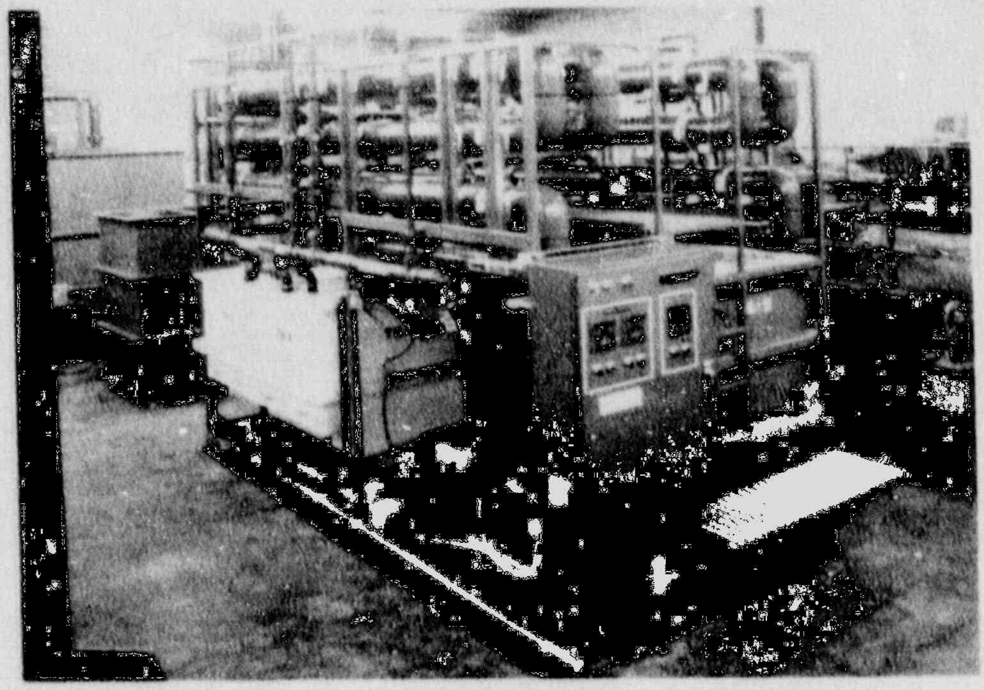
OPEN SINGLE MEMTEK MEMBRANE FILTER UNIT



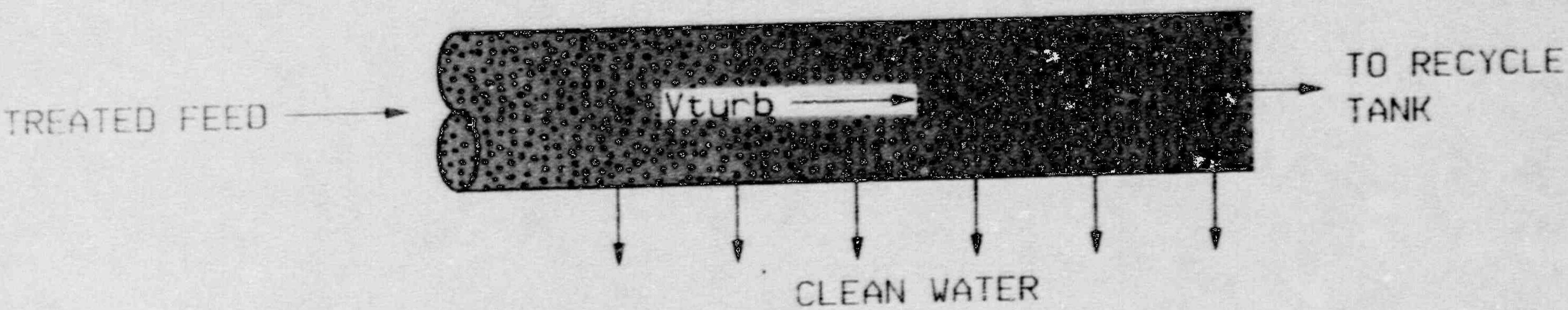
OPEN MEMBRANE FILTER UNITS IN PLACE



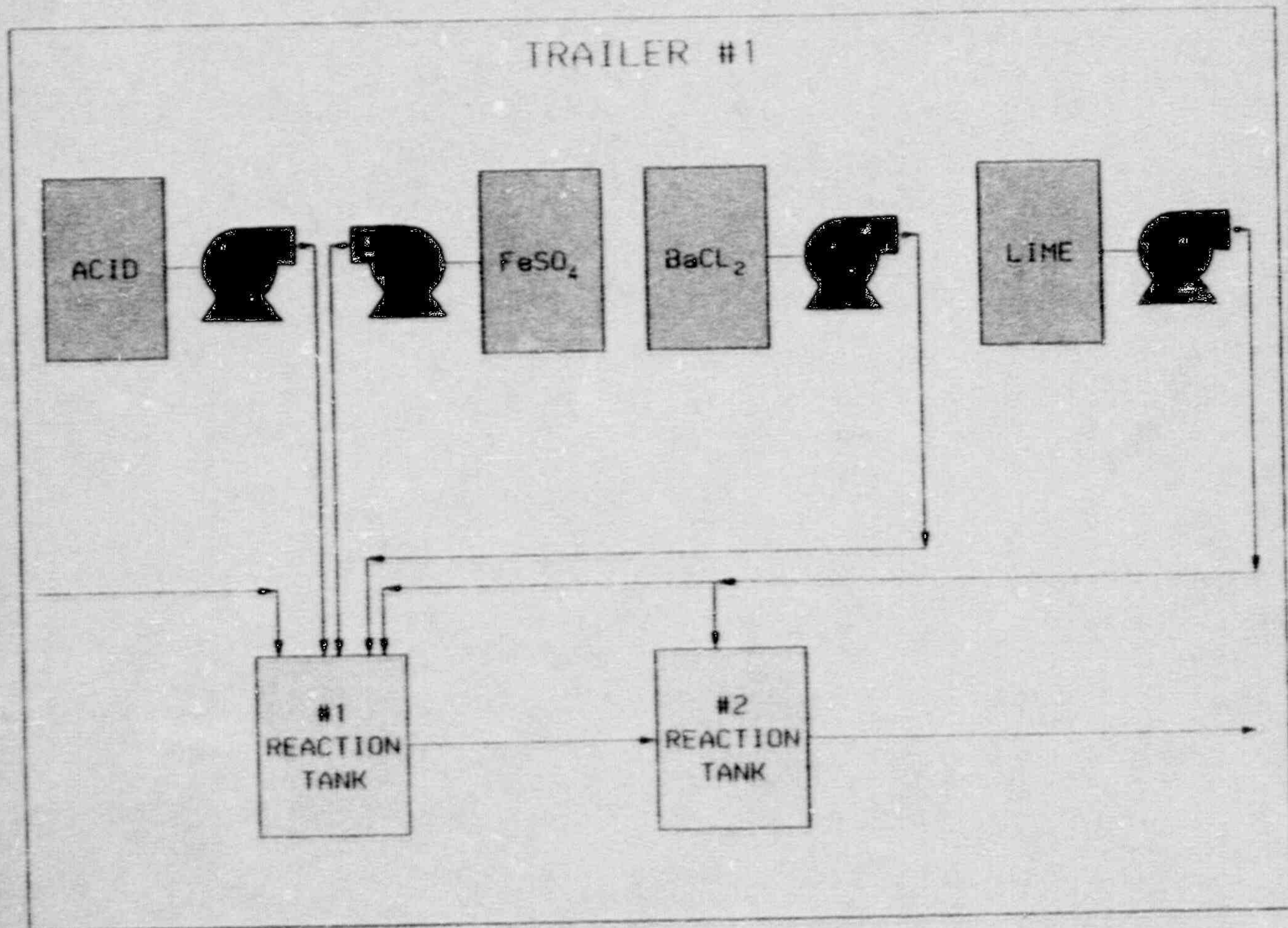
