Rocky Mountain Arsenal
Record of Decision
for the On-Post Operable Unit

Remediation Design and
Implementation Schedule

December 2007

RECORD OF DECISION
FOR THE ON-POST OPERABLE UNIT
ROCKY MOUNTAIN ARSENAL

REMEDIATION DESIGN AND IMPLEMENTATION SCHEDULE

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Acronyms

ACM	Asbestos Containing Material
AH	Agent History
APA	Air Pathways Analysis
APEN	Air Pollution Emissions Notice
ARAR	Applicable or Relevant and Appropriate Requirement
BA	Borrow Area
BANS	Basin A Neck System
BAS	Biological Advisory Subcommittee
BBM	Biota Barrier Material
bcy	bank cubic yards
BEMA	Bald Eagle Management Area
bgs	below ground surface
BOA	Balance of Areas
BT	Burial Trenches
CAB	Community Advisory Board
CAMU	Corrective Action Management Unit
CAT	Complex (Army) Trenches
CCR	Construction Completion Report
CDPHE	Colorado Department of Public Health and Environment
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFS	Confined Flow System
CHWMA	Colorado Hazardous Waste Management Act
COC	Chemicals of Concern
COE	Corps of Engineers
CPA	Central Processing Area
CQA	Construction Quality Assurance
CQAE	Construction Quality Assurance Engineer
CRA	Central Remediation Area
CRCSN	Colorado Responds to Children with Special Needs
CRL	Certified Reporting Limit
CSRG	Containment System Remediation Goal
CSV	Contingent Soil Volume
CWC	Chemical Weapons Convention
CY	Calendar Year or cubic yards
DAA	Detailed Analysis of Alternatives
DBCP	Dibromochloropropane
DCN	Design Change Notice
DCPD	dicyclopentadiene
DDESB	Department of Defense Explosives Safety Board
DDSOW	Draft Design Scope of Work
DIMP	Diisopropylmethylphosphonate
DREZ	Demolition Range Exclusion Zone
DSOW	Design Scope of Work

EBS	Environmental Baseline Survey
ELF	Enhanced Hazardous Waste Landfill
EMS	Environmental Management System
EPA	Environmental Protection Agency
ESD	Explanation of Significant Differences
FCOR	Final Closeout Report
FOST	Finding of Suitability of Transfer
FR	Federal Register
FY	Fiscal Year
FYRR	Five Year Review Report
GAC	Granular Activated Carbon
GB	Sarin/Isopropylmethylphosphonofluoridate
GIS	Geographic Information System
gpm	gallons per minute
GPS	Global Positioning System
GSA	General Service Administration
HCCPD	hexachlorocyclopentadiene
HE	High Explosive
HHE	Human Health Exceedance
HRC	Hydrogen Release Compound
HWL	Hazardous Waste Landfill
IAG	Interagency Agreement
IC-APA	Interactive Comprehensive Air Pathway Analysis
ICD	Integrated Conceptual Design
ICP	Inductively-Coupled Argon Plasma
ICS	Integrated Cover System
ICSD	Integrated Cover System Design
IP	Implementation Plan
IRA	Interim Response Action
ISTD	In-Situ Thermal Desorption
LB	Lime Basins
LNAPL	Light Non-Aqueous Phase Liquid
LTCP	Long Term Care Plan
LTMP	Long Term Monitoring Plan
LWTF	Leachate Wastewater Treatment Facility
LWTS	Landfill Wastewater Treatment System
MCACES	Micro-Computer Aided Cost Estimating System
MCE	Maximum Credible Event
MEC	Munitions and Explosives of Concern
MMAG	Medical Monitoring Advisory Group
MMP	Medical Monitoring Program
MSTS	Miscellaneous Southern Tier Soils
MT	Munitions (Testing)
NBCS	North Boundary Containment System
NCP	National Contingency Plan
NDMA	N-nitrosodimethylamine

NOID	Notice of Intent to Delete
NPL	National Priorities List
NWR	National Wildlife Refuge
OM	Operations and Maintenance
OCH	Other Contaminated History
OCP	Organochlorine Pesticides
OE	Ordnance and Explosives
OERR	Office of Emergency and Remedial Response
OPS	Operating Properly and Successfully
OSWER	Office of Solid Waste and Emergency Response
OU	Operable Unit
P-1	Priority - 1
PCB	Polychlorinated Biphenyl
PCOR	Preliminary Closeout Report
PMC	Program Management Contractor
PMRMA	Program Manager Rocky Mountain Arsenal
PMRMAR	Program Manager Rocky Mountain Arsenal Remediation
ppm	parts per million
QA/QC	Quality Assurance/Quality Control
RAB	Restoration Advisory Board
RCRA	Resource Conservation and Recovery Act
RCWM	Recovered Chemical Warfare Material
RD/RA	Remedial Design and Remedial Action
RDIS	Remediation Design and Implementation Schedule
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
RMA	Rocky Mountain Arsenal
RMAED	Rocky Mountain Arsenal Environmental Database
RMPDC	Rocky Mountain Poison and Drug Center
ROD	Record of Decision
ROE	Report of Excess
RVO	Remediation Venture Office
SACWSD	South Adams County Water and Sanitation District
SAP	Sampling and Analysis Plan
SAPC	Steering and Policy Committee
SAR	Study Area Report
SCH	Significant Contamination History
SCL	Sand Creek Lateral
SEC	Site Evaluation Criteria
SDT	Shell Disposal Trenches
SITE	Superfund Innovative Technology Evaluation
SOW	Scope of Work
SPBA	South Plants Balance of Areas
SPCPA	South Plants Central Processing Area
SPS	South Plants Soil
SSAB	Site Specific Advisory Board

SQI	Submerged Quench Incinerator
SVE	Soil Vapor Extraction
SWIPT	Site-Wide Implementation Plan Team
TBD	to be determined
TCE	Trichloroethylene
TCHD	Tri-County Health Department
TEU	Technical Escort Unit
TRER	Terrestrial Residual Ecological Risk
TSA	Technical Summary of Alternatives
TT	TerraTherm
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
UST	Underground Storage Tank
UXO	Unexploded Ordnance
VOC	Volatile Organic Compound
WBS	Work Breakdown Structure
WP	Work Package
WTP	Western Tier Parcel

Tables

Table 1-1	Correlation of ROD Media Types with Implementation Projects
Table 4.1	5 Year Review Period of Performance

Appendices

Appendix A - Interim Response Action (IRA) Descriptions

Appendix B - Project Descriptions

Appendix C - RDIS Annual Update, Fiscal Year 1998

Appendix D - RDIS Annual Update, Fiscal Year 1999

Appendix E - RDIS Annual Update, Fiscal Year 2000

Appendix F - RDIS Annual Update, Fiscal Year 2001

Appendix G - RDIS Annual Update, Fiscal Year 2002

Appendix H - RDIS Annual Update, Fiscal Year 2003

Appendix I - RDIS Annual Update, Fiscal Year 2004

Appendix J - RDIS Annual Update, Fiscal Year 2005

Appendix K - RDIS Annual Update, Fiscal Year 2006

Appendix L - RDIS Annual Update, Fiscal Year 2007

Appendix M - RDIS Annual Update, Fiscal Year 2008

Appendix N - RDIS Annual Update, Fiscal Year 2009

Appendix O - RDIS Annual Update, Fiscal Year 2010

Appendix P - RDIS Annual Update, Fiscal Year 2011

1.0 INTRODUCTION

The Record of Decision (ROD) for the On-Post Operable Unit (OU) of Rocky Mountain Arsenal (RMA) states:

> *Within 180 days after issuance of the Notice of Availability for the ROD, the Army will append to the ROD a complete, detailed schedule for completion of activities associated with the selected remedy. The schedule will identify the enforceable project milestone dates for design activities. Future design documents will detail milestone dates for implementation activities. Revisions to this schedule will be initiated prior to the start of each fiscal year to allow adequate time for review and concurrence by the Parties.*

The ROD was signed by the Parties on June 11, 1996. It is the Army's intent that the Rocky Mountain Arsenal Record of Decision for the On-Post Operable Unit Remediation Design and Implementation Schedule fulfills this ROD requirement. The Remediation Design and Implementation Schedule (RDIS) was initially completed and submitted on December 9, 1996. The Colorado Department of Public Health and Environment (CDPHE) formally invoked dispute resolution with respect to enforceable milestones in the RDIS on February 18, 1997. The RDIS was amended on March 4, 1997 to establish enforceable dates for issuance of Draft Design Scope of Work (DDSOW) documents for remedial implementation projects, and also to establish target dates and/or enforceable deadlines for Draft Final Designs. On August 4, 1997, a dispute resolution agreement was reached (Section 6.3).

The goals of the RDIS are: to comply with the requirement to append a design schedule to the ROD; establish a process to modify the design schedule; establish a process by which design documents will be developed; establish the general requirements of the design process; identify the major design review points; and required submissions according to the Federal Facility Agreement (FFA) and Environmental Protection Agency (EPA) Remedial Design & Remedial Action (RD/RA) guidance; outline the numerous remedy implementation activities that will occur; and establish a process to incorporate the completed Interim Response Actions (IRA) into a final RMA summary document. It also summarizes implementation project scope or schedule modifications.

To accomplish these goals, the RDIS is divided into six major sections. The introduction section will provide background information concerning the ROD and the major components of the selected remedy. This section will also discuss the Army's assumptions that the design schedule is based upon. Section two will discuss the status of the fourteen IRAs. Section three will establish a process by which design documents will be developed, establish the general design process, and identify the deliverable design documents. Section four will discuss in general terms the activities that will occur during the implementation of a remedial action and generally define reporting, and closeout documentation requirements. Section five will discuss schedule development, components, and the process by which the design schedule will be modified. Section six

provides a synopsis of the Parties comments regarding the December 9, 1996 version of the RDIS with Program Manager Rocky Mountain Arsenal's (PMRMA) responses. In addition to the sections, there are several appendices. Appendix A provides a detailed description of the fourteen IRA. A description of implementation projects, site-wide programs, water treatment and monitoring, program management, and off-post remedy is provided in Appendix B. Appendix C is the Fiscal Year (FY) 98 annual update to the RDIS which details current project progress and modifications, provides a listing of enforceable deadline dates that are in effect, and graphical depictions of the current progressed scheduled. In future updates, an annual appendix will be submitted as an addendum to this RDIS.

1.1 Background

The RMA, Colorado is an inactive Army installation that is transitioning to a National Wildlife Refuge (NWR). The Army's mission at RMA is to complete the ROD selected remedy and prepare RMA for transfer to the Secretary of the Interior. In accordance with EPA's "Notice Policy Change: Partial Deletion of Sites Listed on the National Priorities List" (NPL) (60 FR 55466, November 1, 1995) and current EPA guidance, as designated areas at RMA are remediated and deleted from the NPL, these areas will be added to the NWR pursuant to the requirements of the "Rocky Mountain Arsenal National Wildlife Refuge Act of 1992," Pub.L. No. 102-402.

1.1.1 Scope of the ROD

The ROD for the On-Post OU at RMA was signed on June 11, 1996. The ROD provides the framework, the purpose, and the overall rationale for all the remedial actions, which must be accomplished at the site. The ROD states:

> *The purpose of the on-post remedial action is to prevent current or future excessive exposure to contaminated soil or structures, to reduce contaminant migration into the groundwater, and to treat contaminated groundwater at the boundary to meet remediation goals. The selected remedy described in the ROD will permanently address the threats to human health and the environment by using a combination of containment (as a principal element) and treatment technologies to reduce the toxicity, mobility, or volume of contaminants in groundwater, structures, or soil; comply with applicable or relevant and appropriate requirements (ARAR); and be cost-effective. The ROD for the On-Post OU will be the final response action at RMA.*

1.1.2 Major Components of the ROD

The major components of the selected remedy consist of implementing groundwater, structures, and soil alternatives. The groundwater alternative includes operation of all existing boundary systems and on-post groundwater IRA systems, installation of a new extraction and piping system, and development of an extended monitoring program. The structures alternative includes demolition of all No-Future Use structures. These

structures are defined as Agent History Group, Significant Contamination History Group and Other Contamination History Group. The soil alternative includes construction of a Resource Conservation and Recovery Act (RCRA)- and Toxic Substance Control Act - compliant Hazardous Waste Landfill (HWL) on post, consolidation of soil with low levels of contamination into Basins A and F and the South Plants Central Processing Area; capping or soil cover of contaminated soil in the Basins, South Plants, North Plants, and Section 36 sites; treatment of principal threat soil; and on-post landfilling of soil and debris, including the Basin F Wastepile.

The Army, Shell, EPA, U.S. Fish and Wildlife Service (USFWS) and CDPHE agreed to additional components as part of the ROD, which were included in the overall on-post remedy. These components were considered in the selection of the preferred alternatives. The following components have been incorporated into the RDIS:

- Provision of $48.8 million to provide for the acquisition and delivery of 4,000 acre-feet of potable water to South Adams County Water and Sanitation District (SACWSD), and the extension of the water distribution lines from an appropriate water supply distribution system to all existing well owners with the Diisopropylmethylphosphonate plume footprint north of RMA.
- Potential impacts to the environment of both the acquisition of a water supply for SACWSD and for extension of water-distribution lines.
- RMA Medical Monitoring Program (MMP) to provide baseline health assessments to be determined by on-post monitoring of remedial activities to identify exposure pathways, if any, to any off-post community. Medical Monitoring Advisory Group (MMAG) will evaluate information concerning exposure pathways and identify and recommend appropriate public health actions. The primary goals of the MMP are to monitor any off-post impact on human health due to the remediation and provide mechanisms for evaluation of human health on an individual and community basis.
- Proposed establishment of a trust fund of $5 million per year (in 1995 dollars) to ensure long-term operation and maintenance of remedy once the remedial structures and systems are installed.
- Continued operation of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Wastewater Treatment Plan to support the remediation activities.
- Stored, drummed waste identified in the waste management element of CERCLA Hazardous Waste IRA may be disposed in the on-post HWL in accordance with the Corrective Action Management Unit (CAMU) Designation Document.
- Continued monitoring, as part of design refinement, for areas that may pose a potential risk to biota. The Biological Advisory Subcommittee (BAS) will interpret results and provide design refinement recommendations.
- Any unexploded ordnance (UXO) encountered during remediation will be excavated and transported off-post for detonation, or, if unstable, detonated on post.

1.2 References to Related Technical and Legal Material

The references provided here to the relevant legal material are provided only for the convenience of the reader and are not intended to supplant the actual text of these provisions or the descriptions and data available in the relevant task documents. For the specifics, references should be made to the full text of these provisions or task documents. In order that the RDIS may be kept to a length reasonable for planning purposes, it has been written at a level that presumes that the reader has considerable familiarity with or has access to persons with sufficient familiarity with the RMA cleanup.

