

5.0 MULTI-PARTY AGREEMENTS



DEPARTMENT OF THE ARMY
BASE REALIGNMENT AND CLOSURE
ROCKY MOUNTAIN ARSENAL
7200 QUEBEC STREET, BUILDING 111
COMMERCE CITY, CO. 80022-1748



DAIM-BD-A-RM-RE

7 December 2004

MEMORANDUM FOR U.S. Environmental Protection Agency, (Mr. Greg Hargreaves), Region VIII, Mail Code 8HWM-FF, 999-18th Street, Suite 300, Denver, Colorado 80202-2405

SUBJECT: Milestone Extension for the Shell Disposal Trenches – Cover Project

1. Currently the Draft Final Design 95 Percent enforceable milestone date for the Shell Disposal Trenches – Cover Project is 13 December 2004 (reference letter dated 29 July 2004). In accordance with Paragraph 26.8-26.18 and 34.22 of the Federal Facility Agreement, the RVO is requesting an extension of the 95 Percent deadline to 13 January 2005. The reason for this extension is to allow adequate time to address design comments and changes to the subgrade and the surrounding area drainage design.
2. The point of contact on this matter is Mr. James Green at 303-289-0412.

Bruce M. Huenefeld
BRUCE M. HUENEFELD
RMA Committee Coordinator

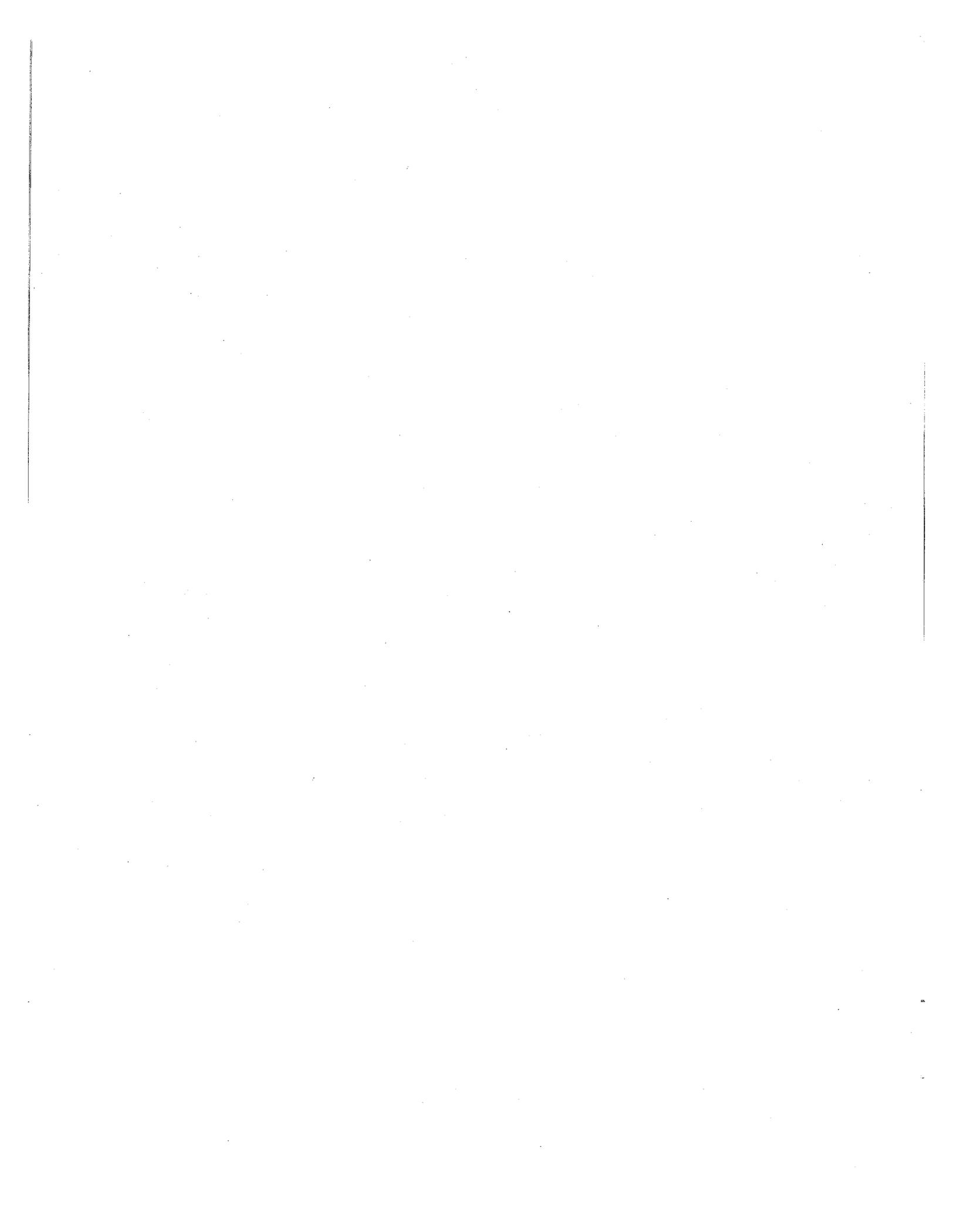
CF:

Rocky Mountain Arsenal, (DAIM-BD-A-RM-CL/Major M. Weslyn Erickson),
Chief Counsel, Commerce City, Colorado 80022-1748)
Pacific Western Technologies, Ltd, (Mr. James Bush), 605 Parfet Street, Suite 200,
Lakewood, Colorado 80215
Shell Oil Company, (Mr. Roger B. Shakely), P.O. Box 538,
Commerce City, Colorado 80037
Washington Group, (Mr. Mark Thomson), P.O. Box 1717,
Commerce City, Colorado 80022
Holme Roberts and Owens, (Mr. Daniel J. Dunn), 1700 Lincoln Street, Suite 4100,
Denver, Colorado 80203
U.S. Fish and Wildlife Service, (Mr. Tom Jackson), Rocky Mountain Arsenal,
Commerce City, Colorado 80022-1748
Tri-County Department Environmental Health Division, (Mr. Rick Kinshella),
4201 East 72nd Avenue, Commerce City, Colorado 80222-1488
Rocky Mountain Arsenal, (Document Tracking Center),
Commerce City, Colorado 80022-1748

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BASE REALIGNMENT AND CLOSURE
ROCKY MOUNTAIN ARSENAL
7200 QUEBEC STREET, BUILDING 111
COMMERCE CITY, CO 80022-1748



DAIM-BD-A-RM-RE

6 January 2005

MEMORANDUM FOR U.S. Environmental Protection Agency, (Mr. Greg Hargreaves), Region VIII, Mail Code 8HWM-FF, 999-18th Street, Suite 300, Denver, Colorado 80202-2405

SUBJECT: Milestone Extension for Shell Disposal Trenches – Cover Project 95 Percent Design

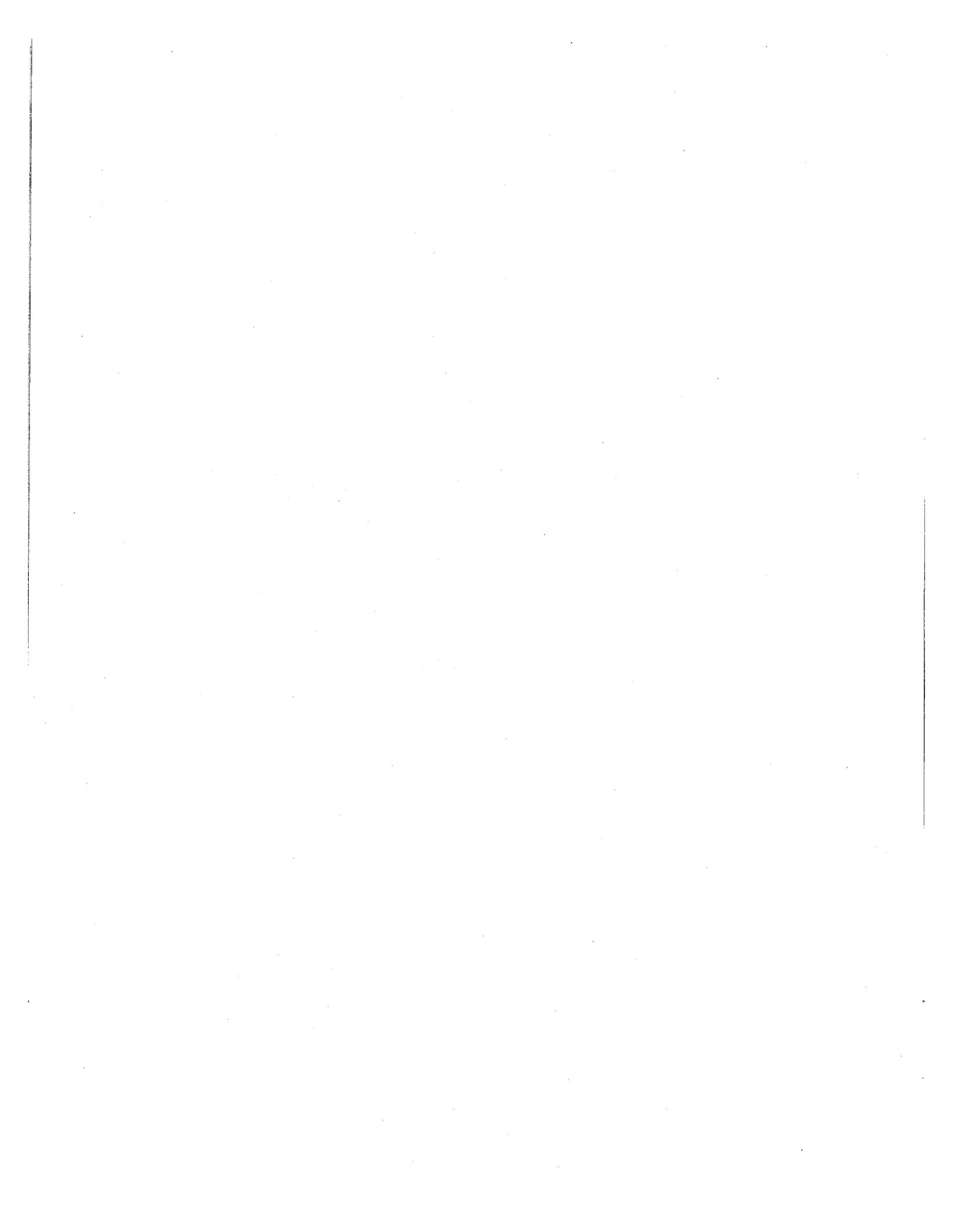
1. Currently the Draft Final Design 95 Percent enforceable milestone date for the Shell Disposal Trenches – Cover Project is 13 January 2005 (reference letter dated 7 December 2004). In accordance with Paragraphs 26.8-26.18 and 34.22 of the Federal Facility Agreement, the Remediation Venture Office is requesting an extension of the 95 Percent deadline to 24 February 2005. The reason for this extension is to allow time to address design issues with the Regulatory Agencies and finalize the Design Analysis.
2. The point of contact on this matter is Mr. James Green at 303-289-0412.

Bruce M. Huenefeld
BRUCE M. HUENEFELD
RMA Committee Coordinator

CF:

Rocky Mountain Arsenal, (DAIM-BD-A-RM-CL/Major M. Weslyn Erickson),
Chief Counsel, Commerce City, Colorado 80022-1748)
Pacific Western Technologies, Ltd, (Mr. James Bush), 605 Parfet Street, Suite 200,
Lakewood, Colorado 80215
Shell Oil Company, (Mr. Roger B. Shakely), P.O. Box 538,
Commerce City, Colorado 80037
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Commerce City, Colorado 80022
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U.S. Fish and Wildlife Service, (Mr. Tom Jackson), Rocky Mountain Arsenal,
Commerce City, Colorado 80022-1748
Tri-County Department Environmental Health Division, (Mr. Rick Kinshella),
4201 East 72nd Avenue, Commerce City, Colorado 80222-1488
Rocky Mountain Arsenal, (Document Tracking Center),
Commerce City, Colorado 80022-1748





Resolution Agreement
Contingent Soil Volume (CSV) Program Sample Accounting Analysis
at the Rocky Mountain Arsenal (RMA)

PURPOSE:

To obtain concurrence among the U.S. Environmental Protection Agency (EPA), the Colorado Department of Public Health and Environment (CDPHE), and the RMA Remediation Venture Office (RVO) (collectively, the Parties) regarding the number of remaining confirmatory samples to be used to identify Contingent Soil Volume (CSV) requiring excavation.