400 GPM MEMBRANE FILTER SYSTEM



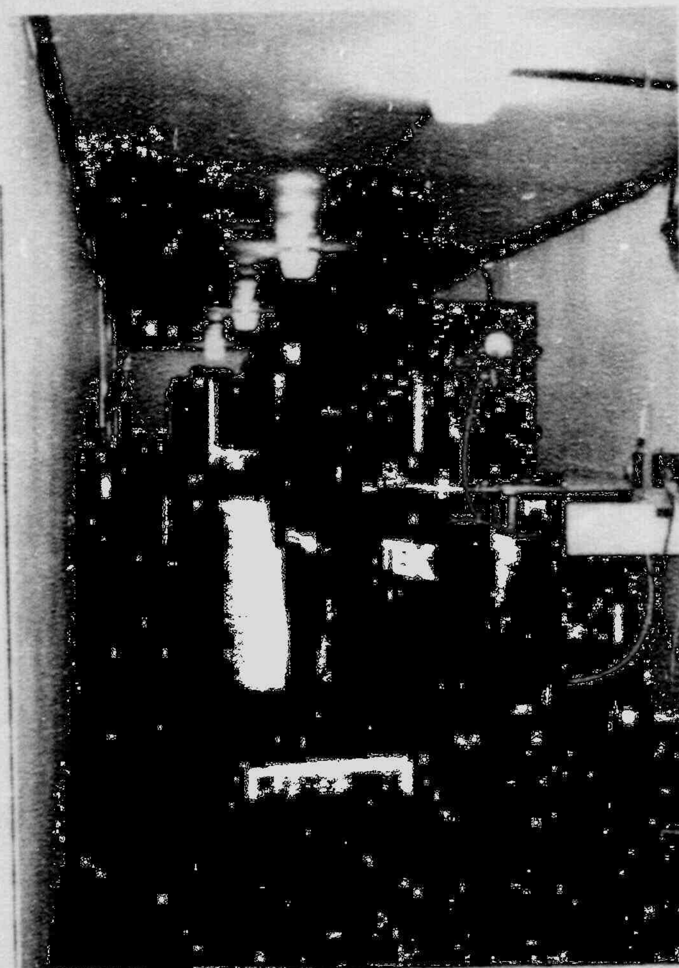
60 GPM MEMBRANE FILTER SYSTEM



OPERATION OF A MEMBRANE FILTER

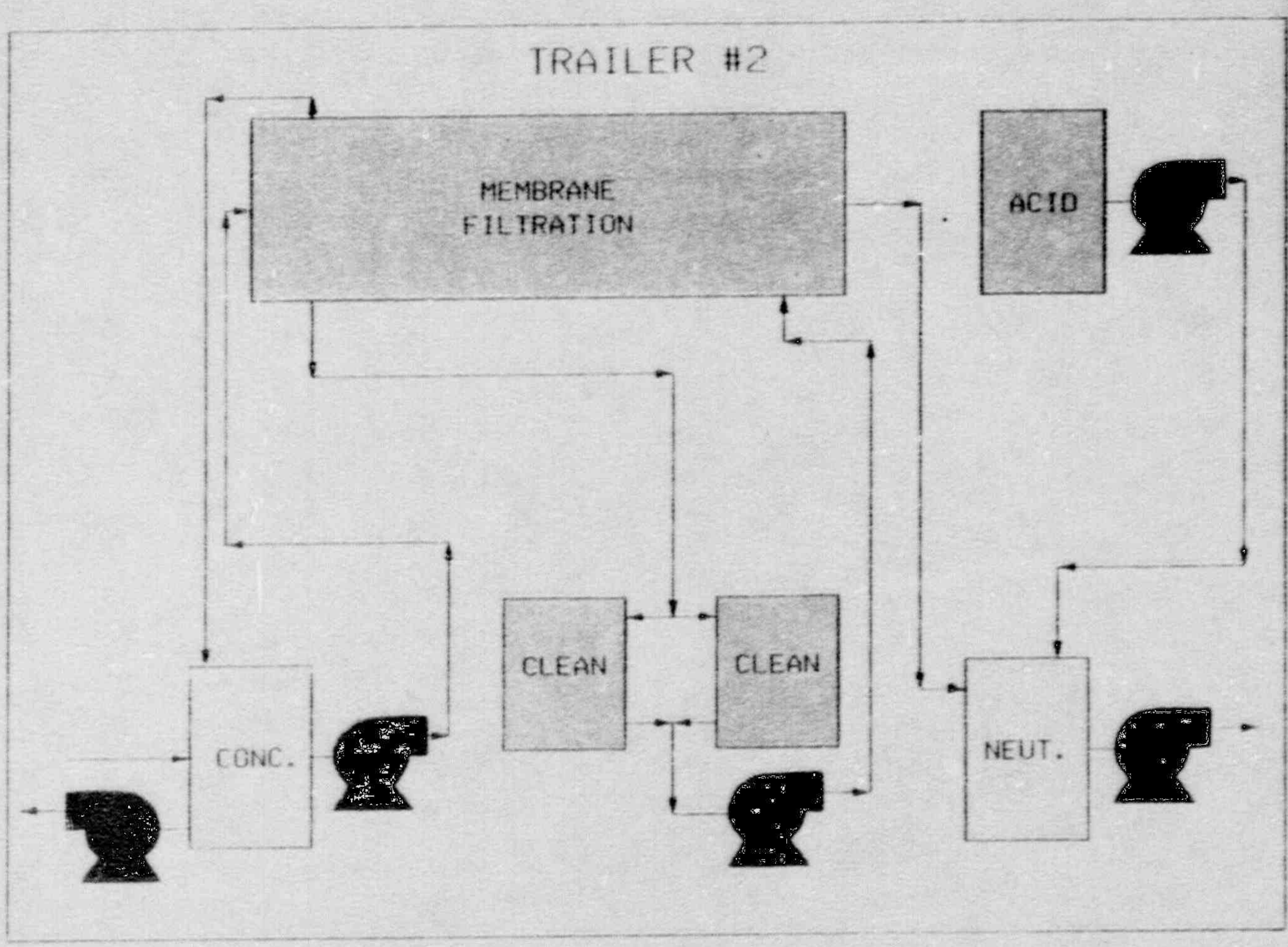


FLOW DIAGRAM-TRAILER NUMBER ONE



INTERIOR VIEW OF TRAILER NUMBER ONE