The cleanup at RMA is governed by a variety of environmental statutes and regulations, including but not limited to the CERCLA (as amended), Colorado Hazardous Waste Management Act (CHWMA), National Contingency Plan (NCP), 40 C.F.R. Part 300, and CHWMA Regulations, 6 CCR 1007-3, as well as agreements and orders entered into pursuant to these statutes and regulations. On February 17, 1989, the Army, Shell, EPA, USFWS, Agency for Toxic Substances and Disease Registry and Department of Justice, (pursuant to CERCLA), entered into an FFA. The FFA established a procedure by which these organizations could cooperate in the assessment, selection, and implementation of response actions resulting from the release or threat of release of hazardous substances, pollutants, or contaminants at RMA. In accordance with CERCLA and the NCP, a ROD for RMA's On-Post OU was agreed to and signed by the Army, EPA, and the State of Colorado on June 11, 1996. The ROD was supported by Shell and USFWS. The ROD sets forth the selected remedial action for the RMA On-Post OU. In addition, the Army and the State of Colorado, pursuant to CHWMA and attendant state hazardous waste management regulations, entered into a Compliance Order on Consent on June 7, 1996. This Compliance Order on Consent specifies how the Army will manage certain hazardous wastes at RMA. Pursuant to the Refuge Act, and EPA's "Notice of Policy Change: Partial Deletion of Sites Listed on the NPL" (60 FR 55466, November 1, 1995), which reinterprets the requirements of the NCP at 40 C.F.R 300.425(e), as designated areas at RMA are cleaned up and deleted from the NPL, these areas will establish and be added to the RMA NWR. To the extent that the RDIS is not consistent with either the FFA or the ROD, the latter shall take precedence.

1.3 Implementation of the ROD Selected Remedy

The Army has organized the required remedial actions into implementation projects, from the selected remedy in the ROD. In addition to these projects, site-wide and water treatment/monitoring projects are also included. The Army has prepared a preliminary implementation sequence and phasing scenario of outside-in to efficiently accomplish this work. The effort incorporated input from the State, EPA, Army, USFWS, and Shell on project implementation priorities. Priorities include areas of documented risk to animals, geographic outside-in sequencing, practical implementation considerations, and community interest. With this input as a basis, the sequencing was further refined to ensure that it is consistent with good remediation and field implementation practices.

The following paragraphs provide a discussion of the assumptions, the development of the implementation projects and justification for the proposed sequencing and phasing.

1.3.1 Assumptions

The implementation of the remedy at RMA is a complex undertaking. Development of a plan for accomplishing that goal required the establishment of several rules or assumptions that could be consistently applied throughout the RDIS. The following is a list of those basic assumptions:

- The RDIS is based on a phased approach dependent upon availability and operations of the disposal facilities.
- Preference is given to the higher biota risk areas first to the extent it is technically feasible. For example, structure demolition must be completed before soil excavation in the same area.
- Borrow sites must be available prior to starting construction or remediation activities at sites that require borrow material.
- Disposal facilities must be available prior to the initiation of excavation or demolition activities at sites moving material to these disposal facilities.
- Agent Treatment Facilities will be addressed under individual implementation projects where agent-contaminated structures or soils may be encountered. Implementation project design efforts will provide a process to screen and determine actual quantities of agent-contaminated materials and provide for their segregation and special handling. This information will allow for a more effective design of agent treatment facilities, if necessary, at a later date. As such, agent treatment facilities have been removed from the RDIS as site-wide programs. However, place-holders will be preserved within the RDIS in the event the facilities are required.
- Adjacent projects with adjoining ditches were sequenced to remediate upstream segments first with the exception of Lake Sediments Remediation where the use of engineering controls is assumed for prevention of recontamination.
- Projects or parts of projects that are not dependent upon the use of disposal/consolidation facilities could be allowed to begin early.
- Practical field perspectives were taken into consideration to minimize double handling, avoid traffic conflicts and implement projects based on common geographical areas.
- Each implementation project is scheduled to be performed from start to finish without delay or time lags between activities.
- Estimated costs and activity duration are consistent with those defined and used during the detailed analysis of alternative phase. As more detailed information becomes available for each project through the design process, estimates and schedule duration will be updated.
- Total annual funding was assumed to be approximately $100 million comprised of a combination of Army, Shell and special RMA account funds. This was based on the Army's understanding that a maximum of $75 million

in FY95 dollars will be available annually through federal funding. An important consideration in the project sequence is that the program be flexible enough to adapt to various funding scenarios. Future schedule modifications will reflect actual funding availability.

- Design schedules identify appropriate FFA requirements for deliverable products and the Regulatory Agencies/RMA Committee review time.
- The remedy will be implemented by a single Program Management Contractor (PMC) under the management and supervision of the Remediation Venture Office (RVO).

1.3.2 Development of Implementation Projects

Sections 9.0 of the ROD, and Section 1.1.2 of this document, discuss the components of the selected remedy. These components were developed based on media type. However, this type of project breakout does not always lend itself well to implementation. To facilitate implementation, the soil and structure remedy components were incorporated into implementation projects that represent a more efficient breakout for execution in the field. The implementation projects were developed based on geographic proximity of ROD remedial actions and the logical execution of the work to be performed. Table 1-1 cross-references the media-type ROD components with the projects, showing how the implementation projects correlate to the ROD selected remedy.

Many RMA remediation technical, regulatory, policy, and regulatory planning issues could only be efficiently addressed on a site-wide basis. The RVO grouped these issues into seven site-wide operational plans: Traffic Management Plan, Air Emission Control and Monitoring Plan, Borrow Areas Plan, Waste Handling Plan, Storm Water Management Plan, Wastewater Management Plan, and PMC Facilities and Operations Plan. The primary purpose of these plans is to provide site-wide guidance on issues that affect multiple projects to ensure consistency on major issues and to avoid duplicating design efforts on individual design projects. These plans will be updated periodically, and will eventually be used by the PMC as the basis for ongoing RMA operational planning.

Long-term activity for the water medium include continued operation of the Northwest Boundary Containment System, North Boundary Containment System, Irondale Containment System, the Basin A Neck and North of Basin F Groundwater IRA Systems, and the new Section 36 Bedrock Ridge Groundwater Extraction System. Operation of wells within these systems may be discontinued in accordance with shutdown criteria developed in Section 9.1 of the On-Post ROD. Maintenance of lake levels and groundwater monitoring will be continued. A network of monitoring wells will be sampled to evaluate the effectiveness of the remedy. A select number of deep wells will also be sampled to monitor any contamination in the confined aquifer. Surface water will be monitored and managed in a manner consistent with the selected remedy.

Air emissions will be controlled as necessary to attain criteria that will ensure that the remedial action will be protective of human health and the environment and minimize

nuisance odors. Each remedial design or work plan will identify the site-specific air emissions criteria to be used as operation parameters and the necessary contingency plans in the event the criteria are exceeded. The CAMU also outlines the need for an air emissions control plan and Air Pathways Analysis (APA) program.

Implementation projects and site descriptions are provided in Appendix B. This project information correlates with previous studies completed during the Remedial Investigations and Feasibility Studies (RI/FS) and Detailed Analysis of Alternatives (DAA). The RI/FS and DAA reports contain additional detailed information about each site.

Table 1-1
Correlation of ROD Media Types with Implementation Projects

Implementation Project	***RMA Section***	***ROD Media Type***
Basin A Consolidation and Remediation	36	Basin A and Ditches Soils, Consolidation of Biota Exceedance Media
Construct Hazardous Waste Landfill	25, 26	Hazardous Waste, Surficial Soils
Operational Construction of Enhanced Hazardous Waste Landfill	25, 26	Enhanced Hazardous Waste
Section 36 Bedrock Ridge Groundwater Plume Extraction System	36	Groundwater in Section 36
South Plants Central Processing Area and Complex Trench Chemical Sewer Plugging	1, 36	ROD Media Type: Chemical Sewer
Sanitary Sewer Manhole Plugging – Phase I	1,2,25,26,35, 36	Sanitary/Process Water Sewers
Munitions (Testing) Soil Remediation	19,20,25,29, 30, 36	Munitions Testing Soils
Burial Trenches Soil Remediation	29,30,32	Burial Trenches Soils
South Plants Structure Demolition and Removal	1,2,36	Agent, Significant, and Other Contamination History Structures
Miscellaneous Northern Tier Soil Remediation	19,24,25	Sand Creek Lateral, Ditches, and Surficial Soils; Chemical Sewer
Toxic Storage Yards Soil Remediation	5,6,31	Toxic Storage Yards Soils
Lake Sediments Remediation	1	Lake Sediments
Miscellaneous Southern Tier Soil Remediation	1,2,3,4,12	Sand Creek Lateral, Ditches, Buried Sediments, and Surficial Soils
Existing (Sanitary) Landfill Remediation	1,4,30,36	Sanitary Landfill
Miscellaneous RMA Structure Demolition and Removal	All except 1, 2,25,36	Agent, Significant, and Other Contamination History Structures
Hex Pit Soil Remediation	1	Hex Pit Soils

Buried M-1 Pits Soil Remediation	1	Buried M-1 Pits Soils
South Plants Balance of Areas Soil Remediation	1,2	South Plants Ditches and Balance of Areas Soils, Chemical Sewer
South Plants Central Processing Area Soil Remediation	1	South Plants Central Processing Area Soils
Section 35 Soil Remediation	35	Secondary Basin, Sand Creek Lateral, Ditches, and Surficial Soils; Chemical Sewer
Shell Disposal Trenches Remediation	36	Shell Trenches
Complex (Army) Disposal Trenches Remediation	36	Complex Trenches
Sanitary Sewer Manhole Plugging-Phase II	3,4,34,35	Sanitary/Process Water Sewers
Secondary Basins Soil Remediation	26	Secondary Basins, Sand Creek Lateral, and Surficial Soils
North Plants Structure Demolition and Removal	25	Agent and Other Contamination History Structures
Section 36 Balance of Areas Soil Remediation	36	Section 36 Balance of Areas, Ditches, and Surficial Soils; Chemical Sewer
North Plants Soil Remediation	25	North Plants Soils, Chemical Sewer
Section 36 Lime Basins Soil Remediation	36	Section 36 Lime Basins
Basin F Waste Pile Remediation	26	Basin F Waste Pile
Former Basin F Solidification	26	ROD Media Type: Former Basin F
Basin F & Basin F Exterior Remediation	23,25,26	Former Basin F, Sand Creek Lateral, Ditches, Secondary Basins, and Surficial Soils; Chemical Sewer

As the RMA remediation program progresses, elements within current project descriptions may be shifted to other projects if justified. Project descriptions within the RDIS are provided as a scheduling baseline. As project designs begin and a revision of the project description is required, that change will be documented in the DDSOW and reflected in future versions of the Site-Wide Implementation Plan (IP). In the event of differences between the RDIS project descriptions and subsequent design documents, the latter shall govern. An annual appendix will be submitted as an addendum to this RDIS to the RMA Committee for review and approval at the beginning of each fiscal year (October 1 – September 30 the following year) with a narrative of completed projects, status of ongoing projects, and noted scope changes. The annual update will then be presented to the RMA Council.

1.3.3 Implementation Phases

The soils/structures ROD implementation projects have been divided into disposal facilities, early start projects and four phases. The disposal facility projects consist of the double-lined landfill, the Basin A consolidation area and the enhanced landfill. The early start projects consist of the Shell and complex trench slurry walls, and the chemical and

the sanitary sewer plugging. Phase I includes consolidation of the outlying areas into the landfill and Basin A, and the demolition of South Plants structures. Phase II consists of the remainder of South Plants, primarily soils removal and capping, not addressed in Phase I. Phase III consists of remediating Sections 35 and 36, the secondary basins, and the North Plants area. Phase IV addresses the lime basins, Basin F wastepile and former Basin F areas. Appendix B contains two figures that depict the project phasing and conceptual logic. Figure 1 is a map that shows the four phases. Figure 2 is a conceptual-logic diagram.

The phased project sequence was developed from various criteria deemed important to the USFWS, Shell, and Army. The EPA and CDPHE have reviewed these criteria and consider them appropriate for remedial implementation. Although the criteria are divided into general areas, they are often interrelated and in total are key to developing an integrated approach to implementation of the ROD. The criteria developed include:

- The HWL and Basin A are critical path projects because the majority of remediation activities may not begin until these two facilities are ready to accept waste materials.
- The Shell/Complex Trench Slurry Walls, the South Plants Central Processing Area and Complex Trench Chemical Sewer Plugging, and the Sanitary Sewer Manhole Plugging projects are identified as early start projects because they do not depend upon the HWL or Basin A for completion.
- Implementing the ROD from a practical field perspective was an important factor in developing the project sequence. Sequencing considered basic guiding principles such as minimizing double handling, avoiding traffic conflicts and implementing projects based on common geographical areas.
- A major benefit of the proposed sequence is the completion of outlying areas early in the remediation schedule. Consistent with EPA guidance, the Army's intent is to turn over portions of the site to USFWS as they are remediated. This proposed "out-to-in" sequence maximizes the ability to accomplish this objective.
- South Plants structures, some areas of South Plants central processing area soils and the Basin A soils, represent the areas currently presenting the highest documented risk to biota. Therefore, Early Start and Phase I activities will begin with the foundation work within Basin A and demolition of South Plants structures.
- An important consideration in the project sequence is that the program be adaptable to various funding scenarios. Given the uncertainty of future government funding levels, this general sequencing and phasing allows for priorities to be outlined but is flexible enough to adapt to actual funding availability.

In addition to funding limitations, other non-technical factors could influence the final sequence of projects. For example, the schedule must be compatible with requirements of the Chemical Weapons Convention (CWC). The terms of the CWC state that the United States must have 40 percent of total production capacity destroyed within five

years of the Entry Into Force, which went into effect on April 29, 1997. To comply with the terms of the CWC, the RVO is currently evaluating whether the North Plants area remediation will need to be moved forward in the schedule.

The proposed sequence does not preclude phases from overlapping. For example, the initiation of Phase IV work will actually begin while Phases II and III work is ongoing according to the design schedule presented in Appendix C. Much of the work in the phases will actually be accomplished in parallel rather than in series.