DISCUSSION:

Based upon concerns regarding the accounting of confirmatory samples and non-confirmatory samples required for significant changes to several ROD remedy projects, the EPA and CDPHE reviewed the designation of confirmatory samples for six projects. Based upon the EPA and CDPHE review, the Parties began discussions to resolve this issue. These discussions led to a new agreement on the accounting of confirmatory samples.

AGREEMENT:

The Parties agree to the following provisions regarding the accounting of confirmatory samples:

1. Soil samples taken to support changes to the ROD will not be counted as confirmatory samples to identify CSV requiring excavation.
2. Soil samples taken from new remedy sites that were not identified in the ROD will not be counted as confirmatory samples to identify CSV requiring excavation.
3. Soil samples taken at remedy sites where excavation limits were implemented in error or established based on inadequate data will not be counted as confirmatory samples to identify CSV requiring excavation.

As a result of the three determinations above, the Parties agree that 189 samples previously designated as confirmatory samples to identify CSV will not count against the ROD limit of 1,014 confirmatory samples. The parties further agree that 50 of these 189 samples are reserved for Basin F.

In addition, recent information indicates that previously unidentified human health exceedance (HHE) soil is present adjacent to the Sand Creek Lateral in proximity to the discharge point of the South Plants stormwater ditches. The extent of HHE soil along the remainder of the Sand Creek Lateral is unknown, but will be evaluated in accordance with a Sampling and Analysis Plan (SAP) that will be prepared by the RVO. Consistent with Provision 3 above, the Parties agree to negotiate in good faith regarding whether or not previous confirmatory samples collected within and adjacent to the lateral will be counted as confirmatory samples to identify CSV requiring excavation.



The Parties also acknowledge that any sampling and potential remediation associated with removal/closure of remedy facilities where hazardous materials are managed after the RMA landfills have been filled are not part of the ROD CSV program. These sites include, but are not limited to:

Hazardous Waste Landfill (HWL)/Enhanced Hazardous Waste Landfill (ELF) Operations Building,
HWL/ELF Waste Staging Area
HWL/ELF Current Stormwater Detention Basins
HWL/ELF Decontamination Facility
HWL/ELF Lift Station
ELF Wastewater Staging Area (bladder tanks, etc.)
HWL/ELF Wastewater Treatment System Building and Lagoon
HWL/ELF WWTS Outfall ("NPDES" discharge point)

Groundwater treatment systems, including treatment buildings, and all associated piping, extraction wells, and injection wells or trenches at the following facilities;

- Basin A Neck Containment System
- CERCLA Wastewater Treatment Facility
- North Boundary Containment System
- Northwest Boundary Containment System
- Railyard System

The identification and provision for sampling of these sites will be documented in the RMA Environmental Management System (Umbrella Plan) and/or closure plans.

CONCURRENCE FOR RESOLUTION AGREEMENT

Bruce M. Huenefeld
Bruce M. Huenefeld
U.S. Army

10 March 2005 Concur/Nonconcur
Date

Greg Hargreaves
Greg Hargreaves
U.S. Environmental Protection Agency

3/10/2005 Concur/Nonconcur
Date

Barbara Nabors
Barbara Nabors
Colorado Department of Public
Health and Environment

March 10, 2005 Concur/Nonconcur
Date

Tom Jackson

Tom Jackson
U.S. Fish and Wildlife Service

3/10/05

Date

Concur Nonconcur

Mark Thomson

Mark Thomson
Shell Oil Company

3/10/05

Date

Concur Nonconcur



Resolution Agreement
Groundwater Extraction/Contaminant Mass Removal Systems
at the Rocky Mountain Arsenal (RMA)

PURPOSE:

To obtain concurrence among the U.S. Environmental Protection Agency, the Colorado Department of Public Health and Environment and the RMA Remediation Venture Office (collectively, the Parties) regarding the design and implementation of groundwater extraction/contaminant mass removal systems at the South Tank Farm Benzene Plume and in the vicinity of the Lime Basins project site.

DISCUSSION:

Based upon design group meetings, the Parties have agreed to locations and processes for conducting groundwater extraction/contaminant mass removal.

AGREEMENT:

The Parties agree to the following provisions regarding groundwater extraction/contaminant mass removal:

1. Extraction and treatment of contaminated groundwater will be performed at the South Tank Farm benzene plume source area(s) and in the vicinity of Lime Basins. The goal for this action will be to remove as much contaminant mass as possible and enhance in-situ biodegradation. The system design will establish the amount of groundwater that can be extracted, and the contaminant mass removal that can be accomplished at the CERCLA Wastewater Treatment Facility (CWTF). The extraction flow rates from South Tank Farm and Lime Basins will be designed to provide maximum utilization of CWTF treatment capacity. The design and operation will consider South Tank Farm as the primary mass removal system. The balance of production between the two systems may be subject to adjustment during operation with concurrence of the Parties.
2. The South Tank Farm plume treatment system is subject to the RCRA exemption for the Underground Injection Control Program because the extracted groundwater will be treated to substantially reduce hazardous constituents prior to re-injection into the same plume area.
3. Mass reduction at the South Tank Farm site will be accomplished through "once-through" treatment at the CWTF, addition of an in-situ biodegradation enhancing agent as appropriate, and re-injection of the treated water at the benzene plume site. The extraction/re-injection system will be designed as a re-circulation cell, thereby providing continuous enhancement of the in-situ biodegradation of benzene in the source area.
4. While the RCRA exemption and "once-through" treatment approach also may be applied to the Lime Basins project site, the need to apply this exemption and the feasibility of achieving RMA Containment System Remediation Goals will be evaluated during design.



5. Conceptually, the design for both systems will consider existing CWTF capacity and treatment processes, aquifer characteristics, treatment interferences to the UV system, contaminant degradation stoichiometry and potential fouling of the reinjection system, while maximizing contaminant mass removal and in-situ biodegradation. An assessment of the existing and new data requirements will be completed and used to define the areas of high contamination. Once the areas of high contamination have been defined, the groundwater extraction systems will be designed to maximize capture of the contaminants. System optimization will occur during the startup period.
6. Groundwater monitoring will be conducted during the South Tank Farm project for system operations, and to ensure that the plume does not migrate beyond current conditions. A groundwater monitoring plan to assess these objectives will be prepared concurrent with the design analysis.
7. The mass of contaminants removed by treatment of extracted groundwater from both the South Tank Farm and Lime Basins sites will be tracked on an incremental and cumulative basis during operation of CWTF. A status update containing this information will be provided at the monthly Water Team meetings. Quarterly reports will be provided for the first year and annually thereafter subject to evaluation.
8. Both the STF Benzene and the Lime Basins groundwater mass removal projects will be added to the Remedial Design Implementation Schedule with a schedule for system startup within 54 weeks of the signing of this agreement. The Parties agree to the accelerated design/construction schedule provided by the RVO (attached) in order to meet this startup deadline. The systems will operate until June 30, 2010 or until the CWTF is decommissioned, whichever is longer.
9. These changes to the RMA Record of Decision (ROD) Groundwater remedy will be documented by an Explanation of Significant Differences, separate from the ROD Amendment being prepared for the changes to the Lime Basins and Former Basin F projects.
10. A schedule for completing all items required by this agreement will be completed within 30 days of the signing of this agreement.

CONCURRENCE FOR RESOLUTION AGREEMENT

Bruce M. Huenefeld
Bruce M. Huenefeld
U.S. Army

10 March 2005
Date

Concur Nonconcur

Greg Hargreaves
Greg Hargreaves
U.S. Environmental Protection Agency

3/10/2005
Date

Concur Nonconcur

Barbara Nabors
Barbara Nabors
Colorado Department of Public
Health and Environment

3/15/2005
Date

Concur Nonconcur

Tom Jackson
Tom Jackson
U.S. Fish and Wildlife Service

3/11/05
Date

Concur Nonconcur

Mark Thomson
Mark Thomson
Shell Oil Company

3/10/05
Date

Concur Nonconcur

Activity ID	Orig Dur	Rem Dur	Forecast Start	Forecast Finish	FY04	FY05	FY06	FY07	FY08
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RMA Groundwater Team

CERCLA Wastewater Treatment Facility

GRDW Dewatering / Mass Removal Systems

Predesign Activities					
CE1A100000	42	42	07MAR05*	17APR05	Pre-design Invig-Mass Removal Systems - MR
Remedial Design					
CE2A200010	56	56	07MAR05	01MAY05	Prepare Draft Design Ext/Rech Syst - MR
CE2A200020	14	14	02MAY05	15MAY05	Regulatory Review of Draft Des Ext/Rech Syst - MR
CE2A200030	28	28	16MAY05	13JUN05	Prepare Draft Final Design Ext/Rech Syst - MR
CE2A200040	14	14	14JUN05	27JUN05	Regulatory Review Draft Fnl Des Ext/Rech Syst - MR
CE2A200050	28	28	28JUN05	26JUL05	Prepare Final Design Ext/Rech Syst - MR
CE2A200060	14	14	27JUL05	09AUG05	Reg Rev and Appvl of Fnl Des Ext/Rech Syst - MR
CE2A200100	70	70	07MAR05	15MAY05	Prepare Draft Design Treatment Plant Mod - MR
CE2A200110	14	14	16MAY05	29MAY05	Regulatory Rev of Draft Des Treat Plant Mod - MR
CE2A200120	42	42	31MAY05	12JUL05	Prepare Draft Final Design Treat Plant Mod - MR
CE2A200130	14	14	13JUL05	26JUL05	Reg Rev Draft Final Des Treat Plant Mod - MR
CE2A200140	28	28	27JUL05	23AUG05	Prepare Final Design Treatment Plant Mod - MR
CE2A200150	14	14	24AUG05	07SEP05	Reg Rev and Appvl Final Des Treat Plant Mod - MR
Remediation Activities					
CE4A300000	112	112	27JUL05	16NOV05	Install Extraction and Recharge Wells - MR
CE4A300010	51	51	20AUG05	10OCT05	Install Extraction and Recharge Piping - MR
CE4A300020	123	123	06OCT05	11FEB06	Well Pump Installation/Manifold Piping - MR
CE4A300030	60	60	27JUL05	25SEP05	Install Meter Building /Complete - MR
CE4A300040	60	60	27JUL05	25SEP05	Install Power Supply - MR

Data Date	29JAN05	Early Bar	0105 - CWTF	Sheet 1 of 2	MEK-Water Group - all activities MEK-Water Team Schedule	
Run Date	23FEB05 10:18	Progress Bar	Draft Groundwater Dewatering/ Mass Removal Systems Expedited Schedule			