/330/

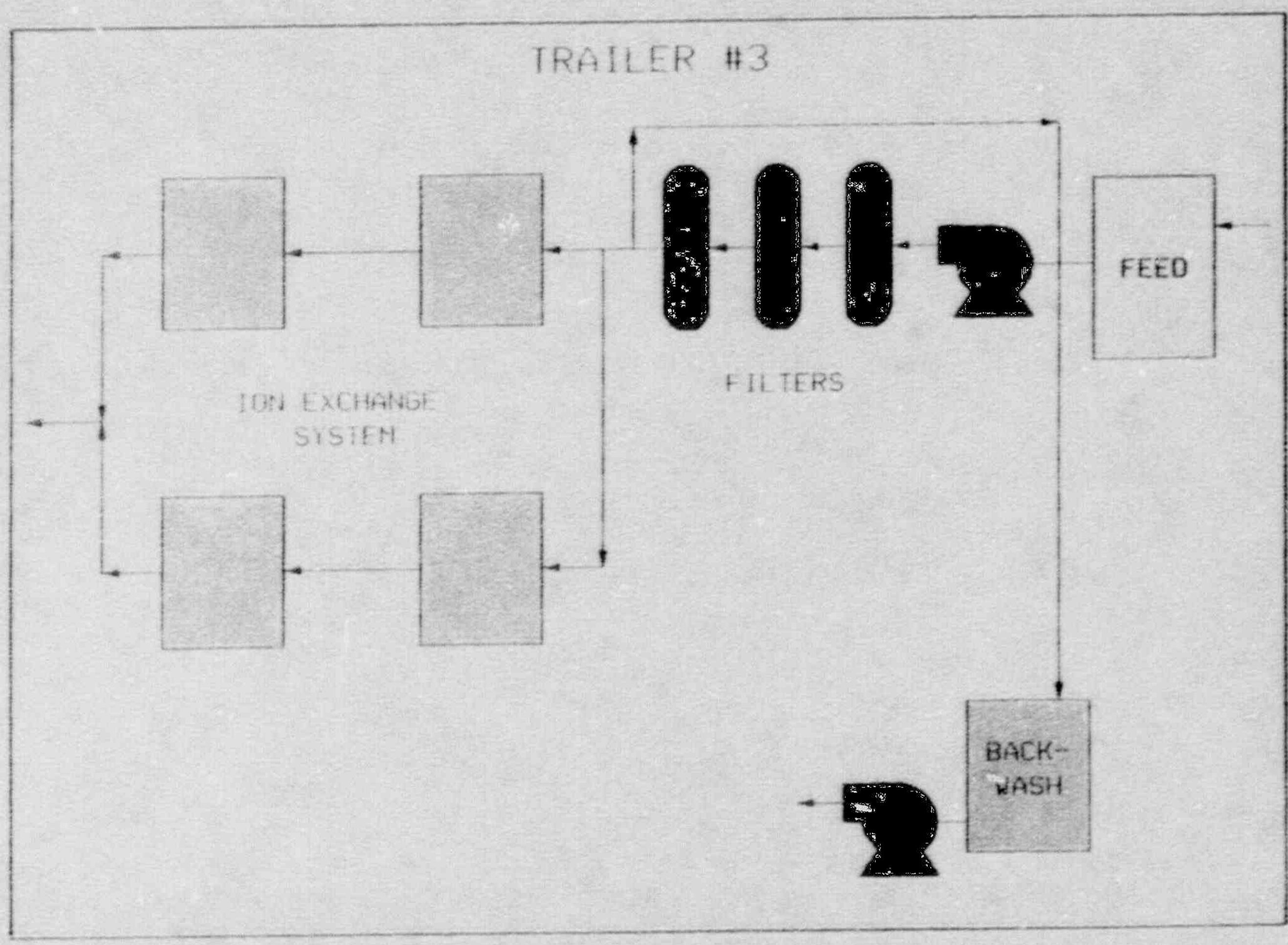


FLOW DIAGRAM-TRAILER NUMBER TWO

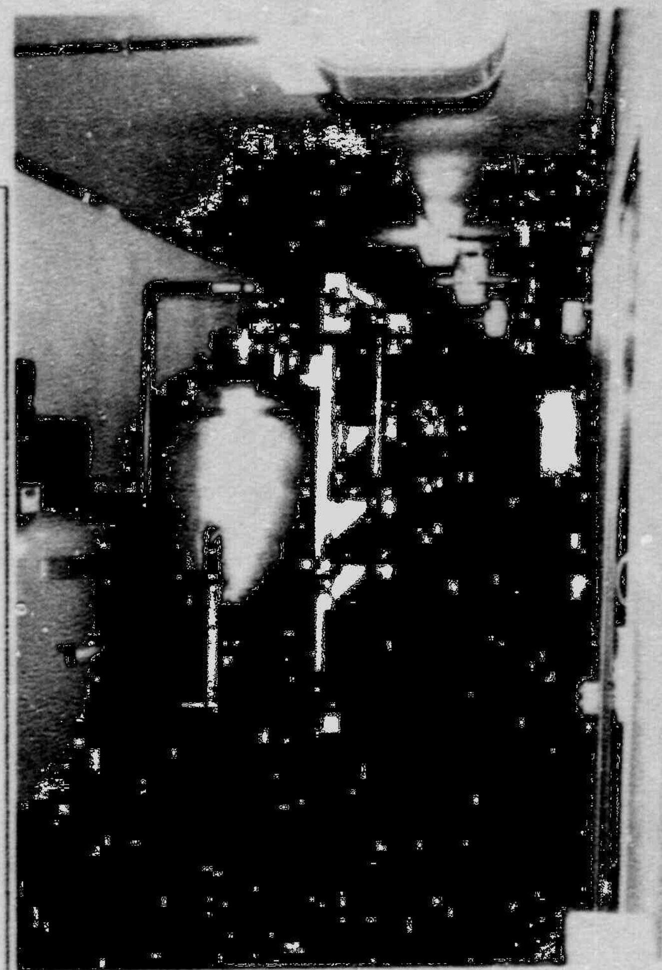
INTERIOR VIEW OF TRAILER NUMBER TWO

/33G/

/340/

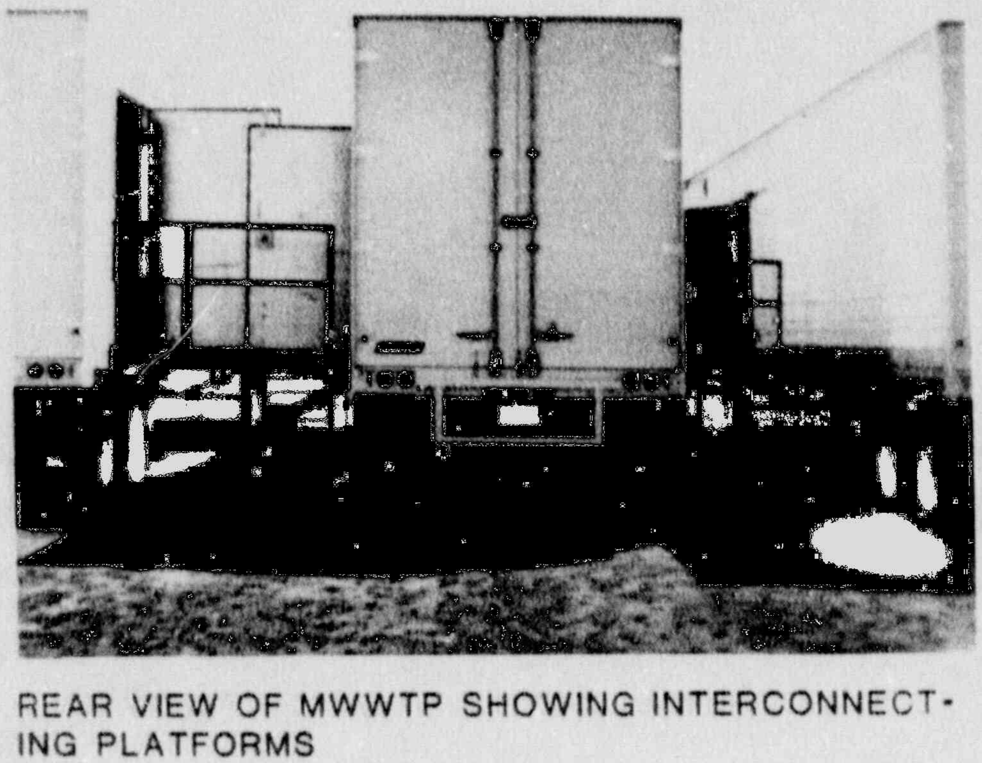