The schedule in Appendix C divides the total RMA remedy implementation into twelve categories of work. This represents an addition of two categories from those presented in the original RDIS. Of these categories, two through seven represent the majority of field work required to execute the selected remedy. The remaining six categories are: Site Wide Programs, Water Treatment/Monitoring Activities, RVO, Program Management, Off-Post Remedy, and Pre-ROD Activities. The Pre-ROD Activities and the Off-Post Remedy are included in the schedule only as a reference. Actual implementation of the Off-Post Remedy is defined and controlled by the ROD for the Off-Post OU. The following depicts how the soil/structures implementation, site wide, and water treatment/monitoring projects fall within these twelve categories of work:

Pre-ROD Remediation
- IRAs and all other work performed prior to signing of the ROD
- Not shown in schedule

Disposal Facilities – Basin A/Landfills
- Construct Hazardous Waste Landfill
- Construction of Enhanced Hazardous Waste Landfill
- Basin A Consolidation and Remediation

Early Start Projects
- Sanitary/Chemical Sewer Manhole Plugging – Phase I
- Shell/Complex (Army) Disposal Trenches Slurry Walls
- Post-ROD Removal Actions for Structures
  - Asbestos IRA
  - Chemical Process Related Activities

Phase I – Outlying Areas
- Toxic Storage Yards Soil Remediation
- Existing (Sanitary) Landfills Remediation
- Lake Sediments Remediation
- Burial Trenches Soil Remediation
- Munitions (Testing) Soil Remediation
- Miscellaneous Northern Tier Soil Remediation
- Miscellaneous Southern Tier Soil Remediation
- Section 36 Bedrock Ridge Groundwater Barrier Plume Extraction System
- South Plants Structure Demolition and Removal
- Miscellaneous RMA Structures Demolition and Removal
  - Drummed Waste Handling and Disposal

Phase II – South Plants Area
- Buried M-1 Pits Soil Remediation
- Hex Pit Soil Remediation
- South Plants Balance of Areas and Central Processing Area Soil Remediation – Phase II
- South Plants Balance of Areas and Central Processing Area Soil Remediation – Phase I

Phase III – Sections 35 & 36 Sites
- Sanitary Sewer Manhole Plugging – Phase II
- Section 36 Balance of Areas Soil Remediation
- Secondary Basins Soil Remediation
- Complex (Army) Disposal Trenches Remediation – Cover
- Shell Disposal Trenches Remediation – Cover
- North Plants Soil Remediation - Cover
- Section 35 Soil Remediation
- North Plants Structure Demolition and Removal

Phase IV – Basin F/Lime Basins
- Basin F Wastepile Remediation
- Former Basin F Principle Threat Soil Remediation
- Basin F and Basin F Exterior Remediation
- Section 36 Lime Basins Soil Remediation

Site-Wide Programs
- RCRA Equivalent Cover Demonstration Project
- Borrow Areas
- Structural Agent Treatment Facility
  - To be addressed as project-specific components, not shown in schedule
- Soil Agent Treatment Facility
  - To be addressed as project-specific components, not shown in schedule
- Site-Wide Biota Monitoring – BAS
- Site-Wide Air Monitoring – APA
- Contingent Soil Volume
- Site-Wide Plume Monitoring
- Confined Flow System Monitoring
- Medical Monitoring Program
- Site-Wide Traffic Management (Haul Roads)
- Site-Wide Geophysical Investigation
- Unexploded Ordnance Disposal
- Biota Barrier Material
- Permanent Revegetation/Mitigation
- Drummed Waste Handling (Plan Development Only)
- Well Abandonment/Retention Program

Water Treatment/Monitoring
- SACWSD Water Supply/Henderson Distribution Line and Hook-ups
- On-Post Water Supply
- Section 36 Bedrock Ridge Groundwater Plume Extraction System (Monitoring)
- Confined Flow System Well Closures

Irondale Containment System
Basin A Neck System
CERCLA Wastewater Treatment Facility
Northwest Boundary Containment System
North Boundary Containment System
South Lakes Plume Management
Groundwater Mass Removal

Remediation Venture Office: RVO (tri-party) shared costs
Program Management
Remedy Support and Operations
Remedy Execution
USFWS
Program Controls
Public Outreach

Program Management: Party-only costs
Program Management
Remedy Support and Operations
Remedy Execution
USFWS
Program Controls
Central Repository
Legal (Trust Fund, etc.)

Off-Post Remedy – (Reference only)
Off-Post Surficial Soil
Off-Post Water Treatment Facility
Off-Post Well Closures

1.4 Implementation Strategy

This section describes the Army, Shell, and USFWS organization and contracting strategy that have been developed to implement the ROD. The RVO will provide the management and execution of the remedy. The PMC will be responsible for implementing the selected remedy at RMA at the direction of the RVO.

1.4.1 Remediation Venture Office

The Army, Shell, and USFWS have formed a tri-party arrangement consisting of personnel from the three organizations. The new entity, called the RVO, is responsible for the overall management and execution of the remedy. Members of the RVO will oversee remedial planning, remedial design, oversees execution of remedial actions, and arrange for post-remedy operation and maintenance. The RVO will be responsible for the design of the early start projects.

1.4.2 Program Management Contractor

The execution of the RMA ROD will be accomplished through a PMC. The PMC shall be the integrating contractor with full responsibility for implementation of the ROD selected remedy. The activities of the PMC will include design activities as well as subcontracting for construction and remediation efforts. The PMC, as the integrating contractor, shall be responsible for site-wide logistical planning and support. The PMC shall be responsible for the integration and documentation of the remedial action needed to obtain EPA or CDPHE certification after completion of remedial action.

The PMC acquisition effort was completed on May 23, 1997, with award of the PMC to Foster Wheeler Environmental Corporation. The award was protested. Discussions are underway in an effort to resolve the protest. The PMC is now scheduled for award in November 1997.

2.0 INTEGRATION OF INTERIM RESPONSE ACTIONS INTO THE RDIS

Since 1975, the Army and Shell have undertaken numerous efforts to protect on- and off-post human health and the environment. Response actions at the most highly contaminated sites were undertaken to stop the spread of or eliminate contamination. All IRAs that required the removal of material were carried out in accordance with applicable laws and regulations and were consistent with and contributed to the efficient performance of the preferred alternatives for the On-Post and Off-Post OU. Fourteen IRAs were initiated. All ongoing actions have been incorporated into the final response action. Detailed descriptions of the fourteen IRAs are located in Appendix A. Additionally, Table A-1 summarizes past and ongoing response actions.

2.1 Continuation of Active IRA'S as Remedial Actions

Numerous groundwater intercept and treatment systems have ongoing operations. The following projects are shown in the schedule under the heading, Water Treatment/Monitoring:

North Boundary Containment and Treatment System
Northwest Boundary Containment and Treatment System
Irondale Control System
Groundwater Intercept and Treatment System in the Basin A Neck Area

The Asbestos Removal and Chemical Process-Related Activities IRAs are also ongoing and will continue as remedial actions. These two projects and their components are shown in the schedule under the heading Post-ROD Removal Actions.

2.2 IRA Completion Summaries

The Army is currently preparing completion summary reports detailing the activities and status of the fourteen IRAs. Those reports will summarize technical plans, alternative assessment reports, decision documents, implementation documents, and operational reports, and will serve as the final close-out documents for the IRAs. Appendix A, Table A-1, provides the current status of each IRA. Final summary reports for all IRAs are projected to be complete by September 1998.

3.0 REMEDIAL DESIGN ACTIVITIES

Chapter 34 of the FFA outlines the three steps as minimum requirements for development of design documents and the procedures for design review and approval by the RMA Committee. The FFA also stipulates the two design documents subject to dispute.

The EPA Superfund Remedial Design and Remedial Action Guidance and Remedial Design/Remedial Action Handbook also provides design procedures. The guidance in both of these documents is specifically written for "Federal Lead Remedial Design." Under this guidance, the EPA may directly hire a design contractor or enter into an Interagency Agreement (IAG) with the U.S. Army Corps of Engineers (USACE) Missouri River Division. In the latter case, the USACE would then contract for design services. With the exception of the RCRA HWL, the Program Manager Rocky Mountain Arsenal Remediation (PMRMAR) will perform or contract all remedial design services. Therefore, the guidance in both of the EPA documents will be considered to the extent it is applicable to the PMRMAR remedial design.

This section of the RDIS will provide a discussion of the remedial design process anticipated to be used by the PMRMAR throughout execution of the ROD.

The FFA specifically identifies several design submissions: the DDSOW, the final design Scope of Work (SOW), the conceptual design, the draft final design and the final design. Two of these design documents are disputable, the DDSOW and the draft final design. The Superfund Remedial Design and Remedial Action Guidance discusses four major design review and approval points. These are: Preliminary Design, Intermediate Design, Prefinal Design, and Final Design. The Preliminary Design is the equivalent of the Conceptual Design and is approximately 30 Percent complete. The Intermediate Design is approximately 60 Percent complete.

The Prefinal Design is the equivalent of the Draft Final Design and is approximately 90 Percent complete. The Final Designs are synonymous.

The Army will use a design process that combines the requirements of the FFA and the EPA RD/RA guidance documents. The dispute points will be governed by the FFA. The RD/RA guidance will be incorporated to ensure that Regulatory Agencies design review comments are solicited and incorporated. It is the intent of the Army to fully involve the

Regulatory Agencies community in the design process to alleviate the necessity for design disputes. In summary the design process to be used throughout the execution of the On-Post ROD will be:

FFA Requirements	RD/RA Requirements	Remarks
Draft Scope of Work	Scope of Work/Work Plan	Disputable/Enforceable Deadline
Final Scope of Work		
Conceptual Design	Preliminary Design Intermediate Design	
Draft Final Design	Prefinal Design	Disputable/Enforceable Deadline
Final Design	Final Design	

Section 1.3.2 introduced the soils/structures implementation projects developed by the Army to execute the ROD. It is anticipated that each implementation project will be designed in accordance with the design process previously discussed. The Army may combine two or more similar projects into one design effort if that proves to be advantageous. As an example, two or three soil remediation projects may be combined into one design and contract package due to their close geographic location, similar disposal points or other justification. If such a combination of projects proves to be a viable option, the Army will notify the Regulatory Agencies in the DDSOW.

3.1 Draft Design Scope of Work

The FFA identifies the DDSOW as the first deliverable for each implementation project. The FFA states that the DDSOW will provide an "outline of the work plan for, and major elements of, the design and engineering work to be conducted" for the project. Specifically, the SOW will include but not be limited to the following:

- Discussion of the design approach for the project
- Available information
- Additional information requirements
- Proposed investigations
- Conceptual design overview
- Anticipated performance monitoring
- Preliminary list of project specific plans

If the RMA Committee determines that two or more of the soils/structures implementation projects should be combined into one design effort, the DDSOW will be the document to justify proceeding in this fashion, and will describe the combined projects. The DDSOW will be submitted to the RMA Committee for review and comment. RMA Committee members will have 30 days to raise dispute issues on the DDSOW.

3.1.1 Design Scope Deadline

The milestone for "Design Scope Deadline" as designated in the Primavera schedules represents the enforceable milestone date for issue of the draft SOW to the Regulatory Agencies for review.

3.2 Final Design Scope of Work

Upon unanimous agreement of the RMA Committee members, or completion of the dispute resolution process, the draft SOW shall be updated and finalized. The Final Design SOW will include an updated schedule for completion of the design, which reflects modifications that were mutually agreed upon during review and comments of the DDSOW. Work on the Conceptual Design shall begin promptly once the Design SOW is finalized.

3.3 Conceptual Design

The FFA identifies the Conceptual Design as the next deliverable for each implementation project. The Conceptual Design, or preliminary design in the RD/RA guidance, represents approximately 30 Percent Design completion. The Conceptual Design will provide a refined project description, design assumptions and criteria with reference to appropriate drawings and specifications, data collection requirements, a discussion of possible design alternatives, identification of ARARs, and schedule for completion of Final Design. The Conceptual Design is not a disputable item, but it will be submitted to the RMA Committee for review and comment. The Conceptual Design will be made available for public input.

3.4 Intermediate Design

The RD/RA guidance refers to the Intermediate Design as approximately 60 Percent complete. The 60 Percent Design will provide the refined design assumptions, rationale for selection of detailed design features, and incorporation of all appropriate Regulatory Agencies comments from the Conceptual Design. This design package will contain preliminary drawings and specifications. This stage of design is not a deliverable or disputable item under the FFA. However, in an effort to assure that the Regulatory Agencies community has ample opportunity for review during the design process, the Army will submit the Intermediate Design to the RMA Committee for review and comment. If it is determined that a design scope is not significantly complex, the requirement for this submission may be waived by the RMA Committee.

3.5 Draft Final Design

The FFA identifies the Draft Final Design as the next deliverable for each implementation project. The FFA defines the Draft Final Design as 95 Percent complete. The RD/RA guidance refers to the Draft Final Design as the Prefinal Design and at 90 Percent complete. For the purposes of the design process, the Draft Final Design shall be considered to be 95 Percent complete. The Draft Final Design will incorporate all comments from the 60 Percent Design and it is anticipated that all significant Regulatory Agencies comments will have been resolved and incorporated. The Draft Final Design will include all the documents required for procurement of the remedial action; the final draft drawings and specifications, final draft design analysis, and cost estimate for the implementation of that portion of the remedial action. The Draft Final Design will also include proposed implementation deadlines. The Draft Final Design will be submitted to the RMA Committee for review and comment.

RMA Committee members will have 30 days to request dispute resolution. The Draft Final Design will also be made available for public input.

3.5.1 Design Deadline

The milestone for "Design Deadline" as designated in the Primavera schedules represents the enforceable milestone date for issue of the Draft Final Design (95 Percent) to the Regulatory Agencies for review.

3.6 Final Design

Upon unanimous agreement of the RMA Committee members, or completion of the dispute resolution process, the Draft Final Design shall be updated and finalized. In accordance with Paragraph 34.15 of the FFA, the Final Design will establish enforceable implementation start and completion deadlines for the remedial action. Once the design is finalized, the Army shall implement the remedy in accordance with the schedule outlined in the Final Design.

3.6.1 Implementation Start Deadline

The milestone for "Implementation Start Deadline" as designated in the Primavera schedules represents the award date of the Army's initial task order associated with each implementation project. The milestone date will become enforceable upon the issuance of the Final Design Package (100 Percent).

3.6.2 Implementation Finish Deadline

The milestone for "Implementation Finish Deadline" as designated in the Primavera schedules represents the completion of all fieldwork (completion of demobilization and/or final inspection) associated with each implementation project. The milestone date

shown will become enforceable upon the issuance of the Final Design Package (100 Percent).

3.7 Plan Development

During the design process, specific plans will be identified to ensure that implementation of the remedial action is completed in a safe, timely, and cost efficient manner to meet the requirements of the ROD. These plans may include a site-specific safety plan, quality assurance plan, operations and maintenance plan, soil erosion mitigation plan, volume verification, sampling and analysis plan and other appropriate plans. The preliminary list of specific plans will be identified in the DDSOW. These plans will be developed during design and may be further defined at RMA Committee prior to the beginning of the remedial action.

4.0 REMEDIAL ACTION ACTIVITIES

Chapter 34 of the FFA outlines the procedures for implementation of a remedial action. Once the final design has been approved by the RMA Committee, the remedial action shall begin. The FFA states:

> *"The only issues relating to implementation of a response action that may be raised for dispute resolution are: (a) whether the response action is being implemented in accordance with the ROD, (b) whether the response action is being implemented in accordance with the applicable final design document, (c) whether the response action is being implemented in accordance with the terms of this agreement, and (d) whether good cause exists for extending an implementation deadline."*

The FFA does not specifically identify any documents that need to be submitted to the RMA Committee during remedial action. However, the FFA does state that the RMA Committee shall receive monthly updates of ongoing remedial actions.