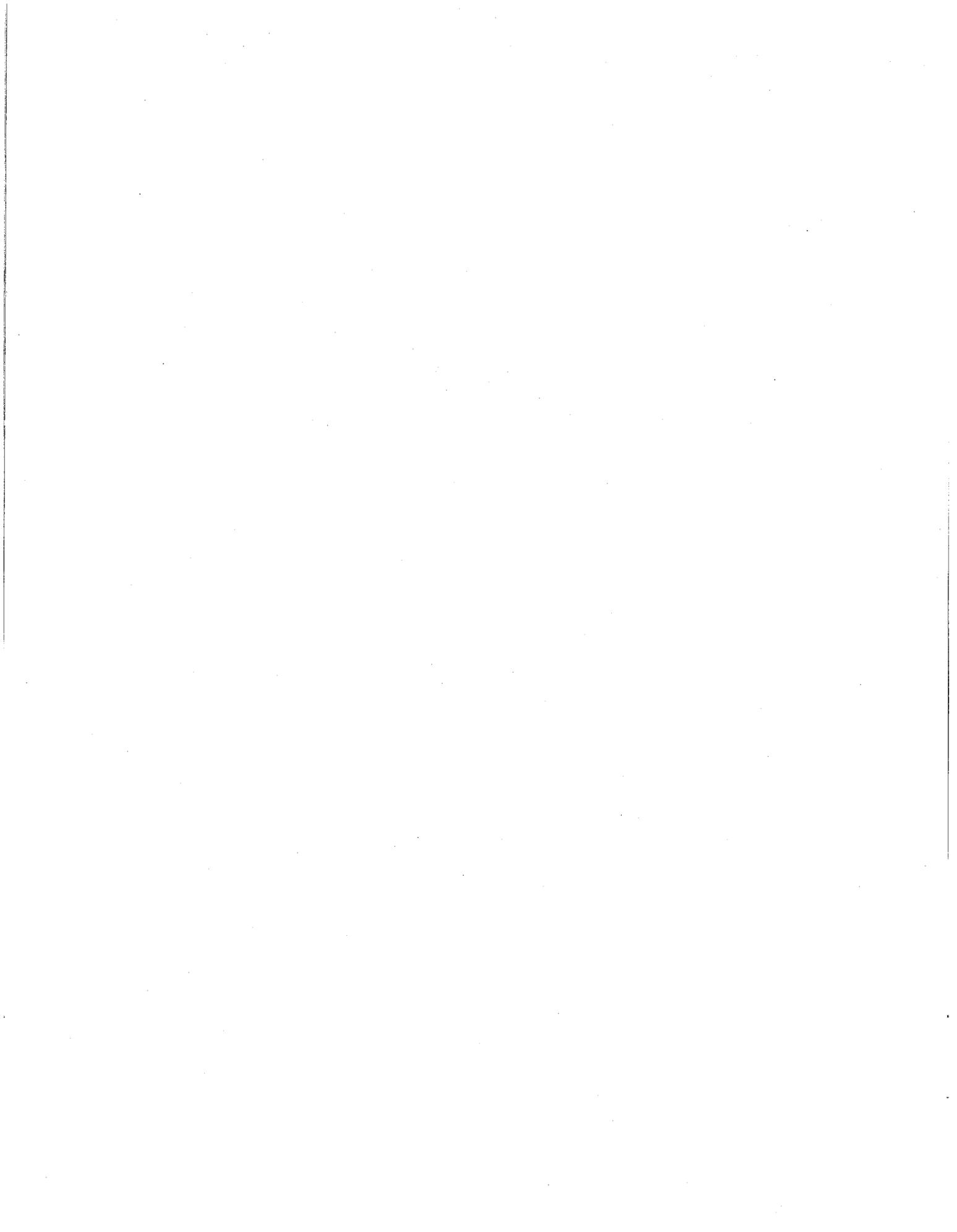


Activity ID	Orig Dur	Rem Dur	Forecast Start	Forecast Finish	FY04		FY05		FY06		FY07		FY08	
					C	N	C	N	C	N	C	N	C	N
CE4A300050	63	63	07DEC05	11FEB06										
					Install Extraction/Recharge Instr/Control - MR									
CE4A300060	125	125	24AUG05	31DEC05										
					Install Treatment Plant Equipment - MR									
CE4A300070	104	104	25OCT05	11FEB06										
					Install Treatment Plant Piping - MR									
CE4A300075	52	52	18DEC05	11FEB06										
					Install Treatment Plant Instr/Control - MR									
CE4A300080	14	14	12FEB06	25FEB06										
					Start-up and Commissioning - MR									

Lime Basins Alternative Remedy Groundwater Action
Schedule Assumptions

1. Preparation of Draft, Draft Final and Final Design Packages in lieu of 30, 60, 95, 100 Percent Design Packages.
2. 14-day regulator review of the Draft and Draft Final Design Packages supplemented with periodic design review meetings with regulatory agencies.
3. Preparation of separate design packages for the extraction/recharge systems and the CERCLA Wastewater Treatment Plant modifications.
4. Concurrent start of pre-design field investigation and draft design effort.
5. Early start of construction of extraction/recharge systems following early issuance of final design package.
6. Start of construction of CWTP modification following issuance of final design package.
7. Procurement of subcontracts and equipment/materials will commence prior to design completion.
8. Single wall instead of dual-contained piping for all transmission pipelines (extraction and recharge).
9. Backfill over pipelines in capped areas will take place after the completion of other construction.
10. Optimizing of extraction and treatment will extend beyond the end of start-up and commissioning.





Resolution Agreement
Proposed Alternative Remedies for Lime Basins and Former Basin F
at the Rocky Mountain Arsenal (RMA)

PURPOSE:

To resolve dispute and obtain concurrence among the U.S. Environmental Protection Agency, the Colorado Department of Public Health and Environment, and the RMA Remediation Venture Office (RVO) (collectively, the Parties) regarding proposed alternative remedies for the Lime Basins and Former Basin F projects.

DISCUSSION:

Based upon concerns regarding short-term health and safety risks during implementation, the RVO proposed an alternative remedy for the Lime Basins project on May 6, 2004. The EPA and CDPHE felt that the alternative remedy for the Lime Basins was unacceptable as proposed, and the Parties began discussions to resolve the dispute. These discussions led to the development of an agreement for proposed alternate remedies for the Lime Basins project and the Former Basin F project. As part of this agreement, the Parties agreed to the concepts of (1) an alternate remedy for the Lime Basins project that includes redundant containment components (2) an alternate remedy for the Former Basin F project that includes the placement of Principal Threat soils into the enhanced landfill and (3) that the two alternate remedies in combination result in a protective overall remedy that is equivalent or superior to the current ROD. The Parties are committed to follow a formal ROD Amendment process for the proposed alternate remedies and, therefore, have agreed to the provisions described below.

AGREEMENT:

The Parties agree to the following provisions regarding proposed alternate remedies for the Lime Basins and Former Basin F projects:

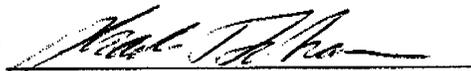
1. A RCRA-Equivalent cover will be installed over the Lime Basins and Former Basin F project sites.
2. Isolation of the Lime Basins will be achieved using an isolation/slurry wall. The understanding of the Parties for the isolation/slurry wall is that it will be fully encompassing of the three historic Lime Basins, have an adequate thickness, be keyed into competent bedrock, and composed of a material that is compatible with long-term groundwater conditions. The Parties also agree that a more effective concept may be developed during the design process.
3. A dewatering system will be installed inside the proposed Lime Basins isolation/slurry wall. The objectives of the system are to maintain an inward hydraulic gradient that will serve as an independent containment system to the slurry wall and to lower the groundwater table within the Lime Basins containment area below the waste. As long as the surrounding local groundwater table is in the alluvium, the dewatering system shall maintain an inward hydraulic gradient, and the groundwater table below the level of the waste. The design analysis for the

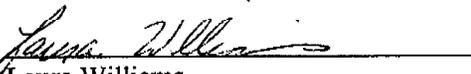
dewatering system will address each of these objectives. The extracted groundwater will initially be routed to the CERCLA Wastewater Treatment Facility (CWTF) for treatment and reinjection at the Basin A Neck Containment System (BANCS). After the CWTF is decommissioned (scheduled for 2010), the groundwater will be sent to the BANCS for treatment and reinjection. The design concept does not involve major modifications to either the storage capacity or treatment processes at CWTF. Treatment equipment may need to be relocated from CWTF to the BANCS.

The mass of contaminants removed by treatment of extracted groundwater will be tracked on an incremental and cumulative basis during operation of the dewatering system.

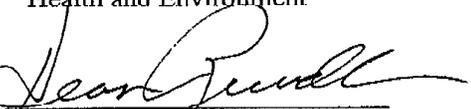
4. The Former Basin F Principal Threat soil volume of 165,000 bcys identified by the ROD and subsequent boundary modifications made to Basin F Exterior will be excavated and placed into the enhanced hazardous waste landfill (ELF). The understanding of the Parties is that the same odor and emission controls developed and used by the Basin F Wastepile will be used on the excavation of Former Basin F Principal Threat (PT) soils. This will include characterization of the Former Basin F odor flux in a manner equivalent to the Basin F Wastepile. The odor flux characterization data will be utilized to determine, by use of modeling, acceptable excavation rates for the proposed Former Basin F soil project. The Parties acknowledge that the initial flux data and modeling indicate that the excavation rate may not exceed 100 bank cubic yards per hour. The Parties also agree that a more complete characterization and/or odor-control concept, provided the environmental protectiveness of the concept is equivalent or superior, may be developed during the design process and result in a higher excavation rate.
5. The Parties agree that, during design, new and existing data can be used to refine, evaluate, and revise the extent of additional excavation for the principal threat soil. This will ensure that all identified PT soil, the highest contaminated soil, and as much human health exceedance soil as possible is removed so that the ELF disposal capacity is fully utilized, not exceeded, and not left unused after all of the ROD CSV has been expended.
6. It is the intent of the Parties that the implementation of the alternative remedy for the Former Basin F Principal Threat soils will occur prior to the implementation of the RCRA-Equivalent cover and isolation/slurry wall components of the Lime Basins alternate remedy. This does not prevent the Parties from agreeing to a different implementation sequence during design.
7. Any modifications to this resolution must be formally agreed to by all Parties and similarly documented. This is a stand alone resolution that neither endorses nor prohibits future proposals regarding Lime Basins and Former Basin F.

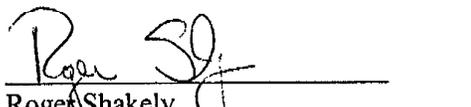
CONCURRENCE FOR RESOLUTION AGREEMENT

BH
10 MAR 05 
Charles T. Scharmann
U.S. Army
3/15/05
Date
Concur/Nonconcur

S.A.P.
3/10/05 
Laura Williams
U.S. Environmental Protection Agency
3/15/05
Date
Concur/Nonconcur

B.N.
3/15/05 
Joan Sowinski
Colorado Department of Public
Health and Environment
15 MAR. 05
Date
Concur/Nonconcur

U.S.F.
3/16/05 
Dean Rundle
U.S. Fish and Wildlife Service
15 MAR 05
Date
Concur/Nonconcur

AAA
3/10/05 
Roger Shakely
Shell Oil Company
3-15-05
Date
Concur/Nonconcur





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7200 QUEBEC STREET, BUILDING 111
COMMERCE CITY, CO 80022-1748



DAIM-BD-A-RM-RE

17 March 2005

MEMORANDUM FOR U.S. Environmental Protection Agency, (Mr. Greg Hargreaves), Region VIII, Mail Code 8HWM-FF, 999-18th Street, Suite 300, Denver, Colorado 80202-2405

SUBJECT: Milestone Extension for North Plants Soil Remediation Project

1. Currently the Draft Final Design (95 Percent) enforceable milestone date for the North Plants Soil Remediation Project is April 6, 2005. In accordance with Paragraphs 26.8-26.18 and 34.22 of the Federal Facility Agreement, the Remediation Venture Office is requesting an extension of the 95 Percent deadline to September 1, 2005. This extension is requested as a result of the Regulatory Agencies' requests for additional free product characterization. The extension will also allow adequate time for resolution of issues prior to the submittal of the 95 Percent Design Package.
2. The point of contact on this matter is Mr. James Green at 303-289-0412.