FLOW DIAGRAM-TRAILER NUMBER THREE

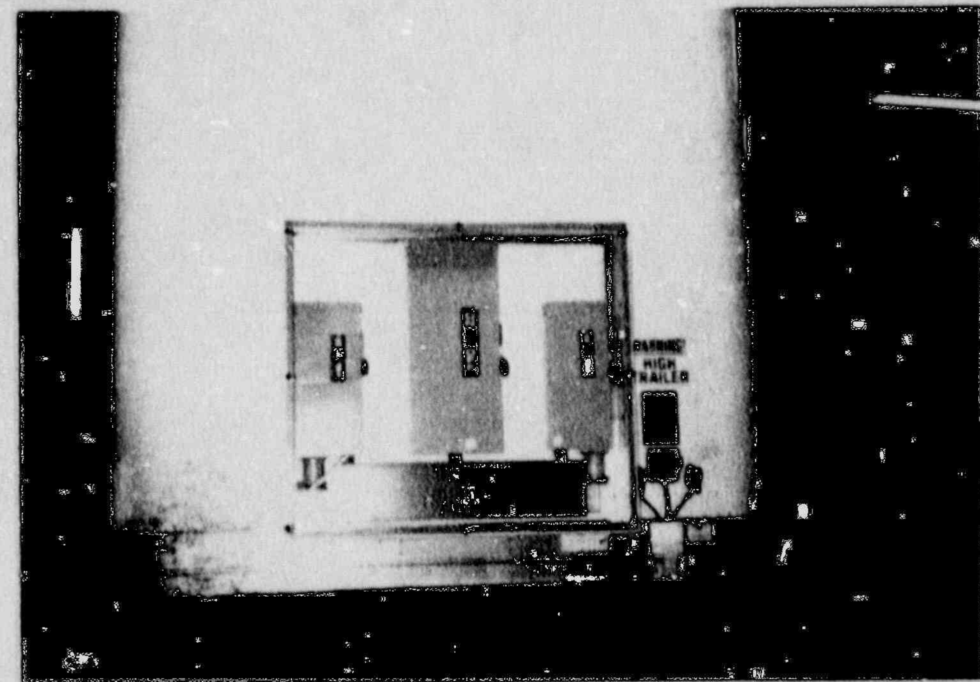


INTERIOR VIEW OF TRAILER
NUMBER THREE

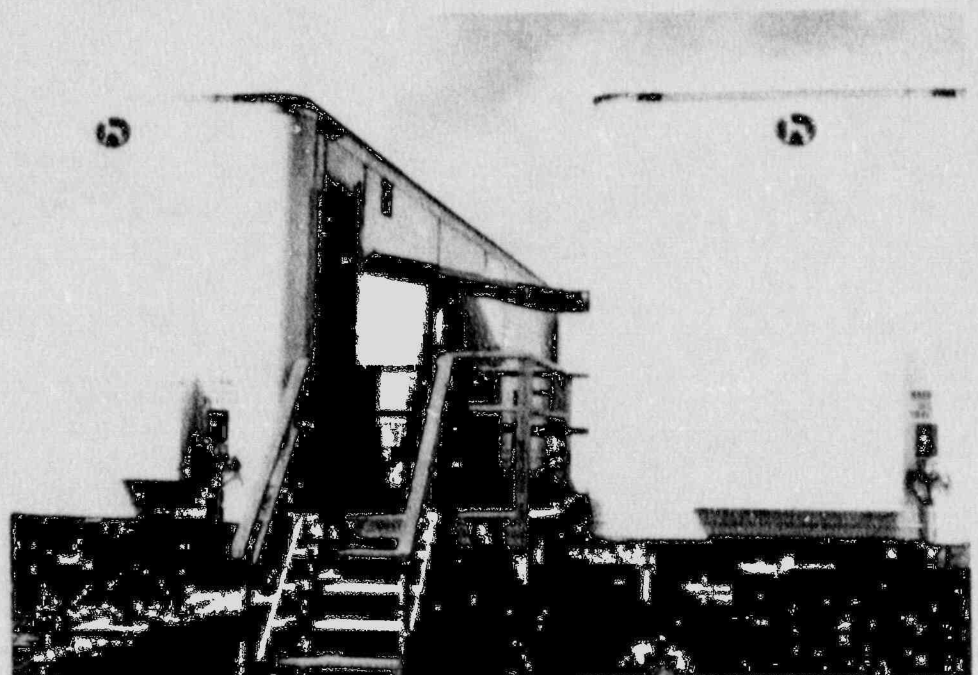
REAR VIEW OF MWWTP IN PLACE AND READY-TO-RUN