This section of the RDIS provides a general discussion of the implementation projects and also addresses the activities that must be performed to ensure proper project completion, project post-closure activities, and the roles and responsibilities of the RVO, EPA, CDPHE, and the PMC relating to these activities.

4.1 Implementation Project Descriptions

Project descriptions, a conceptual-logic diagram, and RMA site map can be found in Appendix B.

4.2 Project Completion and Closure Requirements

Note: The following text represents the RVO's understanding of the CERCLA completion and closure process and how it is proposed to be applied at the RMA. It is recognized

that there is not a consistent viewpoint between the RVO and EPA on this process. Therefore, the RVO and the Regulatory Agencies will begin discussions to define and outline the details of the closure requirements for the RMA. Based on the final agreed to procedure, future changes to this section may be required.

The CERCLA process requires a RA Report to document the completion of cleanup activities of an OU. Since the On-Post OU of RMA was organized into numerous implementation projects, and partial deletions for the RMA from the NPL are envisioned, a single RA report for the On-Post OU will not be sufficient. The Office of Solid Waste and Emergency Response (OSWER) directive 9320.2-09A-P allows an OU to be broken into phases to accelerate implementation of the OU. Therefore, the RVO has outlined the development of the Construction Completion Report (CCR) for each implementation project or portion of an implementation project in support of partial deletions, and closure of the Off-Post and On-Post OUs. Each CCR is equivalent to an RA report for that phase of the OU.

A CCR will be prepared by the PMC for each implementation project or portion of an implementation project. The report requirements will follow the same process as a RA Report:

- Prefinal construction conference
- Prefinal inspection
- Final inspection
- Issue CCR
- Receive approval from EPA and CDPHE

The following subsections further define this process.

4.2.1 Prefinal Construction Conference

A Prefinal Construction Conference will be conducted upon substantial (approximately 90 percent) construction completion but prior to final construction completion of the implementation project. The conference will be scheduled by the RVO and attended by the EPA, CDPHE, PMC, and remediation contractor(s). The objective of the conference is to discuss the project completion and closeout. The topics will include:

- Post-closure operations and maintenance (O&M) plan submission
- Construction clean-up responsibilities
- Demobilization activities
- Security requirements for project transfer
- Prefinal Inspection schedule
- EPA/CDPHE joint inspection schedule
- CCR preparation schedule
- Discussion of current physical completion status

4.2.2 Prefinal and Final Inspections

The purpose of these inspections is to determine whether the construction was completed in accordance with the contract and to determine if all aspects of the plans and specifications and construction quality assurance (CQA) procedures have been implemented in accordance with the On-Post ROD and the approved Remedial Design. In addition to the prefinal and final inspections, the RVO, PMC, and the Regulatory Agencies will conduct a formal review of the construction records (as required in the design specifications and CQA plan), including not limited to, the volume verification survey, the CCR, as-builts, record drawings, Performance Evaluation and Professional Land Surveyor certification statements, survey logs, quality assurance/quality control (QA/QC) logs and sample results, corrective action reports, documented design changes and modifications, and supporting daily and weekly QA/QC summaries. A formal records review typically will be conducted coinciding with the issuance of the draft CCR, but will be conducted no later than 70 days after the final inspection. At the conclusion of the formal records review the RVO will provide to the Regulatory Agencies copies of the Survey Report (or volume verification report) and record drawings. The prefinal and final inspections will be scheduled by the RVO and will be attended by representatives of the EPA, CDPHE, RVO, PMC, and responsible remediation contractor(s).

4.2.2.1 Prefinal Inspection

Each element of the work will be inspected to determine if the work has been completed and is ready for final inspection. Any work in progress and/or minor defects will be noted and included on a prefinal inspection punch list. A prefinal inspection report will be prepared jointly by the PMC and remediation contractor(s).

4.2.2.2 Final Inspection

The construction work and contract are considered complete when the remedy is functional, all punch list items have been performed and resolved, and the terms of the construction contract have been met. If, during the Final Inspection, a few minor work elements are not yet complete, final payment will be retained from the remediation contractor(s) until these elements have been completed. However, these minor work elements may not affect acceptance of the work by the EPA and CDPHE unless these elements impact the performance of the completed project.

4.3 Reports

This section describes the reports that will be generated for the implementation projects.

4.3.1 Monthly Progress Report

During execution of remedial actions, a verbal progress report will be presented at the monthly RMA Committee meetings. In addition, a written progress report will be

prepared and submitted to the RMA Committee. The report will be used to monitor remedial project activities.

4.3.2 Prefinal Inspection Report

A Prefinal Inspection Report will be prepared jointly by the PMC and remediation contractor(s) and will include the following information:

- Prefinal Inspection punch list
- Completion dates for outstanding items
- Proposed date for final inspection

A copy of the Prefinal Inspection Report will be sent to the EPA and CDPHE for review upon approval by the RVO. If necessary, a meeting will be held involving members of RVO, EPA, CDPHE, the PMC, and remediation contractor(s) to resolve any remaining issues or punch list items identified during the Prefinal Inspection or in the Prefinal Inspection Report. Responses to Regulatory Agencies' comments (and any meeting minutes) will serve as the supplement modifying the report. The Prefinal Inspection Report will not be re-issued following the review.

4.3.3 Construction Completion Report

The RVO will submit a PMC-prepared draft CCR for submittal to the EPA and CDPHE for review within 60 days after the Final Inspection. The CCR will document the completion or partial completion of each implementation project of the On-Post or Off-Post OU's. The CCR will become an official record of remedial action activities, and will contain, at minimum, the following:

- Executive summary
- Introduction
- Chronology of events
- Performance standards and cleanup goals that have been met
- Summary of construction and a list of all modifications and a description of major modifications that were made during the project and why they were necessary
- Description of the quality assurance and quality control procedures followed and documentation summary
- Construction health and safety procedures followed and documentation summary
- Environmental compliance (air/odor monitoring, storm water management, waste management, etc.)
- Inspection documentation including Prefinal Inspection, Final Inspection, and Final Records Review
- Discussion of operational and maintenance requirements
- Summary of project costs

- Lessons Learned
- Contact Information
- Documentation
- Written notification by RVO that the project is complete and functional
- Reference of all supporting project documentation

Note: The outline shown above is provided to ensure consistency in reporting. The detail that is to be included under each section will be addressed in the Project Completion Plan for each Implementation Project.

The CCR will be reviewed by the EPA and CDPHE to ensure that the implementation project has been completed. This report is disputable and will serve as the Army's request to EPA for acceptance that the remedial action has been completed. Upon approval of the CCR, a letter will be issued by the EPA with CDPHE concurrence, indicating completion and acceptance of the project.

4.3.4 Partial Deletion Documentation

In support of transferring RMA property to USFWS for use as wildlife refuge as early as possible; the Army will request that EPA delete areas from the NPL when the opportunity or need arises. The early deletion of areas from the NPL can be accomplished through the Partial Deletion process as outlined in the EPA guidance document "Close Out Procedures for National Priorities List Sites" Section 6.0 OSWER 9320.2-09A-P, (also see the Office of Emergency and Remedial Response (OERR) Directive 9320.2-11, Procedures for Partial Deletions at NPL Sites, dated April 30, 1996, OERR Directive 9320.2-11, EPA 540/R-96/014, PB 96-963222, EPA "Notice of Policy Change: Partial Deletion of Sites Listed on the National Priorities List" (60 FR 55466, November 1, 1995), NCP (40 CFR 300. 425 (e)(3)) for further information about partial deletions), and "DoD/EPA Joint Guidance on Streamlined Site Closeout and NPL Deletion Process for DoD Facilities."

Requirements for the partial deletion area are essentially the same as for the full deletion (see RDIS Section 4.4.3). Two differences are the mapping requirements for the partially deleted area and the documentation that supports the decision to partially delete. Partial deletion requirements ensure that (1) the ROD mandated remedial actions are complete; (2) the remedial actions conducted and documented are verified; (3) the area of the site to be deleted is clearly and accurately defined, and delineated; and (4) the public has an opportunity for notice and comment before the portion is formally deleted from the NPL.

In a full deletion, a Final Close Out Report (FCOR) is prepared to document site completion (see RDIS Section 4.4.2.1). In the case of a partial deletion, an FCOR will not yet exist. Therefore, another document will have to serve the same purpose as an FCOR for the portion(s) of the sites that are being considered for deletion. The RMA will prepare the documentation necessary to support partial deletion (summarize historical use, i.e., references to pertinent CCRs and EPA/CDPHE acceptance letters) and

to satisfy all mapping (Geographic Information System coordinates) requirements. These documents will be the basis for justifying the partial deletion and will be part of the partial deletion docket. Documentation will include the completion of an Environmental Baseline Survey (EBS). Included within the EBS, the RVO will demonstrate that petroleum products or derivatives have been sufficiently addressed. The approved documents will allow the Administrator of the EPA to certify to the Secretary of the Army that response actions required are complete and that the transfer of real property can proceed.

4.3.5 Remedial Action Report

Typically upon completion of all fieldwork, an RA Report would be prepared to document the completion of an OU. At the RMA, in conjunction with completion of the final inspection for the last Implementation Project a letter will be issued notifying the Regulatory Agencies that remediation (fieldwork) for the On-Post OU is complete. Issuance of the draft copy of the last CCR (Part 1, see note below) will initiate the preparation of the Preliminary Closeout Report (PCOR); the PCOR will serve as the document for final approval that the On-Post and Off-Post OUs are physically complete, (See Section 4.4.1 and 4.4.1.1).

> *Note: The last implementation project is expected to be a RCRA-Equivalent Cover project; the RVO will prepare and submit a CCR in two parts to document completion of RCRA-Equivalent Covers. Upon completion of fieldwork (installation complete), a CCR (Part 1) will be written to document the cover has been constructed per design. Part 2 of the CCR will be prepared and submitted to EPA and CDPHE as an amendment to Part 1 of the cover CCR. Part 2 will be completed after demonstration of Operating Properly and Successfully, (OPS).*

4.4 Site Closeout Process

Upon physical completion of the final project for the On-Post OU remedy, the EPA, State, and RVO will enter into the site closeout process. The site closeout process at the RMA will consist of documenting that all Superfund response actions are complete and the site can be deleted from the NPL. Site completion requirements provide a definitive endpoint to Superfund cleanup activities and satisfy the National Oil and Hazardous Substances Contingency Plan requirements for site deletion. The site closeout process consists of the following three phases:

- Construction completion activities
- Site completion activities
- Site deletion activities

4.4.1 Construction Completion Activities

Construction completion means that physical construction of the remedy is complete. Characteristics of sites satisfying construction completion criteria related to the RMA include:

- Sites where all necessary physical construction is complete, whether or not final cleanup levels or other requirements have been achieved
- Sites that qualify for deletion from the NPL

Construction completion is considered final when the EPA approves and signs the PCOR.

4.4.1.1 Preliminary Closeout Report

The PCOR forms the basis for the FCOR and focuses on site construction and completion. The EPA's Remedial Project Manager (RPM), responsible for overseeing cleanup actions, often prepares the PCOR. The PCOR should contain the following information:

Preliminary Close Out Report Summary

Chapter	Contents
I. Introduction	- Include general statement indicating date of pre-final inspection and a statement that contractors or the agencies have constructed the remedies in accordance with remedial design plans and specifications.
II. Summary of Site Conditions	- Provide background summary of site location, site description, and NPL listing information. - Describe any removal action activities at the site. - Include remedies selected, date RA initiated, method used to implement RA (e.g., consent decree, contract, coorperative or other agreement), and date and description of pre-final inspections used to determine that construction is complete. - If implemented, summarize details of the institutional controls (e.g., the type of institutional control, who will maintain the control, who will enforce the control).

	- Describe redevelopment potential at the site, or any planned or ongoing redevelopment work.
III. Demonstration of Cleanup Activity QA/QC	- Document that the construction quality assurance/quality control plan was implemented and that construction completion is consistent with the ROD and remedial design plans and specifications.

IV. Activities and Schedule for Site Completion	- Identify activities remaining in order to:
	  - Assure effectiveness of the remedy (e.g., institutional controls, work plan for operation and maintenance).
	  - Assure consistency with the NCP (e.g., joint EPA, State inspection, operational and functional determination).
	  - Satisfy requirements for site completion (e.g., Final RA Report).
	- Specify the organization responsible for implementation of each activity.
	- Set dates for completion of the activities and elements required to satisfy NCP and procedural requirements for issuing a FCOR and reaching site completion.

V. Summary of Remediation Costs	- Report for each operable unit:
	  - ROD estimate of capital costs and annual O&M costs,
	  - Construction contract award amount.

VI. Five Year Review	- State whether a five-year review is required, what type of review is required (statutory or policy), and when scheduled.

A draft of the PCOR must be sent to EPA Headquarters for review. EPA regional staff will coordinate this review. The purpose of the review is to ensure national consistency in reporting construction completions. Upon approval of the PCOR, the EPA, with the State's concurrence, will prepare a letter of approval for the Army, denoting the physical completion of the On-Post and Off-Post OUs.

4.4.2 Site Completion Activities

Site completion marks the end of remedial activity at the site. A site must meet all criteria below to be eligible for site completion status:

- Cleanup levels specified in all RODs are met and cleanup actions and other measures identified in all RODs are successfully implemented.
- Institutional controls are in place.
- The constructed remedy is operational, functional, and performing according to engineering design specifications.
- The site is protective of human health and the environment.
- The only remaining site activity to be completed, if any, is O&M.

In order to document the completion of these requirements, an FCOR is prepared.

4.4.2.1 Final Closeout Report

The FCOR is a summary of site history, emphasizing the RD/RA. In general, the EPA's RPM prepares the FCOR but also may allow other parties to prepare it. The FCOR is usually 10 to 15 pages long and should summarize the information necessary to describe the activities performed and the results achieved. An FCOR can be longer for larger sites with multiple OU's. To keep the report brief, detailed technical or cost information and data may be referenced or appended to the report. The following is an outline of information to be included in the FCOR:

Final Closeout Report Summary

Chapter	Contents
I. Introduction	- General statement indicating that all response actions at the site have been successfully performed.
II. Summary of Site Conditions	- Site background - Removal actions performed - Remedial investigation/feasibility study results - ROD findings - Design criteria - Cleanup activities performed - Community involvement activities performed - Describe redevelopment potential at the site, or any planned or ongoing redevelopment work

III. Demonstration of Cleanup Activity QA/QC	- QA/QC protocol followed - Sampling and analysis protocol followed - Results of on-site inspections
IV. Monitoring Results	- Sufficient data to demonstrate cleanup levels specified in the ROD or Action Memoranda are achieved and implemented and remedies are performing to design specifications - Monitoring required at no-action sites after the ROD is signed should be briefly documented in the FCOR
V. Summary of Operations and Maintenance	- Description of required O&M activities - Assurance that O&M plans are in place and are sufficient to maintain the protectiveness of the remedy - Assurance that all necessary institutional controls are in place - Assurance that O&M activities specified for the site will be performed by the State or the responsible party
VI. Summary of Remediation Costs	- ROD estimate of capital costs and annual O&M costs - Construction contract award amount - Total remedial action construction cost (i.e., capital costs) at time of FCOR - Current estimated annual O&M costs.
VII. Protectiveness	- Assurance that the implemented remedy (or no-action decision) achieves the degree of cleanup or protection specified in the ROD(s) for all pathways of exposure and that no further Superfund response is needed to protect human health and the environment - Assurance that all areas of concern described in the NPL listing have been adequately addressed
VIII. Five Year Review	- Statement explaining whether a five-year review is appropriate, and if so, the type of review (statutory or policy) and the schedule for the review

- Summary of five-year reviews already completed

IX. Bibliography - Complete citations of all relevant reports

The FCOR provides the overall technical justification for site completion. A draft of the FCOR must be submitted to EPA Headquarters for review. EPA regional staff will coordinate this review. The State also must be given the opportunity to review and provide comments, and although EPA's guidance does not require that the state formally offer a signed concurrence on the report; it is regional policy that an FCOR is not approved by EPA without written State concurrence. Site completion is considered final when the Regional Administrator approves and signs the FCOR.