Bruce M Huenefeld

BRUCE M. HUENEFELD
RMA Committee Coordinator

CF:

Rocky Mountain Arsenal, (DAIM-BD-A-RM-CL/Major M. Weslyn Erickson),
Chief Counsel, Commerce City, Colorado 80022-1748)
Pacific Western Technologies, Ltd, (Mr. James Bush), 605 Parfet Street, Suite 200,
Lakewood, Colorado 80215
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Commerce City, Colorado 80022
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Denver, Colorado 80203
U.S. Fish and Wildlife Service, (Mr. Tom Jackson), Rocky Mountain Arsenal,
Commerce City, Colorado 80022-1748
Tri-County Department Environmental Health Division, (Mr. Rick Kinshella),
4201 East 72nd Avenue, Commerce City, Colorado 80222-1488
Rocky Mountain Arsenal, (Document Tracking Center),
Commerce City, Colorado 80022-1748





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COMMERCE CITY, CO 80022-1748



DAIM-BD-A-RM-RE

5 May 2005

MEMORANDUM FOR U.S. Environmental Protection Agency, (Mr. Greg Hargreaves), Region VIII, Mail Code 8HWM-FF, 999-18th Street, Suite 300, Denver, Colorado 80202-2405

SUBJECT: Milestone Extension – Munitions Testing

1. Currently the enforceable Implementation Finish milestone date #2 for the Munitions (Testing) Soil Remediation Project (Additional remediation includes Site ESA-4a) is 20 June 2005, as presented in the FY05 Remediation Design and Implementation Schedule, Appendix J. In accordance with Paragraphs 26.8-26.18 and 34.22 of the Federal Facility Agreement, the RVO is requesting an extension of this milestone to 29 December 2005. This extension is requested as a result of the longer than anticipated assignment of Unexploded Ordnance personnel to the higher priority Section 36 Balance of Areas Soil Remediation project; the addition of revegetation support to the scope of work to meet commitments made in the 6 January 2005 Council agreement; the expansion of the site along the southeast boundary; and the deferment of revegetation support work until October 2005 to mitigate potential impacts to the burrowing owls that inhabit the area during the Spring and Summer months.

2. The point of contact on this matter is Mr. James Green at 303-289-0412.

Bruce M Huenefeld
BRUCE M. HUENEFELD
RMA Committee Coordinator

CF:

Rocky Mountain Arsenal, (DAIM-BD-A-RM-CL/Major M. Weslyn Erickson),
Chief Counsel, Commerce City, Colorado 80022-1748

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Lakewood, Colorado 80215

Shell Oil Company, (Mr. Roger B. Shakely), P.O. Box 538, Commerce City, Colorado 80037

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Holme Roberts and Owens, (Mr. Daniel J. Dunn), 1700 Lincoln Street, Suite 4100,
Denver, Colorado 80203

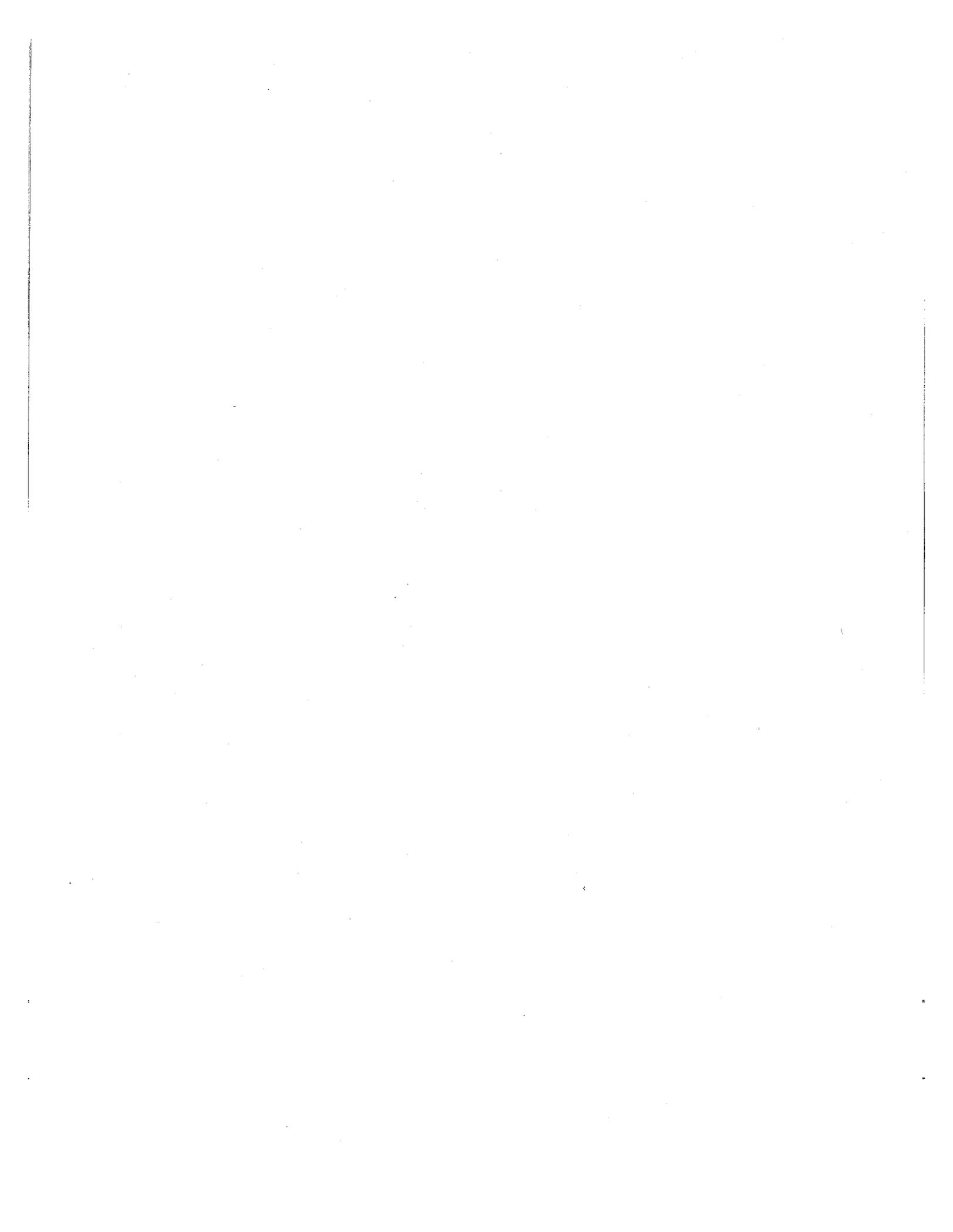
U.S. Fish and Wildlife Service, (Mr. Tom Jackson), Rocky Mountain Arsenal,
Commerce City, Colorado 80022-1748

Tri-County Department Environmental Health Division, (Mr. Rick Kinshella),
4201 East 72nd Avenue, Commerce City, Colorado 80222-1488

Rocky Mountain Arsenal, (Document Tracking Center), Commerce City, Colorado 80022-1748



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DEPARTMENT OF THE ARMY
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ROCKY MOUNTAIN ARSENAL
7200 QUEBEC STREET, BUILDING 111
COMMERCE CITY, CO 80022-1748



DAIM-BD-A-RM-RE

16 August 2005

MEMORANDUM FOR U.S. Environmental Protection Agency, (Mr. Greg Hargreaves), Region VIII, Mail Code 8HWM-FF, 999-18th Street, Suite 300, Denver, Colorado 80202-2405

SUBJECT: North Plants Soil Remediation Project

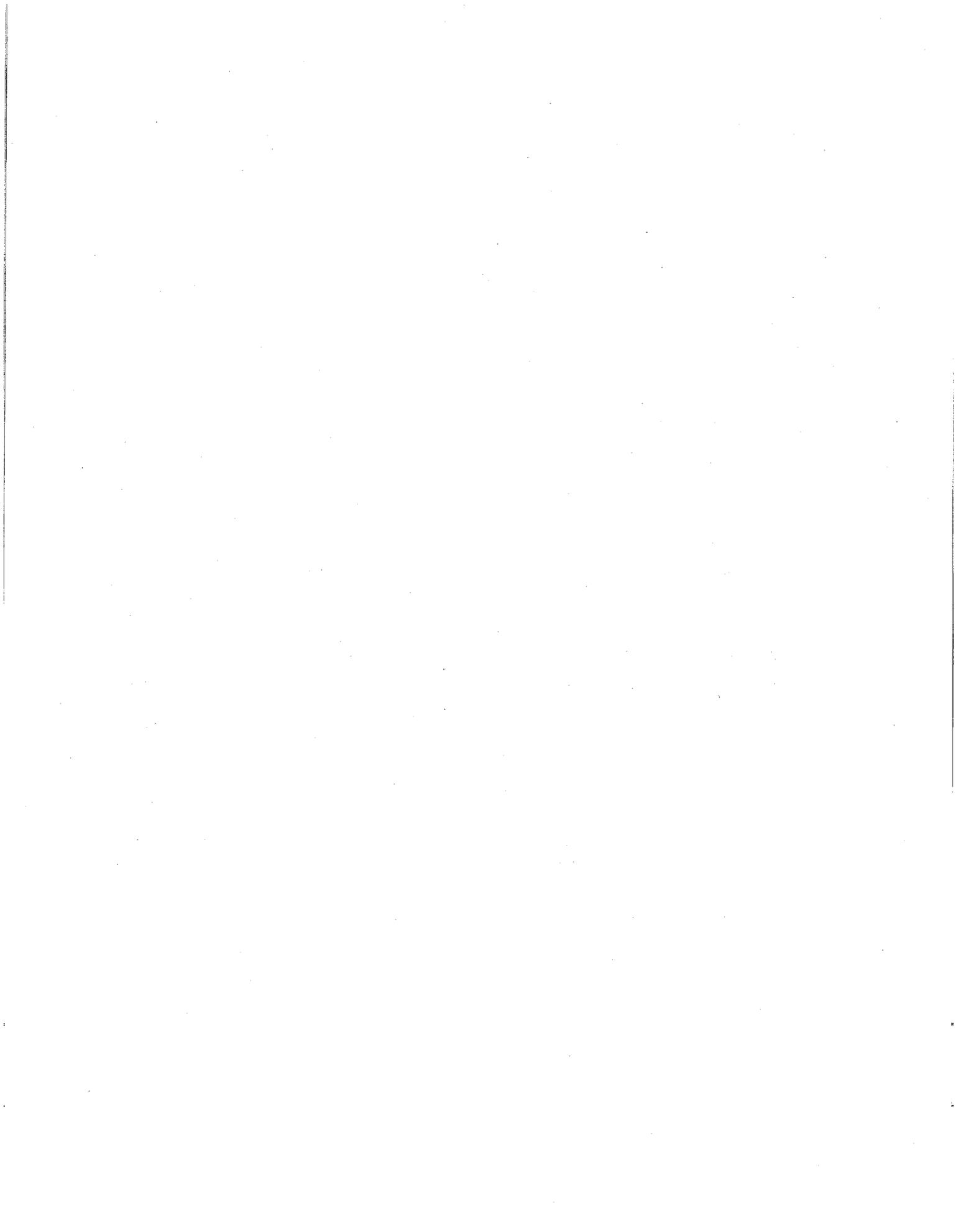
1. Currently the Draft Final Design (95 percent) enforceable milestone date for the North Plants Soil Remediation Project is September 1, 2005. In accordance with Paragraphs 26.8-26.18 and 34.22 of the Federal Facility Agreement, the RVO is requesting an indefinite extension of the 95 percent deadline. This extension is requested as a result of the Regulatory Agencies' requests for additional free product characterization. A new enforceable Milestone date will be established after the Regulatory Agencies are in agreement with the characterization (scope and procedure); the characterization is complete; and based on the results of characterization, a path forward is established and agreed upon.