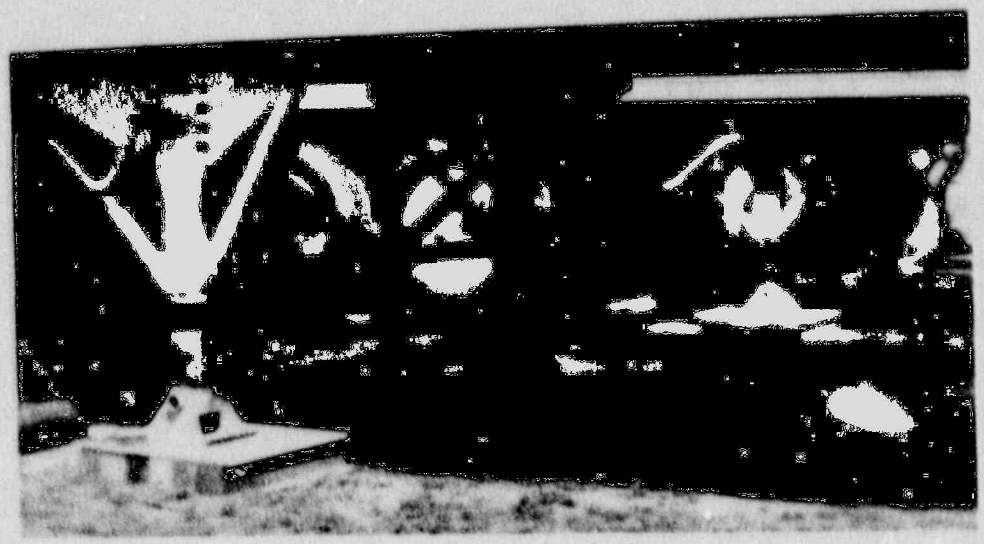
REAR VIEW OF MWWTP SHOWING INTERCONNECTING PLATFORMS



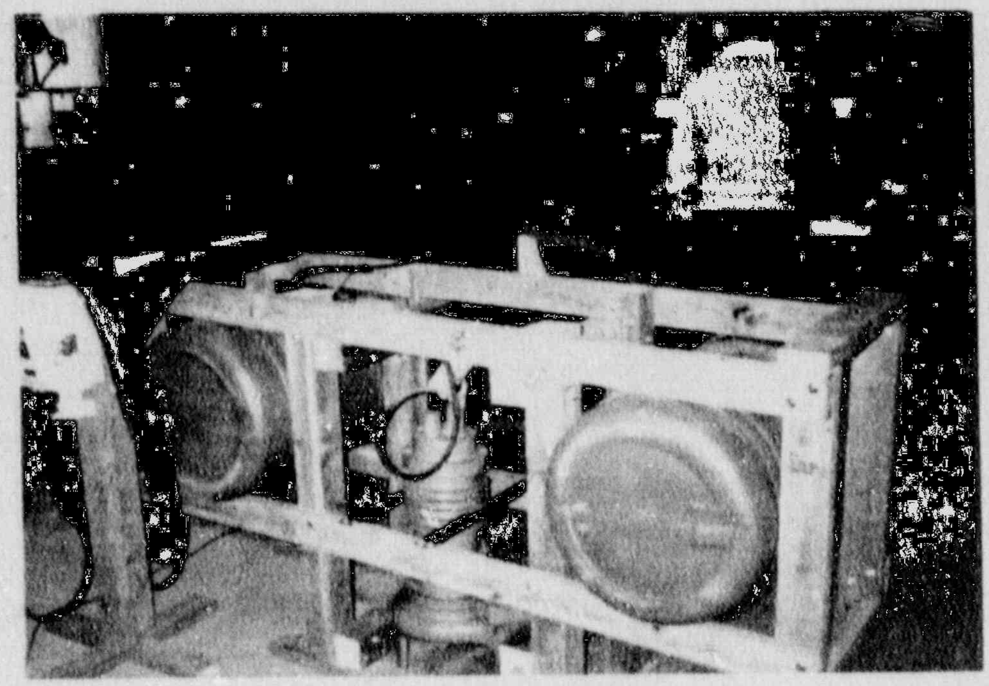
INCOMING ELECTRICAL SWITCHGEAR WITH COVER REMOVED



FRONT VIEW OF MWWTP SHOWING ENTRY STAIRS AND SWITCHGEAR WITH WEATHERPROOF COVER IN PLACE

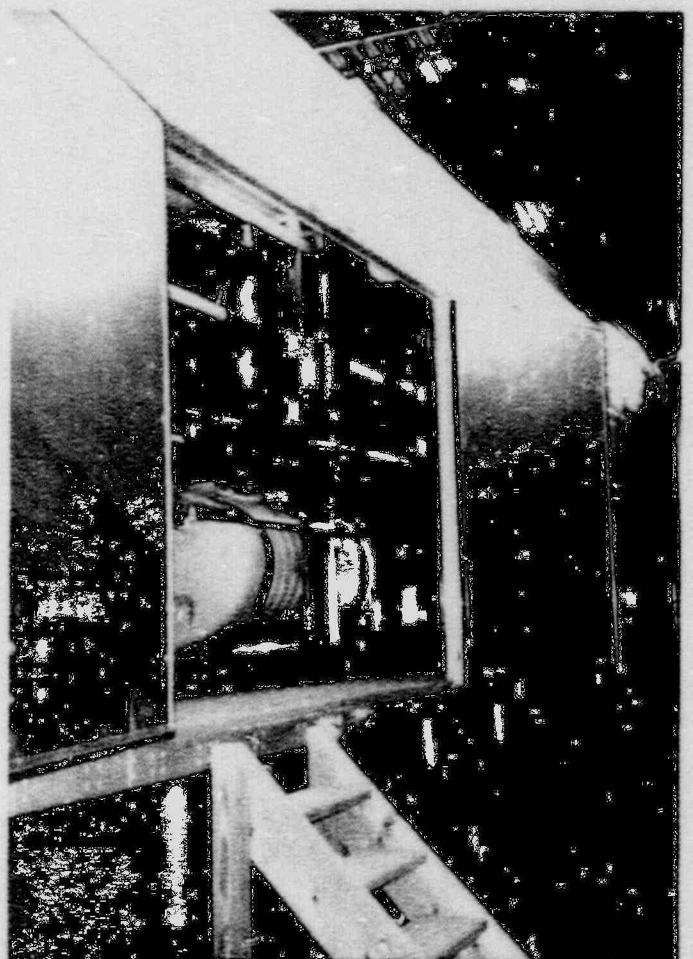


DETAIL OF LANDING GEAR

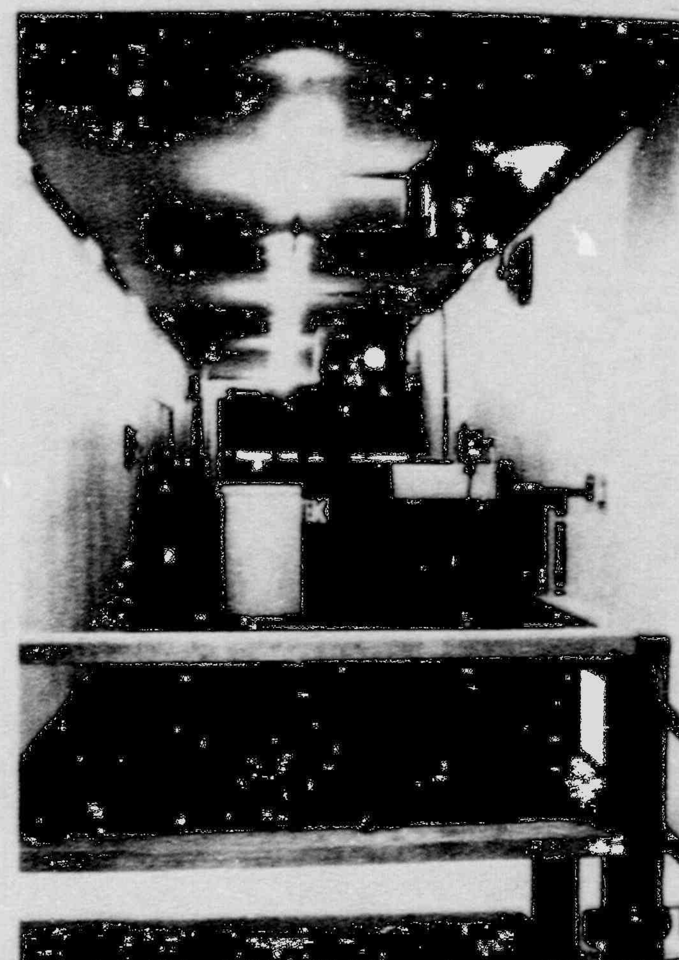


FLOATING FEED PUMP

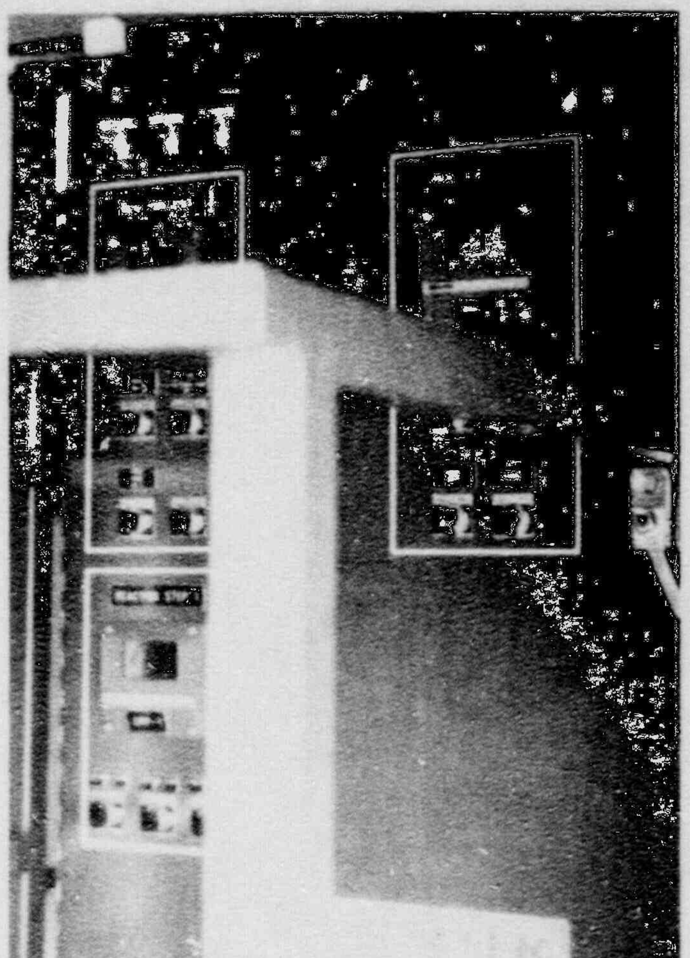
1344



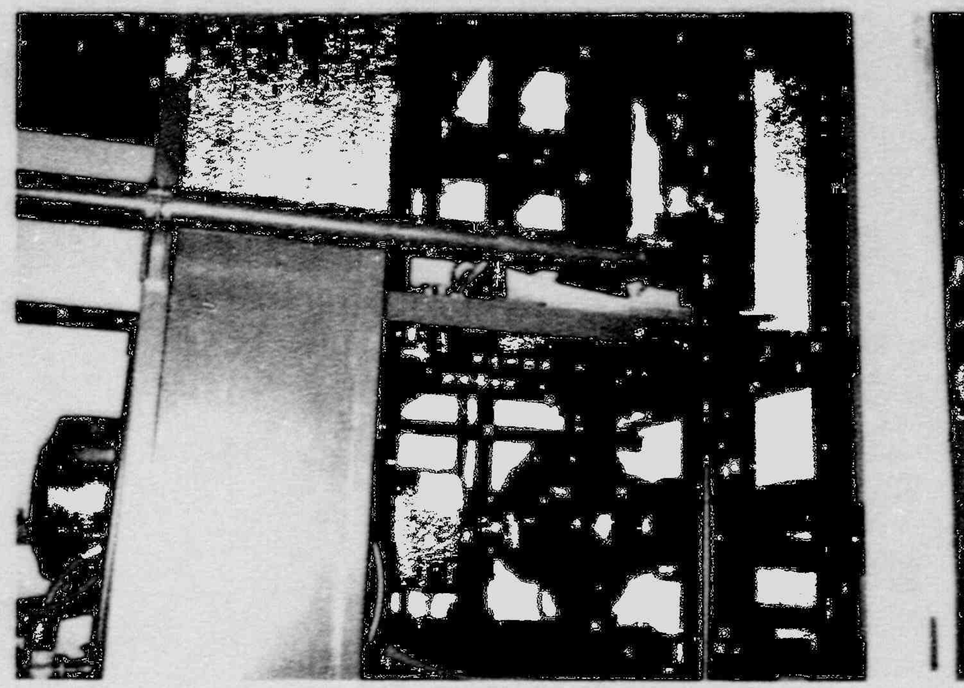
LARGE SIDE ENTRY DOOR



INTERIOR LIGHTING AND ELECTRICAL UNIT HEATER



TRAILER NUMBER ONE CONTROL PANEL



MAIN CIRCULATING PROCESS PUMP