4.4.3 Site Deletion Activities

At this point in the closeout process, issues surrounding placement of the site on the NPL have been addressed, the threat to human health and the environment has been addressed, and the Superfund process has completed its course. Site deletion requirements ensure that documentation and verification of activities and decision making at the site are complete and the public has an opportunity to comment before the site is formally deleted from the NPL. Upon site completion the area remaining not previously deleted from the NPL (see current status of Partial Deletions, Appendices C-P) can be proposed for full deletion.

The NCP states (40 CFR 300.425(e)) that a site may be deleted from the NPL when no further response is appropriate. To delete a site from the NPL, EPA must determine, and the CDPHE must concur, that one of the following criteria has been met:

- Responsible or other Regulatory Agencies have implemented all appropriated response actions required;
- All appropriate fund-financed response under CERCLA has been implemented, and no further response action by responsible parties is appropriate; or
- The remedial investigation has shown that the release poses no significant threat to public health or the environment, and therefore, taking of remedial measures is not appropriate.

The process begins with the EPA consulting with the state and requesting its concurrence with the EPA's intent to delete the site from the NPL. *No site may be deleted from the NPL without State concurrence.* Once State concurrence is obtained, the EPA prepares a deletion docket containing all pertinent information supporting the deletion recommendation. Copies of the completed docket are to be placed in the appropriate regional and local repositories.

4.4.3.1 Notice of Intent to Delete

The Notice of Intent to Delete (NOID) informs the public of the EPA's intention to delete a site from the NPL. Once the deletion docket is complete the NOID is then published in the Federal Register (FR) and in the local newspaper(s). The following is a list of the contents of a NOID:

Contents of the Notice of Intent to Delete

Chapter	Content
I. Summary	Announcement of intent to delete
II. Dates	Dates of a 30-day period for submission of public comments
III. Addresses	Name, address, and phone number of a regional contact to whom comments should be sent; address of regional docket and local repository
IV. Regional Contract Information	Name, address, and phone number of a Regional contact for further information or questions
V. Supplementary Information	Information: identification of site(s) to be deleted and a summary of information in the NOID **NPL Deletion Criteria:** List of the applicable NCP criteria and statement indication that EPA retains the ability to use Superfund authority at a deleted site if future conditions warrant such action (40 CFR Section 300.425(e)(3)) **Deletion Procedures:** Brief description of procedures followed to delete sites from the NPL Bases for Intended Site Deletion(s): Brief descriptions of the following items: • Site history (location, former use, type of contaminants, FR citations of proposed and final NPL listing, and site conditions resulting in listing)

- All response actions taken, including scope of RI (if applicable), general results, and conclusions regarding future performance of these actions
- Specific cleanup standards and criteria and results of all confirmatory sampling O&M procedures and site monitoring program
- Reasons for needing five-year reviews, when appropriate, and plans for their execution, in accordance with EPA's requirements for protectiveness at the time of each future review
- Major community involvement activities
- How site meets deletion criteria
- Evidence of state concurrence with decision to delete a site

The public has the opportunity to comment during the 30-day comment period that follows publication of the NOID. The EPA's RPM is responsible for preparing a responsiveness summary for all local and national comments received. The responsiveness summary should present all comments received during the public comment period, paired with detailed responses to the comments.

4.4.3.2 Notice of Deletion

The final step is for the RPM to publish the Notice of Deletion in the FR. This notice states that all appropriate responses under CERCLA have been implemented and no further response is appropriate. The notice of deletion includes an effective date, a regional contact, and supplemental site information.

4.5 Periodic Reviews (Five Year Reviews)

4.5.1 Timing of Five-Year Review

The RMA's Five-Year review schedule is based on the signature of the Off-Post ROD. Subsequent Five-Year reviews will occur no later than Five Years from EPA's date of concurrence signature for the preceding Five-Year Review report, (for the RMA, the schedule presented in Table 4-1 will be adhered to. A change to the schedule must be approved by the RVO and the Regulatory Agencies).

4.5.2 Objective of Five-Year Review

The purpose of a Five-Year review is to evaluate the implementation and performance of a remedy in order to determine if the remedy is or will be protective of human health and the environment. Evaluation of the remedy and the determination of protectiveness

should be based on and sufficiently supported by data and observations, (OSWER 9355.7-03B-P).

4.5.3 Performer and Content of Five-Year Review

Per the FFA (Paragraph 36.3) the five-year review is to be conducted by the Army. The Army will coordinate all five-year reviews with the EPA concerning proper scope and design of the review.

When a five-year review is performed at the RMA, the review will address the entire RMA site (both Off-Post and On-Post OU). The following is a recommended outline and contents of information to be included in the Five-Year Review Report.

Contents of a Five-Year Review Report

The following report sections…	**Should include these topics when appropriate:**
I. Introduction	- the purpose of the review - who conducted the review - when there view was initiated and completed - whether it is the first review of a subsequent review at the site - status of other five-year reviews, OUs and/or areas of the entire site
II. Site Chronology	- dates of major events (such as the initial discovery of contamination, NPL listing, decision and enforcement documents, start and completion of remedial and removal actions, construction completion, and prior five-year reviews)
III. Background	- physical characteristics and - land resource use - history of contamination - initial response - summary of basis for taking action
IV. Remedial Actions	- remedy selection - remedy implementation - system operations/O&M
V. Progress Since Last Review (as applicable)	- protectiveness statements from last review - status of recommendations and follow-up actions from last review - results of implemented actions, including whether they

	achieved the intended purpose - status of any other prior issues
VI. Five-Year Review Process	- notification of potentially interested parties of start of review - identification of five-year review team members - components and schedule of your five-year review - document review - data review and evaluation - community notification - other community involvement activities - site inspection - site interviews
The following report sections…	**Should include these topics when appropriate:**
VII. Technical Assessment	*Question A: Is the remedy functioning as intended by the decision documents?* - remedial action performance and monitoring results - system operations/O&M - costs of system operations/O&M - opportunities for optimization - early indicators of potential remedy problems - implementation of institutional controls and other measures *Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy still valid?* - changes in exposure pathways - changes in land use - new contaminants and/or contaminant sources - remedy byproducts - changes in standards, newly promulgated standards, and TBCs - changes in toxicity and other contaminant characteristics - expected progress towards meeting RAOs - risk recalculation/assessment (as applicable) *Question C: Has any other information come to light that could call into questioned the protectiveness of the remedy?* - ecological risks - natural disaster impacts - any other information that could call into question the

	protectiveness of the remedy
	Summary of Technical Assessment - summary of findings and conclusions related to Questions A, B, and C
VIII. Issues	- issues that were identified during the technical assessment and other five-year review activities (e.g., site inspection) - a determination of whether issues affect current or future protectiveness - a discussion of unresolved concerns or items raised by support agencies and the community (States, Tribes, other Federal agencies or departments, local governments, citizens, PRPs, other interested parties)
IX. Recommendations and Follow-up Actions	- list of any recommendations, including follow-up actions to ensure protectiveness - parties responsible for implementation - agencies with oversight authority - schedule for completion
X. Protectiveness Statement(s)	- protectiveness statement(s) developed at the OU level - protectiveness statement developed for the site as a whole at construction complete sites
XI. Next Review	statement of when the next review is to be completed, or explanation of why no further five-year reviews are needed

Table 4-1 shows the cut off date for the period of performance included in each five-year review.

TABLE 4-1

FIVE-YEAR REVIEW PERIOD OF PERFORMANCE

SCHEDULED REVIEW (Final Draft Copy Issued for signature)	**Report Scope Cut-Off Dates**	
	Remedial Actions Completed By:*	**Monitoring Data Collected By:****
December 2000	March 31, 2000	September 30,1999
December 2005	March 31, 2005	September 30, 2004
December 2010	March 31, 2010	September 30, 2009
December 2015	March 31, 2015	September 30, 2014
Continue on a five year cycle		

*Completed remedial actions are defined by those projects that have completed CCR with EPA and CDPHE acceptance letters by the cut-off date. This cut-off date also applies to current standards, ARARs, TBCs and quantitation limits that are finalized.
**Includes: air, groundwater, surface water, biota, etc.

4.5.4 Follow-Up to Five-Year Review

If issues are identified during the review that may affect the protectiveness of the remedy, further action will be recommended. If the remedy is determined to be unprotective, follow-up actions must be completed to make the remedy protective. The recommendations will include a schedule for achieving protectiveness and also identify the entity responsible for ensuring that the necessary actions are completed.

4.6 Long-Term Operations and Monitoring/Maintenance

Long-term operations will be performed after the initial remediation work is completed and will continue after the Department of Defense relinquishes much of the site to USFWS. The Army will retain ownership and O&M responsibilities for capped and covered areas, as well as water treatment facilities, including extraction and re-injection wells. These operations include groundwater monitoring and containment systems, such as the caps and the landfill, and continuing the operation of treatment systems. Soil sites where covers or caps are constructed will be inspected on a regular basis, and damage to the vegetative cover or any eroded soil will be repaired. Long-term management also includes access restrictions and institutional control measures to capped and covered areas to ensure the integrity of the remedial action facilities. Where human health exceedances are left in place at soil sites, groundwater monitoring will be conducted. Long-term activities are defined as two separate activity types: short-term and post-remediation. Short-term activities begin (when applicable) with the completion of construction activities for each implementation project and continue until the completion of construction activities for the RMA remediation. Completion of construction activities is defined as the completion of field work and excludes the preparation and approval of CCRs; completion of construction activities for the RMA remediation, is defined as completion of field work for the last implementation project and excludes the preparation

and approval of CCRs, the PCOR and OPS demonstration for RCRA equivalent covers. Post-remediation activities begin upon completion of construction activities for the RMA remediation and continue until such time as deemed necessary, or, as in the case of water treatment systems, until the shutdown criteria have been met.

5.0 SCHEDULE

The RDIS provides a comprehensive view of the overall remediation program and its status to the Regulatory Agencies and the public. Reporting capabilities range from summary level program overviews to detailed activity listings. Additionally, this schedule will be used to represent enforceable and target deadlines for the completion of design and implementation activities as defined in the FFA.

The schedule was developed from the implementation group structure using Primavera Project Planner. This schedule incorporates the implementation project descriptions as described in Appendix B to provide a framework for planning the total remedy implementation. The following sections describe the schedule structure, use of resources, activity duration, schedule logic, and methods for modifying and updating the schedule as remedy implementation progresses.

5.1 Schedule Structure

The scheduled items are organized in six levels of detail defined by the work breakdown structure (WBS). Detailed activities shown in the schedule correspond to level 5 of the WBS (see Figure 5.1). By the use of activity coding, higher levels of organization (schedule levels 0, 1, 2, 3 and 4) are included to allow summarizing, tracking, identification, and selection of groups or types of activities. The schedule is structured at the following six WBS levels:

0. RMA – WBS Level 0
1. OU – WBS Level 1
2. Program Phase – WBS Level 2
3. Implementation Project – WBS Level 3
4. Activity Type – WBS Level 4
5. Project-Specific Activity – WBS Level 5

5.1.1 Rocky Mountain Arsenal – WBS Level 0

This level presents the entire time frame for remediation of RMA and includes the On-Post and Off-Post OU.

5.1.2 Operable Unit – WBS Level 1

For completeness, both the On-Post and Off-Post OU are shown in the RDIS. However, actual implementation of the off-post remedy is defined and controlled by the ROD for the Off-Post OU.

5.1.3 Program Phase – WBS Level 2

Program phases are incorporated into the schedule in order to group implementation projects into larger remedial action areas. These phases are defined in Section 1.3.3 of this report.

5.1.4 Implementation Project – WBS Level 3

An activity code is used to describe each distinct set of activities in the schedule. A distinct set of activities is the equivalent of the implementation projects defined in Appendix B and contain the necessary activities to complete the remedial action for that particular implementation project. The implementation project represents Level 3 of the WBS.

5.1.5 Activity Type – WBS Level 4

Within each project, activities are further defined by activity types. Generally, activities for implementation projects are banded together using the following general types:

Pre-design activities
Remedial design
Procurement cycle
Remediation activities
Construction/operations/closure
Short-term monitoring/maintenance/operations
Post-remediation operations/maintenance

These groups correspond to level 4 of the WBS. All implementation projects include remedial design and either remediation activities or construction/operations/closure depending on the type of project. Pre-design activities are included only for implementation projects requiring substantial pre-design study/analysis. Long-term activities are only included for implementation projects with cap/cover or water monitoring activities.

Remedial design includes all stages of the design from the development of design SOW through the completion of 100 Percent Design. Design activities were developed based on EPA guidance provided in the RD/RA and the FFA as described in Section 3 of this report. Activities include the necessary durations for RVO and Regulatory Agencies reviews, and are consistent with review times defined by the FFA.

The remediation and construction/operations/closure activity types include, as appropriate, either remediation or construction activity. Within each implementation project, all activities are assigned an activity type code depending on the nature of the task. The construction/operations/closure activity type is associated with the on-site disposal facilities (Basin A and the Landfills). The remediation activity type includes the

removal, treatment (if necessary), handling, and disposal of waste and contaminated media.

Long-term activities are included for implementation projects where human health contaminants will remain following completion of the remedial action. This includes landfills, cap/cover areas, and continuing groundwater treatment or monitoring sites. Long-term activities are coded into two separate activity types; short-term activities which fall within the remediation time-frame, and post-remediation activities for those activities which continue past the completion of RMA remediation. This allows the post-remediation long-term activities to be excluded from schedule layouts.

5.1.6 Project Specific Activity – WBS Level 5

Project specific activities form the component elements of each implementation project and correspond to Level 5 of the WBS. The project specific activities contain the basic elements required to complete the remedial action and are not meant to include every activity of a full design or construction schedule.