2. The point of contact on this matter is Mr. James Green at 303-289-0412.

Bruce M. Huenefeld
BRUCE M. HUENEFELD
RMA Committee Coordinator

CF:

Rocky Mountain Arsenal, (DAIM-BD-A-RM-CL/Major M. Weslyn Erickson),
Chief Counsel, Commerce City, Colorado 80022-1748)
Pacific Western Technologies, Ltd, (Mr. James Bush), 605 Parfet Street, Suite 200,
Lakewood, Colorado 80215
Shell Oil Company, (Mr. Roger B. Shakely), P.O. Box 538,
Commerce City, Colorado 80037
Washington Group, (Mr. Mark Thomson), P.O. Box 1717,
Commerce City, Colorado 80022
Holme Roberts and Owens, (Mr. Daniel J. Dunn), 1700 Lincoln Street, Suite 4100,
Denver, Colorado 80203
U.S. Fish and Wildlife Service, (Mr. Tom Jackson), Rocky Mountain Arsenal,
Commerce City, Colorado 80022-1748
Tri-County Department Environmental Health Division, (Mr. Rick Kinshella),
4201 East 72nd Avenue, Commerce City, Colorado 80222-1488
Rocky Mountain Arsenal, (Document Tracking Center),
Commerce City, Colorado 80022-1748





DEPARTMENT OF THE ARMY
BASE REALIGNMENT AND CLOSURE
ROCKY MOUNTAIN ARSENAL
7200 QUEBEC STREET, BUILDING 111
COMMERCE CITY, CO 80022-1748



DAIM-BD-A-RM-RE

15 August 2005

MEMORANDUM FOR U.S. Environmental Protection Agency, (Mr. Greg Hargreaves), Region VIII, Mail Code 8HWM-FF, 999-18th Street, Suite 300, Denver, Colorado 80202-2405

SUBJECT: Draft Final Design (95 Percent) enforceable milestone date for the Complex (Army) Disposal Trenches – Cover Project

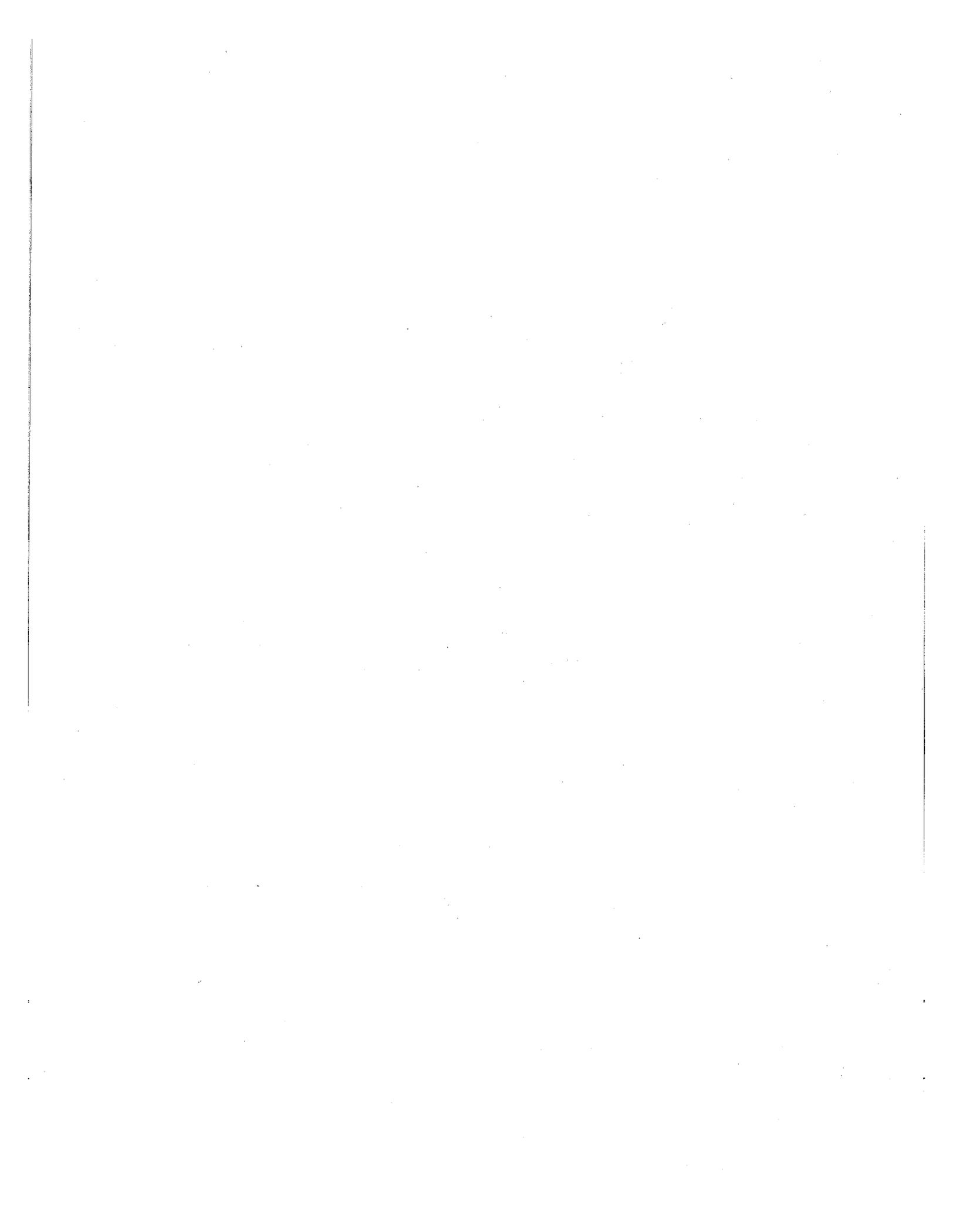
1. Currently the Draft Final Design (95 Percent) enforceable milestone date for the Complex (Army) Disposal Trenches – Cover Project is 14 September 2005. In accordance with Paragraphs 26.8-26.18 and 34.22 of the Federal Facility Agreement, the RVO is requesting an extension of the 95 Percent deadline to 2 March 2006. The reason for this extension is to finish comment resolution and to re-issue the Shell Disposal Trenches – Cover 95% RCRA-Equivalent Cover Design Analysis prior to submitting the 95% Integrated Cover System Design / Complex (Army) Disposal Trenches RCRA-Equivalent Cover Design.

2. The point of contact on this matter is Mr. James Green at 303-289-0412.

Bruce M. Huenefeld
BRUCE M. HUENEFELD
RMA Committee Coordinator

CF:

Rocky Mountain Arsenal, (DAIM-BD-A-RM-CL/Major M. Weslyn Erickson),
Chief Counsel, Commerce City, Colorado 80022-1748)
Pacific Western Technologies, Ltd, (Mr. James Bush), 605 Parfet Street, Suite 200,
Lakewood, Colorado 80215
Shell Oil Company, (Mr. Roger B. Shakely), P.O. Box 538,
Commerce City, Colorado 80037
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Commerce City, Colorado 80022
Holme Roberts and Owens, (Mr. Daniel J. Dunn), 1700 Lincoln Street, Suite 4100,
Denver, Colorado 80203
U.S. Fish and Wildlife Service, (Mr. Tom Jackson), Rocky Mountain Arsenal,
Commerce City, Colorado 80022-1748
Tri-County Department Environmental Health Division, (Mr. Rick Kinshella),
4201 East 72nd Avenue, Commerce City, Colorado 80222-1488
Rocky Mountain Arsenal, (Document Tracking Center),
Commerce City, Colorado 80022-1748



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 8
999 18TH STREET- SUITE 300
DENVER, CO 80202-2466
Phone 800-227-8917
<http://www.epa.gov/region08>



AUG 16 2005

Ref: 8EPR-F

Mr. Bruce Huenefeld
Office of the Program Manager for RMA
ATTN: AMXRM-E
Rocky Mountain Arsenal
Commerce City, CO 80022-2180

Re: Rocky Mountain Arsenal; Section 30 Existing
(Sanitary) Landfills Project Construction Completion
Report for the Rocky Mountain Arsenal Site

Dear Mr. Huenefeld:

The Environmental Protection Agency (EPA) has completed review of the Construction Completion Report (CCR) for the Section 30 Existing (Sanitary) Landfills Project submitted by the Remediation Venture Office. The CCR, in compliance with OSWER Directive 9355.0-4B (Remedial Design/Remedial Action Handbook), documents the remedial action activities which have been accomplished to date, including:

- Completion of all construction items defined in the Project Scope of Work and Final Design Package, as modified, including the status of revegetation efforts which is monitored as part of the annual *Vegetation Management Plan*;
- Completion of the Project remedy in accordance with the goals established in the 1996 On-Post Record of Decision;
- The conduct of a final inspection by the Colorado Department of Public Health and Environment (CDPHE) and EPA; and
- CDPHE concurrence with the CCR via enclosed letter.

Accordingly, EPA approves the CCR as submitted and accepts the Section 30 Existing (Sanitary) Landfills Project as complete.

Sincerely,

A handwritten signature in black ink that reads "Terry L. Anderson for". The signature is written in a cursive, flowing style.

Terry L. Anderson
Director, Federal Facilities Program

Enclosure: CDPHE Concurrence Letter



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8/17/05
STATE OF COLORADO

Bill Owens, Governor
Douglas H. Benevento, Executive Director

Dedicated to protecting and improving the health and environment of the people of Colorado

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Denver, Colorado 80246-1530
Phone (303) 692-2000
TDD Line (303) 691-7700
Located in Glendale, Colorado
<http://www.cdphe.state.co.us>

Laboratory Services Division
8100 Lowry Blvd.
Denver, Colorado 80230-6928
(303) 692-3090



Colorado Department
of Public Health
and Environment

August 15, 2005

Mr. Terry Anderson
~~Director Federal Facilities Office~~
Office of Ecosystems Protection and Remediation
U.S. EPA Region VIII
999 18th Street, Suite 500
Denver, CO 80202-2405

Re: Rocky Mountain Arsenal, Section 30 Existing (Sanitary) Landfills Remediation Project CCR

Dear Mr. Anderson:

My staff has reviewed the Construction Completion Report for the Rocky Mountain Arsenal, Section 30 Existing (Sanitary) Landfills Remediation Project. This report was evaluated for compliance with the objectives described in the Record of Decision, as amended by the Remediation Design and Implementation Schedule, and the final design specifications and drawings for the project. Based upon this evaluation and our observations while the work was being performed, I am pleased to inform you of the State's concurrence with the referenced Construction Completion Report.

Sincerely,

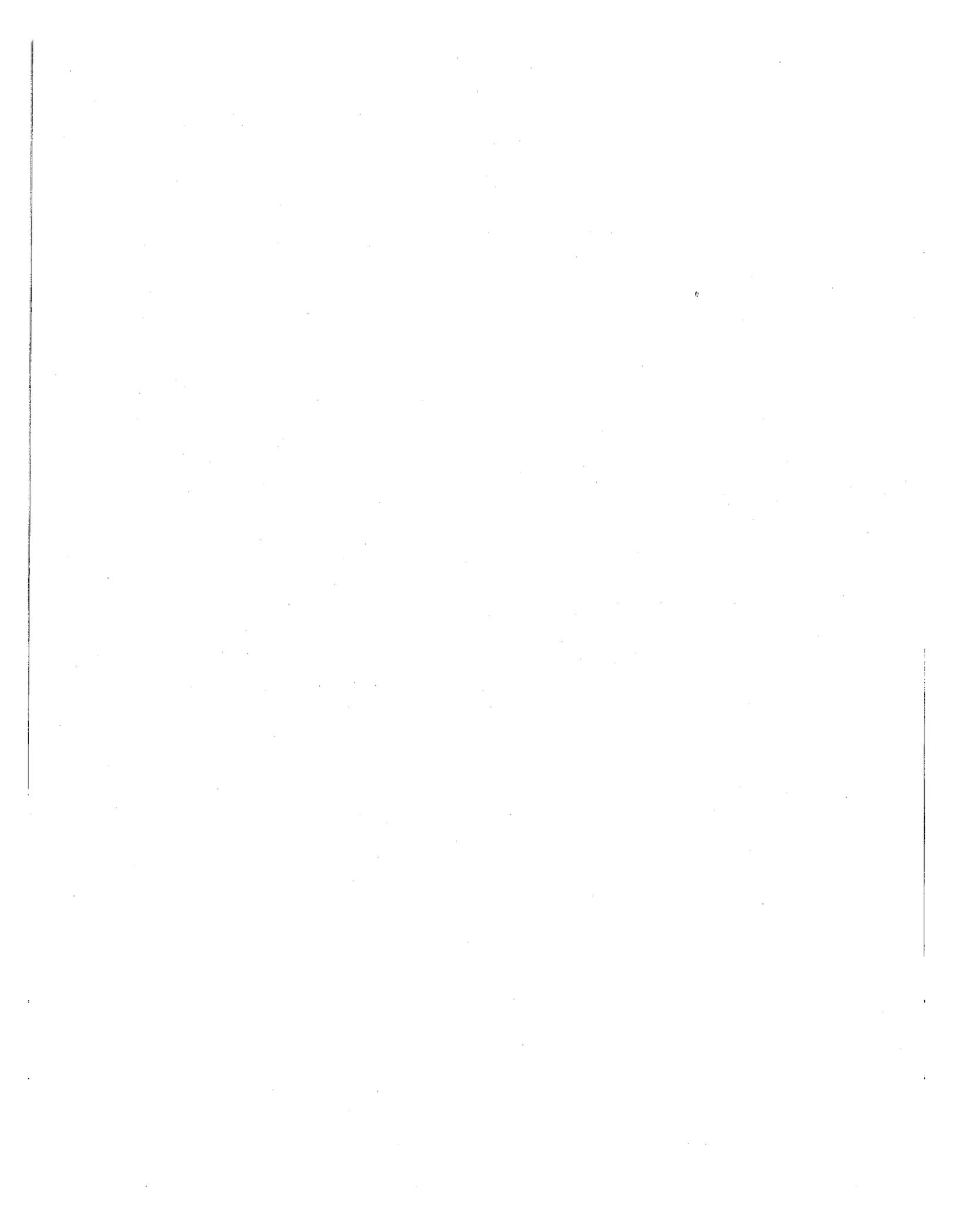
Gary W. Baughman
Director
Hazardous Materials and Waste Management Division