PRESENTATION BY JERRY HOLDERNESS
JACOBS ENGINEERING GROUP INC.

IMPACTS OF EPA GROUNDWATER PROTECTION STANDARDS ON UMTRA PROJECT FUNDING REQUIREMENTS

IMPACTS OF PROPOSED EPA GROUNDWATER STANDARDS ON SITE WORK

RELOCATE DISPOSAL CELLS	SRK, GUN
CHANGE DISPOSAL CELL LOCATION ON SITE	GRJ
DESIGN ENHANCEMENTS OF DISPOSAL CELL	DUR, MAY, NAT, GRJ, SRK GUN, GRN, RFL, BEL/BOW
SIGNIFICANT DRYING OF TAILINGS REQUIRED	DUR, GRN, GRJ
POTENTIAL VEGETATIVE COVERS	GRJ, GUN, SRK, NAT, MAY, FCT
ADDITIONAL SITE CHARACTERIZATION FOR GROUNDWATER COMPLIANCE STRATEGY	GRJ, GUN, GRN, MAY, DUR, FCT, NAT, SRK, TUB, HAT, AMB, BEL

UMTRA

IMPACTS OF PROPOSED EPA GROUNDWATER STANDARDS ON UMTRA PROJECT COSTS

- ESTIMATED COSTS AS OF APRIL 1989 FELL INTO THE FOLLOWING CATEGORIES:

  1. MORE EXTENSIVE NEPA DOCUMENTATION TO INCLUDE GROUNDWATER COMPLIANCE STRATEGIES
  2. MORE EXTENSIVE CHARACTERIZATION, SITE SELECTION AND DESIGN WORK TO SUPPORT THE GROUNDWATER COMPLIANCE STRATEGIES
  3. ENHANCED COVER DESIGNS, ACL APPLICATIONS
  4. RISK IDENTIFIED IN THE ABOVE GENERAL AREAS IN THE FY91 BUDGET SUBMITTAL AND PROJECT CONTINGENCY

- IDENTIFIED COSTS AND RISK TOTALED APPROXIMATELY $60.0M

IMPACTS OF PROPOSED EPA GROUNDWATER STANDARDS ON UMTRA PROJECT COSTS

(CONTINUED)