Implementation projects requiring any remedial action other than long-term activities include remedial design activities. These remedial design activities were developed from the EPA guidance handbook as referenced in Section 5.1.5 and include the design and review elements necessary to complete the design. Remedial design activities included in the schedule are as follows:

1. **Prepare/Revise Design SOW** – The work in this activity includes preparing the design SOW as defined in the FFA and Section 3.1 of this report. The duration of this activity combines three sub-activities into one that includes preparation, Regulatory Agencies review and revision. This combination is done to minimize the number of activities in the schedule. However, the overall time required is maintained. RMA Committee review is shown as a separate activity to identify planned review periods. The DDSOW provided by this activity is disputable as defined in the FFA. For scheduling purposes, it has been assumed that the dispute process is not invoked on any design SOW. Should the dispute resolution process be set forth, remaining schedule activities could be delayed.

2. **Design Scope Deadline** – The milestone for "Design Scope Deadline" as designated in the Primavera schedules represents the enforceable milestone date for issue of the draft SOW to the Regulatory Agencies for review.

3. **Prepare 30 Percent (Conceptual) Design** – As defined in Section 3.3.

4. **RMA Committee Review and Public Input** – The work in this activity includes the review of the 30 Percent Design and preparation of review comments. Additionally, it is anticipated that this would be the first time

that the public is invited to review a planned design activity and provide comments.

5. **Prepare 60 Percent Design –** As defined in Section 3.4.

6. **RMA Committee Review –** The work in this activity includes review of the 60 Percent Design and preparation of review comments.

7. **Prepare 95 Percent Design –** As defined in Section 3.5. Although this document is defined as a disputable product in the FFA, no activities have been incorporated into the schedule. Should the dispute resolution process be set forth, remaining schedule activities could be delayed.

8. **Design Deadline –** The milestone for "Design Deadline" as designated in the Primavera schedules represents the enforceable milestone date for issue of the draft final design (95 Percent) to the Regulatory Agencies for review.

9. **RMA Committee Review –** The work in this activity includes review of the 95 Percent Design and preparation of review comments. This activity also includes a notification of public availability and review period for public comments on the design.

10. **Prepare 100 Percent Design –** As defined in Section 3.6.

11. **Procurement Cycle –** This activity is where contractor procurement is being performed and includes the time from completion of 100 Percent Design to the award of the initial subcontract for an implementation project. Also, during this time necessary plans, submittals and remedial action work plans required for the field activities are being finalized.

12. **Implementation Start Deadline –** The milestone for "Implementation Start Deadline" as designated in the Primavera schedules represents the award date of the Army's initial task order associated with each implementation project. The milestone date will become enforceable upon the issuance of the final design package (100 Percent Design).

13. **Implementation Finish Deadline –** The milestone for "Implementation Finish Deadline" as designated in the Primavera schedules represents the completion of all fieldwork (completion of demobilization and/or final inspection) associated with each implementation project. The milestone date shown will become enforceable upon the issuance of the final design package (100 Percent Design).

Remediation and construction/operations/closure activities incorporate all construction and remedial actions necessary to complete the respective implementation project. This

includes excavation, disposal (landfill or consolidation), treatment, containment (caps/covers), specialized tasks (e.g., UXO clearance and removal) as well as mobilization, demobilization, and final reports. For implementation projects with comparable remedies, a similar set of activities were developed. A brief description of the major construction/remediation activities for the selected implementation project remedies is given below. Since many activities are duplicated throughout the schedule, activity descriptions include a two- to four-character implementation project abbreviation to assist in navigating within Primavera.

The majority of implementation projects contained in the schedule involve excavation activities. In general, excavation implementation projects consist of some or all of the following remedial action activities:

- Mobilization
- Surface UXO clearance, excavation, and transport off-post, if required (potential UXO sites)
- Survey chemical sewer, strip sewer overburden, and excavate chemical sewer, if present (implementation projects containing chemical sewer sites)
- Excavate biota risk soil/material and consolidate to appropriate area
- Excavate human health/principal threat soil/material
- Excavate any identified agent soil/material and caustic wash (potential agent sites)
- Treatment, if required by the remedy
- Landfill treated and excavated material
- Backfill with borrow material
- Backfill chemical sewer overburden, if applicable
- Revegetation
- Demobilization
- Final reports

Containment implementation projects also make up a large portion of the schedule. Containment remedial action activities involve the construction of soil covers, slurry walls, and RCRA caps. A listing of activities associated with containment implementation projects is given below:

- Mobilization
- Install/upgrade existing slurry wall, if applicable
- Install gradefill to bring site elevation to final grade
- Install concrete, if applicable
- Install RCRA equivalent cap, if applicable
- Install final soil cover
- Revegetation
- Demobilization
- Final reports

Additionally, the three structures demolition implementation projects include the following remedial activities:

- Mobilization
- Non-agent structures demolition
- Landfill significant contaminated Non-agent material
- Consolidation of Non-agent material to Basin A
- Agent air monitoring
- Agent structures demolition
- Agent caustic treatment
- Landfill agent demolition material
- Backfill agent demolition areas
- Demobilization
- Final reports

Long-term activities are presented in the schedule for implementation projects where human health contaminants will remain following remediation. All implementation projects with cap/cover activities have long-term activities. In addition, the majority of water facility implementation projects also possess long-term activities.

5.2 Use of Resources

Following completion of the schedule structure, the resources or material quantities associated with each activity were loaded into Primavera. The types of resources loaded include landfill soil/material, consolidation soil/material, cap/cover soil/material, borrow soil, and off-post materials. In the schedule, resources were loaded at the project specific level corresponding to Level 5 of the WBS within each implementation project. A resource-loaded schedule provides a tool for analyzing material movement during scheduled remediation activities and for limiting material movement activity to a specified construction season. It must be noted that at this stage of schedule development, such resource analysis is useful for gross level analysis only. Resource leveling was not performed as it is anticipated that such fine-tuning will take place as more detailed implementation plans are incorporated into the schedule through the detailed design process.

Resources are based on the site volumes from the Final Soil Quantity Calculation Summary Report (Foster Wheeler 1996) and are grouped according to implementation projects. Estimated costs were also loaded at the project specific level, corresponding to Level 5 of the WBS. Activity costs were entered as thousands of dollars and were derived from Micro-Computer Aided Cost Estimating System (MCACES) estimates supporting the estimated remediation costs defined in the ROD. As estimated costs are updated through the design process and estimate updates, cost resources will also be updated. Costs were identified as resources in Primavera rather than cost accounts in order to allow schedule leveling on costs (Primavera does not allow leveling on cost accounts). With costs identified as a resource, Primavera can level costs with either time or cost constraints to evaluate various schedule/funding scenarios.

5.3 Activity Durations

Individual activity durations were calculated from resource information or established by Primavera due to schedule links between activities. Calculated durations were entered in Primavera for each Level 5 activity. Established durations are set by Primavera at the time of scheduling. All activities are scheduled in terms of number of days.

Durations for remedial action activities were based on the activity resources and the MCACES productivities used to develop the projected costs. MCACES productivities were determined during the cost estimate and are dependent on the site characteristics, type of machinery selected and level of protection assigned for the site.

Durations for some activities are not calculated but are established by Primavera and are based on the start and finish of all activities that are linked to them. In all cases, no schedule contingencies were assumed or included in the activity durations.

5.4 Schedule Logic

The scheduling of activities is driven not only by the activity durations but also by restrictions placed on or between activities. These restrictions, collectively referred to as schedule logic, can be defined in Primavera as constrained start or finish dates or as predecessor-successor relationships between activities. The following describes these constraints as defined in the schedule.

5.4.1 Constrained Dates

Start and finish dates can be constrained in Primavera by mandatory start/finish dates or by schedule float definition. Mandatory dates were not generally utilized in the schedule; activities were allowed to start as early as possible based on other defined constraints or relationships. The ROD finish date was entered as a mandatory date with all activities having the ROD activity as a predecessor. This ensures that all remediation activity within the schedule will start after the ROD date without defining a mandatory start for each activity.

Start dates can also be constrained by the allowable float within the schedule. Schedule float, or total float, is the amount of time that an activity can be delayed from its early start date and not result in a delay to the total project finish date. Free float is the amount of time that an activity can be delayed and not result in delays to its immediate successors. In the schedule, the design activities are defined with zero free float. This has the effect of delaying design activities until just before the remediation activity in the schedule, thus eliminating potential gaps between design and remediation.

Start and finish dates can also be constrained in Primavera by calendar assignments. The RDIS has defined the following five calendars:
5-day Workweek: Defines a standard workweek, Monday through Friday.

Revegetation: Assigned to revegetation activities and constrains these activities to two planting seasons per year; spring – Late March thru mid-May; and fall – mid-September thru November.
Bald Eagle Management Area: Standard 5-day workweek, but prohibits work from mid-October through mid-April in specified areas of RMA due to the presence of bald eagles.
Construction Season: Standard 5-day workweek, but includes constraints for lost days due to weather. The number of non-work days per month is based on data collected by the National Weather Service at the former Stapleton Airport over a 30 year period, 1965-1994. This calendar is assigned to most backfill and cover activities where weather conditions are a factor.
Calendar Days: 7-day per week calendar, assigned to review activities.

All calendars recognize the standard holidays observed each year.

5.4.2 Activity Links

Constraints can also be defined as relationships between activities. These links can exist between activities within the same implementation project or between two or more projects. A finish-to-start relationship is used for most of the activity sequencing, especially within an implementation project. This relationship requires that the predecessor activity be completed before the successor activity can start. For instance, mobilization must occur prior to excavation, and excavation must occur prior to backfill. Start-to-start and finish-to-finish relationships were used where activities were required to start or finish on the same date. Relationships between implementation projects are driven by sequence preference and practical implementation restrictions.

5.5 Modification Methods

This schedule will continue to be updated in a variety of ways during the course of remedy implementation. For all projects, design deadlines have been established and are reported in Appendix C of this report. These deadlines are consistent with the dispute resolution agreement, signed August 4, 1997. When the final design is completed, enforceable implementation deadlines will be incorporated into the schedule. As implementation project designs are completed, and remediation activities begin, this schedule will be updated with the appropriate level of detail.

It is anticipated that the review of updated and progressive versions of this schedule and the subsequent revisions of deadlines will be a routine activity of the RMA Committee, with more formal schedule reviews taking place on an annual basis consistent with the annual detail update. In accordance with the dispute resolution agreement, the annual update to the RDIS will be presented to the RMA Council consistent with the federal budget process/time line.

6.0 RESPONSIVENESS SUMMARY

The RDIS was appended to the ROD on December 9, 1996. Regulatory Agencies' comments to the RDIS and PMRMA's responses to these comments are outlined below.

6.1 RVO Responses to CDPHE Comments

Remediation Venture Office's (RVO) Responses to
Colorado Department of Public Health and Environment (CDPHE),
Hazardous Materials and Waste Management Division's
January 10, 1997 Comments on the
Remediation Design and Implementation Schedule (RDIS)

General Comments

Comment 1: Enforceable Deadlines. The CDPHE views the schedule portion of the RDIS as the Army's initial effort at identifying design and implementation dates for remedial activities and recognizes that it is based on the best available information to the Army at the time of preparation. As the Record of Decision (ROD) contemplates, the schedule will be subject to annual review at which time dates may be changed based on a number of factors including funding considerations and the current status of activities. Moreover, the RMA Committee has the responsibility to make appropriate modifications to dates as a greater understanding of remedial projects is gained. We intend to consider all factors in assessing the Army's ability to meet dates in the RDIS and to be flexible in agreeing to extensions or modifications either at Committee or during the annual review process should the need arise.

Nevertheless, we are concerned at the lack of enforceable deadlines for completion of final design documents and for completion of implementation activities. It is vital that the public have assurance that the entire cleanup will be completed within a reasonable time frame. The terms of the Federal Facilities Agreement (FFA) and CERCLA 120 (e)(4) are very clear about the need for there to be enforceable deadlines with respect to both design and implementation activities. Section 34.2 of the FFA requires the Army to attach Design Deadlines as an exhibit to the ROD promptly upon completion of the ROD. Design Deadlines include completion dates for both design scopes of work and final design documents in accordance with paragraph 14.4 (18) of the FFA. Deadlines (which include Design Deadlines) must be enforceable in accordance with FFA paragraph 28.1. Thus the RDIS must identify both design scope of work and final design document dates as enforceable.

CERCLA 120 (e)(4) requires Federal Facilities to enter into an IAG with EPA within 180 days of completion of the RI/FS. The IAG must contain a schedule for the completion of remedial actions as well as arrangements for long-term operation and maintenance. The CDPHE interprets this section of CERCLA to require the RDIS to contain enforceable deadlines for the completion of remedial activities. Discussions have already been initiated on this subject and we are confident that modifications can be made to meet the needs of all parties.

Response: Enforceable design deadlines were incorporated in accordance with the dispute resolution agreement (Aug 97). Implementation start and finish milestones will be established in accordance with Section 3.5 and 3.6 of this version of the RDIS and the dispute resolution agreement (Aug 97). Additionally, an enforceable deadline of September 30, 2011, has been established for field completion of the entire remediation. (Reference Appendix C)

Comment 2: **Data Requests**. The following data requests have been made by the CDPHE.

Comment 2.1: I. Electronic version of both MCACES and Primavera for active projects.

Response: The MCACES estimates used during the development of the RDIS are the same as those presented in the Final Detailed Analysis of Alternatives and are publicly available. As more detailed estimates for each implementation project are developed, they will be made available for review by the Regulatory Agencies. However, these estimates will not be released by hard copy or electronically. This decision is based on the confidential nature of the estimate information and the need to preserve a fair and competitive procurement process for each project. The Regulators will be able to review on these estimates by coordinating with the RMA Committee Coordinator.

An electronic version of the RDIS Primavera file (without funding data) will be provided to the EPA and CDPHE.

Comment 2.2: II. The updated mass-flow chart based on implementation groups tracking the volume requirements for contaminated waste, borrow, cover and cap material. We understand from conversations with Brian Anderson of the Army that this chart is currently in preparation and we will receive copies once it is complete.

Response: The most recent and final version of the mass-flow chart was issued to CDPHE in September 1996.

Comment 2.3: III. Documentation for volumes of implementation groups. For cases where the soil "medium group" is the same as the "implementation group", this information is contained in the Soil Quantity Calculation Summary Report (Foster Wheeler 1996). However, this information needs to be transmitted in some form for those cases where soil medium groups were divided or combined to form new implementation groups.

Response: The final soil volume report was issued September 1996. Additional information regarding soil volumes and their relationship to the soil medium group will be addressed as part of the design implementation process for each implementation project.

Comment 3: Site-Wide Programs Schedule Detail – The MMAG, Trust Fund Working Group, and APA Working Group are attempting to craft milestone schedules for their respective tasks. Once this is accomplished, these schedules should be incorporated into the RDIS or separate schedules that all the parties can consult. Additionally, the RCRA Cap Equivalency studies should contain more detail than a single bar that begins in 1996 and ends in 2000. What are the interim steps that are required to meet the year 2000 goal? The CDPHE believes that a 3-5 year field demonstration should be accounted for in this effort.