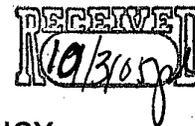
cc: Bruce Huenefeld, RMA
Mark Thomson, Shell
Tom Jackson, USF&WS
Wes Erickson, RMA
RMA File 7.6-6

Laura Williams, EPA
Rick Kinshella, TCHD
Richard Lotz, AGO
Barbara Nabors, HMWMD



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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 8

999 18TH STREET- SUITE 300

DENVER, CO 80202-2466

Phone 800-227-8917

<http://www.epa.gov/region08>

September 28, 2005

Ref: 8EPR-F

Mr. Bruce Huenefeld
Rocky Mountain Arsenal
7200 Quebec Street, Building 111
Commerce City, CO 80022-1748

Re: Construction Completion Report for Operations at
the Groundwater Intercept and Treatment System
North of Basin F Well; Rocky Mountain Arsenal

Dear Mr. Huenefeld:

The Environmental Protection Agency (EPA) has completed review of the Construction Completion Report (CCR) for Operations at the Groundwater Intercept and Treatment System North of Basin F Well Project submitted by the Remediation Venture Office. The CCR, in compliance with OSWER Directive 9355.0-4B (Remedial Design/Remedial Action Handbook), documents the remedial action activities which have been accomplished to date, including:

- Completion of the Project remedy in accordance with the goals established in the 1996 On-Post Record of Decision;
- CDPHE concurrence with the CCR via enclosed letter.

Accordingly, EPA approves the CCR as submitted and accepts the Operations at the Groundwater Intercept and Treatment System North of Basin F Well Project as complete.

Sincerely,

Terry L. Anderson
Director, Federal Facilities Program

Enclosure: CDPHE Concurrence Letter



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cc: Ms. Barbara Nabors, CDPHE
Mr. Rick Kinshella, TCHD
Mr. Jim Bush, PWT
Mr. Jack Lipschultz, DOJ
Major Weslyn Erickson, PMRMA

Mr. Mark Thomson, Shell
Mr. Tom Jackson, USFWS
Mr. Richard Lotz, AGO
Mr. Tony LaChance, RVO
Mr. Kelly Cable, RVO

RECEIVED
10/3/05

STATE OF COLORADO

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Douglas H. Benevento, Executive Director

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8100 Lowry Blvd.
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(303) 692-3090

<http://www.cdphe.state.co.us>



Colorado Department
of Public Health
and Environment

September 28, 2005

Mr. Terry Anderson
Director, Federal Facilities Office
Office of Ecosystem Protection and Remediation
U.S. EPA Region VIII
999 18th Street, Suite 500
Denver, CO 80202-2405

Re: Rocky Mountain Arsenal, Termination of Operations at the Groundwater Intercept and Treatment System North Of Basin F Well Construction Completion Report dated September 2005

Dear Mr. Anderson:

My staff has reviewed the Construction Completion Report for the Rocky Mountain Arsenal, Termination of Operations at the Groundwater Intercept and Treatment System North Of Basin F Well Construction Completion Report. This report was evaluated for compliance with the objectives described in the Record of Decision, as amended by the Remediation Design and Implementation Schedule. Based upon this evaluation and our observations while the work was being performed, I am pleased to inform you of the State's concurrence with the referenced Construction Completion Report.

Sincerely,

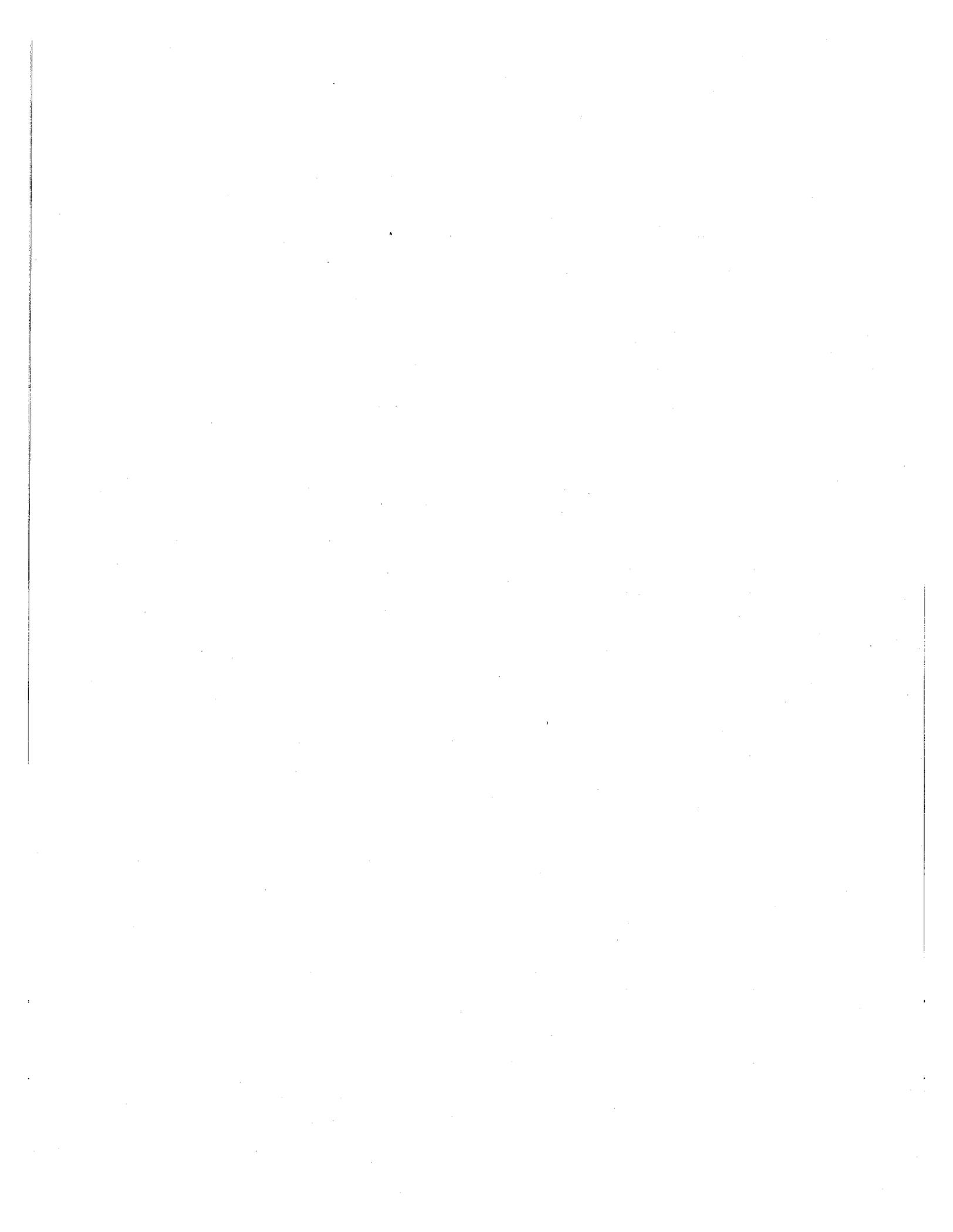
Gary Baughman
Director, Hazardous Materials and
Waste Management Division

cc: Bruce Huenefeld, RMA
Tom Jackson, USF&WS
Rick Kinshella, TCHD
Mark Thomson, Shell Oil
Ed LaRock, CDPHE
RMA File #11.14

Laura Williams, EPA
Brad Coleman, Sentinel Consulting
Richard Lotz, AGO
Barbara Nabors, CDPHE
Weslyn Erickson, PMRMA



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**ENVIRONMENTAL MANAGEMENT SYSTEM FOR
LONG TERM SURVEILLANCE AND MAINTENANCE
OF REMEDY COMPONENTS
ROCKY MOUNTAIN ARESENAL, COLORADO**

Purpose:

In the interest of good environmental stewardship, to develop, consistent with the RMA On-Post and Off-Post Records of Decision, the RMA Federal Facility Agreement, and the National Strategy to Manage Post Construction Completion, an Environmental Management System (EMS) for long-term surveillance and maintenance of remedy components at RMA. The goals of the RMA EMS are to ensure: compliance with applicable or relevant and appropriate requirements; continued protectiveness; and collection of adequate information for CERCLA Five-Year Review.

Discussion:

During the development of the Long-Term Care Program Plan and in recent "Exit Strategy" meetings, the need to describe the administrative and regulatory framework and elements of a program of long-term surveillance and maintenance, and to streamline common ongoing activities at RMA was identified. This includes land use controls, monitoring, maintenance, information management and document control. Other topics may include but are not limited to: regulatory basis, surveillance and maintenance overview, lists/tables of scheduled surveillance and maintenance activities, organizational resources, communications, change control, dispute resolution, records management, reporting, health and safety, training, and quality assurance.