- THE FOLLOWING ADDTIONAL RISKS AND/OR ACTUAL COSTS HAVE BEEN IDENTIFIED SINCE THE PREVIOUS ESTIMATE WAS PREPARED

DESCRIPTION	COST	PREVIOUSLY IDENTIFIED IN RISK
DESIGN ENHANCEMENTS OF DISPOSAL CELL (DUR, GRN, GUN, NAT, GRJ, RFL, BEL/BOW)	\$4.0M	\$3.9M
SIGNIFICANT DRYING OF TAILINGS REQUIRED (DUR, GRJ)	\$3.7M	\$2.2M
ADDITIONAL SITE CHARACTERIZATION FOR GROUNDWATER COMPLIANCE STRATEGY (DUR, GRJ, NAT, GRN, GUN, SRK, MAY, FCT)	\$2.3M	\$0.0M
WORK REQUIRED ON ACL's (DUR)	\$0.6M	\$0.5M

IMPACTS OF PROPOSED EPA GROUNDWATER STANDARDS ON UMTRA PROJECT COSTS

(CONCLUDED)

- CURRENTLY IDENTIFIED COSTS AND RISK TOTAL APPROXIMATELY $64.0M

LIST OF ATTENDEES

LIST OF ATTENDEES

DOE/States/Tribes Meeting: Grand Canyon, AZ: October 25-27, 1989

Name	Address & Zip Code	Phone No.
BUREAU OF INDIAN AFFAIRS		
Jim R. Analla	Bureau of Indian Affairs Navajo Area Office P.O. Box 1060 Gallup, NM 87301	505-863-9501
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Gary Norton	Bureau of Indian Affairs Hopi Agency P.O. Box 158 Keams Canyon, AZ 86034	602-738-2224
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Jerry Thiers	M-K Environmental Services Inc. Same as above	415-442-7581
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Rob Cooney	MK-Ferguson Company PO Box 9136 Albuquerque, NM 87119	505-766-3327
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Marvin Henderson	MK-Ferguson Company Same as above	505-766-3327
Jim Oldham	MK-Ferguson Company Same as above	505-766-3327
	JACOBS ENGINEERING GROUP INC.	
Jack Caldwell	Jacobs Engineering Group Inc. 5301 Central Avenue NE, Suite 1700 Albuquerque, NM 87108	505-845-5704
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Jack Hoopes	Jacobs Engineering Group Inc. Same as above	505-845-4015
Bill Hunt	Jacobs Engineering Group Inc. Same as above	505-845-4015

Name	Address & Zip Code	Phone No.

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ROY F. WESTON

Karen Agogino	Roy F. Weston 5301 Central Avenue NE, Suite 1700 Albuquerque, NM 87108	505-845-4011
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William Glover	Roy F. Weston Same as above	505-845-5671
Mark Miller	Roy F. Weston Same as above	505-845-5704

U.S. DEPARTMENT OF ENERGY

Mike Abrams	U.S. Department of Energy UMTRA Project Office 5301 Central Ave, NE, Suite 1720 Albuquerque, NM 87108	505-845-4628
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Frank Bosiljevac	U.S. Department of Energy Same as above	505-845-5638
Charles Cormier	U.S. Department of Energy Same as above	505-845-4039
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Nancy Lindas	U.S. Department of Energy Same as above	505-845-5666
Dave Mathes	U.S. Department of Energy UMTRA Project Mail Stop EM-451 19901 Germantown Road Germantown, MD 20767	301-353-2794
Mark Matthews	U.S. Department of Energy UMTRA Project Office 5301 Central Avenue NE, Suite 1720 Albuquerque, NM 87108	505-845-4628
Bill Meyers	U.S. Department of Energy P.O. Box 5400 Albuquerque, NM 87115	505-845-4309
Reggie Ortiz	U.S. Department of Energy Same as above	505-845-6205

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MaryBeth Villanueva	U.S. Department of Energy Same as above	505-845-4830
Dee Williamson	U.S. Department of Energy Grand Junction Project Office PO Box 2567 Grand Junction, CO 81502	303-326-6009

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Name	Address & Zip Code	Phone No.
Myron Fliegel	U.S. Nuclear Regulatory Commission Mail Stop 623-SS Washington, DC 20555	202-492-0555
Dan Gillen	U.S. Nuclear Regulatory Commission Same as above	202-492-0517
Ramon Hall	U.S. Nuclear Regulatory Commission Box 25325 Denver, CO 80225	303-236-2805
Ed Hawkins	U.S. Nuclear Regulatory Commission Box 25325 Denver, CO 80225	303-236-2808

U.S. ENVIRONMENTAL PROTECTION AGENCY

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Name	Address & Zip Code	Phone No.
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Richard Coy	UNC Geotech Inc. P.O. Box 14000 Grand Junction, CO 81502	303-444-9750
Charles Jones	UNC Geotech Inc. Same as above	303-444-9750
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Deborah Daniel	Department of Environmental Quality 2021 N. Central Avenue Phoenix, AZ 85004	602-257-2300
	STATE OF COLORADO	
Ed Bischoff	Colorado Department of Health Remedial Programs Section 4210 East 11th Avenue Denver, CO 80220	303-331-4813
Bud Franz	Colorado Department of Health 222 S. 6th Street Grand Junction, CO 81501	303-248-7165
	STATE OF IDAHO	
Lance Nielson	Division of Environmental Quality 450 W. State Street Boise, ID 83720	208-334-5879

Name	Address & Zip Code	Phone No.
STATE OF NORTH DAKOTA		
Terry Lindsey	Div. of Environmental Engineering North Dakota Department of Health PO Box 5520 Bismarck, ND 58502-5520	701-224-2348
STATE OF NEW MEXICO		
Willie Abeele	Environmental Improvement Div. PO Box 968 Santa Fe, NM 87504	505-827-2955
Eloy Montoya	Environmental Improvement Div. 1190 St Francis Drive Santa Fe, NM 87503	505-827-2952
STATE OF TEXAS		
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Cary Gartzke	Texas Department of Health Same as above	512-835-7000
Auburn Mitchell	Office of the Governor PO Box 12428 Austin, TX 78711	512-463-4630
STATE OF UTAH		
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