Response: Working group milestone schedules for the MMAG, Trust Fund, and APA should be maintained on separate schedules apart from the RDIS. Where appropriate, milestone dates will be added to the RDIS for these programs. A more detailed schedule has been incorporated for the RCRA Cap Equivalency studies. (Appendix C, Section 3.2.5, Detail Schedule).

Comment 4: The two year regulatory reviews bar chart shows 11 design scopes of work deadlines within the Oct. 12-Nov. 23, 1997 time frame with most being delivered in a two week span. CDPHE will be as responsive as possible but given our limited staff, we may not be able to conform to this schedule. Is it possible to stagger these dates in order to utilize our limited resources more effectively?

Response: Revised schedules for the following Phase I projects were adopted at the September 11, 1997 RMA Committee meeting. Existing (Sanitary) Landfill Remediation, Lake Sediments Remediation, Burial Trenches Soil Remediation, Munitions (Testing) Soil Remediation, Miscellaneous Northern Tier Soil Remediation, Miscellaneous Southern Tier Soil Remediation, and South Plants Demolition and Removal (reference letter from PMRMA to EPA and CDPHE dated September 16, 1997).

Comment 5: The 100% design preparation step does not include time for regulatory review. A review period should be added so that we can ensure our comments were incorporated from 95% draft final design.

Response: Review of the 100 percent design document to ensure incorporation of comments will occur concurrently with the procurement cycle activity. If such review cannot be conducted without impacting the start date of enforceable implementation, additional time for this review period will be added to the RDIS.

Comment 6: As discussed verbally in previous RDIS meetings, this document should indicate when ARARs will be further identified. Section A.1.0 of the On-Post ROD provides that "upon entering the design phase of each remedial action and prior to remedial implementation, specific sections within the cited references (in Appendix A) will be identified and serve as the pertinent ARARs". This document should provide additional information as to what point in the design process (preferably prior to completion of the draft Final Design Document) these ARARs will be identified for each implementation project.

Response: ARARs will be addressed and further identified during the 30 percent design phase for each project as noted in Section 3.3.

Comment 7: Section 5.1.4 indicates that the project specific activity schedules contain only the basic elements required to complete the remedial action and are not meant to include every activity of a full design or construction project. As indicated in our previous informal comments, the CDPHE would like to receive a more detailed schedule for active projects as soon as they become available (similar to what was made available for the hazardous waste landfill). This will allow us to better understand the project and plan our staffing more efficiently.

Response: The RDIS is intended to be a programmatic schedule that outlines major milestones for all projects. As such, it details schedule activities at Level 5 of the RMA WBS. More detailed schedules will be provided during design and implementation of individual projects as they become available, however, detail beyond Level 5 of the WBS will not be added to the RDIS.

Specific Comments

Comment 8: Pg. 10 – It appears that Storm Water Management, Waste Handling, and Traffic Management should be added as site wide programs. As these are site wide program components of the Implementation Plan, they should be added as Site Wide Programs in the RDIS.

Response: The RVO prepared Version 4.0 of the Site-Wide Implementation Plan (IP) in July 1997 and transmitted it to the Regulators on July 14, 1997. The RVO has reviewed Phase I projects to evaluate which of the seven specific

Operational Plans under the IP needed further refinement in order to implement Phase I of the remedy. Based on this review, the RVO has formulated a methodology to update the necessary components of the IP. This methodology involves providing detailed Traffic and Borrow Plans to support Phase I activities. Consistent with the IP, the RDIS also incorporates Traffic and Borrow Plans descriptions in Appendix B. The other five operational plans (Program Management Contractor Facilities and Operations Plan, Air Emission Control and Monitoring Plan, Waste Handling Plan, Storm Water Management Plan, Wastewater Management Plan) will be addressed in the design packages for each project.

Comment 9: Pg. 13 – The table showing the design process with disputable and enforceable points needs to be updated. The Draft Scope of Work should be indicated as a disputable and an enforceable deadline in order to be consistent with the FFA and section 6 of the RDIS.

Response: Reference Section 3.0, the table has been updated in accordance with the dispute resolution agreement (Aug 97).

Comment 10: Pg. 14 – Sec. 3.3, Conceptual Design. This description is improved over the earlier version. For better consistency with paragraph 14.4 (11) of the FFA, suggest adding the phrase "with reference to appropriate drawings, specifications, data and documentation".

Response: This has been included in the conceptual design section.

Comment 11: Pg. 21 – List of remedial action activities related to excavation. This list of activities must be updated to include volume verification (spatially) and the potential for confirmation sampling/contingent volume excavation as provided for in the ROD. This is an unique component of the RMA remedy which could impact the remedial action activities and must be accounted for in the work plans for implementation groups involving excavation.

Response: Volume verification, confirmation sampling, and contingent volume excavation represent activities at WBS level 6 or lower, and therefore, are not included in the RDIS.

Comment 12: Pg. 22 – Resources for site volumes. See General Comment 2.3.

Response: Information regarding soil volumes and their relationship to the soil medium group will be addressed as part of the design implementation process for each implementation project.

Comment 13: Section 6.1.1 – This section needs to be updated with respect to general comment 1.

Response: This comment is superseded by dispute resolution agreement (Aug 97).

Comment 14: Table A-1. CDPHE submitted detailed comments on this table as it appeared in the draft RDIS in the interest of providing additional detail at a consistent level for all IRAs. These comments were not incorporated and are attached.

Response: These comments have been incorporated into the text of Appendix A.

Comment 15: Section 6.1.1 Design Deadline Dates. The RCRA Milestone for 60% design was previously agreed to be 50, rather than 60 days, after receipt of 30% comments.

Response: This comment is overwritten by the actual status date of June 9, 1997, which was 40 days after receipt of Regulator comments (Reference Appendix C, Section 1.1.1).

Comment 16: Section 6.1.3 Start date for MMAG: Our records indicate that the first meeting of the MMAG took place in September 1997, not December 1995.

Response: The December 1995 date refers to Component 18 of the "Agreement for a Conceptual Remedy for the Cleanup of the Rocky Mountain Arsenal" which states that, "This advisory group will be convened within the next 180 days". The agreement was dated June 13, 1995. 180 days set a milestone of December 10, 1995 for the first meeting to be held. Our records indicate (and is reflected in the schedule) that the first meeting was held on December 6, 1995, satisfying the above-mentioned milestone.

Comment 17: Appendix B. In order to complete the Project Descriptions section, please include a description of all site-wide projects that were identified in the Site-Wide Implementation Plan in addition to ongoing support activities and site wide descriptions already present.

Response: Appendix B has been revised and now includes a description of Traffic Management Plan (Reference Appendix B, Section 8.10). As discussed under Specific Comment to page 10 above, the remaining site-wide plans will be addressed in the design packages for each project.

6.2 RVO Responses to EPA Comments

Remediation Venture Office's (RVO) Responses to
U.S. Environmental Protection Agency (EPA),
Region VIII's
January 27, 1997 Comments on the
Remediation Design Implementation Schedule (RDIS)

Specific Comments

Comment 1: Section 1.3.1, Page 5. The second bullet on page 5 addresses annual funding. It should be expanded to explain how end of year dollars be utilized? Identify one or two additional projects that can be started, project construction and/or design that can be accelerated, if significant year end dollars become available. Prepare a plan now to utilize an unanticipated end of year funding event.

Response: The PMC, as part of the annual work plan, will identify work to be conducted with the funds appropriated for the RMA projects. The PMC will also identify work that could be accomplished if additional funds become available at anytime during the fiscal year for execution of the clean-up program.

Comment 2: Section 1.3.2, Page 5. This section describes the components of the implementation plan as 31 projects, seven site-wide operational plans, and several long-term activities for water-related projects. The components of the plan are subsequently described as 10 categories of work in Section 1.3.3, pages 9 to 11. The site-wide activities listed in the respective sections are different. The schedule should adopt one base list of activities, such as the list in pages 9 to 11, and incorporate the missing items listed on page 5, including traffic, storm water, wastewater, and waste handling plans and programs. The base list should also include ongoing interim response actions, such as asbestos removal, as remedial actions.

Response: The RVO prepared Version 4.0 of the Site-Wide Implementation Plan (IP) in July 1997 and transmitted it to the Regulators on July 14, 1997. The RVO has reviewed Phase I projects to evaluate which of the seven specific Operational Plans under the IP needed further refinement in order to implement Phase I of the remedy. Based on this review, the RVO has formulated a methodology to update the necessary components of the IP. This methodology involves providing detailed Traffic and Borrow Plans to support Phase I activities. Consistent with the IP, the RDIS also incorporates Traffic and Borrow Plans descriptions in Appendix B. The other five operational plans (Program Management Contractor Facilities and Operations Plan, Air Emission Control and Monitoring Plan, Waste

Handling Plan, Storm Water Management Plan, Wastewater Management Plan) will be addressed in the design packages for each project.

Ongoing IRA's, such as asbestos removal, are listed as Post-ROD Removal Actions for Structures.

Comment 3: Section 1.3.2, Page 5. A sentence in the last paragraph states "Operation of the wells within these systems may be discontinued." The regulatory steps necessary to discontinue the operation of the wells should follow the statement.

Response: Change has been incorporated in text.

Comment 4: Section 1.3.3, Page 9. The "Post-ROD Removal Actions for Structures" under the Early Start Projects heading should be entitled as Remedial Actions.

Response: This is the RDIS title for remedial actions, which incorporate ongoing IRAs such as asbestos removal.

Comment 5: Section 1.4.2, Page 12. In the schedule, the procurement of the PMC needs more detail (Phase I, Phase II bids, contracts, etc.).

Response: More detail has been provided in this section and in the detailed schedule located in Appendix C.

Comment 6: Section 2.1, Page 12. The last sentence in the section refers to "Post-ROD Removal Actions". The sentence should refer to Remedial Actions.

Response: "Post-ROD Removal Actions" is the RDIS title for remedial actions, which incorporate ongoing IRAs such as asbestos removal.

Comment 7: Section 2.2, Page 11. As previously agreed, the paragraph should read "The Army is currently preparing completion summary reports detailing the activities of the fourteen IRAs. These reports will summarize data evaluation, remedy selection, technical plans, alternative assessment report, decision documents, implementation activities, and operational performance, and will serve as close out documents for the IRAs."

Response: This section has been revised and includes the above statements.

Comment 8: Section 3.1, Page 13. This section lists items to be included in the draft design scope of work. This list may not be applicable to all remedial action projects. It should be stated that the scope of work "will include but not be limited to" the listed items.

Response: This change has been incorporated.

Comment 9: Section 3.2, Page 14. The second sentence should clarify that any updated schedule in the final design scope of work will reflect modifications which have been mutually agreed to during review and comment of the draft design scope of work.

Response: This change has been incorporated.

Comment 10: Section 3.3, Page 14. The third sentence should be reworded "The conceptual design will provide a refined project description, design assumptions and criteria, data collection needs, and discussion of possible design alternatives." The schedule for the completion of final design is established in the draft design scope of work.

Response: This change has been incorporated.

Comment 11: Section 3.4, Page 14. The word "appropriate" should be deleted from the second sentence.

Response: The word has been deleted.

Comment 12: Section 3.5, Page 15. The final sentence indicates that the draft final design will be made available to the public. This should also be reflected in the schedule.

Response: Public comment period is included concurrently within the Regulatory Agencies/RMA Committee review period of the 95 percent design package.

Comment 13: Section 3.7, Page 15. These plans should be submitted to EPA and the State as part of the formal design review and concurrence process.

Response: Documents that are part of the design process will be included in submittals to EPA and CDPHE as defined in each Design Scope of Work.

Comment 14: Section 4.0, Page 15. This paragraph needs clarification. It is understood that procurement will be necessary before remedial action begins. However, the schedule does not show construction beginning immediately after design is approved. Rather, there is an 18-20 week period of "Prepare/Review/Revised RA Work Plans". As stated previously, these plans should be submitted to EPA and the State as part of the formal design review and concurrence process.

Response: Section 4.0 has been revised (to include subsections) to further clarify the activities that must be performed to ensure proper project completion, and are in accordance with RD/RA guidance and the FFA. This strategy has been included in the final designs for such projects as Basin A Consolidation and Remediation and the Shell/Complex (Army) Disposal Trenches Slurry Walls.

Comment 15: Section 4.0, Page 16. The fifth sentence of the third paragraph on page 16 should read "Sixty days prior to joint inspection, a prefinal inspection report must be prepared."

Response: Section 4.0 has been revised (to include subsections) to further clarify the activities that must be performed to ensure proper project completion, and are in accordance with RD/RA guidance and the FFA. This strategy has been included in the final designs for such projects as Basin A Consolidation and Remediation and the Shell/Complex (Army) Disposal Trenches Slurry Walls.

Comment 16: Section 4.2, Page 16. The second sentence should end "…and meet the requirements of the ROD and RD." The last sentence should end"…shall be prepared 60 days prior to joint inspection with all Parties and the construction contractor."

Response: Section 4.0 has been revised (to include subsections) to further clarify the activities that must be performed to ensure proper project completion, and are in accordance with RD/RA guidance and the FFA. This strategy has been included in the final designs for such projects as Basin A Consolidation and Remediation and the Shell/Complex (Army) Disposal Trenches Slurry Walls.

Comment 17: Section 4.3, Page 16. The paragraph should read "Upon completion of the punch list items, a final inspection will be conducted by all the Parties. The purpose of the final inspection is to ensure that all punch list items have been properly completed and that the remedial action is in full compliance with the ROD and RD. After final inspection, a Construction Report will be prepared for each of the 31 Implementation Projects.

CERCLA requires a Remedial Action Report to document the completion of the On-Post operable unit. Since, the On-Post operable unit consists of 31 Implementation Projects and partial deletions of RMA from the NPL are envisioned prior to completion of all projects, it may be necessary to prepare Remedial Action Reports for one or several combined Implementation Projects. The Remedial Action Report(s) will include reference to the Construction Report(s) and include the Army's and Shell's certification that the activities were performed in accordance with

the ROD and approved RD. Upon review and approval of the Remedial Action Report a project(s) acceptance letter will be executed by the EPA and State indicating the completion and acceptance of the project.

Response: Section 4.0 has been revised (to include subsections) to further clarify the activities that must be performed to ensure proper project completion, are in accordance with RD/RA guidance and the FFA. This strategy has been included in the final designs for such projects as Basin A Consolidation and Remediation and the Shell/Complex (Army) Disposal Trenches Slurry Walls.

Comment 18: Section 4.4.1, Page 17. The monthly reports should begin with the issuance of the RDIS. The reports should not be limited to construction issues.

Response: Section 4.0 has been revised (to include subsections) to further clarify the activities that must be performed to ensure proper project completion, are in accordance with RD/RA guidance and the FFA. This strategy has been included in the final designs for such projects as Basin A Consolidation and Remediation and the Shell/Complex (Army) Disposal Trenches Slurry Walls.