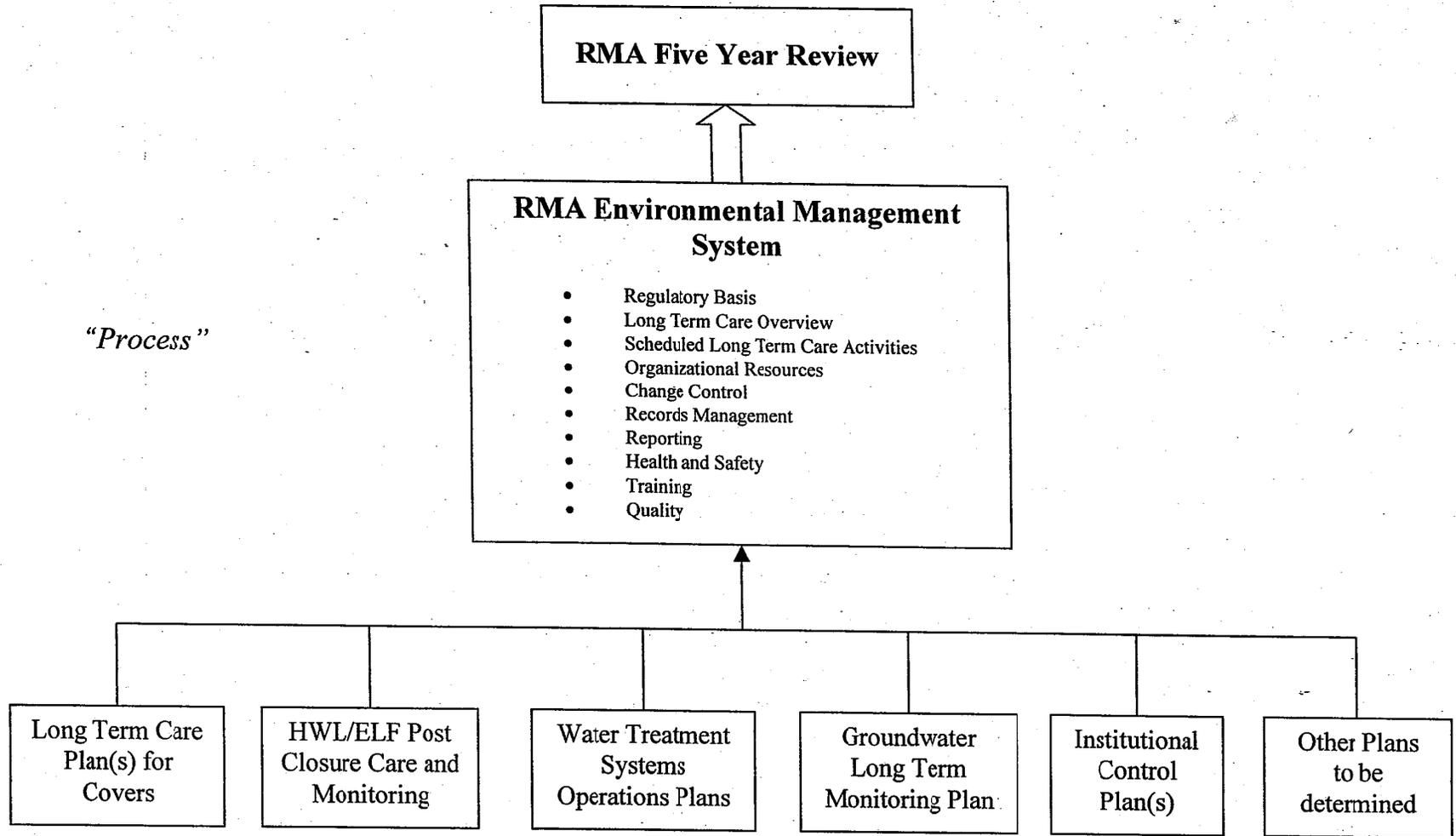
The scope would include, but is not limited to: long-term groundwater monitoring plan; RCRA cover monitoring at ELF and HWL; leachate collection and treatment or disposal from ELF and HWL; RCRA-equivalent, 2-foot, and 3-foot cover monitoring and maintenance; the institutional control plan; water treatment systems operations plans, and other plans to be determined.

The Monticello Long-Term Surveillance and Maintenance Administrative Manual and/or similar documents prepared for other remediation sites will be used for guidance.

It is anticipated that the EMS will be a living document that will evolve as the RMA transitions from remedy to long-term surveillance and maintenance. Iterative in nature, initially the administrative processes would be developed with placeholders established for operating procedures that have yet to be developed. A rough draft of the EMS will be prepared prior to construction completion of the first RCRA-equivalent cover at RMA. The EMS will be further developed as remediation progresses so that it is fully functional before the end of remediation. The status of the EMS will be reviewed annually under the RDIS Annual Update portion of the Remediation Design and Implementation Schedule (RDIS), beginning with Appendix K for Fiscal Year 2006. The attached flowchart illustrates the proposed concept, which is tied to the RMA CERCLA Five Year Review.

Agreement:

1. Establish a working group (charter)
2. Establish shared vision on scope and purpose (especially ownership and level of detail)
3. Undertake modification to the RVO Environmental Compliance Program to address the agreed upon scope and purpose.



“Process”

“Procedures with Data Gathering and Reporting Obligations”

CONCURRENCE FOR DECISION PAPER
ENVIRONMENTAL MANAGEMENT SYSTEM FOR
LONG TERM SURVEILLANCE AND MAINTENANCE
OF REMEDY COMPONENTS
ROCKY MOUNTAIN ARESENAL, COLORADO

Bruce M Huenefeld

Bruce M. Huenefeld
U.S. Army

8 September 2005
Date

Concur / Nonconcur

Greg Hargreaves

Greg Hargreaves
U.S. Environmental Protection Agency

10/12/05
Date

Concur / Nonconcur

Barbara Nabors

Barbara Nabors
Colorado Department of Public Health
and the Environment

Sept. 8, 2005
Date

Concur / Nonconcur

Tom Jackson

Tom Jackson
U.S. Fish and Wildlife Service

10/17/05
Date

Concur / Nonconcur

Mark J. Thomson

Mark Thomson
Shell Oil Company

9/12/05
Date

Concur / Nonconcur



**AMENDMENT TO THE RECORD OF DECISION FOR THE ON-POST OPERABLE
UNIT, ROCKY MOUNTAIN ARSENAL FEDERAL FACILITY SITE**

SECTION 36 LIME BASINS REMEDIATION

BASIN F PRINCIPAL THREAT SOIL REMEDIATION

Prepared by:
Tetra Tech EC, Inc.

Prepared for:
Rocky Mountain Arsenal Remediation Venture Office
Department of the Army
Shell Oil Company
U.S. Fish and Wildlife Service

This document is the property of Rocky Mountain Arsenal Remediation Venture Office and was prepared by Tetra Tech EC, Inc. It is provided on the condition that it will neither be reproduced, copied, or issued to a third party; will be used solely for the intended purpose; and will be used solely for the execution or review of the engineering, remediation, and/or construction of the subject project.

Revision	Prepared By	Reviewed By	Approved By	Date	Pages Affected
0	S. Ache <i>[Signature]</i>	P. Patton <i>[Signature]</i>	J. Lowre <i>[Signature]</i>	October 20, 2005	All



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- 6.0-2 Former Basin F Selected Remedy with PT Soil Excavation Depths



ACRONYMS AND ABBREVIATIONS

ARAR	Applicable or Relevant and Appropriate Requirement
As	Arsenic
BANCS	Basin A Neck Containment System
bcy	bank cubic yard(s)
bgs	below ground surface
CDPHE	Colorado Department of Public Health and Environment
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
COC	Contaminant of Concern
CSRG	Containment System Remediation Goal
DIMP	diisopropyl methylphosphonate
DMP	Demonstration Mixing Pad
D/T	Dilution(s) to Threshold
ELF	Enhanced Hazardous Waste Landfill
EPA	U. S. Environmental Protection Agency
FFA	Federal Facility Agreement
FS	Feasibility Study
HH	Human Health
HHE	Human Health Exceedance
HWL	Hazardous Waste Landfill
IEA/RC	Integrated Endangerment Assessment/Risk Characterization
IRA	Interim Response Action
IRMAICP	Interim RMA Institutional Control Plan
JARDF	Joint Administrative Record Document Facility
MEC	Munitions and Explosives of Concern
NCP	National Contingency Plan
NPL	National Priorities List
O&M	Operations and Maintenance
OCP	Organochlorine Pesticide
OU	Operable Unit
PFT	Paint Filter Test
PT	Principal Threat
RAB	Restoration Advisory Board
RAO	Remedial Action Objective



RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RMA	Rocky Mountain Arsenal
ROD	Record of Decision
RVO	Remediation Venture Office
SEC	Site Evaluation Criteria
SQCSR	Soil Quantity Calculation Summary Report
SSAB	Site Specific Advisory Board
SVOC	Semivolatile Organic Compound
TCHD	Tri-County Health Department
TMV	Toxicity, Mobility and/or Volume
µg/g	microgram(s) per gram
USFWS	U.S. Fish and Wildlife Service
VOC	Volatile Organic Compound
WWTF	Wastewater Treatment Facility



DECLARATION

SITE NAME AND LOCATION

Rocky Mountain Arsenal Federal Facility Site
Operable Unit 03: On-Post
Commerce City, Adams County, Colorado

STATEMENT OF BASIS AND PURPOSE

This decision document amends the remedy decision for the Section 36 Lime Basins (Lime Basins) and Basin F Principal Threat (PT) Soil projects of the Rocky Mountain Arsenal (RMA) Federal Facility Site. The RMA is located in southern Adams County east of Commerce City, Colorado. The Lime Basins are located in the southwest corner of Section 36 of the RMA adjacent to Basin A. Basin F is located in the north central part of Section 26 of the RMA. The original remedy decision is documented in the Record of Decision (ROD) for the On-Post Operable Unit (OU) (FWENC 1996a). The ROD was signed June 11, 1996 and is currently being implemented for the remainder of the 17.2 square miles of the OU. A change in the ROD-selected remedy for the Lime Basins was necessitated due to significant increases in contaminated material volume to be placed in the Enhanced Hazardous Waste Landfill (ELF) and short-term risks associated with the excavation identified during remedial design. A review of the overall RMA remediation identified contaminated soil in Basin F for possible excavation and disposal in the available volume in the ELF. Evaluation of Basin F alternatives resulted in selecting a new remedy for Basin F as well. The new remedies were selected based on the administrative record for the site and were chosen in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986, and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan. This amendment does not change the selected remedy for groundwater, structures or soil at RMA other than the Lime Basins and Basin F PT soil projects.

The Army and U.S. Environmental Protection Agency (EPA) have selected the remedies documented in this ROD Amendment with concurrence from the State of Colorado.

ASSESSMENT OF SITE

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in the 1996 ROD or this ROD amendment, may present an imminent and substantial endangerment to public health, welfare, or the environment.

Lime Basins

The Lime Basins, constructed in 1942, were designed to remove arsenic (As) from South Plants wastewater and to receive other aqueous waste from South Plants (WCC 1989). Three basins were constructed, each approximately 1 acre in size. Through November 1943, wastewater from



the production of Lewisite was routinely treated with lime prior to discharge to the unlined Lime Basins and subsequently discharged by gravity flow into Basin A, located just north of the Lime Basins. The lime was used to precipitate metals and reduce the As concentration in the wastewater. This precipitation process produced a lime sludge that contained high levels of heavy metals, including As (WCC 1990).

After Lewisite manufacturing ceased in November 1943, the Army stopped putting lime slurry into the Lime Basins. The Lime Basins continued to receive aqueous waste from South Plants, from both Army and Shell productions, including pesticide production wastewater. These wastes were transported through two chemical sewers that discharged into the south side of the Lime Basins. In addition, acetylene production by Shell generated lime as a by-product. This lime was deposited as a slurry in the South Plants Lime Pond. Between 1955 and 1963, Shell periodically hauled lime waste from the South Plants Lime Pond to the Lime Basins. In late 1963, a three-inch pipe line was installed to transfer the lime slurry directly from South Plants to the Lime Basins. Lime slurry was disposed in this manner until July 1974. Aerial photographs from 1975 indicate the basins were no longer in use and had been filled in (ESE 1987). In 1993, an Interim Response Action (IRA) was undertaken to mitigate the threat of releases from the Lime Basins, which were identified as a source of groundwater contamination. The remedy selected under this IRA included construction of a subsurface barrier around the basins, extraction and treatment of groundwater, and a vegetative cover over the entire Lime Basins area. However, due to the discovery of munitions-related items during construction only the vegetative cover and a storm sewer line were constructed.

Remedial Investigation sampling identified contaminants of concern (COCs) present in the Lime Basins as organochlorine pesticides (OCPs), As and mercury. These COCs are present throughout the sludge and in the soil surrounding the Lime Basins at concentrations exceeding the site evaluation criteria (SEC) established in the ROD and are a source of groundwater contamination. Based on the soil contamination present in the Lime Basins, the ROD estimated the Human Health Exceedance (HHE) soil volume for the Lime Basins area at 54,151 bank cubic yards (bcy) and a PT soil volume of 9,015 bcy. The HHE soil was identified both within and surrounding the actual basins; however, a significant portion of the basins was not identified as exceeding the HHE criteria based on several nonexceedance samples located within the basins.

During design for the Lime Basins, the HHE boundary was revised to incorporate the entirety of the three basins based on the presence of lime material encountered throughout the basins during post-ROD treatability studies. Test pits showed lime material present throughout the extent of the basins at depths down to 15 feet. Boundary changes between the Lime Basins and Basin A also resulted in changes to the HHE area. In addition, the southern and western overall project boundaries were revised to match the IRA soil cover constructed in 1993. Soil volume was recalculated based on these changes and a revised remediation volume of 89,450 bcy was identified (TtFW 2005a).



Basin F

The Army constructed the Basin F surface impoundment in 1956 to contain liquid wastes from Army and Shell chemical operations on the RMA. The impoundment was created by constructing a dike around a natural depression and lining it with a 3/8-inch asphalt membrane and a 1-foot-thick soil protective layer. The impoundment had a surface area of approximately 93 acres and a capacity of approximately 243 million gallons (ESE 1988c). Basin F was used continuously between December 1956 and December 1981 for the solar evaporation of contaminated liquid wastes. The basin was preliminarily closed by the removal of all conveyance systems into the basin on July 14, 1982.

In 1988, the Army initiated an accelerated remediation to address concerns regarding liquid and soil contamination in and under Basin F. The IRA was conducted to prevent potential infiltration of contamination from the basins to the underlying groundwater, eliminate potential adverse impacts to wildlife, and eliminate emissions of volatile chemicals from the basin. The initial IRA for Basin F hazardous liquid waste, sludge, and soil remediation was performed during 1988 and 1989 (Army 1988). Liquid waste was removed from the basin and incinerated at an on-site facility. Approximately 480,000 cy of contaminated soil, crystalline sludge, sludge, overburden, and asphalt liner were stripped, partially dried by piling and turning, then transferred to the Basin F Wastepile. After the designated contaminated material had been consolidated into the Wastepile, the Basin F surface area was covered with a clay cover, topsoil, and vegetative cover.

Remedial Investigation sampling identified concentrations of OCPs, dicyclopentadiene and chloroacetic acid exceeding the SEC established in the ROD. Concentrations of aldrin and dieldrin also exceed the PT criteria. Groundwater sampling conducted during the RI indicated that Basin F is a source of groundwater contamination. Major contaminants present in the groundwater in the Basin F area include chloroform, benzene, trichloroethylene, dieldrin, diisopropyl methylphosphonate, and dibromochloropropane. Groundwater flow from Basin F is to the north and is currently captured and treated at the North Boundary Containment System.

Soil contamination in Basin F resulted in identification of HHE and PT soil for the ROD. The ROD identified a PT soil volume for Basin F of 191,047 bcy. These PT soil areas are located in the southeast and east central portions of Basin F and comprise approximately 22.6 acres. Because the ROD identified an in situ remediation for the Basin F PT, the 191,047 bcy reported represents an in situ volume. The Soil Quantity Calculation Summary Report (SQCSR) reports a corresponding excavation volume of 266,708 bcy. The additional soil volume is comprised of the PT soil volume and HHE soil that is overlying or interbedded with the PT soil and must be excavated in order to completely excavate the PT soil.

During design for the Basin F/Basin F Exterior project, the project boundary between Basin F and the Basin F Exterior area was modified to more accurately correspond to the historic limits of the basin. The Basin F PT soil volume was recalculated incorporating the boundary change resulting in a revised PT soil volume of approximately 165,000 bcy. The revised total excavation



volume is approximately 233,000 bcy, including the PT soil, 52,000 bcy of overlying HHE soil and 16,000 bcy of interbedded HHE soil.

RATIONALE FOR REMEDY CHANGE

The ROD remedy for the Lime Basins is excavation of PT and HHE soil with disposal in the on-site triple-lined landfill. The excavated area is backfilled with clean borrow and the IRA soil cover is repaired/reinstalled over the Lime Basins area. Remedial design for the Lime Basins commenced in 2002 to develop specific plans for remediation of the basins and surrounding soil. The design process progressed through the 60 percent stage with the 60 percent design analysis provided to the Regulatory Agencies in October 2003. During design for the Lime Basins, it became apparent that actual conditions at the Lime Basins differed significantly from those discussed in the ROD. In particular, the remediation volume to be placed in the ELF and short-term risks associated with the excavation had increased significantly.

New information developed during design and treatability study field characterization resulted in a significant volume increase for the project. Design volume increased from the ROD-identified HHE volume of 54,151 bcy to 89,450 bcy, representing a 65 percent increase over the ROD volume. In addition, although the ROD recognized the potential for dewatering, it did not indicate that any special handling was required to accomplish landfill disposal. Treatability studies performed in support of design determined that some of the Lime Basins material, even when dewatered prior to excavation, could not be placed directly in the ELF because it required stabilization prior to disposal to allow proper compaction (FWENC 2000a). Consequently, the 60 percent design incorporated mixing the wet Lime Basins material with surrounding dry soil prior to disposal in the ELF, increasing the ELF disposal volume to approximately 130,000 bcy, more than double the volume identified for disposal in the ROD.

The additional material handling and mixing requirements result in an increased potential for emissions and odors. Although the ROD included odor control as a necessary component for excavation of the basins, the additional volume and mixing required for disposal in the ELF increase these short-term risks. In addition, excavation activities require shoring side slopes to prevent the excavation walls from collapsing. To accomplish this, the 60 percent design included the installation of sheet pile walls around the deeper basin excavations to stabilize the excavation sidewalls. The addition of sheet pile walls adds to the overall cost and complexity of the project. Numerous geophysical anomalies were also identified during the design resulting in the addition of anomaly clearance requirements during excavation. These additional clearance activities further increase the short-term risks beyond what the ROD identified.

The significant increase in remediation volume and short-term risks associated with the excavation resulted in a cost increase compared to the ROD estimate. Consideration of all the changes encountered and associated cost increases resulted in a determination to reevaluate the remedial action for the Lime Basins project.



With reevaluation of the Lime Basins remedy in progress, the possibility of not excavating the Lime Basins presented a potential opportunity to use a portion of the landfill space in the ELF for containment of waste from the remaining nonexcavation projects. The remaining soil projects to be implemented at RMA were reviewed to determine whether they were compatible with the design for containment within the ELF. The evaluation criteria included identifying an area of contamination not already slated for excavation and landfill, checking that the contaminated soil was consistent with the type of contamination used in the ELF compatibility studies, and that it consisted of a volume suitable for the design capacity of the ELF. This review resulted in identification of the Basin F PT soil for possible disposal in the ELF.

The ROD remedy for the Basin F PT soil is in situ solidification/stabilization of the PT soil to a depth of 10 feet. Before any change to the remedy could be considered, a reevaluation of remedial actions for the Basin F PT soil project was necessary to ensure that overall remedy remained protective.

DESCRIPTION OF SELECTED REMEDIES

The selected remedy for the Lime Basins is construction of a vertical groundwater barrier surrounding the Lime Basins and a Resource Conservation and Recovery Act (RCRA)-equivalent cover, including biota barrier, over the entire Lime Basins area. Dewatering wells are installed inside the barrier wall and the extracted groundwater is treated at an on-site treatment facility. The vertical groundwater barrier wall is constructed to fully encompass the three historic Lime Basins to prevent migration of groundwater through the buried waste. The barrier wall is keyed into competent bedrock, approximately 45 to 50 feet deep, and will have a minimum thickness of 2 feet. A compatibility study will be conducted prior to final design to determine the appropriate barrier material. The RCRA-equivalent cover is contiguous with the Basin A and South Plants covers since the Lime Basins area is situated between these cover areas. The cover is designed consistent with the other RMA RCRA-equivalent covers and includes a minimum 18-inch-thick biota barrier, chokestone, capillary break, 4-ft-thick soil/vegetation layer, and lysimeters for compliance monitoring. The final surface of the RCRA-equivalent cover will be vegetated as required for the other RCRA-equivalent covers. Engineering controls are implemented for the cover including warning signs, obelisks to demarcate the covered areas, fences, survey monuments and erosion/settlement monuments. Long-term surveillance and maintenance, including institutional and engineering controls, will be managed in accordance with the Environmental Management System for remedy components at RMA. Long-term monitoring and maintenance requirements for the RCRA-equivalent cover are equivalent to the requirements for other RCRA-equivalent covers at RMA. These requirements will be defined in the Long-Term Care Program Plan. Institutional controls will be implemented to protect the engineered structures and to prevent contact with contaminated media.

The selected remedy for Basin F is excavation of PT soil with disposal in the on-site ELF. Excavation of PT soil is completed to a maximum depth of 10 feet from the IRA final excavation surface. Approximately 165,000 bcy of PT soil is excavated, transported to the ELF and disposed. The HHE soil overlying or interbedded with PT soil is also excavated and disposed in



the ELF resulting in a total excavation volume, and ELF disposal volume, of approximately 233,000 bcy. Excavation, transportation, and disposal of PT soils are conducted using vapor and odor suppression measures as necessary. The excavated area is backfilled and the residual contaminated soil in Basin F is contained in place beneath the ROD-required RCRA-equivalent cover as part of the Basin F/Basin F Exterior Soil Remediation Project. The cover is designed consistent with the other RMA RCRA-equivalent covers and includes a minimum 18-inch-thick biota barrier, chokestone, capillary break, 4-ft-thick soil/vegetation layer, and lysimeters for compliance monitoring. Engineering controls are implemented for the cover including warning signs, obelisks to demark the covered areas, fences, survey monuments and erosion/settlement monuments. Long-term surveillance and maintenance, including institutional and engineering controls, will be managed in accordance with the Environmental Management System for remedy components at RMA. Long-term monitoring and maintenance requirements for the RCRA-equivalent cover are equivalent to the requirements for other RCRA-equivalent covers at RMA. These requirements will be defined in the Long-Term Care Program Plan. Institutional controls will be implemented to protect the engineered structures and to prevent contact with contaminated media.

STATUTORY DETERMINATIONS

The new, selected remedies for the Lime Basins and Basin F PT satisfy the requirements of CERCLA Section 121 and are protective of human health and the environment, comply with federal and state requirements that are legally applicable or relevant and appropriate to the remedial action, are cost effective and use permanent solutions through proper containment of the wastes and disposal in the on-post ELF. The remedies selected in this ROD Amendment do not satisfy the statutory preference for treatment as a principal element of the remedy for the following reasons. For Basin F, the containment alternative for Basin F PT soil provides substantial long-term risk reduction through containment of waste material in the on-post ELF, is easier to implement, and is lower cost than the ROD-identified treatment alternative. Treatment alternatives for the Lime Basins were eliminated at the alternative screening stage because they were ineffective, difficult to implement or not cost effective.

The Lime Basins and Basin F areas will be retained by the Army and assessed every 5 years, as part of the site-wide 5-year review process, to ensure that the overall remedy continues to provide adequate protection of human health and the environment and complies with applicable regulations. In addition, site-wide institutional controls identified in the RMA Federal Facility Agreement (FFA) are included as requirements in the ROD. These requirements restrict future land use and prohibit certain activities such as agriculture, use of on-post groundwater as a drinking source, and consumption of fish and game taken at RMA.



SIGNATURES

For U.S. Environmental Protection Agency



Date

10/20/05

Max H. Dodson
Assistant Regional Administrator
Office of Ecosystems Protection and Remediation

For U.S. Army

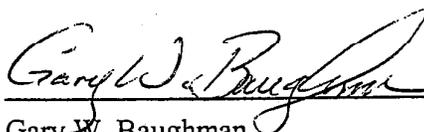


Date

20 OCT 05

Addison D. Davis, IV
Deputy Assistant Secretary of the Army
Environment, Safety, and Occupational Health

For State of Colorado



Date

10/20/05

Gary W. Baughman
Director, Hazardous Materials and Waste Management Division
Colorado Department of Public Health and Environment



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