Comment 19: Section 4.5, Page 17. The second sentence fourth line should be changed to read "…groundwater monitoring and treatment systems." The last sentence should be deleted.

Response: Section 4.0 has been revised (to include subsections) to further clarify the activities that must be performed to ensure proper project completion, are in accordance with RD/RA guidance and the FFA. This strategy has been included in the final designs for such projects as Basin A Consolidation and Remediation and the Shell/Complex (Army) Disposal Trenches Slurry Walls.

Comment 20: Section 4.4.3, Page 17. The following language from the Basin A SOW should be incorporated for consistency, "After final inspection, a Construction Report will be prepared for each of the 31 Implementation Projects. CERCLA requires a Remedial Action Report to document the completion of the On-Post operable unit. Since, the On-Post operable unit consists of 31 Implementation Projects and partial deletions of RMA from the NPL are envisioned prior to completion of all projects, it may be necessary to prepare Remedial Action Reports for one or several combined Implementation Projects. The Remedial Action Report(s) will include reference to the Construction Report(s) and include the Army's and Shell's certification that the activities were performed in accordance with the ROD and approved RD. Upon review and approval of the Remedial Action Report a project(s) acceptance letter will be executed by

the EPA and State indicating the completion and acceptance of the project."

Response: Section 4.0 has been revised (to include subsections) to further clarify the activities that must be performed to ensure proper project completion, are in accordance with RD/RA guidance and the FFA. This strategy has been included in the final designs for such projects as Basin A Consolidation and Remediation and the Shell/Complex (Army) Disposal Trenches Slurry Walls.

Comment 21: Section 5.1.4, Page 20. Number 9 the last paragraph needs to be revised. These plans should be developed during the design process. If done after design, how can Regulators be assured that community health, worker health, or quality assurance can actually be accomplished by the proposed design? Contractor procurement can take place at this time but everything else should be part of design review, evaluation, and approval. In addition, this paragraph contradicts the appropriate intentions of section 3.7.

Response: Section 5.1.6, Item 11 of the current RDIS states that needed plans are identified and developed during the design process and are finalized prior to the start of remedial action.

Comment 22: Section 5.3, Page 23. The last sentence of the first paragraph states that milestone dates may fall anywhere within a given week. The milestone dates need better definition. The effect holidays will have on the review periods also needs to be defined.

Response: Completed. Reference revised Sections 5.3 and 5.4.1 of current RDIS.

Comment 23: Section 6.1.1, Page 25. This section lists design, implementation activities and deadline dates. The list of activities does not correspond to the list of implementation activities in Section 6.1.2, page 26. For example, chemical process equipment remedial action is listed in Section 6.1.2 but not listed in Section 6.1.1. The base list of activities should be the same for project design and implementation.

Response: Reference Appendix C, Section 1.1.1 and 1.1.2 of current RDIS. Lists for Project Design and Implementation are similar, however, Post-ROD Removal Actions for Structures projects are the continuing IRAs and as such followed the IRA implementation design process and no the remedial design process.

Comment 24: Section 6.1 & 6.2. Paragraph 34.2 of the FFA requires that "Design Deadlines" will be appended to the ROD, and that they will be subject to stipulated penalties (enforceable). The definition of "Design Deadlines"

includes "scopes of work" and "final design documents". Therefore the completion dates set in the RDIS for both the scopes of work, and the final design documents must be enforceable. Additionally, the document should state "For the purposes of this document, the 95 percent design will be equivalent to the final design" to ensure compliance with the FFA.

Response: In accordance with the dispute resolution agreement (Aug 97), the draft design scope of work (DDSOW) and the draft final design (95 percent complete) carry enforceable milestone dates (with the exception of the disposal facilities). Refer to Section 3.5 for the definition of 95 percent design.

Comment 25: Appendix C. This appendix presents bar charts representing the design and implementation schedules. The key activities listed in the project design and Implementation Summary schedules are different from the corresponding listing in the 2-year bar chart. For example, the implementation summary schedule lists no site-wide programs whereas the 2-year schedule does list site-wide programs. The base list of activities should be the same in the summary, the 2-year, and the regulatory review bar charts.

Response: The 2-year bar chart has been removed from the RDIS. The Summary Design and Implementation bar charts show all implementation projects. The site-wide programs support the remedial actions, but do not carry enforceable design/implementation dates. The detail bar chart provides the entire list of activities contained in the schedule.

Comment 26: The Baseline Schedule has due dates falling on Sundays and review time beginning on Mondays. The schedule should more realistically define the milestone dates. Holidays should be taken into account.

Response: Schedule has been revised to reflect days as the unit of measure instead of weeks, and also allows for holidays. Reference revised Sections 5.3 and 5.4.1 of current RDIS.

Comment 27: Four or more concurrent design efforts will significantly stress the review capabilities of the Regulators. Building an additional two weeks of review time into the schedule when this occurs would be more realistic.

Response: Revised schedules to allow for additional Regulator review time may be adopted by RMA Committee in the future as needed. (Reference letter from PMRMA to EPA and CDPHE dated September 16, 1997, which revised schedules for Phase I projects).

Comment 28: Everything due within two years should have deliverable dates, i.e., draft final plans, final plans, etc.

Response: Comment no longer applicable by dispute resolution agreement (Aug 97).

Comment 29: All projects should schedule Community outreach at the 95 percent design stage and a regulatory review at the 100 percent stage.

Response: Public comment review period is included concurrently within the Regulator/RMA Committee review period of the 95 percent design package. The Regulatory Agencies are issued a 100 percent design package for approval/acceptance, but is not required prior to initiating procurement activities and therefore not included in the schedule.

Comment 30: All design projects should have a line to schedule the preparation of final reports.

Response: All implementation projects include the activity "Prepare Final Reports". The detailed bar chart included in the previous version of the RDIS excluded activities that fell outside the two-year window. The current version of the RDIS includes a detailed bar chart (Appendix C, Section 3.2.5) of all activities through completion of the remedy at RMA.

Comment 31: Baseline Schedule Sheet 1 of 15. The Construct Hazardous Waste Landfill should schedule Community outreach at the 90 percent design stage and a regulatory review at the 100 percent stage. These comments also apply to all other designs at the 95 percent and 100 percent stage. The Construct Hazardous Waste Landfill should have a line to schedule the preparation of final reports, as is done in the Early Start Projects. This comment applies to all other designs.

Response: The public review and comment period is included concurrently within the Regulator/RMA Committee review period of the 90/95 percent design package. The Parties are issued a 100 percent design package for approval/acceptance, but is not required prior to initiating procurement activities and therefore not included in the schedule.

All implementation projects include the activity "Prepare Final Reports". The detailed bar chart included in the previous version of the RDIS excluded activities that fell outside the two-year window. The current version of the RDIS includes a detailed bar chart (Appendix C, Section 3.2.5) of all activities through completion of the remedy at RMA.

Comment 32: Baseline Schedule Sheet 1 & 2 of 15. Basin A Consolidation & Remediation and the Early Start Projects should have public input at the 60% design stage.

Response: Agreed. Schedule has been corrected.

Comment 33: Baseline Schedule Sheet 2 of 15. Community outreach should be scheduled before 3BA4-140 Excavate UXO and Transport Off-Post.

Response: Community outreach will be included in the detailed implementation schedule as needed.

Comment 34: Baseline Schedule Sheet 2 of 15. The completion dates for Basin A Consolidation and Remediation 3BA4-244 Excavated Biota Soil and 3BA4-248 Consolidate to Basin A are different from the same activities for the Hazardous Waste Landfill. Are these the correct completion dates?

Response: The activities mentioned are not the same activities. The Biota Excavation Activities previously listed under Basin A were for biota soil quantities under NCSA-1c Basin A to Basin B ditches; the excavation is not necessary now as these quantities are already within the footprint of the Basin A cover/cap.

Comment 35: Baseline Schedule Sheet 2 of 15. The heading needs to add Chemical Sewers. There are some dates that need to be corrected for the Chemical and Sanitary Sewer Manhole Plugging.

3SI2-120 Finish 17 NOV 96
3SI2-125 Start 18 NOV 96 Finish 18 DEC 96
3SI2-150 Finish 3 FEB 97
3SI2-160 Start 3 FEB 97 Finish 21 FEB 97

Response: 3SI2-120 - Now RVS12-1200, Prepare/Revise Design Scope of Work – S/CSW1, denotes a finish date of January 16, 1997 and denotes the completion of the final scope of work.

3SI2-125 – Now RVS12-1250, Regulator/RMA Committee Review – S/CSW1, now reads actual start of November 15, 1996, and a completion of December 23, 1996, which was the review period for the revised draft scope of work.

3SI2-150 – Now RVS12-1500, Prepare 60 percent design – S/CSW1, shows a finish date of February 2, 1997, which denotes completion of the 60 percent design package. This package was delivered to the Parties on February 3, 1997.

3SI2-160 – Now RVS12-1600, Regulator/Committee Review – S/CSW1, shows a start of February 3, 1997 and a completion date of March 10, 1997, the receipt of Regulator comments on the 60 percent design package.

Comment 36: Baseline Schedule Sheet 3 of 15. 3SW4-150 The UXO clearance is likely to be of special interest to the community and warrant special focused community outreach.

Response: Community outreach will be included in the detailed implementation schedule as needed.

Comment 37: Baseline Schedule Sheet 3 of 15. 3CT4-154 Is it Practical to install the slurry walls in December?

Response: This has been revised to reflect a more practical schedule as defined in the final design.

Comment 38: Baseline Schedule Sheet 4 of 15. The Post-ROD Removal Actions should be re-titled Removal Actions. PRRA should be changed to RA. The schedule should identify the dates the drafts are due.

Response: "Post-ROD Removal Actions" is the title of ongoing IRAs on the RDIS. Design of the ongoing IRAs were developed under the IRA implementation design process, and therefore, are not included in the RDIS.

Comment 39: Baseline Schedule Sheet 4 of 15. The Toxic Storage Yards Soil Remediation should include review time for the 95% RD and a line for the 100% RD.

Response: All implementation projects include these activities; the detailed bar chart included in the previous version of the RDIS included only those activities that fell within the two year window. The current version of the RDIS includes a detailed bar char (Appendix C, Section 3.2.5) of all activities through the completion of field work at the RMA.

Comment 40: Baseline Schedule Sheet 8 of 15. 3HX1-1 NF The research for the Hex Pit treatability study started in September of 96 and will be completed in March 99. The schedule should set dates for research completion, sample collection, bench scale testing, etc.

Response: Schedule has been updated.

Comment 41: Baseline Schedule Sheet 11 of 15. 2RC1-110 Please correct the spelling of Equivalency. The start date and much more detail should be included here.

Response: Spelling has been corrected.

Comment 42: Baseline Schedule Sheet 11 of 15. Borrow Area 1, 2, 3 should include much more detail. There are no dates for the 30/60/95/100% Designs.

Response: More detail has been incorporated into the schedule.

Comment 43: Baseline Schedule Sheet 12 of 15. 2AT1-110 Were the Agent Treatment Studies submitted to EPA, reviewed, and approved?

Response: This comment has been superceded by the agreement referenced in Section 1.3.1, page 5; Section 1.3.3, page 11; and Appendix C, Section 3.1, page C-19.

Comment 44: Baseline Schedule Sheet 13 of 15. 2BM6-100, 2AM6-100, 3CV4-1NF, 4PM5-100, 4DM5-100, 7MMO-100. The start date should be June 11, 1996. The date of the ROD.

Response: Agree. Dates have been corrected.

Comment 45: Baseline Schedule Sheet 13 of 15. The South Adams County Water Supply should have 30/60/95/100% design and review dates.

Response: The schedule reflects only those milestones identified in the Army, Shell and South Adams County agreement.

Comment 46: Baseline Schedule Sheet 13 of 15. Between 4OP1-130 Selection of Preferred Alternative and 4OP3-115 On-Post Water Source Available, more detail is needed, i.e.: public meeting, procurement activities.

Response: Once a preferred alternative has been chosen a detailed schedule may be developed. If so, these activities would be at a WBS Level 6 or lower, and therefore, would not be included in the RDIS.

Comment 47: Baseline Schedule Sheet 13 of 15. 4BD5-100 What is the Long Term Monitoring/Operations start date based on?

Response: The start date is tied to completion of demobilization activities for Bedrock Ridge Construction.

Comment 48: Baseline Schedule Sheet 13 of 15. 4DA2-130 The finished date should be postponed. Baseline Schedule Sheet 14 of 15. 4IR5-100, 4AN5-100, 4CE5-100, 4NW5-100 The start date should be June 11, 1996. The date of the ROD.

Response: Agree. Dates have been changed. Reference Appendix C.

Comment 49: Baseline Schedule Sheet 14 of 15. 1PRO-048 The finish date should be 11 JUN 96. Baseline Schedule sheet 14 of 15. Begin (Post) ROD Activities. This area of the schedule needs more detail, i.e.: Phase I, II, bids, etc.

Response: It is agreed that the finish date for the ROD should be June 11, 1996. This has been corrected. The activity RVA3N-0020, "Begin Post-ROD Activities" (Appendix C, Section 3.2.5, sheet 44 of 47) is merely an identifier of the beginning (start milestone) of all activities represented by the remedy (reference Section 5.4.1, page 27).

Comment 50: Baseline Schedule Sheet 15 of 15. Completion of Remedial Action. The schedule should include the preparation of final reports for the On-Post OU.

Response: The schedule will be updated to include close-out reporting and reviews, and will be reflected in the FY99 annual update.

6.3 RDIS Dispute Resolution Agreement

The Parties Agree to the Following to Resolve the CDPHE's RDIS Dispute:

The December 9, 1996, version of the Rocky Mountain Arsenal RDIS, as amended on March 4, 1997, establishes enforceable dates for issuance of DDSOW documents for remedial implementation projects. It also establishes target dates and/or enforceable deadlines for draft final designs.

In order to resolve the dispute, the U.S. Army agrees to revise the RDIS so that all target draft final design dates, as outlined in the March 4, 1997 RDIS amendment, become enforceable deadlines. Upon acceptance of the final design, implementation start and finish deadlines will become enforceable and shall be appended as an exhibit to the ROD in accordance with Paragraph 34.2(b) of the FFA. An enforceable deadline of September 30, 2011, has been established in the RDIS for the completion of the entire remediation. In addition, the RDIS will be revised to include an enforceable deadline for the Enhanced Landfill Cell 30 Percent Design Document (December 13, 1999).

The Army further agrees that the RDIS (Section 5.5, Modification Methods) will be updated to reflect that the RMA Council will be involved in annual schedule reviews consistent with the federal budget process/time line. The RMA Council will be updated annually on three major items: the overall status of the RMA cleanup, budget analysis and discussion of potential problems or funding constraints that might affect the schedule, and a presentation of the revised schedule.

Upon completion of the above changes, the RDIS is approved by all Parties.

Response: All above changes have been made to the current RDIS.